

# INSTALLATION INSTRUCTIONS

## AGENCY REQUIRED

RETAIN THESE INSTRUCTIONS FOR FUTURE REFERENCE



### PACKAGED GAS UNITS

508461-01

4/2024

Supersedes 508110-01

# LG/LD 036-360 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.

#### **⚠ CAUTION**

The appliance is not to be used by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction

#### **⚠ CAUTION**

Children should be supervised not to play with the appliance.

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.

**NOTE** - On LD dual-fuel units, before making any adjustments, set outdoor thermostat setpoint above the outdoor

*ambient temperature. This will disable heat pump operation and allow gas heat operation.*

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.**

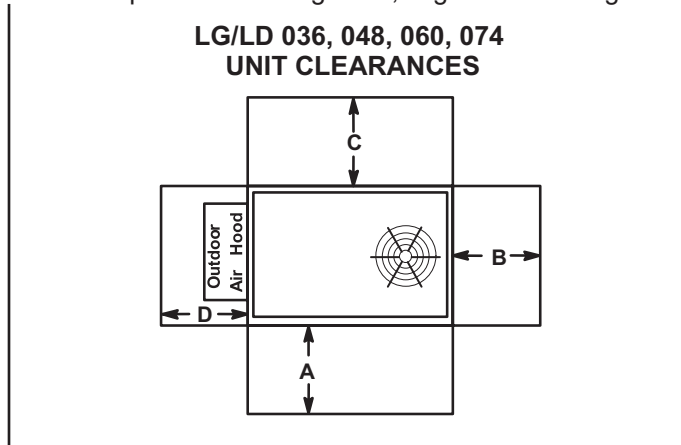
The unit is certified for installation on noncombustible floors only. However, it may be installed on wood flooring, or on class A, class B, or class C material covered floors when used in horizontal discharge applications or in downflow dis-

charge 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

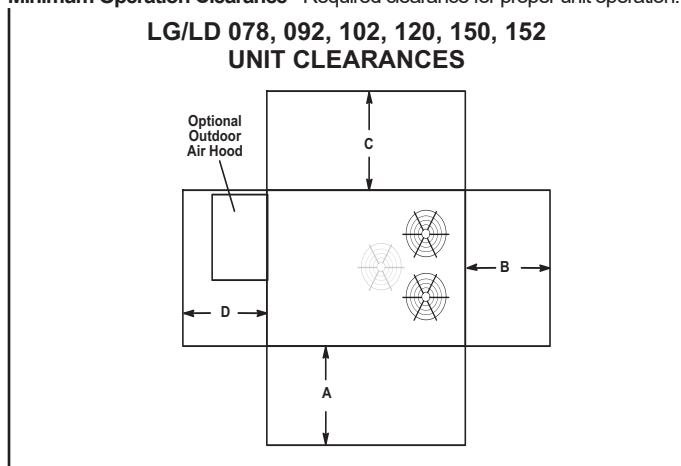


**FIGURE 1**

<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.



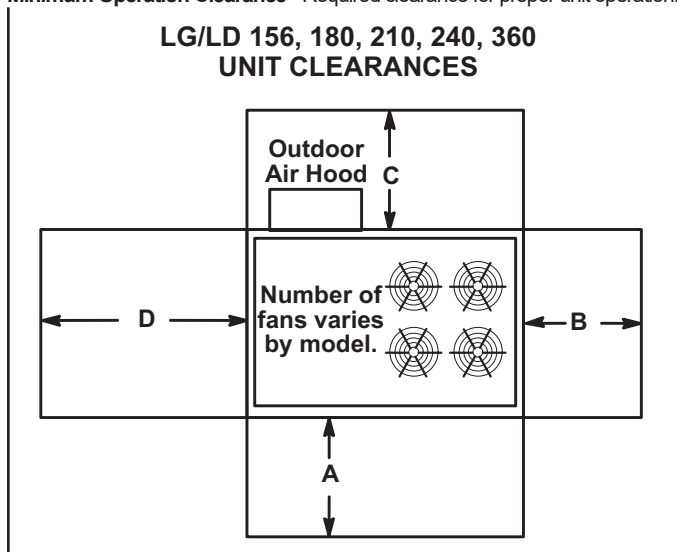
**FIGURE 2**

<sup>1</sup> Unit Clearance	A in.(mm)	B in.(mm)	C in.(mm)	D in.(mm)	Top Clearance
Service Clearance	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

