



WHG WALL HUGGER 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 WHG Wall Hugger Gas Burners are designed specifically for direct fired applications requiring even heat distribution and no flame impingement. Air and fuel are piped into the burner separately and mixed at the nozzle. The WHG produces a flat flame with minimal forward flame travel. The flame hugs the wall in a circular pattern, spreading out from the nozzle while the hot gasses move along the adjacent refractory.

Direct spark ignition is standard with the WHG burner, however, pilot ignition is available as an option. Flame supervision may be accomplished via UV scanner or flame rod. The WHG 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)	175,000	430,000	660,000	950,000	1,350,000	2,300,000
	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.)	2	3	3	4	5	6
L O W F I R E	Max. Input @ 10% Excess Air (Btu/hr)	45,000	110,000	175,000	235,000	340,000	575,000
	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 a static inlet air pressure of 20 osig; consult Hauck.

Table 1. Burner Capacities

C. CAPACITIES (Continued)

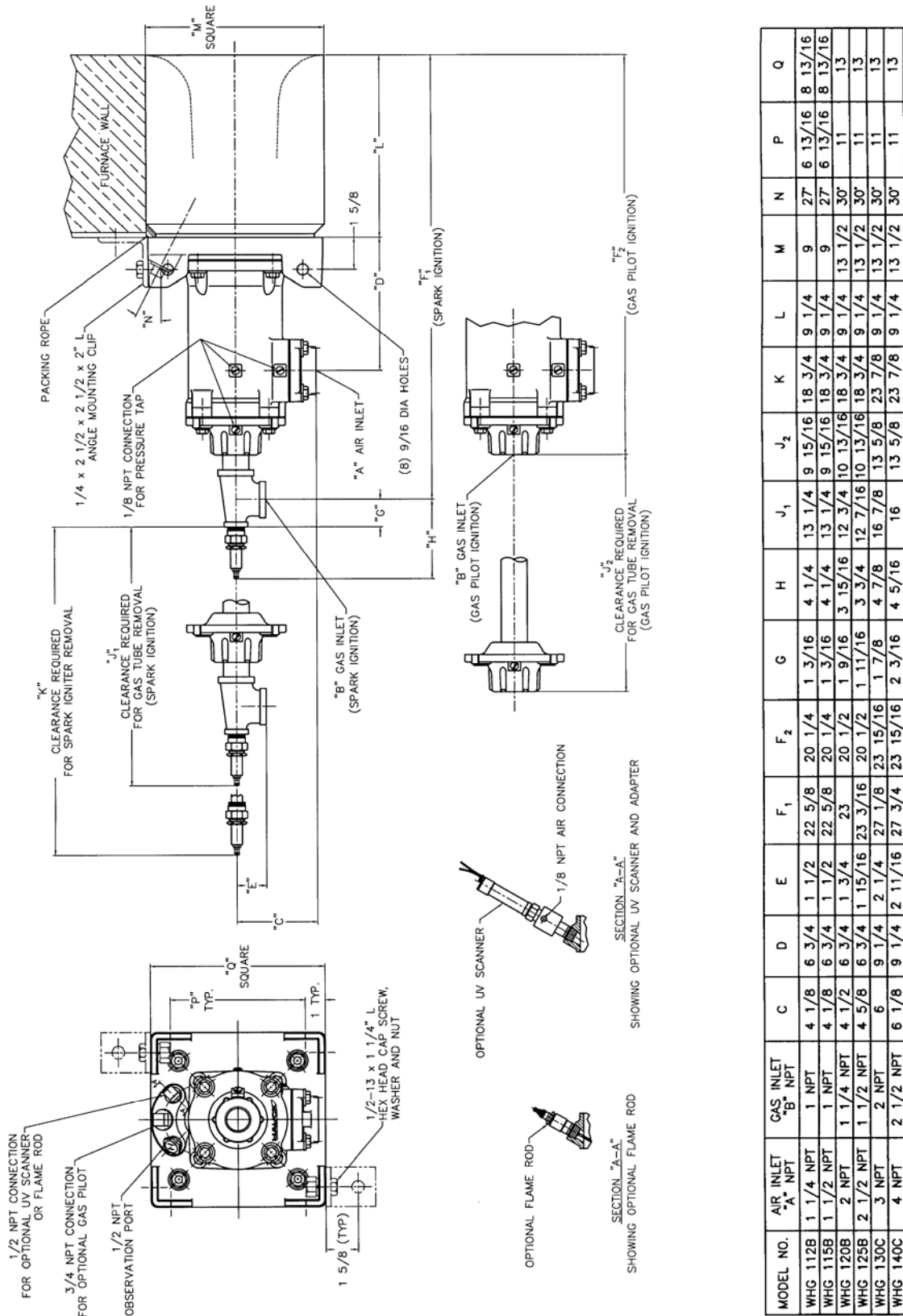
SPECIFICATIONS		MODEL NUMBER					
		112	115	120	125	130	140
H I G H F I R E	Max. Input @ 10% Excess Air (kW)	47	115	175	250	355	610
	Max. Air Flow @ 6,900 Pa (nm ³ /hr)	49	120	183	264	373	641
	Min. Input @ Max. Air Flow (kW)	12.0	28.6	38.4	72.8	95.6	164
	Max. Excess Air (%)	330	340	400	280	310	175
	Flame Length @ Max. Input (mm)	50	75	75	100	125	150
L O W F I R E	Max. Input @ 10% Excess Air (kW)	12	30	45	62	90	150
	Air Flow @ 430 Pa (nm ³ /hr)	12	30	49	65	94	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

