

779P TO 786P PROPORTIONING OIL BURNER

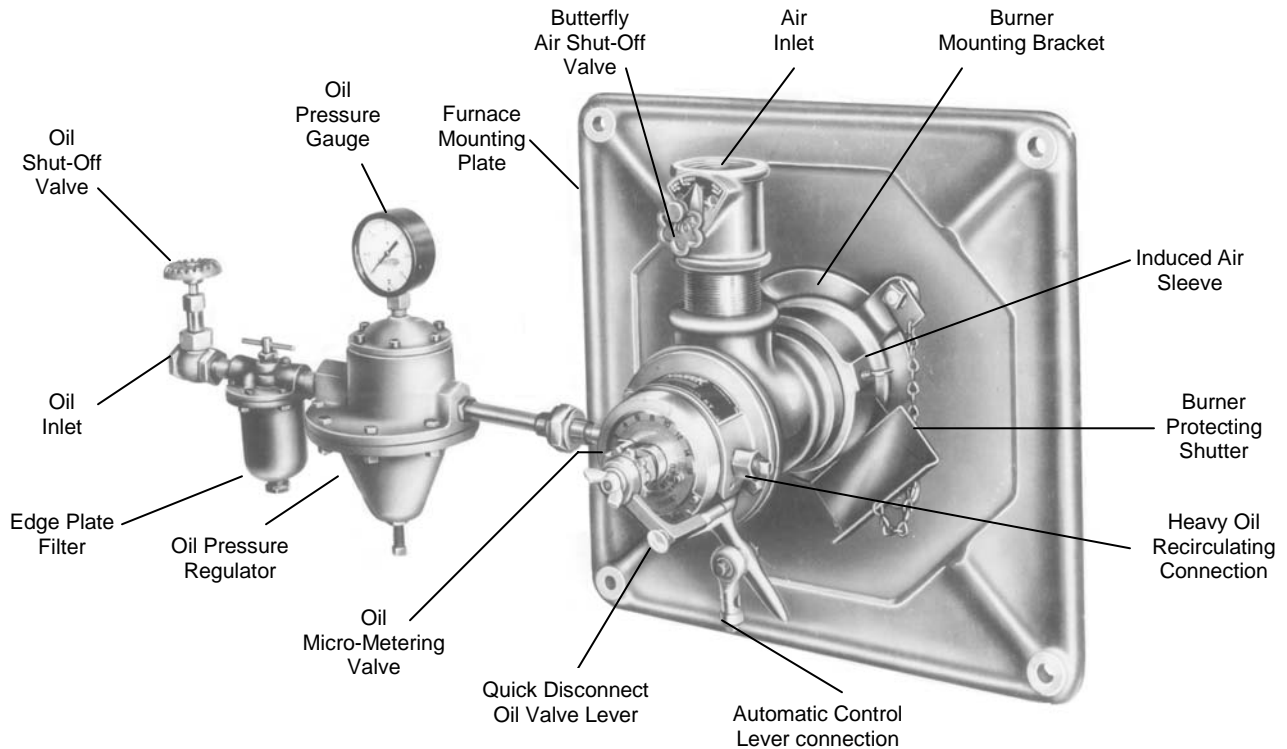


Figure 1. Typical 780 Series Burner Arrangement Showing Burner, Mounting Bracket, Oil Set-Up Assembly, And Furnace Mounting Plate (Optional).



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

With a single lever movement, manually or automatically controlled, the Hauck 780 Series Self Proportioning Oil Burner continuously proportions all air and oil flowing through the burner from low to high fire. Multiple burners on one furnace are controlled by a single synchronous movement of connected burner levers. Once set, air-oil ratio is maintained.

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

BURNER CAPACITIES

Operating With Air Shutters Closed (Sealed-in)

Burner Size	779	780	781	782	783	784	785	786
Air Inlet	1"	1 1/2 "	2"	3"	4"	6"	6"	8"
Oil Inlet Size	3/8"	3/8"	3/8"	3/8"	3/8"	1/2"	1/2"	1/2"
16 osi Air Pressure								
Air Max. (CFM)	34	66	123	210	298	660	910	1620
Oil Max. (GPH)	1.5	2.9	5.4	9.2	13	29	40	71
Oil Min. (GPH)	0.75	1	1.1	1.1	3.1	6.2	11.1	16.7
20 osi Air Pressure								
Air Max. (CFM)	38	74	138	235	334	739	1019	1814
Oil Max. (GPH)	1.7	3.3	6	10.3	14.7	32.5	44.8	79.7
Oil Min. (GPH)	0.75	1	1.2	1.3	3.5	6.9	12.4	18.7
24 osi Air Pressure								
Air Max. (CFM)	42	81	151	257	365	809	1115	1985
Oil Max. (GPH)	1.8	3.6	6.6	11.3	16	35.6	49	87.3
Oil Min. (GPH)	0.75	1	1.3	1.4	3.9	7.6	13.6	20.5
32 osi Air Pressure								
Air Max. (CFM)	48	93	173	296	420	931	1283	2284
Oil Max. (GPH)	2.1	4.1	7.6	13	18.5	40.9	56.4	100.4
Oil Min. (GPH)	0.75	1.1	1.5	1.6	4.4	8.7	15.6	23.6

Operating With Air Shutters Open (Induced air firing)