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

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**

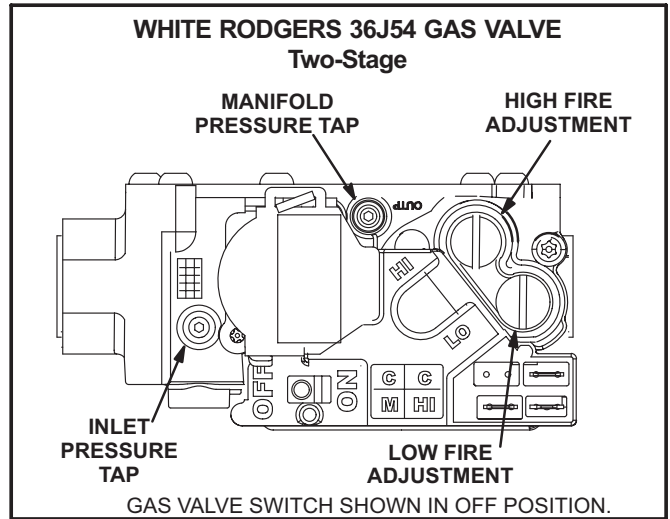
A manual main shut-off valve must be installed external to the unit when local codes require the installation of such a valve.

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

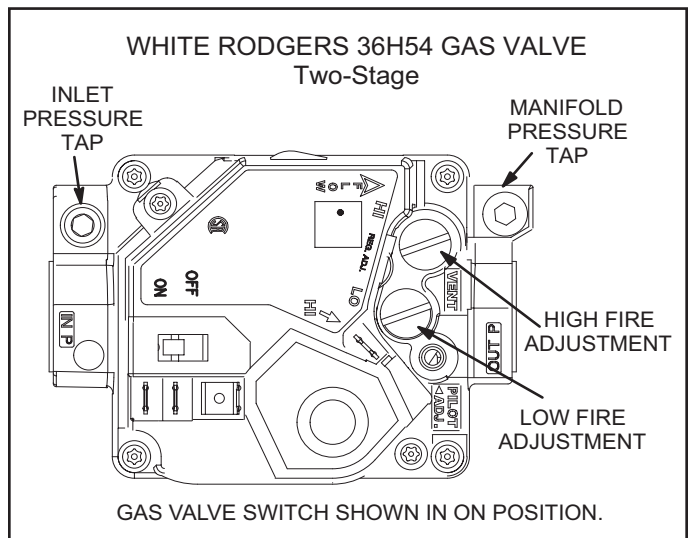
When making piping connections a drip leg should be installed on vertical pipe runs to serve as a trap for sediment or condensate.

A 1/8" N.P.T. plugged tap is located on gas valve for test gauge connection. See Figure 4, Figure 5, and Figure 6 for tap location. See Figure 7 for gas supply piping entry through the side of the unit and Figure 8 for gas piping through the bottom of the unit. A kit is required when routing gas supply piping through the bottom of the unit.

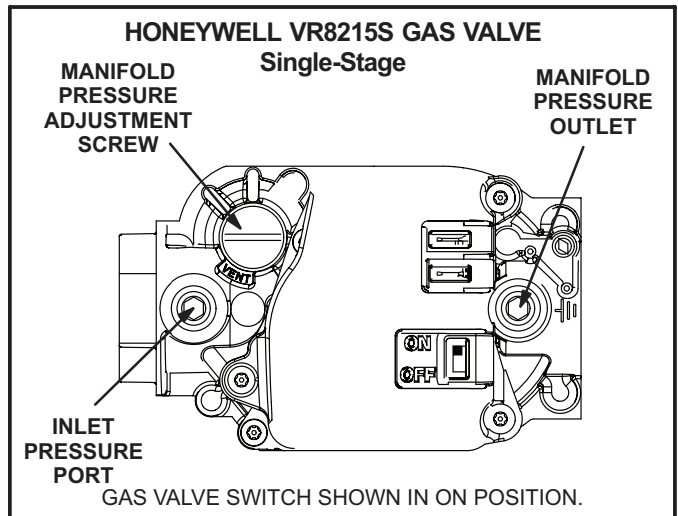
Compounds used on threaded joints of gas piping must be resistant to the actions of liquified petroleum gases.



