780 SERIES SELF-PROPORTIONING OIL BURNERS

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.

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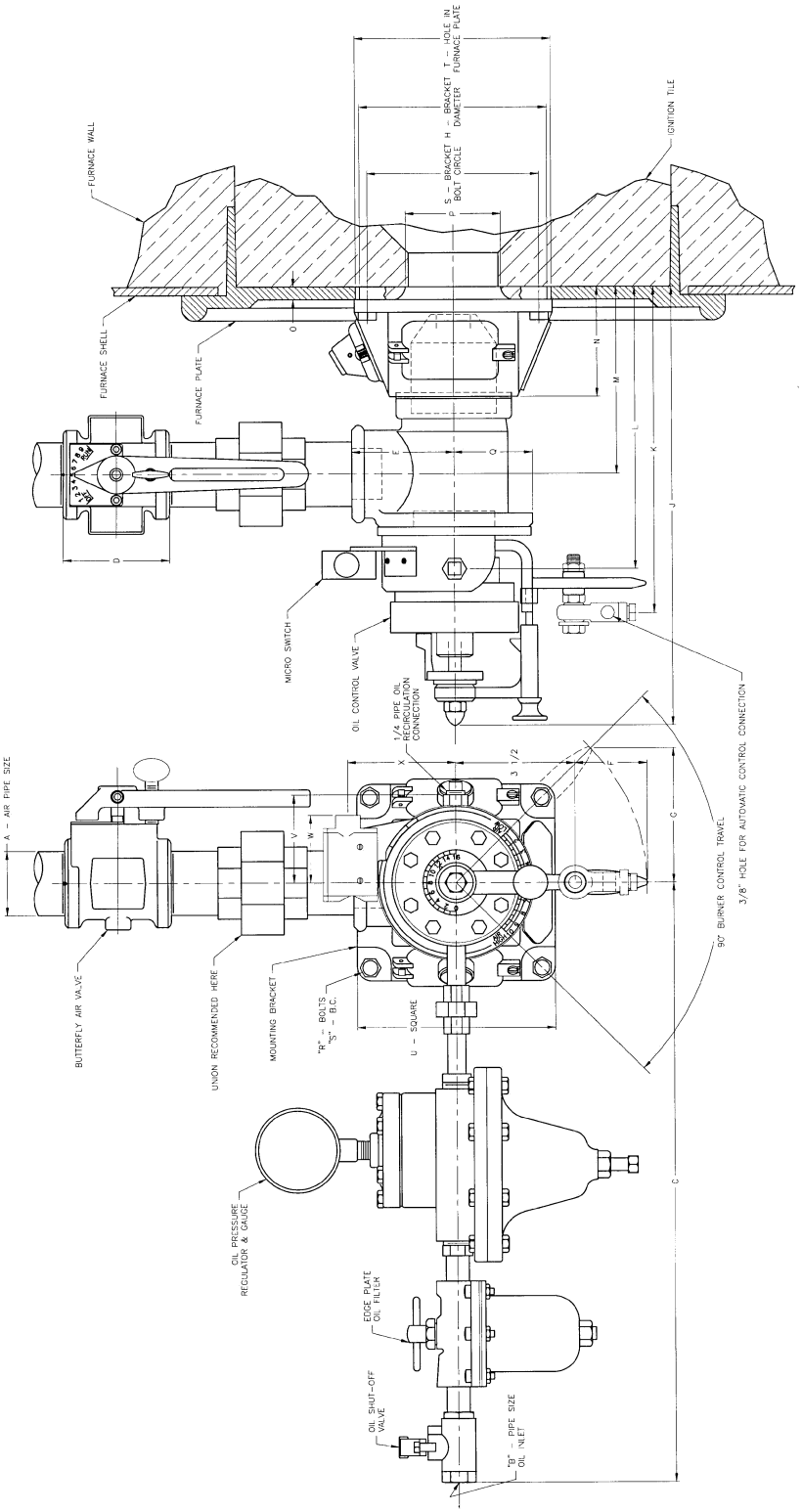
780 SERIES SELF-PROPORTIONING OIL BURNERS

