LGH/LCH SERIES

The LGH/LCH high and standard efficiency 35, 40, 45 and 50 ton (123, 140.7, 158.3 and 175.9 kW) units, are configure to order units (CTO) with a wide selection of factory installed options. The LGH/LCH rooftop units are available in 500,000 Btuh or 800,000 Btuh (146.5 kW or 234.4kW) heating inputs. Gas heat sections are designed with aluminized steel tube heat exchangers. LGH and LCH units are equipped with the same cooling sections and cooling components. The LGH/LCH units utilize four scroll compressors with each compressor equipped with a crankcase heater.

LGH/LCH units are designed for R-410A (high efficiency). Service equipment for R-410A units must be rated for R-410A refrigerant.

Optional electric heat is factory installed in LCH units. Electric heat operates in single or multiple stages depending on the kW input size. 30kW through 90kW heat sections are available for the LCH units in all voltages G, J and Y while105kW through 180kW heat sections are available for LCH G and J voltage units only.

⚠ IMPORTANT

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 qualified installer or service agency.

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

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

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

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.

⚠CAUTION

Danger of sharp metallic edges. Can cause injury. Take care when servicing unit to avoid accidental contact with sharp edges.

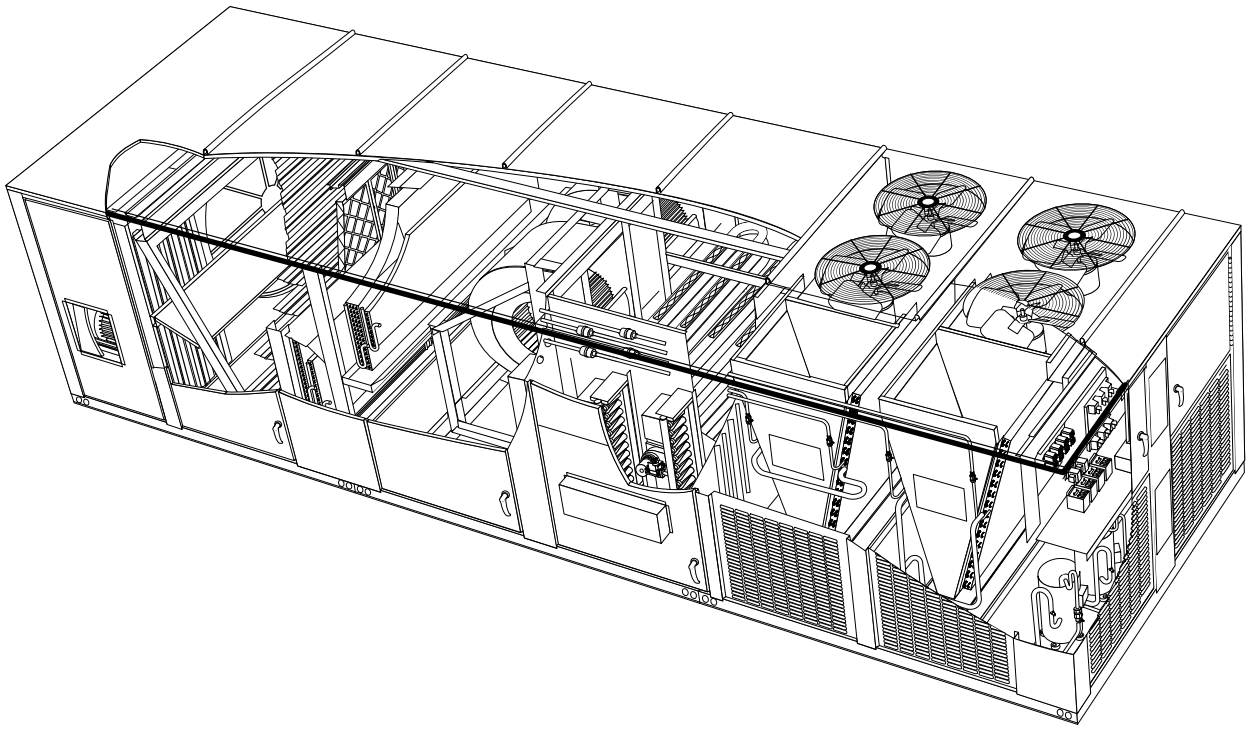


TABLE OF CONTENTS

OPTIONS/ACCESSORIES

Item		Factory	Field
COOLING SYSTEM			
Corrosion Protection - Condenser and Evaporator Coils		O	
Drain Pan Overflow Switch		O	
High Efficiency - R-410A (35, 40 Ton Models)		O	
Hot Gas Bypass (Not available with Humiditrol Option)		O	
Standard Efficiency - R-410A (35, 40, 45, 50 Ton Models)		O	
Service Valves		O	
Spring Isolation (compressor deck)		O	
HEATING SYSTEM			
Standard Heat (2 Stage)		O	
High Heat (2 Stage)		O	
LPG/Propane		O	
Modulating Gas (with stainless steel heat exchanger)		O	
Stainless Steel Heat Exchanger		O	
Low Temperature Vestibule Heater		O	
AIR FILTERS			
MERV 4 - Two Inch		O	
MERV 8 - Two Inch		O	
MERV 13 High Efficiency - Two Inch		O	
Cleanable Metal Mesh - Two Inch		O	
BLOWER			
Supply Motor - 5, 7.5, 10, 15, 20, 25, 30 hp CAV		O	
Supply Motor - 5, 7.5, 10, 15, 20, 25, 30 hp VAV with VFD		O	
Supply VFD Blower Bypass (VAV units with VFD only)		O	
Spring Isolation (blower frame)		O	
CABINET			
Air Flow - Vertical		O	
Air Flow - Horizontal		O	
Double Wall Construction		O	
Hinged Louvered Condenser Section Panels		O	
[1] ROOF CURBS - STANDARD			
14 in. height	S1CURB10E-1		X
24 in. height	S1CURB11E-1		X
CONTROLS			
Blower Proving Switch		O	
Commercial Controls	L Connection® Network Control System		X
	Unit Controller BACnet® Module - C0CTRL50AE1L	O	X
	Unit Controller LonTalk® Module - C0CTRL51AE1L	O	X
	Novar® ETM-2051 Unit Controller	O	
	Novar® LSM Unit Controller	O	
	CPC Einstein Unit COntroller	O	
Dirty Filter Switch		O	
[2] Discharge Air Temperature Sensor - Duct Mounted		O	
Supply Static Pressure Limit Switch - Duct Mounted	C0SNSR11AE1 (Switch)		X
	C0SNSR12AE1- (Mounting Kit)		X
Smoke Detector	Return	O	
	Supply	O	
	Supply & Return	O	
[2] Supply Static Pressure Transducer - Duct Mounted		O	

O = Configure to Order (Factory Installed)
X = Field Installed.
[1] Also available - Roof curbs for vibration isolation, seismic conditions, seismic with wind restraints. Contact your Sales Representative for additional information.
[2] Optional for Constant Air Volume (CAV) units (single zone or bypass zoning control). Automatically furnished with all Variable Air Volume (VFD) units. Shipped with the unit for remote field installation in the supply duct.

OPTIONS/ACCESSORIES

Item	Factory	Field
ELECTRICAL		
Voltage (60HZ) - 208/230V-3 phase, 460V-3 phase or 575V-3 phase	O	
HACR Circuit Breakers - 70, 80, 90, 100, 110, 125, 150, 175, 200, 225, 250 amp	O	
Disconnect Switch - 150, 250 amp	O	
GFI Service Outlets (field wired)	O	
GFI Service Outlets (powered)	O	
HUMIDITROL® CONDENSER REHEAT (CAV UNITS ONLY)		
Humiditrol	O	
Humidity Sensor Kit, Remote Mounted (required)		X
Remote Sensor Wall Seal Plate		X
ECONOMIZER/OUTDOOR AIR/EXHAUST		
Economizer	O	
Economizer Controls		
Differential Sensible (factory setting)	O	
Global Control	O	
Single Enthalpy	O	
Differential Enthalpy	O	
Fresh Air Tempering	O	
Indoor Air Quality CO2 Sensor		X
Outdoor Air CFM Control	O	
Outdoor Air Dampers - Manual or Motorized	O	
Barometric Relief Dampers	O	
Power Exhaust (see next page for specifications)		
50% Standard Static	O	
100% Standard Static	O	
50% High Static Power Exhaust	O	
100% High Static Power Exhaust	O	
50% High Static Power Exhaust with VFD	O	
100% High Static Power Exhaust with VFD	O	
50% High Static Power Exhaust with VFD and Bypass	O	
100% High Static Power Exhaust with VFD and Bypass	O	
Power Exhaust Controls		
Damper Position Control	O	
1 Differential Pressure Transducer	O	
High Static Power Exhaust Options		
Spring Isolation (blower frame)	O	
Energy Recovery Wheel (not available with horizontal configured units)	O	

O = Configure to Order (Factory Installed)
X = Field Installed.
[1] Furnished as standard with all High Static Power Exhaust with VFD.

SPECIFICATIONS - OPTIONAL POWER EXHAUST FANS

Standard Static PEF (50%)	(No.) Motor output	(1) 1 hp
	Motor rpm	1140
	(No.) Diameter - in.	(1) 26
	No. of blades	4
Standard Static PEF (100%)	(No.) Motor output	(2) 1 hp
	Motor rpm	1140
	(No.) Diameter - in.	(2) 26
	No. of blades	4
High Static PEF (50%)	(No.) Nominal motor output	(1) 3, 5 or 7.5 hp available See Blower Data Tables for selection
	Motor - Drive Kit	690 to 1065 rpm available See Blower Drive Kit Tables for selection
	(No.) Blower wheel nominal diameter x width	(1) 18 x 15
High Static PEF (100%)	(No.) Nominal motor output	(2) 3, 5 or 7.5 hp available See Blower Data Tables for selection
	Motor - Drive Kit	690 to 1065 rpm available See Blower Drive Kit Tables for selection
	(No.) Blower wheel nominal diameter x width	(2) 18 x 15

SPECIFICATIONS - 35 TON STANDARD EFFICIENCY

General Data		**Nominal Tonnage**	**35 Ton**	**35 Ton**
		Model No.	**LGH420S4B**	**LGH420S4V**
		Efficiency Type	**Standard**	**Standard**
		Blower Type	**Constant Air Volume (CAV)**	**Variable Air Volume (VAV)**
Cooling Performance		Gross Cooling Capacity - Btuh	435,000	433,000
		[1] Net Cooling Capacity - Btuh	410,000	410,000
		AHRI Rated Air Flow - cfm	14,000	14,000
		Total Unit Power - kW	41.8	41.0
		[1] EER (Btuh/Watt)	9.8	10.0
		[2] IEER (Btuh/Watt)	10.2	11.0
		Refrigerant Type	R-410A	R-410A
	Refrigerant Charge Furnished	Circuit 1	21 lbs. 0 oz.	22 lbs. 0 oz.
		Circuit 2	21 lbs. 0 oz.	22 lbs. 0 oz.
		Circuit 3	21 lbs. 0 oz.	22 lbs. 0 oz.
		Circuit 4	21 lbs. 0 oz.	22 lbs. 0 oz.
	Refrigerant Charge Furnished with Humiditrol Option	Circuit 1	25 lbs. 0 oz.	- - -
		Circuit 2	25 lbs. 0 oz.	- - -
		Circuit 3	21 lbs. 0 oz.	- - -
		Circuit 4	21 lbs. 0 oz.	- - -
Gas Heating Options Available - See page 12			Standard or High Capacity, Staged or Modulating Control	
Compressor Type (no.)			Scroll (4)	Scroll (4)
Condenser Coils		Net face area - sq. ft. total	94.1	94.1
		Tube diameter - in.	3/8	3/8
		Number of rows	2	2
		Fins per inch	20	20
Condenser Fans		Motor horsepower	(6) 3/4	(6) 3/4
		Motor rpm	1075	1075
		Total Motor watts	4800	4800
		Diameter - in.	(6) 24	(6) 24
		No. of blades	4	4
		Total Air volume - cfm	30,000	30,000
Evaporator Coils		Net face area - sq. ft. total	37.4	37.4
		Tube diameter - in.	3/8	3/8
		No. of rows	4	4
		Fins per inch	14	14
		Drain connection - number and size	(1) 1 in. NPT coupling	(1) 1 in. NPT coupling
		Expansion device type	Balanced Port Thermostatic Expansion Valve, removeable power head	
Indoor Blower and Drive Selection		Nominal motor output	5 to 30 hp available - See Blower Data Tables for selection	
		Motor - Drive kit	510 to 1270 rpm available - See Blower Drive Kit Tables for selection	510 to 1270 rpm available - See Blower Drive Kit Tables for selection
		Blower wheel nominal dia. x width - in.	(2) 20 x 15	(2) 20 x 15
Filters		Type of filter	Disposable, pleated MERV 4	
		No. and size - in.	(11) 25 x 16 x 2	
Electrical characteristics			208/230V, 460V or 575V - 60 hertz - 3 phase	

NOTE - Net capacity includes evaporator blower motor heat deduction. Gross capacity does not include evaporator blower motor heat deduction.
[1] Tested at conditions included in AHRI Standard 340/360; 95°F outdoor air temperature and 80°F db/67°F wb entering evaporator air; minimum external duct static pressure.
[2] Integrated Energy Efficiency Ratio tested according to AHRI Standard 340/360.

SPECIFICATIONS - 35 TON HIGH EFFICIENCY

General Data		**Nominal Tonnage**	**35 Ton**	**35 Ton**
		Model No.	**LGH420H4B**	**LGH420H4V**
		Efficiency Type	**High**	**High**
		Blower Type	**Constant Air Volume (CAV)**	**Variable Air Volume (VAV)**
Cooling Performance		Gross Cooling Capacity - Btuh	443,000	443,000
		[1] Net Cooling Capacity - Btuh	420,000	420,000
		AHRI Rated Air Flow - cfm	14,000	13,250
		Total Unit Power - kW	38.9	38.9
		[1] EER (Btuh/Watt)	10.8	10.8
		[2] IEER (Btuh/Watt)	11.3	12.5
		Refrigerant Type	R-410A	R-410A
	Refrigerant Charge Furnished	Circuit 1	30 lbs. 0 oz.	31 lbs. 0 oz.
		Circuit 2	30 lbs. 0 oz.	31 lbs. 0 oz.
		Circuit 3	30 lbs. 0 oz.	31 lbs. 0 oz.
		Circuit 4	30 lbs. 0 oz.	31 lbs. 0 oz.
	Refrigerant Charge Furnished with Humiditrol Option	Circuit 1	33 lbs. 0 oz.	- - -
		Circuit 2	33 lbs. 0 oz.	- - -
		Circuit 3	30 lbs. 0 oz.	- - -
		Circuit 4	30 lbs. 0 oz.	- - -
Gas Heating Options Available - See page 12			Standard or High Capacity, Staged or Modulating Control	
Compressor Type (no.)			Scroll (4)	Scroll (4)
Condenser Coils		Net face area - sq. ft. total	111.2	111.2
		Tube diameter - in.	3/8	3/8
		Number of rows	3	3
		Fins per inch	20	20
Condenser Fans		Motor horsepower	(6) 1	(6) 1
		Motor rpm	1140	1140
		Total Motor watts	5000	5000
		Diameter - in.	(6) 24	(6) 24
		No. of blades	4	4
		Total Air volume - cfm	35,000	35,000
Evaporator Coils		Net face area - sq. ft. total	37.4	37.4
		Tube diameter - in.	3/8	3/8
		No. of rows	4	4
		Fins per inch	14	14
		Drain connection - number and size	(1) 1 in. NPT coupling	(1) 1 in. NPT coupling
		Expansion device type	Balanced Port Thermostatic Expansion Valve, removeable power head	
Indoor Blower and Drive Selection		Nominal motor output	5 to 30 hp available - See Blower Data Tables for selection	
		Motor - Drive kit	510 to 1270 rpm available - See Blower Drive Kit Tables for selection	510 to 1270 rpm available - See Blower Drive Kit Tables for selection
		Blower wheel nominal dia. x width - in.	(2) 20 x 15	(2) 20 x 15
Filters		Type of filter	Disposable, pleated MERV 4	
		No. and size - in.	(11) 25 x 16 x 2	
Electrical characteristics			208/230V, 460V or 575V - 60 hertz - 3 phase	

NOTE - Net capacity includes evaporator blower motor heat deduction. Gross capacity does not include evaporator blower motor heat deduction.
[1] Tested at conditions included in AHRI Standard 340/360; 95°F outdoor air temperature and 80°F db/67°F wb entering evaporator air; minimum external duct static pressure.
[2] Integrated Energy Efficiency Ratio tested according to AHRI Standard 340/360.

SPECIFICATIONS - 40 TON STANDARD EFFICIENCY

General Data		**Nominal Tonnage**	**40 Ton**	**40 Ton**
		Model No.	**LGH480S4B**	**LGH480S4V**
		Efficiency Type	**Standard**	**Standard**
		Blower Type	**Constant Air Volume (CAV)**	**Variable Air Volume (VAV)**
Cooling Performance		Gross Cooling Capacity - Btuh	502,000	476,000
		[1] Net Cooling Capacity - Btuh	470,000	450,000
		AHRI Rated Air Flow - cfm	16,000	14,800
		Total Unit Power - kW	47.4	45.9
		[1] EER (Btuh/Watt)	9.8	9.8
		[2] IEER (Btuh/Watt)	10.1	11.0
		Refrigerant Type	R-410A	R-410A
	Refrigerant Charge Furnished	Circuit 1	21 lbs. 0 oz.	22 lbs . 0 oz.
		Circuit 2	21 lbs . 0 oz.	22 lbs . 0 oz.
		Circuit 3	21 lbs . 0 oz.	22 lbs . 0 oz.
		Circuit 4	21 lbs . 0 oz.	22 lbs . 0 oz.
	Refrigerant Charge Furnished with Humiditrol Option	Circuit 1	25 lbs . 0 oz.	- - -
		Circuit 2	25 lbs . 0 oz.	- - -
		Circuit 3	21 lbs . 0 oz.	- - -
		Circuit 4	21 lbs . 0 oz.	- - -
Gas Heating Options Available - See page 12			Standard or High Capacity, Staged or Modulating Control	
Compressor Type (no.)			Scroll (4)	Scroll (4)
Condenser Coils		Net face area - sq. ft. total	94.1	94.1
		Tube diameter - in.	3/8	3/8
		Number of rows	2	2
		Fins per inch	20	20
Condenser Fans		Motor horsepower	(6) 3/4	(6) 3/4
		Motor rpm	1075	1075
		Total Motor watts	4800	4800
		Diameter - in.	(6) 24	(6) 24
		No. of blades	4	4
		Total Air volume - cfm	30,000	30,000
Evaporator Coils		Net face area - sq. ft. total	37.4	37.4
		Tube diameter - in.	3/8	3/8
		No. of rows	4	4
		Fins per inch	14	14
		Drain connection - number and size	(1) 1 in. NPT coupling	(1) 1 in. NPT coupling
		Expansion device type	Balanced Port Thermostatic Expansion Valve, removeable power head	
Indoor Blower and Drive Selection		Nominal motor output	5 to 30 hp available - See Blower Data Tables for selection	
		Motor - Drive kit	510 to 1270 rpm available - See Blower Drive Kit Tables for selection	510 to 1270 rpm available - See Blower Drive Kit Tables for selection
		Blower wheel nominal dia. x width - in.	(2) 20 x 15	(2) 20 x 15
Filters		Type of filter	Disposable, pleated MERV 4	
		No. and size - in.	(11) 25 x 16 x 2	
Electrical characteristics			208/230V, 460V or 575V - 60 hertz - 3 phase	

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

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

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

SPECIFICATIONS - 40 TON HIGH EFFICIENCY

General Data		**Nominal Tonnage**	**40 Ton**	**40 Ton**
		Model No.	**LGH480H4B**	**LGH480H4V**
		Efficiency Type	**High**	**High**
		Blower Type	**Constant Air Volume (CAV)**	**Variable Air Volume (VAV)**
Cooling Performance		Gross Cooling Capacity - Btuh	491,000	494,000
		[1] Net Cooling Capacity - Btuh	470,000	470,000
		AHRI Rated Air Flow - cfm	13,000	14,000
		Total Unit Power - kW	42.5	38.9
		[1] EER (Btuh/Watt)	11.0	10.8
		[2] IEER (Btuh/Watt)	12.0	13.0
		Refrigerant Type	R-410A	R-410A
	Refrigerant Charge Furnished	Circuit 1	30 lbs. 0 oz.	31 lbs. 0 oz.
		Circuit 2	30 lbs. 0 oz.	31 lbs. 0 oz.
		Circuit 3	30 lbs. 0 oz.	31 lbs. 0 oz.
		Circuit 4	30 lbs. 0 oz.	31 lbs. 0 oz.
	Refrigerant Charge Furnished with Humiditrol Option	Circuit 1	33 lbs. 0 oz.	- - -
		Circuit 2	33 lbs. 0 oz.	- - -
		Circuit 3	30 lbs. 0 oz.	- - -
		Circuit 4	30 lbs. 0 oz.	- - -
Gas Heating Options Available - See page 12			Standard or High Capacity, Staged or Modulating Control	
Compressor Type (no.)			Scroll (4)	Scroll (4)
Condenser Coils		Net face area - sq. ft. total	111.2	111.2
		Tube diameter - in.	3/8	3/8
		Number of rows	3	3
		Fins per inch	20	20
Condenser Fans		Motor horsepower	(6) 1	(6) 1
		Motor rpm	1140	1140
		Total Motor watts	5000	5000
		Diameter - in.	(6) 24	(6) 24
		No. of blades	4	4
		Total Air volume - cfm	35,000	35,000
Evaporator Coils		Net face area - sq. ft. total	37.4	37.4
		Tube diameter - in.	3/8	3/8
		No. of rows	4	4
		Fins per inch	14	14
		Drain connection - number and size	(1) 1 in. NPT coupling	(1) 1 in. NPT coupling
		Expansion device type	Balanced Port Thermostatic Expansion Valve, removeable power head	
Indoor Blower and Drive Selection		Nominal motor output	5 to 30 hp available - See Blower Data Tables for selection	
		Motor - Drive kit	510 to 1270 rpm available - See Blower Drive Kit Tables for selection	510 to 1270 rpm available - See Blower Drive Kit Tables for selection
		Blower wheel nominal dia. x width - in.	(2) 20 x 15	(2) 20 x 15
Filters		Type of filter	Disposable, pleated MERV 4	
		No. and size - in.	(11) 25 x 16 x 2	
Electrical characteristics			208/230V, 460V or 575V - 60 hertz - 3 phase	

NOTE - Net capacity includes evaporator blower motor heat deduction. Gross capacity does not include evaporator blower motor heat deduction.
[1] Tested at conditions included in AHRI Standard 340/360; 95°F outdoor air temperature and 80°F db/67°F wb entering evaporator air; minimum external duct static pressure.
[2] Integrated Energy Efficiency Ratio tested according to AHRI Standard 340/360.

SPECIFICATIONS - 45 TON STANDARD EFFICIENCY

General Data		**Nominal Tonnage**	**45 Ton**	**45 Ton**
		Model No.	**LGH540S4B**	**LGH540S4V**
		Efficiency Type	**Standard**	**Standard**
		Blower Type	**Constant Air Volume (CAV)**	**Variable Air Volume (VAV)**
Cooling Performance		Gross Cooling Capacity - Btuh	554,000	549,000
		[1] Net Cooling Capacity - Btuh	525,000	520,000
		AHRI Rated Air Flow - cfm	15,000	15,000
		Total Unit Power - kW	53.5	52.0
		[1] EER (Btuh/Watt)	9.8	10.0
		[2] IEER (Btuh/Watt)	10.5	11.7
		Refrigerant Type	R-410A	R-410A
	Refrigerant Charge Furnished	Circuit 1	30 lbs. 0 oz.	31 lbs. 0 oz.
		Circuit 2	30 lbs. 0 oz.	31 lbs. 0 oz.
		Circuit 3	30 lbs. 0 oz.	31 lbs. 0 oz.
		Circuit 4	30 lbs. 0 oz.	31 lbs. 0 oz.
	Refrigerant Charge Furnished with Humiditrol Option	Circuit 1	33 lbs. 0 oz.	- - -
		Circuit 2	33 lbs. 0 oz.	- - -
		Circuit 3	30 lbs. 0 oz.	- - -
		Circuit 4	30 lbs. 0 oz.	- - -
Gas Heating Options Available - See page 12			Standard or High Capacity, Staged or Modulating Control	
Compressor Type (no.)			Scroll (4)	Scroll (4)
Condenser Coils		Net face area - sq. ft. total	111.2	111.2
		Tube diameter - in.	3/8	3/8
		Number of rows	3	3
		Fins per inch	20	20
Condenser Fans		Motor horsepower	(6) 3/4	(6) 3/4
		Motor rpm	1075	1075
		Total Motor watts	4900	4900
		Diameter - in.	(6) 24	(6) 24
		No. of blades	4	4
		Total Air volume - cfm	29,000	29,000
Evaporator Coils		Net face area - sq. ft. total	37.4	37.4
		Tube diameter - in.	3/8	3/8
		No. of rows	4	4
		Fins per inch	14	14
		Drain connection - number and size	(1) 1 in. NPT coupling	(1) 1 in. NPT coupling
		Expansion device type	Balanced Port Thermostatic Expansion Valve, removeable power head	
Indoor Blower and Drive Selection		Nominal motor output	5 to 30 hp available - See Blower Data Tables for selection	
		Motor - Drive kit	510 to 1270 rpm available - See Blower Drive Kit Tables for selection	510 to 1270 rpm available - See Blower Drive Kit Tables for selection
		Blower wheel nominal dia. x width - in.	(2) 20 x 15	(2) 20 x 15
Filters		Type of filter	Disposable, pleated MERV 4	
		No. and size - in.	(11) 25 x 16 x 2	
Electrical characteristics			208/230V, 460V or 575V - 60 hertz - 3 phase	

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

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

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

SPECIFICATIONS - 50 TON STANDARD EFFICIENCY

General Data		**Nominal Tonnage**	**50 Ton**	**50 Ton**
		Model No.	**LGH600S4B**	**LGH600S4V**
		Efficiency Type	**Standard**	**Standard**
		Blower Type	**Constant Air Volume (CAV)**	**Variable Air Volume (VAV)**
Cooling Performance		Gross Cooling Capacity - Btuh	607,000	598,000
		[1] Net Cooling Capacity - Btuh	575,000	565,000
		AHRI Rated Air Flow - cfm	16,000	16,000
		Total Unit Power - kW	58.7	57.7
		[1] EER (Btuh/Watt)	9.8	9.8
		[2] IEER (Btuh/Watt)	10.3	11.0
		Refrigerant Type	R-410A	R-410A
	Refrigerant Charge Furnished	Circuit 1	30 lbs. 0 oz.	31 lbs. 0 oz.
		Circuit 2	30 lbs. 0 oz.	31 lbs. 0 oz.
		Circuit 3	30 lbs. 0 oz.	31 lbs. 0 oz.
		Circuit 4	30 lbs. 0 oz.	31 lbs. 0 oz.
	Refrigerant Charge Furnished with Humiditrol Option	Circuit 1	33 lbs. 0 oz.	- - -
		Circuit 2	33 lbs. 0 oz.	- - -
		Circuit 3	30 lbs. 0 oz.	- - -
		Circuit 4	30 lbs. 0 oz.	- - -
Gas Heating Options Available - See page 12			Standard or High Capacity, Staged or Modulating Control	
Compressor Type (no.)			Scroll (4)	Scroll (4)
Condenser Coils		Net face area - sq. ft. total	111.2	111.2
		Tube diameter - in.	3/8	3/8
		Number of rows	3	3
		Fins per inch	20	20
Condenser Fans		Motor horsepower	(6) 1	(6) 1
		Motor rpm	1140	1140
		Total Motor watts	5000	5000
		Diameter - in.	(6) 24	(6) 24
		No. of blades	4	4
		Total Air volume - cfm	35,000	35,000
Evaporator Coils		Net face area - sq. ft. total	37.4	37.4
		Tube diameter - in.	3/8	3/8
		No. of rows	4	4
		Fins per inch	14	14
		Drain connection - number and size	(1) 1 in. NPT coupling	(1) 1 in. NPT coupling
		Expansion device type	Balanced Port Thermostatic Expansion Valve, removeable power head	
Indoor Blower and Drive Selection		Nominal motor output	5 to 30 hp available - See Blower Data Tables for selection	
		Motor - Drive kit	510 to 1270 rpm available - See Blower Drive Kit Tables for selection	510 to 1270 rpm available - See Blower Drive Kit Tables for selection
		Blower wheel nominal dia. x width - in.	(2) 20 x 15	(2) 20 x 15
Filters		Type of filter	Disposable, pleated MERV 4	
		No. and size - in.	(11) 25 x 16 x 2	
Electrical characteristics			208/230V, 460V or 575V - 60 hertz - 3 phase	

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

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

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

SPECIFICATIONS - GAS HEAT

Gas Heating Performance (2 Stage)	**Heat Input Type**		**Standard 2 Stage**	**High 2 Stage**
	Input - First Stage	Btuh (kW)	330,000 (96.6)	528,000 (154.6)
	Input - Second Stage	Btuh (kW)	500,000 (146.4)	800,000 (234.4)
	Output - First Stage	Btuh (kW)	264,000 (77.3)	422,400 (123.7)
	Output - Second Stage	Btuh (kW)	400,000 (117.1)	640,000 (187.4)
Gas Heating Performance (4 Stage)	**Heat Input Type**		**Standard 4 Stage**	**High 4 Stage**
	Input - First Stage	Btuh (kW)	165,000 (48.3)	264,000 (77.4)
	Input - Second Stage	Btuh (kW)	330,000 (96.7)	528,000 (154.7)
	Input - Third Stage	Btuh (kW)	415,000 (121.6)	664,000 (194.6)
	Input - Fourth Stage	Btuh (kW)	500,000 (146.5)	800,000 (234.4)
	Output - First Stage	Btuh (kW)	132,000 (38.7)	211,200 (61.9)
	Output - Second Stage	Btuh (kW)	264,000 (77.4)	422,400 (124.8)
	Output - Third Stage	Btuh (kW)	332,000 (97.3)	531,200 (155.6)
	Output - Fourth Stage	Btuh (kW)	400,000 (117.2)	640,000 (187.5)
Gas Heating Performance (Fully Modulating)	**Heat Input Type**		**Standard Fully Modulating**	**High Fully Modulating**
	Input - Minimum	Btuh (kW)	125,000 (36.6)	200,000 (58.6)
	Input - Full	Btuh (kW)	500,000 (146.5)	800,000 (234.4)
	Output - Minimum	Btuh (kW)	100,000 (29.3)	160,000 (46.9)
	Output - Full	Btuh (kW)	400,000 (117.2)	640,000 (187.5)
	Temperature Rise Range - °F		10 - 40	25 - 55
	Thermal Efficiency		80%	
	Gas Supply Connections		1-1/4 in. NPT	
Recommended Gas Supply Pressure		Natural	7 in. w.g. (1.5 kPa)	
		LPG/Propane	11 in. w.g. (2.7 kPa)	

HIGH ALTITUDE INFORMATION

Units are certified for operation from 0 to 2000 feet above sea level. If the unit is installed at altitudes above 2000 feet, the unit must be derated 4% for every 1000 feet above sea level. Thus, at an altitude of 4000 feet, the unit would require a 16% derate.

BLOWER DATA

BLOWER TABLE INCLUDES RESISTANCE FOR BASE UNIT ONLY WITH DRY INDOOR COIL, HIGH GAS HEAT, ECONOMIZER, ONE ROW REHEAT COIL & AIR FILTERS IN PLACE

Add factory installed options air resistance, then determine from blower table blower motor output and drive kit required.
See page 19 for horizontal configured unit air resistance.
See page 20 for factory installed options air resistance data.
See page 21 for factory installed drive kit specifications.

TOTAL STATIC PRESSURE - 0.2 Thru 2.4 in. w.g.
For 2.6 thru 4.6 in. w.g., see next page

Air Volume cfm	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0		2.2		2.4	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
10,500	460	3.25	500	3.25	535	3.45	575	3.90	620	4.50	670	5.40	715	6.25	755	7.05	790	7.75	820	8.40	850	9.05	- - -	- - -
11,000	490	3.70	520	3.75	550	3.90	585	4.25	630	4.85	675	5.65	720	6.55	760	7.40	795	8.20	830	9.00	860	9.70	890	10.40
11,500	520	4.25	540	4.25	565	4.35	600	4.70	635	5.20	680	5.95	725	6.85	765	7.75	805	8.70	840	9.60	870	10.35	900	11.10
12,000	540	4.80	555	4.80	580	4.90	610	5.15	650	5.70	690	6.40	730	7.20	770	8.15	810	9.10	845	10.05	880	10.95	910	11.80
12,500	560	5.45	575	5.45	600	5.50	625	5.70	660	6.15	695	6.75	735	7.55	780	8.60	815	9.55	850	10.50	885	11.50	915	12.35
13,000	580	6.10	600	6.10	620	6.20	645	6.35	675	6.75	705	7.25	745	8.05	785	9.00	820	9.95	860	11.10	895	12.15	925	13.05
13,500	600	6.85	615	6.85	635	6.85	660	7.05	685	7.30	720	7.90	750	8.50	790	9.45	830	10.50	865	11.55	900	12.65	930	13.60
14,000	620	7.60	635	7.60	655	7.65	675	7.75	700	8.05	730	8.50	760	9.05	795	9.85	835	10.95	870	12.00	905	13.15	940	14.30
14,500	640	8.45	660	8.45	675	8.50	690	8.55	720	8.85	745	9.20	775	9.80	805	10.50	840	11.45	875	12.50	910	13.65	945	14.85
15,000	665	9.35	680	9.35	690	9.40	715	9.50	735	9.70	755	9.95	785	10.50	815	11.15	850	12.10	880	13.00	915	14.15	950	15.40
15,500	685	10.35	695	10.35	715	10.35	730	10.40	750	10.55	775	10.90	800	11.35	825	11.90	855	12.65	890	13.70	920	14.70	955	16.00
16,000	705	11.40	720	11.40	735	11.40	750	11.45	770	11.60	790	11.85	810	12.15	840	12.80	865	13.40	895	14.30	930	15.45	960	16.55
16,500	730	12.45	740	12.45	750	12.45	770	12.50	785	12.60	805	12.85	825	13.15	850	13.65	875	14.25	905	15.10	935	16.10	965	17.20
17,000	745	13.65	760	13.65	775	13.65	790	13.65	805	13.75	820	13.90	845	14.30	865	14.65	890	15.25	915	16.00	945	16.95	975	18.05
17,500	770	14.90	780	14.90	795	14.90	805	14.90	820	14.95	840	15.15	860	15.40	880	15.80	905	16.35	925	16.90	955	17.85	980	18.75
18,000	790	16.20	800	16.20	810	16.20	825	16.20	845	16.30	860	16.40	875	16.60	895	16.95	915	17.40	940	18.05	965	18.85	990	19.70
18,500	810	17.60	820	17.60	835	17.60	850	17.60	860	17.60	875	17.75	895	17.95	910	18.20	930	18.65	950	19.15	975	19.90	1000	20.75
19,000	830	19.05	845	19.05	855	19.05	865	19.05	880	19.05	895	19.15	910	19.35	930	19.65	945	19.95	965	20.45	990	21.15	1010	21.85
19,500	855	20.60	865	20.60	875	20.60	885	20.60	900	20.60	915	20.70	930	20.85	945	21.05	960	21.35	980	21.80	1000	22.35	1025	23.20
20,000	875	22.20	885	22.20	895	22.20	910	22.20	920	22.20	935	22.30	945	22.40	965	22.65	980	22.95	995	23.30	1015	23.80	1035	24.45
20,500	895	23.90	905	23.90	915	23.90	930	23.90	940	23.90	950	23.95	965	24.05	980	24.25	995	24.50	1010	24.85	1030	25.35	1050	25.95
21,000	920	25.70	925	25.70	935	25.70	945	25.70	960	25.70	970	25.75	985	25.85	1000	26.00	1010	26.20	1030	26.60	1045	26.95	1065	27.55
21,500	940	27.60	945	27.60	960	27.60	970	27.60	980	27.60	990	27.60	1000	27.65	1015	27.80	1030	28.00	1045	28.30	1060	28.65	1080	29.20
22,000	960	29.55	970	29.55	980	29.55	990	29.55	1000	29.55	1010	29.55	1025	29.65	1035	29.75	1050	29.95	1060	30.15	1075	30.45	1095	31.00
22,500	980	31.65	990	31.65	1000	31.65	1010	31.65	1020	31.65	1030	31.65	1045	31.70	1055	31.80	1065	31.90	1080	32.15	1095	32.45	1110	32.85

BLOWER DATA

BLOWER TABLE INCLUDES RESISTANCE FOR BASE UNIT ONLY WITH DRY INDOOR COIL, HIGH GAS HEAT, ECONOMIZER, ONE ROW REHEAT COIL & AIR FILTERS IN PLACE

Add factory installed options air resistance, then determine from blower table blower motor output and drive kit required.
See page 19 for horizontal configured unit air resistance.
See page 20 for factory installed options air resistance data.
See page 21 for factory installed drive kit specifications.

TOTAL STATIC PRESSURE - 2.6 Thru 4.6 in. w.g.
For .2 thru 2.4 in. w.g., see previous page

Air Volume	2.6		2.8		3.0		3.2		3.4		3.6		3.8		4.0		4.2		4.4		4.6	
cfm	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
8000	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
8500	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
9000	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
9500	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
10,000	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
10,500	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
11,000	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
11,500	925	11.70	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
12,000	935	12.50	965	13.30	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
12,500	945	13.25	975	14.15	1000	14.90	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
13,000	955	14.00	980	14.80	1010	15.75	1035	16.60	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
13,500	960	14.60	990	15.65	1015	16.50	1045	17.55	1070	18.40	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
14,000	970	15.35	1000	16.45	1025	17.35	1050	18.30	1075	19.20	1100	20.15	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
14,500	975	15.95	1005	17.10	1035	18.25	1060	19.25	1085	20.20	1110	21.20	1135	22.25	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
15,000	980	16.55	1010	17.70	1040	18.95	1070	20.15	1095	21.20	1120	22.30	1140	23.15	1165	24.20	1185	25.10	- - -	- - -	- - -	- - -
15,500	985	17.15	1020	18.55	1045	19.60	1075	20.90	1100	22.00	1125	23.10	1150	24.25	1175	25.40	1195	26.30	1215	27.25	1235	28.15
16,000	995	17.95	1025	19.20	1055	20.50	1080	21.65	1110	23.00	1135	24.20	1160	25.35	1180	26.35	1205	27.55	1225	28.50	1245	29.50
16,500	1000	18.60	1030	19.85	1060	21.20	1085	22.35	1115	23.80	1140	25.00	1165	26.25	1190	27.50	1215	28.80	1235	29.80	1255	30.85
17,000	1005	19.25	1035	20.55	1065	21.90	1095	23.30	1120	24.55	1145	25.80	1170	27.10	1195	28.40	1220	29.75	1245	31.10	1265	32.20
17,500	1010	19.95	1040	21.25	1070	22.60	1100	24.05	1125	25.30	1155	26.90	1180	28.25	1205	29.60	1225	30.70	1250	32.15	1275	33.55
18,000	1020	20.90	1045	21.95	1075	23.35	1105	24.80	1130	26.10	1160	27.70	1185	29.10	1210	30.50	1235	31.95	1260	33.40	1280	34.60
18,500	1025	21.70	1055	23.00	1080	24.15	1110	25.60	1135	26.90	1165	28.55	1190	29.95	1215	31.40	1240	32.90	1265	34.40	- - -	- - -
19,000	1035	22.80	1060	23.85	1090	25.20	1115	26.45	1145	28.00	1170	29.40	1195	30.85	1220	32.30	1245	33.85	1270	35.40	- - -	- - -
19,500	1045	23.95	1070	24.95	1095	26.10	1125	27.55	1150	28.90	1175	30.25	1200	31.75	1225	33.25	1255	35.10	- - -	- - -	- - -	- - -
20,000	1060	25.35	1080	26.15	1105	27.30	1130	28.50	1155	29.80	1180	31.20	1205	32.65	1235	34.50	- - -	- - -	- - -	- - -	- - -	- - -
20,500	1070	26.65	1090	27.45	1115	28.55	1140	29.75	1165	31.05	1190	32.45	1215	33.90	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
21,000	1085	28.25	1105	29.00	1125	29.90	1150	31.05	1170	32.10	1195	33.45	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
21,500	1095	29.70	1115	30.45	1135	31.30	1160	32.45	1180	33.45	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
22,000	1110	31.45	1130	32.20	1150	33.00	1170	33.95	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
22,500	1125	33.30	1145	34.05	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -

BLOWER DATA

POWER EXHAUST FANS
[1] 50% HIGH STATIC OPERATION, NO ERW

Air Volume cfm	Return Duct Negative Static Pressure - Inches Water Gauge (Pa)																					
	0		0.1		0.2		0.3		0.4		0.5		0.6		0.7		0.8		0.9		1.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
4000	410	0.75	465	1.00	520	1.25	575	1.50	630	1.80	685	2.15	740	2.50	795	2.85	845	3.25	900	3.70	955	4.15
4500	460	1.10	510	1.35	560	1.60	610	1.90	655	2.20	705	2.55	755	2.90	805	3.30	850	3.70	900	4.15	945	4.55
5000	510	1.50	555	1.75	600	2.05	645	2.40	690	2.70	735	3.10	775	3.40	820	3.85	865	4.25	910	4.70	950	5.15
5500	560	2.00	600	2.25	645	2.60	685	2.95	725	3.30	765	3.70	805	4.05	845	4.50	885	4.90	925	5.35	965	5.85
6000	610	2.55	650	2.90	685	3.25	725	3.60	760	3.95	800	4.40	835	4.80	870	5.20	910	5.65	945	6.10	980	6.55
6500	665	3.30	700	3.65	730	3.95	765	4.35	800	4.75	835	5.20	870	5.60	905	6.10	935	6.50	970	7.00	1005	7.50
7000	715	4.10	745	4.45	780	4.90	810	5.25	840	5.65	875	6.15	905	6.55	940	7.05	970	7.50	1000	8.00	1030	8.50
7500	765	5.05	795	5.45	825	5.85	855	6.30	885	6.75	915	7.20	945	7.65	975	8.15	- - -	- - -	- - -	- - -	- - -	- - -
8000	815	6.10	845	6.55	870	6.95	900	7.45	930	7.95	955	8.35	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
8500	865	7.30	895	7.80	920	8.25	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -

POWER EXHAUST FANS
[1] 100% HIGH STATIC OPERATION, NO ERW

Air Volume cfm	Return Duct Negative Static Pressure - Inches Water Gauge (Pa)																					
	0		0.1		0.2		0.3		0.4		0.5		0.6		0.7		0.8		0.9		1.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
8000	410	1.45	450	1.70	495	2.05	535	2.35	580	2.70	625	3.10	665	3.50	710	3.95	750	4.40	790	4.85	835	5.35
8500	435	1.70	475	2.00	515	2.35	555	2.70	595	3.05	635	3.45	675	3.85	715	4.30	755	4.75	795	5.25	835	5.75
9000	460	2.05	495	2.35	535	2.70	575	3.05	610	3.40	650	3.85	690	4.30	725	4.70	765	5.20	800	5.65	840	6.20
9500	485	2.40	520	2.70	555	3.05	595	3.45	630	3.85	665	4.25	700	4.70	740	5.20	775	5.65	810	6.15	845	6.65
10,000	510	2.80	545	3.15	580	3.50	615	3.90	650	4.35	680	4.70	715	5.15	750	5.65	785	6.15	820	6.65	855	7.20
10,500	535	3.20	570	3.60	600	3.95	635	4.40	665	4.80	700	5.25	730	5.70	765	6.20	795	6.65	830	7.20	860	7.70
11,000	560	3.70	590	4.05	625	4.50	655	4.90	685	5.35	720	5.85	750	6.30	780	6.75	810	7.25	840	7.75	875	8.40
11,500	585	4.20	615	4.60	645	5.05	675	5.45	705	5.90	735	6.40	765	6.90	795	7.40	825	7.90	855	8.45	885	9.00
12,000	610	4.80	640	5.20	670	5.70	700	6.15	725	6.55	755	7.05	785	7.60	815	8.10	840	8.60	870	9.15	900	9.75
12,500	635	5.40	665	5.90	690	6.30	720	6.80	750	7.30	775	7.75	805	8.30	830	8.80	860	9.40	885	9.90	915	10.55
13,000	660	6.10	690	6.60	715	7.00	740	7.45	770	8.05	795	8.50	820	9.00	850	9.65	875	10.15	900	10.70	930	11.35
13,500	690	6.90	715	7.35	740	7.80	765	8.30	790	8.80	815	9.30	840	9.85	865	10.40	895	11.05	920	11.65	945	12.20
14,000	715	7.65	740	8.15	765	8.65	785	9.10	810	9.60	835	10.15	860	10.70	885	11.30	910	11.90	935	12.50	960	13.10
14,500	740	8.50	765	9.05	785	9.45	810	10.00	835	10.60	860	11.20	880	11.65	905	12.25	930	12.90	955	13.55	975	14.05
15,000	765	9.40	785	9.85	810	10.45	835	11.05	855	11.50	880	12.15	905	12.75	925	13.30	950	13.95	970	14.50	995	15.20
15,500	790	10.35	810	10.85	835	11.45	855	11.95	880	12.60	900	13.15	925	13.80	945	14.35	970	15.05	990	15.65	1015	16.35
16,000	815	11.40	835	11.90	860	12.55	880	13.10	900	13.65	925	14.35	945	14.90	965	15.50	990	16.20	1010	16.85	- - -	- - -
16,500	840	12.50	860	13.05	885	13.70	905	14.30	925	14.85	945	15.45	965	16.05	990	16.80	- - -	- - -	- - -	- - -	- - -	- - -
17,000	865	13.65	885	14.20	905	14.80	925	15.40	950	16.15	970	16.80	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
17,500	890	14.85	910	15.50	930	16.10	950	16.75	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
18,000	915	16.15	935	16.80	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -

NOTE - See page 21 for factory installed drive kit specifications.

[1] Size power exhaust fans in economizer mode to minimize building static pressure during free" cooling.