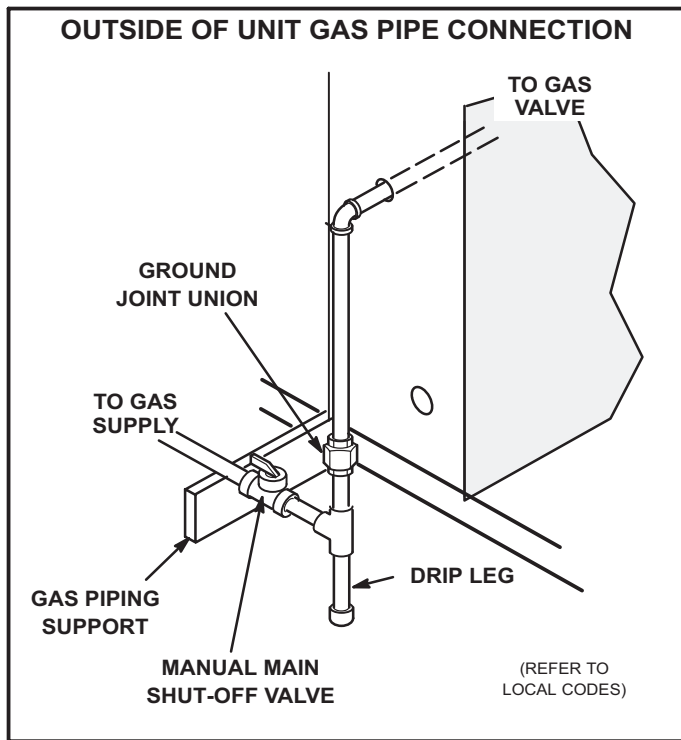
**FIGURE 4**



**FIGURE 5**



**FIGURE 6**



**FIGURE 7**

**High Altitude Derate - Non-ULNOx**

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**

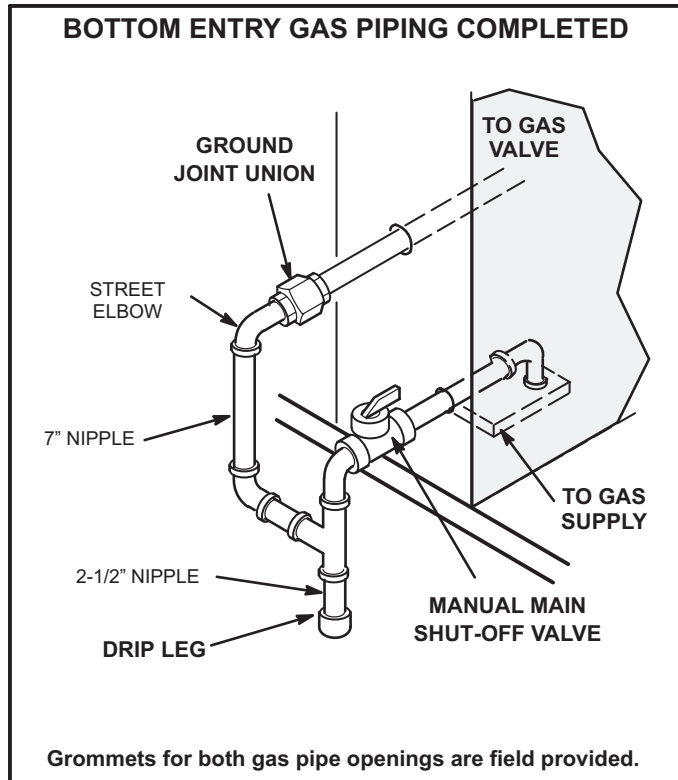
Unit	Altitude Ft.*	Gas Manifold Pressure
All	2000-4500	See Unit Nameplate
036-074	4500 And Above	Derate 2% / 1000 Ft. Above Sea Level
078-152	4500 And Above	Derate 4% / 1000 Ft. Above Sea Level
156-360	4500 And Above	Derate 4% / 1000 Ft. Above Sea Level

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

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

**High Altitude Derate - ULNOx**

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



**FIGURE 8**

**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.
036-074	4.5	10.5	10.8	13.5
078-360	4.7	10.5	10.8	13.5

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, 036, 048, 060, 074 Dual Heat	2.0	3.5	5.9	10.5
078-300	1.6	3.7	5.5	10.5

## Gas Heat Operation - Non-ULNOx Units

See the operating instruction plate on the unit for details.