Burner With Pyramid Bracket



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(NOT TO SCALE)

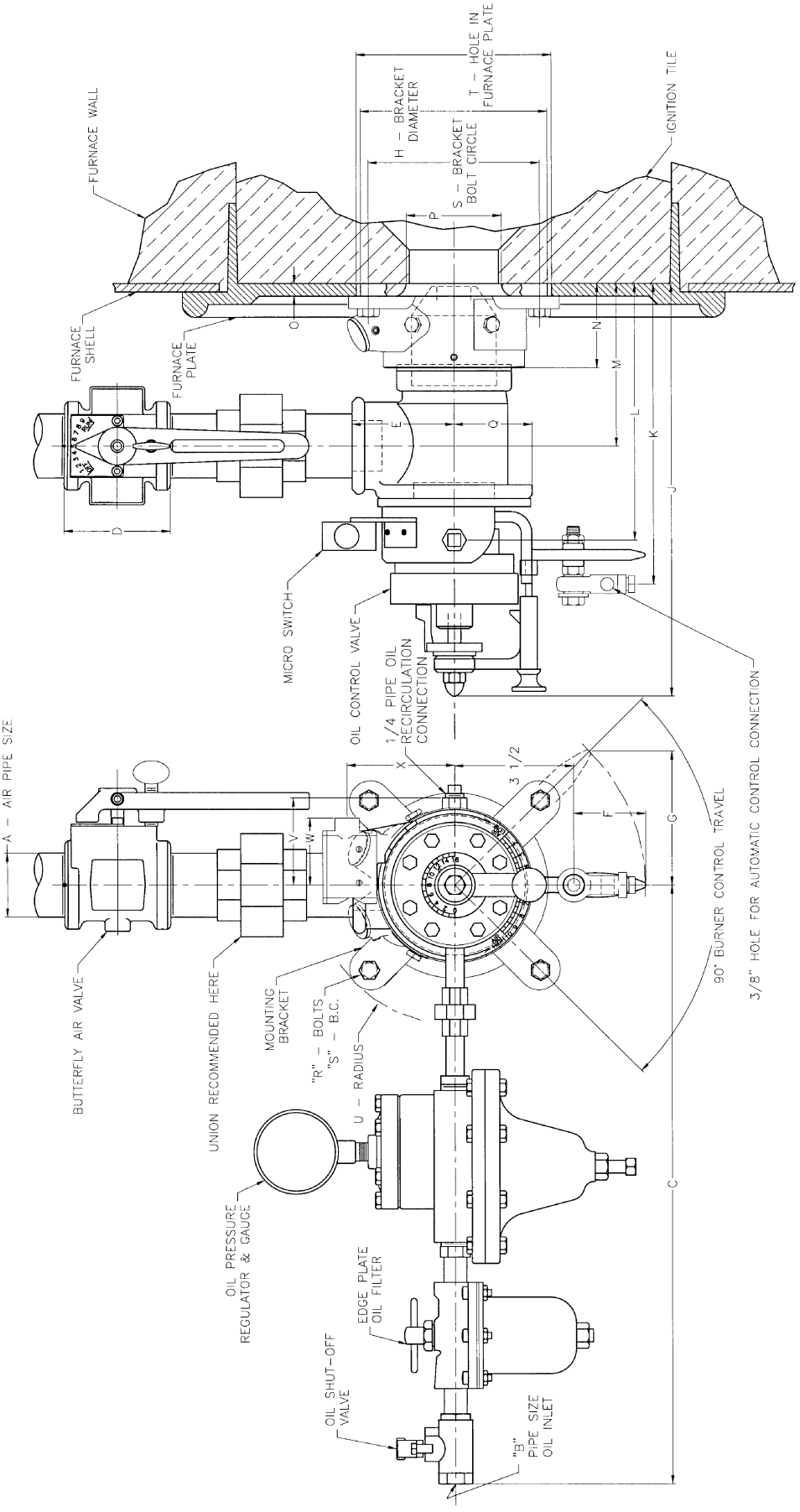
DIMENSIONS IN INCHES

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	6 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	8 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