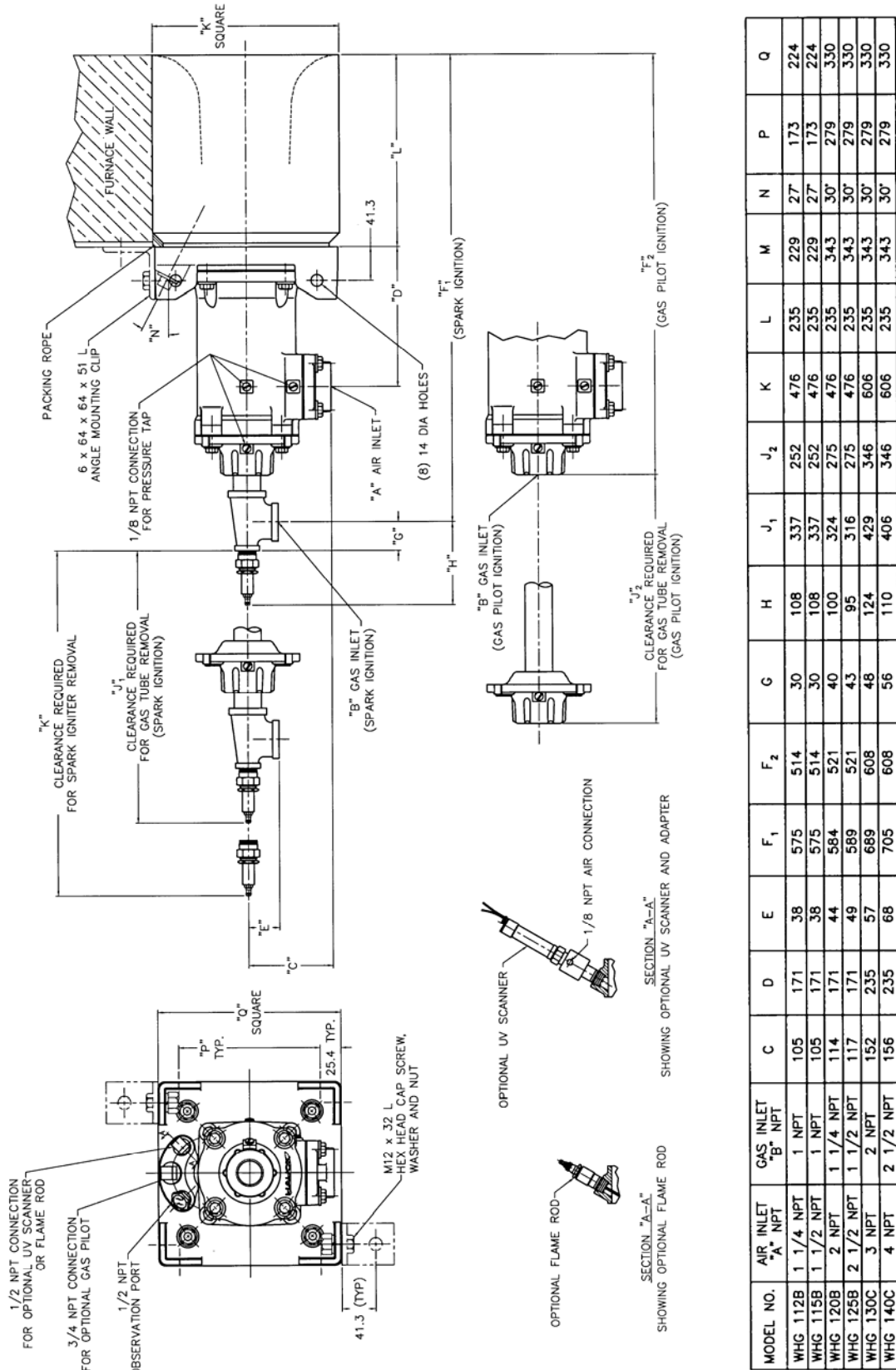
D. DIMENSIONS



Y1494
(NOT TO SCALE)

Figure 1. Dimensions

D. DIMENSIONS (Continued)



Y1494 METRIC
(NOT TO SCALE)

NOTES:
1. DIMENSIONS ARE IN MM

MODEL NO.	AIR INLET "A" NPT	GAS INLET "B" NPT	C	D	E	F ₁	F ₂	G	H	J ₁	J ₂	K	L	M	N	P	Q
WHG 112B	1 1/4 NPT	1 NPT	105	171	38	575	514	30	108	337	252	476	235	229	27	173	224
WHG 115B	1 1/2 NPT	1 NPT	105	171	38	575	514	30	108	337	252	476	235	229	27	173	224
WHG 120B	2 NPT	1 1/4 NPT	114	171	44	584	521	40	100	324	275	476	235	343	30	279	330
WHG 125B	2 1/2 NPT	1 1/2 NPT	117	171	49	589	521	43	95	316	275	476	235	343	30	279	330
WHG 130C	3 NPT	2 NPT	152	235	57	689	608	48	124	429	346	606	235	343	30	279	330
WHG 140C	4 NPT	2 1/2 NPT	156	235	68	705	608	56	110	406	346	606	235	343	30	279	330

Figure 2. Metric Dimensions

E. INSTALLATION

CAUTION

Do not disassemble the tile from the burner when installing the burner. A bonding agent seals the burner to the tile. Disassembly will destroy the effectiveness of the seal.

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 settling into the UV scanner port and blocking the lens.

1. Since WHG burners can fire in any position, they can be installed through the roof, walls or bottom of the furnace. **Irregardless of position, the outlet end of the tile must be flush with the inner wall surface.** The inside furnace wall surface should be flat in the vicinity of the WHG tile outlet to permit free expansion of the hot combustible gases.
2. For installation in an existing hard wall furnace, refer to Figure 3.