## Gas Heat Operation - ULNOx Units

### Manifold Pressure

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**  
**MANIFOLD PRESSURE (in.w.c.)**

High Fire	3.2-3.6.
Low Fire	1.7-2.1

### Proper Combustion

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**  
**CO<sub>2</sub> RATES (ppm)**

High Fire	6.0-7.5
Low Fire	6.0-7.5 (CO <sub>2</sub> tracks)

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.

## 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.

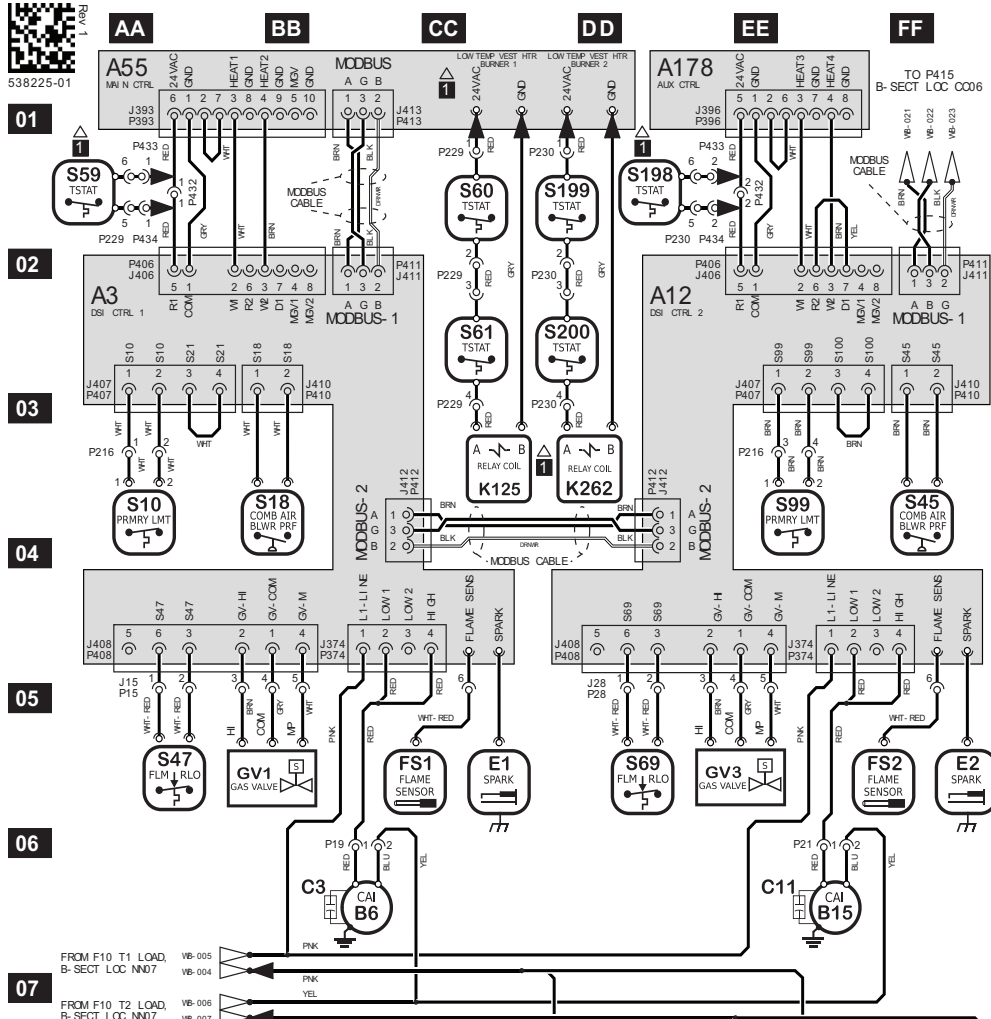
**NOTE - To obtain accurate reading, shut off all other gas appliances connected to meter.**