(OVER)

Burner With Combination Access Bracket



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	6 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

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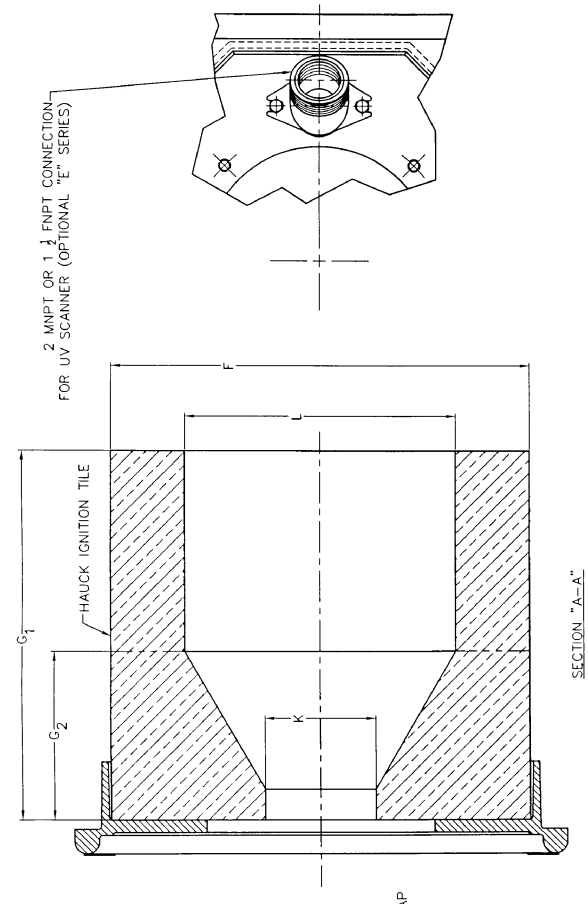
(NOT TO SCALE)

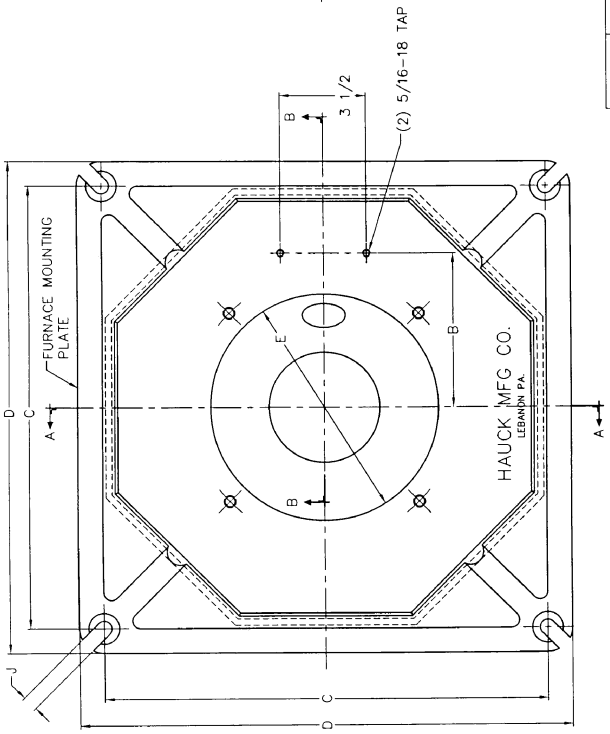
780 SERIES SELF-PROPORTIONING OIL BURNERS