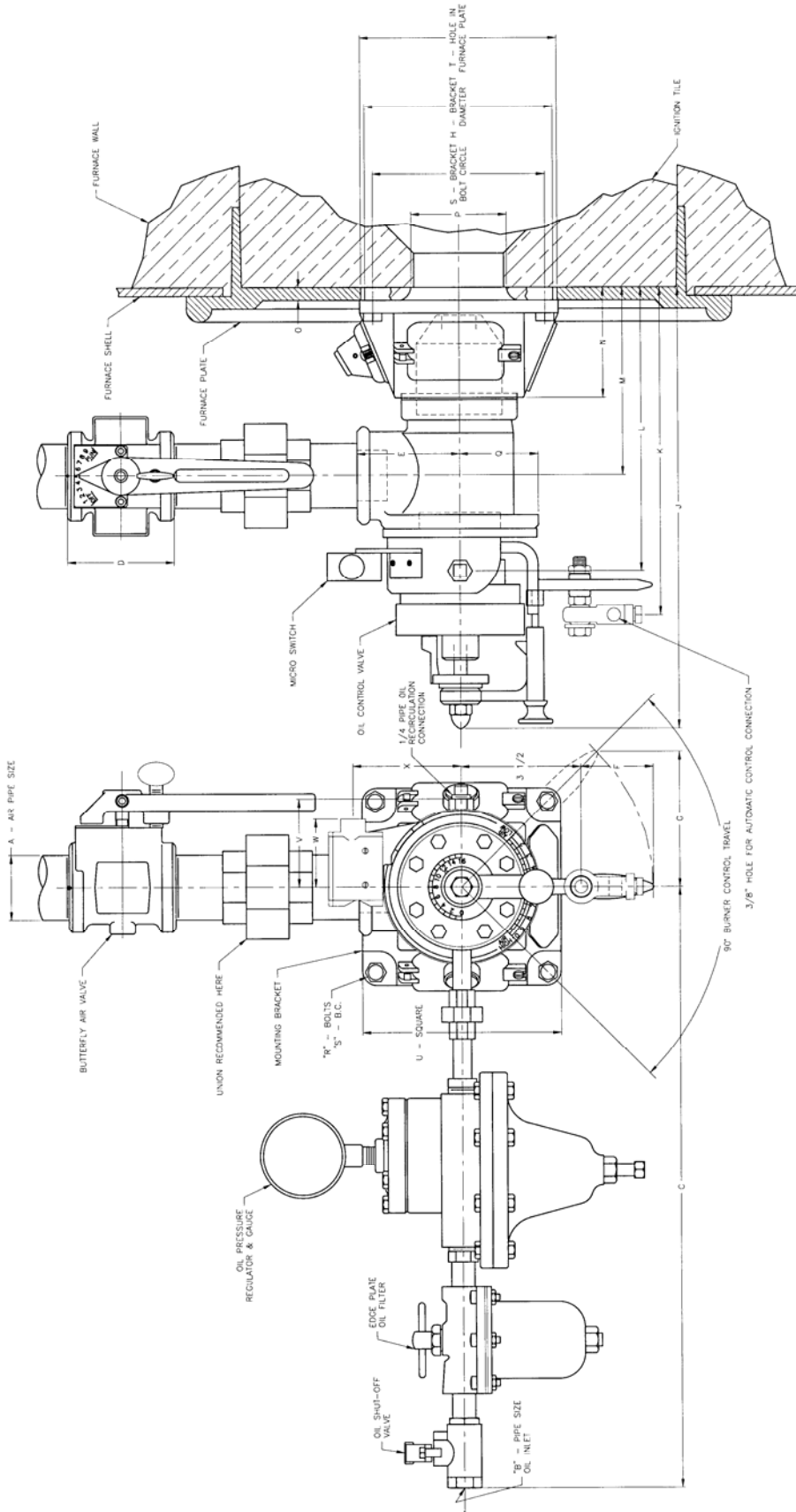
Burner Size	779	780	781	782	783	784	785	786
16 osi Air Pressure								
Air Max. (CFM)	34	66	123	210	298	660	910	1620
Oil Max. (GPH)	2.5	4.9	9.2	15.6	22	49.2	67.8	120.3
Oil Min. (GPH)	1.3	1.7	1.9	1.9	5.3	10.5	18.8	28.3
20 osi Air Pressure								
Air Max. (CFM)	38	74	138	235	334	739	1019	1814
Oil Max. (GPH)	3.1	6	10.9	18.7	26.7	59	81.5	145
Oil Min. (GPH)	1.4	1.8	2.2	2.4	6.4	12.5	22.5	34
24 osi Air Pressure								
Air Max. (CFM)	42	81	151	257	365	809	1115	1985
Oil Max. (GPH)	3.4	6.9	12.6	21.5	30.5	67.8	93.3	166.3
Oil Min. (GPH)	1.4	1.9	2.5	2.6	7.4	14.5	25.9	39
32 osi Air Pressure								
Air Max. (CFM)	48	93	173	296	420	931	1283	2284
Oil Max. (GPH)	4.2	8.2	15.2	26	37	81.8	112.8	200.8
Oil Min. (GPH)	1.5	2.2	3	3.2	8.8	17.4	31.2	47.2

The table above gives approximate burner capacities for combustion chambers with drafts from 0.05" wc to 0.1" wc and 41% induced secondary air at 16 osi pressure, 45% at 20 osi pressure, 47.5% at 24 osi pressure and 50% at 32 osi pressure. If more draft is available, maximum burner capacity can be increased.

Note: Capacities in these tables are based on No. 2 fuel oil with a gross heating value of 138,000 Btu/gallon. Capacities for other grade fuel oils will vary based on their gross heating value.

