



JAG JET AIR 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 JAG Jet Air Gas Burner is specifically designed for homogenizing, solution heat treating, and low temperature applications. The design of the firing and flame protection tubes provides the flame with protection from recirculation air cross velocities which are typically present in low temperature applications and can result in high CO emissions. The high exit velocity of the JAG burner in conjunction with recirculation tube enables furnace gas recirculation to minimize NOx emissions.

Direct spark ignition is standard with the JAG burner, and flame supervision may be accomplished via UV scanner or flame rod. The JAG burner may be operated with furnace temperatures up to 1600°F (870°C) with ambient combustion air.

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

JAG BURNER CAPACITIES (STANDARD)

BURNER		BURNER STATIC INLET AIR PRESSURE							
		100 Series	0.17 OSIG	1 OSIG	4 OSIG	8 OSIG	12 OSIG	16 OSIG	20 OSIG
		200 Series	0.17 OSIG	0.5 OSIG	2 OSIG	4 OSIG	6 OSIG	8 OSIG	10 OSIG
SVG_20C-JAG	Input Capacity (10 ³ BTU/hr)	90	200	390	550	680	785	880	
	Excess Air (%)	1,000	2,000	3,500	5,000	5,000	5,000	4,500	
	Flame Length (in)	In Tube	In Tube	2	6	6	8	8	
SVG_25C-JAG	Input Capacity (10 ³ BTU/hr)	100	300	535	725	875	1,000	1,120	
	Excess Air (%)	1,500	2,500	5,000	7,000	7,000	7,000	7,000	
	Flame Length (in)	In Tube	In Tube	6	6	6	12	16	
SVG_30C-JAG	Input Capacity (10 ³ BTU/hr)	125	290	600	850	1,060	1,250	1,310	
	Excess Air (%)	4,500	5,000	5,000	7,000	7,000	7,500	7,500	
	Flame Length (in)	In Tube	In Tube	6	10	12	12	16	
SVG_40C-JAG	Input Capacity (10 ³ BTU/hr)	230	560	1,050	1,440	1,810	2,075	2,300	
	Excess Air (%)	2,500	3,500	5,000	7,500	7,500	7,500	7,500	
	Flame Length (in)	6	12	12	16	18	18	24	
SVG_60C-JAG	Input Capacity (10 ³ BTU/hr)	555	1,062	2,364	3,166	3,619	4,150	4,584	
	Excess Air (%)	2,500	2,500	3,500	3,500	4,000	4,000	4,000	
	Flame Length (in)	In Tube	In Tube	6	8	12	16	24	
SVG280C-JAG BURNER STATIC PRESSUR		0.11 OSIG	0.43 OSIG	2.9 OSIG	5.4 OSIG	9 OSIG	12 OSIG	15 OSIG	
SVG_80C-JAG	Input Capacity (10 ³ BTU/hr)	800	1,618	4,180	5,700	7,374	8,515	9,520	
	Excess Air (%)	2,500	2,500	3,500	5,000	7,500	7,500	7,500	
	Flame Length (in)	12	24	24	30	36	36	42	

JAG BURNER CAPACITIES (METRIC)