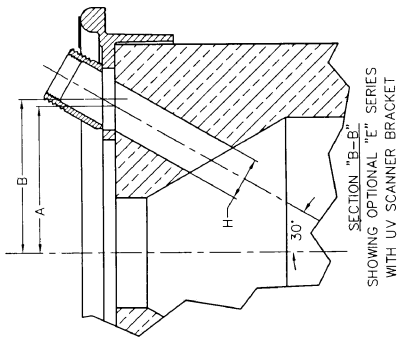
FURNACE MOUNTING PLATE & IGNITION TILE



BURNER NUMBER	DIMENSIONS											
	A	B	C	D	E	F	G_1	G_2	H	J	K	L
779	3 1/4	3 11/16	10 3/4	12	4 7/16	9	9	–	1 1/8	1/2	2	5
780	4	4 7/32	14 1/4	16	5 3/4	12 1/2	10 1/2	–	1 3/4	5/8	2 1/2	7 1/2
781	5 1/8	5 11/32	16	18	7 1/4	14	13 1/2	–	1 3/4	5/8	3 1/2	9
782	6	6 9/32	18	20	8 1/4	17	15	–	1 3/4	5/8	4 1/2	10
783	6	6 9/32	18	20	9 1/4	17	15	–	1 3/4	5/8	4 1/2	11
784	7	7 5/8	20	23	11 1/4	19 1/2	18	9	2	3/4	6	14
785	7	7 5/8	20	23	11 1/4	19 1/2	18	9	2	3/4	6	14
786	7	7 5/8	20	23	12 1/4	19 1/2	18	9	2	3/4	6 1/2	14

NOTES:
1. TILE SHAPE 'F' IS OCTAGONAL FOR 779–783 BURNERS AND ROUND FOR 784–786 BURNERS.
2. HALF TILE 'G' SUPPLIED FOR 784–786 BURNERS; TOTAL TILE LENGTH 'G' MUST BE MAINTAINED WITH BRICK/REFRACTORY BY CUSTOMER.





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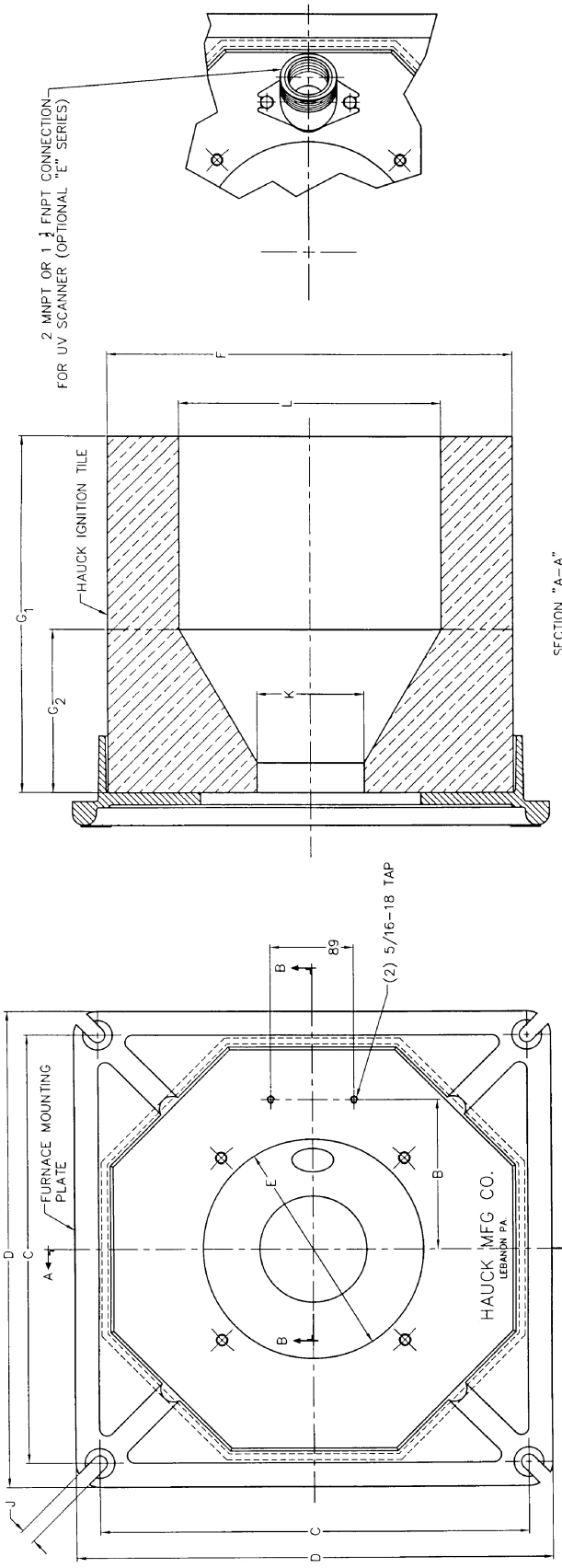
(NOT TO SCALE)