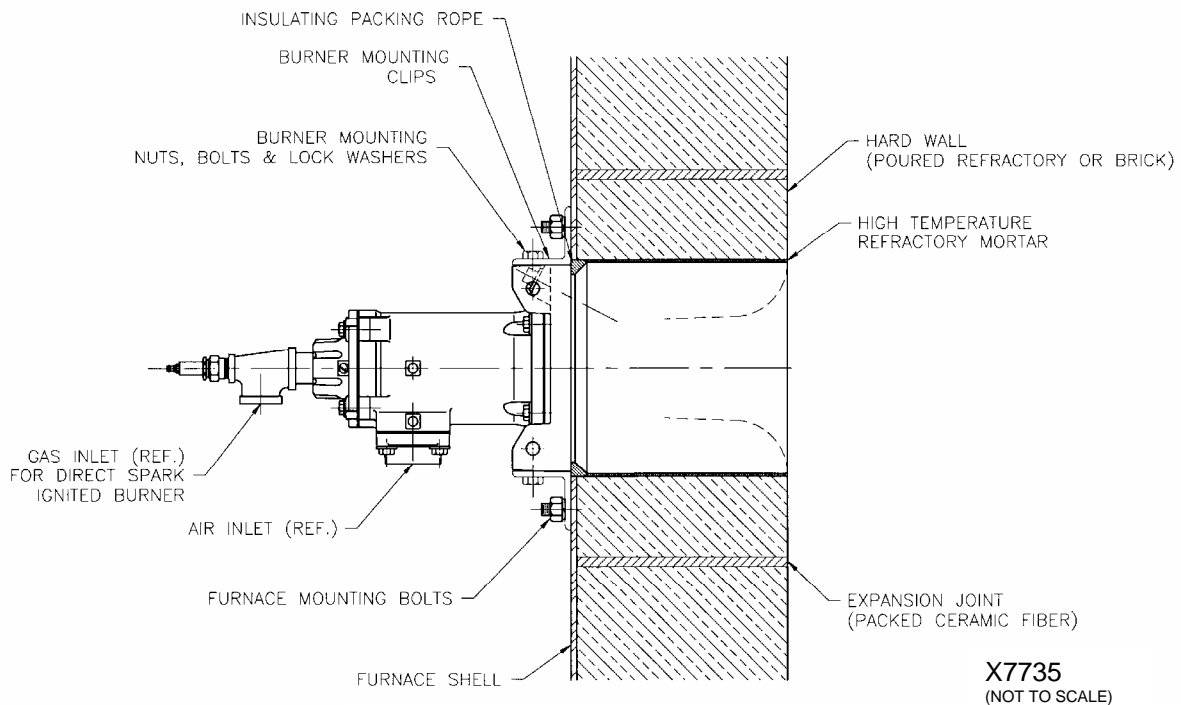


Figure 3. Burner Installation - Hard Wall

- a. Furnish an opening in the outside furnace shell 1/2" (13mm) larger than the outside square dimensions of the refractory tile.
- b. From inside the furnace, remove poured refractory or brick by making a square cut-out 1/2" (13mm) larger than the outside square dimensions of the burner refractory tile.

- c. If the furnace wall is too thick or too thin, the burner must be recessed or extended with spacers to mount to the furnace shell. Fabricate spacers and/or angle mounting clips as required and bolt them to the four corners of the mounting plate as shown in Figure 3.
- d. Weld the appropriate size studs of appropriate length to the furnace shell to accept the burner mounting clips.
- e. Pack suitable insulating packing rope in the entire grooved section of the tile. This will provide a seal between the burner tile and the furnace hard wall refractory or firebrick.
- f. Coat the outside surfaces of the burner tile with high temperature refractory mortar.
- g. Insert the tile into the furnace opening and secure the burner mounting clips to the furnace shell with appropriate lock washers and nuts.

