

# INSTALLATION INSTRUCTIONS

AGENCY REQUIRED

RETAIN THESE INSTRUCTIONS FOR FUTURE REFERENCE



## PACKAGED GAS UNITS

506373-03

7/2020

Supersedes 506373-02

# LGH036-360 UNITS

## 3 THROUGH 30 TONS

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### Safety

## WARNING

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

Use of this unit as a construction heater or air conditioner is not recommended during any phase of construction. Very low return air temperatures, harmful vapors and operation of the unit with clogged or misplaced filters will damage the unit.

If this unit has been used for heating or cooling of buildings or structures under construction, the following conditions must be met or the warranty will be void:

- The vent hood must be installed per these installation instructions.
- A room thermostat must control the unit. The use of fixed jumpers that will provide continuous heating or cooling is not allowed
- A pre-filter must be installed at the entry to the return air duct.
- The return air duct must be provided and sealed to the unit.

- Return air temperature range between 55°F (13°C) and 80°F (27°C) must be maintained.
- Air filters must be replaced and pre-filter must be removed upon construction completion.
- The input rate and temperature rise must be set per the unit rating plate.
- The heat exchanger, components, duct system, air filters and evaporator coil must be thoroughly cleaned following final construction clean-up.
- The unit operating conditions (including airflow, cooling operation, ignition, input rate, temperature rise and venting) must be verified according to these installation instructions.

**NOTE** - The Commonwealth of Massachusetts stipulates these additional requirements:

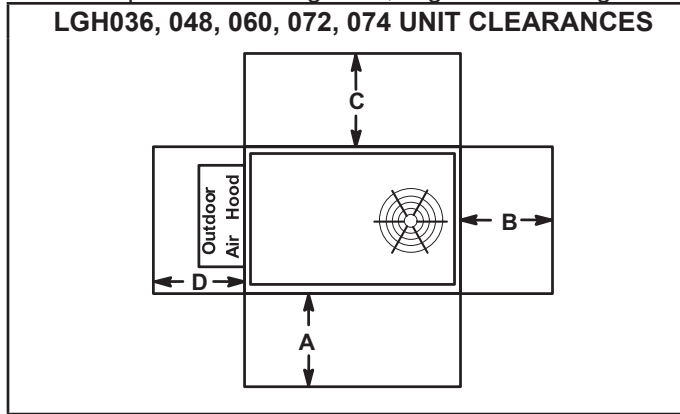
- **Gas units shall be installed by a licensed plumber or gas fitter only.**
- **The gas cock must be “T handle” type.**

The unit is certified for installation on noncombustible floors only. However, it may be installed on wood flooring, or on class A, class B, or class C material covered floors when used in horizontal discharge applications or in downflow discharge applications when mounted on an LARMF roof mounting frame.

Adequate clearance shall be provided around air openings into the vestibule area. Provisions shall be made for proper operation and for combustion air and ventilation air supply. Unit must be adjusted for the temperature rise range and within the allowable external static pressure on furnaces with a duct system as listed on unit nameplate.

**United States**

The unit is ETL/CSA certified for outdoor installations only at the clearances to combustible materials listed on the unit nameplate and in Figure 1, Figure 2 and Figure 3.

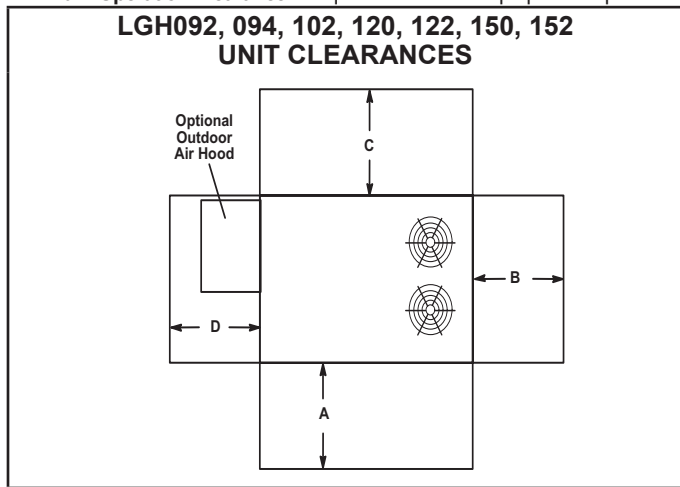


**FIGURE 1**

<sup>1</sup> Unit Clearance	A in.(mm)	B in.(mm)	C in.(mm)	D in.(mm)	Top Clearance
Service Clearance	48 (1219)	36 (914)	36 (914)	36 (914)	Unobstructed
Clearance to Combustibles	36 (914)	1 (25)	1 (25)	1 (25)	Unobstructed
Minimum Operation Clearance	36 (914)	36 (914)	36 (914)	36 (914)	Unobstructed

Note - Entire perimeter of unit base requires support when elevated above mounting surface.

<sup>1</sup>Service Clearance - Required for removal of serviceable parts.  
**Clearance to Combustibles** - Required clearance to combustible material.  
**Minimum Operation Clearance** - Required clearance for proper unit operation.

