



RKG RADIANT CONE GAS BURNER



WARNING

These instructions are intended for use only by experienced, qualified combustion start-up personnel. Adjustment of this equipment and its components by unqualified personnel can result in fire, explosion, severe personal injury, or even death.

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These instructions are intended to serve as guidelines covering the installation, operation, and maintenance of Hauck equipment. While every attempt has been made to ensure completeness, unforeseen or unspecified applications, details, and variations may preclude covering every possible contingency. **WARNING: TO PREVENT THE POSSIBILITY OF SERIOUS BODILY INJURY, DO NOT USE OR OPERATE ANY EQUIPMENT OR COMPONENT WITH ANY PARTS REMOVED OR ANY PARTS NOT APPROVED BY THE MANUFACTURER.** Should further information be required or desired or should particular problems arise which are not covered sufficiently for the purchaser's purpose, contact Hauck Mfg. Co.



WARNING

This equipment is potentially dangerous with the possibility of serious personal injury and property damage. Hauck Manufacturing Company recommends the use of flame supervisory equipment and fuel safety shutoff valves. Furthermore, Hauck urges rigid adherence to National Fire Protection Association (NFPA) standards and insurance underwriter's requirements. Operation and regular preventative maintenance of this equipment should be performed only by properly trained and qualified personnel. Annual review and upgrading of safety equipment is recommended.

A. GENERAL INFORMATION

The Hauck RKG Radiant Cone Gas Burners are designed specifically for direct fired applications requiring even heat distribution with a short flame length. The RKG burner fires any clean industrial fuel gas. Supplemental Data Sheets 4, 4.1, 4.2, 4.3, 4.4, and 4.5 list detailed burner performance data. Direct spark ignition is standard with the RKG burner, however, pilot ignition is available as an option. Flame supervision may be accomplished via UV scanner or flame rod. The RKG may be operated with furnace temperatures up to 2800°F (1540°C) with ambient combustion air. Preheated air versions are available for combustion air temperatures up to 800°F (425°C), consult Hauck.

B. RECEIVING AND INSPECTION

Upon receipt, check each item on the bill of lading and/or invoice to determine that all equipment has been received. A careful examination of all parts should be made to ascertain if there has been any damage in shipment.

IMPORTANT

If the installation is delayed and the equipment is stored outside, provide adequate protection as dictated by climate and period of exposure. Special care should be given to all motors and bearings, if applicable, to protect them from rain or excessive moisture.

C. CAPACITIES

| SPECIFICATIONS | | MODEL NUMBER | | | | | |
|--|--------------------------------------|--------------|---------|---------|---------|-----------|-----------|
| | | 112 | 115 | 120 | 125 | 130 | 140 |
| H I G H F I R E | Max. Input @ 10% Excess Air (Btu/hr) | 177,500 | 432,300 | 658,200 | 952,500 | 1,344,000 | 2,310,000 |
| | Max. Air Flow @ 16 osig (scfh) | 1,840 | 4,480 | 6,820 | 9,870 | 13,930 | 23,960 |
| | Min. Input @ Max. Air Flow (Btu/hr) | 45,420 | 108,100 | 144,800 | 275,800 | 359,900 | 620,400 |
| | Max. Excess Air (%) | 330 | 340 | 400 | 280 | 310 | 175 |
| | Flame Length @ Max. Input (in.) | 6 | 7 | 7 | 8 | 9 | 10 |
| | | | | | | | |
| L O W F I R E | Max. Input @ 10% Excess Air (Btu/hr) | 43,940 | 108,100 | 177,500 | 232,500 | 340,700 | 577,100 |
| | Air Flow @ 1 osig (scfh) | 455 | 1,120 | 1,840 | 2,410 | 3,530 | 5,980 |
| | Min. Input @ Air Flow (Btu/hr) | 12,720 | 26,680 | 32,050 | 75,270 | 76,510 | 176,300 |
| | Max. Excess Air (%) | 280 | 345 | 510 | 240 | 390 | 240 |

NOTES:

1. Capacities based on natural gas with HHV of 1034 Btu/ft³, 0.59 S.G., and a stoichiometric air/gas ratio of 9.74:1 with burner firing into chamber under no pressure.
2. Air and gas flows based on 60°F @ sea level.
3. Static air pressures measured at the burner air inlet pressure tap.
4. Flame lengths measured from the end of the refractory tile.
5. All data based on industry standard air and gas piping practices.
6. Flame detection available via flame rod or UV scanner.
7. Burners can be operated up to 20 osig static air inlet pressure; consult Hauck.