3. For installation in an existing soft wall furnace, refer to Figure 4.

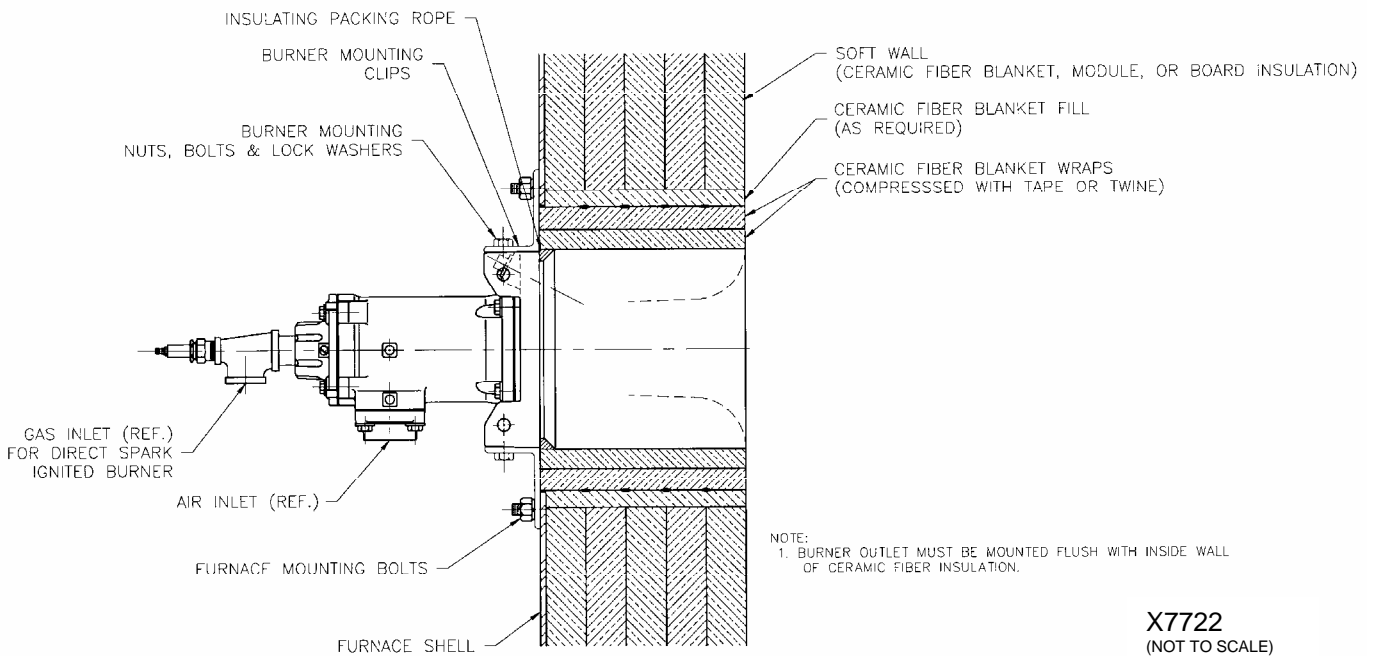


Figure 4. Burner Installation – Soft Wall

- a. Furnish an opening in the outside furnace shell a nominal 3" (76mm) larger than the outside square dimensions of the refractory tile.
- b. From inside the furnace, remove the ceramic fiber blanket or board by making a square cut-out 3 to 6" (76 to 152mm) larger than the outside square dimensions of the burner refractory tile.
- c. If the furnace wall is too thick or too thin, the burner must be recessed or extended with spacers to mount to the furnace shell. Fabricate spacers and/or angle mounting clips as required and bolt them to the four corners of the mounting plate as shown in Figure 4.

- d. Weld the appropriate sizes studs of appropriate length to the furnace shell to accept the burner mounting clips.
 - e. Pack suitable insulating packing rope in the entire grooved section of the tile. This will provide a seal between the burner tile and the furnace soft wall.
 - f. 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.
