

INSTALLATION INSTRUCTIONS

AGENCY REQUIRED

RETAIN THESE INSTRUCTIONS FOR FUTURE REFERENCE



Intertek

PACKAGED GAS UNITS
507351-05
11/2018
Supersedes 8/2017

KG/KD 024-300 UNITS 2 THROUGH 25 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.

NOTE - On KD 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 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.



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507351-05

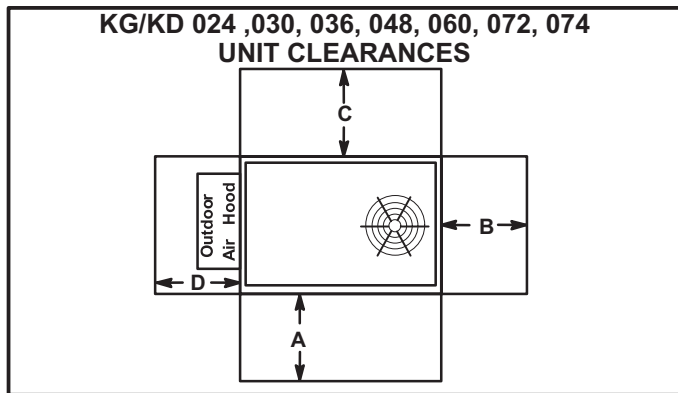


FIGURE 1

¹ 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.

¹**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.

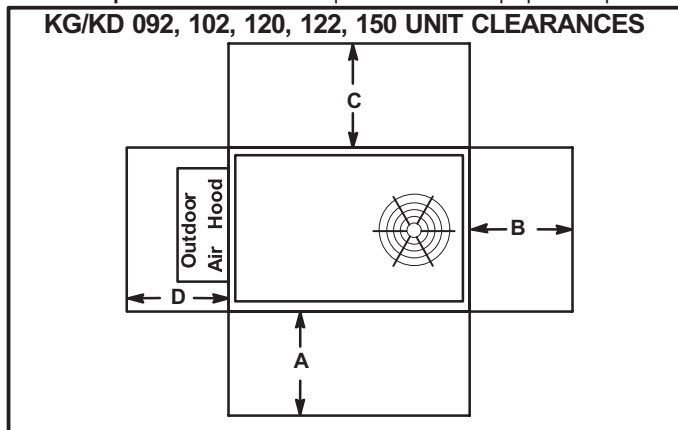


FIGURE 2

¹ 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.

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Minimum Operation Clearance - Required clearance for proper unit operation.

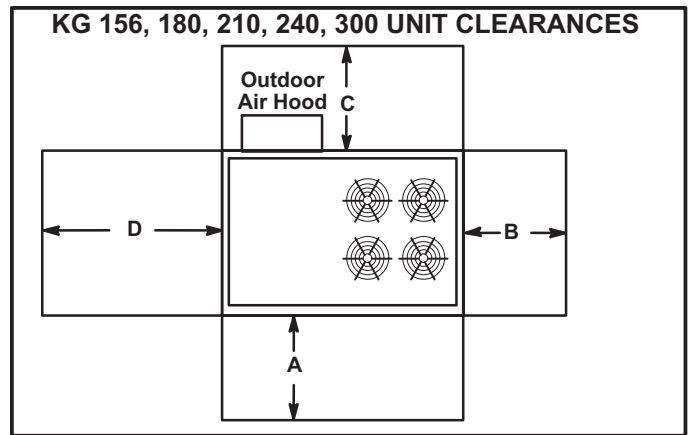


FIGURE 3

¹ 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.

¹**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

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, Figure 6 or Figure 7 for tap location. See Figure 8 for gas supply piping entry through the side of the unit and Figure 9 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.