Table 1. Capacities

D. DIMENSIONS



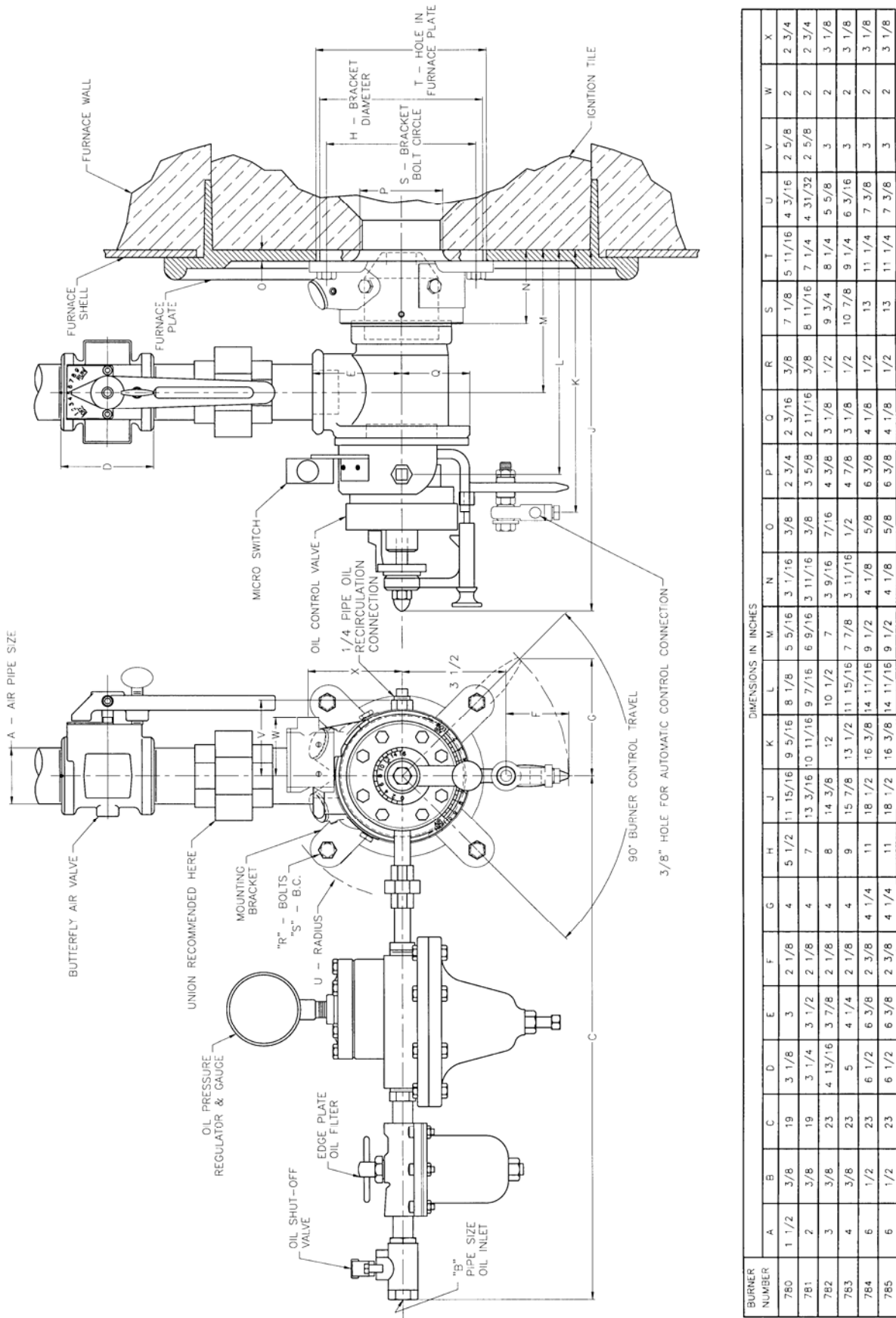
BURNER NUMBER	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
779	1	3/8	18 1/2	3	2 3/8	---	3	4 1/4	8 7/8	6 3/16	5 3/4	3 3/4	2 9/16	1/4	2	1 5/8	5/16	5 1/4	4 7/16	4 3/8	2 5/8	3 1/4	3/8
780	1 1/2	3/8	19	3 1/8	3	2 1/8	4	5 1/2	12 1/8	9 1/2	8 5/16	5 1/2	3 1/4	3/8	2 5/8	2 3/16	3/8	7 1/8	5 11/16	5 3/4	2 5/8	2	2 3/4
781	2	3/8	19	3 1/4	3 1/2	2 1/8	4	7	13 1/2	11	9 3/4	6 7/8	4	3/8	3 5/8	2 11/16	3/8	8 11/16	7 1/4	7 1/4	2 5/8	2	2 3/4
782	3	3/8	23	4 13/16	3 7/8	2 1/8	4	8	15 7/8	13 1/2	12	8 1/2	5 1/16	7/16	4 1/2	3 1/8	1/2	9 3/4	6 1/4	8 3/8	3	2	3 1/8
783	4	3/8	23	5	4 1/4	2 1/8	4	9	17 1/2	15 1/8	13 9/16	9 1/2	5 5/16	1/2	4 7/8	3 1/8	1/2	10 7/8	9 1/4	9	3	2	3 1/8
784	6	1/2	23	6 1/2	6 3/8	2 3/8	4 1/4	11	20 1/4	18 1/8	16 7/16	11 1/4	5 7/8	5/8	6 1/4	4 1/8	1/2	13	11 1/4	11	3	2	3 1/8
785	6	1/2	23	6 1/2	6 3/8	2 3/8	4 1/4	11	20 1/4	18 1/8	16 7/16	11 1/4	5 7/8	5/8	6 1/4	4 1/8	1/2	13	11 1/4	11	3	2	3 1/8
786	•8	1/2	27	5 1/2	7 7/8	2 3/8	4 1/4	12	27	24 1/2	22 1/2	15 3/4	7 1/4	5/8	8	4 1/8	1/2	14 3/4	12 1/4	12	3	2	3 1/8