BLOWER DATA

POWER EXHAUST FANS
[1] 50% HIGH STATIC OPERATION WITH ERW (BY-PASS DAMPERS CLOSED)

Air Volume cfm	Return Duct Negative Static Pressure - Inches Water Gauge (Pa)																					
	0		0.1		0.2		0.3		0.4		0.5		0.6		0.7		0.8		0.9		1.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
2500	390	0.35	460	0.50	530	0.70	600	0.90	670	1.15	735	1.40	805	1.70	870	2.00	935	2.35	1005	2.75	1070	3.10
3000	465	0.60	525	0.75	585	1.00	645	1.20	700	1.45	760	1.75	815	2.05	870	2.35	930	2.70	985	3.05	1040	3.45
3500	545	0.95	595	1.15	645	1.35	695	1.60	745	1.90	795	2.20	845	2.50	895	2.85	945	3.20	990	3.55	1040	3.95
4000	620	1.35	665	1.60	710	1.90	755	2.15	800	2.45	840	2.75	885	3.10	930	3.45	975	3.80	1015	4.15	1060	4.60
4500	700	1.95	740	2.25	780	2.55	820	2.85	855	3.10	895	3.45	935	3.80	975	4.20	1015	4.60	1050	4.95	- - -	- - -
5000	775	2.70	815	3.00	850	3.30	885	3.65	920	4.00	955	4.35	990	4.70	1025	5.10	1060	5.50	- - -	- - -	- - -	- - -
5500	855	3.60	885	3.90	920	4.25	950	4.60	985	5.00	1015	5.35	1050	5.75	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
6000	935	4.70	965	5.05	990	5.35	1020	5.75	1050	6.15	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -

POWER EXHAUST FANS
[1] 100% HIGH STATIC OPERATION WITH ERW (BY-PASS DAMPERS CLOSED)

Air Volume cfm	Return Duct Negative Static Pressure - Inches Water Gauge (Pa)																					
	0		0.1		0.2		0.3		0.4		0.5		0.6		0.7		0.8		0.9		1.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
5000	445	0.85	505	1.15	565	1.45	625	1.85	680	2.20	740	2.65	800	3.15	855	3.60	910	4.15	970	4.75	1025	5.30
5500	490	1.15	545	1.45	600	1.80	650	2.15	705	2.55	760	3.05	810	3.50	865	4.00	915	4.55	970	5.15	1020	5.70
6000	535	1.45	585	1.80	635	2.15	685	2.60	735	3.00	780	3.45	830	3.95	880	4.50	925	5.00	975	5.60	1020	6.15
6500	580	1.85	625	2.20	670	2.60	715	3.00	760	3.45	805	3.95	850	4.45	895	4.95	940	5.50	985	6.10	1030	6.75
7000	625	2.35	665	2.70	710	3.15	750	3.55	795	4.05	835	4.50	880	5.05	920	5.60	960	6.15	1005	6.80	1045	7.40
7500	670	2.90	710	3.30	750	3.75	790	4.20	825	4.65	865	5.15	905	5.70	945	6.25	985	6.85	1025	7.50	1060	8.05
8000	715	3.50	750	3.90	790	4.40	825	4.85	860	5.35	900	5.90	935	6.45	975	7.05	1010	7.65	1045	8.25	- - -	- - -
8500	760	4.20	795	4.65	830	5.15	865	5.65	900	6.20	935	6.75	970	7.30	1000	7.85	1035	8.45	1070	9.10	- - -	- - -
9000	800	4.90	835	5.45	870	5.95	900	6.45	935	7.05	970	7.65	1000	8.20	1035	8.85	1065	9.40	- - -	- - -	- - -	- - -
9500	845	5.80	880	6.35	910	6.85	940	7.40	975	8.05	1005	8.60	1035	9.20	1065	9.80	- - -	- - -	- - -	- - -	- - -	- - -
10,000	890	6.75	920	7.30	950	7.85	980	8.45	1010	9.05	1040	9.65	1070	10.30	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
10,500	935	7.85	965	8.45	995	9.05	1020	9.60	1050	10.25	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
11,000	980	9.00	1010	9.65	1035	10.25	1060	10.80	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
11,500	1025	10.30	1050	10.90	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
12,000	1070	11.75	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -

NOTE - See page 21 for factory installed drive kit specifications.

[1] Size power exhaust fans with ERW in economizer mode to minimize building static pressure during free" cooling.

BLOWER DATA

POWER EXHAUST FANS
[1] 50% HIGH STATIC OPERATION WITH ERW IN ECONOMIZER MODE (BY-PASS DAMPERS OPEN)

Air Volume cfm	Return Duct Negative Static Pressure - Inches Water Gauge (Pa)																					
	0		0.1		0.2		0.3		0.4		0.5		0.6		0.7		0.8		0.9		1.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
3500	380	0.55	435	0.70	495	0.90	555	1.10	615	1.35	675	1.60	730	1.85	790	2.15	845	2.45	900	2.80	960	3.15
4000	430	0.80	485	1.00	535	1.20	585	1.40	640	1.65	690	1.95	740	2.20	790	2.50	845	2.85	895	3.20	945	3.55
4500	485	1.10	530	1.30	575	1.55	625	1.80	670	2.05	715	2.35	760	2.65	805	2.95	855	3.30	900	3.65	945	4.00
5000	540	1.55	580	1.75	620	2.00	665	2.30	705	2.55	745	2.85	790	3.20	830	3.50	870	3.85	910	4.15	950	4.55
5500	590	2.05	630	2.30	670	2.60	705	2.85	745	3.15	780	3.45	820	3.80	855	4.10	895	4.50	930	4.80	970	5.25
6000	645	2.65	680	2.90	715	3.20	750	3.50	785	3.85	820	4.15	855	4.50	890	4.85	925	5.25	960	5.65	995	6.05
6500	700	3.35	730	3.65	765	4.00	795	4.30	830	4.65	860	5.00	890	5.30	925	5.70	955	6.10	990	6.50	1020	6.90
7000	755	4.20	785	4.55	815	4.90	845	5.20	875	5.60	905	5.95	935	6.35	960	6.65	990	7.05	1020	7.45	1050	7.90
7500	805	5.15	835	5.50	865	5.90	890	6.20	920	6.60	945	6.95	975	7.40	1000	7.75	1030	8.20	1060	8.65	- - -	- - -
8000	860	6.25	885	6.60	915	7.05	940	7.40	965	7.80	990	8.15	1020	8.65	1045	9.05	1070	9.45	- - -	- - -	- - -	- - -
8500	915	7.55	940	7.90	965	8.35	990	8.75	1015	9.15	1040	9.60	1060	9.95	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -

POWER EXHAUST FANS
[1] 100% HIGH STATIC OPERATION WITH ERW IN ECONOMIZER MODE (BY-PASS DAMPERS OPEN)

Air Volume cfm	Return Duct Negative Static Pressure - Inches Water Gauge (Pa)																					
	0		0.1		0.2		0.3		0.4		0.5		0.6		0.7		0.8		0.9		1.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
7000	415	1.15	470	1.50	520	1.80	570	2.10	620	2.50	675	2.90	725	3.35	775	3.80	825	4.30	875	4.80	925	5.35
7500	445	1.45	495	1.75	540	2.05	590	2.45	640	2.85	685	3.25	735	3.70	780	4.15	825	4.65	875	5.20	920	5.70
8000	475	1.75	520	2.05	565	2.40	610	2.80	655	3.20	700	3.65	745	4.10	790	4.55	835	5.10	880	5.60	920	6.10
8500	505	2.10	545	2.40	590	2.80	635	3.25	675	3.60	715	4.05	760	4.55	800	5.00	845	5.55	885	6.05	925	6.60
9000	535	2.50	575	2.85	615	3.25	655	3.65	695	4.10	735	4.55	775	5.00	815	5.50	855	6.05	895	6.60	935	7.15
9500	565	2.95	600	3.30	640	3.70	680	4.15	715	4.55	755	5.05	790	5.50	830	6.05	870	6.60	905	7.15	945	7.75
10,000	595	3.45	630	3.80	665	4.20	700	4.65	740	5.15	775	5.65	810	6.10	845	6.65	880	7.15	920	7.80	955	8.35
10,500	625	4.00	660	4.40	690	4.80	725	5.25	760	5.75	795	6.25	830	6.75	865	7.30	900	7.90	935	8.50	965	9.00
11,000	655	4.60	685	4.95	720	5.45	750	5.90	785	6.40	820	6.95	850	7.45	885	8.05	915	8.55	950	9.20	980	9.75
11,500	680	5.15	715	5.65	745	6.10	775	6.60	810	7.15	840	7.65	870	8.20	905	8.80	935	9.40	965	9.95	995	10.55
12,000	710	5.85	740	6.35	775	6.90	805	7.40	835	7.95	865	8.50	895	9.05	925	9.65	955	10.25	985	10.85	1015	11.50
12,500	740	6.65	770	7.15	800	7.70	830	8.25	860	8.80	885	9.30	915	9.90	945	10.50	975	11.15	1005	11.80	1030	12.35
13,000	770	7.50	800	8.05	825	8.50	855	9.10	885	9.70	910	10.20	940	10.85	965	11.40	995	12.10	1020	12.65	1050	13.40
13,500	800	8.40	830	9.00	855	9.50	880	10.00	910	10.65	935	11.20	965	11.90	990	12.50	1015	13.10	1045	13.85	- - -	- - -
14,000	830	9.35	855	9.90	885	10.55	910	11.10	935	11.70	960	12.30	985	12.90	1010	13.50	1040	14.25	1065	14.90	- - -	- - -
14,500	860	10.40	885	11.00	910	11.55	935	12.15	960	12.75	985	13.40	1010	14.05	1035	14.70	1060	15.40	- - -	- - -	- - -	- - -
15,000	890	11.55	915	12.15	940	12.75	965	13.40	985	13.95	1010	14.60	1035	15.30	1060	16.00	- - -	- - -	- - -	- - -	- - -	- - -
15,500	920	12.75	945	13.40	965	13.90	990	14.60	1015	15.30	1035	15.85	1060	16.60	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
16,000	950	14.00	970	14.55	995	15.25	1020	16.00	1040	16.60	1065	17.35	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
16,500	980	15.35	1000	15.95	1025	16.70	1045	17.30	1065	17.95	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
17,000	1010	16.80	1030	17.45	1050	18.10	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -

NOTE - See page 21 for factory installed drive kit specifications.

[1] Size power exhaust fans in economizer mode to minimize building static pressure during free" cooling.

BLOWER DATA

POWER EXHAUST FANS

STANDARD STATIC ([1] TWO FAN OPERATION)

Return Duct Negative Static Pressure Inches Water Gauge	Air Volume cfm	Return Duct Negative Static Pressure Inches Water Gauge	Air Volume cfm
0	12,100	0.50	5700
0.05	11,600	0.55	5000
0.10	11,150	0.60	4300
0.15	10,600	0.65	3800
0.20	10,100	0.70	3400
0.25	9500	0.75	3000
0.30	8900	0.80	2500
0.35	8200	0.85	2300
0.40	7400	0.90	2000
0.45	6500		

[1] For one fan operation, use half of the air volume value.

OUTDOOR AIR PERCENTAGE VS. FRESH AIR DAMPER ANGLE - Less ERW

Fresh Air Damper Opening Angle	Percentage of Outdoor Air Available at Various Return Duct Static Pressures - in. w.g.			
	0.2	0.4	0.6	0.8
10°	5%	11%	16%	21%
20°	19%	25%	30%	36%
30°	34%	39%	44%	50%
40°	48%	53%	59%	64%
50°	62%	68%	73%	79%
60°	77%	82%	87%	93%
70°	91%	96%	100%	100%
80°	100%	100%	100%	100%

NOTE - Outdoor air percentage will vary when a variable frequency drive (VFD) drive is used on the supply air blower.

OUTDOOR AIR PERCENTAGE VS. FRESH AIR DAMPER ANGLE - With ERW

[1] ERW Static Pressure		Percentage of Outdoor Air Available at Various Return Duct Static Pressures																	
		0 Return Duct Static						0.2 Return Duct Static						0.4 Return Duct Static					
	in. w.g.	1.2	1.0	0.8	0.6	0.4	0.2	1.2	1.0	0.8	0.6	0.4	0.2	1.2	1.0	0.8	0.6	0.4	0.2
Fresh Air Damper Opening Angle	10°	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
	20°	9%	4%	- - -	- - -	- - -	- - -	14%	9%	4%	- - -	- - -	- - -	19%	14%	9%	4%	- - -	- - -
	30°	23%	18%	13%	8%	2%	- - -	28%	23%	18%	13%	8%	2%	34%	28%	23%	18%	13%	8%
	40°	38%	32%	27%	22%	17%	11%	43%	38%	32%	27%	22%	17%	48%	43%	38%	32%	27%	22%
	50°	52%	46%	41%	36%	31%	25%	57%	52%	46%	41%	36%	31%	62%	57%	52%	46%	41%	36%
	60°	66%	61%	55%	50%	45%	39%	71%	66%	61%	55%	50%	45%	77%	71%	66%	61%	55%	50%
	70°	81%	75%	70%	64%	59%	54%	86%	81%	75%	70%	64%	59%	91%	86%	81%	75%	70%	64%
	80°	95%	89%	84%	78%	73%	68%	100%	95%	89%	84%	78%	73%	100%	100%	95%	89%	84%	78%

[1] ERW Static Pressure		Percentage of Outdoor Air Available at Various Return Duct Static Pressures											
		0.6 Return Duct Static						0.8 Return Duct Static					
	in. w.g.	1.2	1.0	0.8	0.6	0.4	0.2	1.2	1.0	0.8	0.6	0.4	0.2
Fresh Air Damper Opening Angle	10°	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
	20°	25%	19%	14%	9%	4%	- - -	30%	25%	19%	14%	9%	4%
	30°	39%	34%	28%	23%	18%	13%	44%	39%	34%	28%	23%	18%
	40°	54%	48%	43%	38%	32%	27%	59%	54%	48%	43%	38%	32%
	50°	68%	62%	57%	52%	46%	41%	73%	68%	62%	57%	52%	46%
	60°	84%	77%	71%	66%	61%	55%	87%	84%	77%	71%	66%	61%
	70°	97%	91%	86%	81%	75%	70%	100%	97%	91%	86%	81%	75%
	80°	100%	100%	100%	95%	89%	84%	100%	100%	100%	100%	95%	89%

NOTE - Outdoor air percentage will vary when a variable frequency drive (VFD) drive is used on the supply air blower.

[1] See page 22 for Energy Recovery Wheel Specifications.

BLOWER DATA

AIR RESISTANCE

HORIZONTAL AIRFLOW APPLICATIONS

Air Volume	Standard Static Power Exhaust fans or No Power Exhaust Fans	50% High Static Power Exhaust Fans	100% High Static Power Exhaust Fans
cfm	in. w.g.	in. w.g.	in. w.g.
10,000	.20	.23	.25
10,500	.20	.25	.30
11,000	.20	.25	.30
11,500	.20	.30	.40
12,000	.20	.33	.45
12,500	.20	.35	.50
13,000	.20	.38	.55
13,500	.25	.43	.60
14,000	.25	.45	.65
14,500	.25	.48	.70
15,000	.30	.55	.80
15,500	.30	.58	.85
16,000	.30	.63	.95
16,500	.30	.63	.95
17,000	.30	.68	1.05
17,500	.30	.70	1.10
18,000	.30	.75	1.20
18,500	.30	.78	1.25
19,000	.30	.83	1.35
19,500	.30	.83	1.40
20,000	.30	.90	1.50
20,500	.35	.94	1.60
21,000	.35	.98	1.70
21,500	.35	1.02	1.80
22,000	.35	1.04	1.90
22,500	.35	1.10	2.00

BLOWER DATA

FACTORY INSTALLED OPTIONS AIR RESISTANCE

ECONOMIZER RETURN AIR DAMPER WITH ERW

Outdoor Air Volume With ERW cfm	Return Duct Negative Static Pressure 0 in. w.g.				
	0.2	0.4	0.6	0.8	1.0
3250	0.32	0.12	- - -	- - -	- - -
3500	0.36	0.16	- - -	- - -	- - -
3750	0.40	0.20	- - -	- - -	- - -
4000	0.44	0.24	0.04	- - -	- - -
4250	0.48	0.28	0.08	- - -	- - -
4500	0.52	0.32	0.12	- - -	- - -
4750	0.57	0.37	0.17	- - -	- - -
5000	0.60	0.40	0.20	- - -	- - -
5250	0.65	0.45	0.25	0.05	- - -
5500	0.68	0.48	0.28	0.08	- - -
5750	0.73	0.53	0.33	0.13	- - -
6000	0.76	0.56	0.36	0.16	- - -
6250	0.81	0.61	0.41	0.21	0.01
6500	0.84	0.64	0.44	0.24	0.04
6750	0.89	0.69	0.49	0.29	0.09
7000	0.93	0.73	0.53	0.33	0.13
7250	0.97	0.77	0.57	0.37	0.17
7500	1.01	0.81	0.61	0.41	0.21
7750	1.05	0.85	0.65	0.45	0.25
8000	1.09	0.89	0.69	0.49	0.29
8250	1.13	0.93	0.73	0.53	0.33
8500	1.17	0.97	0.77	0.57	0.37
8750	1.21	1.01	0.81	0.61	0.41
9000	1.25	1.05	0.85	0.65	0.45

WET INDOOR COIL

Air Volume cfm	Wet Indoor Coil in.w.g.
12,000	0.20
13,000	0.22
14,000	0.24
15,000	0.27
16,000	0.30
17,000	0.33
18,000	0.36
19,000	0.39
20,000	0.42
21,000	0.45
22,000	0.48

BLOWER DRIVE KITS

CONSTANT AIR VOLUME AND VARIABLE FREQUENCY DRIVE KIT SPECIFICATIONS

Nominal hp	Maximum hp	Drive Kit Number	RPM Range (Adjustable Pulley)
5	5.75	1	530 - 640
		2	590 - 725
7.5	8.63	3	565 - 695
		4	685 - 825
10	11.5	5	655 - 790
		6	740 - 895
15	17.25	7	740 - 895
		8	870 - 1035
20	23	9	810 - 980
		10	980 - 1165
25	28.75	11	870 - 1035
		12	1010 - 1175
30	34.5	13	980 - 1165
		14	1065 - 1270

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

HIGH STATIC POWER EXHAUST FANS - DRIVE KIT SPECIFICATIONS - CAV or VFD

Nominal hp per blower	[1] Maximum hp per blower	RPM Range [3] Adjustable	Drive Kit Number		
			50% Applications Rear Position	[2] 100% Applications Order One Each:	
				Front Position	Rear Position
3	3.45	735-920	6(A)-B35	6(B)-B36	6(A)-B35
		690-845	5(A)-B35	5(B)-B36	5(A)-B35
5	5.75	795-975	3(A)-B35	3(B)-B36	3(A)-B35
		735-920	4(A)-B35	4(B)-B36	4(A)-B35
7.5	8.63	850-1065	1(A)-B35	1(B)-B36	1(A)-B35
		820-980	2(A)-B35	2(B)-B36	2(A)-B35

[1] In VFD applications, nominal motor output is also maximum usable motor output.
[2] Two drive kits are required for the same rpm, one for the front blower position and one for the rear blower position because of different belt length requirements.
[3] Adjustable motor pulleys are factory set for maximum RPM in VFD applications.

ENERGY RECOVERY WHEEL SPECIFICATIONS

[1] **Enthalpy Wheel AHRI Rating Data**		Nominal Airflow	6600 cfm		
	EATR - Exhaust Air Transfer Ratio	at minus 1 in. w. c.	4.6%		
		at 0 in. w.c.	1.9%		
		at 1 in. w.c.	0.9%		
	OACF Outdoor Air Correction Factor	at minus 1 in. w. c.	0.99%		
		at 0 in. w.c.	1.05%		
		at 1 in. w.c.	1.08%		
[1] **Thermal Ratings at 0.95 in. w.c. Pressure Differential**			Sensible	Latent	Total
	Total Effectiveness	100% Airflow Heating	68	60	65
		75% Airflow Heating	73	67	71
		100% Airflow Cooling	68	60	63
		75% Airflow Cooling	73	67	70
	Net Effectiveness	100% Airflow Heating	68	60	65
		100% Airflow Cooling	68	60	63
Dimensions		diameter x width - in. (mm)	63 x 3 (1600 x 76)		

[1] Rated in accordance with AHRI Standard 1060-2001. For further information, please reference AHRI 1060-2005 Standard For Rating Air-to-Air Heat Exchangers For Energy Recovery Ventilation Equipment.

EFFECTIVENESS

Air Flow cfm	Static Pressure in. w.c.	Effectiveness (%)			
		Sensible	Latent	Total	
				Cooling	Heating
3250	0.45	79.7	75.1	76.9	78.0
3500	0.48	78.8	73.9	75.9	77.0
3750	0.52	77.9	72.8	74.9	76.1
4000	0.55	77.0	71.7	73.8	54.1
4250	0.59	76.1	70.6	72.8	74.1
4500	0.62	75.3	69.4	71.8	73.2
4750	0.66	74.4	68.3	70.7	72.2
5000	0.69	73.5	67.2	69.7	71.2
5250	0.73	72.6	66.1	68.7	70.3
5500	0.76	71.8	64.9	67.7	69.3
5750	0.80	70.9	63.8	66.6	68.3
6000	0.83	70.0	62.7	65.6	67.4
6250	0.87	69.1	61.6	64.6	66.4
6500	0.90	68.2	60.4	63.5	65.4
6750	0.94	67.4	59.3	62.5	64.5
7000	0.97	66.5	58.2	61.5	63.5
7250	1.01	65.6	57.1	60.4	62.5
7500	1.04	64.7	55.9	59.4	61.6
7750	1.08	63.8	54.8	58.4	60.6
8000	1.11	62.9	53.6	57.3	59.6
8250	1.15	62.0	52.5	56.3	58.7
8500	1.18	61.1	51.4	55.2	57.7
8750	1.22	60.3	50.2	54.2	56.7
9000	1.25	59.4	49.1	53.1	55.7

ELECTRICAL DATA

35 TON STANDARD EFFICIENCY (R-410A)			LGH420S4						
[1] Voltage - 60hz			208/230V - 3 Ph						
Compressor 1		Rated Load Amps	29.5						
		Locked Rotor Amps	195						
Compressor 2		Rated Load Amps	29.5						
		Locked Rotor Amps	195						
Compressor 3		Rated Load Amps	29.5						
		Locked Rotor Amps	195						
Compressor 4		Rated Load Amps	29.5						
		Locked Rotor Amps	195						
Outdoor Fan Motors (6)		Full Load Amps	3.7						
		(total)	(22.2)						
Service Outlet 115V GFI (amps)			15						
Indoor Blower Motor		Horsepower	**5**	**7.5**	**10**	**15**	**20**	**25**	**30**
		Full Load Amps	16.7	24.2	30.8	46.2	59.4	74.8	78
[2] Maximum Overcurrent Protection		Unit Only	175	200	200	225	250	[4] 300	[4] 300
	Power Exhaust	50% Standard Static (2) 1 hp motor	200	200	200	250	250	[4] 300	[4] 300
		100% Standard Static (2) 1 hp motor	200	200	200	250	250	[4] 300	[4] 300
		50% High Static (1) 3 hp motor	200	200	200	250	250	[4] 300	[4] 300
		100% High Static (2) 3 hp motor	200	200	225	250	250	[4] 300	[4] 300
		50% High Static (1) 5 hp motor	200	200	225	250	250	[4] 300	[4] 300
		100% High Static (2) 5 hp motor	225	225	225	250	[4] 300	[4] 300	[4] 350
		50% High Static (1) 7.5 hp motor	200	225	225	250	[4] 300	[4] 300	[4] 300
		100% High Static (2) 7.5 hp motor	225	250	250	250	[4] 300	[4] 350	[4] 350
[3] Minimum Circuit Ampacity		Unit Only	167	175	181	201	217	236	240
	Power Exhaust	50% Standard Static (2) 1 hp motor	172	179	186	206	222	241	245
		100% Standard Static (2) 1 hp motor	177	184	191	210	227	246	250
		50% High Static (1) 3 hp motor	178	185	192	211	228	247	251
		100% High Static (2) 3 hp motor	188	196	203	222	238	258	262
		50% High Static (1) 5 hp motor	184	191	198	217	234	253	257
		100% High Static (2) 5 hp motor	200	208	215	234	251	270	274
		50% High Static (1) 7.5 hp motor	191	199	205	221	234	249	253
		100% High Static (2) 7.5 hp motor	215	223	230	249	266	285	289

[1] Extremes of operating range are plus and minus 10% of line voltage.
[2] HACR type breaker or fuse.
[3] Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.
[4] Factory installed circuit breaker not available.

ELECTRICAL DATA

35 TON STANDARD EFFICIENCY (R-410A)			LGH420S4						
[1] Voltage - 60hz			460V - 3 Ph						
Compressor 1		Rated Load Amps	14.8						
		Locked Rotor Amps	95						
Compressor 2		Rated Load Amps	14.8						
		Locked Rotor Amps	95						
Compressor 3		Rated Load Amps	14.8						
		Locked Rotor Amps	95						
Compressor 4		Rated Load Amps	14.8						
		Locked Rotor Amps	95						
Outdoor Fan Motors (6)		Full Load Amps	1.9						
		(total)	(11.4)						
Service Outlet 115V GFI (amps)			15						
Indoor Blower Motor		Horsepower	**5**	**7.5**	**10**	**15**	**20**	**25**	**30**
		Full Load Amps	7.6	11	14	21	27	34	35
[2] Maximum Overcurrent Protection		Unit Only	90	100	100	110	125	125	150
	Power Exhaust	50% Standard Static (2) 1 hp motor	100	100	100	110	125	150	150
		100% Standard Static (2) 1 hp motor	100	100	100	110	125	150	150
		50% High Static (1) 3 hp motor	100	100	100	110	125	150	150
		100% High Static (2) 3 hp motor	100	100	100	110	125	150	150
		50% High Static (1) 5 hp motor	100	100	110	125	125	150	150
		100% High Static (2) 5 hp motor	110	110	110	125	125	150	175
		50% High Static (1) 7.5 hp motor	100	110	110	125	125	150	150
		100% High Static (2) 7.5 hp motor	125	125	125	125	150	150	175
[3] Minimum Circuit Ampacity		Unit Only	84	87	90	99	106	115	122
	Power Exhaust	50% Standard Static (2) 1 hp motor	86	89	92	101	108	117	125
		100% Standard Static (2) 1 hp motor	88	92	95	103	111	120	127
		50% High Static (1) 3 hp motor	88	92	95	103	111	120	127
		100% High Static (2) 3 hp motor	93	97	100	108	116	124	132
		50% High Static (1) 5 hp motor	91	95	98	106	114	122	130
		100% High Static (2) 5 hp motor	99	102	105	114	121	130	137
		50% High Static (1) 7.5 hp motor	95	98	101	110	117	126	133
		100% High Static (2) 7.5 hp motor	106	109	112	121	128	137	144

[1] Extremes of operating range are plus and minus 10% of line voltage.
[2] HACR type breaker or fuse.
[3] Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

ELECTRICAL DATA

35 TON STANDARD EFFICIENCY (R-410A)			LGH420S4						
[1] Voltage - 60hz			575V - 3 Ph						
Compressor 1		Rated Load Amps	12.2						
		Locked Rotor Amps	80						
Compressor 2		Rated Load Amps	12.2						
		Locked Rotor Amps	80						
Compressor 3		Rated Load Amps	12.2						
		Locked Rotor Amps	80						
Compressor 4		Rated Load Amps	12.2						
		Locked Rotor Amps	80						
Outdoor Fan Motors (6)		Full Load Amps	1.6						
		(total)	(9.6)						
Service Outlet 115V GFI (amps)			15						
Indoor Blower Motor		Horsepower	**5**	**7.5**	**10**	**15**	**20**	**25**	**30**
		Full Load Amps	6.1	9	11	17	22	27	32
[2] Maximum Overcurrent Protection		Unit Only	80	80	80	90	100	110	125
	Power Exhaust	50% Standard Static (2) 1 hp motor	80	80	80	90	110	110	125
		100% Standard Static (2) 1 hp motor	80	80	80	100	110	110	125
		50% High Static (1) 3 hp motor	80	80	80	100	110	110	125
		100% High Static (2) 3 hp motor	80	90	90	100	110	125	125
		50% High Static (1) 5 hp motor	80	80	90	100	110	125	125
		100% High Static (2) 5 hp motor	90	90	90	100	110	125	125
		50% High Static (1) 7.5 hp motor	80	90	90	100	110	125	125
		100% High Static (2) 7.5 hp motor	90	100	100	110	125	125	125
[3] Minimum Circuit Ampacity		Unit Only	69	72	74	80	85	90	95
	Power Exhaust	50% Standard Static (2) 1 hp motor	71	74	76	82	87	92	97
		100% Standard Static (2) 1 hp motor	73	76	78	85	91	98	104
		50% High Static (1) 3 hp motor	73	76	78	85	91	98	104
		100% High Static (2) 3 hp motor	77	80	82	89	95	101	108
		50% High Static (1) 5 hp motor	75	78	80	87	93	100	106
		100% High Static (2) 5 hp motor	81	84	86	93	100	106	112
		50% High Static (1) 7.5 hp motor	78	81	83	90	96	103	109
		100% High Static (2) 7.5 hp motor	87	90	92	99	105	112	118

[1] Extremes of operating range are plus and minus 10% of line voltage.
[2] HACR type breaker or fuse.
[3] Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

ELECTRICAL DATA

35 TON HIGH EFFICIENCY (R-410A)			LGH420H4						
[1] Voltage - 60hz			208/230V - 3 Ph						
Compressor 1		Rated Load Amps	29.5						
		Locked Rotor Amps	195						
Compressor 2		Rated Load Amps	29.5						
		Locked Rotor Amps	195						
Compressor 3		Rated Load Amps	29.5						
		Locked Rotor Amps	195						
Compressor 4		Rated Load Amps	29.5						
		Locked Rotor Amps	195						
Outdoor Fan Motors (6)		Full Load Amps	4.8						
		(total)	(28.8)						
Service Outlet 115V GFI (amps)			15						
Indoor Blower Motor		Horsepower	5	7.5	10	15	20	25	30
		Full Load Amps	16.7	24.2	30.8	46.2	59.4	74.8	78
[2] Maximum Overcurrent Protection		Unit Only	200	200	200	250	250	[4] 300	[4] 300
	Power Exhaust	50% Standard Static (2) 1 hp motor	200	200	200	250	250	[4] 300	[4] 300
		100% Standard Static (2) 1 hp motor	200	200	225	250	250	[4] 300	[4] 300
		50% High Static (1) 3 hp motor	200	200	225	250	250	[4] 300	[4] 300
		100% High Static (2) 3 hp motor	200	225	225	250	[4] 300	[4] 300	[4] 300
		50% High Static (1) 5 hp motor	200	225	225	250	250	[4] 300	[4] 300
		100% High Static (2) 5 hp motor	225	225	250	250	[4] 300	[4] 350	[4] 350
		50% High Static (1) 7.5 hp motor	225	225	225	250	[4] 300	[4] 300	[4] 300
		100% High Static (2) 7.5 hp motor	250	250	250	[4] 300	[4] 300	[4] 350	[4] 350
[3] Minimum Circuit Ampacity		Unit Only	174	181	188	207	224	243	247
	Power Exhaust	50% Standard Static (2) 1 hp motor	178	186	193	212	229	248	252
		100% Standard Static (2) 1 hp motor	183	191	198	217	233	253	257
		50% High Static (1) 3 hp motor	184	192	199	218	234	254	258
		100% High Static (2) 3 hp motor	195	202	209	229	245	264	268
		50% High Static (1) 5 hp motor	190	198	205	224	241	260	264
		100% High Static (2) 5 hp motor	207	215	221	241	257	276	280
		50% High Static (1) 7.5 hp motor	198	205	212	227	241	256	259
		100% High Static (2) 7.5 hp motor	222	230	236	256	272	291	295

[1] Extremes of operating range are plus and minus 10% of line voltage.
[2] HACR type breaker or fuse.
[3] Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.
[4] Factory installed circuit breaker not available.

ELECTRICAL DATA

35 TON HIGH EFFICIENCY (R-410A)			LGH420H4						
[1] Voltage - 60hz			460V - 3 Ph						
Compressor 1		Rated Load Amps	14.8						
		Locked Rotor Amps	95						
Compressor 2		Rated Load Amps	14.8						
		Locked Rotor Amps	95						
Compressor 3		Rated Load Amps	14.8						
		Locked Rotor Amps	95						
Compressor 4		Rated Load Amps	14.8						
		Locked Rotor Amps	95						
Outdoor Fan Motors (6)		Full Load Amps	2.4						
		(total)	(14.4)						
Service Outlet 115V GFI (amps)			15						
Indoor Blower Motor		Horsepower	**5**	**7.5**	**10**	**15**	**20**	**25**	**30**
		Full Load Amps	7.6	11	14	21	27	34	35
[2] Maximum Overcurrent Protection		Unit Only	100	100	100	110	125	150	150
	Power Exhaust	50% Standard Static (2) 1 hp motor	100	100	100	110	125	150	150
		100% Standard Static (2) 1 hp motor	100	100	110	125	125	150	150
		50% High Static (1) 3 hp motor	100	100	110	125	125	150	150
		100% High Static (2) 3 hp motor	100	100	110	125	125	150	150
		50% High Static (1) 5 hp motor	100	110	110	125	125	150	150
		100% High Static (2) 5 hp motor	110	110	110	125	150	150	175
		50% High Static (1) 7.5 hp motor	110	110	110	125	125	150	175
		100% High Static (2) 7.5 hp motor	125	150	150	125	150	150	175
[3] Minimum Circuit Ampacity		Unit Only	87	90	93	102	109	118	125
	Power Exhaust	50% Standard Static (2) 1 hp motor	89	92	95	104	111	120	128
		100% Standard Static (2) 1 hp motor	91	95	98	106	114	123	130
		50% High Static (1) 3 hp motor	91	95	98	106	114	123	130
		100% High Static (2) 3 hp motor	96	100	103	111	119	127	135
		50% High Static (1) 5 hp motor	94	98	101	109	117	125	133
		100% High Static (2) 5 hp motor	102	105	108	117	124	133	140
		50% High Static (1) 7.5 hp motor	98	101	104	113	120	129	136
		100% High Static (2) 7.5 hp motor	109	112	115	124	131	140	147

[1] Extremes of operating range are plus and minus 10% of line voltage.
[2] HACR type breaker or fuse.
[3] Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

ELECTRICAL DATA

35 TON HIGH EFFICIENCY (R-410A)			LGH420H4						
[1] Voltage - 60hz			575V - 3 Ph						
Compressor 1		Rated Load Amps	12.2						
		Locked Rotor Amps	80						
Compressor 2		Rated Load Amps	12.2						
		Locked Rotor Amps	80						
Compressor 3		Rated Load Amps	12.2						
		Locked Rotor Amps	80						
Compressor 4		Rated Load Amps	12.2						
		Locked Rotor Amps	80						
Outdoor Fan Motors (6)		Full Load Amps	2						
		(total)	(12)						
Service Outlet 115V GFI (amps)			15						
Indoor Blower Motor		Horsepower	**5**	**7.5**	**10**	**15**	**20**	**25**	**30**
		Full Load Amps	6.1	9	11	17	22	27	32
[2] Maximum Overcurrent Protection		Unit Only	80	80	80	100	110	110	125
	Power Exhaust	50% Standard Static (2) 1 hp motor	80	80	90	100	110	110	125
		100% Standard Static (2) 1 hp motor	80	90	90	100	110	125	125
		50% High Static (1) 3 hp motor	80	90	90	100	110	125	125
		100% High Static (2) 3 hp motor	90	90	90	100	110	125	125
		50% High Static (1) 5 hp motor	80	90	90	100	110	125	125
		100% High Static (2) 5 hp motor	90	90	100	110	110	125	125
		50% High Static (1) 7.5 hp motor	90	90	90	100	110	125	125
		100% High Static (2) 7.5 hp motor	100	100	100	110	125	125	150
[3] Minimum Circuit Ampacity		Unit Only	71	74	76	82	87	92	97
	Power Exhaust	50% Standard Static (2) 1 hp motor	73	76	78	84	89	94	99
		100% Standard Static (2) 1 hp motor	75	78	80	88	94	100	106
		50% High Static (1) 3 hp motor	75	78	80	87	94	100	106
		100% High Static (2) 3 hp motor	79	82	84	91	98	104	110
		50% High Static (1) 5 hp motor	78	80	82	90	96	102	108
		100% High Static (2) 5 hp motor	84	87	89	96	102	108	114
		50% High Static (1) 7.5 hp motor	80	83	85	93	99	105	111
		100% High Static (2) 7.5 hp motor	89	92	94	102	108	114	120

[1] Extremes of operating range are plus and minus 10% of line voltage.
[2] HACR type breaker or fuse.
[3] Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

ELECTRICAL DATA

40 TON STANDARD EFFICIENCY (R-410A)			LGH480S4						
[1] Voltage - 60hz			208/230V - 3 Ph						
Compressor 1		Rated Load Amps	30.1						
		Locked Rotor Amps	225						
Compressor 2		Rated Load Amps	30.1						
		Locked Rotor Amps	225						
Compressor 3		Rated Load Amps	30.1						
		Locked Rotor Amps	225						
Compressor 4		Rated Load Amps	30.1						
		Locked Rotor Amps	225						
Outdoor Fan Motors (6)		Full Load Amps	3.7						
		(total)	(22.2)						
Service Outlet 115V GFI (amps)			15						
Indoor Blower Motor		Horsepower	**5**	**7.5**	**10**	**15**	**20**	**25**	**30**
		Full Load Amps	16.7	24.2	30.8	46.2	59.4	74.8	78
[2] Maximum Overcurrent Protection		Unit Only	175	200	200	225	250	[4] 300	[4] 300
	Power Exhaust	50% Standard Static (2) 1 hp motor	200	200	200	250	250	[4] 300	[4] 300
		100% Standard Static (2) 1 hp motor	200	200	200	250	250	[4] 300	[4] 300
		50% High Static (1) 3 hp motor	200	200	225	250	250	[4] 300	[4] 300
		100% High Static (2) 3 hp motor	200	225	225	250	[4] 300	[4] 300	[4] 300
		50% High Static (1) 5 hp motor	200	200	225	250	250	[4] 300	[4] 300
		100% High Static (2) 5 hp motor	225	225	225	250	[4] 300	[4] 300	[4] 350
		50% High Static (1) 7.5 hp motor	200	225	225	250	[4] 300	[4] 300	[4] 300
		100% High Static (2) 7.5 hp motor	225	250	250	250	[4] 300	[4] 350	[4] 350
[3] Minimum Circuit Ampacity		Unit Only	170	178	184	204	220	239	243
	Power Exhaust	50% Standard Static (2) 1 hp motor	175	182	189	208	225	244	248
		100% Standard Static (2) 1 hp motor	180	187	194	213	230	249	253
		50% High Static (1) 3 hp motor	181	188	195	214	231	250	254
		100% High Static (2) 3 hp motor	191	199	205	225	241	260	264
		50% High Static (1) 5 hp motor	187	194	201	220	237	256	260
		100% High Static (2) 5 hp motor	203	211	218	237	253	273	277
		50% High Static (1) 7.5 hp motor	194	202	208	224	237	252	256
		100% High Static (2) 7.5 hp motor	218	226	233	252	268	288	292

[1] Extremes of operating range are plus and minus 10% of line voltage.
[2] HACR type breaker or fuse.
[3] Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.
[4] Factory installed circuit breaker not available.

ELECTRICAL DATA

40 TON STANDARD EFFICIENCY (R-410A)			LGH480S4						
[1] Voltage - 60hz			460V - 3 Ph						
Compressor 1		Rated Load Amps	16.7						
		Locked Rotor Amps	114						
Compressor 2		Rated Load Amps	16.7						
		Locked Rotor Amps	114						
Compressor 3		Rated Load Amps	16.7						
		Locked Rotor Amps	114						
Compressor 4		Rated Load Amps	16.7						
		Locked Rotor Amps	114						
Outdoor Fan Motors (6)		Full Load Amps	1.9						
		(total)	(11.4)						
Service Outlet 115V GFI (amps)			15						
Indoor Blower Motor		Horsepower	**5**	**7.5**	**10**	**15**	**20**	**25**	**30**
		Full Load Amps	7.6	11	14	21	27	34	35
[2] Maximum Overcurrent Protection		Unit Only	100	110	110	125	125	150	150
	Power Exhaust	50% Standard Static (2) 1 hp motor	110	110	110	125	125	150	150
		100% Standard Static (2) 1 hp motor	110	110	110	125	125	150	150
		50% High Static (1) 3 hp motor	110	110	110	125	125	150	150
		100% High Static (2) 3 hp motor	110	110	110	125	125	150	150
		50% High Static (1) 5 hp motor	110	110	110	125	125	150	175
		100% High Static (2) 5 hp motor	110	125	125	125	150	150	175
		50% High Static (1) 7.5 hp motor	110	110	125	125	150	150	175
		100% High Static (2) 7.5 hp motor	125	150	150	150	150	175	175
[3] Minimum Circuit Ampacity		Unit Only	92	95	98	106	114	122	130
	Power Exhaust	50% Standard Static (2) 1 hp motor	94	97	100	109	116	125	132
		100% Standard Static (2) 1 hp motor	96	100	103	111	118	127	135
		50% High Static (1) 3 hp motor	96	100	103	111	118	127	135
		100% High Static (2) 3 hp motor	101	105	108	116	123	132	139
		50% High Static (1) 5 hp motor	99	103	106	114	121	130	137
		100% High Static (2) 5 hp motor	107	110	113	121	129	138	145
		50% High Static (1) 7.5 hp motor	103	106	109	117	125	133	141
		100% High Static (2) 7.5 hp motor	114	117	120	128	136	144	152

[1] Extremes of operating range are plus and minus 10% of line voltage.
[2] HACR type breaker or fuse.
[3] Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

ELECTRICAL DATA

40 TON STANDARD EFFICIENCY (R-410A)			LGH480S4						
[1] Voltage - 60hz			575V - 3 Ph						
Compressor 1		Rated Load Amps	12.2						
		Locked Rotor Amps	80						
Compressor 2		Rated Load Amps	12.2						
		Locked Rotor Amps	80						
Compressor 3		Rated Load Amps	12.2						
		Locked Rotor Amps	80						
Compressor 4		Rated Load Amps	12.2						
		Locked Rotor Amps	80						
Outdoor Fan Motors (6)		Full Load Amps	1.6						
		(total)	(9.6)						
Service Outlet 115V GFI (amps)			15						
Indoor Blower Motor		Horsepower	**5**	**7.5**	**10**	**15**	**20**	**25**	**30**
		Full Load Amps	6.1	9	11	17	22	27	32
[2] Maximum Overcurrent Protection		Unit Only	80	80	80	90	100	110	125
	Power Exhaust	50% Standard Static (2) 1 hp motor	80	80	80	90	110	110	125
		100% Standard Static (2) 1 hp motor	80	80	80	100	110	110	125
		50% High Static (1) 3 hp motor	80	80	80	100	110	110	125
		100% High Static (2) 3 hp motor	80	90	90	100	110	125	125
		50% High Static (1) 5 hp motor	80	80	90	100	110	125	125
		100% High Static (2) 5 hp motor	90	90	90	100	110	125	125
		50% High Static (1) 7.5 hp motor	80	90	90	100	110	125	125
		100% High Static (2) 7.5 hp motor	90	100	100	110	125	125	125
[3] Minimum Circuit Ampacity		Unit Only	69	72	74	80	85	90	95
	Power Exhaust	50% Standard Static (2) 1 hp motor	71	74	76	82	87	92	97
		100% Standard Static (2) 1 hp motor	73	76	78	85	91	98	104
		50% High Static (1) 3 hp motor	73	76	78	85	91	98	104
		100% High Static (2) 3 hp motor	77	80	82	89	95	101	108
		50% High Static (1) 5 hp motor	75	78	80	87	93	100	106
		100% High Static (2) 5 hp motor	81	84	86	93	100	106	112
		50% High Static (1) 7.5 hp motor	78	81	83	90	96	103	109
		100% High Static (2) 7.5 hp motor	87	90	92	99	105	112	118

[1] Extremes of operating range are plus and minus 10% of line voltage.
[2] HACR type breaker or fuse.
[3] Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

ELECTRICAL DATA

40 TON HIGH EFFICIENCY (R-410A)			LGH480H4						
[1] Voltage - 60hz			208/230V - 3 Ph						
Compressor 1		Rated Load Amps	30.1						
		Locked Rotor Amps	225						
Compressor 2		Rated Load Amps	30.1						
		Locked Rotor Amps	225						
Compressor 3		Rated Load Amps	30.1						
		Locked Rotor Amps	225						
Compressor 4		Rated Load Amps	30.1						
		Locked Rotor Amps	225						
Outdoor Fan Motors (6)		Full Load Amps	4.8						
		(total)	(28.8)						
Service Outlet 115V GFI (amps)			15						
Indoor Blower Motor		Horsepower	5	7.5	10	15	20	25	30
		Full Load Amps	16.7	24.2	30.8	46.2	59.4	74.8	78
[2] Maximum Overcurrent Protection		Unit Only	200	200	200	250	250	[4] 300	[4] 300
	Power Exhaust	50% Standard Static (2) 1 hp motor	200	200	225	250	250	[4] 300	[4] 300
		100% Standard Static (2) 1 hp motor	200	200	225	250	250	[4] 300	[4] 300
		50% High Static (1) 3 hp motor	200	200	225	250	250	[4] 300	[4] 300
		100% High Static (2) 3 hp motor	225	225	225	250	[4] 300	[4] 300	[4] 300
		50% High Static (1) 5 hp motor	200	225	225	250	[4] 300	[4] 300	[4] 300
		100% High Static (2) 5 hp motor	225	225	250	250	[4] 300	[4] 350	[4] 350
		50% High Static (1) 7.5 hp motor	225	225	225	250	[4] 300	[4] 300	[4] 350
		100% High Static (2) 7.5 hp motor	250	250	250	[4] 300	[4] 300	[4] 350	[4] 350
[3] Minimum Circuit Ampacity		Unit Only	177	184	191	210	227	246	250
	Power Exhaust	50% Standard Static (2) 1 hp motor	181	189	196	215	231	251	255
		100% Standard Static (2) 1 hp motor	186	194	200	220	236	255	259
		50% High Static (1) 3 hp motor	187	195	201	221	237	256	260
		100% High Static (2) 3 hp motor	198	205	212	231	248	267	271
		50% High Static (1) 5 hp motor	193	201	208	227	243	263	267
		100% High Static (2) 5 hp motor	210	218	224	244	260	279	283
		50% High Static (1) 7.5 hp motor	201	208	215	230	244	259	262
		100% High Static (2) 7.5 hp motor	225	233	239	259	275	294	298

[1] Extremes of operating range are plus and minus 10% of line voltage.
[2] HACR type breaker or fuse.
[3] Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.
[4] Factory installed circuit breaker not available.