(See Reverse Side For Metric Dimensions)

METRIC DIMENSIONS

780 SERIES SELF-PROPORTIONING OIL BURNERS

FURNACE MOUNTING PLATE & IGNITION TILE



BURNER NUMBER	DIMENSIONS										
	A	B	C	D	E	F	G_1	G_2	H	J	K	L
779	83	94	273	305	113	229	229	–	29	13	51	127
780	102	107	362	406	146	318	267	–	44	16	64	191
781	130	136	406	457	184	356	343	–	44	16	89	229
782	152	160	457	508	210	432	381	–	44	16	114	254
783	152	160	457	508	235	432	381	–	44	16	114	279
784	178	194	508	584	286	495	457	229	51	19	152	356
785	178	194	508	584	286	495	457	229	51	19	152	356
786	178	194	508	584	311	495	457	229	51	19	165	356

NOTES:
1. TILE SHAPE 'F' IS OCTAGONAL FOR 779–783 BURNERS AND ROUND FOR 784–786 BURNERS.
2. HALF TILE 'G' SUPPLIED FOR 784–786 BURNERS; TOTAL TILE LENGTH 'G' MUST BE MAINTAINED WITH BRICK/REFRACTORY BY CUSTOMER.

Y7526 METRIC
(NOT TO SCALE)

780 SERIES SELF-PROPORTIONING OIL BURNERS
GENERAL INFORMATION

AIR SUPPLY
The required atomizing air pressure at the burner for most applications is 16 osi for light distillate oils and from 24 to 32 osi for heavy residual oils. The higher air pressure range may be required for high furnace temperatures or higher oil firing capacities for maximum heat liberation in a specific combustion space. It is recommended that air supply piping enter from above the burner (12 o'clock). The air supply piping can enter from either side of the burner body (3 or 9 o'clock position) if necessitated by the installation.

OIL SUPPLY
Oil should be supplied to the burner oil pressure regulator at 25 psig or more for light oils not requiring heating, and at 35 psig or more for heated heavy residual oils. The oil pressure regulator reduces and maintains constant oil pressure at the required operating pressure, usually 2 to 10 psig at the burner.

Heavy residual oils must be heated to a viscosity of 80-90 SSU. The oil temperature should be held constant to avoid variation in burner firing rates. By piping an oil return line to the oil recirculation connection provided, hot oil can be circulated up to and through the oil control valve in each burner. Consequently, the temperature of the oil at the burner can be easily maintained. The oil does not cool off to cause unequal distribution, poor regulation, or atomization problems. At start-up, the hot oil can even be circulated up to and through the valve with no oil entering the burner. When the oil in the valve reaches the required temperature, the oil valve can be opened to easily light the burner.

ACCESSORY COMPONENTS

BURNER MOUNTING BRACKETS
Two standard burner mounting brackets are available: the Combination Accessory Mounting Bracket and the Pyramid Bracket. The Combination Accessory Mounting Bracket is recommended for installations that do not have induced air around the burner. The Combination Accessory Mounting Bracket can easily convert to natural gas firing and accommodates a spark ignited gas pilot and UV flame supervision. The Pyramid Bracket is recommended for installations that have induced combustion air around the burner. The Pyramid Bracket allows for a spark-ignited gas pilot and UV flame supervision.