*FLANGED TYPE BUTTERFLY VALVE ON NO. 786 BURNER

Y20
(NOT TO SCALE)

Figure 2. Dimensions 779 – 786 Burner With Pyramid Bracket

D. DIMENSIONS (Continued)

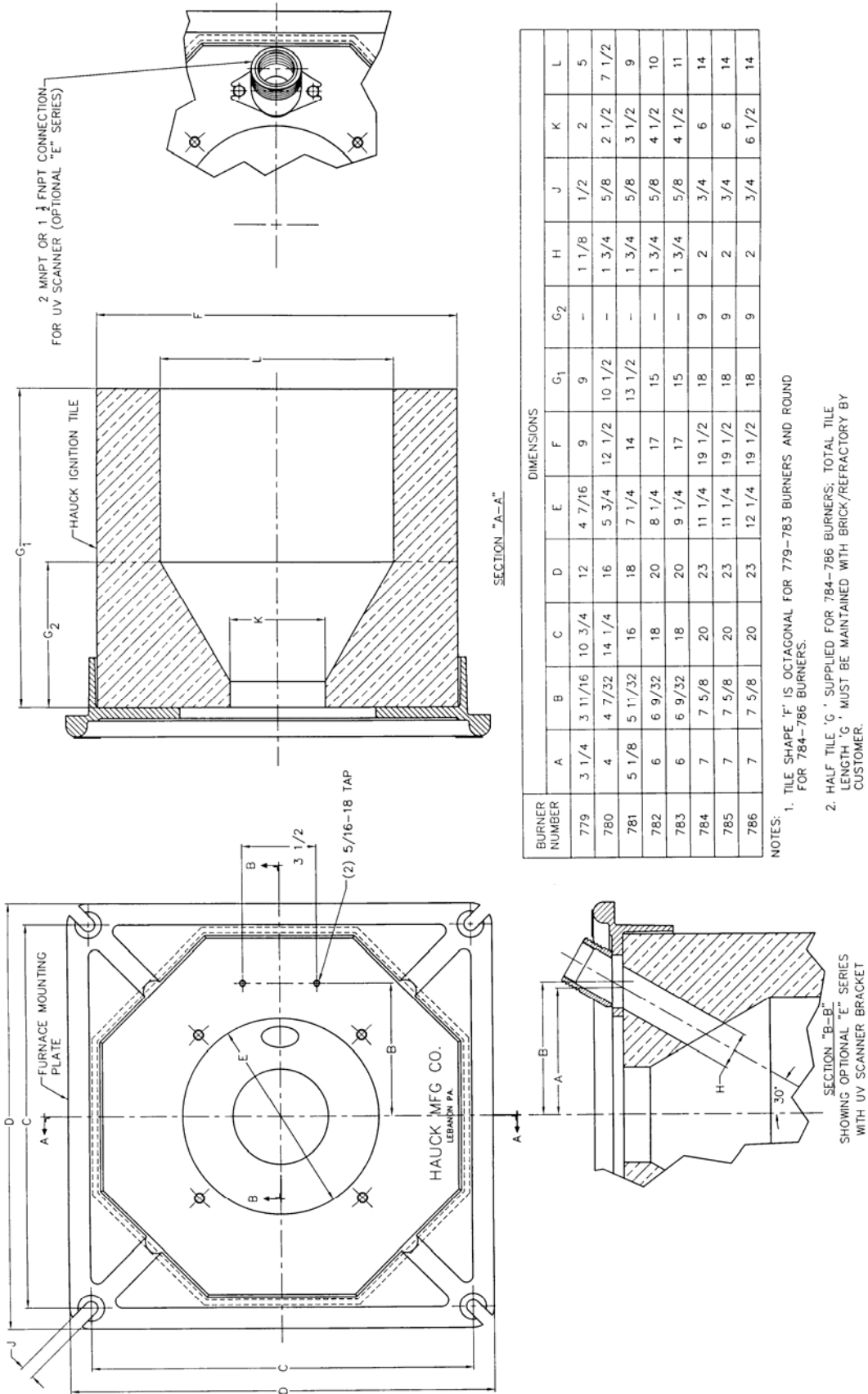


BURNER NUMBER	DIMENSIONS IN INCHES																						
	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
780	1 1/2	3/8	19	3 1/8	3	2 1/8	4	5 1/2	11 15/16	9 5/16	8 1/8	5 5/16	3 1/16	3/8	2 3/4	2 3/16	3/8	7 1/8	5 11/16	4 3/16	2 5/8	2	2 3/4
781	2	3/8	19	3 1/4	3 1/2	2 1/8	4	7	13 3/16	10 11/16	9 7/16	8 9/16	3 11/16	3/8	3 5/8	2 11/16	3/8	8 11/16	7 1/4	4 31/32	2 5/8	2	2 3/4
782	3	3/8	23	4 13/16	3 7/8	2 1/8	4	8	14 3/8	12	10 1/2	7	3 9/16	7/16	4 3/8	3 1/8	1/2	9 3/4	8 1/4	5 5/8	3	2	3 1/8
783	4	3/8	23	5	4 1/4	2 1/8	4	9	15 7/8	13 1/2	11 15/16	7 7/8	3 11/16	1/2	4 7/8	3 1/8	1/2	10 7/8	9 1/4	6 3/16	3	2	3 1/8
784	6	1/2	23	6 1/2	6 3/8	2 3/8	4 1/4	11	18 1/2	16 3/8	14 11/16	9 1/2	4 1/8	5/8	6 3/8	4 1/8	1/2	13	11 1/4	7 3/8	3	2	3 1/8
785	6	1/2	23	6 1/2	6 3/8	2 3/8	4 1/4	11	18 1/2	16 3/8	14 11/16	9 1/2	4 1/8	5/8	6 3/8	4 1/8	1/2	13	11 1/4	7 3/8	3	2	3 1/8