**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
60,000	60	150	120	300
65,000	55	111	138	277
70,000	51	103	129	257
100,000	36	90	72	180
108,000	33	67	83	167
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
<b>Natural-1000 btu/cu ft</b>		<b>LP-2500 btu/cu ft</b>		

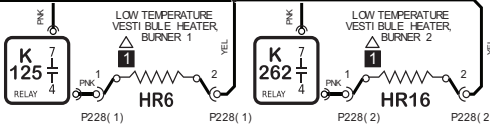
**NOTE - Table assumes standard temperature (60°F), pressure (30in.Hg.), and fuel heating values (Btuh/Ft.3). Apply pressure corrections in altitudes above 2000 ft.**

# Typical Gas Heat Schematic



**KEY LIST**

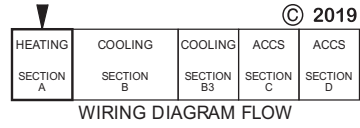
LOCATION	COMPONENT DESCRIPTION
AA/EE02	A3, A12 CONTROL BOARD, DSI BURNER 1, 2
AA01	A55 CONTROL BOARD, MAIN
EE01	A178 CONTROL BOARD, EXTENSION
BB/EE07	B6, B15 MOTOR, COMBUSTION AIR IND., BURNER 1, 2
BB/EE06	C3, C11 CAPACITOR, CAI MOTOR 1, 2
CC/FF06	E1, E2 IGNITER, SPARK, BURNER 1, 2
CC/FF06	FS1, FS2 SENSOR, FLAME, BURNER 1, 2
BB/EE06	GV1, GV2 VALVE, GAS, BURNER 1, 2
DD/FF08	HR6, HR16 HEATER, -50C LOW TEMP VEST. BURNER 1, 2
CC/DD03	K125, K262 RELAY, LOW TEMP VEST HEATER, BURNER 1, 2
DD/EE08	K125, K262 RELAY, LOW TEMP VEST HEATER, BURNER 1, 2
AA/EE04	S10, S99 LIMIT, PRIMARY, BURNER 1, 2
BB/FF04	S18, S45 SWITCH, COMB AIR BLWR PROOF, BURNER 1, 2
AA/DD06	S47, S69 SWITCH, FLAME ROLLOUT, BURNER 1, 2
AA/DD02	S59, S198 TSTAT, OPEN 20F, CLOSE 10F, BURNER 1, 2
CC/DD02	S60, S199 TSTAT, OPEN 20F, CLOSE 10F, BURNER 1, 2
CC/DD03	S61, S200 TSTAT, OPEN 50F, CLOSE 20F, BURNER 1, 2