FURNACE MOUNTING PLATE AND IGNITION TILE
A furnace mounting plate and refractory tile are essential to optimum burner performance. The furnace mounting plate holds the burner and tile in proper alignment position on the furnace. The furnace mounting plate prevents the furnace shell from buckling. Failure to use a mounting plate greatly increases the likelihood of heat forcing the burner and tile out of proper alignment with the furnace, thus reducing burner efficiency. Refractory tiles are designed for the burner operating with air shutters open (open or induced secondary air firing). Consult Hauck on applications requiring the air shutters to be closed (sealed-in or no induced air firing). Some heavy oil applications may require tile extensions beyond the dimensions listed; consult Hauck for assistance. The refractory tile and mounting plate can be quickly and easily removed from the furnace for maintenance or replacement.

(OVER)

ACCESSORY COMPONENTS

IGNITION CHAMBER UNITS AND BRACKETS

Hauck Ignition Chamber Units (ICU) are specially designed for applications where an extended tile is required to prevent quenching of the burner flame: 1. When furnace conditions are comparable to open firing; 2. With low furnace temperatures; 3. With considerable air turbulence in the furnace; 4. When cold air is forced or drawn into the furnace. To counteract these conditions, the normal burner tile is extended by the addition of refractory and then the entire chamber is encased in a steel jacket. For normal applications, the refractory is entirely encased in a mild steel jacket. In installations where the chamber is directly exposed to the furnace atmosphere, the last six inches is made of stainless steel. The use of an ICU is most critical on applications using a 784, 785 or 786 since they are normally supplied with a “half-tile” only nine inches long. Hauck Ignition Chamber Brackets (ICB) are used externally to support the ICU. The series chosen will depend on the specifics of the application, e.g., space, furnace wall thickness, burner mounting arrangement, etc.

LOW FIRE MICRO SWITCH

The burner can be equipped with a low fire micro switch that indicates when the burner is at low fire. The switch is wired into the burner control system and will not allow the burner to be ignited unless the burner is at low fire. All burners are equipped with mounting holes for field installation of the switch.

OIL REGULATOR SET-UP ASSEMBLY

The regulator oil set-up assembly consists of a PRO oil pressure regulator, edge plate filter and a manual shutoff valve. All of the components are prepiped into a single unit. Each unit is pre-sized to efficiently handle the oil supply requirements of the burner. The PRO is designed to function as a rugged, self-contained pressure-reducing regulator. Its self-contained design eliminates the need for external actuators or control lines. The PRO maintains fuel pressure within close limits. The edge plate filter removes particulate from the oil and aids in prevention of nozzle blockage.

GAS PILOT ASSEMBLIES

Hauck IPG blast-type gas pilots are recommended for ignition of 780P series burners. Each pilot is designed to provide flame stability, reliable ignition and long life even under the most severe operating conditions.

The pilot is factory assembled and consists of a flame retaining nozzle, air-gas mixer, air cock, gas cock, gas pressure regulator and an 18” length of flexible pipe. Series 1400 pilots (slip-fit, spark- ignited) are designed for the 780P Series burner. The pilot requires 8-32 osi of air pressure and 1 psi or less of gas pressure. A standard coil transformer or spark generator can be used for ignition.