ELECTRICAL DATA

40 TON HIGH EFFICIENCY (R-410A)			LGH480H4						
[1] Voltage - 60hz			460V - 3 Ph						
Compressor 1		Rated Load Amps	16.7						
		Locked Rotor Amps	114						
Compressor 2		Rated Load Amps	16.7						
		Locked Rotor Amps	114						
Compressor 3		Rated Load Amps	16.7						
		Locked Rotor Amps	114						
Compressor 4		Rated Load Amps	16.7						
		Locked Rotor Amps	114						
Outdoor Fan Motors (6)		Full Load Amps	2.4						
		(total)	(14.4)						
Service Outlet 115V GFI (amps)			15						
Indoor Blower Motor		Horsepower	**5**	**7.5**	**10**	**15**	**20**	**25**	**30**
		Full Load Amps	7.6	11	14	21	27	34	35
[2] Maximum Overcurrent Protection		Unit Only	110	110	110	125	125	150	150
	Power Exhaust	50% Standard Static (2) 1 hp motor	110	110	110	125	125	150	150
		100% Standard Static (2) 1 hp motor	110	110	110	125	125	150	175
		50% High Static (1) 3 hp motor	110	110	110	125	125	150	175
		100% High Static (2) 3 hp motor	110	110	110	125	125	150	175
		50% High Static (1) 5 hp motor	110	110	110	125	150	150	175
		100% High Static (2) 5 hp motor	125	125	125	125	150	150	175
		50% High Static (1) 7.5 hp motor	110	125	125	125	150	150	175
		100% High Static (2) 7.5 hp motor	150	150	150	150	150	175	175
[3] Minimum Circuit Ampacity		Unit Only	95	98	101	109	117	125	133
	Power Exhaust	50% Standard Static (2) 1 hp motor	97	100	103	112	119	128	135
		100% Standard Static (2) 1 hp motor	99	103	106	114	121	130	138
		50% High Static (1) 3 hp motor	99	103	106	114	121	130	138
		100% High Static (2) 3 hp motor	104	108	111	119	126	135	142
		50% High Static (1) 5 hp motor	102	106	109	117	124	133	140
		100% High Static (2) 5 hp motor	110	113	116	124	132	141	148
		50% High Static (1) 7.5 hp motor	106	109	112	120	128	136	144
		100% High Static (2) 7.5 hp motor	117	120	123	131	139	147	155

[1] Extremes of operating range are plus and minus 10% of line voltage.
[2] HACR type breaker or fuse.
[3] Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

ELECTRICAL DATA

40 TON HIGH EFFICIENCY (R-410A)			LGH480H4						
[1] Voltage - 60hz			575V - 3 Ph						
Compressor 1		Rated Load Amps	12.2						
		Locked Rotor Amps	80						
Compressor 2		Rated Load Amps	12.2						
		Locked Rotor Amps	80						
Compressor 3		Rated Load Amps	12.2						
		Locked Rotor Amps	80						
Compressor 4		Rated Load Amps	12.2						
		Locked Rotor Amps	80						
Outdoor Fan Motors (6)		Full Load Amps	2						
		(total)	(12)						
Service Outlet 115V GFI (amps)			15						
Indoor Blower Motor		Horsepower	**5**	**7.5**	**10**	**15**	**20**	**25**	**30**
		Full Load Amps	6.1	9	11	17	22	27	32
[2] Maximum Overcurrent Protection		Unit Only	80	80	80	100	110	110	125
	Power Exhaust	50% Standard Static (2) 1 hp motor	80	80	90	100	110	110	125
		100% Standard Static (2) 1 hp motor	80	90	90	100	110	125	125
		50% High Static (1) 3 hp motor	80	90	90	100	110	125	125
		100% High Static (2) 3 hp motor	90	90	90	100	110	125	125
		50% High Static (1) 5 hp motor	80	90	90	100	110	125	125
		100% High Static (2) 5 hp motor	90	90	100	110	110	125	125
		50% High Static (1) 7.5 hp motor	90	90	90	100	110	125	125
		100% High Static (2) 7.5 hp motor	100	100	100	110	125	125	150
[3] Minimum Circuit Ampacity		Unit Only	71	74	76	82	87	92	97
	Power Exhaust	50% Standard Static (2) 1 hp motor	73	76	78	84	89	94	99
		100% Standard Static (2) 1 hp motor	75	78	80	88	94	100	106
		50% High Static (1) 3 hp motor	75	78	80	87	94	100	106
		100% High Static (2) 3 hp motor	79	82	84	91	98	104	110
		50% High Static (1) 5 hp motor	78	80	82	90	96	102	108
		100% High Static (2) 5 hp motor	84	87	89	96	102	108	114
		50% High Static (1) 7.5 hp motor	80	83	85	93	99	105	111
		100% High Static (2) 7.5 hp motor	89	92	94	102	108	114	120

[1] Extremes of operating range are plus and minus 10% of line voltage.
[2] HACR type breaker or fuse.
[3] Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

ELECTRICAL DATA

45 TON STANDARD EFFICIENCY (R-410A)			LGH540S4						
[1] Voltage - 60hz			208/230V - 3 Ph						
Compressor 1		Rated Load Amps	33.3						
		Locked Rotor Amps	239						
Compressor 2		Rated Load Amps	33.3						
		Locked Rotor Amps	239						
Compressor 3		Rated Load Amps	33.3						
		Locked Rotor Amps	239						
Compressor 4		Rated Load Amps	33.3						
		Locked Rotor Amps	239						
Outdoor Fan Motors (6)		Full Load Amps	3.7						
		(total)	(22.2)						
Service Outlet 115V GFI (amps)			15						
Indoor Blower Motor		Horsepower	**5**	**7.5**	**10**	**15**	**20**	**25**	**30**
		Full Load Amps	16.7	24.2	30.8	46.2	59.4	74.8	78
[2] Maximum Overcurrent Protection		Unit Only	200	200	225	250	250	[4] 300	[4] 300
	Power Exhaust	50% Standard Static (2) 1 hp motor	200	225	225	250	250	[4] 300	[4] 300
		100% Standard Static (2) 1 hp motor	225	225	225	250	[4] 300	[4] 300	[4] 300
		50% High Static (1) 3 hp motor	225	225	225	250	[4] 300	[4] 300	[4] 300
		100% High Static (2) 3 hp motor	225	225	250	250	[4] 300	[4] 300	[4] 350
		50% High Static (1) 5 hp motor	225	225	225	250	[4] 300	[4] 300	[4] 350
		100% High Static (2) 5 hp motor	225	250	250	[4] 300	[4] 300	[4] 350	[4] 350
		50% High Static (1) 7.5 hp motor	225	225	250	250	[4] 300	[4] 350	[4] 350
		100% High Static (2) 7.5 hp motor	250	250	250	[4] 300	[4] 300	[4] 350	[4] 350
[3] Minimum Circuit Ampacity		Unit Only	184	191	198	216	233	252	256
	Power Exhaust	50% Standard Static (2) 1 hp motor	188	196	203	221	238	257	261
		100% Standard Static (2) 1 hp motor	193	201	207	226	242	262	266
		50% High Static (1) 3 hp motor	194	202	208	227	243	263	267
		100% High Static (2) 3 hp motor	205	212	219	238	254	273	277
		50% High Static (1) 5 hp motor	200	208	214	233	250	269	273
		100% High Static (2) 5 hp motor	217	225	231	250	266	285	289
		50% High Static (1) 7.5 hp motor	208	215	222	237	251	266	269
		100% High Static (2) 7.5 hp motor	232	240	246	265	281	300	304

[1] Extremes of operating range are plus and minus 10% of line voltage.
[2] HACR type breaker or fuse.
[3] Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.
[4] Factory installed circuit breaker not available.

ELECTRICAL DATA

45 TON STANDARD EFFICIENCY (R-410A)			LGH540S4						
[1] Voltage - 60hz			460V - 3 Ph						
Compressor 1		Rated Load Amps	17.9						
		Locked Rotor Amps	125						
Compressor 2		Rated Load Amps	17.9						
		Locked Rotor Amps	125						
Compressor 3		Rated Load Amps	17.9						
		Locked Rotor Amps	125						
Compressor 4		Rated Load Amps	17.9						
		Locked Rotor Amps	125						
Outdoor Fan Motors (6)		Full Load Amps	1.9						
		(total)	(11.4)						
Service Outlet 115V GFI (amps)			15						
Indoor Blower Motor		Horsepower	**5**	**7.5**	**10**	**15**	**20**	**25**	**30**
		Full Load Amps	7.6	11	14	21	27	34	35
[2] Maximum Overcurrent Protection		Unit Only	110	110	110	125	125	150	150
	Power Exhaust	50% Standard Static (2) 1 hp motor	110	110	110	125	125	150	175
		100% Standard Static (2) 1 hp motor	110	110	125	125	150	150	175
		50% High Static (1) 3 hp motor	110	110	125	125	150	150	175
		100% High Static (2) 3 hp motor	110	110	125	125	150	150	175
		50% High Static (1) 5 hp motor	110	125	125	125	150	150	175
		100% High Static (2) 5 hp motor	125	125	125	150	150	175	175
		50% High Static (1) 7.5 hp motor	125	125	125	125	150	150	175
		100% High Static (2) 7.5 hp motor	150	150	150	150	150	175	175
[3] Minimum Circuit Ampacity		Unit Only	97	101	104	111	119	128	135
	Power Exhaust	50% Standard Static (2) 1 hp motor	100	103	106	114	121	130	137
		100% Standard Static (2) 1 hp motor	102	105	108	116	124	132	140
		50% High Static (1) 3 hp motor	102	105	108	116	124	132	140
		100% High Static (2) 3 hp motor	107	110	113	121	128	137	145
		50% High Static (1) 5 hp motor	105	108	111	119	126	135	143
		100% High Static (2) 5 hp motor	112	116	119	127	134	143	150
		50% High Static (1) 7.5 hp motor	108	112	115	122	130	139	146
		100% High Static (2) 7.5 hp motor	119	123	126	133	141	150	157

[1] Extremes of operating range are plus and minus 10% of line voltage.
[2] HACR type breaker or fuse.
[3] Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

ELECTRICAL DATA

45 TON STANDARD EFFICIENCY (R-410A)			LGH540S4						
[1] Voltage - 60hz			575V - 3 Ph						
Compressor 1		Rated Load Amps	12.8						
		Locked Rotor Amps	80						
Compressor 2		Rated Load Amps	12.8						
		Locked Rotor Amps	80						
Compressor 3		Rated Load Amps	12.8						
		Locked Rotor Amps	80						
Compressor 4		Rated Load Amps	12.8						
		Locked Rotor Amps	80						
Outdoor Fan Motors (6)		Full Load Amps	1.6						
		(total)	(9.6)						
Service Outlet 115V GFI (amps)			15						
Indoor Blower Motor		Horsepower	**5**	**7.5**	**10**	**15**	**20**	**25**	**30**
		Full Load Amps	6.1	9	11	17	22	27	32
[2] Maximum Overcurrent Protection		Unit Only	80	80	80	100	110	110	125
	Power Exhaust	50% Standard Static (2) 1 hp motor	80	80	90	100	110	125	125
		100% Standard Static (2) 1 hp motor	80	90	90	100	110	125	125
		50% High Static (1) 3 hp motor	80	90	90	100	110	125	125
		100% High Static (2) 3 hp motor	90	90	90	100	110	125	125
		50% High Static (1) 5 hp motor	90	90	90	100	110	125	125
		100% High Static (2) 5 hp motor	90	90	100	110	110	125	125
		50% High Static (1) 7.5 hp motor	90	90	90	100	110	125	125
		100% High Static (2) 7.5 hp motor	100	100	100	110	125	125	150
[3] Minimum Circuit Ampacity		Unit Only	72	75	77	83	88	93	98
	Power Exhaust	50% Standard Static (2) 1 hp motor	74	77	79	85	90	95	100
		100% Standard Static (2) 1 hp motor	76	79	81	88	94	100	107
		50% High Static (1) 3 hp motor	76	79	81	88	94	100	107
		100% High Static (2) 3 hp motor	80	83	85	92	98	104	110
		50% High Static (1) 5 hp motor	78	81	83	90	96	103	109
		100% High Static (2) 5 hp motor	84	87	89	96	102	109	115
		50% High Static (1) 7.5 hp motor	81	84	86	93	99	105	112
		100% High Static (2) 7.5 hp motor	90	93	95	102	108	114	121

[1] Extremes of operating range are plus and minus 10% of line voltage.
[2] HACR type breaker or fuse.
[3] Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

ELECTRICAL DATA

50 TON STANDARD EFFICIENCY (R-410A)			LGH600S4						
[1] Voltage - 60hz			208/230V - 3 Ph						
Compressor 1		Rated Load Amps	48.1						
		Locked Rotor Amps	245						
Compressor 2		Rated Load Amps	48.1						
		Locked Rotor Amps	245						
Compressor 3		Rated Load Amps	48.1						
		Locked Rotor Amps	245						
Compressor 4		Rated Load Amps	48.1						
		Locked Rotor Amps	245						
Outdoor Fan Motors (6)		Full Load Amps	4.8						
		(total)	(28.8)						
Service Outlet 115V GFI (amps)			15						
Indoor Blower Motor		Horsepower	**5**	**7.5**	**10**	**15**	**20**	**25**	**30**
		Full Load Amps	16.7	24.2	30.8	46.2	59.4	74.8	78
[2] Maximum Overcurrent Protection		Unit Only	[4] 300	[4] 300	[4] 300	[4] 300	[4] 350	[4] 350	[4] 350
	Power Exhaust	50% Standard Static (2) 1 hp motor	[4] 300	[4] 300	[4] 300	[4] 300	[4] 350	[4] 350	[4] 400
		100% Standard Static (2) 1 hp motor	[4] 300	[4] 300	[4] 300	[4] 300	[4] 350	[4] 400	[4] 400
		50% High Static (1) 3 hp motor	[4] 300	[4] 300	[4] 300	[4] 300	[4] 350	[4] 400	[4] 400
		100% High Static (2) 3 hp motor	[4] 300	[4] 300	[4] 300	[4] 350	[4] 350	[4] 400	[4] 400
		50% High Static (1) 5 hp motor	[4] 300	[4] 300	[4] 300	[4] 300	[4] 350	[4] 400	[4] 400
		100% High Static (2) 5 hp motor	[4] 300	[4] 300	[4] 350	[4] 350	[4] 350	[4] 400	[4] 400
		50% High Static (1) 7.5 hp motor	[4] 300	[4] 300	[4] 300	[4] 350	[4] 350	[4] 400	[4] 400
		100% High Static (2) 7.5 hp motor	[4] 350	[4] 350	[4] 350	[4] 350	[4] 400	[4] 400	[4] 400
[3] Minimum Circuit Ampacity		Unit Only	253	260	267	282	298	317	321
	Power Exhaust	50% Standard Static (2) 1 hp motor	258	265	272	287	303	322	326
		100% Standard Static (2) 1 hp motor	262	270	276	292	308	327	331
		50% High Static (1) 3 hp motor	263	271	277	293	309	328	332
		100% High Static (2) 3 hp motor	274	281	288	303	319	339	343
		50% High Static (1) 5 hp motor	269	277	284	299	315	334	338
		100% High Static (2) 5 hp motor	286	294	300	316	332	351	355
		50% High Static (1) 7.5 hp motor	277	284	291	306	320	335	338
		100% High Static (2) 7.5 hp motor	301	309	315	331	347	366	370

[1] Extremes of operating range are plus and minus 10% of line voltage.
[2] HACR type breaker or fuse.
[3] Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.
[4] Factory installed circuit breaker not available.

ELECTRICAL DATA

50 TON STANDARD EFFICIENCY (R-410A)			LGH600S4						
[1] Voltage - 60hz			460V - 3 Ph						
Compressor 1		Rated Load Amps	18.6						
		Locked Rotor Amps	125						
Compressor 2		Rated Load Amps	18.6						
		Locked Rotor Amps	125						
Compressor 3		Rated Load Amps	18.6						
		Locked Rotor Amps	125						
Compressor 4		Rated Load Amps	18.6						
		Locked Rotor Amps	125						
Outdoor Fan Motors (6)		Full Load Amps	2.4						
		(total)	(14.4)						
Service Outlet 115V GFI (amps)			15						
Indoor Blower Motor		Horsepower	**5**	**7.5**	**10**	**15**	**20**	**25**	**30**
		Full Load Amps	7.6	11	14	21	27	34	35
[2] Maximum Overcurrent Protection		Unit Only	110	110	125	125	150	150	175
	Power Exhaust	50% Standard Static (2) 1 hp motor	110	125	125	125	150	150	175
		100% Standard Static (2) 1 hp motor	125	125	125	125	150	150	175
		50% High Static (1) 3 hp motor	125	125	125	125	150	150	175
		100% High Static (2) 3 hp motor	125	125	125	125	150	150	175
		50% High Static (1) 5 hp motor	125	125	125	125	150	150	175
		100% High Static (2) 5 hp motor	125	125	125	150	150	175	175
		50% High Static (1) 7.5 hp motor	125	125	125	150	150	175	175
		100% High Static (2) 7.5 hp motor	150	150	150	150	150	175	200
[3] Minimum Circuit Ampacity		Unit Only	103	106	109	117	124	133	140
	Power Exhaust	50% Standard Static (2) 1 hp motor	105	109	112	119	127	135	143
		100% Standard Static (2) 1 hp motor	108	111	114	122	129	138	145
		50% High Static (1) 3 hp motor	108	111	114	122	129	138	145
		100% High Static (2) 3 hp motor	112	116	119	126	134	143	150
		50% High Static (1) 5 hp motor	110	114	117	124	132	141	148
		100% High Static (2) 5 hp motor	118	121	124	132	139	148	156
		50% High Static (1) 7.5 hp motor	114	117	120	128	135	144	151
		100% High Static (2) 7.5 hp motor	125	128	131	139	146	155	162

[1] Extremes of operating range are plus and minus 10% of line voltage.
[2] HACR type breaker or fuse.
[3] Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

ELECTRICAL DATA

50 TON STANDARD EFFICIENCY (R-410A)			LGH600S4						
[1] Voltage - 60hz			575V - 3 Ph						
Compressor 1		Rated Load Amps	14.8						
		Locked Rotor Amps	100						
Compressor 2		Rated Load Amps	14.8						
		Locked Rotor Amps	100						
Compressor 3		Rated Load Amps	14.8						
		Locked Rotor Amps	100						
Compressor 4		Rated Load Amps	14.8						
		Locked Rotor Amps	100						
Outdoor Fan Motors (6)		Full Load Amps	2						
		(total)	(12)						
Service Outlet 115V GFI (amps)			15						
Indoor Blower Motor		Horsepower	**5**	**7.5**	**10**	**15**	**20**	**25**	**30**
		Full Load Amps	6.1	9	11	17	22	27	32
[2] Maximum Overcurrent Protection		Unit Only	90	90	100	110	110	125	125
	Power Exhaust	50% Standard Static (2) 1 hp motor	90	100	100	110	110	125	125
		100% Standard Static (2) 1 hp motor	100	100	100	110	125	125	125
		50% High Static (1) 3 hp motor	100	100	100	110	125	125	125
		100% High Static (2) 3 hp motor	100	100	100	110	125	125	150
		50% High Static (1) 5 hp motor	100	100	100	110	125	125	150
		100% High Static (2) 5 hp motor	100	110	110	110	125	125	150
		50% High Static (1) 7.5 hp motor	100	100	110	110	125	125	150
		100% High Static (2) 7.5 hp motor	110	110	110	125	125	150	150
[3] Minimum Circuit Ampacity		Unit Only	82	85	87	93	98	103	108
	Power Exhaust	50% Standard Static (2) 1 hp motor	84	87	89	95	100	105	110
		100% Standard Static (2) 1 hp motor	86	89	91	98	104	110	117
		50% High Static (1) 3 hp motor	86	89	91	98	104	110	117
		100% High Static (2) 3 hp motor	90	93	95	102	108	114	120
		50% High Static (1) 5 hp motor	89	91	93	100	106	113	119
		100% High Static (2) 5 hp motor	95	98	100	106	112	119	125
		50% High Static (1) 7.5 hp motor	91	94	96	103	109	115	122
		100% High Static (2) 7.5 hp motor	100	103	105	112	118	124	131

[1] Extremes of operating range are plus and minus 10% of line voltage.
[2] HACR type breaker or fuse.
[3] Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

ELECTRICAL DATA

OPTIONAL ACCESSORIES

208/230V - 3 Ph

Optional Power Exhaust Fan(s)	Static Type	Standard 50%	Standard 100%	High 50%	High 100%	High 50%	High 100%	High 50%	High 100%
	Motor hp	1	1	3	3	5	5	7.5	7.5
	Number of Motors	1	2	1	2	1	2	1	2
	Full load amps total	4.8	9.6	10.6	21.2	16.7	33.4	24.2	48.4
	Locked rotor amps total	23	46	66	132	105	210	152	304
Optional Energy Recovery Wheel (ERW)	(No.) hp	(1) 1/4							
	Full load amps	2.3							

460V - 3 Ph

Optional Power Exhaust Fan(s)	Static Type	Standard 50%	Standard 100%	High 50%	High 100%	High 50%	High 100%	High 50%	High 100%
	Motor hp	1	1	3	3	5	5	7.5	7.5
	Number of Motors	1	2	1	2	1	2	1	2
	Full load amps total	2.4	4.8	4.8	9.6	7.6	15.2	11.0	22.0
	Locked rotor amps total	11.5	23	26.8	53.6	45.6	91.2	66.0	132.0
Optional Energy Recovery Wheel (ERW)	(No.) hp	(1) 1/4							
	Full load amps	1.2							

575V - 3 Ph

Optional Power Exhaust Fan(s)	Static Type	Standard 50%	Standard 100%	High 50%	High 100%	High 50%	High 100%	High 50%	High 100%
	Motor hp	1	1	3	3	5	5	7.5	7.5
	Number of Motors	1	2	1	2	1	2	1	2
	Full load amps total	2	4	3.9	7.8	6.1	12.2	9	18
	Locked rotor amps total	8.9	17.8	23.4	46.8	36.6	73.2	54	108
Optional Energy Recovery Wheel (ERW)	(No.) hp	(1) 1/4							
	Full load amps	1.0							

CAV AND VAV DRIVE COMPONENT MANUFACTURER'S NUMBERS

Drive No.	DRIVE COMPONENTS							
	MOTOR PULLEY		BLOWER PULLEY		BLOWER BUSHING		BELTS	
	OEM Part No.	Browning No.	OEM Part No.	Browning No.	OEM Part No.	Browning No.	OEM Part No.	Browning No.
1	P-8-2237	1VP62 X 1-1/8	78M9001	1B5V160	79M0601	B - 1-11/16	78M6401	5VX900
2	100239-03	1VP65 X 1-1/8	78M8901	1B5V154	79M0601	B - 1-11/16	78M6401	5VX900
3	78M7101	1VP65 X 1-3/8	78M9001	1B5V160	79M0601	B - 1-11/16	78M6401	5VX900
4	78M7001	1VP62 X 1-3/8	78M8701	1B5V124	79M0601	B - 1-11/16	78M5901	5VX830
5	78M5601	1VP71 X 1-3/8	78M8901	1B5V154	79M0601	B - 1-11/16	78M6401	5VX900
6	78L5601	1VP71 X 1-3/8	78M8801	1B5V136	79M0601	B - 1-11/16	78M6201	5VX860
7	78M7201	1VP62 X 1-5/8	78M8801	1B5V136	79M0601	B - 1-11/16	78M6001	5VX840
8	78M7401	1VP75 X 1-5/8	78M8701	1B5V124	79M0601	B - 1-11/16	78M5901	5VX830
9	78M7501	2VP71 X 1-5/8	79M0001	2B5V124	79M0601	B - 1-11/16	78M5901	5VX830
10	78M7601	2VP75 X 1-5/8	78M9901	2B5V110	79M0601	B - 1-11/16	78M5701	5VX800
11	78L7701	2V58B70 X 1-7/8	79M0001	2B5V124	79M0601	B - 1-11/16	78M5801	5VX810
12	78M7801	2V68B80 X 1-7/8	79M0001	2B5V124	79M0601	B - 1-11/16	78M5901	5VX830
13	78M7701	2V58B70 X 1-7/8	78M9901	2B5V110	79M0601	B - 1-11/16	78M5701	5VX800
14	78M7701	2V58B70 X 1-7/8	79M0201	2Q5V103	79M0801	Q - 1-11/16	78M5601	5VX780

POWER EXHAUST DRIVE COMPONENT MANUFACTURER'S NUMBERS

Drive No.	DRIVE COMPONENTS					
	MOTOR PULLEY		BLOWER PULLEY		BELTS	
	Browning No.	OEM Part No.	Browning No.	OEM Part No.	Browning No.	OEM Part No.
1A	1VP60 x 1 3/8	78L5501	BK100 x 1 7/16	39L1301	BX68	88K3401
1B	1VP60 x 1 3/8	78L5501	BK100 x 1 7/16	39L1301	BX62	57A7701
2A	1VP60 x 1 3/8	78L5501	BK110 x 1 7/16	81M0401	BX70	31K9601
2B	1VP60 x 1 3/8	78L5501	BK110 x 1 7/16	81M0401	BX64	24L5001
3A	1VP56 x 1 1/8	P-8-1492	BK100 x 1 7/16	39L1301	BX68	88K3401
3B	1VP56 x 1 1/8	P-8-1492	BK100 x 1 7/16	39L1301	BX61	93J9801
4A	1VP60 x 1 1/8	41C1301	BK115 x 1 7/16	81M0501	BX71	31K9701
4B	1VP60 x 1 1/8	41C1301	BK115 x 1 7/16	81M0501	BX64	24L5001
5A	1VP56 x 7/8	P-8-1494	BK115 x 1 7/16	81M0501	BX71	31K9701
5B	1VP56 x 7/8	P-8-1494	BK115 x 1 7/16	81M0501	BX64	24L5001
6A	1VP60 x 7/8	80K5501	BK115 x 1 7/16	81M0501	BX71	31K9701
6B	1VP60 x 7/8	80K5501	BK115 x 1 7/16	81M0501	BX64	24L5001

NOTE - A drives for rear blower assembly; B drives for front blower assembly.

LGH/LCH PARTS ARRANGEMENT

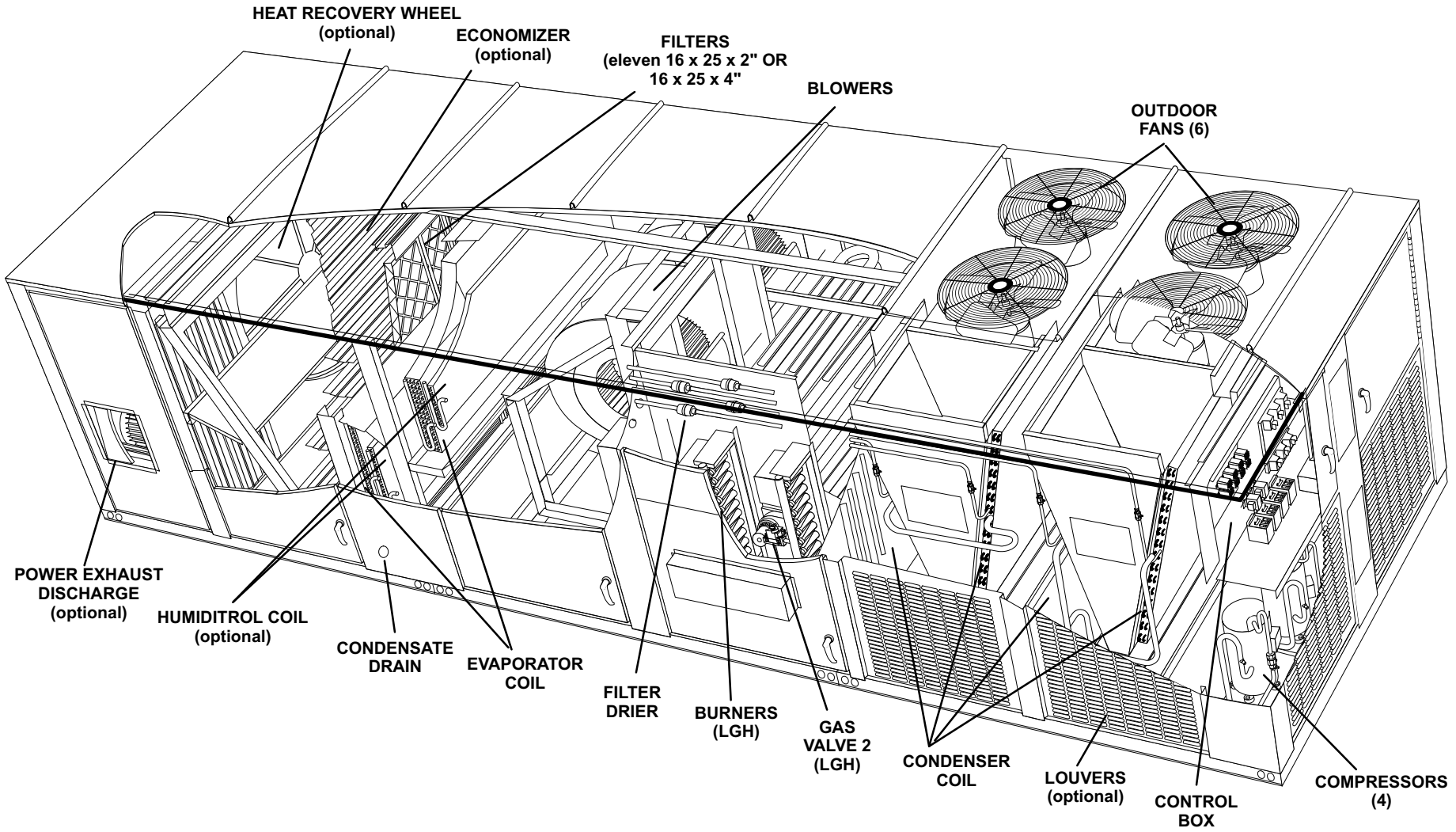
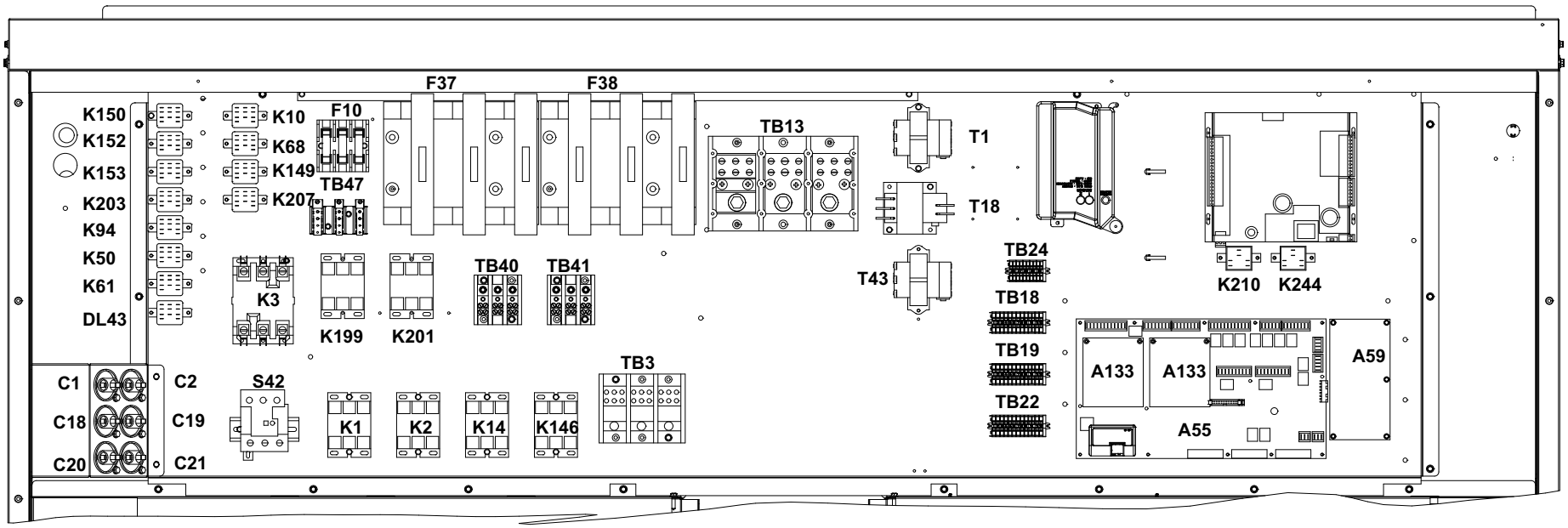


FIGURE 1

LGH/LCH CONTROL BOX PARTS ARRANGEMENT



A55 - UNIT CONTROLLER
A59 - COMPRESSOR 3 & 4 MODULE
A133 - GENERAL PURPOSE MODULE
C1 - CAP. OUTDOOR FAN 1
C2 - CAP. OUTDOOR FAN 2
C18 - CAP. OUTDOOR FAN 3
C19 - CAP. OUTDOOR FAN 4
C20 - CAP. OUTDOOR FAN 5
C21 - CAP. OUTDOOR FAN 6
DL43 - DELAY, CYCLE TIMER
F10 - FUSE OUTDOOR FAN MOTOR
F37 - FUSE (Y VOLTAGE)
F38 - FUSE (Y VOLTAGE)
K1 - CONTACTOR COMPRESSOR 1
K2 - CONTACTOR COMPRESSOR 2
K3 - BLOWER CONTACTOR
K10 - RELAY OUTDOOR FAN 1
K14 - CONTACTOR COMPRESSOR 3
K50 - RELAY DESICCANT WHEEL
K61 - RELAY DESICCANT WHEEL
K68 - RELAY OUTDOOR FAN 2
K94 - RELAY DESICCANT WHEEL
K146 - CONTACTOR COMPRESSOR 4
K149 - RELAY OUTDOOR FAN 3
K150 - RELAY OUTDOOR FAN 4
K152 - RELAY OUTDOOR FAN 5
K153 - RELAY OUTDOOR FAN
K199 - CONTACTOR EXHAUST BLOWER 1
K201 - CONTACTOR EXHAUST BLOWER 2
K203 - RELAY INVERTER BLOWER
K207 - RELAY INVERTER EXHAUST BLOWER
K210 - RELAY ALC CONTROL
K244 - RELAY ALC CONTROL
S42 - BLOWER OVERLOAD RELAY
T1 - TRANSFORMER CONTROL
T18 - TRANSFORMER CONTACTOR
T43 - TRANSFORMER HUMIDITROL
TB3 - TERMINAL BLOCK ELECTRIC HEAT
TB13 - TERMINAL BLOCK SUB-FUSE
TB18 - TERMINAL STRIP INVERTER
TB19 - TERMINAL STRIP MODULATING GAS
TB22 - TERMINAL STRIP O.D. AIRFLOW
TB24 - TERMINAL STRIP COMMON
TB40 - TERMINAL STRIP COMP 1
TB41 - TERMINAL STRIP COMP 2
TB47 - TERMINAL STRIP EXHAUST FANS

FIGURE 2

I-UNIT COMPONENTS

ELECTROSTATIC DISCHARGE (ESD)
Precautions and Procedures

⚠ CAUTION

Electrostatic discharge can affect electronic components. Take precautions during 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, such as the gas valve or blower deck, before performing any service procedure.

LGH/LCH units are configure to order units (CTO). All units come standard with hinged unit panels. The unit panels may be held open with the door rod located inside the unit.

A-Control Box Components

Control box components are shown in figure 2, The control box is located above the compressor compartment.

1-Disconnect Switch S48

All units may be equipped with an optional disconnect switch S48. S48 is a switch which can be used by the service technician to disconnect power to the unit.

NOTE - S48 is not an over current protection switch. If unit is equipped with S48 other means of over current protection must be used.

2-Control Transformer T1 (all units Y voltage)

All units use a T1 line voltage to 24VAC transformer mounted in the control box. Transformer supplies power to control circuits in the unit. The transformer is rated at 70VA and is protected by a 3.5 amp circuit breaker (CB8). The 208/230 (Y) voltage transformer has two primary voltage taps as shown in figure 3. Units will be factory wired for 230V (orange and black). 208V (red and black) applications must be re-wired in the field.

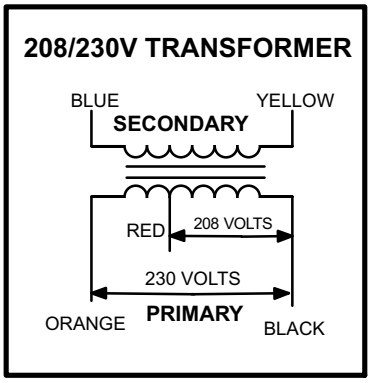


FIGURE 3

3-Contactor Transformer T18

T18 is a single line voltage to 24VAC transformer used in all units. Transformer T18 is rated at 100VA and protected by a 4.5 amp circuit breaker (CB18). The transformer supplies 24VAC power to the contactors.

4-Humiditrol Transformer T43

T43 is a single line voltage to 24VAC transformer used on optional Humiditrol units. Transformer T43 is rated at 70VA and is protected by a 3.5 amp circuit breaker (CB8). The transformer supplies 24VAC power to the reheat solenoid valves.

5-Terminal Strips TB3, TB13, TB18, TB19, TB22, TB24

TB3 and TB13 terminal strips distribute line voltage power to unit line voltage components. TB24 supplies 24V to S37 and S39 (if used) switches and to A30 and A24 (if used) pressure sensors. TB18 is used any time an optional inverter or power exhaust is installed in the unit. TB18 is also used to pass an analog signal from A34 transducer (if used) to the A133 board. T18 also supplies an analog output to inverter control. See unit diagram. TB19 distributes a signal from the A133 board to modulating gas controls. TB22 is used with outdoor air options.

6-Terminal Strips TB40, TB41, TB47

All L1, L2 and L3 wiring is color coded; L1 is red, L2 is yellow and L3 is blue. TB40 distributes line voltage to compressor B1 and motor blower B3 through contactors K1 and K3. TB40 also distributes line voltage to optional power exhaust blowers B35 and B36. TB41 distributes line voltage to compressors B2, B13 and B20 through contactors K2, K14 and K146. TB47 distributes line voltage to condenser fans B4, B5, B21, B22, B23 and B24. through contactors K10, K68, K149, K150, K152 and K153. See unit wiring diagram.

7-Outdoor Fan Motor Fuse Block & Fuses F10 (all units)

Three line voltage, F10 fuses provide overcurrent protection to all condenser fans in all units. The fuses are rated at 40A in three phase, 208/230V applications. All others use 30A fuses.

8-Fuses F37 and F38 (Y volt and G, J volt with electric heat)

Three line voltage fuses F37 provide overcurrent protection for compressor B1, blower B3 and optional exhaust blower B35 and B36. Three line voltage fuses F38 provide overcurrent protection for compressor B2, B13 and B20.

9-Outdoor Fan Capacitors C1, C2, C18, C19, C20, C21 (single phase motors only)

Fan capacitors C1, C2, C18 C19, C20 and C21 are used to assist in the start up of condenser fans B4, B5, B21, B22, B23 and B24 respectively. Ratings will be on condenser fan motor nameplate or see side of capacitor.

10-Compressor Contactor K1, K2, K14 & K146

All compressor contactors are three-pole double-break contactors with a 24VAC coil. In all LGH/LCH units, K1 (energized by A55), K2 (energized by A55), K14 (energized by A59) and K146 (energized by A59) controls compressors B1, B2, B13 and B20 respectively in response to cooling demands.

11-Blower Contactor K3 (all units)

Blower contactor K3, used in all units, is a three-pole double-break contactor with a 24VAC coil used to energize the indoor blower motor B3 in response to blower demand. K3 is energized by A55 Unit Controller.

12-Outdoor Fan Relay K10, K68, K149, K150, K152, K153 (all units)

Outdoor fan relays K10, K68, K149, K150, K152 and K153 are DPDT in single phase units and 3PDT in three phase units. All have 24VAC coils. In all units, K10 (energized by A55), K68 (energized by A55), K149, K150, K152 and K153 (energized by A59) controls condenser fans B4 (fan 1), B5 (fan 2), B21 (fan 3), B22 (fan 4), B23 (fan 5) and B24 (fan 6) respectively, in response to cooling demand.

13-Burner Controls A3 & A12 (LGH units)

All LGH units have two burner controls. A3 controls gas heat section one, while A12 controls gas heat section two. The first gas heat section and the second gas heat section burner controls are identical. Both burner controls are factory set and are not adjustable. The control makes three attempts at ignition and then locks out the system if ignition is not obtained after the third trial. Reset after lockout requires only breaking and remaking thermostat demand. The control shuts off gas flow immediately in the event of a gas or power failure. Upon restoration of gas and power, the control will restart the ignition sequence and continue until flame is established or system locks out. For a more detailed description see the Gas Heat Components section.

14-Power Exhaust Contactors K199 & K201

Contactors K199 and K201 are N.O. DPDT contactors with a 24VAC coil. K199 K201 are used in all units equipped with optional power exhaust. When K199 and K201 close, the exhaust fans B35 and B36 are energized.

15-Blower Motor Overload Relay S42 (CAV units with motors of 10 HP and above)

Relay S42 is located in the control box and is connected in line with the blower motor to monitor the current flow to the motor. When the relay senses an overload condition, a set of normally closed contacts open to de-energize DI-2 P299-4 of the A55 Unit Controller. A55 de-energizes all outputs.

16-Desiccant Wheel Relays K50, K61, K94

Desiccant wheel relays K50 and K61 are SPDT relays and K94 is a 3PDT relay. All have a 24VAC coil. Relays are used in all units equipped with optional desiccant wheel.

17-Supply Blower Auxiliary Relay K203

Blower relay K203, used in all VAV units, is a 24VAC single pole relay used to energize the B3 indoor blower motor in response to blower demand. K203 is energized by the A55 Unit Controller.

18-Exhaust Blower Auxiliary Relay K207

Power exhaust K207 is used in optional variable speed power exhaust. K207 is used to energize the exhaust fans B35 and B36 in response to exhaust demand. K207 is energized by the A55 Unit Controller.

UNIT CONTROL BOARDS

Units are equipped with a series of control boards which integrates most control functions required for the LGH/LCH units. The control boards are located in the lower right hand corner of the control box. The control includes complete unit diagnostics with permanent code storage, field programmable control parameters and control options, on-site testing and serial communications. Several different printed circuit boards (see figure 4) make-up the modular configurations for the LGH/LCH units. See figure 4 for control location. For further information refer to the Unit Controller manual sent with each unit.

19-Unit Controller A55 (all units)

The A55 Unit Controller is the heart of the system. It controls two compressors, two two-stage gas valves or two banks of electric heat, one outdoor fan and one blower. A55 includes the thermostat inputs, serial communications ports, diagnostic code display, control pushbutton, system configuration dip switches and four expansion ports.

20-General Purpose GP1 Module A133

The general purpose control module has three optional modes: Variable Air Volume Control (VAV), Modulating Gas Valve Control (MGV) and General Purpose (GP). The mode is determined by the DIP switch setting and the position of the GP1 on the A55 Unit Controller. Each mode uses a different terminal block for field-wired inputs and outputs. See figure 4.

21-Compressor 3 & 4 Control Module A59 (all units)

The compressor 3 & 4 control module A59 controls two additional compressor stages for the LGH/LCH units. A59 includes all inputs and outputs required for compressor and fan control, compressor stage diagnostics and low ambient control.