BURNER		BURNER STATIC INLET AIR PRESSURE						
		0.7 mbar	2 mbar	9 mbar	17 mbar	26 mbar	35 mbar	43 mbar
SVGE20C-JAG	Input Capacity (kW)	24	53	103	145	180	207	232
	Excess Air (%)	1,000	2,000	3,500	5,000	5,000	5,000	4,500
	Flame Length (m)	In Tube	In Tube	0.05	0.15	0.15	0.20	0.20
SVGE25C-JAG	Input Capacity (kW)	26	79	141	191	231	264	296
	Excess Air (%)	1,500	2,500	5,000	7,000	7,000	7,000	7,000
	Flame Length (m)	In Tube	In Tube	0.15	0.15	0.15	0.30	0.41
SVGE30C-JAG	Input Capacity (kW)	33	76	158	224	280	330	346
	Excess Air (%)	4,500	5,000	5,000	7,000	7,000	7,500	7,500
	Flame Length (m)	In Tube	In Tube	0.15	0.25	0.30	0.30	0.41
SVGE40C-JAG	Input Capacity (kW)	61	148	277	380	478	548	607
	Excess Air (%)	2,500	3,500	5,000	7,500	7,500	7,500	7,500
	Flame Length (m)	0.15	0.30	0.30	0.41	0.46	0.46	0.61
SVGE60C-JAG	Input Capacity (kW)	147	280	624	836	955	1,096	1,210
	Excess Air (%)	2,500	2,500	3,500	3,500	4,000	4,000	4,000
	Flame Length (m)	In Tube	In Tube	0.15	0.20	0.30	0.41	0.61
BURNER		0.5 mbar	2 mbar	13 mbar	23 mbar	39 mbar	52 mbar	65 mbar
SVGE80C-JAG	Input Capacity (kW)	211	427	1,104	1,505	1,947	2,248	2,513
	Excess Air (%)	2,500	2,500	3,500	5,000	7,500	7,500	7,500
	Flame Length (m)	0.30	0.61	0.61	0.76	0.91	0.91	1.07

NOTES:

- Capacities based on Natural Gas with HHV of 1034 BTU/ft³ (Standard), and LHV of 36.74 MJ/nm³ (Metric), 0.59 S.G., and a stoichiometric ratio of 9.74:1 with burner firing into chamber under no pressure at 10% excess air.
- Excess air based on 2V or higher, flame signal via a Honeywell 7800 series Burner Control
- Flame lengths measured from end of flame protection tube.