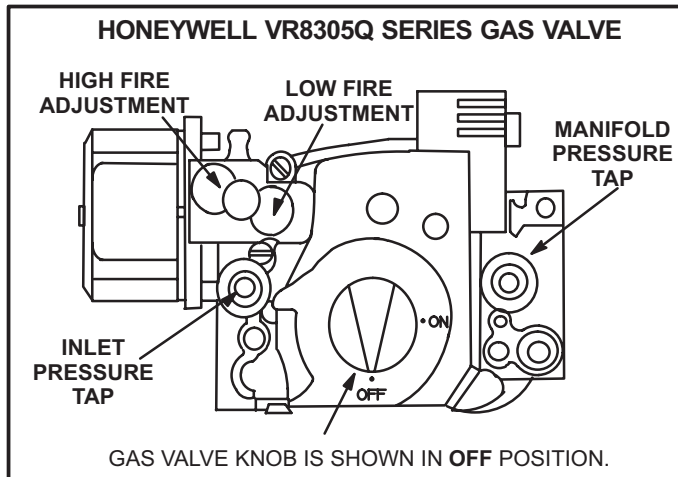


FIGURE 4

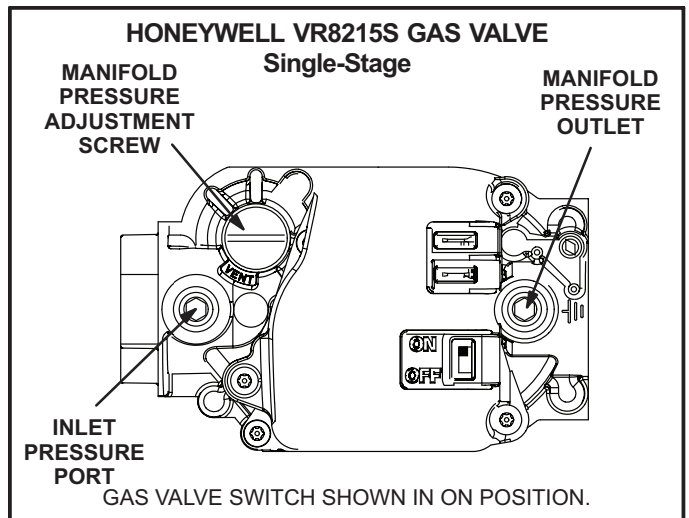


FIGURE 5

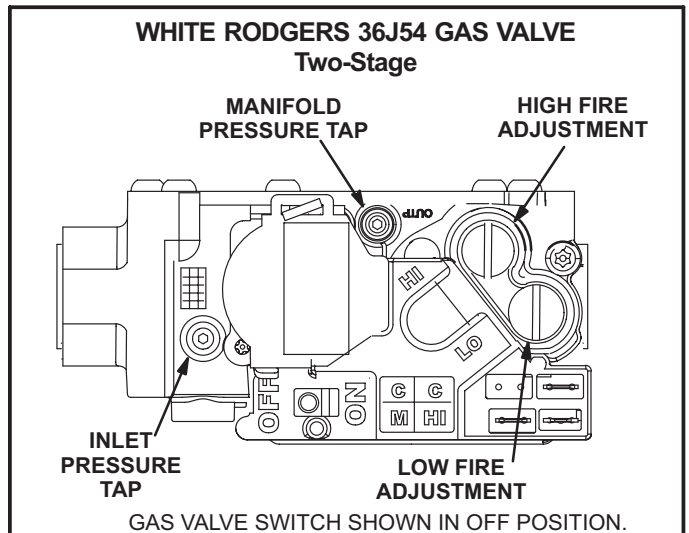


FIGURE 6

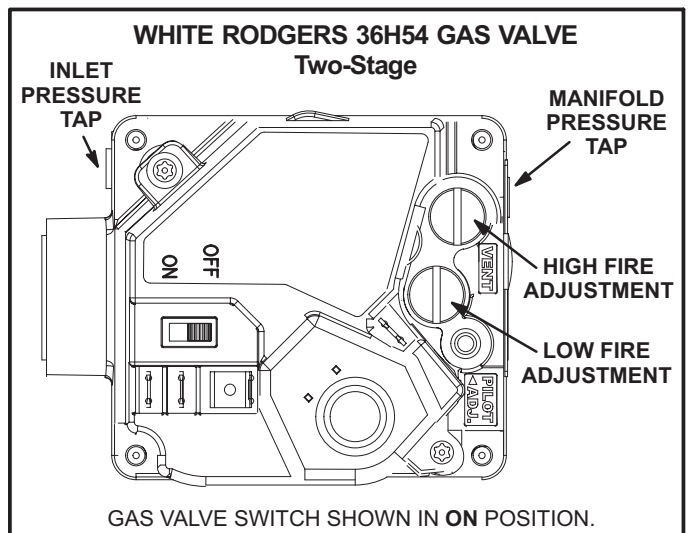


FIGURE 7

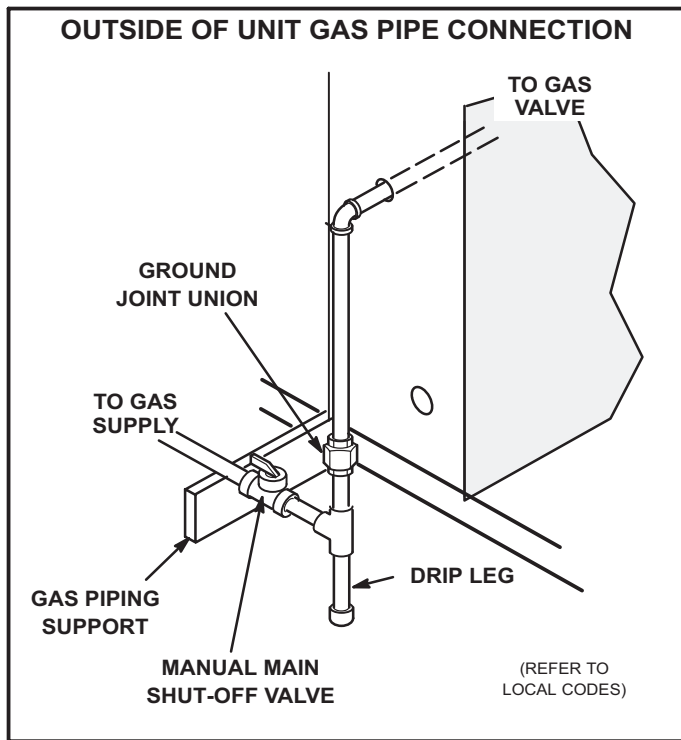


FIGURE 8

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.

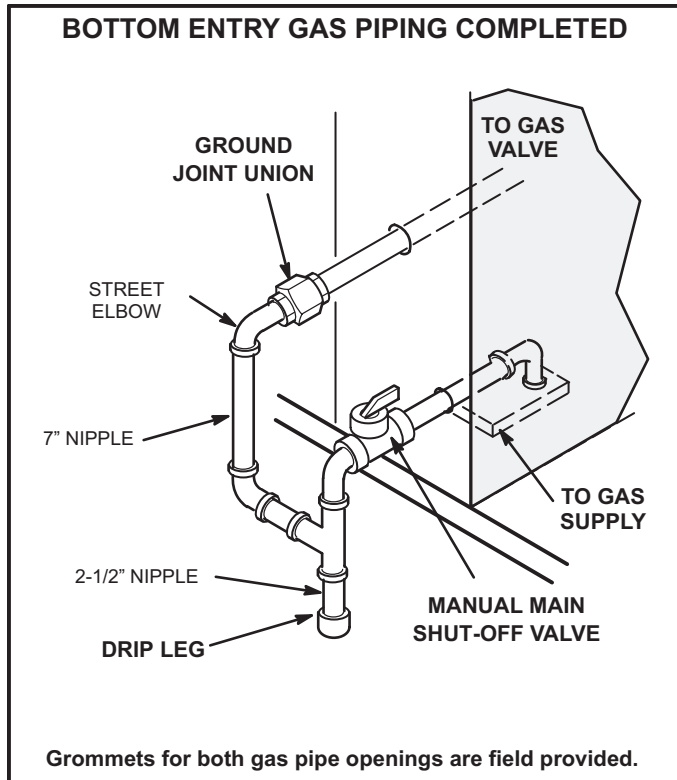


FIGURE 9

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 Stage ±0.2	2nd Stage ± 0.3.	1st Stage ±0.2	2nd Stage ± 0.3.
	024, 030, 036, 048, 060, 072, 074 Std./Med./High Heat	NA	3.5	NA
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

See the operating instruction plate on the unit for details

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 4. 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.