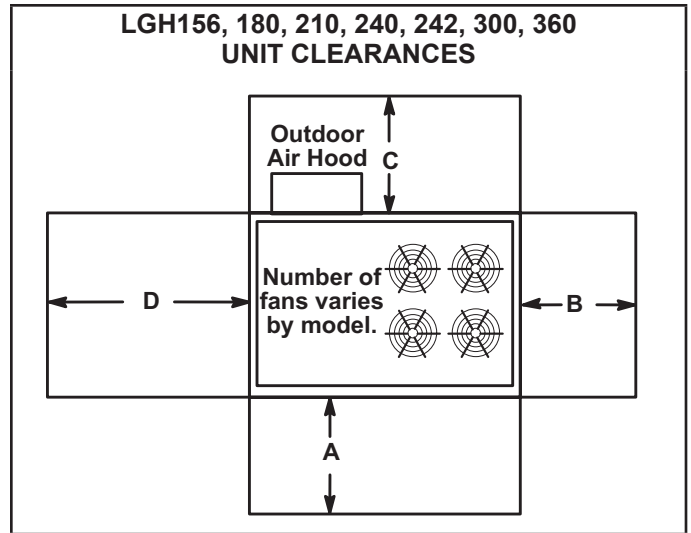


**FIGURE 2**

<sup>1</sup> Unit Clearance	A in.(mm)	B in.(mm)	C in.(mm)	D in.(mm)	Top Clearance
Service Clearance	60 (1524)	36 (914)	36 (914)	60 (1524)	Unobstructed
Clearance to Combustibles	36 (914)	1 (25)	1 (25)	1 (25)	Unobstructed
Minimum Operation Clearance	36 (914)	36 (914)	36 (914)	36 (914)	Unobstructed

Note - Entire perimeter of unit base requires support when elevated above mounting surface.

<sup>1</sup>Service Clearance - Required for removal of serviceable parts.  
**Clearance to Combustibles** - Required clearance to combustible material.  
**Minimum Operation Clearance** - Required clearance for proper unit operation.



**FIGURE 3**

<sup>1</sup> Unit Clearance	A in.(mm)	B in.(mm)	C in.(mm)	D in.(mm)	Top Clearance
Service Clearance	60 (1524)	36 (914)	36* (914)	66 (1676)	Unobstructed
Clearance to Combustibles	36 (914)	1 (25)	1 (25)	1 (25)	Unobstructed
Minimum Operation Clearance	45 (1143)	36 (914)	36** (914)	41 (1041)	Unobstructed

\*242, 300H and 360 units with high static exhaust fans allow 80in. (2032mm).

\*\*242, 300H and 360 units with high static exhaust fans allow 80in. (2032mm).

Note - Entire perimeter of unit base requires support when elevated above mounting surface.

<sup>1</sup>Service Clearance - Required for removal of serviceable parts.  
**Clearance to Combustibles** - Required clearance to combustible material.  
**Minimum Operation Clearance** - Required clearance for proper unit operation.

Installation of the ETL/CSA certified units must conform with local building codes. In the absence of local codes, units must be installed according to the current National Fuel Gas Code ANSI Z223.1/NFPA 54.

When installed, the unit must be electrically wired and grounded according to local codes or, in the absence of local codes, with the current National Electric Code, ANSI/NFPA 70.

The current American National Standard (ANSI Z223.1/NFPA 54) National Fuel Gas Code is available from the following address:

American National Standard Institute Inc.  
 11 West 42nd Street  
 New York, NY 10036

1 - The current National Electric Code (ANSI/NFPA 70) is available from the following address:

National Fire Protection Association  
 1 Batterymarch Park  
 PO Box 9101  
 Quincy, MA 02269-9101

Use only the type of gas approved for use with this furnace. Refer to unit nameplate.

Never test for gas leaks with an open flame. Check all connections with a commercially available soap solution made specifically for leak detection.

**NOTE** - Furnace must be adjusted to obtain a temperature rise (high and low fire) within the range(s) specified on the unit nameplate. Failure to do so may cause erratic limit operation.

**Canada**

The unit is CSA International (CSA) certified for combination heating/cooling for outdoor installations and non-residential use only at the clearances to combustible materials as listed on the unit nameplate.

Installation of CSA international certified units must conform with current standard CSA B149.1, "Natural Gas and Propane Installation Codes" and applicable local codes. Authorities having jurisdiction should be consulted before installation.

The unit must be wired and electrically grounded according to local codes or, in the absence of local codes, current CSA Standard C22.1 Canadian Electrical Code Part 1. Installation of combination heating/cooling units must also conform with current CSA Standard B52 "Mechanical Refrigeration Code."