Table 1. Burner Capacities

D. DIMENSIONS

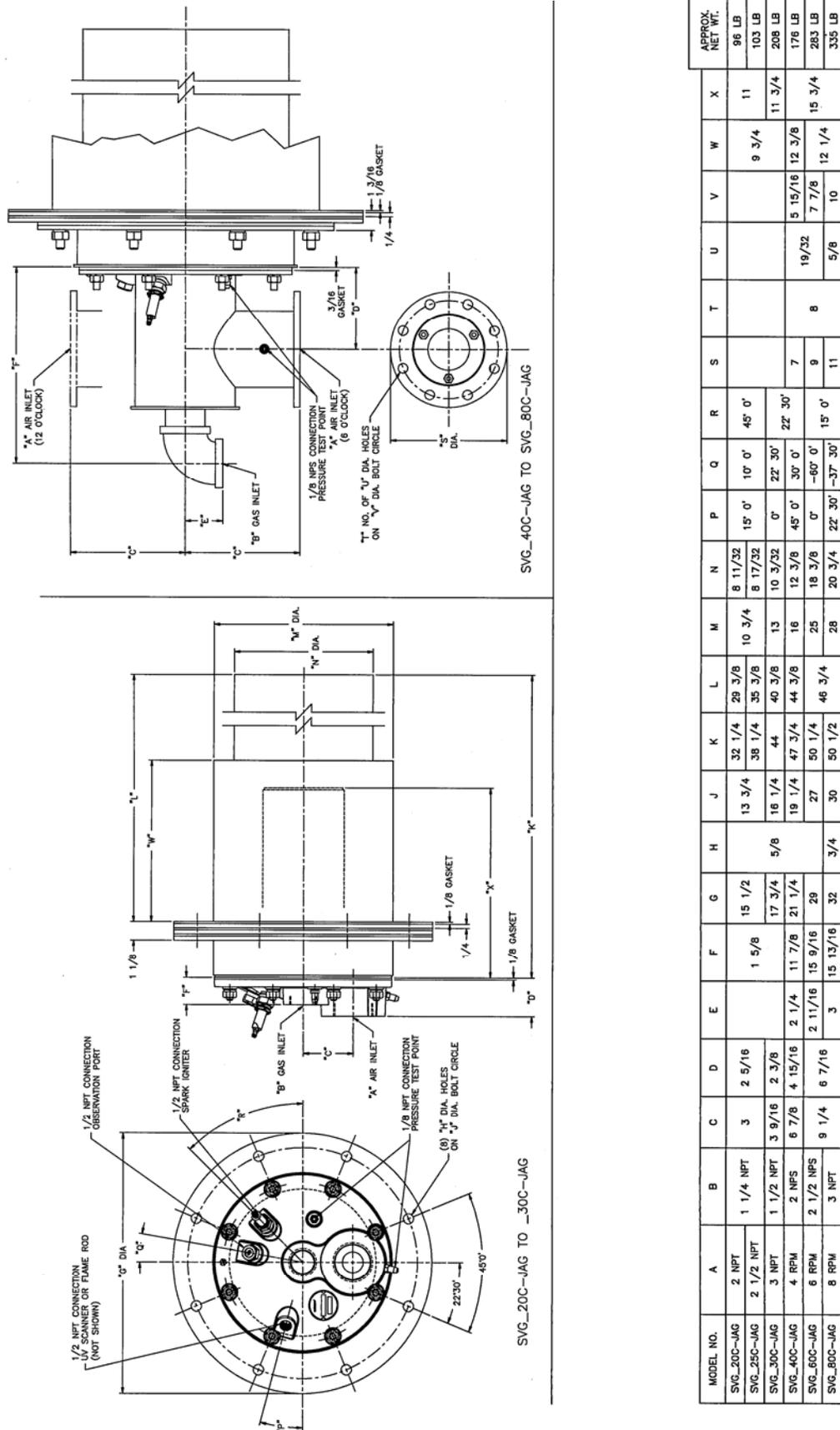
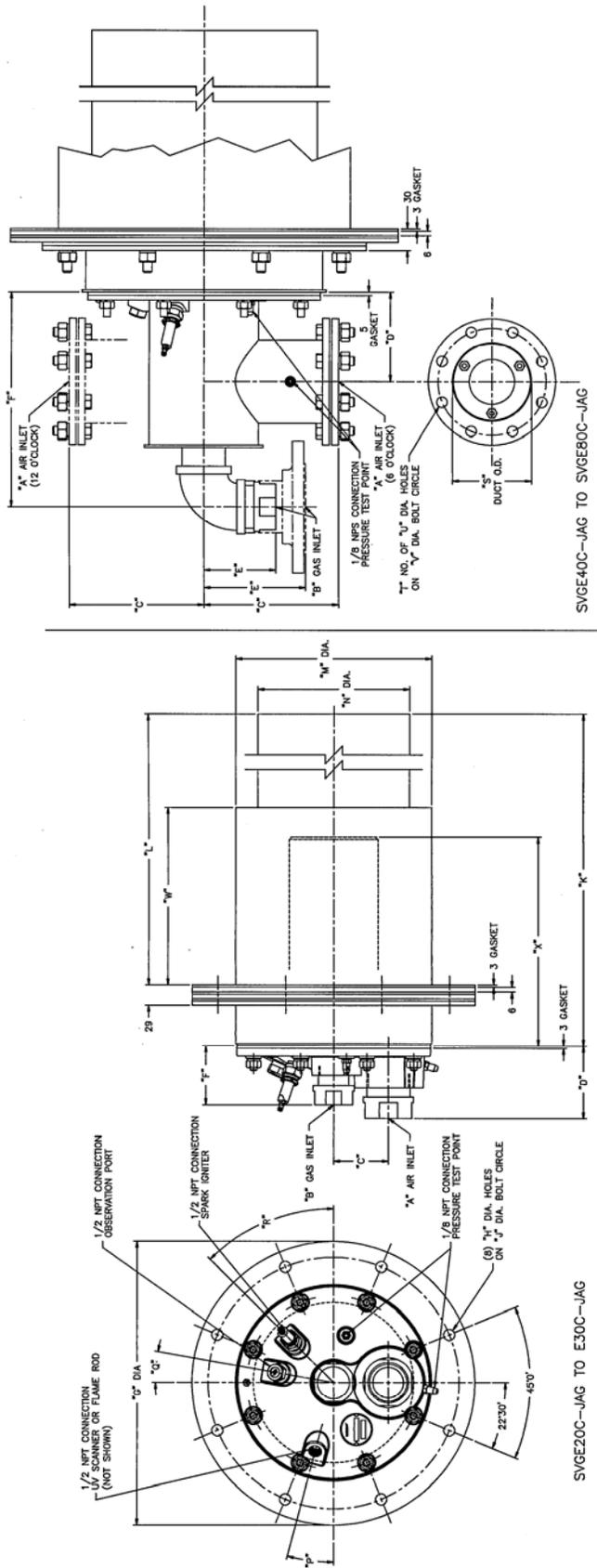