Table 1. Burner Capacities

C. CAPACITIES (Continued)

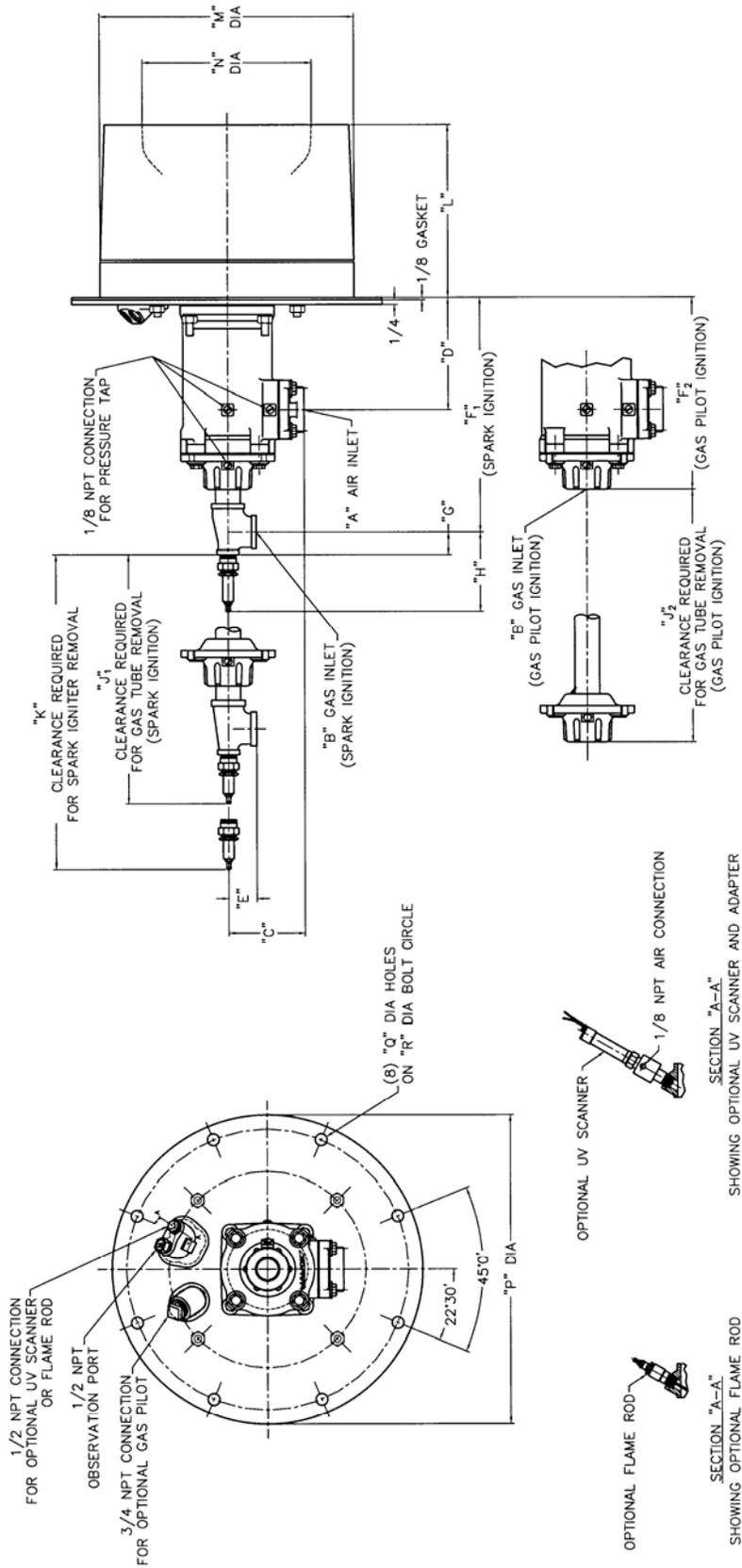
| SPECIFICATIONS | | MODEL NUMBER | | | | | |
|----------------|--|--------------|------|------|------|------|------|
| | | 112 | 115 | 120 | 125 | 130 | 140 |
| HIGH FIRE | Max. Input @ 10% Excess Air (kW) | 46.9 | 114 | 174 | 251 | 355 | 611 |
| | Max. Air Flow @ 6,900 Pa (nm ³ /hr) | 49.3 | 120 | 183 | 264 | 373 | 641 |
| | Min. Input @ Max. Air Flow (kW) | 12.0 | 28.6 | 38.4 | 72.8 | 95.6 | 164 |
| | Max. Excess Air (%) | 330 | 340 | 400 | 280 | 310 | 175 |
| | Flame Length @ Max. Input (mm) | 150 | 175 | 175 | 200 | 230 | 255 |
| | | | | | | | |
| LOW FIRE | Max. Input @ 10% Excess Air (kW) | 11.6 | 28.6 | 47.0 | 61.5 | 90.0 | 152 |
| | Air Flow @ 430 Pa (nm ³ /hr) | 12.2 | 30.0 | 49.3 | 64.6 | 94.5 | 160 |
| | Min. Input @ Air Flow (kW) | 3.4 | 7.1 | 8.5 | 19.9 | 20.2 | 46.6 |
| | Max. Excess Air (%) | 280 | 345 | 510 | 240 | 390 | 240 |