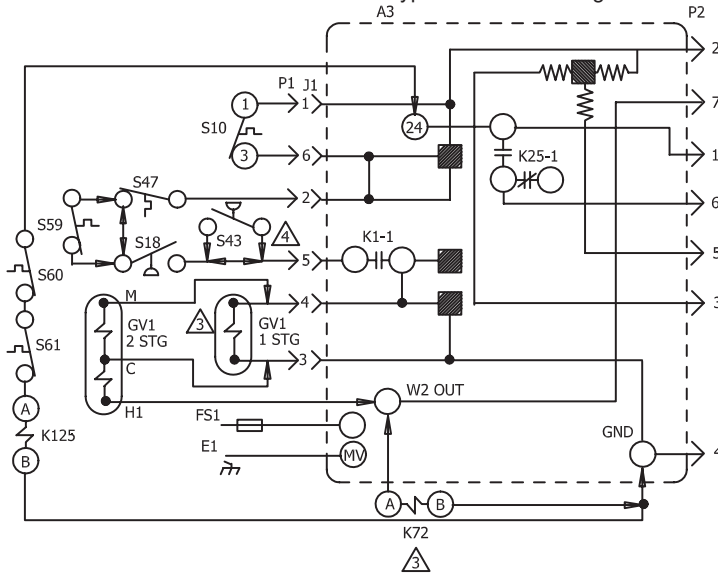
**TABLE 4
GAS METER CLOCKING CHART**

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
70,000	51	103	129	257
105,000	34	69	86	171
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
Natural-1000 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.

Typical Gas Heat Schematic

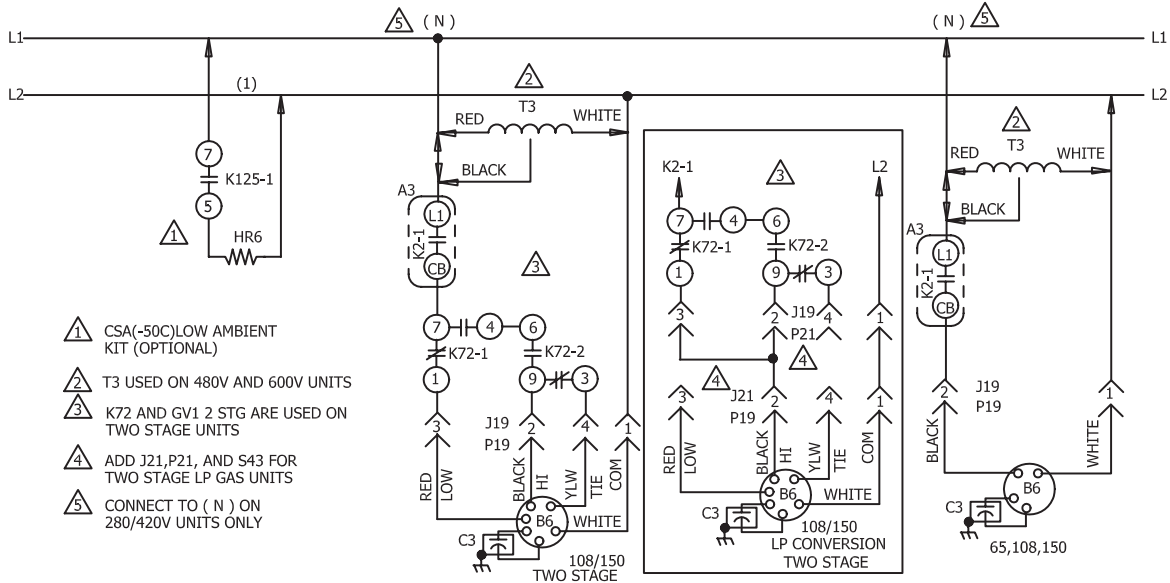
This schematic is typical. See the wiring schematic on the unit for actual unit wiring.