 - g. Slowly insert the burner into the furnace opening and secure the burner mounting clips to the furnace shell with appropriate lock washers and nuts.
 - h. Pack additional fiber to fill any remaining openings completely. It is important to make sure the fiber is well packed around the tile.
 - i. 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 plate. Fill any gaps or voids with ceramic fiber.
4. 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.

5. If using the optional gas pilot, connect the air/gas mixture piping to the inlet on the gas pilot.
6. 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



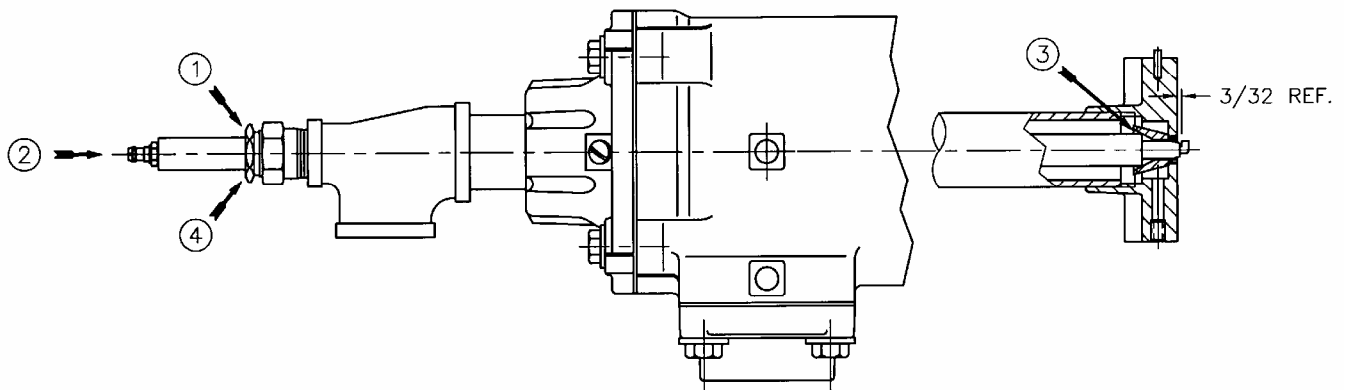
WARNING

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

Ignition of the WHG 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 5).



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

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(NOT TO SCALE)

Figure 5. 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

WHG 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 gas pilot should remain on to assure optimum igniter service life.

I. MAINTENANCE

The WHG 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