**Connect Gas Piping**

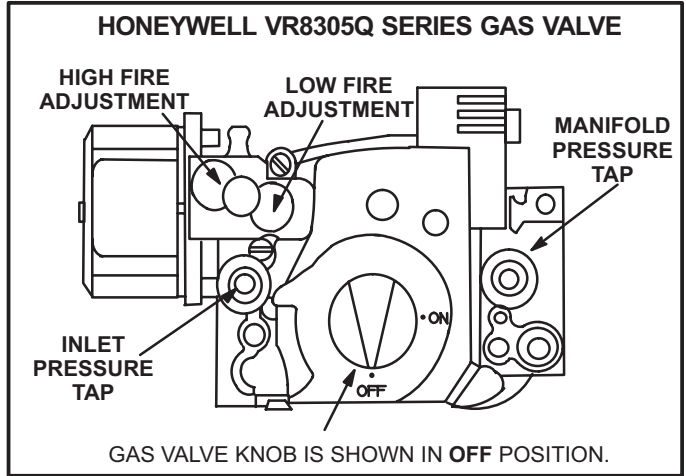
A manual main shut-off valve must be installed external to the unit when local codes require the installation of such a valve.

Install a ground joint union between the gas control manifold and the main manual shut-off valve.

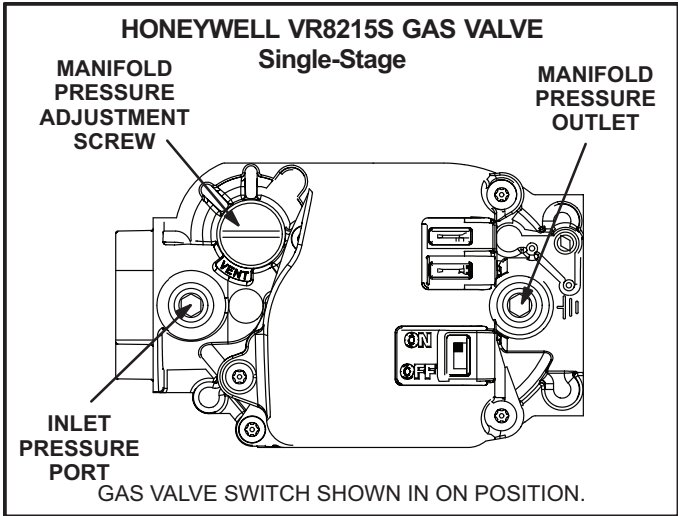
When making piping connections a drip leg should be installed on vertical pipe runs to serve as a trap for sediment or condensate.

A 1/8" N.P.T. plugged tap is located on gas valve for test gauge connection. See Figure 4 through Figure 8 for tap location. See Figure 9 for gas supply piping entry through the side of the unit and Figure 10 for gas piping through the bottom of the unit. A kit is required when routing gas supply piping through the bottom of the unit.

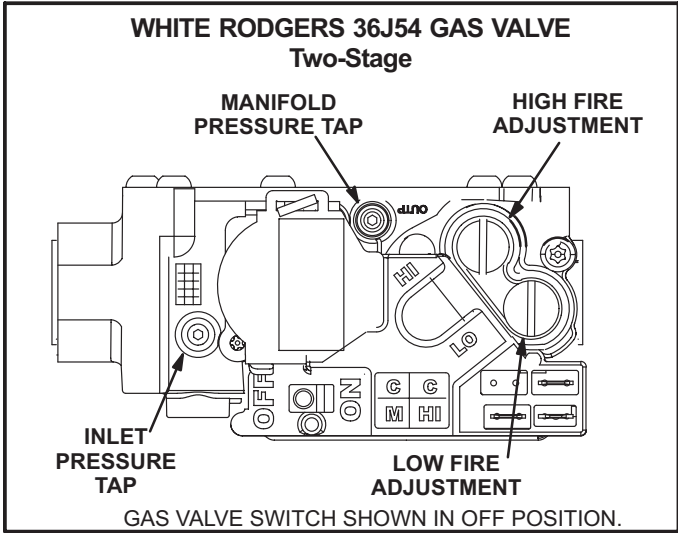
Compounds used on threaded joints of gas piping must be resistant to the actions of liquified petroleum gases.