**NOTES**  
 1 -50C LOW TEMPERATURE VESTIBULE HEATER - OPTIONAL

← DENOTES OPTI ONAL COMPONENTS AND W I R I N G

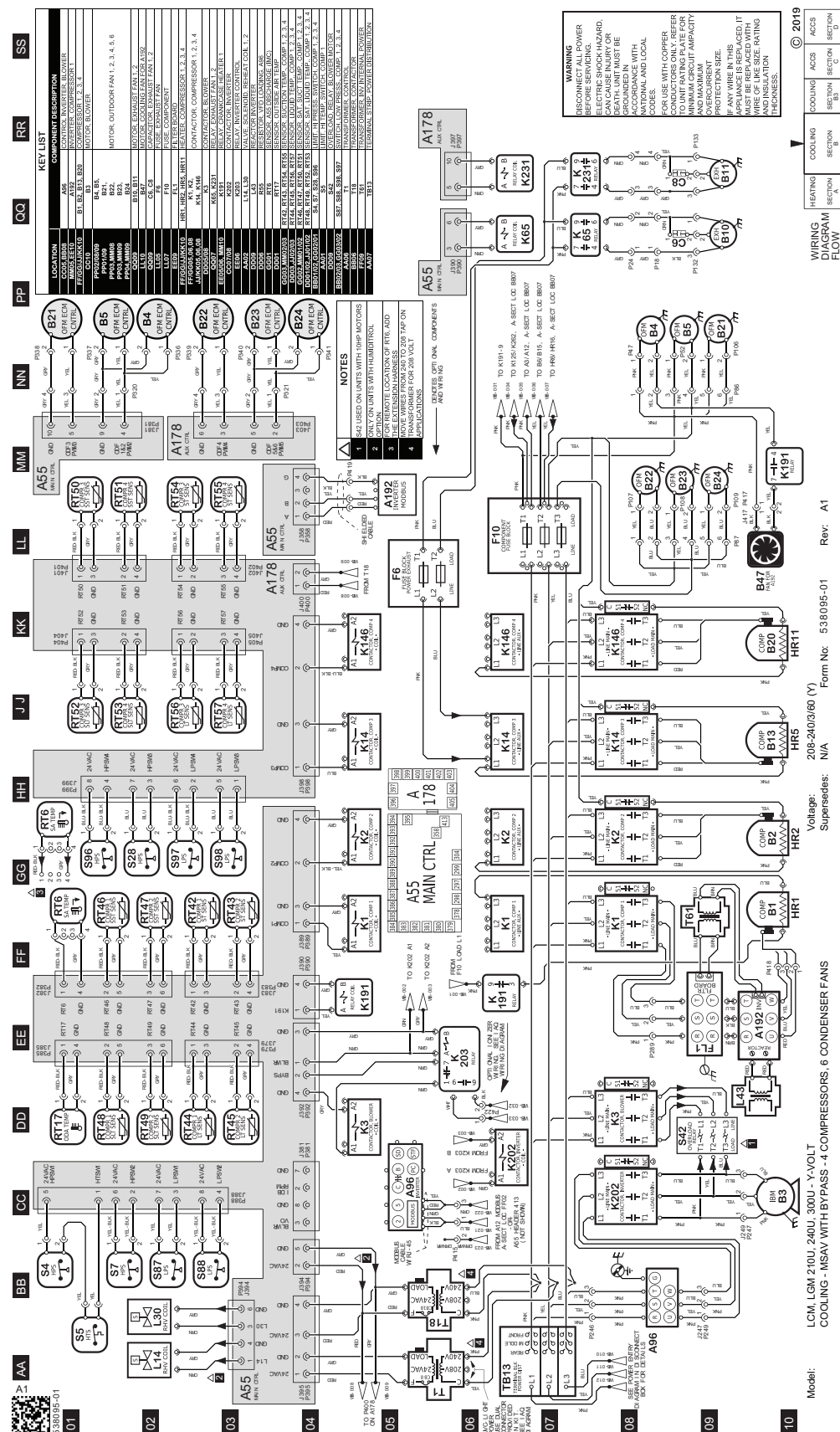
10 Model: LG, LD, SG Series RTU - Gas Heat  
 Input Heat Capacity 169k - 480k Btuh  
 Voltage: 208-240V/3~60Hz (Y), 460V/3~60Hz (G)  
 Supersedes: N/A Form No: 538225- 01 Rev: 1



7x10  
 CUT  
 SIZE

REV	EC NO.	DATE	BY	APVD	REVISION NOTE
---	CN-010356	06-21-2022	MXR6	JAL21	ORIGINATED AT PD&R CARROLLTON, TX
001	CN-012295C	04-03-2024	MXR6	MXT5	A) REVISED CAI B6/B15 SYMBOL B) ADDED SG MODEL TO TITLE BLOCK.

# Typical Unit Schematic



## Repair Parts Listing

When ordering repair parts, include the complete model number and serial number listed on the ETL/CSA rating plate - e.g. LGT120H4EH1Y.

### 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  
Ignition Controller

### Cooling Parts

Compressors  
Condenser Fan Motors  
Condenser Fan Blades  
Condenser Fan Run Capacitors\*  
\*Used only with PSC motor applications  
Condenser Fan Mounting Bracket  
Fan Grille  
Indoor Blower Motors  
Blower Wheel  
Expansion Valve  
Distributor  
Exhaust Fans (Opt.)  
Reversing Valve (LD and reheat units 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 (LD only)  
Fan Control Board (LD only)

### ULNOx Units

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