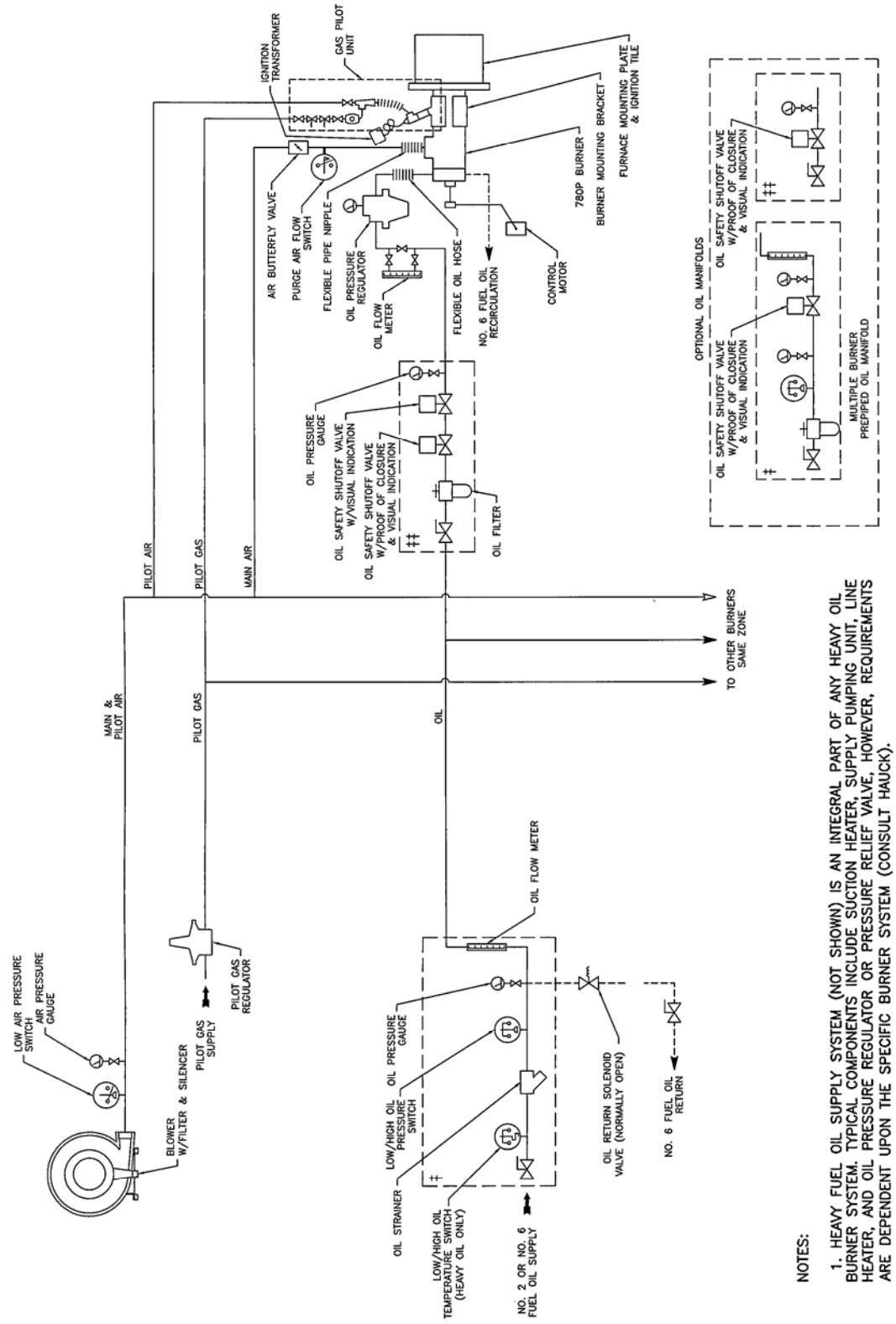
AUTOMATIC CONTROL

For automatic burner operation, the lever on the oil control valve is connected to an electric control motor, which is driven via a furnace temperature controller. The levers of all burners on a furnace or temperature control zone can be easily linked together and operated by one control motor and temperature controller. Specifics regarding automatic burner operation are as follows:

Oil Control Valve	Lever Angular Travel (Lo – Hi Fire)		90°
	Lever Stroke Length (Lo – Hi Fire)		5”
	Lever Operating Radius Clearance		3 1/2"
Electric Control Motor	Operating Torque Requirement	779P-785P	200 lb-in
		786P	300 lb-in

780 SERIES SELF-PROPORTIONING OIL BURNERS

TYPICAL MULTIPLE BURNER SYSTEM SELF-PROPORTIONING CONTROL



Y6659
(NOT TO SCALE)

NOTES:

1. HEAVY FUEL OIL SUPPLY SYSTEM (NOT SHOWN) IS AN INTEGRAL PART OF ANY HEAVY OIL BURNER SYSTEM. TYPICAL COMPONENTS INCLUDE SUCTION HEATER, SUPPLY PUMPING UNIT, LINE HEATER, AND OIL PRESSURE REGULATOR OR PRESSURE RELIEF VALVE, HOWEVER, REQUIREMENTS ARE DEPENDENT UPON THE SPECIFIC BURNER SYSTEM (CONSULT HAUCK).