CONTROLLER INPUTS AND OUTPUTS

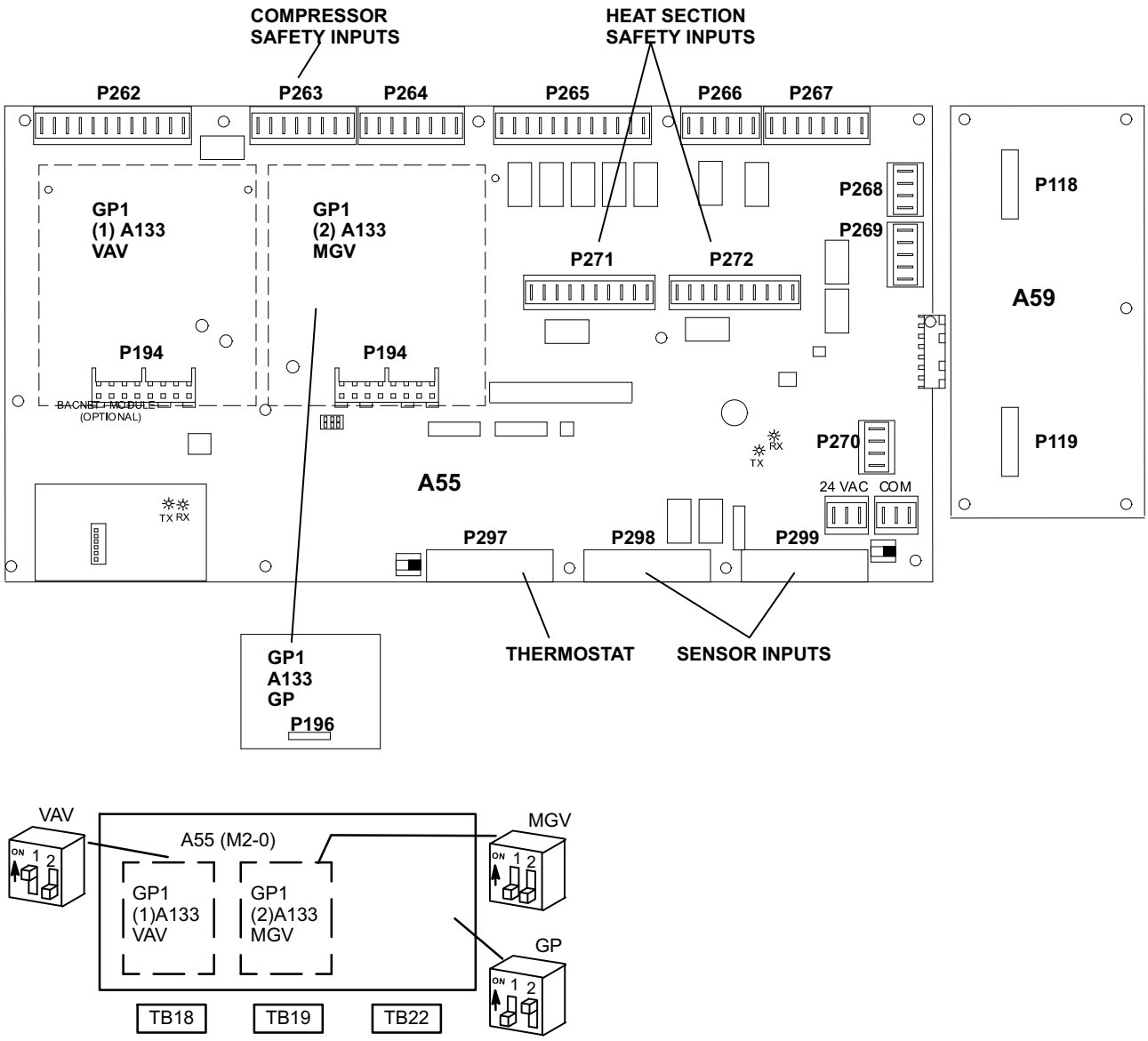
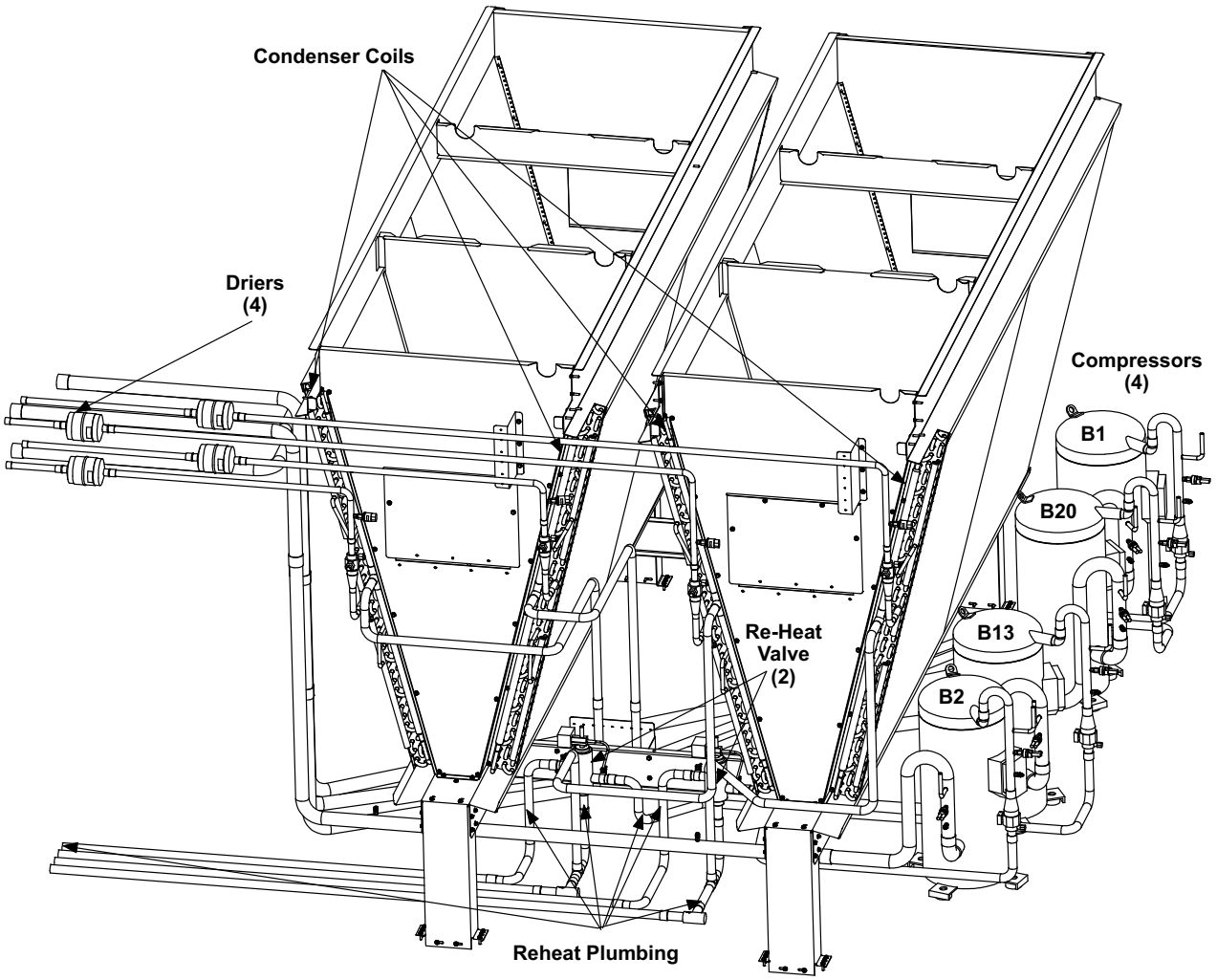


FIGURE 4

LGH/LCH CONDENSER PLUMBING
(shown with reheat plumbing)



COMPRESSOR DETAIL

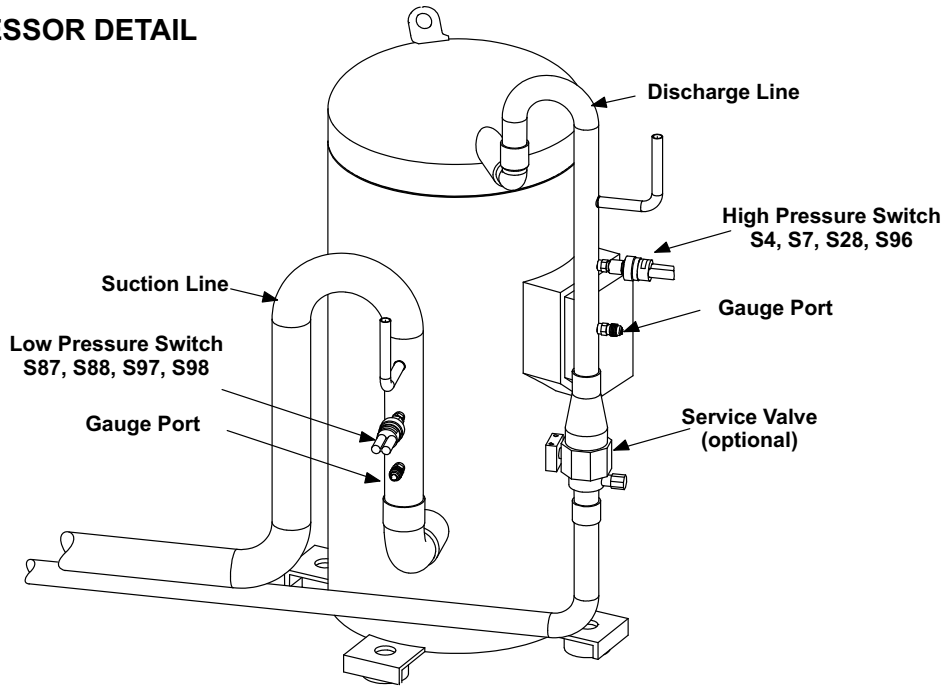


FIGURE 5

LGH/LCH EVAPORATOR PLUMBING
constant air volume

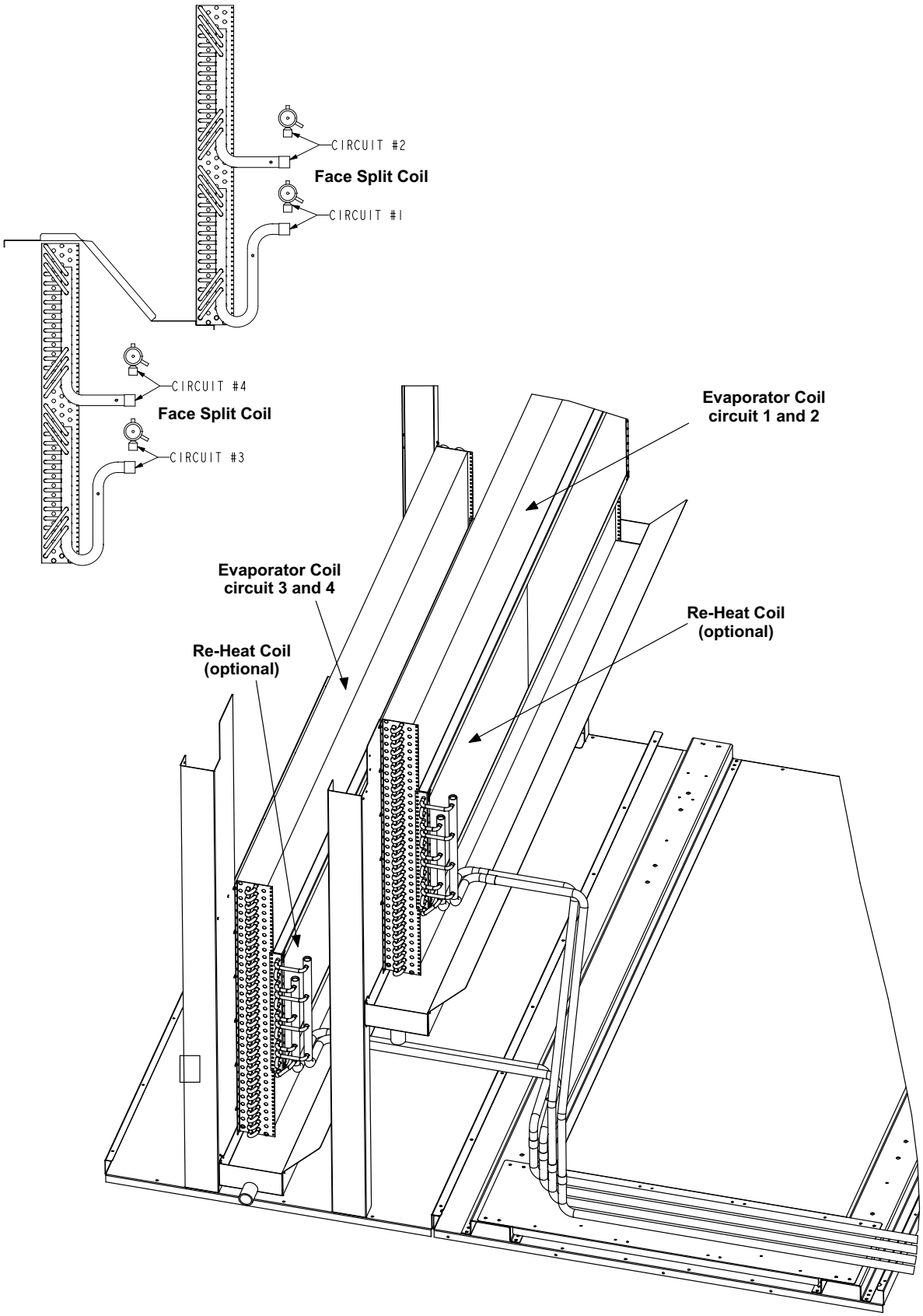


FIGURE 6

LGH/LCH EVAPORATOR PLUMBING
variable air volume

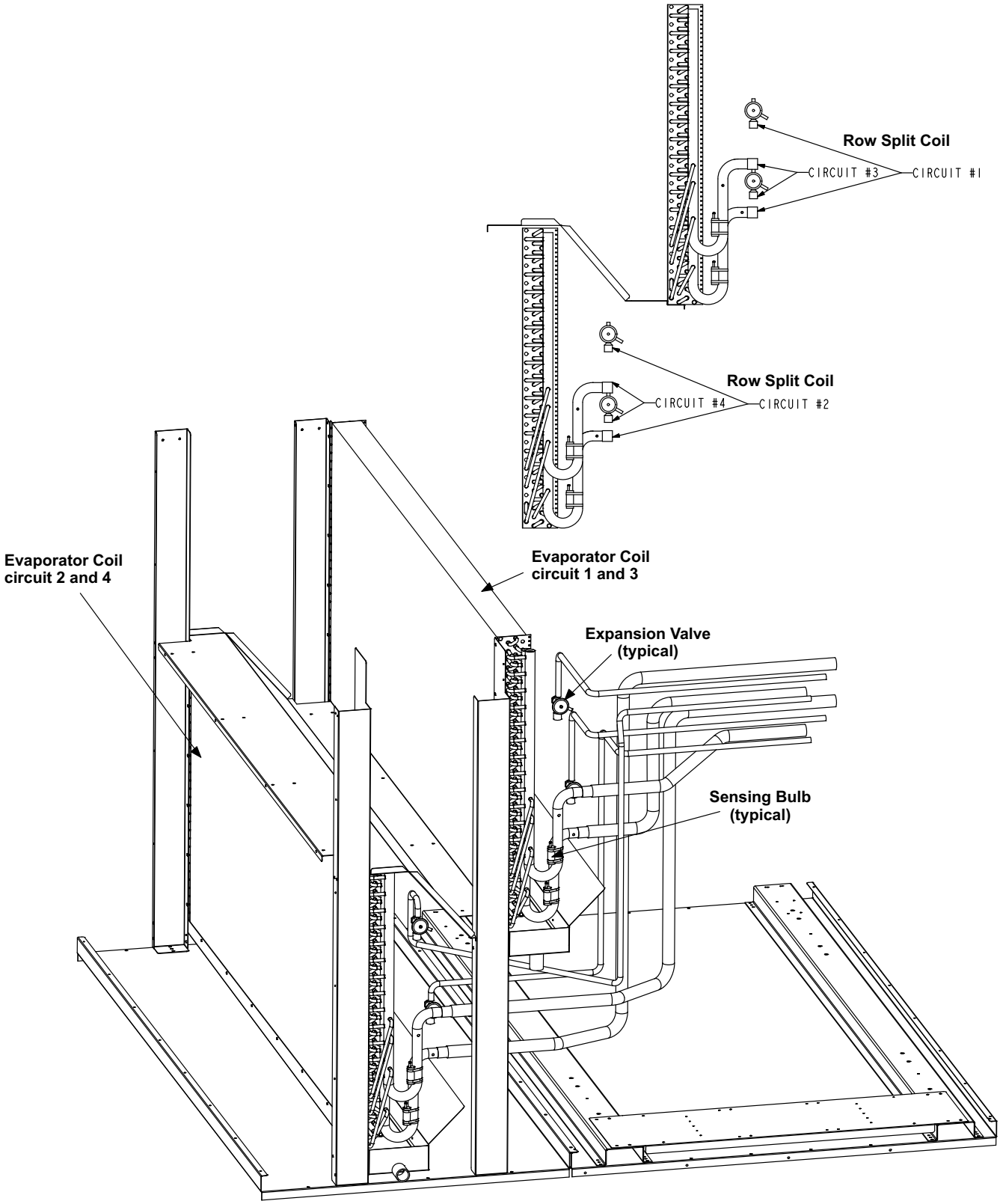


FIGURE 7

B-Cooling Components

All units use independent cooling circuits consisting of separate compressors, condenser coils and evaporator coils. See figures 5, 6 and 7. Six draw-through type condenser fans are used in all units. All units are equipped with belt-drive blowers which draw air across the evaporator during unit operation.

Cooling may be supplemented by a factory installed economizer. The evaporators on constant air volume units are face split and are stacked. Evaporators on variable air volume units are row split and are stacked. See figures 6 and 7 for more detail. Each evaporator uses a thermostatic expansion valve as the primary expansion device. Each evaporator is also equipped with enhanced fins and rifled tubing. In all units each compressor is protected by a crankcase heater, high pressure switch and low pressure switch. Additional protection is provided by low ambient switches and freezestats (on each evaporator).

1-Compressors B1, B2, B13 & B20

All units use scroll compressors and are equipped with independent cooling circuits. The capacity of each compressor is added to reach the total capacity of the unit. Compressor electrical specifications can be found in the SPECIFICATIONS section in this manual.

⚠ WARNING

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

Each compressor is energized by a corresponding compressor contactor.

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

2-Crankcase Heaters HR1, HR2, HR5 & HR11

All units use belly-band type crankcase heaters. Heater HR1 is installed around compressor B1, heater HR2 compressor B2, HR5 compressor B13 and HR11 compressor B20.

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

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

S4 (first circuit), S7 (second circuit), S28 (third circuit) and S96 (fourth circuit) are wired in series with the respective compressor contactor coils.

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

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

4-Low Ambient Switches S11, S84, S85 & S94

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

In the LGH/LCH units S11 (compressor one), S84 (compressor two) are wired in parallel, to the outdoor fan relay K149 while S85 (compressor three) and S94 (compressor four) are in parallel, wired to outdoor fan relay K150.

Units charged with R-410A

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

5-Low Pressure Switches S87, S88, S97 & S98

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

S87 (compressor one), S88 (compressor two), S98 (compressor three) and S97 (compressor four) are wired in series with the A55 Unit Controller.

The Unit Controller governs the low pressure switches by shunting the switches during start up until pressure is stabilized. After the shunt period, the control has a three-strike counter, during each cooling demand, before the compressor is locked out. The control is reset y breaking and remaking the cooling demand.

NOTE - Shunt time period varies according to compressor off time and the outdoor temperature. Refer to Integrated Modular Control Guide sent with each unit.

When suction pressure drops to 40 ± 5 psig (276 ± 34 kPa) (indicating low pressure), the switch opens and the compressor is de-energized. The switch automatically resets when pressure in the suction line rises to 90 ± 5 psig (620 ± 34 kPa).

6-Service Valve (optional all units)

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

7-Filter Drier (all units)

All units have a filter drier located in the liquid line of each refrigerant circuit behind the panel above the heat section. The drier removes contaminants and moisture from the system.

8-Freezestats S49, S50, S53 & S95

Each unit is equipped with a low temperature switch (freezestat) located on the return bend of each evaporator coil. S49 (first circuit), S50 (second circuit), S53 (third circuit) and S95 (fourth circuit) are located on the corresponding evaporator coils.

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

A55 Unit Controller has a three-strike counter before locking out the particular compressor circuit. This means the control allows three freezestat trips per one cooling demand. The control can be reset by breaking and remaking the cooling demand.

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

9-Condenser Fans B4, B5, B21, B22, B23 & B24

See Specifications section in this manual for specifications of condenser fans used in LGH/LCH units. All units are equipped with six condenser fans. The complete fan assembly may be removed for servicing and cleaning. See steps below. Reverse order when reassembling. See figure 8.

1 - Unscrew 6 fan grill screws and remove grill.

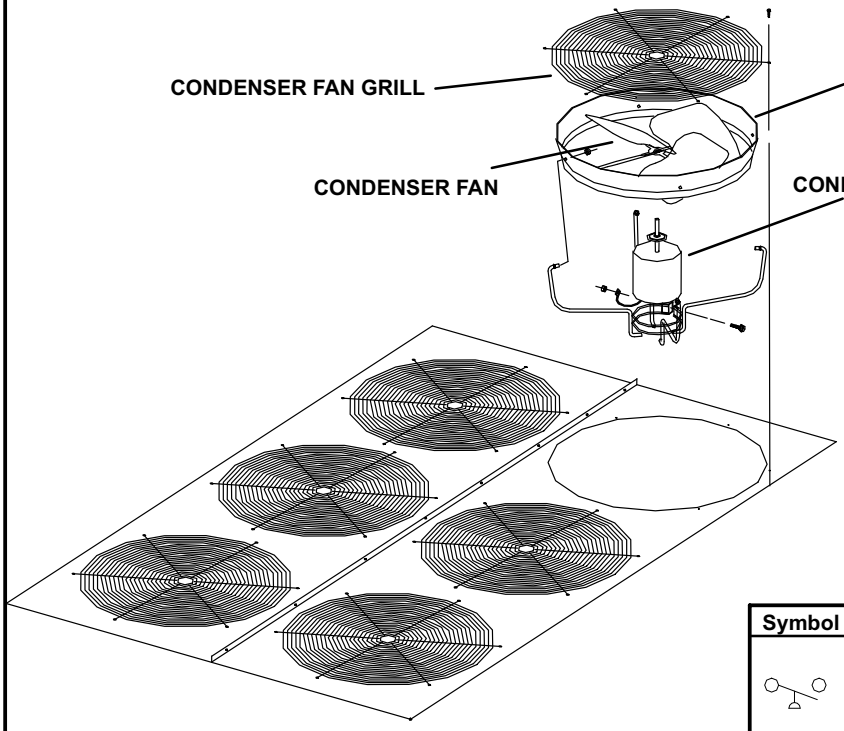
2 - Loosen fan blade hub set screw and slide fan off motor shaft.

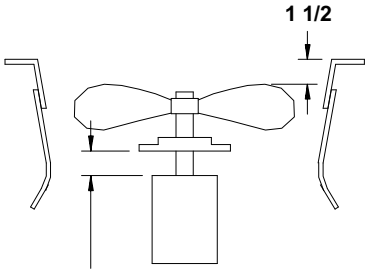
3 - Loosen motor bracket bolt.

4 - Disconnect motor wire jack/plug and remove motor.

Motor and fan blades can now be serviced.

Condenser Fan Removal and Operation





FAN AND RAIN SHIELD LOCATION

Symbol	Description
	Fan energized when liquid pressure is higher than 450 psig R-410A De-energized when liquid line pressure less than 240 psig R-410A. *Note - A box units fans are de-energized at 140 psig.*
55°F	A55 (TP2) De-energizes fan below 55°F/13°C (default ECTO 4.07)
40°F	A55 (TP1) De-energizes fan below 40°F/4.4°C (default ECTO 4.06)
	A55 delays the fan 2 second (default 4.16) after thermostat demand.

1 A55 de-energizes all compressors below 0°F (-18°C) default (ECTO 4.08, 4.09, 4.10, 4.11).
2 Multiple low ambient switches on same fan must all be open to de-energize fan.

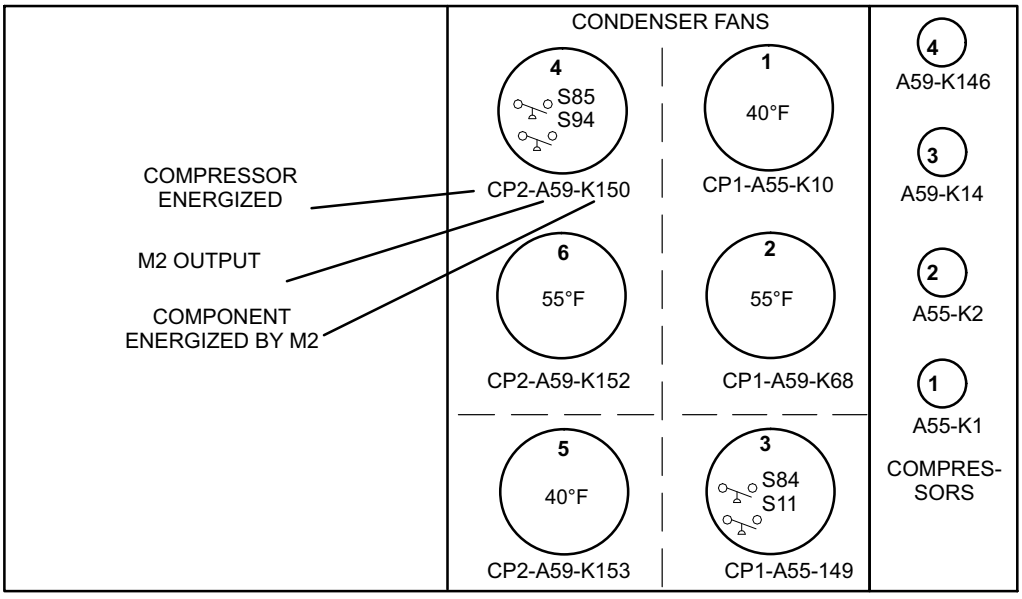


FIGURE 8

C-Blower Compartment

The blower compartment in all units is located between the evaporator coil and the heat section.

1-Blower Wheels (all units)

All units have two 20 in. x 15 in. (508 mm x 381 mm) blower wheels. Both wheels are driven by one motor.

2-Indoor Blower Motor B3 (all units)

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

OPERATION / ADJUSTMENT

Initiate blower demand at thermostat according to instructions provided with thermostat. Unit will cycle on thermostat demand. The following steps apply to applications using a typical electro-mechanical thermostat.

1- Blower operation is manually set at the thermostat subbase fan switch. With fan switch in **ON** position, blowers will operate continuously.

2- With fan switch in **AUTO** position, the blowers will cycle with demand.

In zone sensor applications the blower will cycle with demand (default). For continuous blower operation change ECTO 6.17 to option 1. Refer to the Unit Controller manual.

Determining Supply CFM

1- The following measurements must be made with a dry indoor coil. Run blower without a cooling demand. Air filters must be in place when measurements are taken.

2- *VFD Units Only* -
Set the VFD to 60Hz using Unit Controller ECTO 0.08. Refer to the Unit Controller manual provided with unit.

3- Measure the indoor blower shaft RPM.

4- With all access panels in place, measure static pressure external to unit (from supply to return).

5- Referring to blower data in the front of this manual, use static pressure and RPM readings to determine unit CFM.

6- The blower RPM can be adjusted at the motor pulley. Loosen Allen screw and turn adjustable pulley clockwise to increase CFM. Turn counterclockwise to decrease CFM. See figure 9 and 10.
Loosen both Allen screws on units equipped with two belts. Remove the key and turn the inner sheave the opposite direction of the outer sheave. Replace the key before securing Allen screws.

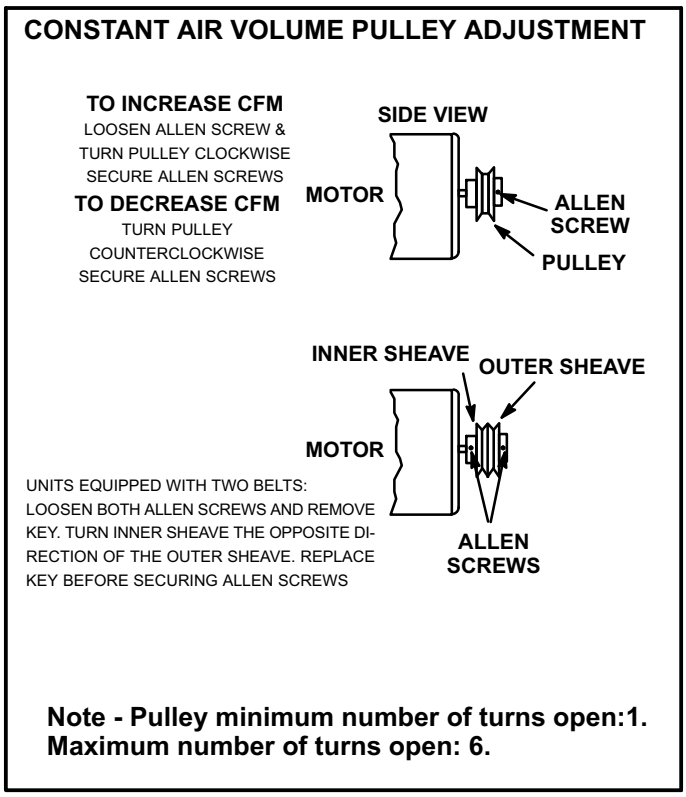


FIGURE 9

7- *Variable Air Volume Supply Air Blowers* -
In addition to adjusting the motor pulley, the supply CFM can be adjusted at the Unit Controller or by using optional software. The VFD must be set to 60Hz. Refer to the Unit Controller manual ECTO 0.08.

In default mode, the Unit Controller is set to drive the blower to maximum CFM output (100% or 60Hz). To decrease the CFM, reduce the VAV maximum output (ECTO 0.08). To increase the CFM, contact Technical Support.

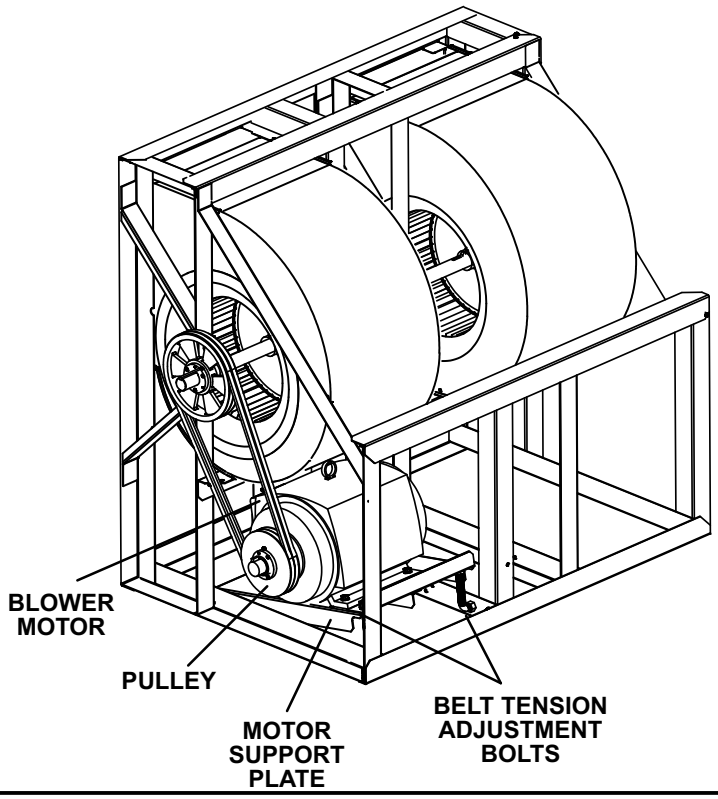
The default minimum blower output is 50% (30Hz). Refer to ECTO 0.06 and 0.07 to adjust the VAV minimum output.

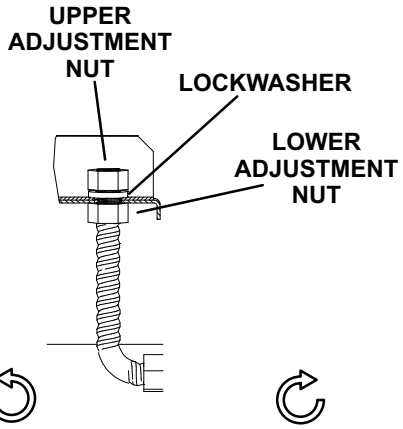
Optional Power Exhaust Blowers

1- Determine the power exhaust CFM in the same manner as the supply CFM with one exception: measure the return duct static pressure instead of total external pressure. See power exhaust fans blower tables in BLOWER DATA section.

2- The RPM can be adjusted at the motor pulley. Loosen Allen screw and turn adjustable pulley clockwise to increase CFM. Turn counterclockwise to decrease CFM. Secure Allen screw. See figure 10.

BLOWER ASSEMBLY





TO LOOSEN BELT
Turn upper nut on both adjustment bolts counter-clockwise. Secure support plate with lower nuts.

TO TIGHTEN BELT
Turn lower nuts on both adjustment bolts clockwise. Secure support plate with upper nuts.

FIGURE 10

Blower Belt Adjustment

Maximum life and wear can be obtained from belts only if proper pulley alignment and belt tension are maintained. Tighten belt as shown in figure 10.Tension new belts after a 24-48 hour period of operation. This will allow belt to stretch and seat to grooves. Make sure blower and motor pulley are aligned as shown in figure 11. Also make sure motor support plate is level. See figure 12.

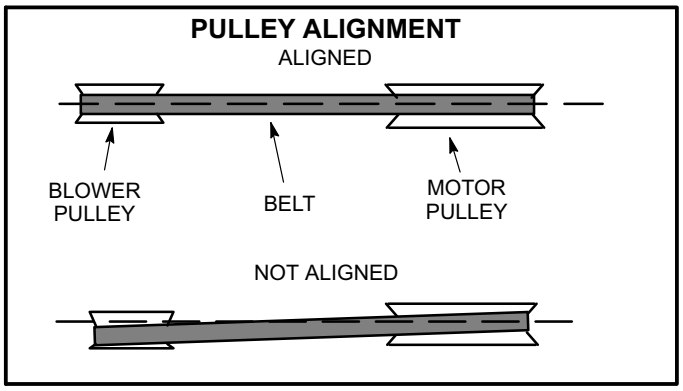


FIGURE 11

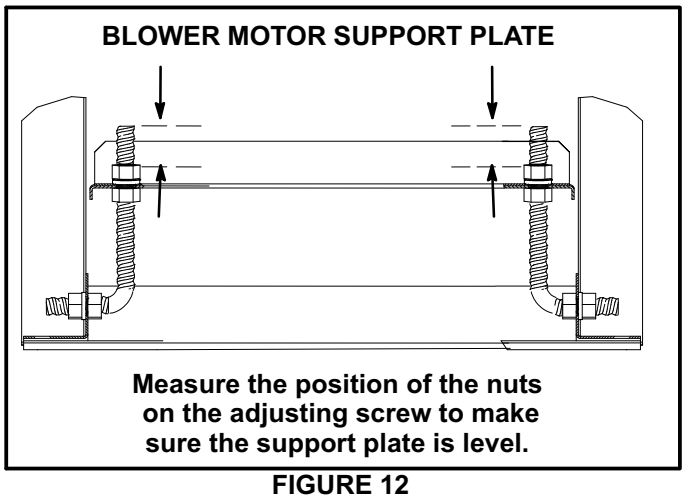


FIGURE 12

Check Belt Tension

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

1- Measure span length X. See figure 13.

2- Apply perpendicular force to center of span (X) with enough pressure to deflect belt 1/64" for every inch of span length or 0.4mm per 25.4mm of span length.

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

Example: Deflection distance of a 1016mm span would be 16mm.

3- Measure belt deflection force. Used belt values apply when tightening the belt after 24-48 hours.
For a used belt, the deflection force should be:
5 lbs. for 5 & 7.5 HP applications
8 lbs. for 10 & 15 HP applications
7 lbs. for 20, 25, & 30 HP applications

For a new belt, the deflection force should be:
8 lbs. for 5 & 7.5 HP applications
12 lbs. for 10 & 15 HP applications
11 lbs. for 20, 25, & 30 HP applications

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

Field-Furnished Blower Drives

For field-furnished blower drives, use manufacturer's drive number tables (see table of contents).

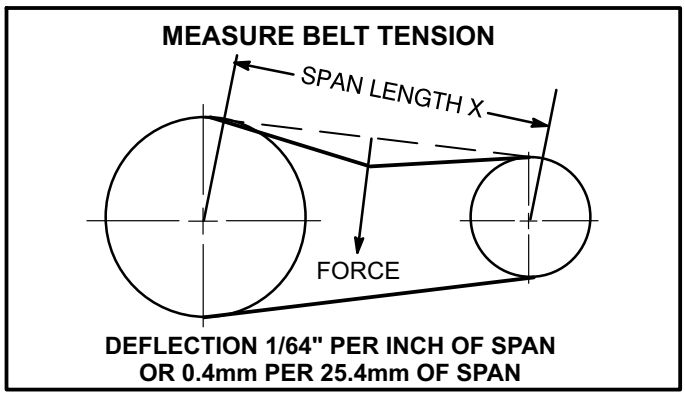


FIGURE 13

LGH HEATING PARTS ARRANGEMENT
(high heat 11 burner, tube & standard heat 7 burner, tube)

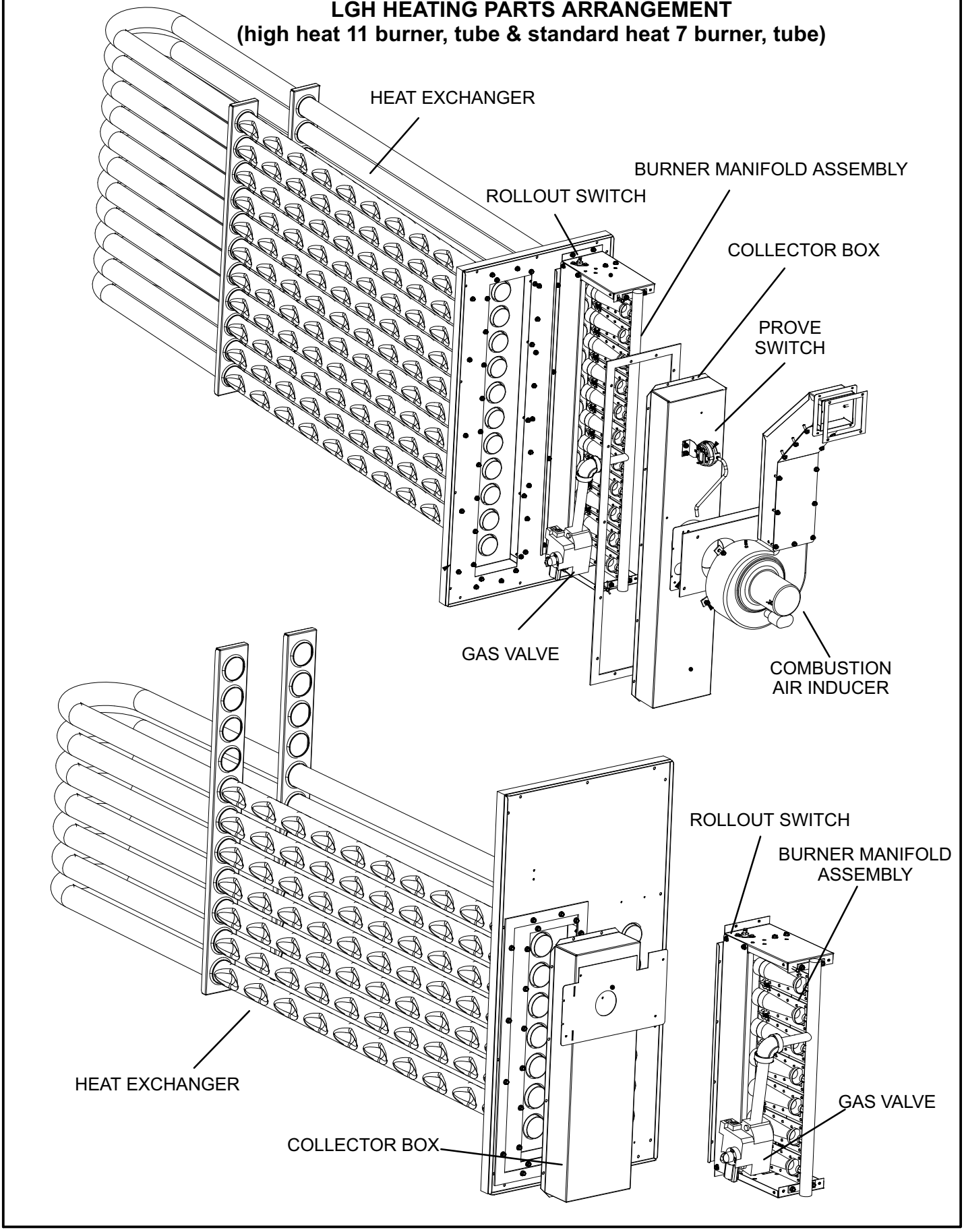


FIGURE 14

D-GAS HEAT COMPONENTS

LGH480 units are available in 500,000 BTUH (146.5 kW) (standard gas heat - 7 burner and tube heat-exchanger) or 800,000 BTUH (234.4 kW) (high gas heat - 11 burner and tube heat exchanger) sizes. All units are equipped with two gas heat sections (figure 15). In downflow position each section is protected by a high temperature control limit, S10 and S99. In horizontal position only, one primary limit is used (S10) and it is located in the blower compartment. For both applications a secondary limit (S21) is located in the blower compartment. See figure 19. Flexible pipe is used to connect the gas supply from one heat section to the other. Cast iron pipe will feed the supply gas to each gas valve.

NOTE - Care should be taken to insure flexible pipe does not touch any other part of the unit. Breaks or tears in the flexible pipe will result in a gas leak.

Heat Section Electrical Components

The heat section (see figure 15) houses the burner controls A3 and A12, combustion air inducers transformers T3 and T13 (480V & 575V only), combustion air inducer relays K13 and K19, gas relays K72 and K73 and limit relay K123.

LGH HEAT SECTION

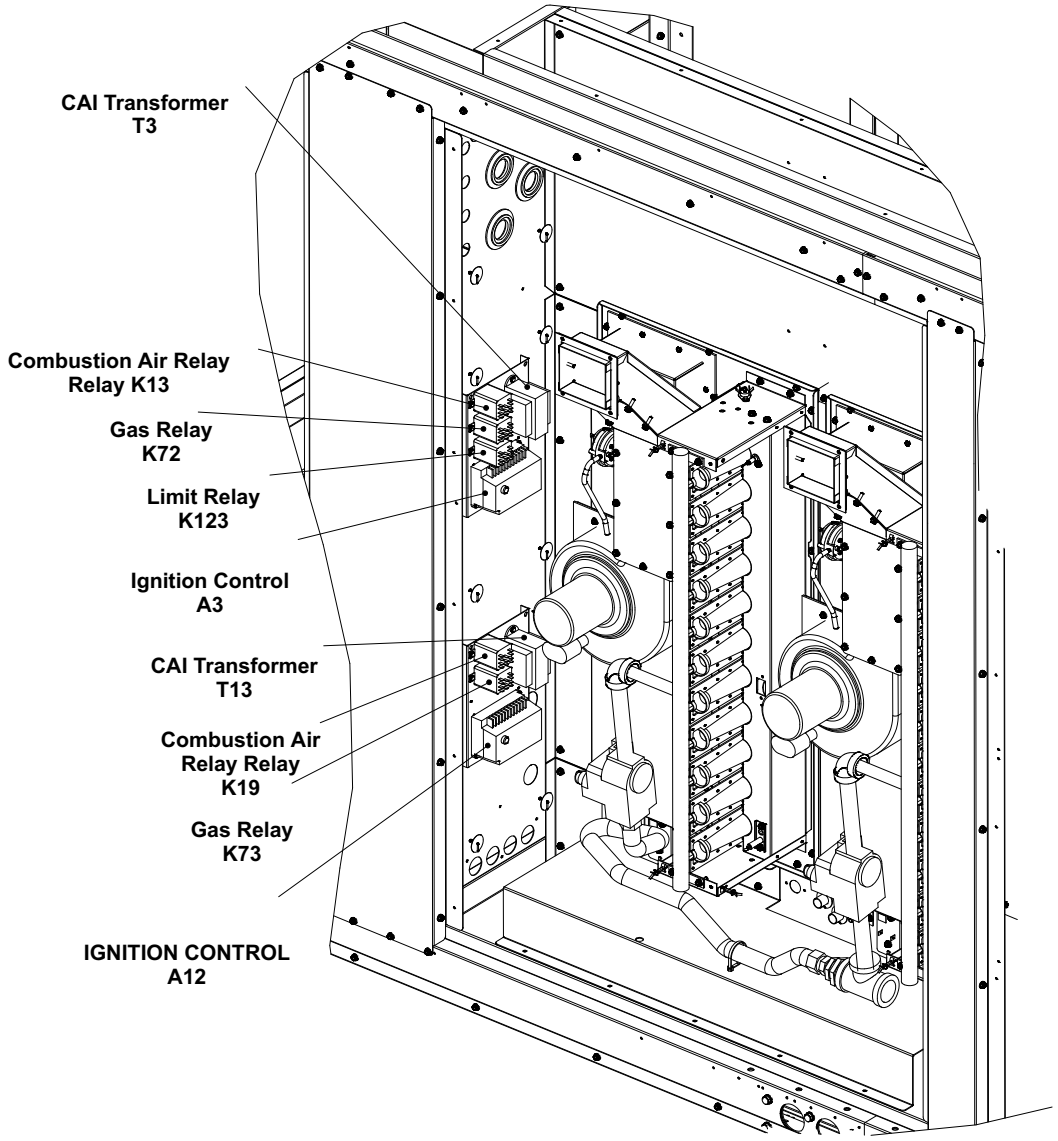


FIGURE 15

⚠ WARNING

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

1-Burner Ignition Control A3 (heat section 1) & A12 (heat section 2)

The ignition controls are located in the control box. Two different manufacturers' (Utec and Fenwal) controls are used in the LGH units. Both ignition controls operate the same.

The ignition control provides three main functions: gas valve control, ignition and flame sensing. The unit will usually ignite on the first attempt; however, the ignition attempt sequence provides three trials for ignition before locking out. The lockout time for the Utec is 5 minutes. The lockout time for the Fenwal control is 5 minutes. After lockout, the ignition control automatically resets and provides three more attempts at ignition. Manual reset after lockout requires breaking and remaking power to the ignition control. Both controls have LEDS for troubleshooting. See table 1.

TABLE 1

UTEC	
LED Flashes	Indicates
Steady Off	No power or control hardware fault.
Steady On	Power applied. Control OK.
3 Flashes	Ignition lockout from too many trials.
4 Flashes	Ignition lockout from too many flame losses within single call for heat.
5 Flashes	Control hardware fault detected.
Kidde Fenwal	
LED Flashes	Indicates
Steady On	Internal control failure.
2 Flashes	Flame with no call for heat.
3 Flashes	Ignition lockout.

Flame rectification sensing is used on all LGH units. Loss of flame during a heating cycle is indicated by an absence of flame signal (0 microamps). If this happens, the control will immediately restart the ignition sequence and then lock out if ignition is not gained after the third trial. See table 18 for microamp signal values .

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

On a heating demand, the ignition control is energized by the A55 Unit Controller. The ignition control then allows 30 to 40 seconds for the combustion air blower to vent exhaust gases from the burners. When the combustion air blower is purging the exhaust gases, the combustion air prove switch is closing proving that the combustion air blower is operating before allowing the ignition control to energize. When the combustion air prove switch is closed and the delay is over, the ignition control activates gas valve, the spark electrode and the flame sensing electrode. Sparking stops immediately after flame is sensed. The combustion air blower continues to operate throughout the heating demand. If the flame fails or if the burners do not ignite, the ignition control will attempt to ignite the burners up to two more times. If ignition cannot be obtained after the third attempt, the control will lock out. The ignition control is not adjustable.

The Utec control is illustrated in figure 16 and Fenwal control in figure 17. The spade connections are used to connect the control to unit. Each of the spade terminals are identified by function. The spark electrode wire connects to the spark-plug-type connector on top of the control.

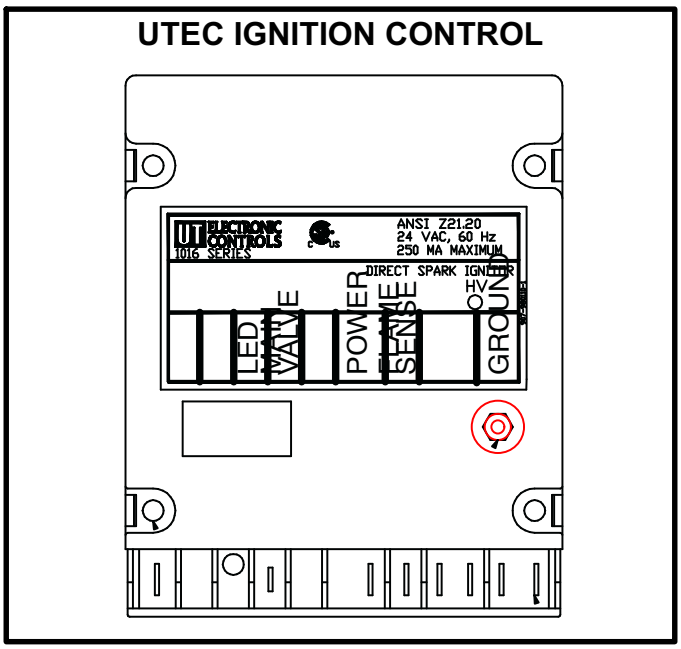


FIGURE 16

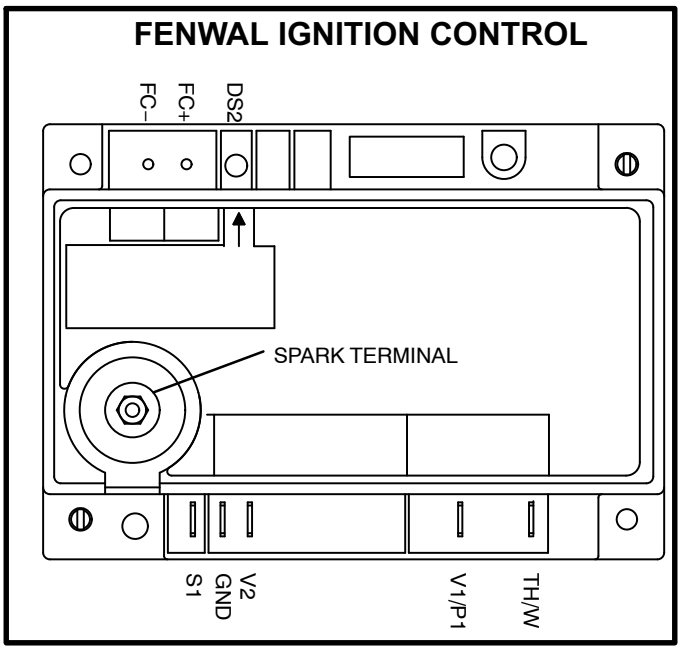


FIGURE 17

2-Combustion Air Inducer Relay K13

Combustion air inducer relay K13, used in all LGH units, is a DPDT relay with a 24VAC coil. K13 is energized by the A55 Unit Controller after a standard heating demand from the thermostat. K13 remains energized throughout the heating demand. When energized, K13 N.O. contacts close to energize the combustion air inducer and begin a heating sequence. Prove switch S18 closes as combustion air static pressure falls to “prove" combustion air inducer operation. When S18 closes, the ignition control and gas valve is energized to begin a heating sequence.