Figure 1. Dimensions

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D. DIMENSIONS (Continued)



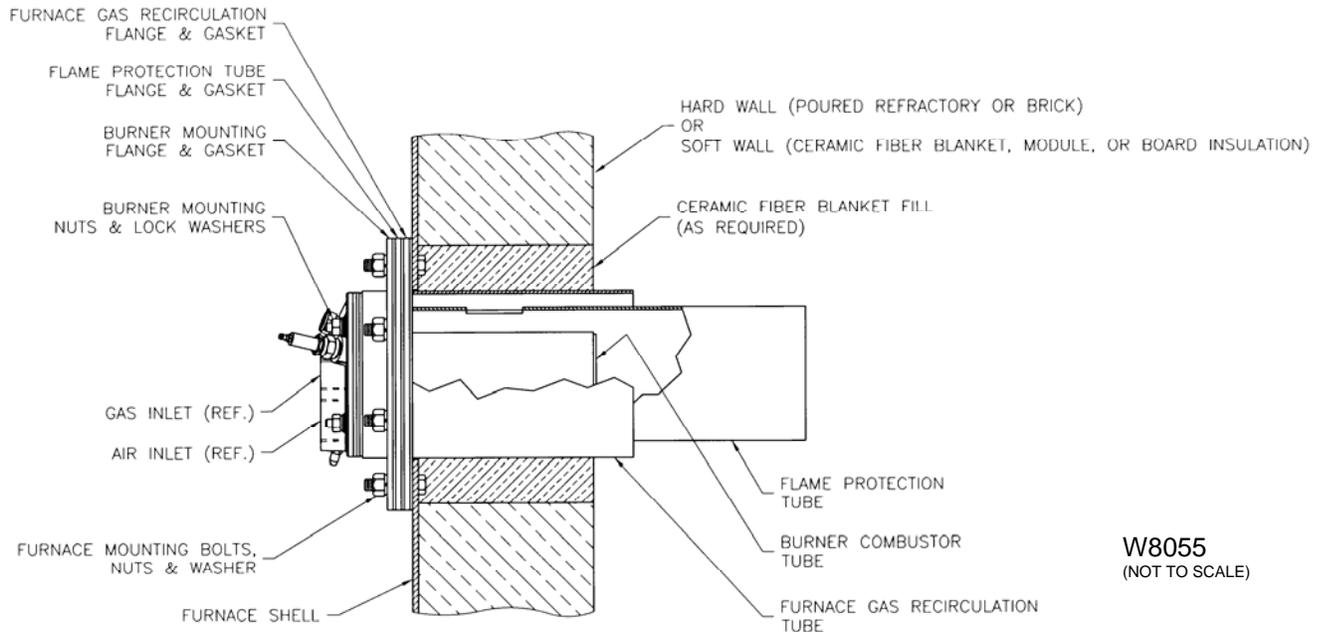
MODEL NO.	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	U	V	W	X	APPROX. NET WT.
SVGE20C-JAG	2 RP		76	102		83	394		349	819	746	273	212	15' 0"	10' 0"	45' 0"					279	44 KG	
SVGE25C-JAG	2 1/2 RP	1 1/2 RP	90	197		451	451	16	413	972	899	330	217	0'	22' 30"	22' 30"				248	47 KG		
SVGE30C-JAG	3 RP		188	125	100	302	540		489	1118	1026	406	256	45' 0"	30' 0"	22' 30"	114				298	95 KG	
SVGE40C-JAG	4 RPM	2 RP	248	164	152	395	737		686	1276	1127	635	314	0'	45' 0"	30' 0"	159	15	200	314	400	80 KG	
SVGE60C-JAG	6 RPM	DIN 85			159	402	813	19	762	1283	1187	712	467	0'	-60' 0"	15' 0"	210	203	16	254	311	128 KG	
SVGE80C-JAG	8 RPM	DIN 80										527	527	22' 30"	-37' 30"							160 KG	