NOTES:

1. Capacities based on natural gas with LHV of 36.74 MJ/nm³, 0.59 S.G., and a stoichiometric air/gas ratio of 9.74:1 with burner firing into chamber under no pressure.
2. Air and gas flows based on 0°C @ sea level.
3. Static air pressures measured at the burner air inlet pressure tap.
4. Flame lengths measured from the end of the refractory tile.
5. All data based on industry standard air and gas piping practices.
6. Flame detection available via flame rod or UV scanner.
7. Burners can be operated up to 8,620 Pa static air inlet pressure; consult Hauck.

Table 2. Metric Burner Capacities

D. DIMENSIONS

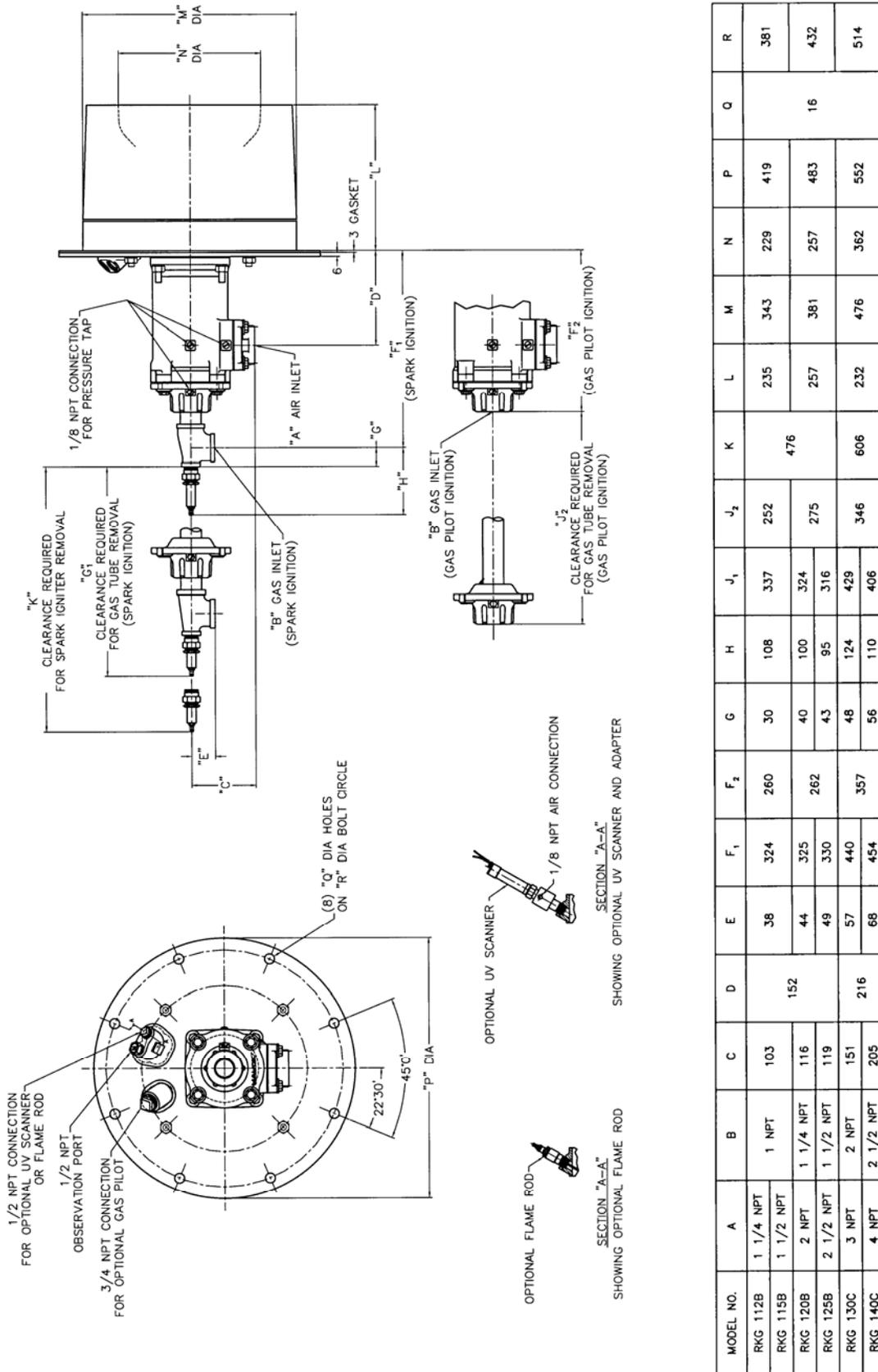


| MODEL NO. | A | B | C | D | E | F ₁ | F ₂ | G | H | J ₁ | J ₂ | K | L | M | N | P | Q | R |
|-----------|-----------|-----------|---------|-------|---------|----------------|----------------|---------|---------|----------------|----------------|--------|--------|--------|--------|--------|-----|--------|