3-Combustion Air Inducer Relay K19

Combustion air inducer relay K19, used in all LGH units, is a DPDT relay with a 24 VAC coil. K19 is energized by the A55 Unit Controller after a standard heat demand from the thermostat. K19 remains energized throughout the demand. When energized, K19 N.O. contacts close to energize the second heat section combustion air inducer and begin second section heating sequence. Prove switch S45 closes as combustion air static pressure falls to “prove" combustion air inducer operation. When S45 closes, the ignition control and gas valve is energized to begin the heating sequence.

4-Limit Relay K123

Relay K123 is a 3PDT relay wired in series with primary limits S10, S99 and secondary S21. K123 remains energized as long as S10, S99 and S21 contacts remain closed. If any of the three limits open, K123 is de-energized shutting down heat sections.

5-Gas Valve Relays K72 & K73

K72 and K73 are SPDT relays wired in series with combustion air inducer relays K13 and K19 respectively and with gas valves GV1 and GV3. On a call for second stage heat (W2), the relays normally open terminals “5" and “7" close, energizing combustion air inducers B6 and B15 on second stage heat (high speed).

6-C.A.I. Transformers T3 & T13 (460 & 575 Volts Only)

LGH 460 (G) and 575 (J) voltage units use two autotransformers to provide 230VAC. Transformers are mounted in the heat section. The transformers have an output rating of 0.5A. T3 supplies 230VAC power to combustion air inducer B6, while T13 supplies power to combustion air inducer B15.

7-Heat Exchanger (Figure 14)

The LGH units use aluminized steel inshot burners with matching tubular aluminized steel (stainless steel is an option) heat exchangers and two-stage redundant gas valves. LGH uses two eleven tube/burners for high heat and two seven tube/burners for standard heat. Each burner uses a burner venturi to mix gas and air for proper combustion. Combustion takes place at each tube entrance. As hot combustion gases are drawn through each tube by the combustion air blower, exhaust gases are drawn out and fresh air/gas mixture is drawn in . Heat is transferred to the air stream from all surfaces of the heat exchanger tubes. The supply air blowers, controlled by the A55 Unit Controller, force air across all surfaces of the tubes to extract the heat of combustion. The shape of the tubes ensures maximum heat exchange.

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

8-Burner Assembly (Figure 14)

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

Burners

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

Orifice

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

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

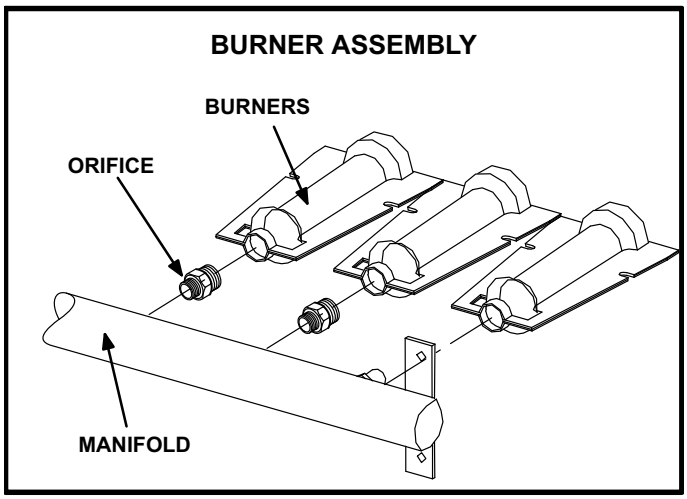


FIGURE 18

9-Primary High Temperature Limits S10 & S99

S10 and S99 are SPST N.C. auto-reset limit switches. S10 and S99 are the primary high temperature limits for the heat sections. See figure 19 for location of S10 and S99. In horizontal positions S10 is used only and located in the blower compartment.

Both limit switches are wired in series with limit relay K123 which is wired to A55. Once K123 contacts open both heat sections shuts down and the indoor blower is energized.

Limit set points are factory set and cannot be adjusted. See table 2.

TABLE 2

Btu Capacity	S10	S99	S21
Standard 500,000	open 140° ± 5° close 110 ± 8°		open 185° ± 5° close 145° ± 7°
High 800,000	open 150° ± 5° close 120 ± 8°		

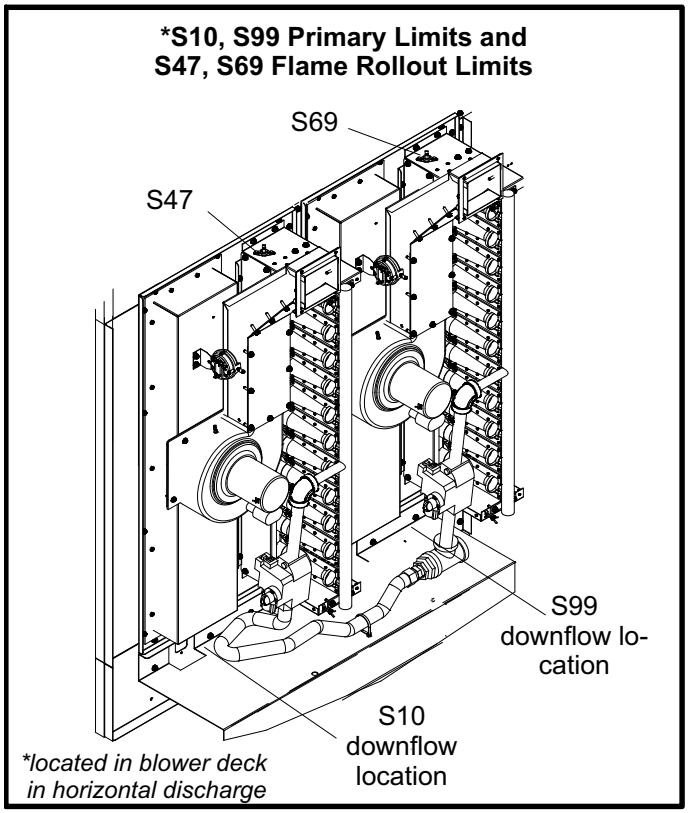


FIGURE 19

10-Secondary High Temperature Limit S21

S21 is the secondary high temperature limit used for both heat sections. The secondary limit is located in the blower compartment.

Secondary limit S21 is also wired to limit relay K`123 and functions in the same manner as the primary limits, but is factory set to actuate at a different temperature. All limits used are SPST N.C. auto-reset limits.

Limit set points are factory set and cannot be adjusted. If limit must replaced same type and set point must be used.

11-Flame Rollout Limits S47 and S69

Flame rollout limits S47 and S69 are SPST N.C. high temperature limits located on top of the burner box. S47 and S69 are wired to the Unit Controller. When S47 or S69 sense flame rollout (indicating a blockage in the combustion air passages), the corresponding flame rollout limit trips and the ignition control immediately closes the gas valve.

Limit S47 and S69 are factory preset to open at 250°F ± 12°F (121.1°C ± 6.7°C) on a temperature rise. All flame rollout limits are manual reset.

12-Combustion Air Prove Switches S18 & S45

The combustion air prove switch S18 and S45 are SPST N.O. pressure switches located in the heat section (see figure 14). Both switches are identical and used to monitor combustion air blower operation. Switch S18 and S45 are wired to the A55 Unit Controller. The switch actuates on a negative pressure fall. This pressure fall and switch actuation allows power to the ignition control (proves, by closing, that the combustion air inducer is operating before allowing the ignition control to energize). The combustion air prove switch is factory set and not adjustable. The switch will automatically open on a pressure rise (less negative). Table 3 shows prove switch settings for unit production dates before and after February 2009.

TABLE 3
S18 & S45 Prove Switch Settings

Unit Production Date	Close“ w.c. (Pa)	Open “ w.c. (Pa)
Feb. 2009 & Later	0.25 ± 5 (62.3±12.4)	0.10±5 (24.8±12.4)
Prior to Feb. 2009	0.46±5 (114±12.4)	0.31±5 (77.2±12.4)

13-Combustion Air Inducers B6 and B15

Combustion air inducers B6 and B15 are identical two speed inducers which provide fresh air to the corresponding burners while clearing the combustion chamber of exhaust gases.

On a heating demand, the ignition control is energized by the A55 Unit Controller. The ignition control then allows 30 to 40 seconds for the combustion air inducer to vent exhaust gases from the burners. When the combustion air inducer is purging the exhaust gases, the combustion air prove switch is closing proving that the combustion air inducer is operating before allowing the ignition control to energize. When the combustion air prove switch is closed and the delay is over, the ignition control activates the first stage operator of the gas valve (low fire), the spark and the flame sensing electrode. Sparking stops immediately after flame is sensed. The inducers switch to second stage speed on a W2 call for second stage heat.

All motors operate at 3200 RPM and are equipped with auto-reset overload protection. Inducers are supplied by various manufacturers. Ratings may vary by manufacturer. Specific inducer electrical ratings can be found on the unit rating plate.

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

14-Combustion Air Motor Capacitors C3 & C11

The combustion air inducer motors in all LGH units require run capacitors. Capacitor C3 is connected to combustion air inducer B6 and C11 is connected to combustion air inducer B15. Ratings for capacitor will be on combustion air inducer motor nameplate or see side of capacitor.

15-Gas Valves GV1 and GV3

GV1 and GV3 are identical two stage redundant gas valves. Units are equipped with valves manufactured by Honeywell or White-Rodgers. The Honeywell valve is quick opening (on and off in less than 3 seconds) for both first stage and second stage. The Honeywell valve is adjustable for both first and second stage. The White-Rodgers is also quick opening on first stage heat, but slow opening on second stage heat (on to second stage in 40 seconds and off to first stage in 30 seconds).*The White-Rodgers valve is adjustable for second stage heat only.* On a call for first stage heat, the valve (Honeywell or White-Rodgers) is energized by the ignition control simultaneously with the spark electrode. On a call for high heat, the second stage operator is energized directly from A55 (GV1 and GV3). A manual shut-off knob is provided on the valve for shut-off. Manual shut-off knob immediately closes both stages without delay. Figure 20 shows White-Rodgers and Honeywell gas valve components. Table 4 shows factory gas valve regulation for LGH series units.

16-Spark Electrodes

An electrode assembly is used for ignition spark. Two identical electrodes are used (one for each gas heat section). The electrode tip protrudes into the flame envelope of the adjacent burner. The electrode assembly is fastened to burner supports and can be removed for service without removing any part of the burners. Simply remove the two screws securing the electrode assembly and slide it out of unit.

During ignition, spark travels through the spark electrode (figure 21) and ignites the bottom burner. Flame travels from burner to burner until all are lit.

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

Spark gap may be checked with appropriately sized twist drills or feeler gauges. Disconnect power to the unit and remove electrode assembly. The gap should be between 0.125" ± 0.015" (3.2 mm ± .4 mm). See figure 21.

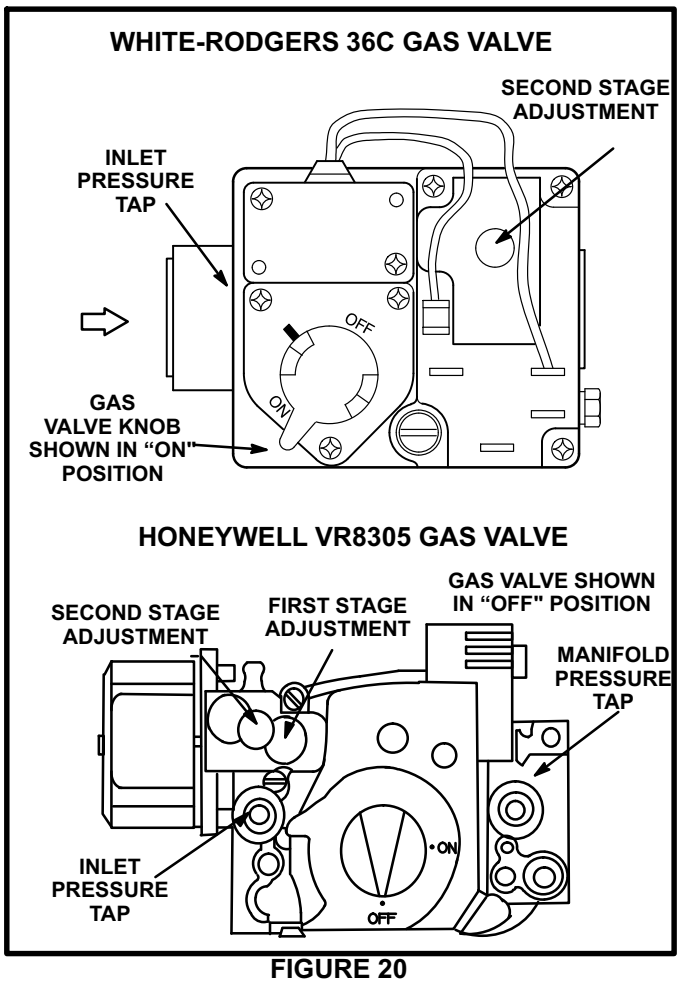


FIGURE 20

TABLE 4

GAS VALVE REGULATION FOR LGA/LGC UNITS			
Operating Pressure (outlet) Factory Setting			
Natural		L.P.	
Low	High	Low	High
1.6±0.2"W.C. 398±50Pa	3.7±0.3"W.C. 920±75Pa	5.5±0.3"W.C. 1368±75Pa	10.5±0.5"W.C. 2611±125Pa

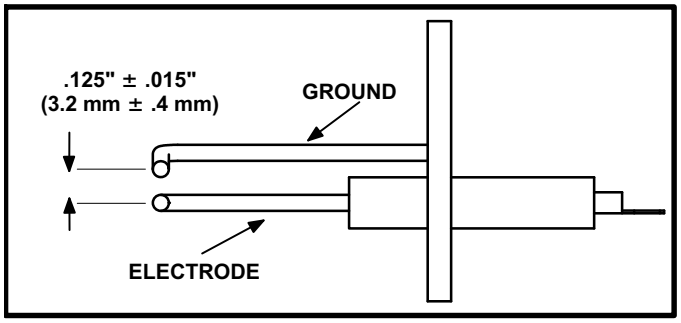


FIGURE 21

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

17-Flame Sensors

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

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

E-ELECTRIC HEAT COMPONENTS

See ELECTRIC HEAT DATA tables (table of contents) for possible LCH to EHA match-ups and electrical ratings.

EHA parts arrangement is shown in figure 22. All electric heat sections consist of electric heating elements exposed directly to the air stream. Multiple-stage elements are sequenced on and off in response to thermostat demand.

1-Electric Heat Relay K9 75to180kW

LCH units equipped with 75 to 180kW electric heat use an electric heat relay K9. K9 is a N.O. SPST pilot relay intended to electrically isolate the unit's 24V circuit from the electric heat 24V circuit. K9 is energized by the A55 Unit Controller. K9-1 closes, enabling T2 to energize the electric heat contactors.

2-Contactors K15, K16 and K17 all voltages

Contactors K15, K16 and K17 are all three-pole double-break contactors located on the electric heat vestibule. All contactors are equipped with a 24VAC coil. The coils in the K15, K16 and K17 contactors are energized by A55 Unit Controller. Contactors K15 and K16 energize the first stage heating elements, while K17 energizes the second stage heating elements.

3-Contactors K18, K75 and K76

These contactors are found on G and J voltage, 105 through 180kW EHA units. Contactors K18, K75 and K76 are identical to contactors K15. K16 and K17. The coils on these contactors are energized by A55 Unit Controller and relay K9. K18, K75 and K76 energizes the second stage heating elements.

4-Primary Limit S15

S15 is an auto-reset thermostat wired in series with contactor K15 and relay K9. When S15 opens, indicating a problem in the system, K15 and K9 are de-energized and first stage and all subsequent stages of heat are de-energized. S15 is factory set and cannot be adjusted.

EHA VESTIBULE PANEL

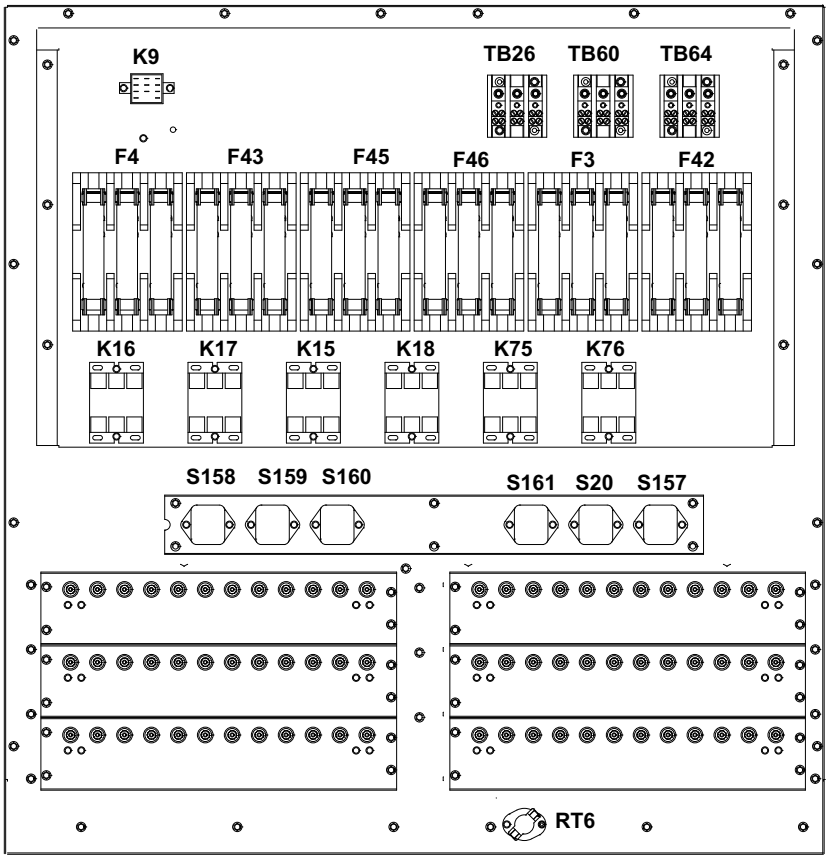


FIGURE 22

5-Secondary Limits S20, S157, S158, S159, S160 and S161

S20, S157, S158, S159, S160 and S161 are manual reset limit switches that provide back up high temperature protection. Each limit is wired in series with a contactor and heating element. When one or more limit opens the heating element is de-energized which in turn de-energizes the heating element. See EHA diagram for secondary limit / contactor match-up.

6-Heating Elements HE1 through HE12

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

7-Fuses F3, F42, F43, F44, F45, F46

F3, F42, F43, F44, F45 and F46 are 250V 60 amp (Y voltage) and 660V 60 amp (G and J voltage) fuses that provide overcurrent protection to HE1 through HE12. Each fuse is connected in series with a heating element. See EHA diagram for specific fuse / heating element match up.

8-Terminal Strips TB2, TB3 and TB13

Terminal strip TB2 and TB13 is used for single point power installations only. TB2 and TB13 distributes L1, L2 and L3 power to TB3. Units with multi-point power connections will not use TB2. Terminal strip TB3 is used to distribute power to electric heat components.

9-Terminal Strips TB26, TB64 and TB60

These terminal strips are used to distribute power from L1, L2 and L3 to its respective heating element. See EHA diagrams.

II-PLACEMENT AND INSTALLATION

Make sure the unit is installed in accordance with the installation instructions and all applicable codes. See accessories section for conditions requiring use of the optional roof mounting frame (RMFE-14).

III-START UP - OPERATION

IMPORTANT-The crankcase heater must be energized for 24 hours before attempting to start compressor. Set thermostat so there is no demand to prevent compressors from cycling.

A-Preliminary Checks

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

2- Inspect all electrical wiring, both field- and factory-installed, for loose connections. Tighten as required.

3- Check to ensure that refrigerant lines do not rub against the cabinet or against other refrigerant lines.

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

5- Make sure filters are in place before start-up.

B-Cooling Start-Up

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

2- *2 Heat / 2 Cool Thermostat -*
First-stage thermostat demand will energize compressors 1 and 2. Second-stage thermostat demand will energize compressors 3 and 4. On units with an economizer, when outdoor air is acceptable, a first-stage demand will energize the economizer; a second-stage demand will energize compressors 1 and 2. Refer to the Unit Controller manual provided with each unit for other staging options.

3- Each refrigerant circuit is separately charged with R-410A refrigerant. See unit rating plate for correct amount of charge. See figure 23 for refrigerant routing on units equipped with a constant air volume supply air blower. See figure 24 for refrigerant routing on units equipped with a variable air volume supply air blower. See figure 47 for refrigerant routing on units equipped with a reheat coil (Humiditrol).

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

Manifold gauge sets used with systems charged with R-410A refrigerant must be capable of handling the higher system operating pressures. The gauges should be rated for use with pressures of 0-800 on the high side and a low side of 30" vacuum to 250 psi with dampened speed to 500 psi. Gauge hoses must be rated for use at up to 800 psi of pressure with a 4000 psi burst rating.

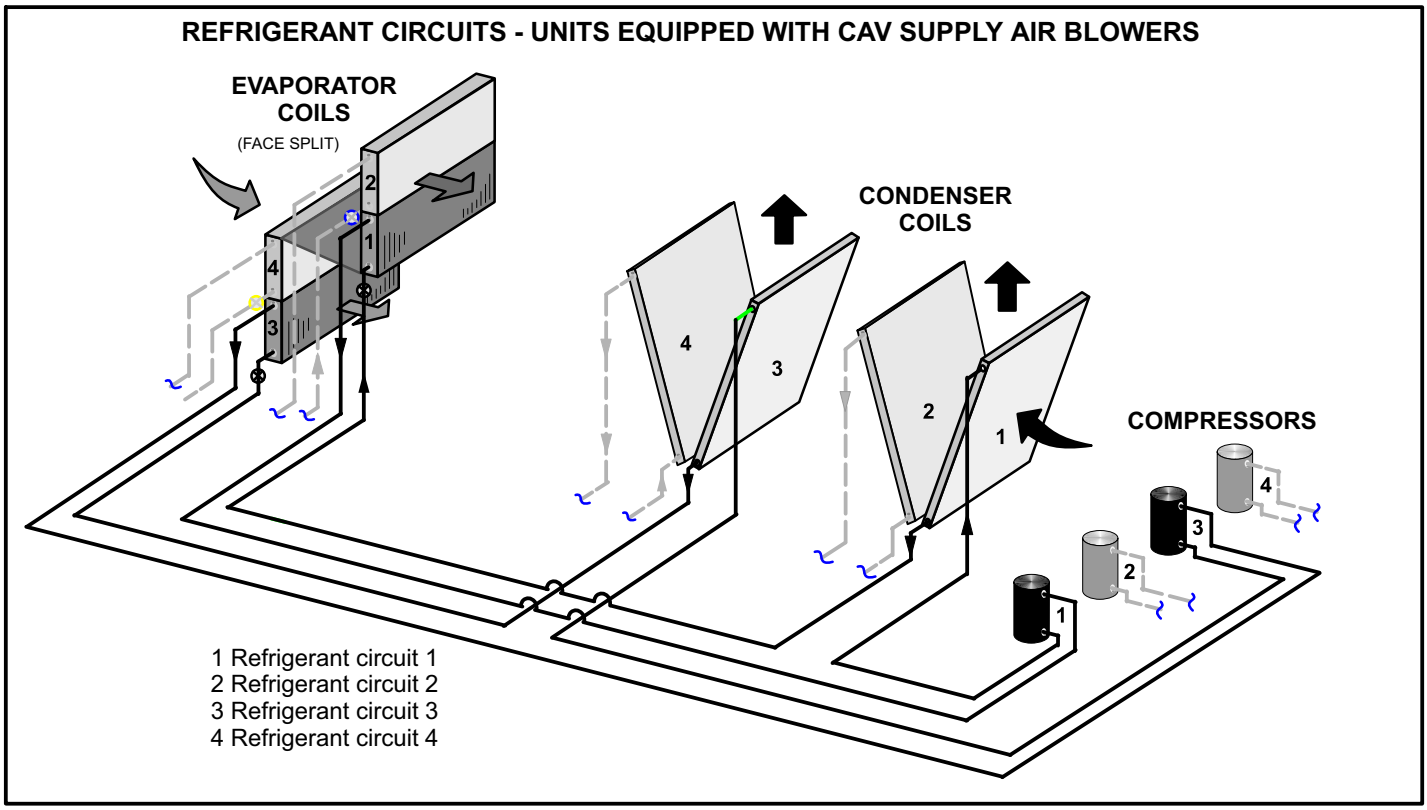


FIGURE 23

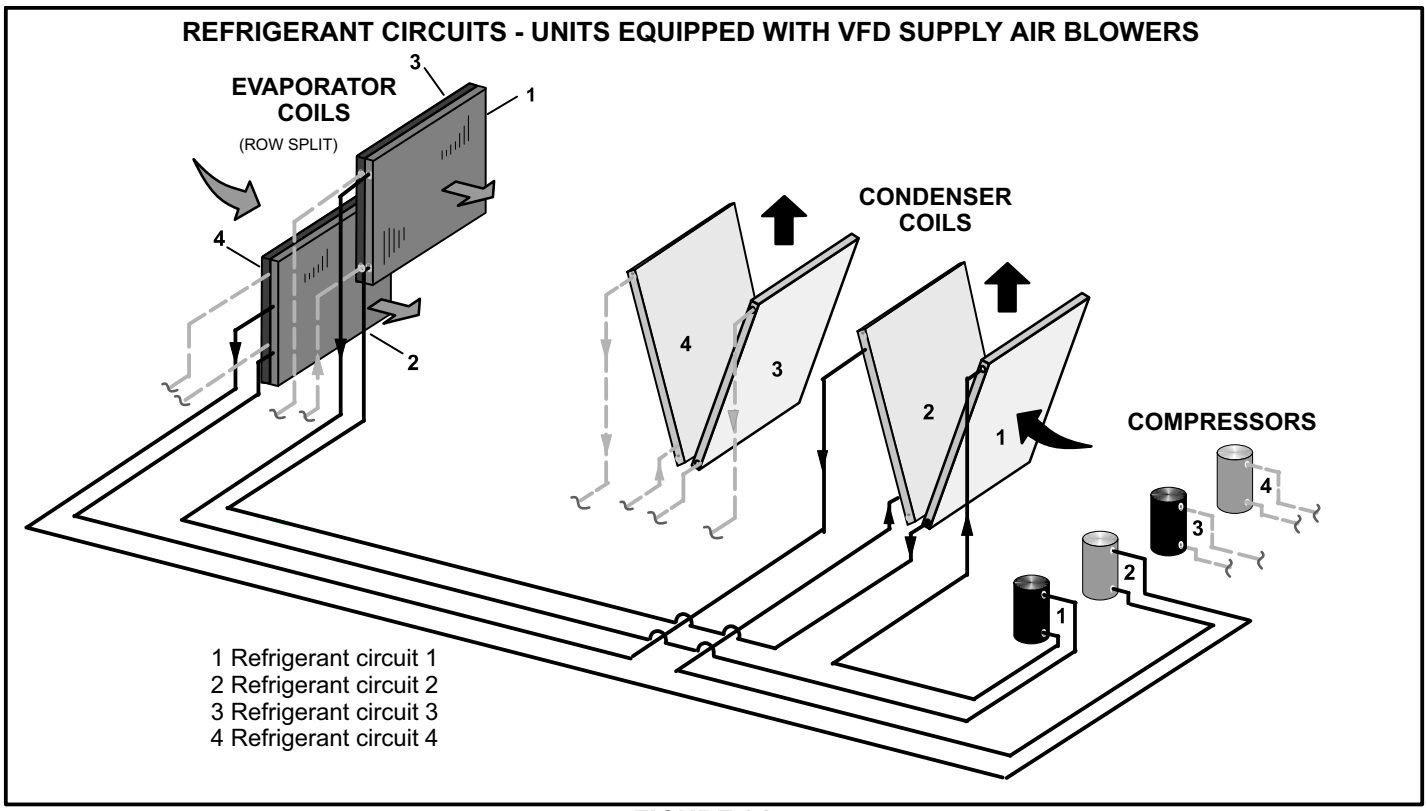


FIGURE 24

C-Refrigerant Charge and Check

WARNING-Do not exceed nameplate charge under any condition.

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

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

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

IMPORTANT - Charge unit in cooling mode. Make sure reheat (Humiditrol) is not energized.

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

2- Check each system separately with all stages operating.

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

4- Apply the outdoor temperature to tables 5 through 16 to determine normal operating pressures. Pressures are listed for sea level applications at 80°F dry bulb and 67°F wet bulb return air.

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

6- If discharge pressure is high, remove refrigerant from the system. If discharge pressure is low, add refrigerant to the system.
   - Add or remove charge in increments.
   - Allow the system to stabilize each time refrigerant is added or removed.

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

TABLE 5
LGH/LCH420S - R410A - CAV

Outdoor Coil Entering Air Temp	Circuit 1		Circuit 2		Circuit 3		Circuit 4	
	Dis. ±10 psig	Suc. ±5 psig	Dis. ±10 psig	Suc. ±5 psig	Dis. ±10 psig	Suc. ±5 psig	Dis. ±10 psig	Suc. ±5 psig
65°F*	270	131	317	136	291	134	291	133
75°F	313	134	341	139	331	137	331	134
85°F	355	136	391	142	375	138	370	137
95°F	396	138	446	144	418	140	412	139
105°F	446	140	500	147	464	141	452	141
115°F	500	142	552	150	513	142	507	143

TABLE 6
LGH/LCH420S - R410A - VFD

Outdoor Coil Entering Air Temp	Circuit 1		Circuit 2		Circuit 3		Circuit 4	
	Dis. ±10 psig	Suc. ±5 psig	Dis. ±10 psig	Suc. ±5 psig	Dis. ±10 psig	Suc. ±5 psig	Dis. ±10 psig	Suc. ±5 psig
65°F*	280	112	310	115	310	137	312	141
75°F	330	115	360	118	350	140	350	143
85°F	380	117	410	121	400	142	380	141
95°F	420	121	470	125	450	144	435	143
105°F	495	124	530	128	510	146	490	147
115°F	535	128	590	131	570	148	550	150

TABLE 7
LGH/LCH420H - R410 - CAV

Outdoor Coil Entering Air Temp	Circuit 1		Circuit 2		Circuit 3		Circuit 4	
	Dis ±10 psig	Suc ±5 psig	Dis ±10 psig	Suc ±5 psig	Dis ±10 psig	Suc ±5 psig	Dis ±10 psig	Suc ±5 psig
65°F*	230	127	300	133	260	130	270	130
75°F	290	134	330	135	300	132	300	131
85°F	320	135	380	137	340	135	340	132
95°F	390	137	430	139	390	136	370	133
105°F	440	143	490	142	440	139	430	137
115°F	500	146	550	144	500	141	490	139

TABLE 8
LGH/LCH420H - R410 - VFD

Outdoor Coil Entering Air Temp	Circuit 1		Circuit 2		Circuit 3		Circuit 4	
	Dis ±10 psig	Suc ±5 psig	Dis ±10 psig	Suc ±5 psig	Dis ±10 psig	Suc ±5 psig	Dis ±10 psig	Suc ±5 psig
65°F*	250	121	280	124	260	140	270	140
75°F	300	124	320	126	305	142	306	142
85°F	330	126	370	127	340	143	350	144
95°F	390	130	420	131	400	146	390	147
105°F	420	131	470	132	450	147	460	148
115°F	470	134	540	134	510	149	520	150

TABLE 9
LGH/LCH480S - R410A - CAV

Outdoor Coil Entering Air Temp	Circuit 1		Circuit 2		Circuit 3		Circuit 4	
	Dis ±10 psig	Suc ±5 psig	Dis ±10 psig	Suc ±5 psig	Dis ±10 psig	Suc ±5 psig	Dis ±10 psig	Suc ±5 psig
65°F*	270	131	317	136	291	134	291	133
75°F	313	134	341	139	331	137	331	134
85°F	355	136	391	142	375	138	370	137
95°F	396	138	446	144	418	140	412	139
105°F	446	140	500	147	464	141	452	141
115°F	500	142	552	150	513	142	507	143

TABLE 10
LGH/LCH480S - R410A - VFD

Outdoor Coil Entering Air Temp	Circuit 1		Circuit 2		Circuit 3		Circuit 4	
	Dis ±10 psig	Suc ±5 psig	Dis ±10 psig	Suc ±5 psig	Dis ±10 psig	Suc ±5 psig	Dis ±10 psig	Suc ±5 psig
65°F*	282	114	317	116	315	138	316	139
75°F	336	116	361	118	353	139	351	143
85°F	389	119	414	121	403	142	396	145
95°F	429	122	470	124	451	144	441	144
105°F	502	126	529	128	511	147	498	147
115°F	547	130	595	131	576	149	558	150

TABLE 11
LGH/LCH480H - R410A - CAV

Outdoor Coil Entering Air Temp	Circuit 1		Circuit 2		Circuit 3		Circuit 4	
	Dis ±10 psig	Suc ±5 psig	Dis ±10 psig	Suc ±5 psig	Dis ±10 psig	Suc ±5 psig	Dis ±10 psig	Suc ±5 psig
65°F*	231	127	296	133	264	130	369	130
75°F	292	134	336	135	301	132	293	131
85°F	322	135	380	137	344	135	343	132
95°F	386	137	434	139	390	136	373	133
105°F	436	143	487	142	442	139	433	137
115°F	500	146	546	144	496	141	487	139

TABLE 12
LGH/LCH480H - R410A - VFD

Outdoor Coil Entering Air Temp	Circuit 1		Circuit 2		Circuit 3		Circuit 4	
	Dis ±10 psig	Suc ±5 psig	Dis ±10 psig	Suc ±5 psig	Dis ±10 psig	Suc ±5 psig	Dis ±10 psig	Suc ±5 psig
65°F*	250	121	283	124	267	140	273	140
75°F	301	124	324	126	305	142	306	142
85°F	331	136	371	127	349	143	355	144
95°F	390	130	420	131	398	146	389	147
105°F	428	131	477	132	456	147	459	148
115°F	479	134	537	134	516	149	522	150

TABLE 13
LGH/LCH540S - R410A - CAV

Outdoor Coil Entering Air Temp	Circuit 1		Circuit 2		Circuit 3		Circuit 4	
	Dis ±10 psig	Suc ±5 psig	Dis ±10 psig	Suc ±5 psig	Dis ±10 psig	Suc ±5 psig	Dis ±10 psig	Suc ±5 psig
65°F*	291	122	308	127	300	125	295	125
75°F	326	126	350	129	335	128	330	127
85°F	375	129	400	133	385	133	380	132
95°F	412	132	440	136	423	134	423	134
105°F	464	134	494	138	475	136	469	137
115°F	506	136	539	140	520	138	506	138

TABLE 14
LGH/LCH540S - R410A - VFD

Outdoor Coil Entering Air Temp	Circuit 1		Circuit 2		Circuit 3		Circuit 4	
	Dis ±10 psig	Suc ±5 psig	Dis ±10 psig	Suc ±5 psig	Dis ±10 psig	Suc ±5 psig	Dis ±10 psig	Suc ±5 psig
65°F*	285	119	324	124	320	138	310	139
75°F	329	121	368	125	355	139	350	140
85°F	391	125	418	128	400	142	400	142
95°F	454	127	476	129	460	144	450	144
105°F	497	130	525	133	515	145	500	147
115°F	554	133	580	136	570	147	555	149

TABLE 15
LGH/LCH600S - R410A - CAV

Outdoor Coil Entering Air Temp	Circuit 1		Circuit 2		Circuit 3		Circuit 4	
	Dis ±10 psig	Suc ±5 psig	Dis ±10 psig	Suc ±5 psig	Dis ±10 psig	Suc ±5 psig	Dis ±10 psig	Suc ±5 psig
65°F*	258	123	336	126	291	125	298	124
75°F	316	125	375	127	324	126	316	125
85°F	376	129	422	130	369	129	362	127
95°F	425	132	466	132	414	131	395	129
105°F	478	134	533	134	469	133	444	131
115°F	535	137	596	138	530	136	509	134

TABLE 16
LGH/LCH600S - R410A - VFD

Outdoor Coil Entering Air Temp	Circuit 1		Circuit 2		Circuit 3		Circuit 4	
	Dis ±10 psig	Suc ±5 psig	Dis ±10 psig	Suc ±5 psig	Dis ±10 psig	Suc ±5 psig	Dis ±10 psig	Suc ±5 psig
65°F*	251	109	300	111	297	135	295	135
75°F	304	111	342	113	338	136	335	137
85°F	343	114	388	115	382	139	384	140
95°F	398	117	433	117	433	141	424	142
105°F	445	119	489	119	485	142	477	144
115°F	490	122	545	121	537	145	521	146

D-Charge Verification - Approach Method - AHRI TESTING

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

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

2- Approach temperature should match values in table 17. An approach temperature greater than value shown indicates an undercharge. An approach temperature less than value shown indicates an overcharge.

3- The approach method is not valid for grossly over or undercharged systems. Use tables 5 through 16 as a guide for typical operating pressures.

TABLE 17
APPROACH TEMPERATURES

CONSTANT AIR VOLUME	
Unit	**Approach Temperature**
420S, 480S	8°F ± 1 (4.4 ± 0.5)
420H , 480H, 600S	6°F ± 1 (3.3 ± 0.5)
540S	7°F ± 1 (3.9 ± 0.5)
VARIABLE AIR VOLUME	
420S, 540S	8°F ± 1 (4.4 ± 0.5)
420H, 480H,	6°F ± 1 (3.3 ± 0.5)
480S	9°F ± 1 (5.0 ± 0.5)
600S	7°F ± 1 (3.9 ± 0.5)

E-Heating Start Up

FOR YOUR SAFETY READ BEFORE LIGHTING

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

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

⚠WARNING

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

⚠WARNING

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

⚠WARNING

SMOKE POTENTIAL

The heat exchanger in this unit could be a source of smoke on initial firing. Take precautions with respect to building occupants and property. Vent initial supply air outside when possible.

⚠WARNING

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

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

Placing Unit In Operation

⚠WARNING

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

Gas Valve Operation for White Rodgers 36C Series Valve (Figure 25) and Honeywell VR8305Q (Figure 26) Series Gas Valve

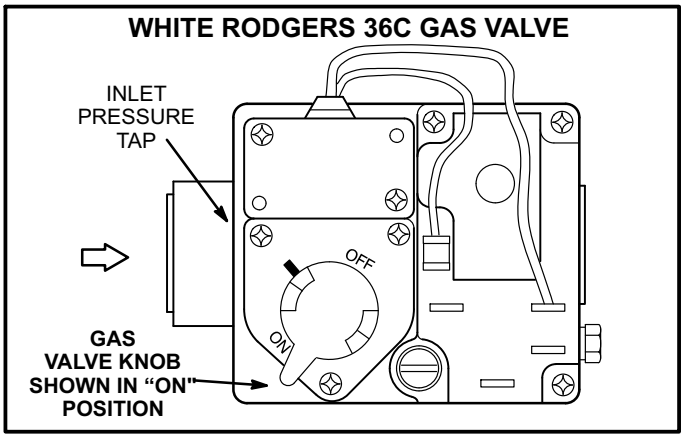


FIGURE 25

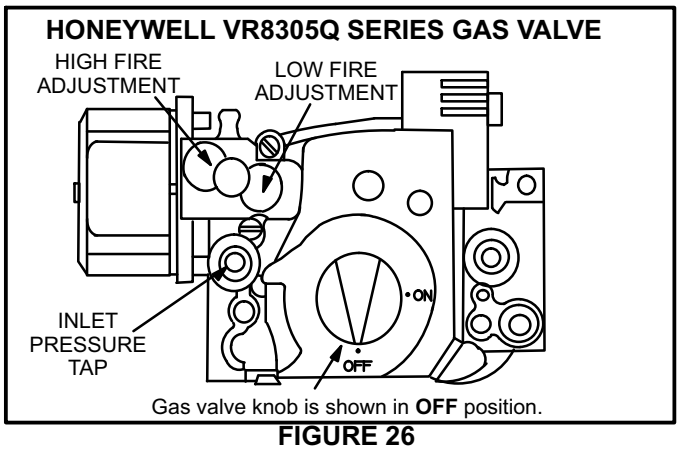


FIGURE 26

1- Set thermostat to lowest setting.

2- Turn off all electrical power to appliance.

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

4- Open or remove the heat section access panel.

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

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

7- Turn the knob on the gas valve counterclockwise ↶ to **ON**. Do not force.

8- Close or replace the heat section access panel.

9- Turn on all electrical power to unit.

10- Set thermostat to desired setting.

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

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

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

14- If the appliance will not operate, follow the instructions “Turning Off Gas to Appliance" and call your service technician or gas supplier.

Turning Off Gas to Unit

1- If using an electromechanical thermostat, set to the lowest setting.

2- Before performing any service, turn off all electrical power to the unit.

3- Open or remove the heat section access panel.

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

5- Close or replace the heat section access panel.

F-Safety or Emergency Shutdown

Turn off power to unit. Close manual and main gas valves.

IV- SYSTEMS SERVICE CHECKS

A-LGH Heating System Service Checks

All LGH units are C.G.A. design certified without modification.

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

1-Gas Piping

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

2-Testing Gas Piping

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

When pressure testing gas lines, the gas valve must be disconnected and isolated. Gas valves can be damaged if subjected to more than 0.5 psig [14"W.C. (3481 Pa)]. See figure 27.

When checking piping connection for gas leaks, use the preferred means. Common kitchen detergents can cause harmful corrosion on various metals used in gas piping. The use of specialty Gas Leak Detector is strongly recommended. It is available through part number 31B2001. See CORP 8411-L10, for further details.

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

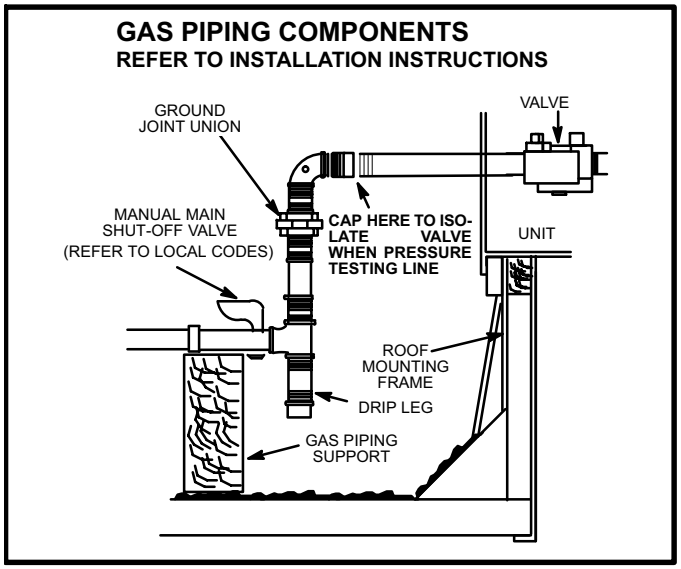


FIGURE 27

3-Testing Gas Supply Pressure

When testing gas supply pressure, connect test gauge to the inlet pressure tap on the gas valve (figure 25 and 26). Test supply gas pressure with unit firing at maximum rate (both stages energized). Make sure the reading falls within the range of the following values. Low pressure may result in erratic operation or “underfire." High pressure can result in permanent damage to the gas valve or “overfire." For natural gas units, operating pressure at the unit gas connection must be between 4.7"W.C. and 10.5"W.C. (1168 Pa and 2610 Pa). For L.P. gas units, operating pressure at the unit gas connection must be between 10.8"W.C. and 13.0"W.C. (2685 Pa and 3232 Pa).

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

4-Check and Adjust Manifold Pressure

After line pressure has been checked and adjusted, check manifold pressure. Move test gauge to the outlet pressure tap located on unit gas valve GV1. See table 4 in GAS HEAT COMPONENT section for proper manifold pressure and figure 20 for location of pressure tap on the gas valve.

The manifold pressure is factory set and should not require adjustment. If manifold pressure is incorrect and no other source of improper manifold pressure can be found, the valve must be replaced. Refer to figure 20 for location of gas valve (manifold pressure) adjustment screw.

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

⚠ CAUTION

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

Manifold Adjustment Procedure

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

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

3- After allowing the unit to stabilize for five minutes, record the manifold pressure and compare to the values given for gas supply pressure in table 4.

⚠ CAUTION

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

5-Proper Gas Flow

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

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

6-Burners

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

Figure 28 shows how to remove burner assembly.

1- Turn off electrical power and the gas supply to the unit.

2- Open the burner compartment access panel.

3- Remove screws securing burners to burner support and lift burners from the orifices. See figure 28 . Clean as necessary. Spark gap on ignition electrode must be properly set. See figure 21.

4- Replace burners and screws securing burner.

5- Replace the burner compartment access panel.

6- Turn on power and gas supply to unit. T o begin operation see E- Heating Start Up in section III- .

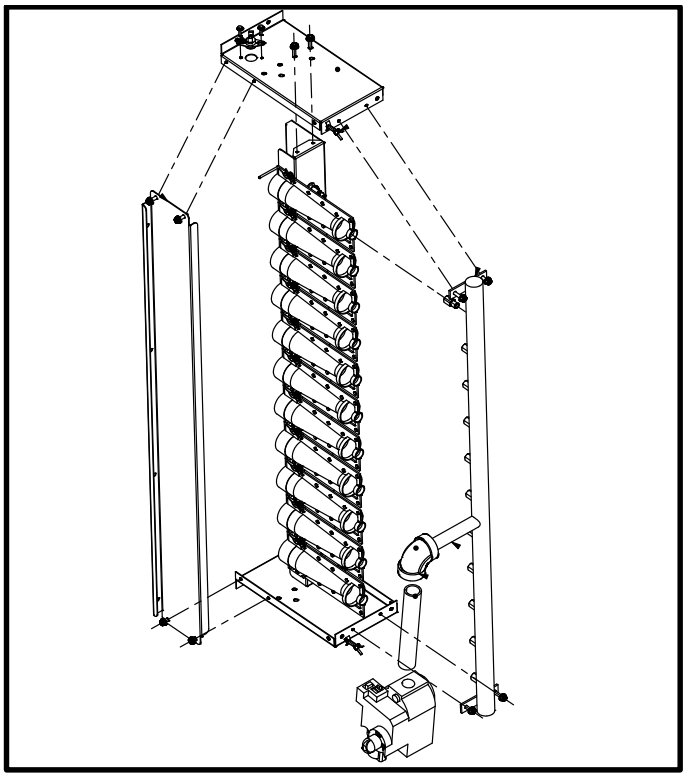


FIGURE 28

7-Heat Exchanger

To Access or Remove Heat Exchanger From Unit:

1- Turn off gas and electric power.

2- Remove access panel(s) and unit center mullion.

3- Remove gas valve, manifold assembly and burners.

4- Remove combustion air blower and flue box. Pay careful attention to the order in which gaskets and orifice are removed.

5- Support heat exchanger (to prevent it from falling when final screws are removed.)