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(NOT TO SCALE)

Figure 2. Metric Dimensions

E. INSTALLATION

1. Furnish an opening in the furnace shell 1/2" (13mm) larger than the burner's furnace gas recirculation tube diameter. Since JAG burners can be fired in any position, they can be installed through the roof, or sidewall of the furnace.
2. For installation in an existing hard or soft wall furnace (see Figure 1), make the hole in the insulating material, where the burner will be installed, 3 to 6" (76 to 152mm) larger than the outside diameter of the furnace gas recirculation tube.



NOTE:

1. FURNACE GAS RECIRCULATION TUBE CAN BE MOUNTED RECESSED, FLUSH, OR EXTENDED PAST THE INSIDE FURNACE WALL, HOWEVER, CERAMIC FIBER BLANKET FILL MUST BE SLIGHTLY RECESSED BEHIND THE FURNACE GAS RECIRCULATION TUBE BY A NOMINAL 2" (51MM) AS TO NOT RESTRICT RECIRCULATION FLOW OF FURNACE GAS.

Figure 3. Burner Installation

3. Weld the appropriate size studs of appropriate length to the furnace shell to accept the burner flanges (see Figure 3 for number of studs and bolt circle).
4. Remove the temporary hardware from the burner flanges that are used for shipping purposes only.
5. Install the furnace gas recirculation gasket over the welded studs on the furnace shell. Then, install the furnace gas recirculation tube, flame protection tube gasket, and flame protection tube.
6. Install the burner mounting gasket over welded studs. Insert the burner housing and secure. The burner flanges to the furnace shell with appropriate lock washers and nuts.
7. Pack ceramic fiber blanket to fill the opening between the furnace gas recirculation tube and furnace insulation.

NOTE

Ceramic fiber blanket fill must be slightly recessed behind the furnace gas recirculation tube by a nominal 2" (51 mm) as to not restrict recirculation flow of furnace gas.

E. INSTALLATION

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 flanges. Fill any gaps or voids with ceramic fiber.
9. For horizontal burner installation, the burner should be positioned so that the UV flame detector is located above the horizontal centerline to prevent moisture or airborne debris from settling into the scanner port and blocking the lens.

NOTE

Hauck recommends installing a cooling/cleaning air line to the UV scanner adapter. Typically, this can be accomplished by installing a 1/2 NPT (DN 15) pipe tee between the UV scanner and the UV scanner connection on the burner backplate. Connect a clean ambient air source of approximately 100 scfh (2.7 nm³/hr) to the pipe tee

10. If the integrated air differential pressure taps are to be used for air flow measurement, install a threaded pipe nipple into the air connection of the burner having a length that is at least 4 times the pipe diameter. This will allow the use of the built-in differential air orifice taps for accurate air flow measurement. For example, for 1-1/4 NPT (DN32) pipe use a pipe nipple that is at least 5" (127mm) long.
11. Connect the air and gas lines to the burner. Use a union and flex connection in the lines, unions will permit easy servicing when required, and flex connections will alleviate vibration and expansion of piping. Avoid elbows and abrupt directional changes in piping where possible, as turbulence can affect flow measurement accuracy and reduce pressure at the burner.
12. Verify that all piping connections are tight.