| RKG 112B | 1 1/4 NPT | 1 NPT | 4 1/16 | | 1 1/2 | 12 3/4 | 10 1/4 | 1 3/16 | 4 1/4 | 13 1/4 | 9 15/16 | 18 3/4 | 9 1/4 | 13 1/2 | 9 | 16 1/2 | | 15 |
| RKG 115B | 1 1/2 NPT | | | 6 | 1 3/4 | 12 13/16 | 10 5/16 | 1 9/16 | 3 15/16 | 12 3/4 | 10 13/16 | | 10 1/8 | 15 | 10 1/8 | 19 | 5/8 | 17 |
| RKG 120B | 2 NPT | 1 1/4 NPT | 4 9/16 | | 1 15/16 | 13 | | 1 11/16 | 3 3/4 | 12 7/16 | | | | | | | | |
| RKG 125B | 2 1/2 NPT | 1 1/2 NPT | 4 11/16 | | 2 1/4 | 17 5/16 | 14 1/16 | 1 7/8 | 4 7/8 | 16 7/8 | 13 5/8 | 23 7/8 | 9 1/8 | 18 3/4 | 14 1/4 | 21 3/4 | | 20 1/4 |
| RKG 130C | 3 NPT | 2 NPT | 5 15/16 | 8 1/2 | 2 11/16 | 17 7/8 | | 2 3/16 | 4 5/16 | 16 | | | | | | | | |
| RKG 140C | 4 NPT | 2 1/2 NPT | 8 1/16 | | | | | | | | | | | | | | | |

Figure 1. Dimensions

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(NOT TO SCALE)

D. DIMENSIONS (Continued)



Y7284 METRIC
(NOT TO SCALE)