Y6623
(NOT TO SCALE)

Figure 3. Dimensions 780-785 Burner With Combination Access Bracket

D. DIMENSIONS (Continued)



Y7526
(NOT TO SCALE)

Figure 4. Furnace Mounting Plate & Ignition Tile Dimensions

E. INSTALLATION

1. Install the ignition tile. When the furnace mounting plate is used, securely seat the tile in the flange provided for it on the inside of the furnace mounting plate. Where this plate is not used, cut a hole in the furnace shell 1/4" larger in diameter than the burner mounting bracket opening. Place the tile in the furnace wall and secure it firmly in place.
2. Bolt the burner mounting bracket to the furnace mounting plate or the furnace shell. If the latter method is used, make sure that the centerline of the bracket is aligned with the centerline of the tile and apply a 1/8" layer of air setting refractory cement to the face of the tile so that when the bolts are tightened, an air tight seal will exist between the tile and the bracket.

CAUTION

If a pyramid mounting bracket is used, make sure that it is positioned so that the bracket ports do not interfere with the operation of the burner or its accessories.

3. Unscrew the Allen setscrews in the mounting bracket.
4. Insert the burner nozzle into the mounting bracket as far as it will go.
5. Lock the burner in position by tightening the Allen setscrews.
6. Install a Butterfly Air Valve as shown in Figure 1. A union and flexible air connection between the butterfly air valve and the burner is recommended. The union will allow the burner to be easily removed for cleaning. The flexible connection helps to isolate the burner from movements of the piping caused by heat expansion.

NOTE

Air piping should enter the burner from the top or, when necessary, from either side. If air enters from the bottom, the air piping could be flooded with oil if an air failure should occur.

7. Supply a low pressure air supply line to the burner. This line must be adequately sized and piped to avoid excessive pressure drops. The combustion air should be clean. If there is any possibility that the blower will pull dirt in with the air, a filter should be provided at the blower intake.
8. Pipe the oil set-up assembly to the burner. The oil pressure regulator and filter must be in a horizontal position and, if possible, about 8 to 12 inches below the burner. This will prevent oil from draining into the burner after the shutoff valve is closed. Use galvanized iron piping for any extension between the micro oil valve and filter to prevent clogging from iron pipe scale.
9. Supply a fuel line to the inlet of the oil set-up assembly. When heavy fuel oil is used with automatic ignition, or when frequent starting is necessary, install a circulating system so that hot oil of the proper viscosity (80 to 90 SSU) will be available to the burner at the time of burner start-up. When heated oil is being used, it is advisable to trace and insulate the oil supply lines.

CAUTION

All piping must be properly supported and aligned to avoid strain on the burner and associated equipment.

10. IF APPLICABLE, install the pilot ignition system in accordance with the instructions which accompanied the unit.
11. Start fuel and air flow to the pilot.
12. Ignite the pilot by energizing the ignition transformer (automatic system) or by placing a lighted torch at the end of the pilot nozzle (manual system). Adjust the pilot as described in the instructions which accompanied the unit. When properly adjusted, the pilot should produce a sharp, blue, high velocity, blast type flame.
13. Start the oil supply pump. It is recommended that oil at **50 psig** be supplied to the inlet of the pressure regulator.

NOTE

When firing on heavy oils requiring heating, a Hauck Viscometer or other suitable device should be used to determine the oil temperature required to produce the needed viscosity of 80 to 90 SSU.

14. Adjust the oil pressure regulator for the appropriate, initial discharge pressure: **5 to 10 psig** for light oil, **7 to 15 psig** for heavy oil.
15. Make sure that the burner micro valve is in the low fire position.
16. Open all restrictions in the air supply line to the burner.
17. Open the main shutoff valve in the fuel line to the burner.
18. Ignite the burner by slowly moving the operating lever forward until the burner lights.

CAUTION

Remain in the low fire position 2 to 10 minutes to allow for the ignition tile to warm up sufficiently to insure good burning.

19. Adjust the oil pressure regulator to achieve a uniform oil-air ratio and consistent flame characteristics between low fire and high fire positions. At this stage of adjustment a **consistent flame characteristic is required regardless of the flame condition** (how rich or lean the flame is). To accomplish this adjustment, complete the following.
 - A. Slowly rotate the burner oil-air control levers from low fire to high fire and observe the flame.
 - B. If the flame changes from a lean flame at low fire to a rich flame at high fire, the oil pressure is too high. Correct this by adjusting the oil pressure regulator.
 - C. If the flame changes from a rich flame at low fire to a lean flame at high fire, the oil pressure is too low. Correct this by adjusting the oil pressure regulator.

20. Once the flame character is consistent, it can be made richer or leaner, **over the entire range from low fire to high fire**, by SLIGHTLY altering the position of the micro oil valve pointer at low fire. To accomplish this adjustment, complete the following.
- A. Drive the burner oil-air control levers to the low fire position.
 - B. Loosen the wing-nut on the burner micro oil valve pointer.
 - C. To make the flame richer, rotate the pointer SLIGHTLY to the right (clockwise direction).
 - D. To make the flame leaner, rotate the pointer SLIGHTLY to the left (counterclockwise direction).
 - E. Monitor the flame condition and repeat steps C and D until a flame having the desired conditions is observed.
 - F. Tighten the wing-nut on the burner micro oil valve pointer.