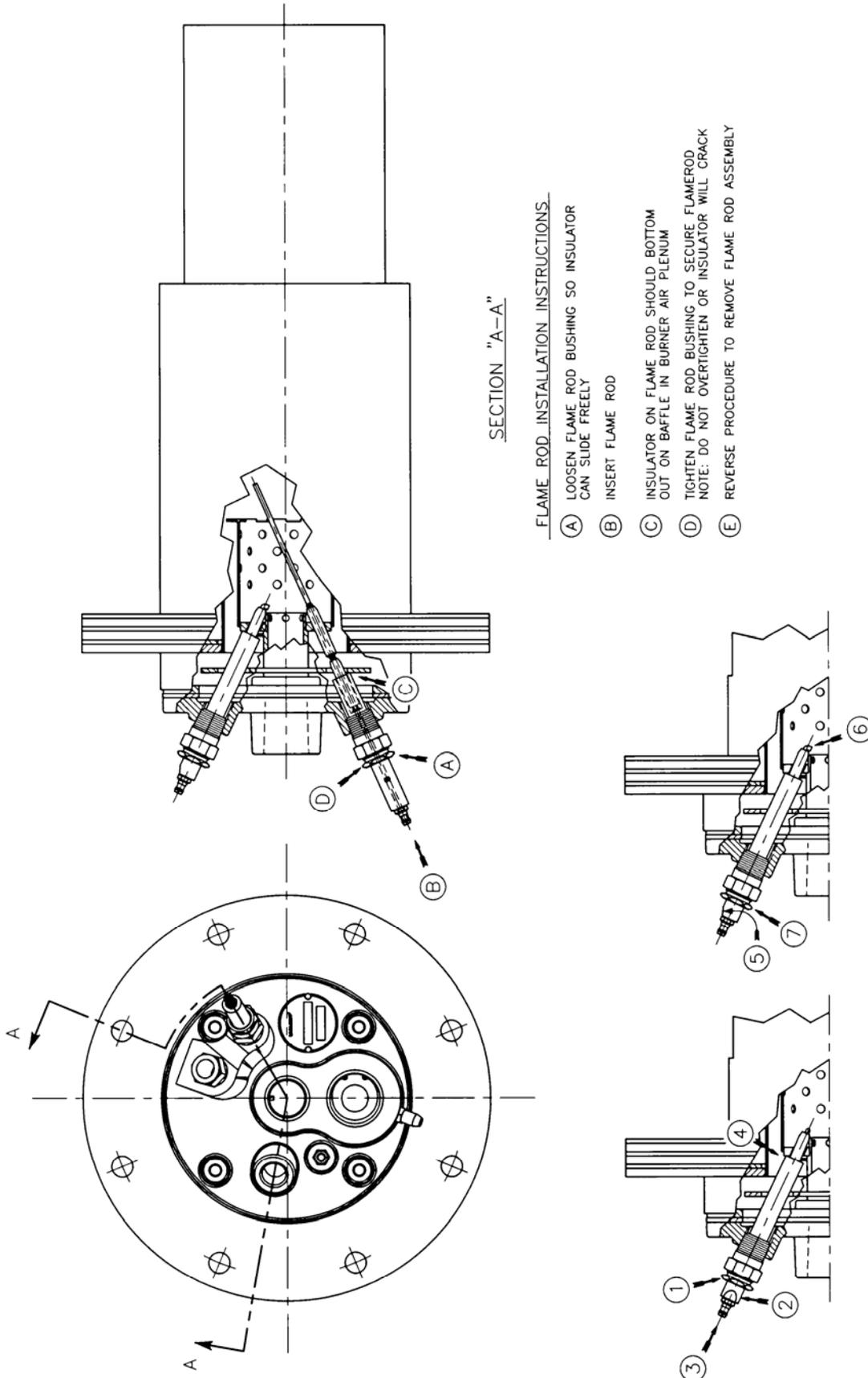
WARNING

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

F. IGNITION

Ignition of the JAG is by a direct spark igniter (included). 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/fuel ratios than the half-wave type. For applications requiring burner ignition with combustion air at or above 4 osi (1724 Pa), a standard coil ignition transformer must be used.