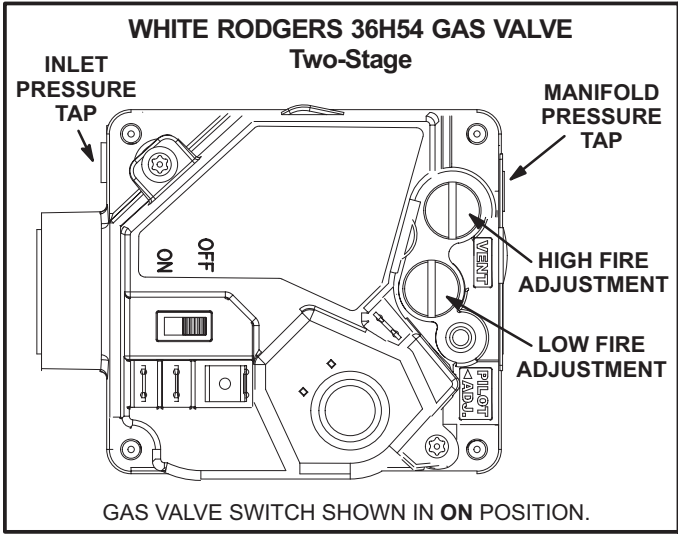
**FIGURE 4**



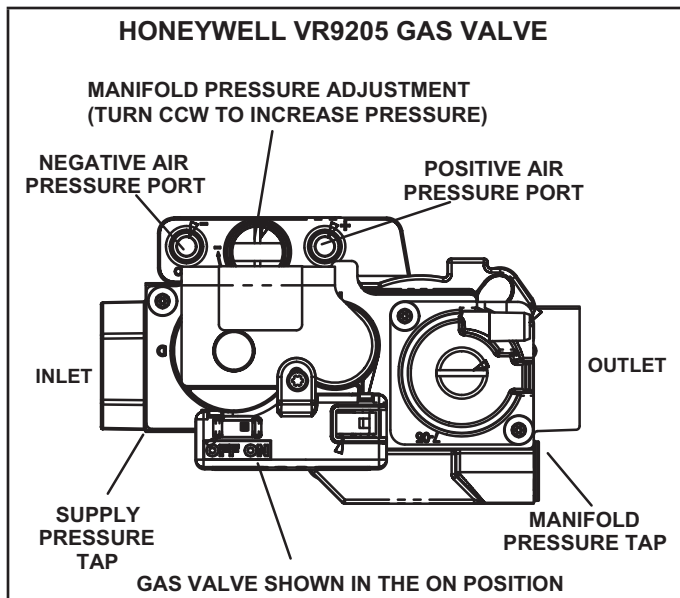
**FIGURE 5**



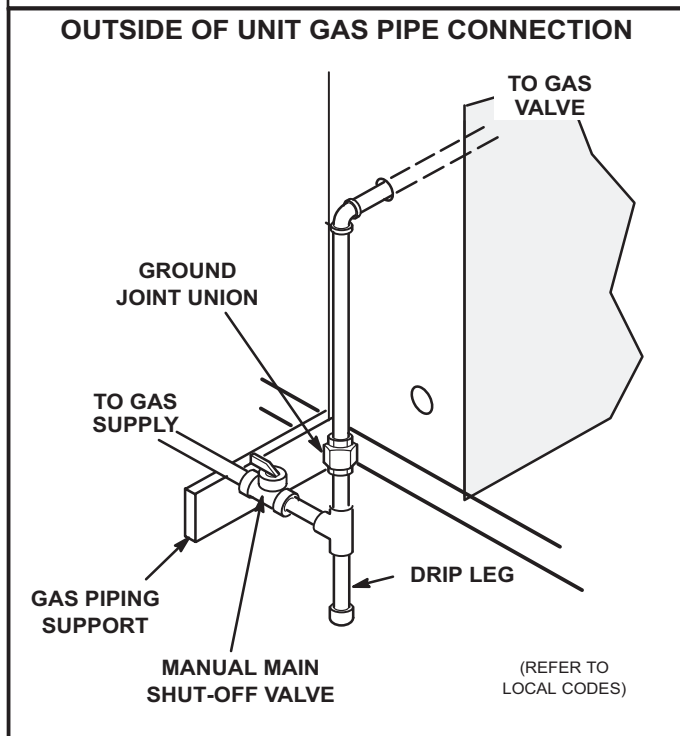
**FIGURE 6**



**FIGURE 7**



**FIGURE 8**



**FIGURE 9**

### High Altitude Derate

Locate the high altitude conversion sticker in the unit literature bag. Fill out the conversion sticker and affix next to the unit nameplate.

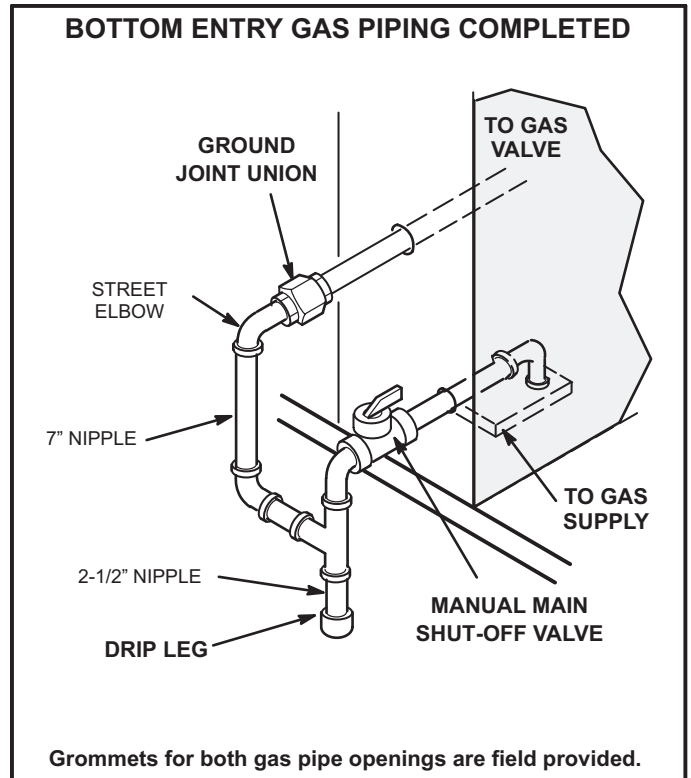
Refer to table 1 for high altitude adjustments.