KEY	DESCRIPTION
A3	CONTROL - BURNER 1
B6	MOTOR, COMBUSTION AIR BLOWER 1
C3	CAPACITOR, COMB AIR BLOWER MOTOR 1
E1	SPARK
FS1	SENSOR, FLAME
GV1	VALVE, GAS 1
HR6	HEATER, 50C LOW AMBIENT KIT
K72-1, 2	RELAY, GAS 3
K125-1	RELAY, HEAT SHUTOFF
S10	SWITCH, LIMIT PRIMARY GAS
S18	SWITCH, COMB AIR BLOWER PROVE
S43	SWITCH, LOW GAS PRESSURE
S47	SWITCH, FLAME ROLLOUT BURNER 1
S59	THERMOSTAT, OPEN -20F, CLOSE 10F
S60	THERMOSTAT, OPEN 20F, CLOSE -10F
S61	THERMOSTAT, OPEN 50F, CLOSE 20F
T3	TRANSFORMER, COMB AIR BLOWER

J/P	JACK/PLUG DESCRIPTION
1	GAS LIMIT
2	HEAT
19	COMB AIR BLOWER
21	COMB AIR BLOWER 2

■ INDICATES MICRO PROCESSOR
 ← DENOTES OPTIONAL COMPONENTS

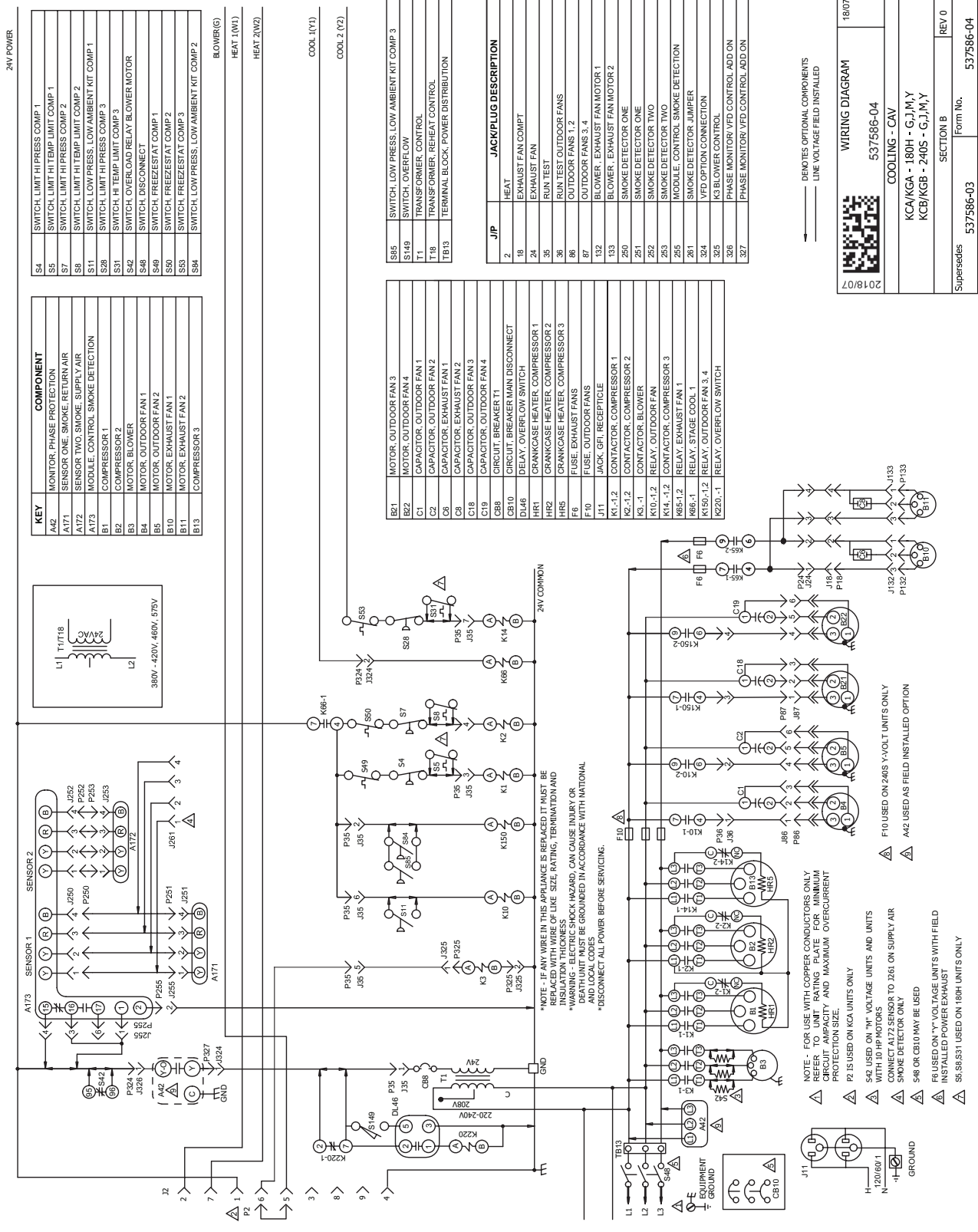


- ⚠ CSA(-50C)LOW AMBIENT KIT (OPTIONAL)
- ⚠ T3 USED ON 480V AND 600V UNITS
- ⚠ K72 AND GV1 2 STG ARE USED ON TWO STAGE UNITS
- ⚠ ADD J21, P21, AND S43 FOR TWO STAGE LP GAS UNITS
- ⚠ CONNECT TO (N) ON 280/420V UNITS ONLY

10/14		WIRING DIAGRAM	10/14
		537776-01	
HEATING			
GAS HEAT - KGA, KGB - 65 THRU 150 UNITS			
SECTION A			REV. 0
Supersedes		New Form No.	
537061-02		537776-01	

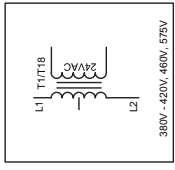
Typical Unit Schematic