6- Remove screws supporting heat exchanger and slide out.

7- To install heat exchanger, reverse procedure. Be sure to secure all wires and check plumbing and burner plate for airtight seal. Screws must be torqued to 35 in.-lbs. (155.7 N) to ensure proper operation.

8-Flame Sensing

Flame current is an electrical current which passes from the ignition control through the sensor electrode during unit operation. See table below for flame signal range. The electrodes should be located so the tips are at least 1/2" (12.7 mm) inside the flame envelope. Do not bend electrodes. To measure flame current, use the following procedure below:

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

1- Disconnect power to unit.
2- Remove lead from sensing electrode and install a 0-50DC microamp meter in series between the sensing electrode and the sensing lead.
3- Reconnect power and adjust thermostat for heating demand.
4- When flame is established compare reading to table 18. Do not bend electrodes.
5- Disconnect power to unit before disconnecting meter. Make sure sensor wire is securely reconnected before reconnecting power to unit.

TABLE 18

Manufacturer	Nominal Signal	Drop Out
Utec	0.5-1.0	0.4
Fenwal	0.7-1.2	0.7

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

B-Cooling System Service Checks

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

1-Gauge Manifold Attachment

Service gauge ports are identified in figure 5. Attach high pressure line to discharge line Schrader port and the low pressure line to the suction line Schrader port.

NOTE-When unit is properly charged discharge line pressures should approximate those in tables 5 through 16.

V-MAINTENANCE

⚠ CAUTION

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

A-Filters

Units are equipped with eleven 16 X 25 X 2" (406 x 635 x x51 mm) or 16 x 25 x 4" (406 x 635 x 102 mm) filters. Filters should be checked monthly and replaced when necessary with filters of like kind and size. Take note of air flow direction marking on filter frame when reinstalling filters. Orient filters as shown in figure 29.

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

Units equipped with optional outdoor air intake hoods contain four 20 X 25 X 2" (508 X 635 X 51mm) aluminum cleanable filters. See figure 30 for location of filters. On horizontal air discharge installations, remove two screws and pivot screen to access filters. See figure 31.

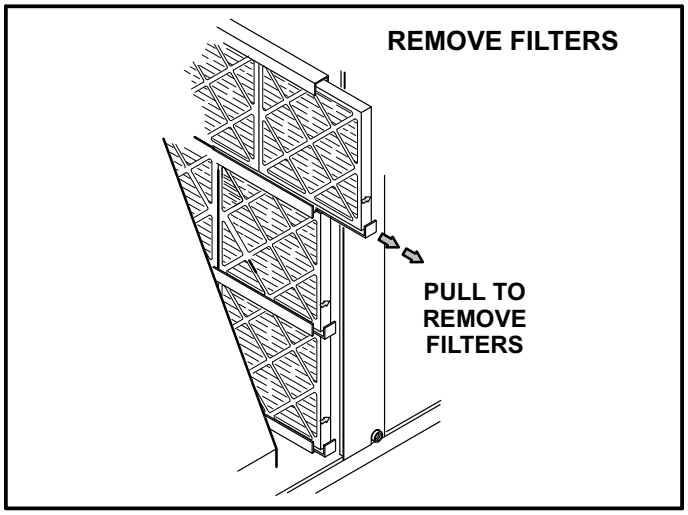


FIGURE 29

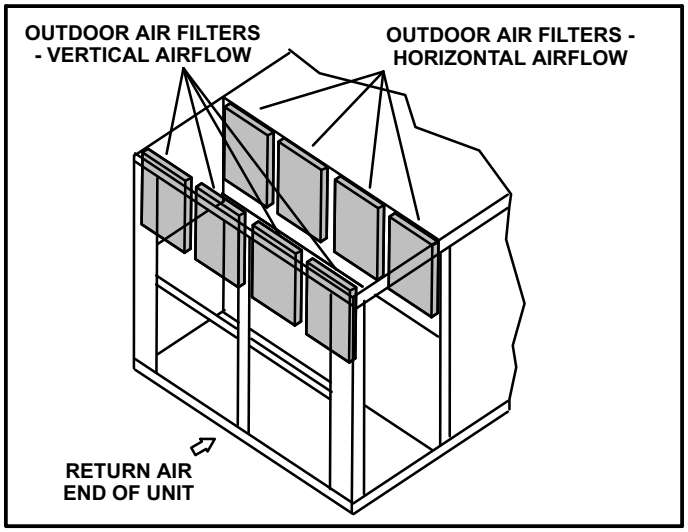


FIGURE 30

B-Lubrication

All motors are lubricated at the factory. No further lubrication is required.

Blower shaft bearings are prelubricated. For extended bearing life, relubricate at least once every two years with a lithium base grease, such as Alvania 3 (Shell Oil), Chevron BRB2 (Standard Oil) or Regal AFB2 (Texas Oil). Use a hand grease gun for relubrication. Add only enough grease to purge through the bearings so that a bead of grease appears at the seal lip contacts.

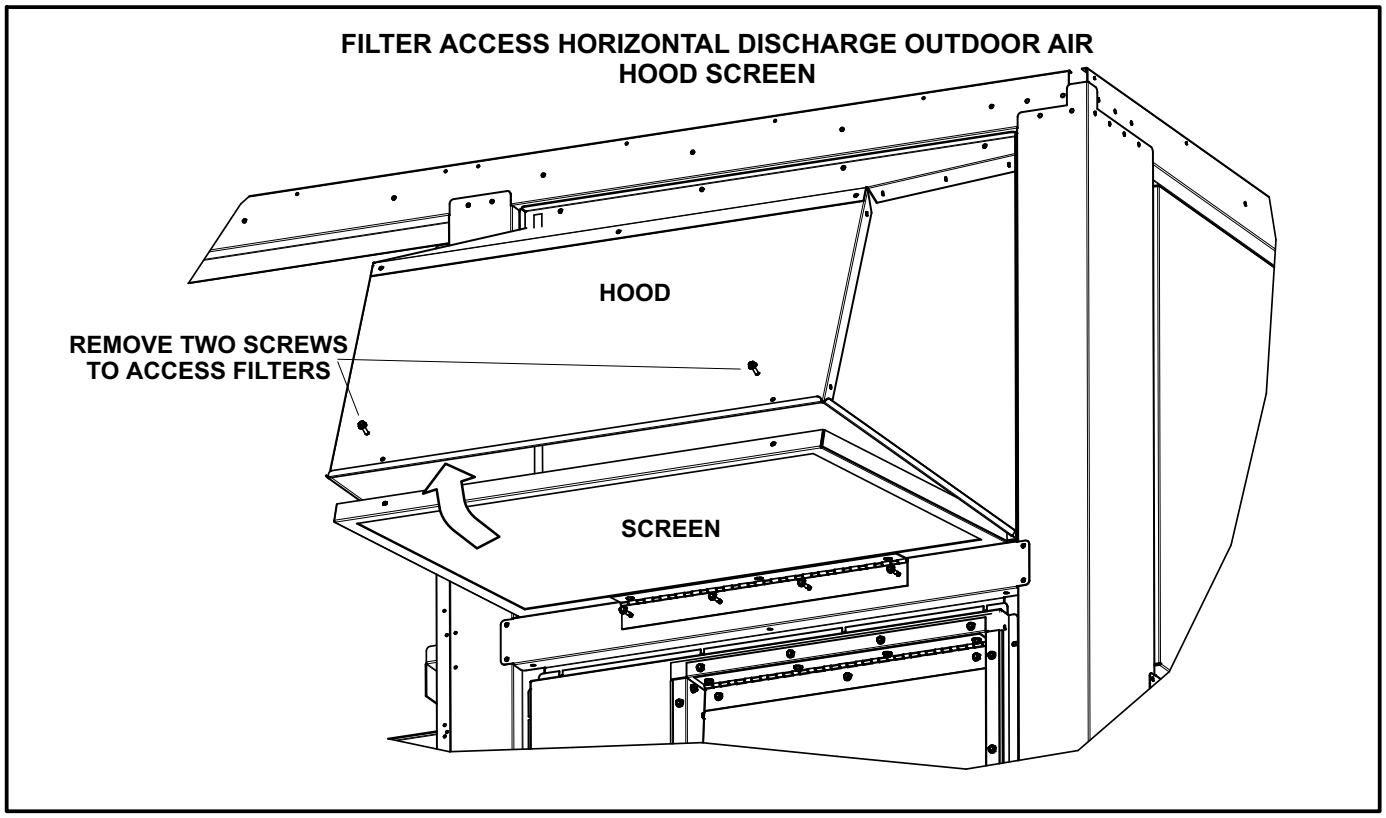


FIGURE 31

⚠ CAUTION

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

C-Supply Air Blower Wheel

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

NOTE-Do not lose balancing clips.

D-Evaporator Coil

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

E-Condenser Coil

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

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

F-Electrical

1- Check all wiring for loose connections.

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

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

G-Burners

1- Periodically examine burner flames for proper appearance during the heating season.

2- Before each heating season examine the burners for any deposits or blockage which may have occurred.

3- Remove burners as shown in section IV-SYSTEM SERVICE CHECKS figure 28 and clean as necessary. Replace burners and check spark gap.

H-Combustion Air Inducer

Under normal operating conditions, the combustion air inducer wheel should be checked and cleaned prior to the heating season. However, it should be examined periodically during the heating season to establish an ideal cleaning schedule. With power supply disconnected, the condition of the inducer wheel can be determined by looking through the vent opening.

Clean combustion air inducer as follows:

1- Shut off power supply and gas to unit.
2- Disconnect prove switch air tubing from combustion air inducer port.
3- Remove and retain screws securing combustion air inducer to flue box. Remove and retain the screw securing the combustion air inducer to the vent connector. See figure 32.
4- Clean inducer wheel blades with a small brush and wipe off any dust from housing. Clean accumulated dust from front of flue box cover.
5- Return combustion air inducer motor to the original location and secure with retained screws. It is recommended that the combustion air inducer gasket be replaced during reassembly.
6- Clean combustion air inlet screen on heat access panel using a small brush.

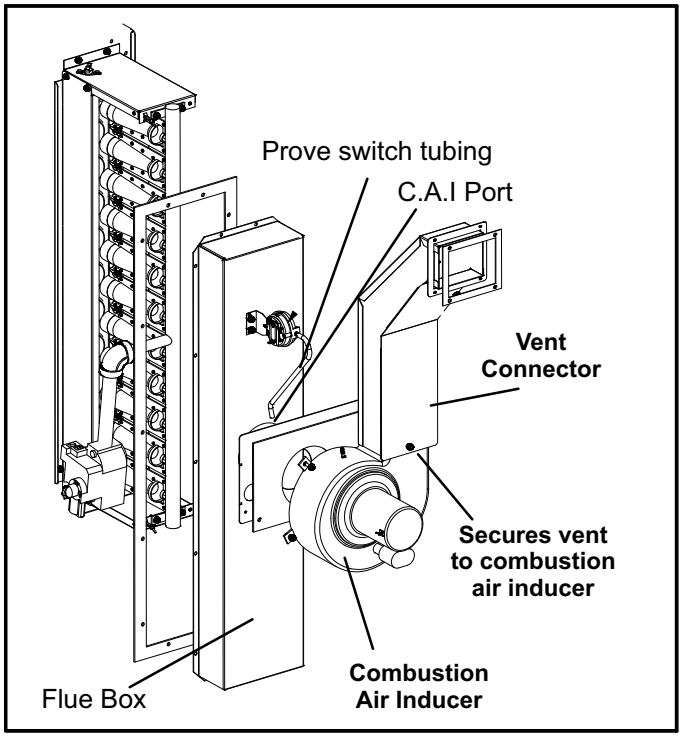


FIGURE 32

I-Flue Passageway and Flue Box

1- Remove combustion air inducer assembly as described in section H-.
2- Remove flue box cover. Clean with a wire brush as required.
3- Remove flue baffle retaining bracket and pull tube baffles from heat exchanger tubes. Clean tubes and baffles with a wire brush. Figure 14 shows a more detailed view of the heat exchanger.
4- Reinsert tube baffles, secure baffle retaining bracket and reassemble the unit. The flue box cover gasket and combustion air inducer gasket should also be replaced during reassembly.

VI-ACCESSORIES

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

A- S1CURB Mounting Frame

When installing the LGH/LCH units on a combustible surface , the S1CURB roof mounting frame is used. The roof mounting frames are recommended in all other applications but not required. If the units are not mounted on a flat (roof) surface, they MUST be supported under all edges and under the middle of the unit to prevent sagging. The units MUST be mounted level within 1/16" per linear foot or 5mm per meter in any direction.

The assembled S1CURB mounting frame is shown in figure 34. Refer to the roof mounting frame installation instructions for details of proper assembly and mounting. The roof mounting frame MUST be squared to the roof and level before mounting. Plenum system MUST be installed before the unit is set on the mounting frame. Typical roof curbing and flashing is shown in figure 33. Refer to the roof mounting frame installation instructions for proper plenum construction and attachment.

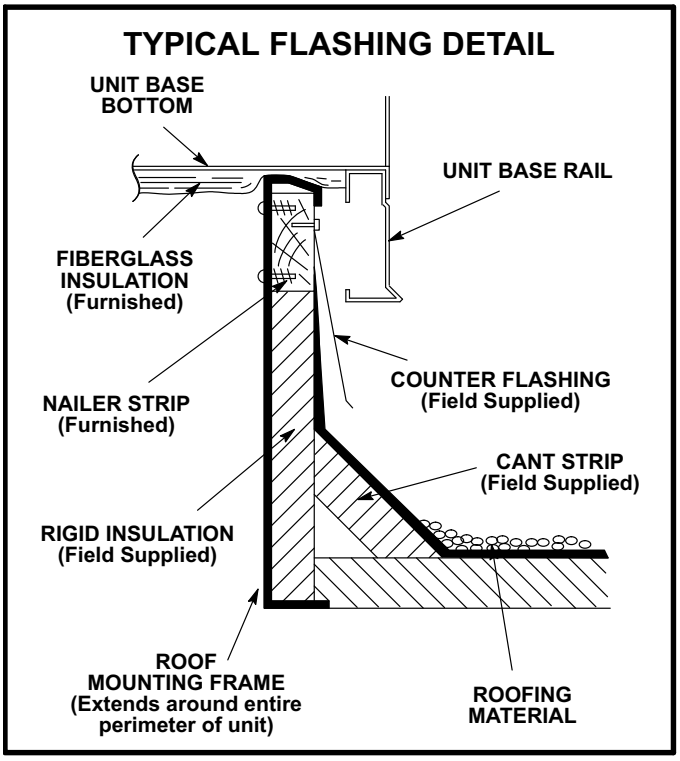


FIGURE 33

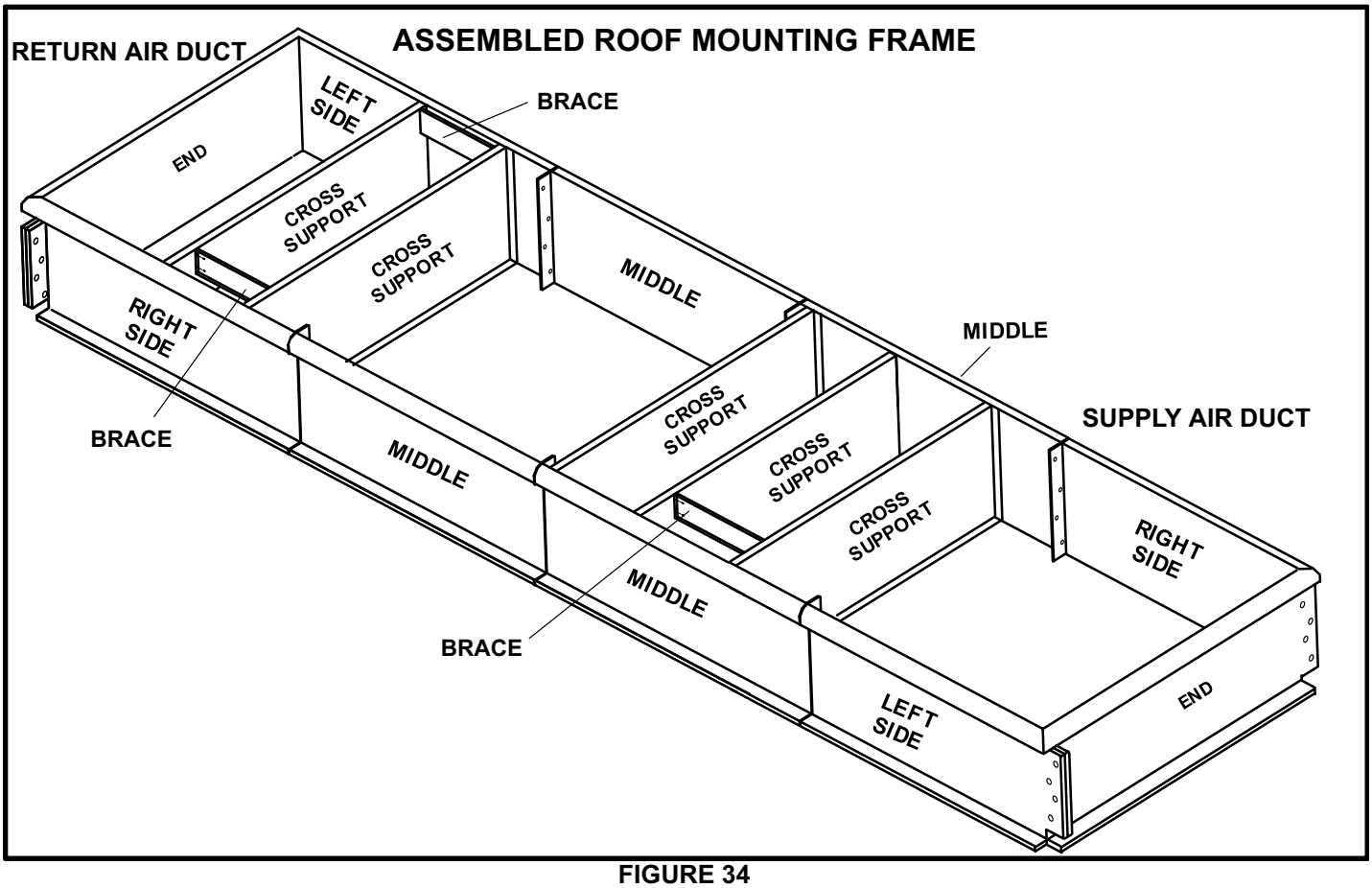


FIGURE 34

B- Outdoor Air Dampers

Dampers may be manually or motor (M) operated to allow up to 25 percent outside air into the system at all times . Either air damper can be installed in LGH/LCH units. Washable filter supplied with the outdoor air dampers can be cleaned with water and a mild Detergent should be sprayed with Filter Handicoater when dry prior to reinstallation. Filter Handicoater is R.P. Products coating no. 418 and is available as Part No. P-8-5069.

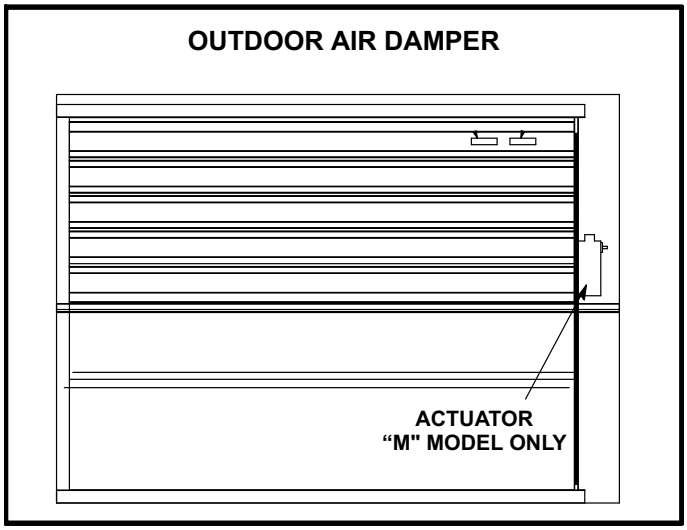


FIGURE 35

C-Economizer

(Factory Installed)

Unit may contain an optional modulating economizer controlled by the A55 Unit Controller. See figure 37. Economizer dampers modulate open to use outdoor air for free cooling when temperature is suitable during the occupied time period.

Set damper minimum position as follows.

1- Set economizer DIP switch to “DSET" position as shown in figure 36.

2- Rotate MIN POS SET potentiometer to approximate desired fresh air percentage. Indicator on damper motor reads actual damper position in degrees open.

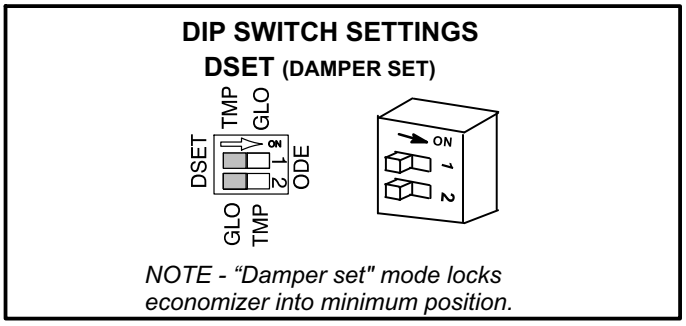


FIGURE 36

3- Measure outdoor air temperature. Mark the point on the bottom line of chart 1 and label the point “A" (40°F, 4°C shown).

4- Measure return air temperature. Mark that point on the top line of chart 1 and label the point “B" (74°F, 23°C shown).

5- Measure mixed air (outdoor and return air) temperature. Mark that point on the top line of chart 1 and label point “C" (70°F, 21°C shown).

6- Draw a straight line between points A and B.

7- Draw a vertical line through point C.

8- Draw a horizontal line where the two lines meet. Read the percent of fresh air intake on the side.

9- If fresh air percentage is less than desired, adjust MIN POS SET potentiometer higher. If fresh air percentage is more than desired, adjust MIN POS SET potentiometer lower. Repeat steps 3 through 8 until calculation reads desired fresh air percentage.

10- Return the A55 Unit Controller DIP switch to original position.

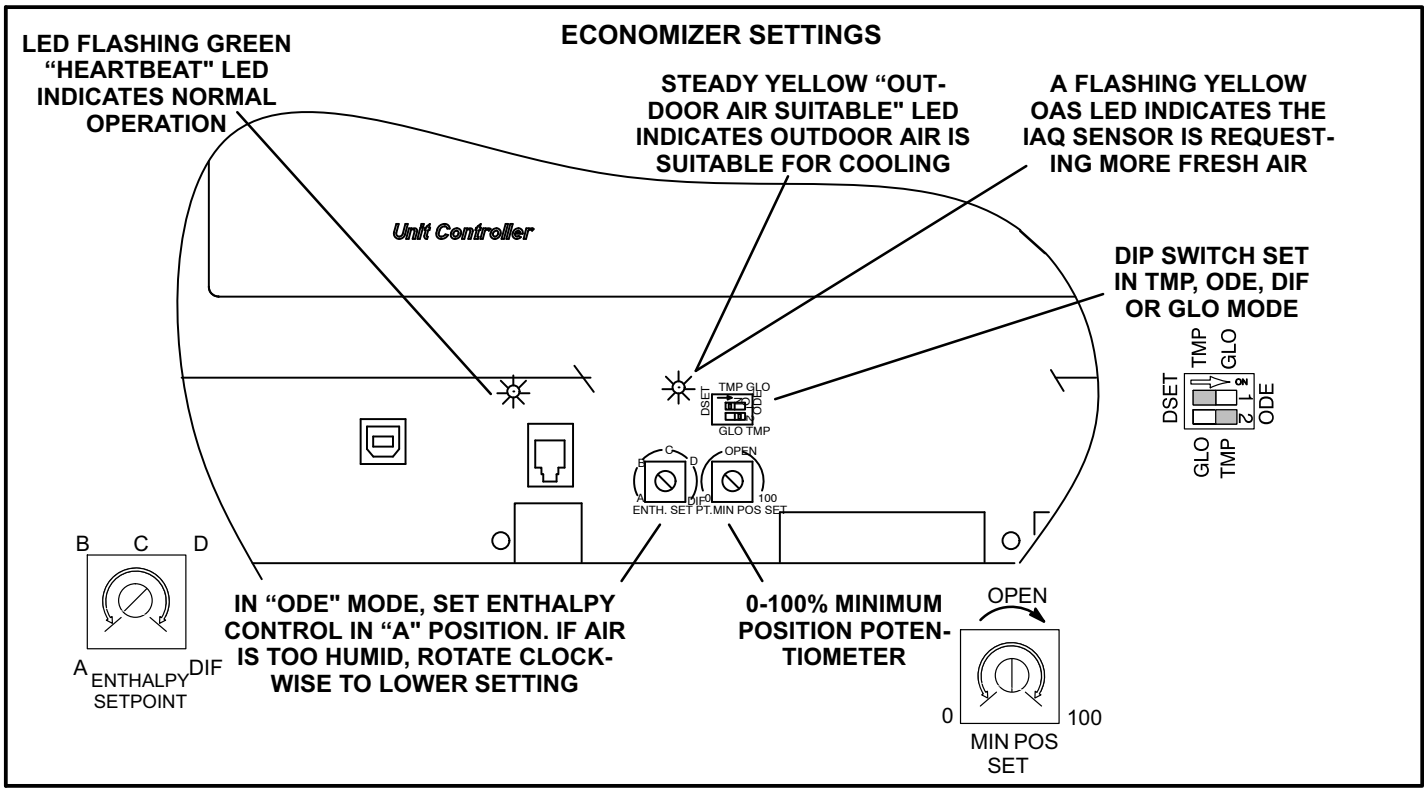
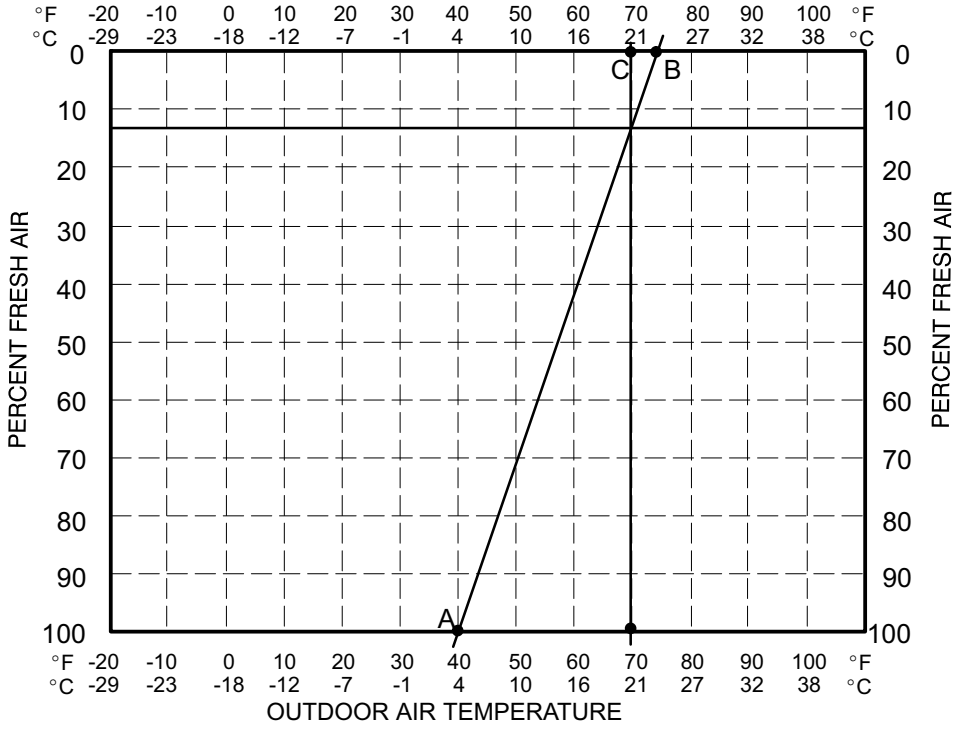


FIGURE 37

CHART 1

CALCULATE MINIMUM FRESH AIR PERCENTAGE (MIXED AND RETURN AIR TEMPERATURE)



Units Equipped With An Energy Recovery Wheel

The economizer minimum damper position must be adjusted to allow for the air resistance of the ERW.

1- Determine the required outdoor air CFM.

2- Apply the CFM to table 19 to determine the target static pressure drop across the ERW.

3- Measure the static pressure drop across the ERW. See figure 38.

4- Adjust the A55 DIP switch damper minimum position potentiometer as described previously.

5- Read the static pressure drop across the ERW and adjust the potentiometer as needed to reach the target pressure drop.

6- Remember to return A55 DIP switch to original position.

For example, a unit with an outdoor air flow of 6500 CFM would require an ERW pressure drop of 0.9"w.c.

TABLE 19

Outdoor Flow - cfm	Static Pressure - in. w.c.
3250	0.45
3500	0.48
3750	0.52
4000	0.55
4250	0.59
4500	0.62
4750	0.66
5000	0.69
5250	0.73
5500	0.76
5750	0.80
6000	0.83
6250	0.87
6500	0.90
6750	0.94
7000	0.97
7250	1.01
7500	1.04
7750	1.08
8000	1.11
8250	1.15
8500	1.18
8750	1.22
9000	1.25

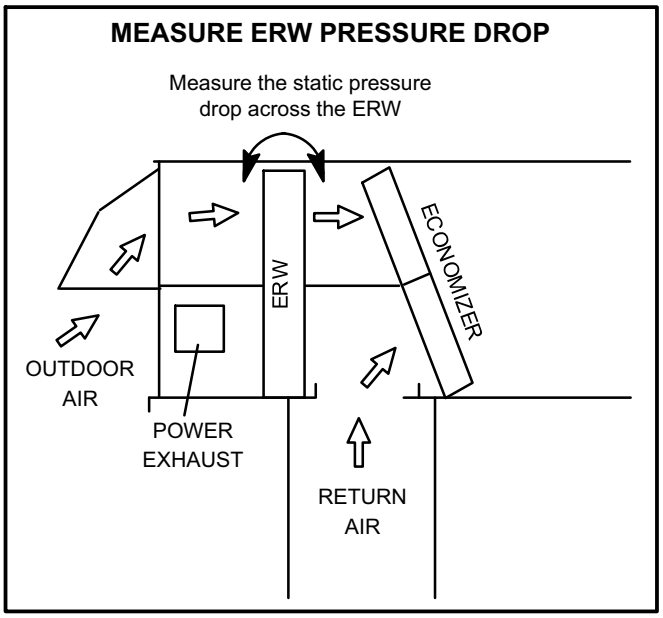


FIGURE 38

D-Supply Air Variable Frequency Drive (VAV units only)

LGH/LCH VAV units will contain a supply air blower equipped with a variable frequency drive A96 (VFD) which varies supply air CFM. As duct static increases, the supply air volume will decrease. As duct static decreases, the supply air volume will increase.

The Unit Controller uses input from a field-installed pressure transducer (A30) to maintain a 1.0" w.c. (default) static pressure. Refer to the Unit Controller manual ECTO 0.04 and 0.05 to adjust the static pressure setpoint. Install the transducer according to manufacturer's instructions.

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

The supply air VFD (A96) is located on the front side of the unit in the return air compartment. See figure 39.

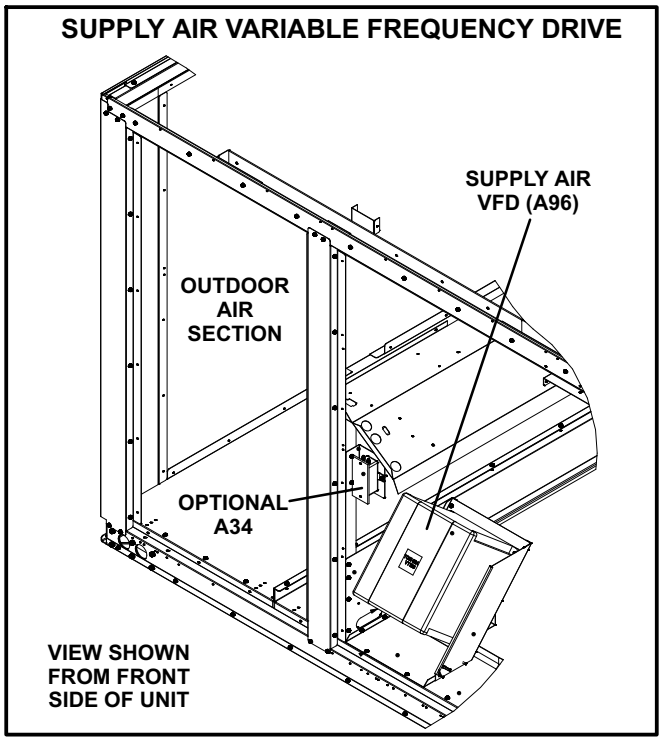


FIGURE 39

Excessive Duct Static

The Unit Controller will lock-out the unit for 5 minutes if static pressure exceeds 2.0"w.c. for 20 seconds. The Unit Controller will permanently shut down the unit after three occurrences. See Unit Controller ECTO 5.02, 0.21 and 0.22 to adjust default values.

Optional field-installed high pressure switch (S155) will de-energize the unit above static pressure setpoint. Refer to B3 blower VFD wiring diagram. Set cut-out pressure at 2"w.c. unless otherwise specified. Switch must be manually reset.

Supply Air VFD By-Pass Plug (Optional)

The supply air VFD may be by-passed using jack/plug connections. Locate J/P198 connectors in control box area under the relays. Disconnect J198 from P198 and connect J204 to P198. See figure 40. Blower will operate in constant air volume mode.

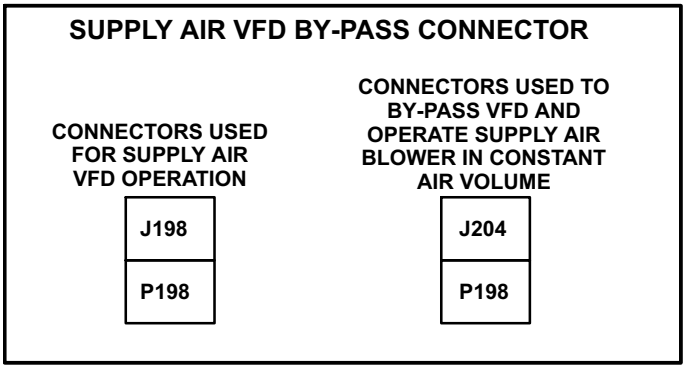


FIGURE 40

E-Gravity Exhaust Dampers

Gravity exhaust dampers are used with LGH/LCH series units. The dampers are installed in the return air compartment of the unit . The dampers must be used any time power exhaust blowers or fans are applied to LGH/LCH series units and are optional with an economizer.

F-Power Exhaust Blowers & Fans

Power exhaust blowers and fans are used with LGH /LCH series units. Power exhaust blowers and fans provide exhaust air pressure relief.

LGH/LCH units may contain one or two power exhaust fans or blowers. Exhaust blowers are shown in figure 41. Exhaust fans are located in the same place and discharge air in the same direction.

Power exhaust equipped with two fans or blowers is operated in two stages. Power exhaust blowers may be equipped with a variable frequency drive (VFD) to vary exhaust air CFM. Two fan, two blower and VFD applications require a factory-installed General Purpose GP1 control board (1)A133.

The Unit Controller will use damper position or building static pressure to initiate power exhaust. Any time building static is used to initiate power exhaust a GP1 (1)A133 board is required for operation.

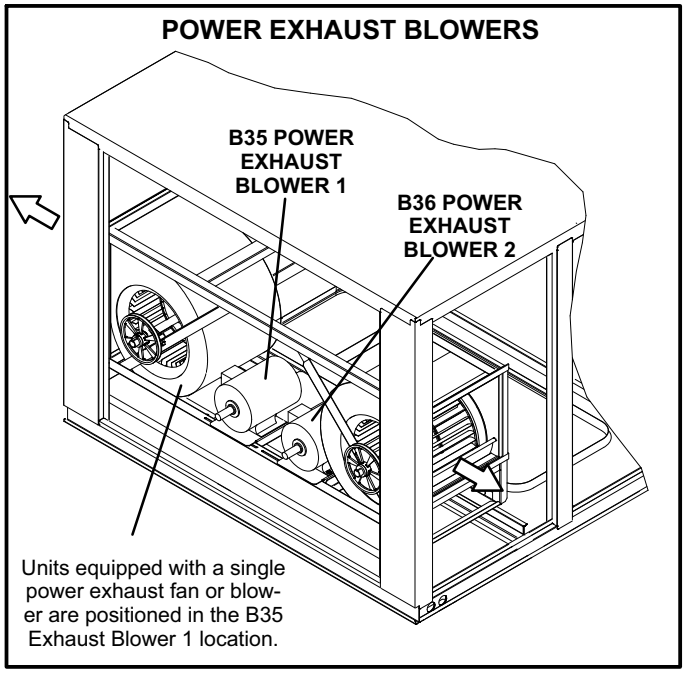


FIGURE 41

General Purpose GP1 Board (1)A133 W/TB18

The GP1 board is positioned on the A55 Unit Controller in the control box area. See figure 42. Only one GP1 board is required regardless of the number of VFD and power exhaust functions.

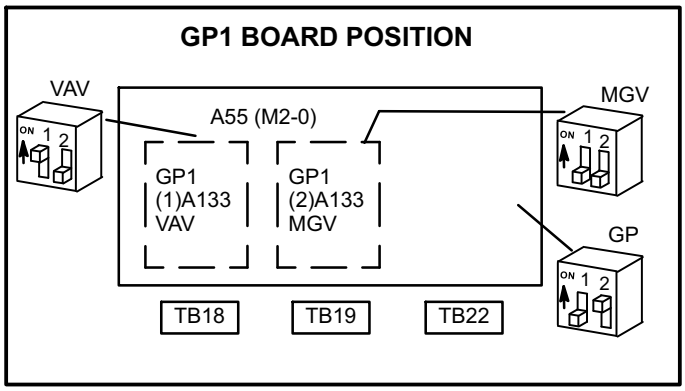


FIGURE 42

Optional Power Exhaust Variable Frequency Drive

Power Exhaust VFD (A137) will increase exhaust air CFM when building pressure is higher than setpoint and decrease the volume when building pressure is lower than setpoint. The default setpoint is 0.1"w.c.

Power exhaust VFD is available with one or two blowers; only one VFD is required. The power exhaust VFD is located in the return air compartment on the back side of the unit. See figure 43.

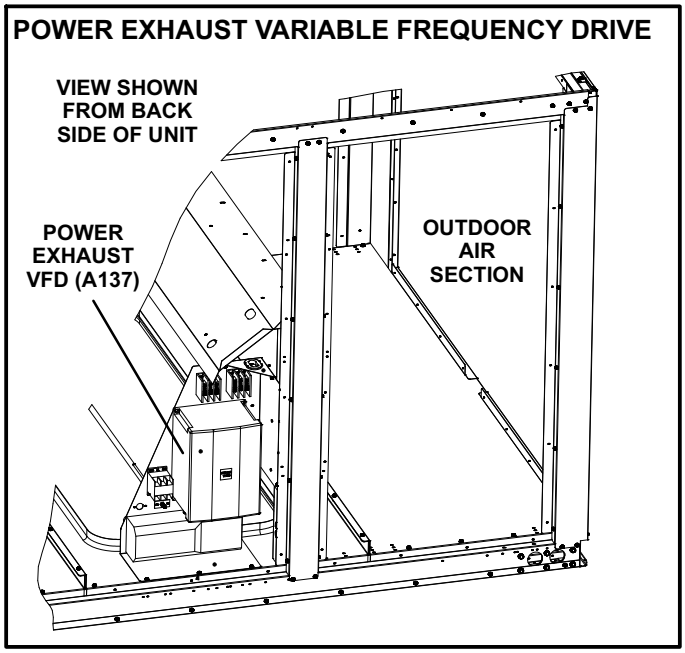


FIGURE 43

Power Exhaust Control Options

Damper Position

The Unit Controller will initiate stage 1 power exhaust when economizer or outdoor air damper travel reaches 50%. The Unit Controller will initiate stage 2 power exhaust when economizer or outdoor air damper travel reaches 75%. Refer to the Unit Controller manual ECTO 8.20 and 8.23 to adjust the default setting.

Pressure Switches (S37 and S39)

Field-installed switches are used to sense the static pressure difference between outdoor air and building air. Power exhaust equipped with one fan or blower use one switch (S37). Power exhaust equipped with two fans uses both switches.

Stage 1 power exhaust will be energized above 0.1"w.c. (default) building static pressure. Stage 2 power exhaust will be energized if building static pressure rises above 0.2"w.c. (default). Use ECTO 8.20 to adjust stage 1 setpoint and ECTO 8.23 to adjust stage 2 setpoint.

Install the switches according to manufacturer's instructions. Use an Outdoor Kit on the outdoor (reference) air tubing to prevent pressure fluctuations due to wind gusts.

Pressure Transducer (A34)

The optional factory-installed pressure transducer is used to sense the static pressure difference between outdoor air and building air. The transducer is located in the return air section of unit near the supply air VFD (A96). See figure 39. Only one pressure transducer is needed regardless of number of exhaust blowers.

Stage 1 power exhaust constant air volume will be energized above 0.1"w.c. (default) building static pressure. Stage 2 power exhaust constant air volume will be energized if building static pressure rises above 0.2"w.c. (default). Use ECTO 8.20 to adjust stage 1 setpoint and ECTO 8.23 to adjust stage 2 setpoint. Power exhaust equipped with a VFD will vary the CFM output to maintain a building static pressure of 0.1"w.c.

Complete transducer installation as follows:

1- Connect field-provided 1/4" tubing to the (+) port on the transducer. Route tubing through unit return air opening to a return air diffuser in the ductwork.

2- Locate the outdoor air kit shipped in a box in the blower section on the back side of the unit. Install outdoor air kit on the top of the unit in location shown in figure 44. Use manufacturer's instructions.

Note - Outdoor kit reduces fluctuations in reference reading due to wind gusts.

3- Locate the tubing provided with the outdoor air kit. Route the tubing from the outdoor kit through the hole under the intake hood to A34 as shown in figure 44.

Connect tubing to the (-) port on the transducer. Coil and secure excess tubing - do not cut.

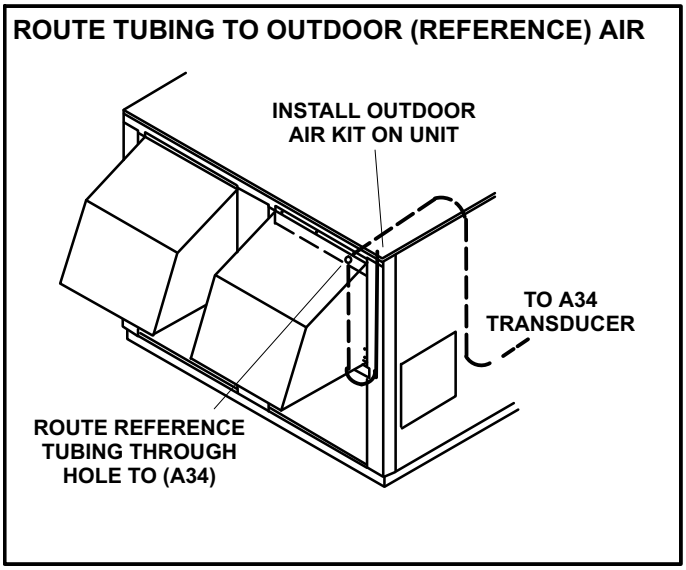


FIGURE 44

Power Exhaust VFD By-Pass Plug (Optional)

The power exhaust VFD may be by-passed using jack/plug connections. Locate J/P211 connectors in control box area under the relays. Disconnect J211 from P211 and connect J215 to P211. See figure 45. Exhaust blower will operate at maximum speed.

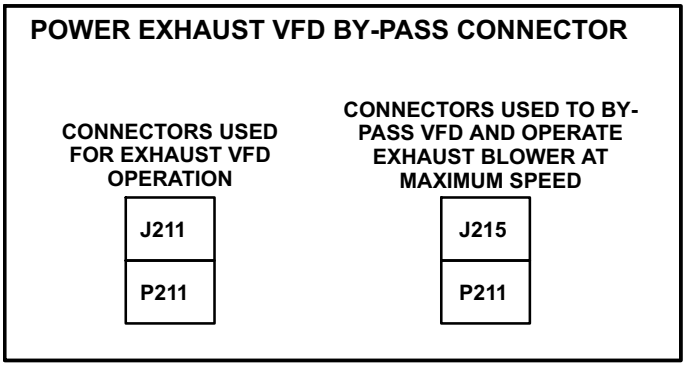


FIGURE 45

G-Control Systems

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

H-Smoke Detectors A17 and A64

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

I-Energy Recovery Wheel

LGH/LCH units may contain an optional energy recovery wheel. The ERW is located in the outdoor air entering and exhaust air streams. In the heating mode, the wheel rotates to transfer heat from the exhaust air stream to the outdoor air intake air stream. In the cooling mode the process reverses. See figure 46.

The ERW motor (B28) is energized when outdoor air is above 65°F (monitored by S125), or below 40°F monitored by S23). Between the temperature range of 40°F and 65°F the wheel does not operate. This range is for economizer operation. Thermostats S125 and S23 are located on a panel above the inverter for the indoor blower. Refer to wiring diagram on unit panels.

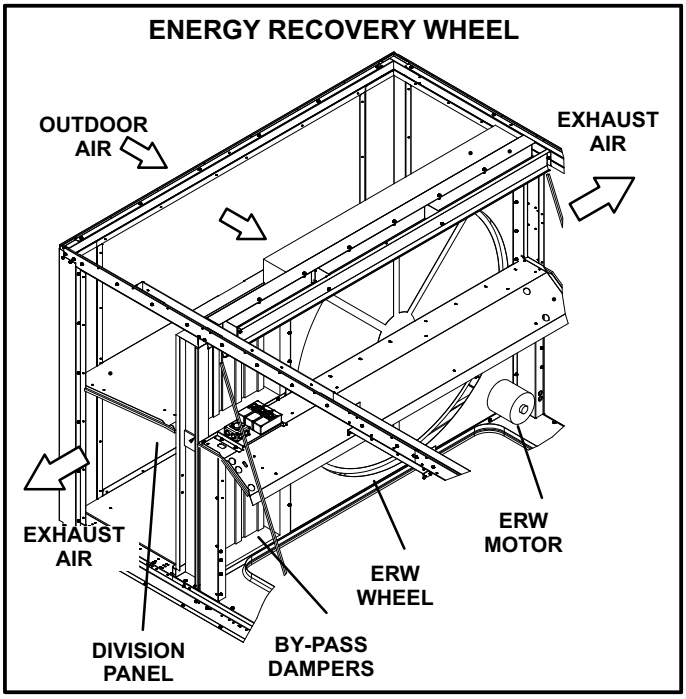


FIGURE 46

Note - When the outdoor air temperature is between 65°F and 40°F, DL43 will energize the ERW for one minute every ten minutes to clean the wheel.

The adjustable S36 end switch will energize by-pass dampers open as outdoor air dampers open. By-pass dampers will close as outdoor air dampers close or move to minimum position.