**TABLE 1  
HIGH ALTITUDE DERATE**

Altitude Ft.*	Gas Manifold Pressure
2000-4500	See Unit Nameplate
4500 And Above	Derate 2% / 1000 Ft. Above Sea Level

\*Units installed at 0-2000 feet do not need to be modified.

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



**FIGURE 10**

### High Altitude Derate - ULNOx Units

Ultra-Low NOx units are approved for installations from 0 -4500 ft. No modifications are required. Above 2000 ft, the furnace will naturally de-rate approximately 10%.

### Pressure Test Gas Piping

Operating pressures at the unit gas connection must be as shown in table 2.

**TABLE 2  
OPERATING PRESSURE AT GAS CONNECTION "w.c"**

Model	Natural Gas		LP/ Propane Gas	
	Min.	Max.	Min	Max.
KG/KD 024-090	4.5	10.5	11	13
KG/KD 092-300	4.7	10.5	11	13

When testing the pressure of gas lines, the gas valve must be disconnected and isolated. Gas valves can be damaged if subjected to more than 0.5 psig.

**⚠ WARNING**

**FIRE OR EXPLOSION HAZARD** Failure to follow the safety warnings exactly could result in serious injury, death or property damage. Never test for gas leaks with an open flame. Use a commercially available soap solution made specifically for the detection of leaks to check all connections. A fire or explosion may result causing property damage, personal injury or loss of life.

## Two-Stage Gas Valve Adjustment

Gas manifold pressures should match pressures shown in table 3. On two stage gas valves, initiate a W2 thermostat demand to check high fire pressure before low fire pressure. With high fire operating, reduce the thermostat demand to W1 and check the low fire pressure. Refer to the Unit Controller manual to initiate a thermostat demand.

**IMPORTANT - Do not set low fire pressure lower than the certified minimum input rating listed in table 3.**

**TABLE 3**  
MANIFOLD INPUT PRESSURES in.wg. (kPa)

Unit	Natural Gas		Propane (LP)Gas	
	1st Stg ±0.2	2nd Stg ± 0.3.	1st Stg ±0.2	2nd Stg ± 0.3.
024, 030, 036, 048, 060, 072, 074 Std./Med./High Heat	NA	3.5	NA	10.5
036, 048, 060, 072, 074, 090 Dual Heat	2.0	3.5	5.9	10.5
092-300	1.6	3.7	5.5	10.5

## Gas Heat Operation

### Non-ULNOx Units

See the operating instruction plate on the unit for details.

### ULNOx Units

Use the following steps to correctly measure manifold pressure:

- 1- Remove the threaded plug from the outlet side of the gas valve and install a field-provided barbed fitting. Connect measuring device "+" connection to barbed fitting to measure manifold pressure. Start unit and allow 15 minutes for unit to reach steady state.

- 2- After allowing unit to stabilize for 15 minutes, record manifold pressure and compare to value given in table 4. Normally manifold adjustment is not necessary; adjust manifold only if needed.

- 3- Shut unit off and remove manometer as soon as an accurate reading has been obtained.

**TABLE 4**  
ULNOx Manifold Pressures (in.w.c.)

High Fire	3.2-3.6
Low Fire	1.7-2.1

### Proper Combustion - ULNOx Units

Restart unit and check for any gas leaks. Seal any leaks if found. Furnace should operate minimum 15 minutes with correct manifold pressure and gas flow rate before checking combustion. Table 5 shows acceptable combustion. The maximum carbon monoxide reading should not exceed 100 ppm.

**TABLE 5**  
CO2 RATES (ppm)

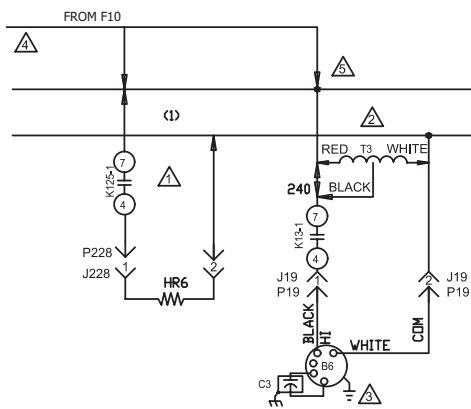
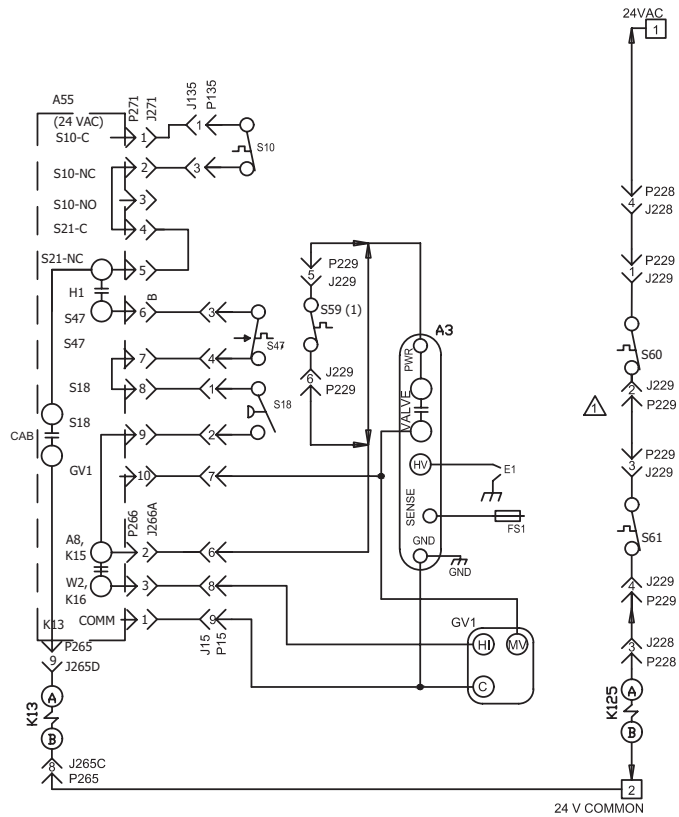
High Fire	6.0-7.5
Low Fire	6.0-7.5 (CO2 tracks)