CAUTION

When adjusting the micro oil valve pointer, always maintain the air control lever in the low fire position.



WARNING

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

F. OPERATION

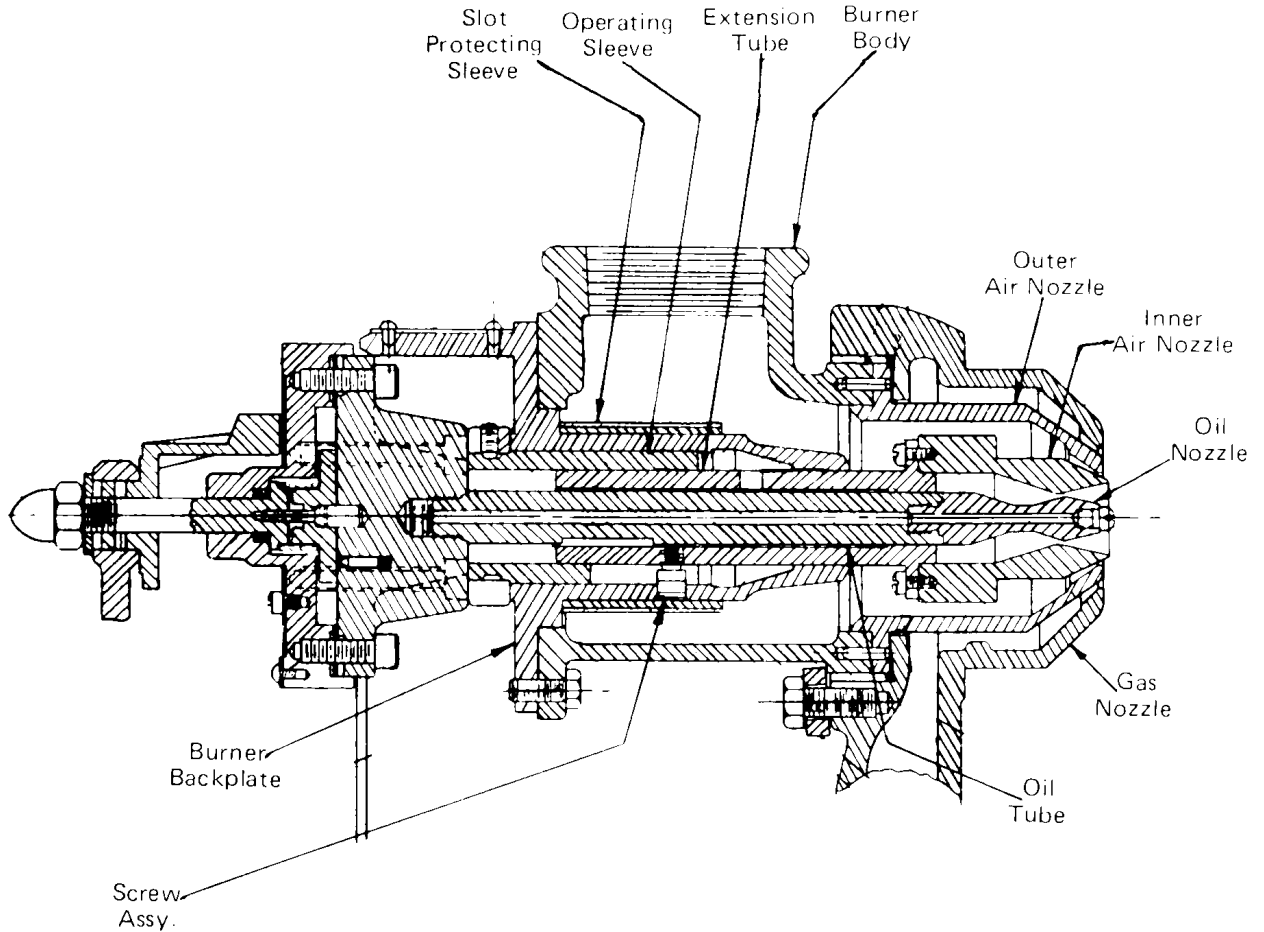
During the normal operations, the air, and oil valves are operated simultaneously. The oil valve linkage can be quickly disconnected. The valves are designed to operate together and the linkages are not engineered for an adjustable radius or length of arc.

With the valves properly linked, the air valve supplies a fixed air volume per position on the fuel control valves. For proper combustion, the oil flow is set to be "on ratio" with the air volume throughout the burner's operational range. The initial adjustment of the oil valve is critical and should be done with care. **Once the valves are adjusted, no changes should be made in their settings.**

CAUTION

Linkage adjustments, pressure adjustments, or any other changes which affect the burner's operation should be accomplished as described in this Instruction Manual. If problems are encountered, contact Hauck Manufacturing Company.

MAINTENANCE



**Figure 5. Cutaway View Of The 780 Seires Burner Assembly
Showing The Individual Components.**

The inner air nozzle on the burner assembly moves forward and backward on the smooth surface of the oil tube/oil nozzle assembly. Periodic applications of a high temperature grease (via the lubrication fitting) will help trouble free service.