ERW should operate on unit start-up unless the outdoor temperature is between 40°F and 65°F. When outdoor air temperature is between 40°F and 65°F, install a jumper between S125 thermostat terminal “R" and K94 relay coil terminal “A" to check ERW operation.

J-Blower Proving Switch S52

The blower proving switch monitors blower operation and locks out the unit in case of blower failure. The switch is N.O. and closes at 0.14" W.C. (34.9 Pa) The switch is mounted on the upper left hand corner of the blower deck. Wiring for the blower proving switch is shown on the temperature control section (C2) wiring diagram in back of this manual.

K-Dirty Filter Switch S27

The dirty filter switch senses static pressure increase indicating a dirty filter condition. The switch is N.O. and closes at 1" W.C. (248.6 Pa) The switch is mounted on the top filter channel corner. Wiring for the dirty filter switch is shown on the temperature control section (C2) wiring diagram in back of this manual. Actuation of this switch does not affect unit operation.

L-Indoor Air Quality (CO_2) Sensor A63

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

M-Drain Pan Overflow Switch S149 (optional)

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

N-Factory-Installed Humiditrol

General

Humiditrol units provide a dehumidifying mode of operation. These units contain a reheat coil adjacent to and downstream of the evaporator coil. Reheat coil solenoid valves, L14 and L30, route hot discharge gas from the compressor to the reheat coil. Return air pulled across the evaporator coil is cooled and dehumidified; the reheat coil adds heat to supply air.

See figure 47 for reheat refrigerant routing.

L14 and L30 Reheat Coil Solenoid Valves

When Unit Controller input (P269-9) indicates room conditions require dehumidification, L14 and L30 reheat valves are energized and refrigerant is routed to the reheat coil.

Reheat Setpoint

Reheat is factory-set to energize when indoor relative humidity rises above 60% (default). Reheat will terminate when the indoor relative humidity falls 3% below setpoint, or 57% (default). The reheat setpoint can be adjusted by changing ECTO 4.25 . A setting of 100% will disable reheat. The reheat setpoint can also be adjusted using an optional Network Control Panel (NCP).

A91 Humidity Sensor

Relative humidity should correspond to the sensor (A91) output voltage listed in table 20. For example: if indoor air relative humidity is 80% $\pm$ 3%, the humidity sensor output should read 8.00VDC.

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

Read Relative Humidity At Unit Controller

Turn MODE DIP “TEMP" switch #4 “ON". Display will alternately flash from readout to output. A single push on the pushbutton will toggle the readout upward from 0.0 to 0.7 incrementally. A double push will toggle the readout downward from 0.7 to 0.0 incrementally. Readout 0.7 indicates percent relative humidity.

TABLE 20

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

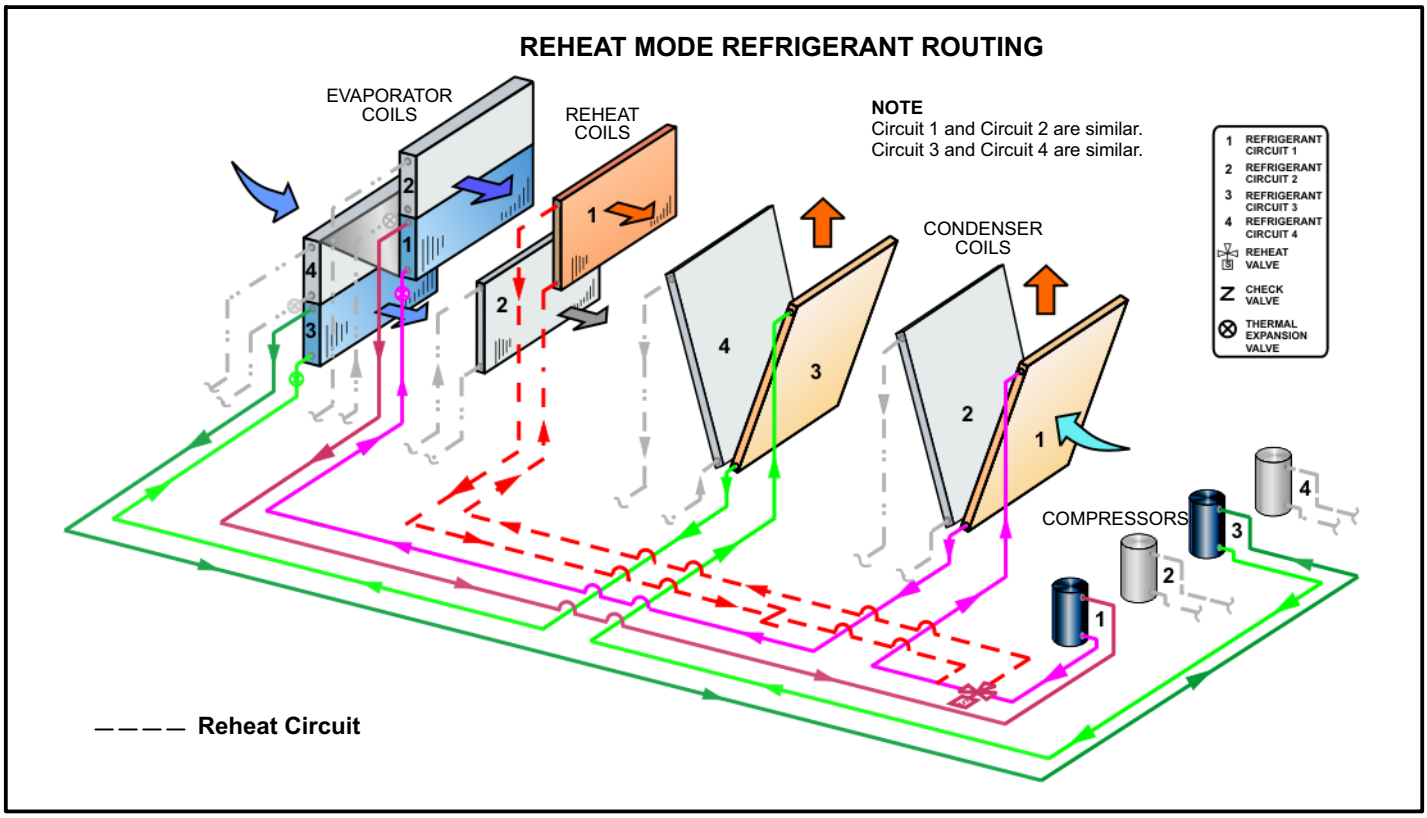


FIGURE 47

Check-Out

Test Humiditrol operation using the following procedure.

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

2- Set Unit Controller ECTO system mode parameter 6.01 to option 0 (default local thermostat mode).

3- For RH sensors, set Unit Controller ECTO reheat setpoint parameter 4.25 to option 0 (% relative humidity). For digital input, set Unit Controller ECTO reheat setpoint parameter 4.25 to 100% relative humidity.

4- Press the Unit Controller pushbutton to by-pass the compressor minimum run delay.

5- **When check-out is complete, set ECTO 4.25 back to the proper humidity setpoint, and set ECTO 6.01 to the proper setting.**

Reheat Operation

The following conditions must be met before reheat will be energized:

1- Blower must be operating.

2- System must be in occupied mode.

3- System must NOT be operating in heating mode.

4- One cooling demand is required if the unit has been in heating mode, the Unit Controller has been reset, or at initial unit start-up.

IMPORTANT - Free cooling does not operate during reheat. Free cooling will operate as shown in the Unit Controller manual.

Reheat will operate as shown in table 21.

Units are shipped from the factory to provide two stages of cooling. (ECTO 5.04 option 2 and 6.01 option 0).

Three stages of cooling is available in zone sensor mode (ECTO 6.01 set to option 1, 2, or 3). Three stages of cooling is also available by installing a transfer relay and a three-stage thermostat; ECTO 5.04 must be set to option 3.

Four stages of cooling is available in zone sensor mode (ECTO 6.01 set to option 1, 2, or 3) on units with four compressors.

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

NOTE - Another thermostat staging option is available which allows both compressors to be energized during free cooling. See ECTO 5.04 option 1 in Unit Controller manual.

TABLE 21
REHEAT OPERATION

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

*Cooling stage is initiated when zone temperature is higher than the cooling setpoint plus the appropriate stage differential (ECTO 6.10, 6.12, 6.13, 6.14).

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

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

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

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

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

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

The following conditions must be met before reheat will be energized:

1- Blower must be operating.

2- System must be in occupied mode.

3- System must NOT be operating in heating mode.

4- One cooling demand is required if the unit has been in heating mode, the Unit Controller has been reset, or at initial unit start-up.

O-Modulating Gas Valve (MGV)

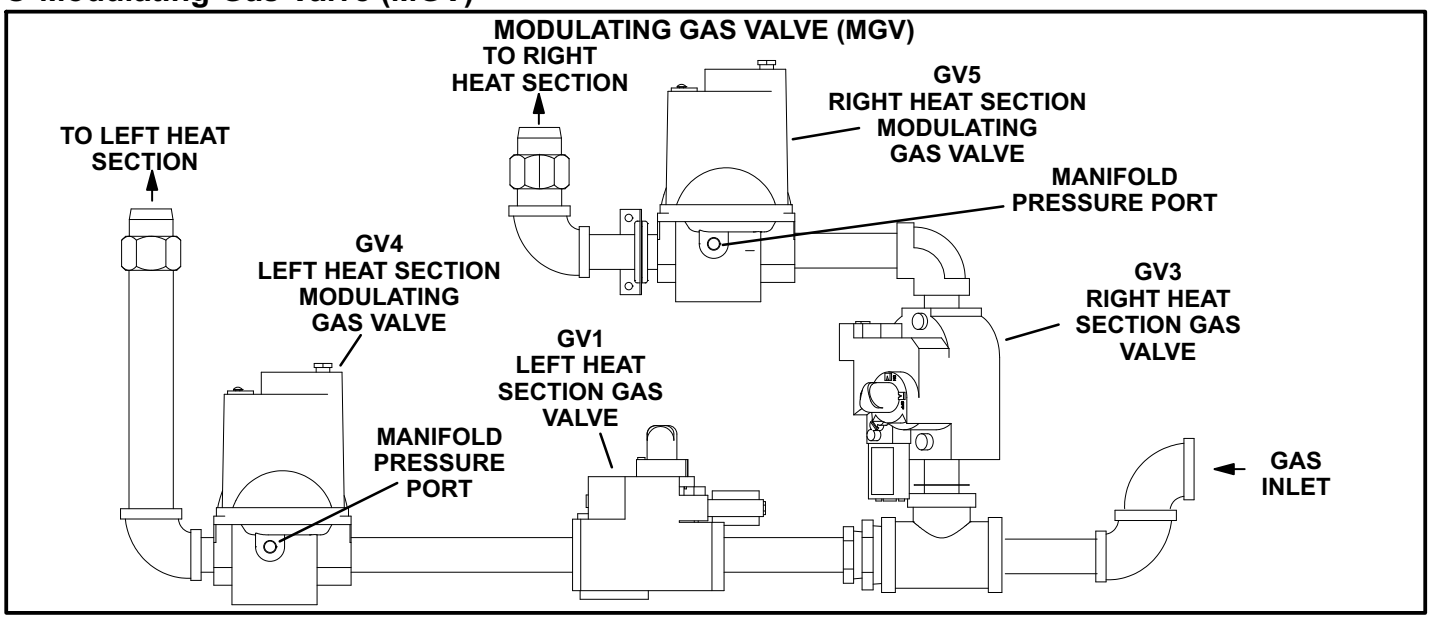


FIGURE 48

Units equipped with optional modulating gas valves (MGV) contain two modulating gas valves in addition to two standard gas valves. See figure 48.

Operation

The Unit Controller will control modulating gas valves to maintain 110°F (default) discharge air during the heating cycle. The left heat section will operate when 25-50% of nameplate heat is needed. Both heat sections will operate when 50-100% of the nameplate heat is needed.

The normally open MGV will allow full heating capacity should the MGV fail.

Start-Up

1- Operate the unit in heating mode according to the Heating Start-Up section in this manual.

2- After the unit has operated for 5 minutes,
M2-0 Unit Controllers: turn the OPT1 and OPT2 switches ON. See figure 49.
M2-1 Unit Controllers: use the “Service/ Test" menu to run high capacity.
The unit will operate at maximum heating input.

3- Measure the manifold pressure at the gas valves. Manifold pressures should be:
GV1 & GV3:
Natural - 4.0"w.c. LP - 10.8"w.c.
GV4 & GV5:
Natural - 3.7"w.c. LP - 10.5"w.c.

4- *M2-0 Unit Controllers*: turn the OPT2 switch OFF.
M2-1 Unit Controllers: use the “Service/Test" menu to run low capacity.
The unit will operate at minimum heating input.

5- Measure the manifold pressure at the gas valves. Manifold pressures should be:
GV1 & GV3:
Natural - 4.0"w.c. LP - 10.8"w.c.
GV4 & GV5:
Natural - 0.9"w.c. LP - 2.6"w.c.

6- *M2-0 Unit Controllers*: turn OPT1 switch OFF.

NOTE - BOTH OPT1 AND OPT2 SWITCHES MUST BE OFF FOR NORMAL UNIT OPERATION.

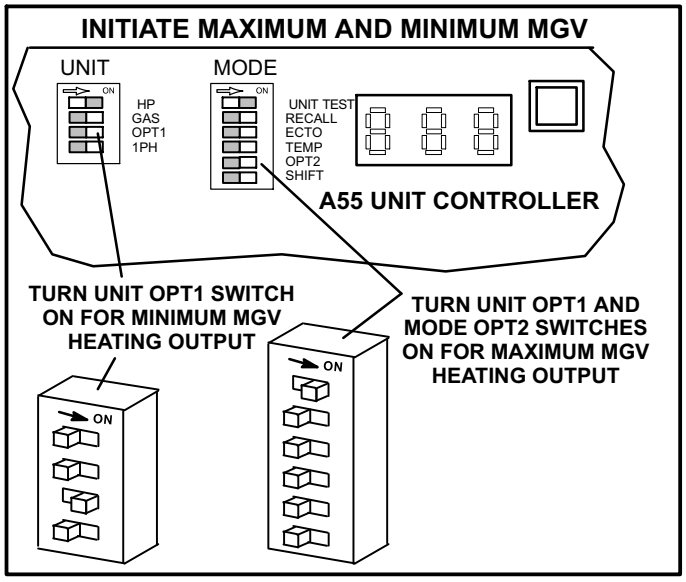


FIGURE 49

Unit Controller Output

The Unit Controller 0-10VDC output to the MGVs increases to modulate valves further closed during a reduced heating demand. The Unit Controller 0-10VDC output to the MGVs decreases to modulate valves further open during a higher heating demand.

Heating Demand Reduces → **A55 Output To MGVs Increases** → **MGVs Modulate Further Closed** → **Heating Output Lowers**

Heating Demand Increases → **A55 Output To MGVs Reduces** → **MGVs Modulate Further Open** → **Heating Output Increases**

P-Outdoor Air CFM Control

Outdoor air CFM Control is a factory-installed option available on units equipped with a supply air variable frequency drive (VFD) and economizer.

The Unit Controller modulates outdoor air dampers to maintain a constant amount of outdoor air regardless of blower speed. This ensures minimum ventilation requirements are met at lower supply air volumes.

The Unit Controller uses a velocity sensor (A24) and a general purpose add-on board (A133) to modulate dampers. The sensor is located in the outdoor air stream. See figure 50. The board is installed on the Unit Controller. See figure 51.

Set Damper Minimum Position

1- Operate unit at full supply air CFM with all zone dampers open. Refer to VFD Supply Air Blower Start-Up section in this manual.

2- Use an air flow hood to measure the outdoor air CFM entering the unit.

3- Set economizer DIP switch to “DSET" position as shown in figure 52. DIP switch is located on the A55 Unit Controller. See figure 51.

4- Adjust the MIN POS SET potentiometer until the air flow hood reads the design minimum outdoor air CFM. See figure 52.

NOTE - Refer to local codes or authorities having jurisdiction when determining design minimum outdoor air requirements.

5- Return the A55 Unit Controller DIP switch to original position. Refer to the A55 manual.

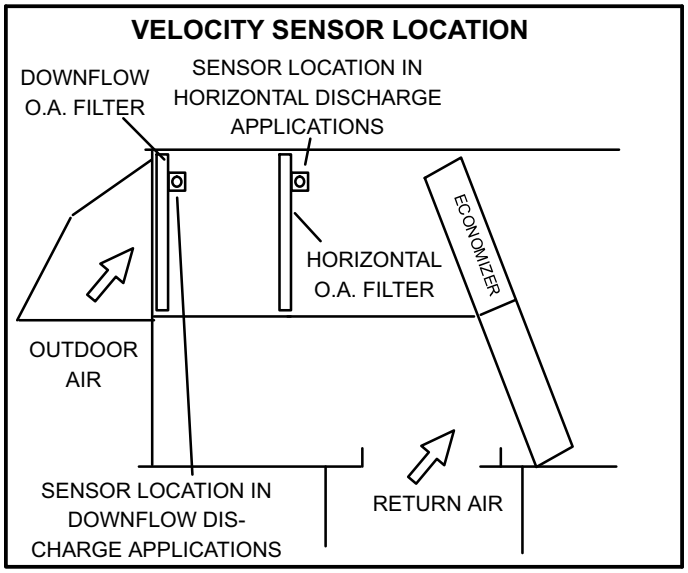


FIGURE 50

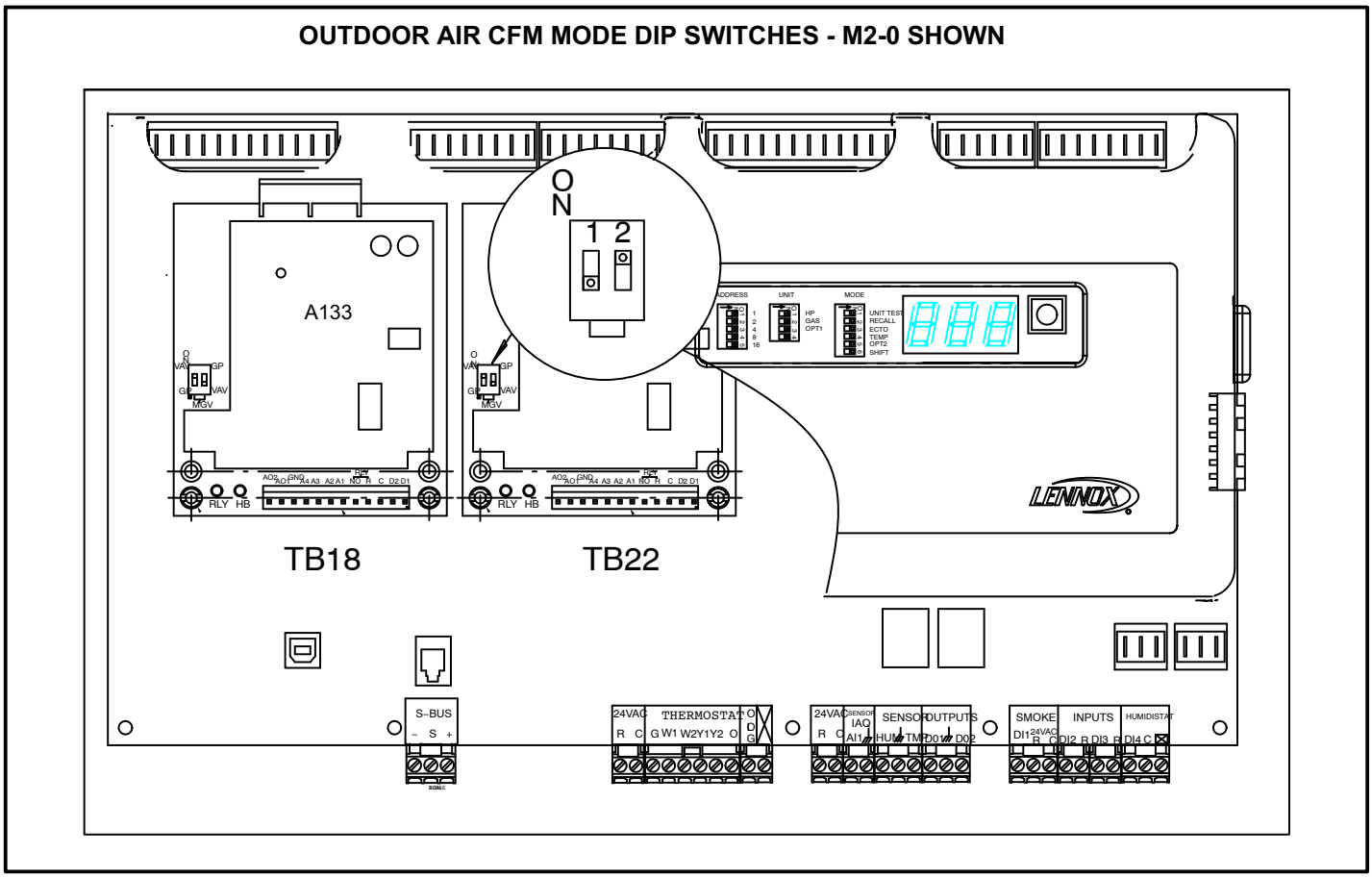


FIGURE 51

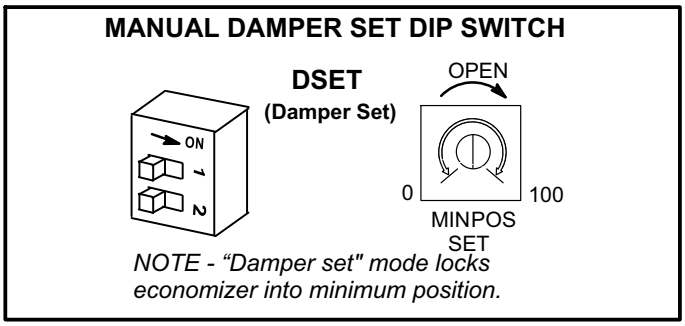


FIGURE 52

Set Velocity Setpoint - M2-0 Unit Controllers

1- Turn the Unit Controller MODE DIP "TEMP" switch ON. See figure 53. The Unit Controller display will alternately flash from sensor readout to output value.

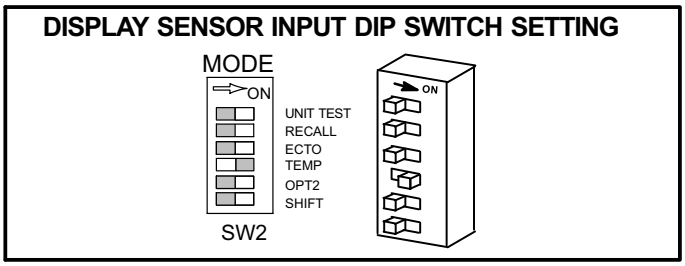


FIGURE 53

2- Press the pushbutton until "oAc" is displayed. The output value from the A24 velocity sensor will be displayed alternately with the oAc readout. Divide the A24 output value by 10 to determine the sensor voltage.

Readout ÷ 10 = A24 Sensor Voltage

_____ **Record Sensor Voltage Here**

3- Return the Unit Controller MODE DIP "TEMP" switch to OFF.

4- Adjust ECTO 9.02 to the sensor voltage. Refer to the Unit Controller manual provided with each rooftop unit.

Set Velocity Setpoint - M2-1 Unit Controllers

1- Measure the DC voltage between TB22-6 and TB22-10.

2- Multiply DC voltage by 25.4.

3- Round to the nearest whole number and enter the result in ECTO 9.02.

Velocity Sensor Range

The velocity sensor is factory-set for 0-5m/s. (0-984ft/min.) If a higher velocity is required, move the sensor jumper as shown in figure 54.

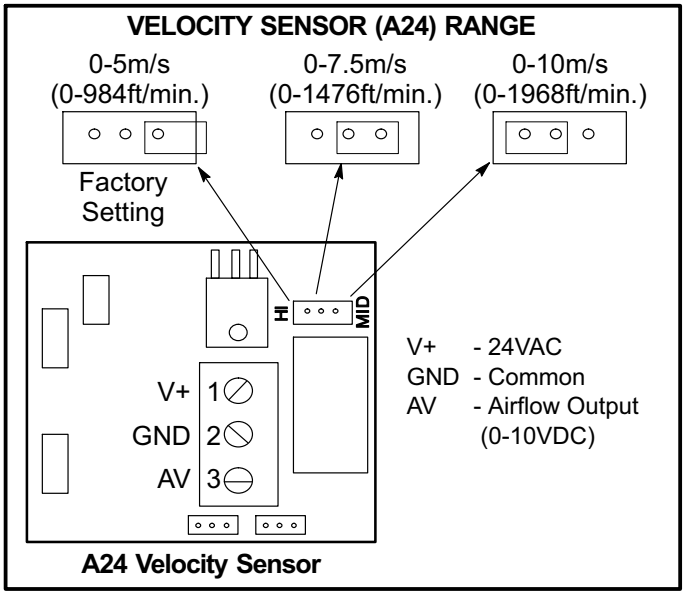


FIGURE 54

Q-Factory Installed Hot Gas Bypass (HGB)

Hot gas bypass is a factory-installed option only. The HGB valve routes refrigerant from the discharge line to the suction line to keep the evaporator coil from icing when supply air volume is low. The HGB valve will start to open when the suction pressure drops below 105 psig (R410A). The de-superheating TXV routes cooler gas from the liquid line to the suction line. This prevents high refrigerant temperatures in the compressor. See figure 55 for components and figure 56 for refrigerant routing.

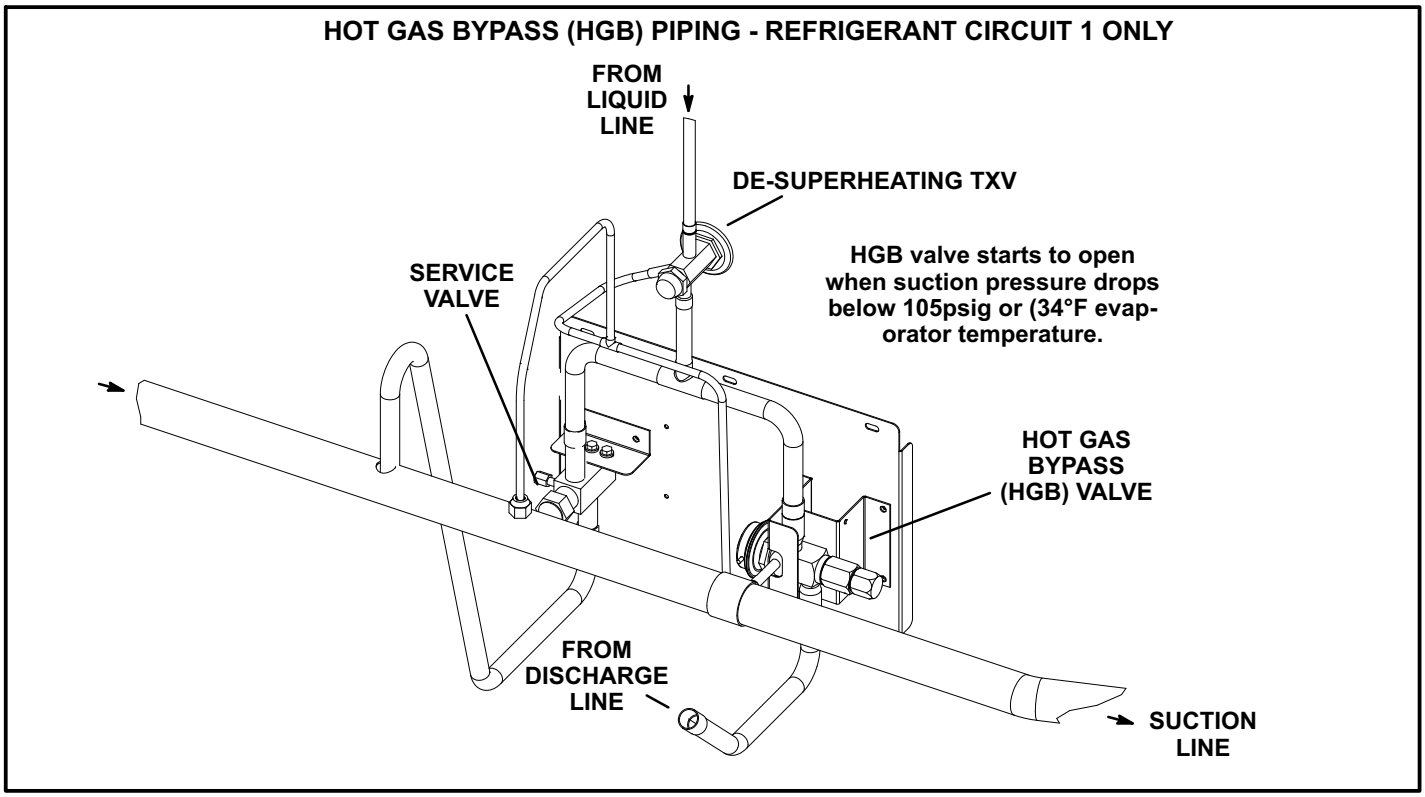


FIGURE 55

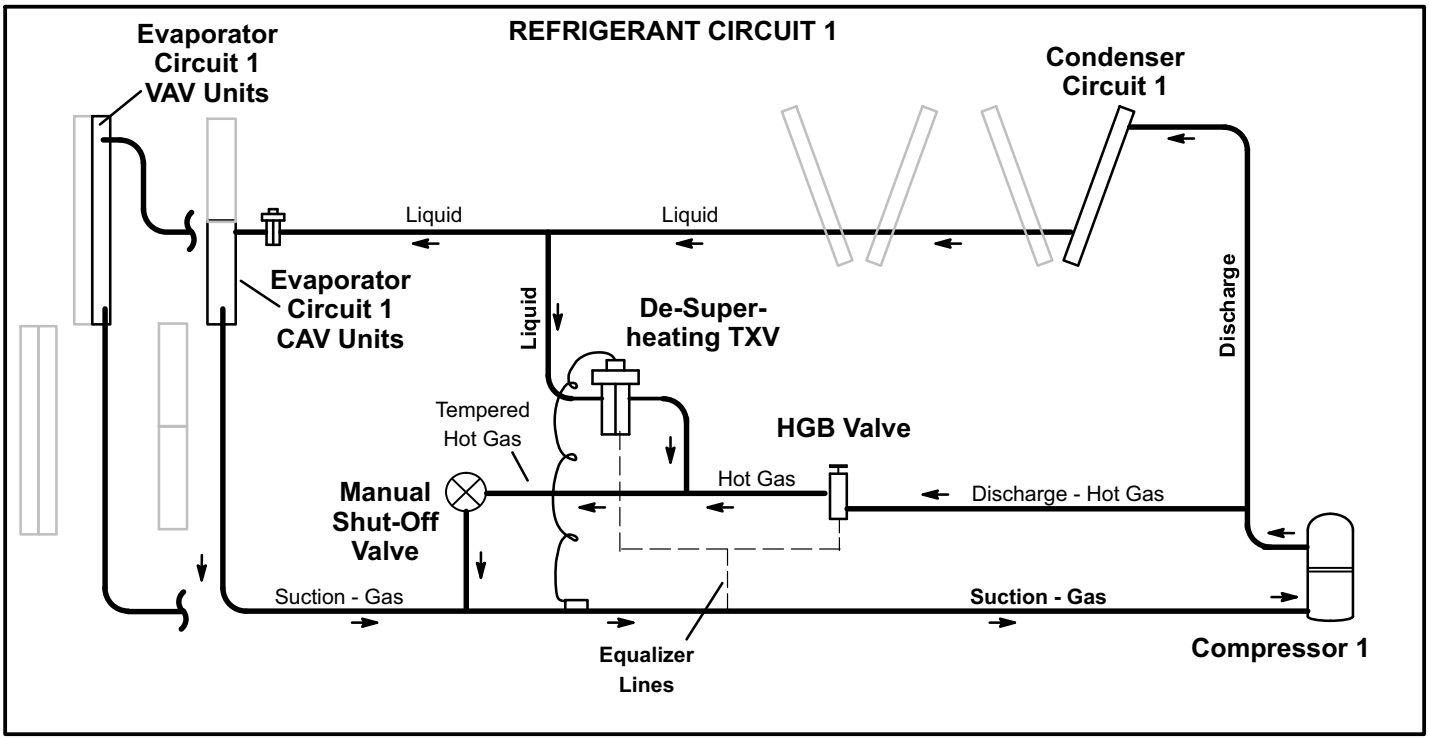
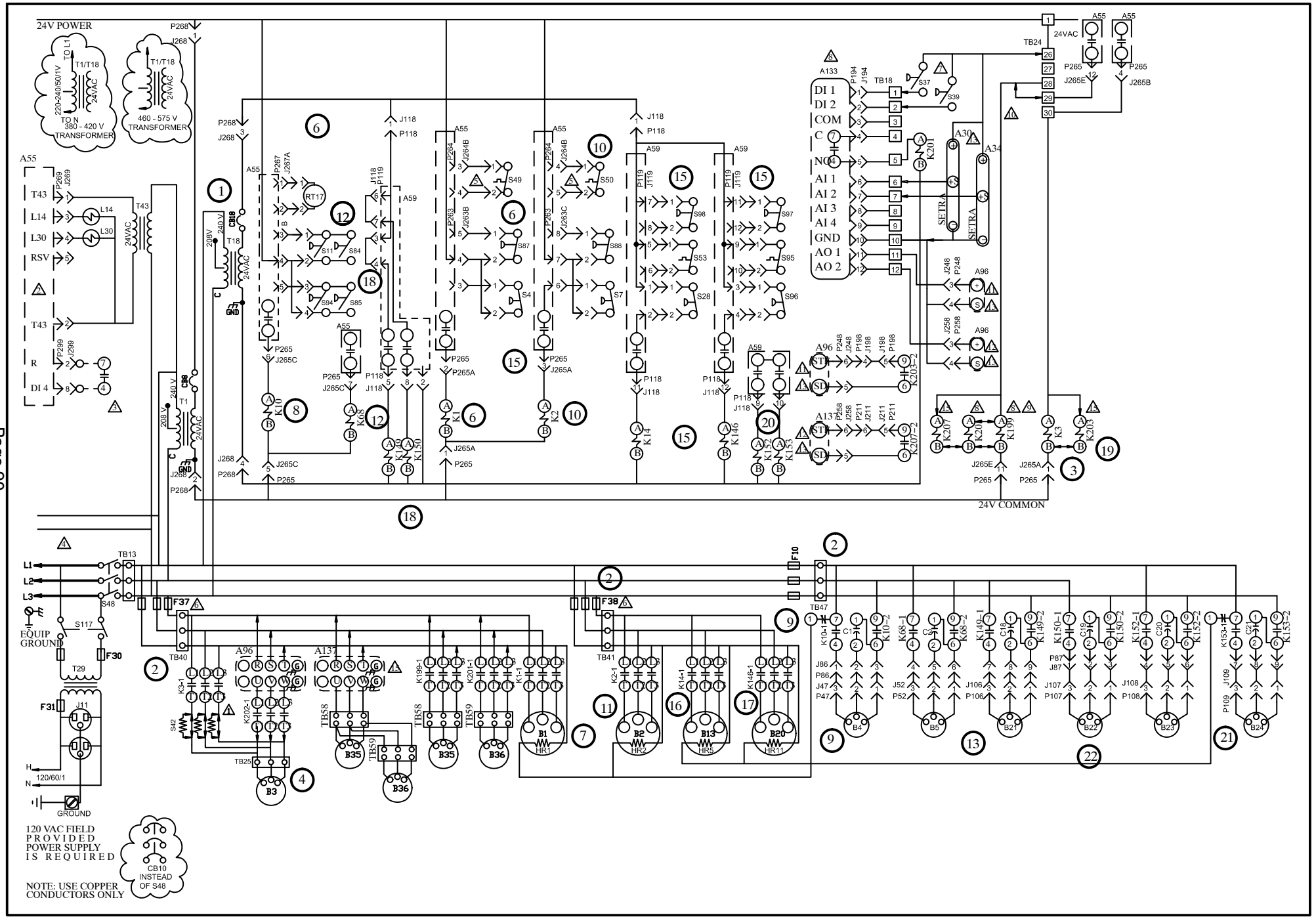


FIGURE 56

VII-WIRING DIAGRAMS AND OPERATION SEQUENCE



1. S42 USED ON "M" VOLTAGE UNITS AND UNITS WITH HIGH EFFICIENCY MOTORS
2. ONLY ON UNITS WITH HUMIDITROL OPTION
3. EXTERNAL HUMIDITROL CONTACTS
4. CONNECTS TO SECTION "A" HEATING DIAGRAM, MAY BE LOCATED IN HEATING COMPARTMENT
5. S49 AND S50 ARE PART OF 5VDC CIRCUIT
6. F37 AND F38 ARE NOT USED ON UNITS LESS ELECTRIC HEAT, 480 AND 600 V
7. S37 AND S39 PRESSURE SWITCH CONTROL
8. VOLTAGE CONTROL SINGLE STAGE
9. VOLTAGE CONTROL TWO STAGE
10. REMOVE JUMPER BETWEEN TB24-28 AND TB24-29 WHENEVER ALC CONTROL IS USED REFER TO SECTION C DIAGRAM
11. A30 SENSOR AND A96 INVERTER CONTROL FOR B3 SUPPLY AIR BLOWER
12. REMOVE JUMPER BETWEEN TB24-28 AND TB24-29 WHENEVER ALC CONTROL IS USED REFER TO SECTION C DIAGRAM
13. A34 SENSOR AND A137 INVERTER CONTROL FOR B35 AND B36 EXHAUST AIR BLOWERS
14. A30 MAY BE USED WITH OR WITHOUT A34 NOTE
    A34 MAY BE USED WITH OR WITHOUT A30
    A30 MAY BE USED WITH OR WITHOUT A34
    A34 MAY BE USED WITH OR WITHOUT B9
    A34 MAY BE USED WITH EITHER A96 VFD OR B9
15. MITSUBISHI VFD
16. K202-1 CONTACTOR MAY BE OMITTED ON UNITS WITH VFD OPERATION ONLY
17. USED ON VFD APPLICATIONS.

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

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

DENOTES OPTIONAL COMPONENTS
LINE VOLTAGE FIELD INSTALLED

DESCRIPTION	
KEY	**COMPONENT**
A30	SENSOR, PRESSURE DISCHARGE AIR
A34	SENSOR, PRESSURE RETURN AIR
A55	PANEL, MAIN PANEL LENNOX
A59	PANEL, COMPRESSORS 3 AND 4
A96	CONTROL, INVERTER SUPPLY
A133	PANEL, GP BOARD LENNOX
A137	CONTROL, INVERTER RETURN
B1	COMPRESSOR 1
B2	COMPRESSOR 2
B3	MOTOR, BLOWER
B4	MOTOR, OUTDOOR FAN 1
B5	MOTOR, OUTDOOR FAN 2
B13	COMPRESSOR 3
B20	COMPRESSOR 4
B21	MOTOR, OUTDOOR FAN 3
B22	MOTOR, OUTDOOR FAN 4
B23	MOTOR, OUTDOOR FAN 5
B24	MOTOR, OUTDOOR FAN 6
B35	MOTOR, EXHAUST BLOWER 1
B36	MOTOR, EXHAUST BLOWER 2
C1	CAPACITOR, OUTDOOR FAN 1
C2	CAPACITOR, OUTDOOR FAN 2
C18	CAPACITOR, OUTDOOR FAN 3
C19	CAPACITOR, OUTDOOR FAN 4
C20	CAPACITOR, OUTDOOR FAN 5
C21	CAPACITOR, OUTDOOR FAN 6
CB8	CIRCUIT, BREAKER T1
CB10	CIRCUIT BREAKER, MAIN DISCONNECT UNIT
CB18	CIRCUIT, BREAKER T18
F10	FUSE, OUTDOOR FAN MOTOR
F30	FUSE, TRANSFORMER T29 PRIMARY
F31	FUSE, TRANSFORMER T29 SECONDARY
F37	FUSE, COMPRESSOR GROUP 1
F38	FUSE, COMPRESSOR GROUP 2
HR1	HEATER COMPRESSOR 1
HR2	HEATER COMPRESSOR 2
HR5	HEATER COMPRESSOR 3
HR11	HEATER COMPRESSOR 4
J11	JACK, GFI, RECEPTACLE
J47	JACK, OUTDOOR FAN 1
J52	JACK, OUTDOOR FAN 2
J86	JACK, OUTDOOR FAN INTERFACE
J87	JACK, OUTDOOR FAN INTERFACE 2
J106	JACK, OUTDOOR FAN 3
J107	JACK, OUTDOOR FAN 4
J108	JACK, OUTDOOR FAN 5
J109	JACK, OUTDOOR FAN 6
J118	JACK, COMPRESSOR 3 AND 4, CONTROL
J119	JACK, COMPRESSOR 3 AND 4, INPUT
J211	JACK, INVERTER EXHAUST BLOWER
J132	JACK, BLOWER , EXHAUST FAN MOTOR 1
J133	JACK, BLOWER , EXHAUST FAN MOTOR 2
J138	JACK, EXHAUST FAN 2
J139	JACK, EXHAUST FAN 3
J194	JACK, I/O FOR A133 LENNOX A133 BOARD
J248	JACK, VFD CONTROL
J258	JACK, VFD CONTROL EXHAUS AIR
J263	JACK, HIGH AND LOW PRESSURE SWITCHES
J264	JACK, BLOWER DECK
J265	JACK, CONTACTORS AND RELAYS
J267	JACK, OUTDOOR FAN AREA
J268	JACK, TRANSFORMER 1 POWER
J269	JACK, HUMIDITROL
J299	JACK, HUMIDITROL INTERFACE
K1,-1	CONTACTOR, COMPRESSOR 1
K2,-1	CONTACTOR, COMPRESSOR 2
K3, -1	CONTACTOR, BLOWER
K10,-1,2	RELAY, OUTDOOR FAN 1
K14,-1	CONTACTOR, COMPRESSOR 3
K68,-1	RELAY, OUTDOOR FAN 2
K146,1	CONTACTOR, COMPRESSOR 4
K149,-1	RELAY, OUTDOOR FAN 3
K150,-1	RELAY, OUTDOOR FAN 4
K152,-1	RELAY, OUTDOOR FAN 5
K153,-1,2	RELAY, OUTDOOR FAN 6
K199,-1	CONTACTOR, EXHAUST BLOWER 1
K201,-1	CONTACTOR, EXHAUST BLOWER 2
K202, -1	CONTACTOR, INVERTER BLOWER
K203, -2	RELAY, SUPPLY BLOWER AUX
K207, -2	RELAY, EXHAUST BLOWER AUX
L14	VALVE, SOLENOID REHEAT COIL 1
L30	VALVE, SOLENOID REHEAT COIL 2
P47	PLUG, OUTDOOR FAN 1
P52	PLUG, OUTDOOR FAN 2
P86	PLUG, OUTDOOR FAN INTERFACE
P87	PLUG, OUTDOOR FAN INTERFACE 2
P106	PLUG, OUTDOOR FAN 3
P107	PLUG, OUTDOOR FAN 4
P108	PLUG, OUTDOOR FAN 5
P109	PLUG, OUTDOOR FAN 6
P118	PLUG, COMPRESSOR 3 AND 4, CONTROL
P119	PLUG, COMPRESSOR 3 AND 4, INPUT
P211	PLUG, INVERTER EXHAUST BLOWER
P194	PLUG, I/O FOR A133 LENNOX A133 BOARD
P248	PLUG, VFD CONTROL
P258	PLUG, VFD CONTROL EXHAUS AIR
P263	PLUG, HIGH AND LOW PRESSURE SWITCHES
P264	PLUG, BLOWER DECK
P265	PLUG, CONTACTORS AND RELAYS
P267	PLUG,OUTDOOR FAN AREA
P268	PLUG, TRANFORMERS
P269	PLUG, HUMIDITROL
P299	PLUG, SAFETY
RT17	SENSOR, OUTDOOR AIR
S4	SWITCH, LIMIT HI PRESS COMPRESS 1
S7	SWITCH, LIMIT HI PRESS COMPRESS 2
S11	SWITCH, LOW PRESS, LOW AMBIENT KIT COMP 1
S28	SWITCH, LIMIT HI PRESS COMPRESS 3
S37	SWITCH, PRESSURE EXHAUST FAN
S39	SWITCH, EXHAUST FAN
S42	SWITCH, OVERLOAD RELAY BLOWER MOTOR
S48	SWITCH, DISCONNECT
S49	SWITCH, FREEZE STAT COMPRESS 1
S50	SWITCH, FREEZE STAT COMPRESS 2
S53	SWITCH, FREEZE STAT COMPRESS 3
S84	SWITCH, LOW PRESS, LOW AMBIENT KIT COMP 2
S85	SWITCH, LOW PRESS, LOW AMBIENT KIT COMP 3
S87	SWITCH, LOW PRESS, COMP 1
S88	SWITCH, LOW PRESS, COMP 2
S94	SWITCH, LOW PRESS, LOW AMBIENT KIT COMP 4
S95	SWITCH, FREEZE STAT COMPRESS 4
S96	SWITCH, LIMIT HI PRESS COMPRESS 4
S97	SWITCH, LOW PRESS, COMP 4
S98	SWITCH, LOW PRESS, COMP 3
S117	SWITCH, GFI
T1	TRANSFORMER, CONTROL
T18	TRANSFORMER, CONTACTOR
T29	TRANSFORMER, GFI
TB13	TERMINAL STRIP, POWER DISTRIBUTION
TB18	TERMINAL STRIP, CYCLE CONTROL
TB23	TERMINAL STRIP, BLOWER SPEED
TB24	TERMINAL STRIP, UNIT ADDER
TB40	TERMINAL STRIP, COMPRESSOR 1
TB41	TERMINAL STRIP, COMPRESSOR 2
TB47	TERMINAL STRIP, COMPRESSOR 3
TB58	TERMINAL STRIP, EXAUST FANS
TB59	TERMINAL STRIP, INVERTER BY-PASS

WIRING DIAGRAM | 12/09

COOLING

LCH,LGH 420S, 480S, 540S 1- G,J,M,Y

SECTION B | REV. 2.0

Supersedes | New Form No. 537223-01

SEQUENCE OF OPERATION - M2-0 UNIT CONTROLLER

Power:

1- Line voltage from TB13, unit disconnect S48, or other factory or field installed optional power disconnects, such as CB10, energizes transformer T1 and T18. Transformer T1 provides 24VAC power to terminal strip TB26 and T18 provides 24VAC power to terminal strip TB18. The two terminal strips provide 24VAC power to the unit cooling, heating and blower controls and thermostat.

2- Terminal strip TB40, TB41 and TB47 are also energized when the unit disconnect closes. These terminal strips supply line voltage to compressor crankcase heaters, compressors, blower motors and fan motors.

Blower Operation (OCP input must be on):

3- The main control module A55 receives a demand from thermostat terminal G. A55 energizes blower contactor K3 with 24VAC.

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

1st Stage Cooling

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

6- 24VAC is routed through TB24 to the main control module A55. After A55 proves N.C. low pressure switch S87, N.C. freezestat S49 and N.C. high pressure switch S4, compressor contactor K1 is energized.

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

8-Control module A55 energizes condenser fan contactor K10.