### ULNOx Operation

ULNOx units are not equipped with gas orifices that supply each burner. Instead, a single gas orifice supplies gas to the air/gas elbow. An intake air orifice supplies combustion air to the air/gas elbow. The combustion air blower draws the air/gas mixture from the air/gas elbow into the air/gas plenum box. When the spark ignites the gas, the ignition sensor proves the flame and combustion occurs in the burner premix plate. The burner box liner directs the flames into the burner tube sleeves.

# Typical Gas Heat Schematic

KEY	DESCRIPTION
A3	CONTROL, BURNER 1
A55	CONTROL, MAIN BOARD LENNOX
B6	MOTOR COMBUSTION AIR BLOWER
C3	CAPACITOR, COMB AIR BLOWER 1
E1	SPARK
F10	FUSE, OUTDOOR FAN MOTOR
FS1	SENSOR FLAME
GV1	VALVE GAS 1
HR6	HEATER, -50C LOW AMBIENT KIT
J15	JACK, BURNER 1
J19	JACK, COMBUSTION AIR BLOWER 1
J135	JACK, PRIMARY LIMIT
J228	JACK, VESTIBULE HEATER
J229	JACK, VESTIBULE HEATER CONTROL 1
J265C	JACK, CONTACTOR RELAY
J266A	JACK, HEATING CONTROL STG 1
J271A,B	JACK, HEATING SENSORS STG 1
K13,-1	RELAY, COMBUSTION AIR BLOWER
K123,-1	RELAY, SINGLE THROW LIMIT
K125,-1	RELAY, HEAT SHUT OFF
P15	PLUG, BURNER 1
P19	PLUG, COMBUSTION AIR BLOWER 1
P135	PLUG, PRIMARY LIMIT
P228	PLUG, VESTIBULE HEATER
P229	PLUG, VESTIBULE HEATER CONTROL 1
P265	PLUG, CONTACTOR RELAY
P266	PLUG, HEATING CONTROL
P271	PLUG, HEATING SENSORS STG 1
S10	SWITCH, LIMIT PRIMARY GAS
S18	SWITCH, COMBUSTION AIR BLOWER PROOF
S47	SWITCH FLAME ROLLOUT BURNER
S59	TSTAT, OPEN -20F, CLOSE 10F
S60	TSTAT, OPEN 20F, CLOSE -10F
S61	TSTAT, OPEN 50F, CLOSE 20F
T3	TRANSFORMER COMB AIR BWR 1



- △ CSA (-50C) LOW AMBIENT KIT (OPTIONAL)
- △ T3 USED ON 575 V UNITS ONLY
- △ GROUND WIRE CE ONLY
- △ F10 USED ON UNITS WITH SCCR OPTION
- △ T3 NOT CONNECTED TO F10 ON 575V SCCR UNITS