This schematic is typical. See the wiring schematic on the unit for actual unit wiring.



KEY	COMPONENT
A42	MONITOR PHASE PROTECTION
AT1	SENSOR ONE SMOKE RETURN AIR
AT2	SENSOR TWO SMOKE SUPPLY AIR
AT3	MODULE CONTROL SMOKE DETECTION
B1	COMPRESSOR 1
B2	COMPRESSOR 2
B3	COMPRESSOR 3
B4	MOTOR BLOWER
B5	MOTOR OUTDOOR FAN 1
B6	MOTOR OUTDOOR FAN 2
B7	MOTOR EXHAUST FAN 1
B8	MOTOR EXHAUST FAN 2
B9	MOTOR EXHAUST FAN 3
B10	MOTOR EXHAUST FAN 4
B11	MOTOR EXHAUST FAN 5
B12	MOTOR EXHAUST FAN 6
B13	COMPRESSOR 4

KEY	COMPONENT
S4	SWITCH LIMIT HI PRESS COMP 1
S5	SWITCH LIMIT HI TEMP LIMIT COMP 1
S6	SWITCH LIMIT HI TEMP LIMIT COMP 2
S7	SWITCH LIMIT HI TEMP LIMIT COMP 3
S8	SWITCH LOW PRESS LOW AMBIENT KIT COMP 1
S9	SWITCH LOW PRESS LOW AMBIENT KIT COMP 2
S10	SWITCH LOW PRESS LOW AMBIENT KIT COMP 3
S11	SWITCH HI TEMP LIMIT COMP 1
S12	SWITCH HI TEMP LIMIT COMP 2
S13	SWITCH HI TEMP LIMIT COMP 3
S14	SWITCH OVERLOAD RELAY BLOWER MOTOR
S15	SWITCH DISCONNECT
S16	SWITCH FREEZE STAT COMP 1
S17	SWITCH FREEZE STAT COMP 2
S18	SWITCH FREEZE STAT COMP 3
S19	SWITCH LOW PRESS LOW AMBIENT KIT COMP 2
S20	SWITCH LOW PRESS LOW AMBIENT KIT COMP 3