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

10- Simultaneous with step 8, 24VAC is routed through the A55 Unit Controller. After A55 proves N.C. low pressure switch S88, N.C. freezestat S50 and N.C. high pressure switch S7, compressor contactor K2 is energized.

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

12- A55 Unit Controller energizes condenser fan 2 relay K68. Compressor 3 control module A59 energizes condenser fan relay K149 through N.O. low ambient pressure switches S11 or S84.

13- N.O. contacts K68-1 and K149-1 close energizing condenser fans B5 and B21.

2nd Stage Cooling

14- Second stage cooling demand energizes Y2.

15-24VAC is routed through TB18 to compressor 3 and 4 module A59. After A59 proves N.C. low pressure switches S98 and S97, N.C. freezestats S53 and S95 and N.C. high pressure switches S28 and S96, compressor contactors K14 and K146 are energized.

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

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

18-N.O. low ambient pressure switches S85 and S94 close to energize condenser fan relay K150.

19-N.O. contacts K150-1 close energizing condenser fan B22.

20- Compressor 3 and 4 module A59 energizes condenser fan relay K152 and K153.

21-N.O. contacts K152-1 and K153-1 close energizing condenser fan B23 and B24. N.C. contacts K152-2 open de-energizing compressor 3 crankcase heater HR5 and compressor 4 crankcase heater HR11.

Power Exhaust Fans:

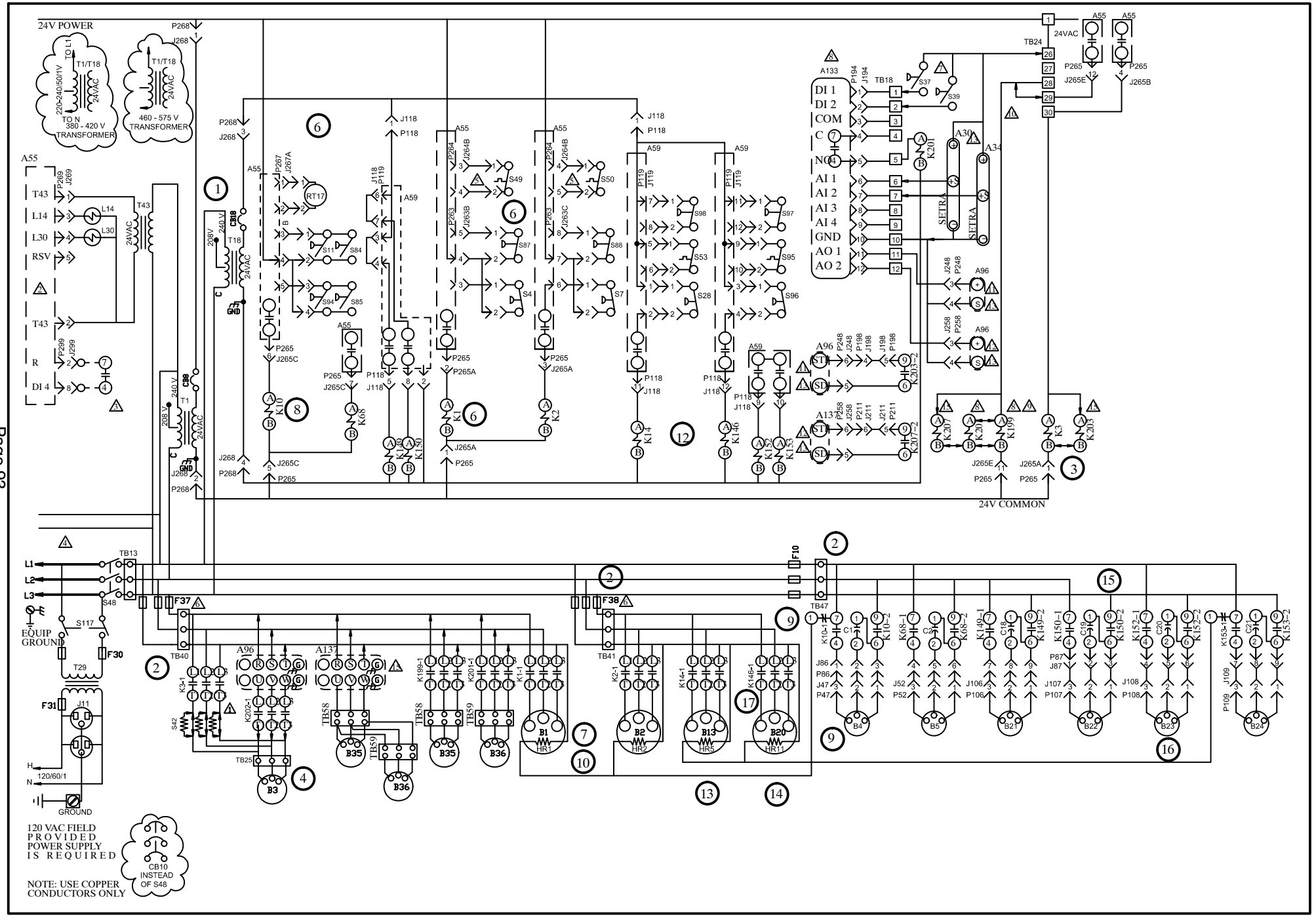
Option 1 - A55 Unit Controller receives a demand and energizes exhaust fan relay K199 and K201 with 24VAC at 50% (travel) outside air damper open (adjustable).

N.O. K99-1 and K201-1 both close, energizing exhaust fan motors B35 and B36..

Option 2 - Building static rises. N.O. Pressure switches S37 and S39 close. Board (1) A133 energizes A55 and K201. A55 energizes K199. K199 and K201 close energizing B35 and B36.

Option 3 - Building static rises. A34 (set point varies) energizes A55 and K201. A55 energizes K199. K199 and K201 close energizing B35 and B36.

Option 4 - VAV units - Building static rises. A34 energizes A55 and K201. A55 energizes K199. K199 and K201 close energizing B35 and B36. A34 modulates B35 and B36.


24V POWER
TO L1
T1/T18
220-240/50/1V
24VAC
TO N
380 - 420 V
TRANSFORMER
460 - 575 V
TRANSFORMER
24V COMMON
EQUIP GROUND
GROUND
120/60/1
120 VAC FIELD PROVIDED POWER SUPPLY IS REQUIRED
CB10 INSTEAD OF S48
NOTE: USE COPPER CONDUCTORS ONLY
DI 1
DI 2
COM
C
NO
AI 1
AI 2
AI 3
AI 4
GND
AO 1
AO 2
24VAC
SETRA

SEQUENCE OF OPERATION - M2-1 UNIT CONTROLLER

Power:

1- Line voltage from TB2, unit disconnect S48, or other factory or field installed optional power disconnects, such as CB10, energizes transformer T1 and T18. Transformer T1 provides 24VAC power to A55 Unit Controller and T18 provides 24VAC power to A59 Compressor 3 & 4 Controller. The two Controllers provide 24VAC power to the unit cooling, heating and blower controls and thermostat.

2- Terminal strip TB40, TB41 and TB47 are also energized when the unit disconnect closes. These terminal strips supply line voltage to compressor crankcase heaters, compressors, blower motors and fan motors.

Blower Operation (OCP input must be on):

3- The main control module A55 receives a demand from thermostat terminal G. A55 energizes blower contactor K3 with 24VAC.

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

1st Stage Cooling

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

6- 24VAC is routed to the A55 Unit Controller. After A55 proves N.C. low pressure switches S87 and S88, N.C. freezestats S49 and S50 and N.C. high pressure switches S4 and S7, compressor contactors K1 and K2 are energized.

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

8- A55 Unit Controller and A59 Compressor 3 and 4 Controller energize fan contactors K10, K68 and K149 based on low ambient switch S11 and S84 inputs and pre-defined control logic.

9- N.O. contacts K10-1, K68-1 and K149-1 close energizing condenser fan B4, B5 and B21.

10- Relay contacts K10-1 and K10-2 open de-energizing crankcase heater HR1 and HR2.

2nd Stage Cooling

11- Second stage cooling demand energizes Y2.

12- 24VAC is routed to A59 Compressor 3 and 4 Controller. After A59 proves N.C. low pressure switches S98 and S97, N.C. freezestats S53 and S95 and N.C. high pressure switches S28 and S96, compressor contactors K14 and K146 are energized.

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

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

15- A59 Compressor 3 and 4 Controller energizes fan contactors K150, K152 and K153 based on low ambient switch S85 and S94 inputs and pre-defined Unit Controller logic.

16- N.O. contacts K150-1, K152-1 and K153-1 close energizing condenser fans B22, B23 and B24.

17- N.C. contacts K153-2 open de-energizing crankcase heater HR5 and HR11.

Power Exhaust Fans:

Option 1 - A55 Unit Controller receives a demand and energizes exhaust fan contactor K199 and K201 with 24VAC at 50% (travel) outside air damper open (adjustable).

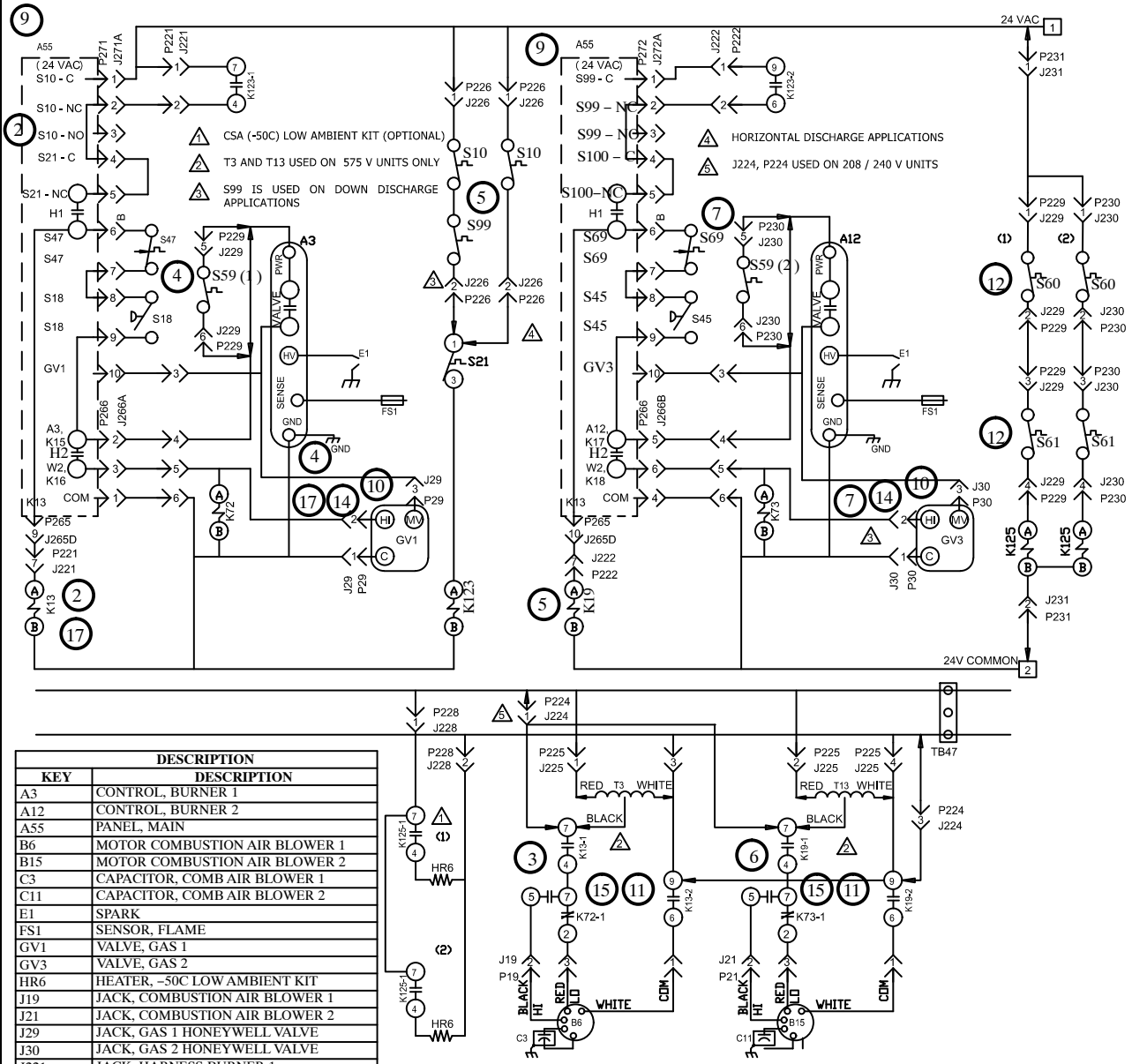
N.O. K199-1 and K201-1 both close, energizing exhaust fan motors B35 and B36..

Option 2 - Building static rises. N.O. Pressure switches S37 and S39 close. Board (1) A133 energizes A55 and K201. A55 energizes K199. K199 and K201 close energizing B35 and B36.

Option 3 - Building static rises. A34 (set point varies) energizes A55 and K201. A55 energizes K199. K199 and K201 close energizing B35 and B36.

Option 4 - VAV units - Building static rises. A34 energizes A55 and K201. A55 energizes K199. K199 and K201 close energizing B35 and B36. A34 modulates B35 and B36.

GAS HEAT FOR "S" SERIES



DESCRIPTION	
KEY	DESCRIPTION
A3	CONTROL, BURNER 1
A12	CONTROL, BURNER 2
A55	PANEL, MAIN
B6	MOTOR COMBUSTION AIR BLOWER 1
B15	MOTOR COMBUSTION AIR BLOWER 2
C3	CAPACITOR, COMB AIR BLOWER 1
C11	CAPACITOR, COMB AIR BLOWER 2
E1	SPARK
FS1	SENSOR, FLAME
GV1	VALVE, GAS 1
GV3	VALVE, GAS 2
HR6	HEATER, –50C LOW AMBIENT KIT
J19	JACK, COMBUSTION AIR BLOWER 1
J21	JACK, COMBUSTION AIR BLOWER 2
J29	JACK, GAS 1 HONEYWELL VALVE
J30	JACK, GAS 2 HONEYWELL VALVE
J221	JACK, HARNESS BURNER 1
J222	JACK, HARNESS BURNER 2
J224	JACK, CAB POWER 208/240V
J225	JACK, CAB POWER 480/600V
J226	JACK, S10 HORIZONTAL DISCHARGE LIMIT
J228	JACK, VESTIBULE HEATER
J229	JACK, VESTIBULE HEATER CONTROL 1
J230	JACK, VESTIBULE HEATER CONTROL 2
J231	JACK, VESTIBULE HEATER CONTROL PWR
J265	JACK, CONTACTOR RELAY
J266A	JACK, HEATING CONTROL STG 1
J266B	JACK, HEATING CONTROL STG 2

J271A,B	JACK, HEATING SENSORS STG 1
J272A,B	JACK, HEATING SENSORS STG 2
K13,–1	RELAY, COMBUSTION AIR BLOWER 1
K19,–1	RELAY, COMBUSTION AIR BLOWER 2
K72, –1	RELAY, GAS 3
K73, –1	RELAY, GAS 4
K123, –1,2	RELAY, PRIMARY LIMIT
K125,–1	RELAY, HEAT SHUT OFF
P19	PLUG, COMBUSTION AIR BLOWER 1
P21	PLUG, COMBUSTION AIR BLOWER 2
P29	PLUG, GAS 1 HONEYWELL VALVE

P30	PLUG, GAS 2 HONEYWELL VALVE
P221	PLUG, HARNESS BURNER 1
P222	PLUG, HARNESS BURNER 2
P224	PLUG, CAB POWER 208/240V
P225	PLUG, CAB POWER 480/600V
P226	PLUG, S10 HORIZONTAL DISCHARGE LIMIT
P228	PLUG, VESTIBULE HEATER
P229	PLUG, VESTIBULE HEATER CONTROL 1
P230	PLUG, VESTIBULE HEATER CONTROL 2
P231	PLUG, VESTIBULE HEATER CONTROL PWR
P265	PLUG, CONTACTOR RELAY

P266	PLUG, HEATING CONTROL
P271A,B	PLUG, HEATING SENSORS STG 1
P272A,B	PLUG, HEATING SENSORS STG 2
S10	SWITCH, LIMIT PRIMARY GAS
S18	SWITCH, COMB AIR BLOWER 1 PROOF
S21	SWITCH, LIMIT SECONDARY GAS HEAT
S45	SWITCH, COMB AIR BLOWER 2 PROOF
S47	SWITCH, FLAME ROLLOUT BURNER
S59	TSTAT, OPEN –20F, CLOSE 10F
S60	TSTAT, OPEN 20F, CLOSE –10F
S61	TSTAT, OPEN 50F, CLOSE 20F
S69	SWITCH, FLAME ROLLOUT 2
S99	SWITCH, LIMIT PRIMARY BURNER 2
T3	TRANSFORMER, COMB AIR BLOWER 1
T13	TRANSFORMER, COMB AIR BLOWER 2
TB47	TERMINAL STRIP, EXHAUST FANS

DENOTES OPTIONAL COMPONENTS

WIRING DIAGRAM	08/09
HEATING	
GAS HEAT ENERGENCE 500 AND 800 UNITS	
SECTION A	
Supersedes	New Form No. 537218-01

SEQUENCE OF OPERATION
GAS HEAT FOR "S" SERIES

FIRST STAGE HEAT:

1 - Heating demand initiates at W1 in thermostat.

2 - 24VAC is routed to the A55 Unit Controller. After A55 proves N.C. primary limit S10, the combustion air blower relay K13 is energized.

3 - N.O. K13-1 contacts close allowing line voltage (or transformer T3 in 460V and 575V only) to energize combustion air blower B6.

4 - After the combustion air inducer B6 has reached full speed, the combustion air proving switch (S18) contacts close. The A55 routes 24VAC through N.C. burner 1 flame rollout switch S47 and the closed contacts of the combustion air proving switch (S18) to energize the ignition module A3. After a 30 second delay A3 energizes the W1 terminal (low fire) of gas valve GV1.

5 - After A55 proves N.C. primary gas heat limit S99 the combustion air inducer relay K19 is energized.

6 - N.O. K19-1 contacts close allowing line voltage (or transformer T13 in 460V and 575V only) to energize combustion air inducer B15.

7 - After the combustion air inducer B15 has reached full speed, the combustion air proving switch (S45) contacts close. The A55 routes 24VAC through N.C. burner 2 flame rollout switch S69 and the closed contacts of the combustion air proving switch (S45) to energize the ignition module A12. After a 30 second delay A12 energizes the W1 terminal (low fire) of gas valve GV3. Indoor blower energizes after time delay Time delay is field adjustable with a factory set default of 40 seconds.

SECOND STAGE HEAT:

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

9 - A second stage heating demand is received by A55 Unit Controller.

10 - A55 Unit Controller will energize the corresponding W2 terminal (high fire) of gas valves GV1 and GV3 respectively.

11 - N.O. terminals 5 and 7 on relays K72 and K73 close, energizing combustion air inducers B6 and B15 on second stage heat (high speed).

OPTIONAL LOW AMBIENT KIT (C.G.A. -50° C LOW AMBIENT KIT):

12 - Line voltage (or transformer T20 in 460V and 575V only) is routed through the low ambient kit fuses F20 and N.C. low ambient kit thermostats S60 and S61 to energize low ambient kit heater HR6.

END OF SECOND STAGE HEAT:

13 - Heating demand is satisfied. Terminal W2 is de-energized.

14 - Terminals W2 (high fire) of GV1 and GV3 are de-energized by the A55 Module.

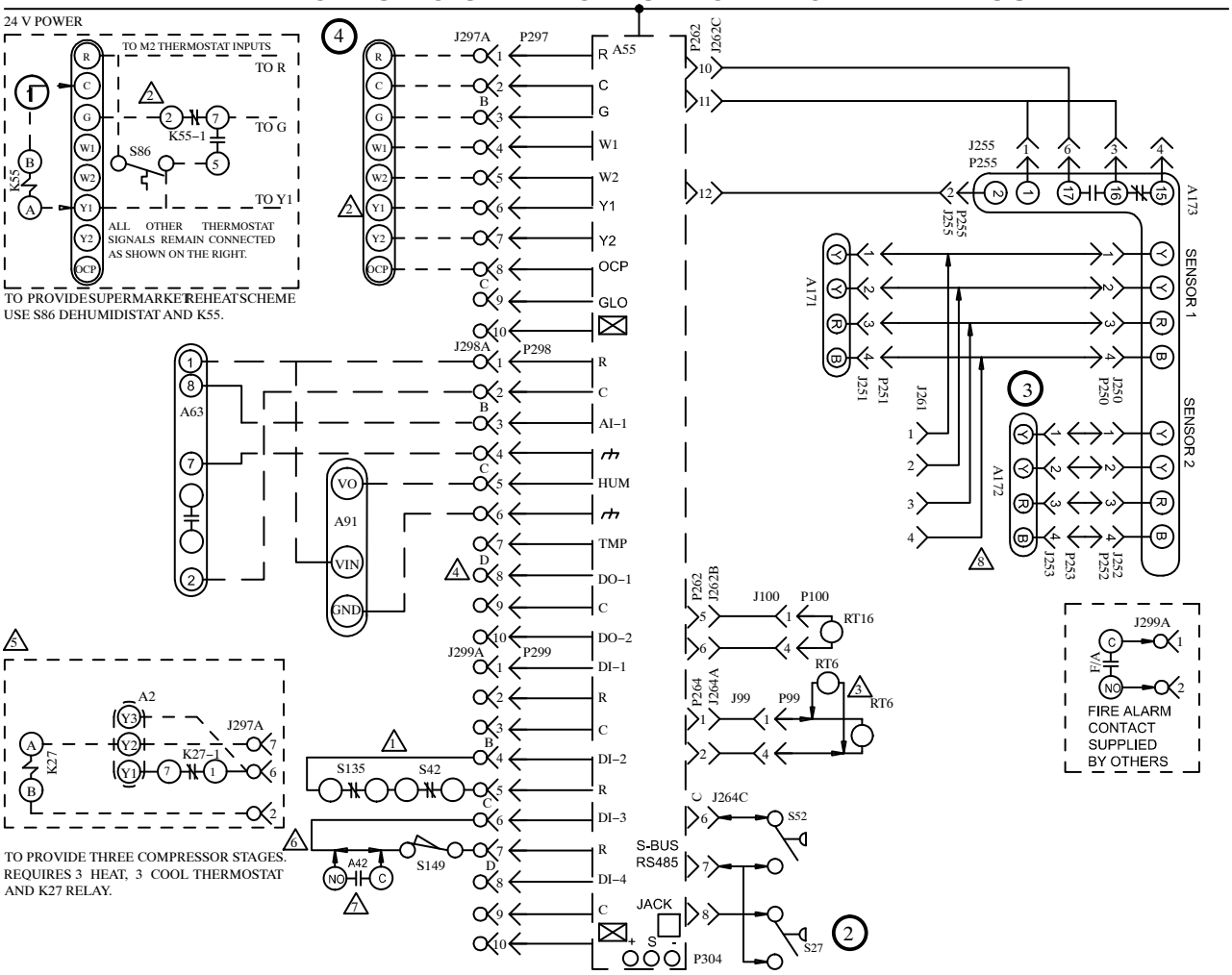
15 - Terminals 5 and 7 on K72 and K73 open. Combustion air inducers B6 and B15 ramp down to first stage heat (low speed).

END OF FIRST STAGE HEAT:

16 - Heating demand is satisfied. Terminal W1 is de-energized.

17 - Ignition module A3 is de-energized by A55 in turn de-energizing terminal W1 of GV1. Combustion inducer relay K13 is also de-energized. At the same instant, ignition module A12 is de-energized by A55 module in turn de-energizing the W1 terminal of GV3. K19 combustion air inducer relay is also de-energized.

ELECTRONIC OR ELECTROMECHANICAL THERMOSTAT



DESCRIPTION	
KEY	**COMPONENT**
A2	SENSOR, ELECTRONIC THERMOSTAT
A42	MONITOR, PHASE PROTECTOR
A55	PANEL, MAIN
A63	SENSOR, CO2 (IAQ) OPTIONAL
A91	SENSOR, HUMIDITY
A171	SENSOR ONE, SMOKE, RETURN AIR
A172	SENSOR TWO, SMOKE, SUPPLY AIR
A173	MODULE, CONTROL SMOKE DETECTION
J99	JACK, RT16 RETURN AIR SENSOR
J100	JACK, RT6 SUPPLY AIR SENSOR
J250	JACK, SMOKE DETECTOR ONE
J251	JACK, SMOKE DETECTOR ONE
J252	JACK, SMOKE DETECTOR TWO
J253	JACK, SMOKE DETECTOR TWO
J255	JACK, MODULE, CONTROL SMOKE DETECTION
J261	JACK, SUPPLY SMOKE DETECTOR JUMPER
J262	JACK, ECONOMIZER
J264	JACK, BLOWER DECK
J297	JACK, THERMOSTAT – DDC INTERFACE
J298	JACK, IAQ INTERFACE
J299	JACK, SAFETY INTERFACE
K27, –1	RELAY, TRANSFER
K55,–1	RELAY, BLOWER
P99	PLUG, RT16 RETURN AIR SENSOR
P100	PLUG, RT6 SUPPLY AIR SENSOR
P250	PLUG, SMOKE DETECTOR ONE
P251	PLUG, SMOKE DETECTOR ONE
P252	PLUG, SMOKE DETECTOR TWO
P253	PLUG, SMOKE DETECTOR TWO
P255	PLUG, MODULE, CONTROL SMOKE DETECTION
P262	PLUG, ECONOMIZER
P264	PLUG, BLOWER DECK
P297	PLUG, THERMOSTAT – DDC INTERFACE
P298	PLUG, IAQ INTERFACE
P299	PLUG, SAFETY INTERFACE
P304	PLUG, SYS BUS
RT6	SENSOR, SUPPLY AIR TEMP
RT16	SENSOR, RETURN AIR TEMP
S27	SWITCH, FILTER
S52	SWITCH, AIRFLOW
S42	SWITCH, OVERLOAD RELAY BLOWER MOTOR LO
S86	SWITCH, DEHUMIDISTAT
S135	SWITCH, OVERLOAD RELAY BLOWER MOTOR HI
S149	SWITCH, OVERFLOW

1. FOR MOTORS WITH S42 AND S135 EXTERNAL OVERLOAD LESS INVERTER, SEE INVERTER WITH BY PASS FOR S42 HOOK UP
2. USE S86 DEHUMIDISTAT AND K55 FOR OPTIONAL SUPERMARKET REHEAT SCHEME, M2 PARAMETERS NEED TO BE MODIFIED UNDER THE SETTINGS MENU OR VIA UC SOFTWARE FOR SIMULTANEOUS HEATING AND COOLING.
3. REMOTE LOCATION OF RT6
4. P298–8 (DO–1) IS SERVICE RELAY OUTPUT (24VAC) IF USED CONNECT TO AN INDICATOR LIGHT
5. THERMOSTAT HOOKUP FOR PROGRAMMABLE CONFIGURATION OF THE M2 BOARD (A55).
6. M2 SETTINGS MUST BE MODIFIED WHEN A42, S42, S52, S135 OR S149 ARE INSTALLED
7. A42 USED ON 036 THROUGH 72 UNITS ONLY
8. CONNECT A172 SENSOR TO J261 ON SUPPLY AIR SMOKE DETECTOR ONLY

DESIGNATES OPTIONAL WIRING
CLASS II FIELD WIRING

	WIRING DIAGRAM	11/09
ACCESSORIES		
ELECTRONIC OR ELECTROMECHANICAL THERMOSTAT FOR ENERGENCE™		
SECTION C		REV. 3.0
Supersedes	New Form No. 537108-01	

SEQUENCE OF OPERATION

1 - Terminal block P297 on the A55 Unit Controller energizes the thermostat components with 24VAC.

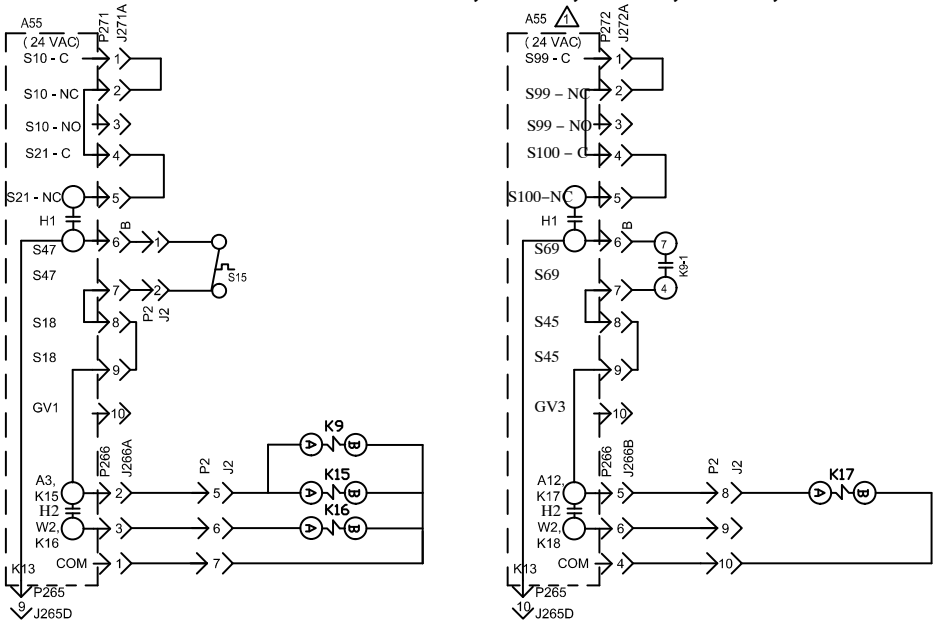
OPERATION:

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

3 - The A55 Unit Controller receives data from the supply and return smoke detectors A171 and A172, blower motor overload relay S42, discharge sensor RT6, return air sensor RT16 and the outdoor air sensor RT17.

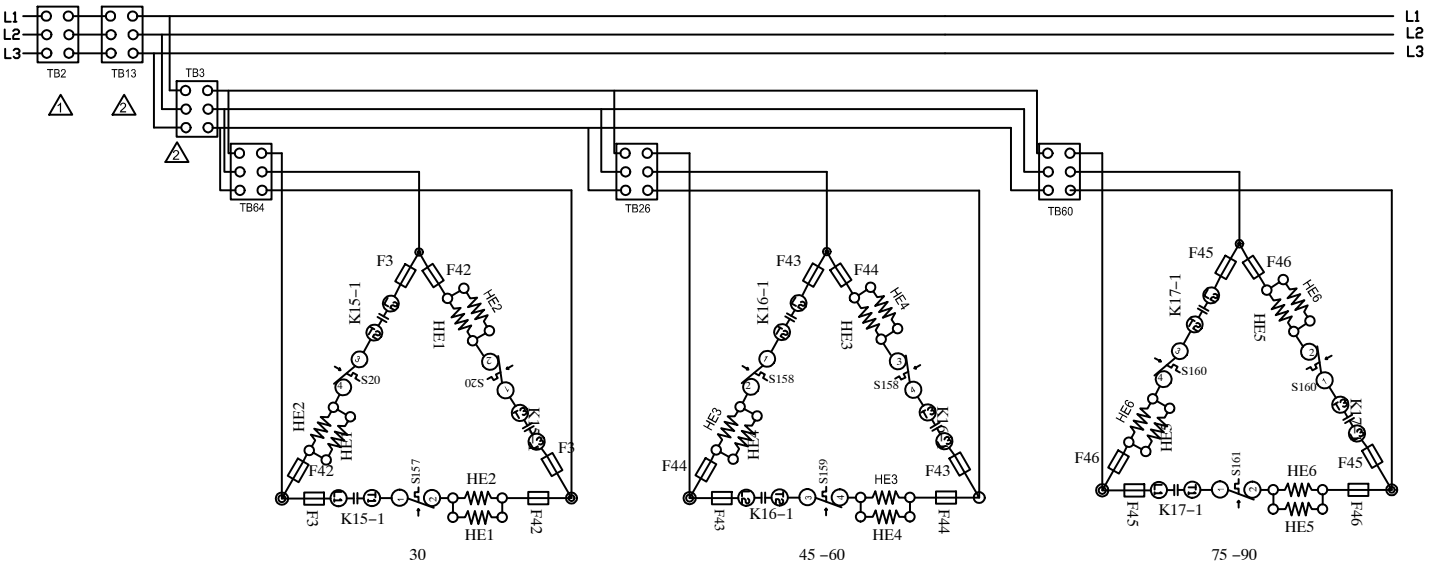
4 - The A55 Unit Controller receives data from the electronic thermostat A2 (Y1, Y2, W1, W2, G, OCP) and the CO_2 sensor (if economizer is used) via terminal block P297. A55 energizes the appropriate components.

EHA-30kW, 45kW, 60kW, 75kW, 90kW Y Voltage



KW	HE1	HE2	HE3	HE4	HE5	HE6
30	15	15				
45	15	15	15			
60	15	15	15	15		
75	15	15	15	15	15	
90	15	15	15	15	15	15

DESCRIPTION	
KEY	**DESCRIPTION**
A55	PANEL, MAIN BOARD LENNOX
F3	FUSE, ELECTRIC HEAT 1, 2
F42	FUSE, ELECTRIC HEAT 3,4
F43	FUSE, ELECTRIC HEAT 5, 6
F44	FUSE, ELECTRIC HEAT 7, 8
F45	FUSE, ELECTRIC HEAT 9, 10
F46	FUSE, ELECTRIC HEAT 11, 12
HE1	ELEMENT, ELECTRIC HEAT 1
HE2	ELEMENT, ELECTRIC HEAT 2
HE3	ELEMENT, ELECTRIC HEAT 3
HE4	ELEMENT, ELECTRIC HEAT 4
HE5	ELEMENT, ELECTRIC HEAT 5
HE6	ELEMENT, ELECTRIC HEAT 6
J266A	JACK, HEATING CONTROL STG 1
J266B	JACK, HEATING CONTROL STG 2
J271A,B	JACK, HEATING SENSORS STG 1
J272A,B	JACK, HEATING SENSORS STG 2
K9, –1	RELAY, HEAT
K15,–1	CONTACTOR, ELECTRIC HEAT 1
K16,–1	CONTACTOR, ELECTRIC HEAT 2
K17,–1	CONTACTOR, ELECTRIC HEAT 3
P266	PLUG, HEATING CONTROL
P271	PLUG, HEATING SENSORS STG 1
P272	PLUG, HEATING SENSORS STG 2
S15	SWITCH, LIMIT PRIMARY ELECTRIC HEAT
S20	SWITCH, LIMIT SECONDARY ELECTRIC HEAT 1
S157	SWITCH, LIMIT SECONDARY ELECTRIC HEAT 2
S158	SWITCH, LIMIT SECONDARY ELECTRIC HEAT 3
S159	SWITCH, LIMIT SECONDARY ELECTRIC HEAT 4
S160	SWITCH, LIMIT SECONDARY ELECTRIC HEAT 5
S161	SWITCH, LIMIT SECONDARY ELECTRIC HEAT 6
TB2	TERMINAL STRIP, UNIT
TB3	TERMINAL STRIP, ELECTRIC HEAT CIRCUIT
TB26	TERMINAL STRIP, ELECTRIC HEAT CIRCUIT 2
TB60	TERMINAL STRIP, ELECTRIC HEAT CIRCUIT 3
TB64	TERMINAL STRIP, ELECTRIC HEAT CIRCUIT 1



30 45 –60 75 –90

DESIGNATION	VOLTAGE
Y	208–230/60/3
G	460/60/3
J	575/60/3
M	380–420/50/3

DENOTES OPTIONAL COMPONENTS

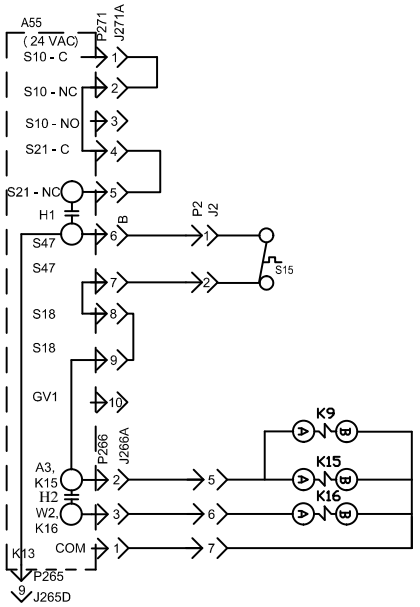
WIRING DIAGRAM	10/09
HEATING	
EHA - 30, 45, 60, 75, 90 - 1,2 - Y	
SECTION A	
Supersedes	New Form No. 537221-01

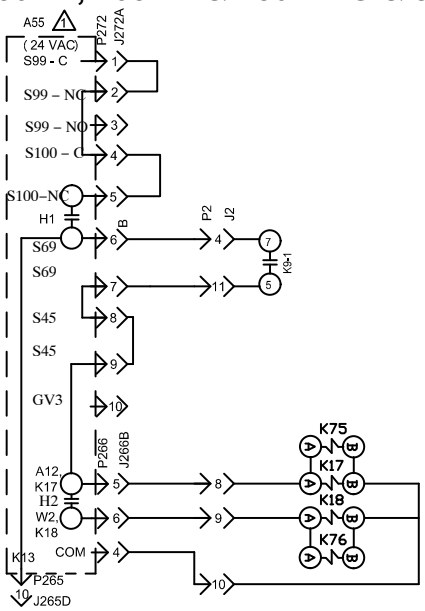
© 2009 Lennox Commercial

1 NOT USED ON 75 AND 90KW UNITS

2 TB3 IS USED IN SOME UNITS

EHA-30kW, 45kW, 60kW, 75kW, 90kW, 105kW, 120kW, 150kW, 165kW & 180kW G & J Voltage

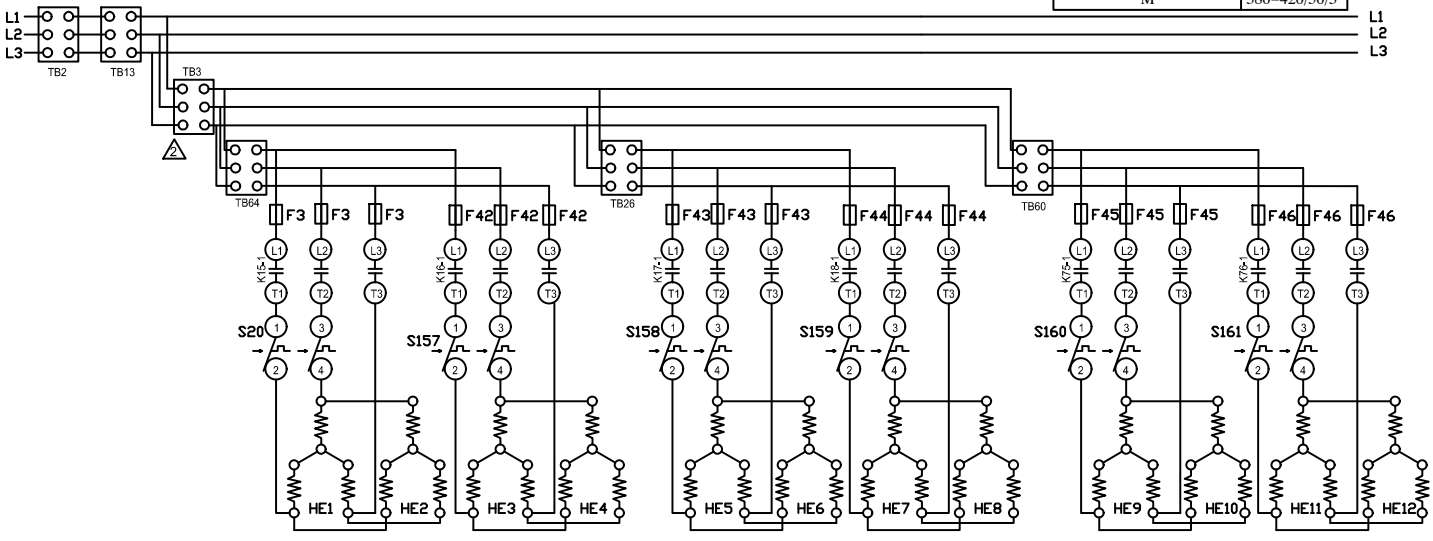




DESCRIPTION	
KEY	**DESCRIPTION**
A55	PANEL, MAIN BOARD LENNOX
F3	FUSE, ELECTRIC HEAT 1, 2
F42	FUSE, ELECTRIC HEAT 3,4
F43	FUSE, ELECTRIC HEAT 5, 6
F44	FUSE, ELECTRIC HEAT 7, 8
F45	FUSE, ELECTRIC HEAT 9, 10
F46	FUSE, ELECTRIC HEAT 11, 12
HE1	ELEMENT, ELECTRIC HEAT 1
HE2	ELEMENT, ELECTRIC HEAT 2
HE3	ELEMENT, ELECTRIC HEAT 3
HE4	ELEMENT, ELECTRIC HEAT 4
HE5	ELEMENT, ELECTRIC HEAT 5
HE6	ELEMENT, ELECTRIC HEAT 6
HE7	ELEMENT, ELECTRIC HEAT 7
HE8	ELEMENT, ELECTRIC HEAT 8
HE9	ELEMENT, ELECTRIC HEAT 9
HE10	ELEMENT, ELECTRIC HEAT 10
HE11	ELEMENT, ELECTRIC HEAT 11
HE12	ELEMENT, ELECTRIC HEAT 12
J2	JACK, ELECTRIC HEAT
J266A	JACK, HEATING CONTROL STG 1
J266B	JACK, HEATING CONTROL STG 2
J271A,B	JACK, HEATING SENSORS STG 1
J272A,B	JACK, HEATING SENSORS STG 2
K9, –1	RELAY, HEAT
K15,–1	CONTACTOR, ELECTRIC HEAT 1
K16,–1	CONTACTOR, ELECTRIC HEAT 2
K17,–1	CONTACTOR, ELECTRIC HEAT 3
K18,–1	CONTACTOR, ELECTRIC HEAT 4
K75,–1	CONTACTOR, ELECTRIC HEAT 5
K76,–1	CONTACTOR, ELECTRIC HEAT 6
P2	PLUG, ELECTRIC HEAT
P266	PLUG, HEATING CONTROL

KW	HE1	HE2	HE3	HE4	HE5	HE6	HE7	HE8	HE9	HE10	HE11	HE12
30	15	15										
45	15	15	15									
60	15	15	15	15								
75	15	15	15	15	15							
90	15	15	15	15	15	15						
105	15	15	15	15	15	15	15					
120	15	15	15	15	15	15	15	15				
135	15	15	15	15	15	15	15	15	15			
150	15	15	15	15	15	15	15	15	15	15		
165	15	15	15	15	15	15	15	15	15	15	15	
180	15	15	15	15	15	15	15	15	15	15	15	15

DESIGNATION	VOLTAGE
Y	208–230/60/3
G	460/60/3
J	575/60/3
M	380–420/50/3



30 – 60 75 – 120 135 – 180

1 NOT USED ON 75 AND 180KW UNITS

2 TB3 IS USED IN SOME UNITS

DENOTES OPTIONAL COMPONENTS

P271	PLUG, HEATING SENSORS STG 1
P272	PLUG, HEATING SENSORS STG 2
S15	SWITCH, LIMIT PRIMARY ELECTRIC HEAT
S20	SWITCH, LIMIT SECONDARY ELECTRIC HEAT 1
S157	SWITCH, LIMIT SECONDARY ELECTRIC HEAT 2
S158	SWITCH, LIMIT SECONDARY ELECTRIC HEAT 3
S159	SWITCH, LIMIT SECONDARY ELECTRIC HEAT 4
S160	SWITCH, LIMIT SECONDARY ELECTRIC HEAT 5

S161	SWITCH, LIMIT SECONDARY ELECTRIC HEAT 6
TB2	TERMINAL STRIP, UNIT
TB3	TERMINAL STRIP, ELECTRIC HEAT CIRCUIT
TB13	TERMINAL STRIP, POWER DISTRIBUTION
TB26	TERMINAL STRIP, ELECTRIC HEAT CIRCUIT 2
TB60	TERMINAL STRIP, ELECTRIC HEAT CIRCUIT 3
TB64	TERMINAL STRIP, ELECTRIC HEAT CIRCUIT 1

WIRING DIAGRAM	07/09
HEATING	
E1EH - 30, 45, 60, 90, 105, 120, 135, 150, 165, 180 - I- G,J,M	
SECTION A	
Supersedes	New Form No. 537220-01

SEQUENCE OF OPERATION

HEATING ELEMENTS:

1 - Terminal strip TB2 (CB10 or S48 may be in place of TB2) supplies line power to TB3. TB3 supplies line voltage to the heating element terminal strips. Each element is protected by a fuse and secondary limit.

EHA Y VOLTAGE

FIRST STAGE HEAT:

2 - Heating demand initiates at W1 in thermostat.

3 - 24VAC is routed to the A55 Unit Controller. After A55 proves N.C. primary limit S15, the electric heat contactor K15 and heat relay K9 are energized. Indoor blower is energized with no time delay.

4 - N.O. contact K15-1 closes energizing heating elements HE1 and HE2.

5 - A55 is energized when N.O. contacts K9-1 close. A N.O. contact in A55 closes energizing electric heat relay K17.

6 - N.O. contacts K17-1 close energizing elements HE5 and HE6.

SECOND STAGE HEAT:

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

8 - 24VAC is routed through the A55 Unit Controller, which in turn energizes the electric heat contactor K16.

9 - N.O. contacts K16-1 close energizing elements HE3 and HE4.

END OF SECOND STAGE HEAT:

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

11 - Electric heat contactors K16 is de-energized.

12 - Heating elements HE3 and HE4 are de-energized.

END OF FIRST STAGE HEAT:

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

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

15 - Heating elements HE1, HE2, HE5 and HE6 are de-energized.

EHA G, J VOLTAGE

FIRST STAGE HEAT:

1 - Heating demand initiates at W1 in thermostat.

2 - 24VAC is routed to the A55 Unit Controller. After A55 proves N.C. primary limit S15, the electric heat contactor K15 and heat relay K9 are energized. Indoor blower is energized with no time delay.

3 - N.O. contact K15-1 closes energizing heating elements HE1 and HE2.

4 - A55 is energized when N.O. contacts K9-1 close. N.O. contacts in A55 close energizing electric heat relays K17, K18K75 and K76.

5 - N.O. contacts K17-1, K18-1, K75-1 and K76-1 close energizing elements HE5, HE6, HE7, HE8, HE9, H10, HE11 and HE12.

SECOND STAGE HEAT:

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

7 - 24VAC is routed through the A55 Unit Controller, which in turn energizes the electric heat contactor K16.

8 - N.O. contacts K16-1 close energizing elements HE3 and HE4.

END OF SECOND STAGE HEAT:

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

10 - Electric heat contactor K16 is de-energized.

11 - Heating elements HE3 and HE4 are de-energized.

END OF FIRST STAGE HEAT:

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

13 - Electric heat contactors K15, K17, K18, K75 and K76 are de-energized.

14 - Heating elements HE1, HE2, HE5, HE6, HE7, HE8, HE9, HE10, HE11 and HE12 are de-energized.