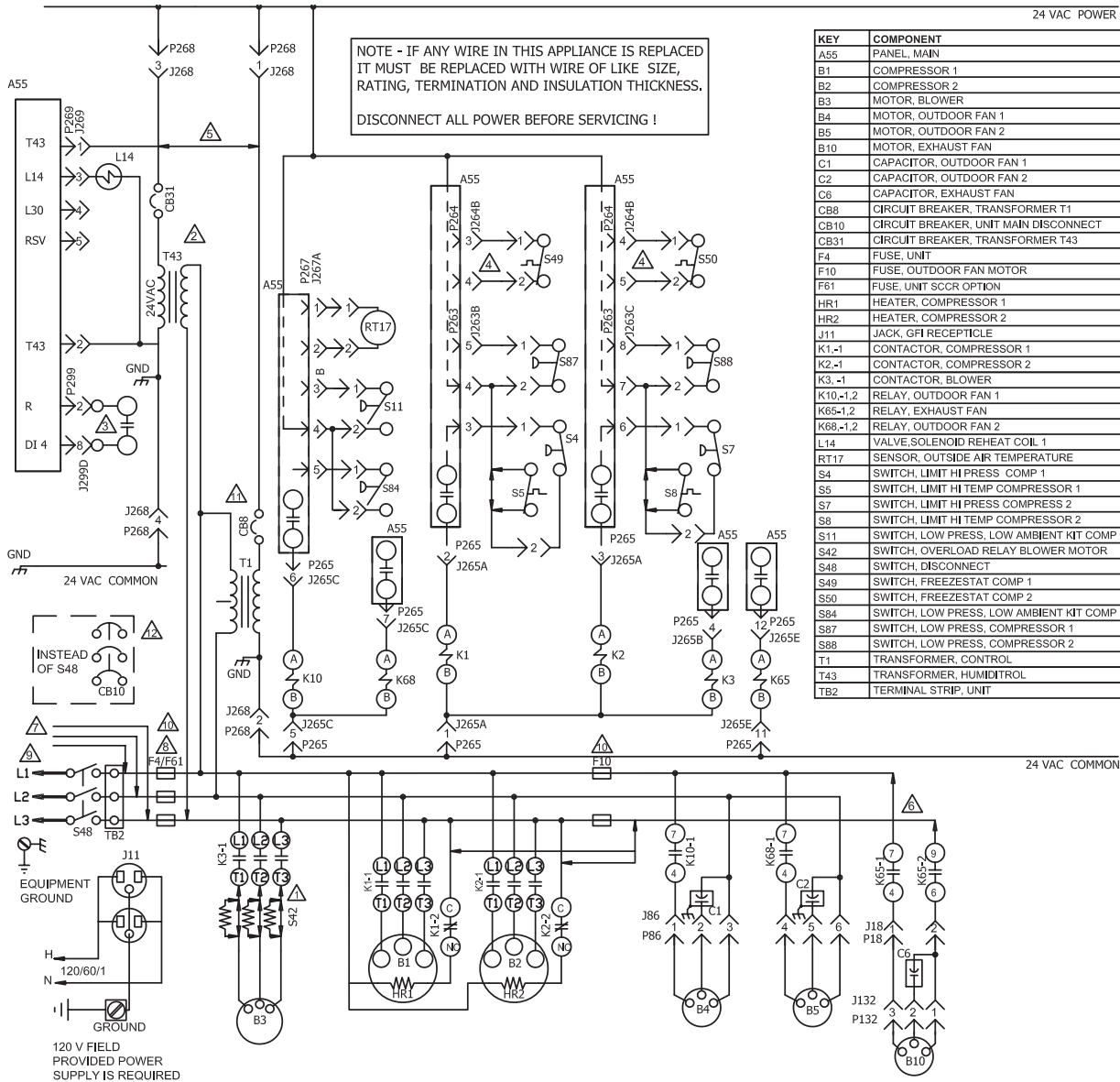
← DENOTES OPTIONAL COMPONENTS

2018/07	WIRING DIAGRAM	07/18
	537705-04	
HEATING		
GAS HEAT, 130, 180 AND 240		
SECTION A		REV. 0
Supersedes	New Form No.	
537705-03	537705-04	



# Typical Unit Schematic

24 VAC POWER



KEY	COMPONENT
A55	PANEL, MAIN
B1	COMPRESSOR 1
B2	COMPRESSOR 2
B3	MOTOR, BLOWER
B4	MOTOR, OUTDOOR FAN 1
B5	MOTOR, OUTDOOR FAN 2
B10	MOTOR, EXHAUST FAN
C1	CAPACITOR, OUTDOOR FAN 1
C2	CAPACITOR, OUTDOOR FAN 2
C6	CAPACITOR, EXHAUST FAN
CB8	CIRCUIT BREAKER, TRANSFORMER T1
CB10	CIRCUIT BREAKER, UNIT MAIN DISCONNECT
CB31	CIRCUIT BREAKER, TRANSFORMER T43
F4	FUSE, UNIT
F10	FUSE, OUTDOOR FAN MOTOR
F61	FUSE, UNIT SCRR OPTION
HR1	HEATER, COMPRESSOR 1
HR2	HEATER, COMPRESSOR 2
J11	JACK, GFI RECEPTICLE
K1-1	CONTACTOR, COMPRESSOR 1
K2-1	CONTACTOR, COMPRESSOR 2
K3-1	CONTACTOR, BLOWER
K10-1,2	RELAY, OUTDOOR FAN 1
K65-1,2	RELAY, EXHAUST FAN
K68-1,2	RELAY, OUTDOOR FAN 2
L14	VALVE, SOLENOID REHEAT COIL 1
RT17	SENSOR, OUTSIDE AIR TEMPERATURE
S4	SWITCH, LIMIT HI PRESS COMP 1
S5	SWITCH, LIMIT HI TEMP COMPRESSOR 1
S7	SWITCH, LIMIT HI TEMP COMPRESSOR 2
S8	SWITCH, LIMIT HI TEMP COMPRESSOR 2
S11	SWITCH, LOW PRESS, LOW AMBIENT KIT COMP 1
S42	SWITCH, OVERLOAD RELAY BLOWER MOTOR
S48	SWITCH, DISCONNECT
S49	SWITCH, FREEZESTAT COMP 1
S50	SWITCH, FREEZESTAT COMP 2
S84	SWITCH, LOW PRESS, LOW AMBIENT KIT COMP 2
S87	SWITCH, LOW PRESS, COMPRESSOR 1
S88	SWITCH, LOW PRESS, COMPRESSOR 2
T1	TRANSFORMER, CONTROL
T43	TRANSFORMER, HUMIDITROL
TB2	TERMINAL STRIP, UNIT