JIP	JACK/PLUG DESCRIPTION
2	HEAT
3	EXHAUST FAN COMFT
4	EXHAUST FAN
5	RUN TEST
6	RUN TEST OUTDOOR FANS
7	RUN TEST OUTDOOR FANS 1, 2
8	OUTDOOR FANS 3, 4
9	BLOWER - EXHAUST FAN MOTOR 1
10	BLOWER - EXHAUST FAN MOTOR 2
11	BLOWER - EXHAUST FAN MOTOR 3
12	BLOWER - EXHAUST FAN MOTOR 4
13	BLOWER - EXHAUST FAN MOTOR 5
14	BLOWER - EXHAUST FAN MOTOR 6
15	SMOKE DETECTOR ONE
16	SMOKE DETECTOR TWO
17	SMOKE DETECTOR THREE
18	SMOKE DETECTOR FOUR
19	SMOKE DETECTOR FIVE
20	SMOKE DETECTOR SIX
21	SMOKE DETECTOR SEVEN
22	SMOKE DETECTOR EIGHT
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24	SMOKE DETECTOR TEN
25	SMOKE DETECTOR ELEVEN
26	SMOKE DETECTOR TWELVE
27	SMOKE DETECTOR THIRTEEN
28	SMOKE DETECTOR FOURTEEN
29	SMOKE DETECTOR FIFTEEN
30	SMOKE DETECTOR SIXTEEN
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112	SMOKE DETECTOR NINETY EIGHT
113	SMOKE DETECTOR NINETY NINE
114	SMOKE DETECTOR HUNDRED

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91	SMOKE DETECTOR SEVENTY SEVEN
92	SMOKE DETECTOR SEVENTY EIGHT
93	SMOKE DETECTOR SEVENTY NINE
94	SMOKE DETECTOR EIGHTY
95	SMOKE DETECTOR EIGHTY ONE
96	SMOKE DETECTOR EIGHTY TWO
97	SMOKE DETECTOR EIGHTY THREE
98	SMOKE DETECTOR EIGHTY FOUR
99	SMOKE DETECTOR EIGHTY FIVE
100	SMOKE DETECTOR EIGHTY SIX
101	SMOKE DETECTOR EIGHTY SEVEN
102	SMOKE DETECTOR EIGHTY EIGHT
103	SMOKE DETECTOR EIGHTY NINE
104	SMOKE DETECTOR NINETY
105	SMOKE DETECTOR NINETY ONE
106	SMOKE DETECTOR NINETY TWO
107	SMOKE DETECTOR NINETY THREE
108	SMOKE DETECTOR NINETY FOUR
109	SMOKE DETECTOR NINETY FIVE
110	SMOKE DETECTOR NINETY SIX
111	SMOKE DETECTOR NINETY SEVEN
112	SMOKE DETECTOR NINETY EIGHT
113	SMOKE DETECTOR NINETY NINE
114	SMOKE DETECTOR HUNDRED

DEMOTES OPTIONAL COMPONENTS
LINE VOLTAGE FIELD INSTALLED

2018/07

1807

WIRING DIAGRAM

537586-04

COOLING - CAV

KCA/KGA - 180H - G,J,M,Y

KCB/KGB - 240S - G,J,M,Y

SECTION B

REV 0

Supersedes 537586-03 Form No. 537586-04

Repair Parts Listing

When ordering repair parts, include the complete model number and serial number listed on the ETL/CSA rating plate - e.g. KGB120S4BH1Y.

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

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 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 (KD only)
Fan Control Board (KD only)