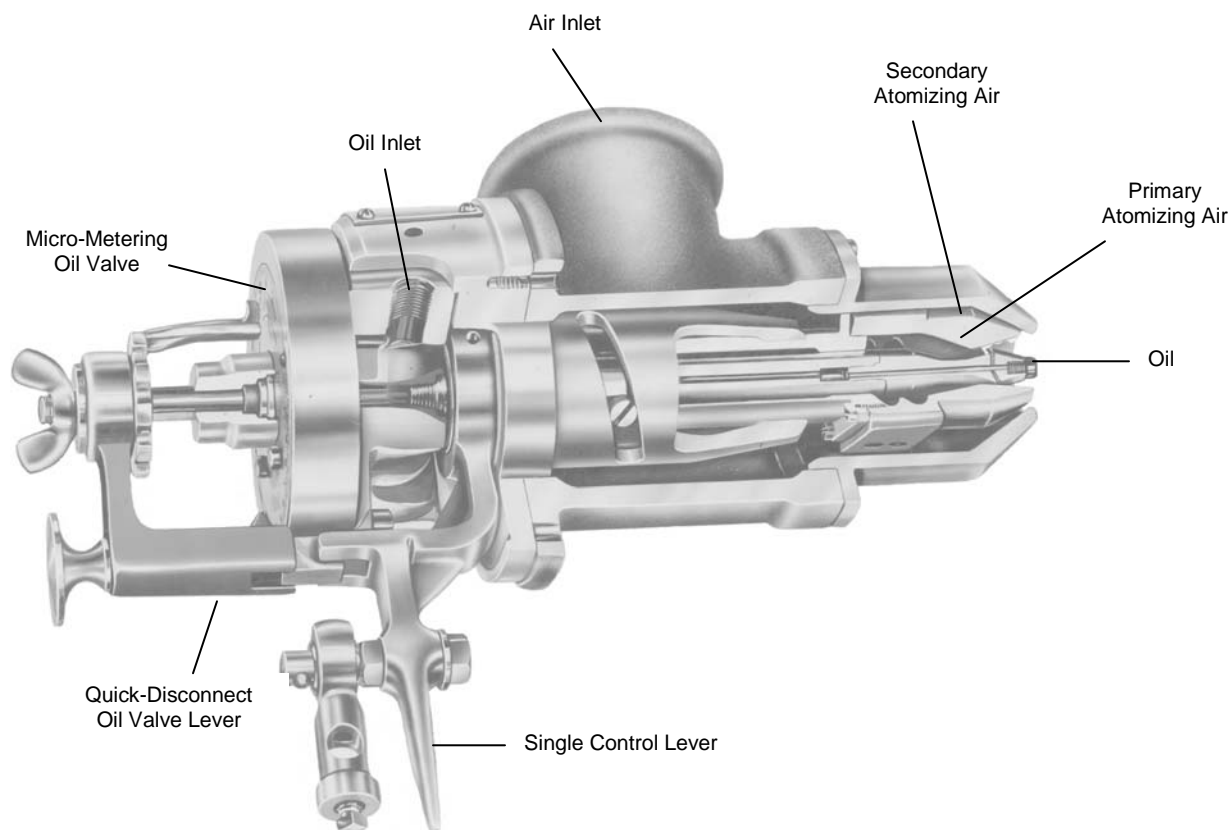


Figure 6. Sectional View Of Hauck Self Proportioning Oil Burner

To clean the oil nozzle and/or the air valve, complete the following.

CAUTION

Extreme care must be exercised when removing the burner parts since close tolerance, machined surfaces are required for proper operation. Use brass jawed or other soft metal tools for removing and holding the oil tube. Wrench flats are provided on both the oil nozzle and the oil tube to facilitate disassembly.

- A. Disconnect the oil supply and return lines to the oil micro valve AT THE UNIONS PROVIDED.
- B. Free the oil micro valve operating lever by disengaging the arm's quick disconnect.
- C. Rotate the valve's operating lever until the micro switch (if used) actuator arm is clear of the micro switch roller and the four socket head cap screws.
- D. Remove the four socket head cap screws which attach the valve to the burner backplate.
- E. Remove the micro valve and the attached oil tube and nozzle from the burner.
- F. Disconnect the oil nozzle from the oil tube.

- G. Clean the oil nozzle by soaking it in a solvent. If the ports are plugged, they must be completely cleared of debris using compressed air or a wooden or soft metal instrument. EXERCISE CARE NOT TO CHANGE THE SIZE OR THE SHAPE OF THE PORT OPENINGS.
- H. Reconnect the oil nozzle to the oil tube.
- I. Remove the burner backplate assembly from the burner body by removing the hex head cap screws. THE BURNER BACKPLATE ASSEMBLY INCLUDES THE OPERATING LEVER, OPERATING SLEEVE, OPERATING SCREW ASSEMBLY, EXTENSION TUBE, INNER AIR NOZZLE, AND FELT WITH FELT SLEEVE.
- J. Clean the eight tangential air inlet openings in the inner air nozzle. If the inner air nozzle must be removed, PUNCH MARK THE PIECES FOR REINSTALLATION REFERENCE. THE ORIENTATION OF THE INNER AIR NOZZLE MUST NOT BE CHANGED.
- K. Remove the felt sleeve and felt which protect the operating screw and slot.
- L. Remove the operating screw.
- M. Pull the inner air nozzle and extension tube out of the backplate and operating sleeve assembly.
- N. Inspect and clean all parts of old grease and dirt.

CAUTION

Do not loosen or adjust the socket head set screws located where the operating lever is attached to the operating sleeve. The sleeve attachment to the lever determines the concentricity and minimum gap tolerances at the atomizing point of the burner. THIS ADJUSTMENT IS VERY CRITICAL.

CAUTION

Prior to reassembly of the parts, ensure that all mounting surfaces are clean and free of burrs.