2. ALL HEAVY FUEL OIL PIPING MUST BE TRACED (ELECTRIC OR STEAM) AND INSULATED. SELF-REGULATING HEAT TRACING IS RECOMMENDED TO MAINTAIN THE DESIRED TEMPERATURE OF A GIVEN FUEL OIL TO ACHIEVE 90 SSU (1.8×10^{-5} M^2/SEC) AT THE BURNER. ELECTRICAL HEAT TRACING WITH A NOMINAL RATING OF 12 W/FT (39W/M) COVERED WITH A NOMINAL 2" (51MM) FIBERGLASS TYPE INSULATION IS SUFFICIENT FOR MOST APPLICATIONS.

3. OPTIONAL OIL MANIFOLDS CAN BE UTILIZED FOR MULTIPLE BURNERS FIRING INTO A COMMON HEATING CHAMBER, HOWEVER, SPECIAL FEATURES ARE REQUIRED IN THE ASSOCIATED CONTROL SYSTEM (SEE HAUCK APPLICATION SHEET GJ77).

(OVER)

ORDERING INFORMATION

To order a basic 780 Series burner, the following items must be specified:

1. Burner Size
2. Mounting Bracket Type
3. Butterfly Air Valve
4. Oil Regulator Set-Up Assembly
   - Manual Shutoff Valve
   - Edge Plate Filter (FEP)
   - Oil Pressure Regulator
   - Pressure Gauge
5. Furnace Mounting Plate
6. Refractory Ignition Tile
7. Ignition Pilot Gas Unit (IPG)

Accessory items:

1. Low Fire Limit Switch
2. Ignition Chamber Unit (ICU)
3. Bracket, Ignition Chamber (ICB)

NOTE: In addition to the standard observation port located at 3 o'clock, extra observation ports are available in either the furnace mounting plate or refractory tile. The extra observation port for 779 through 783 burners can be located at 6, 9 or 12 o'clock. For 784 through 786 burners, an extra observation port can be located 180° from the standard observation port. Observation port brackets (1 1/2" FNPT or 2" MNPT) for scanner or observation port are also available.

780 SERIES SELF-PROPORTIONING OIL BURNERS

MODIFYING FLAME CHARACTERISTICS

The Hauck 780P Series burner has been designed to operate efficiently with the oil flame characteristics required on the majority of normal applications. In circumstances and furnace environments where other than normal flame characteristics are desired, slight modifications can be made to the standard burner nozzle prior to shipment. Counter rotary air holes, deflector vane and air straightener assemblies are engineered to shorten, lengthen, or otherwise modify the 780P flame. The nature of these changes requires close coordination between the user and the factory. Hauck Application Engineers will gladly discuss your particular requirements and coordinate the burner nozzle modifications needed to meet your specific requirements.

FLAME SUPERVISION

All 780P Series burners accommodate flame supervision. Hauck strongly recommends the use of flame supervision on 780P series burners. Consult Hauck for recommendations on properly outfitting the 780P burner for flame supervision. In addition to flame supervision, Hauck recommends the use of spark ignited gas pilots for main burner ignition. A complete line of gas pilots, gas pilot accessories and flame supervision equipment is available from Hauck. The Combination Accessory Mounting Bracket provides the most flexibility for flame supervision, pilot ignition and future natural gas conversions.

Approximate Weights – In Pounds

Burner Model	Burner	Furnace Mounting Plate	Pyramid Mounting Bracket	Combination Accessory Mounting Bracket	Ignition Tile	ICU
779	8	17	6	5 – Pyramid Type	34	280
780	16	40	10	6	88	350
781	22	50	15	8	126	520
782	33	74	21	16	218	685
783	41	74	21	16	214	730
784	75	92	30	25	150	945
785	75	92	30	25	150	1050
786	109	92	45	40 – Pyramid Type	150	1200

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