NOTES:
1. DIMENSIONS ARE IN MM

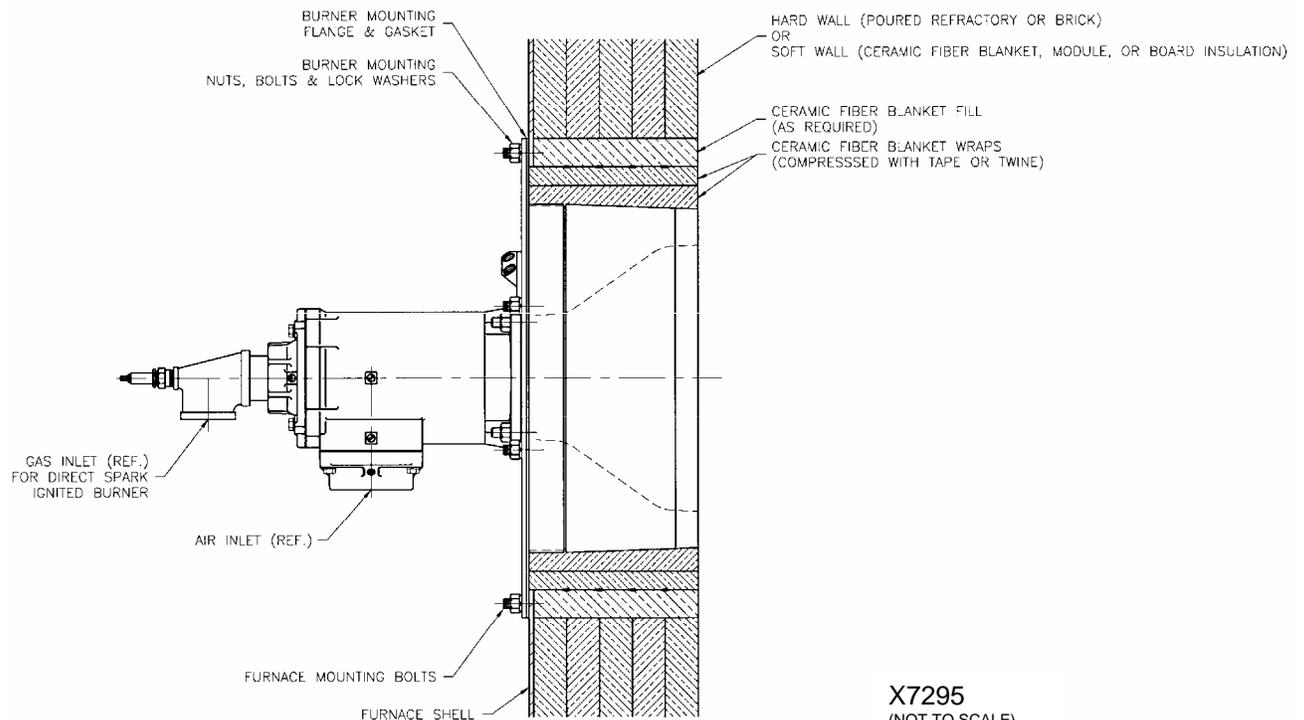
Figure 2. Metric Dimensions

E. INSTALLATION

NOTE

If the burner utilizes an ultraviolet (UV) scanner for flame supervision, the burner should be positioned so that the UV scanner is located above the horizontal centerline of the burner to prevent moisture and airborne debris from setting into the UV scanner port and blocking the lens.

1. Furnish an opening in the outside furnace shell 1/2" (13mm) larger than the outside diameter of the refractory tile. Since RKG burners can fire in any position, they can be installed through the roof, walls or bottom of the furnace.
2. For installation in an existing hard wall furnace, see Figure 3. From inside the furnace, remove poured refractory or brick by making a hole in the hard wall refractory where the burner tile will be installed 3 to 6" (76 to 152mm) larger than the outside diameter of the refractory tile.
3. For installation in an existing soft wall furnace, see Figure 3. From inside the furnace, remove the ceramic fiber blanket or board where the burner tile will be installed 3 to 6" (76 to 152mm) larger than the outside diameter of the refractory tile.



NOTE:

1. BURNER OUTLET MUST BE MOUNTED FLUSH WITH INSIDE WALL OF CERAMIC FIBER INSULATION OR SLIGHTLY RECESSED.
2. CERAMIC FIBER BLANKET WRAP AROUND THE REFRACTORY TILE SHOULD BE COMPRESSED BY 25% USING TAPE OR TWINE.