- O. Reinsert the inner air nozzle and extension tube into the backplate and operating sleeve.
- P. Replace the operating screw.
- Q. Regrease the unit and check its operation.
- R. Replace the felt and felt sleeve.
- S. Insert the backplate assembly into the burner body and secure it in place with the cap screws.

- T. Replace the oil micro valve with its attached oil tube. Secure the valve in position by replacing the four socket head cap screws.
- U. Ensure that the micro switch contact roller (if used) and the switch actuator (located on the operating lever of the oil micro valve) are properly aligned. The micro switch should be activated when the oil micro switch is in the full off position. Reposition the micro switch if it has been moved or damaged.
- V. Engage the oil micro valve's quick disconnect lever.
- W. Reconnect the oil supply and return lines to the oil micro valve. Ensure that the unions are tightly sealed.

ALIGNMENT OF THE INNER AND OUTER AIR NOZZLES ON A HAUCK PROPORTIONING OIL BURNER

Whenever a HAUCK PROPORTIONING OIL BURNER is reassembled after either cleaning the burner or replacing parts, the clearance between the Inner and Outer Air Nozzles should be checked. If the clearance is not within the limits listed in Table 2, the following instructions describe the correct procedure to be used for setting this clearance:

- A. Remove backplate assembly from burner body by removing bolts which hold it to the body (See Figure 5).
- B. Loosen the two Allen setscrews on each side of the operating lever collar which holds it to the slotted sleeve.
- C. Holding the operating lever in low position turn the inner nozzle so that it moves away from the backplate as far as it will go. Then tighten lightly the one Allen set screw in lever which will be located toward the high side of the burner.
- D. Move operating lever to high position. Replace the assembly in the burner and tighten bolts which hold it to the body evenly and securely.
- E. Hold three clearance wires (or narrow strip stock) of the proper thickness equally spaced between the inner nozzle and outer nozzle and pull the operating lever to low position all the way. The inner nozzle will then be spaced the proper distance from the outer nozzle and the lever will slip on the operating sleeve to the low position.
- F. Without moving lever tighten securely the Allen setscrew in operating lever collar on the high side. Move the lever to the high position and tighten securely the second Allen setscrew in the collar lever at the low side.

BURNER	CLEARANCE
779	.007" - .010"
780	.010" - .012"
781	.010" - .012"
782	.010" - .015"
783	.010" - .015"
784	.050" - .062"
785	.050" - .062"
786	.050" - .062"

Table 2.

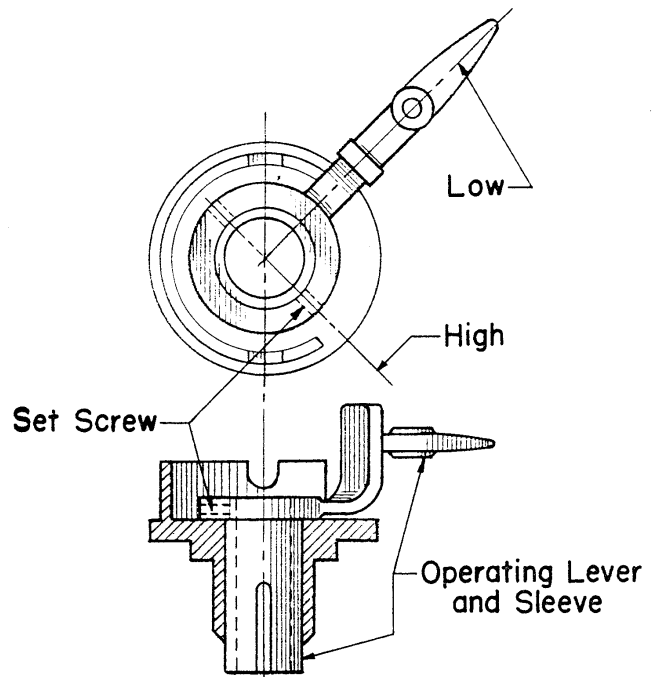


Figure 7. Drawing of the air nozzle control lever showing the set screw locations.

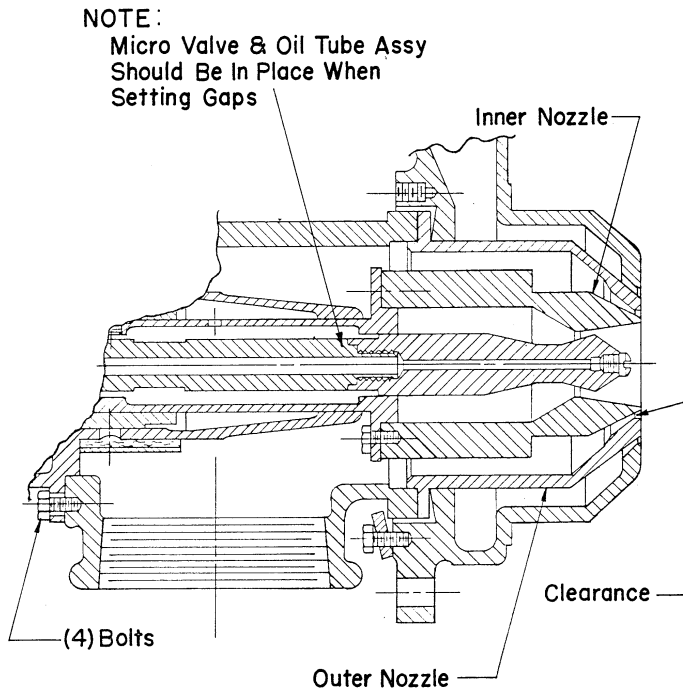


Figure 8. Schematic representation depicting the inner and outer nozzles.