F. IGNITION (Continued)



FLAME ROD INSTALLATION INSTRUCTIONS

- (A) LOOSEN FLAME ROD BUSHING SO INSULATOR CAN SLIDE FREELY
- (B) INSERT FLAME ROD
- (C) INSULATOR ON FLAME ROD SHOULD BOTTOM OUT ON BAFFLE IN BURNER AIR PLENUM
- (D) TIGHTEN FLAME ROD BUSHING TO SECURE FLAME ROD. NOTE: DO NOT OVERTIGHTEN OR INSULATOR WILL CRACK
- (E) REVERSE PROCEDURE TO REMOVE FLAME ROD ASSEMBLY

SPARK IGNITER INSTALLATION INSTRUCTIONS

- (1) LOOSEN SPARK IGNITER BUSHING SO INSULATOR CAN SLIDE FREELY
- (2) ORIENT SPARK IGNITER SO THAT FLAT ON THE INSULATOR IS AS SHOWN
- (3) INSERT SPARK IGNITER
- (4) INSULATOR ON SPARK IGNITER SHOULD BOTTOM OUT ON BACKPLATE OF BURNER CUP
- (5) ROTATE IGNITER 90° COUNTERCLOCKWISE SO THAT FLAT ON INSULATOR FACES AWAY FROM BURNER CENTERLINE AS SHOWN
- (6) TIP OF SPARK IGNITER POINTS TO CENTER OF BURNER WITH CORRECT SPARK GAP
- (7) TIGHTEN SPARK IGNITER BUSHING TO SECURE SPARK IGNITER. NOTE: DO NOT OVER TIGHTEN OR INSULATOR WILL CRACK
- (8) REVERSE PROCEDURE TO REMOVE IGNITER ASSEMBLY

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(NOT TO SCALE)

Figure 4. Spark Igniter and Flame Rod Installation

F. IGNITION (Continued)

NOTE

For safety reasons, it is recommended that the burner be ignited under low fire conditions.



WARNING

If standard coil ignition transformer is used, provisions must be made to eliminate the ignition spark falsely satisfying the “flame on” UV flame detector. Hauck designed flame supervisory panels accomplish this by “timing out” the spark transformer after a short (10 seconds for most applications) trial for ignition.

G. INITIAL SET-UP

JAG 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 burner capacities in the appropriate Supplemental Data Sheet for burner air flow at low fire conditions).
3. Adjust the limiting gas orifice valve to the required opening (readjustment of the limiting gas orifice may be necessary for final burner set-up). Remove the screw cap and begin the adjustment; clockwise adjustment of the screw will decrease gas flow while counterclockwise adjustment will increase gas flow. Replace screw cap when the adjustment is complete.
4. Refer to Section F for spark igniter set-up.
5. Once the spark igniter is set and the initial gas and air adjustments are made, the burner can be ignited. **BE SURE THAT THE BURNER IS BEING IGNITED UNDER LOW FIRE CONDITIONS (MINIMUM AIR AND GAS FLOWS).** Ignite the burners. When all burners are ignited, increase the combustion air to the high fire position (refer to burner capacities in the appropriate Supplemental Data Sheet for burner air flow at high fire conditions).
6. When the high fire combustion air is set, adjust the limiting gas orifice valve 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 and integral air orifice can be related to air flows if a air orifice meter is not available.

G. INITIAL SET-UP (Continued)

8. Drive the burner to the low fire position and verify that the 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.

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 should be shut off.

I. MAINTENANCE

The JAG burners have no moving parts requiring any lubrication. However, periodic inspection should be performed to determine if cleaning is required and to inspect the condition of the burner tubes.

Should it become necessary to remove the spark igniter for cleaning or inspection, the spark igniter must be inserted properly for best ignition (see Figure 4 for proper spark igniter installation procedure).

J. RECOMMENDED SPARE PARTS LIST

Item	Qty.	Part Number	Description
1	1	See Parts List	Spark Igniter Assembly
2	1	See Parts List	Flame Rod Assembly (If Applicable)
3	1	See Parts List	UV Scanner (If Applicable)
4	*	See Parts List	Replacement Flame Protection Tube Assembly

* - Quantity dependent upon number of burners installed; contact Hauck.

Table 3. Recommended Spare Parts