- ⚠ S42 USED ON "M" VOLTAGE UNITS AND UNITS WITH HIGH EFFICIENCY MOTORS
- ⚠ ONLY IN UNITS WITH HUMIDITROL OR PHASE AND VOLTAGE DETECTION OPTION
- ⚠ EXTERNAL HUMIDITROL CONTACTS
- ⚠ S49 AND S50 ARE PART OF 5VDC CIRCUIT
- ⚠ J268-1,-3 AND J268-2,-4 ARE CONNECTED ON UNITS WITHOUT HUMIDITROL OR PHASE DETECTION OPTIONS
- ⚠ B10 IS NOT USED ON UNITS WITH ERV
- ⚠ USED ON UNITS WITH ERV SINGLE POINT POWER. SEE ERV DIAGRAM
- ⚠ USED ON LCH AND UNITS WITH ERV SINGLE POINT POWER ONLY
- ⚠ NOTE: FOR USE WITH COPPER CONDUCTORS ONLY. REFER TO UNIT RATING PLATE FOR MINIMUM CIRCUIT AMPACITY AND MAXIMUM OVERCURRENT PROTECTION SIZE.
- ⚠ F61 AND F10 USED ON LGH UNITS WITH SCRR OPTION
- ⚠ MOVE WIRE FROM 240 TO 208 TAP ON TRANSFORMER FOR 208 VOLT APPLICATIONS
- ⚠ CB10 NOT AVAILABLE ON UNITS WITH SCRR OPTION

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

— DENOTES OPTIONAL COMPONENTS  
 — LINE VOLTAGE FIELD INSTALLED

2019/06	WIRING DIAGRAM	06/19
	537625-04	
	COOLING	
	LCH/LGH - 092H, 102H, 120H, 150H - G, J, M, Y	
SECTION B		REV 0
Supersedes	New Form No.	
537625-03	537625-04	

## Proper Gas Flow (Approximate)

- 1- Operate unit at least 15 minutes before checking gas flow. Determine the time in seconds for two revolutions of gas through the meter. (Two revolutions assures a more accurate time.) A portable LP gas meter (17Y44) is available for LP applications.
- 2- Divide the number of seconds by two and compare to the time in table 6. If manifold pressure is correct and rate is incorrect, check gas orifices for proper size and restriction.
- 3- Remove temporary gas meter if installed.

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

**TABLE 6**  
**GAS METER CLOCKING CHART**

Unit Input Rate (Btuh)	Seconds for One Revolution			
	Natural		LP	
	1 cu ft Dial	2 cu ft Dial	1 cu ft Dial	2 cu ft Dial
65,000	55	111	138	277
78,000	46	92	115	231
108,000	33	67	83	167
125,000	29	58	72	144
130,000	28	55	69	138
150,000	24	48	60	120
169,000	21	43	53	107
180,000	20	40	50	100
240,000	15	30	38	75
260,000	14	28	35	69
360,000	10	20	30	50
480,000	8	15	19	38
Natural-1000 btu/cu ft		LP-2500 btu/cu ft		

**NOTE** - Table assumes standard temperature (60°F), pressure (30in.Hg.), and fuel heating values (Btuh/Ft.3). Apply pressure corrections in altitudes above 2000 ft.

## Repair Parts Listing

When ordering repair parts, include the complete model number and serial number listed on the ETL/CSA rating plate - e.g. LGH120S4BH1Y.

### Gas Heat Section Parts

Heat Exchanger  
 Combustion Air Assembly  
 Combustion Air Proving Switch  
 Burner Assembly  
 Burner Manifold Assembly  
 Main Burner Orifices  
 Flame Roll-out Switches  
 Auxiliary Limit Controls  
 Ignition Electrode Assembly  
 Ignition Lead  
 Ignition Sensor Assembly  
 Sensor Lead  
 Combination Gas Valve  
 Limit Controls

### Additional for ULNOx Units:

Intake Air Screen  
 Intake Air Orifice  
 Air/Gas Elbow  
 Air/Gas Plenum Box  
 Burner Premix Plate  
 Burner Box Liner & Tubes  
 Inlet Reducer  
 Rubber Coupling

### Cooling Parts

Compressors  
 Condenser Fan Motors  
 Condenser Fan Blades  
 Condenser Fan Run Capacitors  
 Freezestats  
 Condenser Fan Mounting Bracket  
 Fan Grille  
 Indoor Blower Motors  
 Blower Wheel  
 Expansion Valve  
 Distributor  
 Exhaust Fans (Opt.)  
 Reversing Valve (KD only)

### Electrical Control Parts

Compressor Contactors  
 Circuit Breakers (Opt.)  
 Transformer (Control)  
 Transformer (Contactor)  
 Blower Contactor  
 Limit, Blower Relay  
 Heat Relays  
 Condenser Fan Relays  
 Capacitor CAB  
 Relay CAB  
 Disconnect Switch (Opt.)  
 Defrost Control (KD only)  
 Fan Control Board (KD only)