Figure 3. Burner Installation

4. Weld the appropriate size studs of appropriate length to the furnace shell to accept the burner mounting flange and gasket (see Figure 1 to determine the size and number of studs, and the bolt circle).

5. Wrap the tile with two layers of 1" (25mm) fiber rated for a higher temperature than the furnace. Secure fiber wrap with tape or twine to compress the ceramic fiber wrap by 25% to retain the fiber.
6. Install the burner mounting gasket over the welded bolts on the furnace shell. Slowly insert the burner into the furnace opening and secure the burner mounting flange with appropriate lock washers and nuts.
7. Pack additional fiber to fill any remaining openings completely. It is important to make sure the fiber is well packed around the tile.
8. Ceramic fiber must be repacked after the initial firing of the burners. Inspect installation for any gaps that will allow heat from the furnace to overheat the furnace shell and burner mounting flange. Fill any gaps or voids with ceramic fiber.
9. Connect the air and gas to the burner. Use a flex connection in the lines to alleviate vibration and expansion of piping. Avoid elbows and abrupt directional changes in the piping where possible, as turbulence can affect flow measurement accuracy, and reduce pressure at the burner.

NOTE

Due to the proximity of the UV scanner to the flame in the refractory tile, Hauck recommends installing a cooling/cleaning air line to the UV scanner adapter. Connect a clean, ambient air source of approximately 100 scfh (2.7nm³/hr) to the 1/8 NPT (DN 6) connection on the UV scanner adapter.

10. If using the optional gas pilot, connect the air/gas mixture piping to the inlet on the gas pilot.
11. Verify that all piping connections are tight. Close all port openings on the burner backplate.
If port openings are left open, the burner mounting plate will overheat.

F. IGNITION



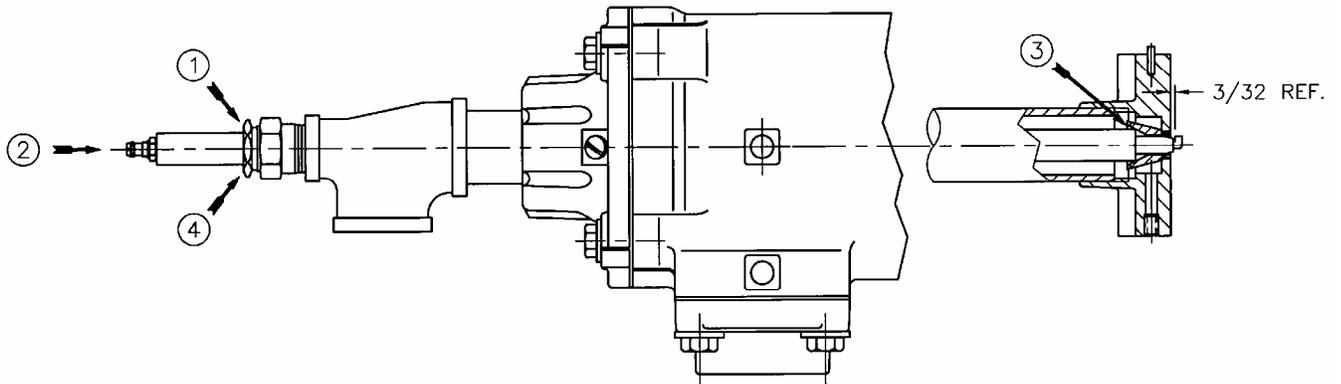
WARNING

Adjustment of this equipment by unqualified personnel can result in fire, explosion, severe personal injury, or even death.

Ignition of the RKG is by a direct spark igniter or the optional gas pilot. A 5000/6000 volt standard coil type ignition transformer or a half-wave "spark-blind" solid state type transformer can be utilized. Both transformers yield satisfactory results, however, the standard coil type transformer provides reliable ignition over a wider range of air/gas ratios than the half-wave type.

For direct spark ignited burners:

1. Ensure that the spark igniter is properly installed (see Figure 4).



SPARK IGNITER INSTALLATION INSTRUCTIONS

- ① LOOSEN SPARK IGNITER BUSHING SO INSULATOR CAN SLIDE FREELY
- ② INSERT SPARK IGNITER
- ③ INSULATOR ON SPARK IGNITER SHOULD BOTTOM OUT ON IGNITER GUIDE
- ④ TIGHTEN SPARK IGNITER BUSHING TO SECURE SPARK IGNITER
NOTE: DO NOT OVER TIGHTEN OR INSULATOR WILL CRACK
- ⑤ REVERSE PROCEDURE TO REMOVE IGNITER ASSEMBLY

W5987
(NOT TO SCALE)

Figure 4. Spark Igniter Installation

2. Connect the ignition wire from the transformer to the spark plug on the spark igniter. A snap-on ignition type connector is recommended.
3. Energize the igniter transformer. The igniter should spark across the gap.

For optional gas pilot ignited burners:

1. Ensure that the gas pilot igniter is threaded tightly into the pilot port (see Figure 1).
2. Connect the ignition wire from the transformer to the spark plug on the gas pilot igniter. A snap-on ignition type connector is recommended.
3. If using a Hauck IPG spark ignited gas pilot, see Hauck sheet IPG-9 for detailed operating instructions. Otherwise, see pilot vendor literature.

G. INITIAL SET-UP

RKG burners typically operate with automatic control systems. The burners are capable of proportional control over their entire capacity range. In a typical system, ignition will be preceded by a series of steps.

1. Once installed, the burner is ready for initial set-up. The specific operation of the burner will depend on the individual system components in the entire combustion system. Refer to the Instruction Sheets that accompany the individual components.
2. Combustion air pressure should be set at the combustion air control valve. Typical settings will be specific to the application. Hauck recommends that the combustion air setting remain at minimum until the burner has been ignited. Refer to the capacity table in Section C for burner air flows at various combustion air pressures.
3. Adjust the limiting orifice valve, in the gas line to the required opening. (Readjustment of the limiting orifice may be necessary for final burner set-up).
4. Refer to Section F for spark igniter or optional gas pilot set-up.
5. Once the spark igniter or gas pilot have been set-up, the burner is ready for ignition. **BE SURE THAT THE BURNER IS BEING IGNITED UNDER LOW FIRE CONDITIONS (MINIMUM GAS AND AIR FLOWS.)** Ignite the burner, or burners. When all burners are ignited, bring the combustion air to the high fire position (refer to burner capacities in Section C for burner air flows at high fire conditions).
6. When the high fire combustion air is set, adjust the limiting gas orifice to achieve the desired gas flow at high fire.
7. Verify air/gas ratio using orifice meters in the air and gas lines. Static air pressure at the burner inlet can be related to air flows if an air orifice meter is not available.
8. Drive the burner to low fire position and verify that settings are consistent. Repeat steps 2 through 8 as necessary until high and low fire settings remain consistent.
9. To shut down the burner system:
 - a. Return the burner to the low fire position.
 - b. Close all fuel shutoff valves
 - c. **To prevent damage to the burner and other components, allow the furnace to cool to below 600°F before shutting off the combustion air.**

H. OPERATION

Once properly installed, ignited and fired, the burner is ready for operation. The operation of the burner will depend on the specific items in the combustion control system and the application of the burners. Refer to the instruction sheet that accompanies each item. When the burner is firing, the spark igniter or gas pilot should be shut off. However, pilot air to the should remain on to assure optimum igniter service life.

I. MAINTENANCE

The RKG burner has no moving parts, however, there are some items that require periodic maintenance. Inspect and clean the UV scanner and gas pilot nozzle as required.

Periodically check the air/gas ratio to ensure the burner is operating at peak efficiency. Flue gas analysis can be performed with any commercially available flue gas analyzer.

J. RECOMMENDED SPARE PARTS LIST

| Item | Qty. | Part Number | Description |
|------|------|----------------|----------------------------|
| 1 | 1 | See Parts List | Spark Igniter Assembly |
| 2 | 1 | 20579 | UV Scanner (If Applicable) |
| 3 | 1 | See Parts List | Flame Rod (If Applicable) |

Table 3. Recommended Spare Parts

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