

Design and Application Details

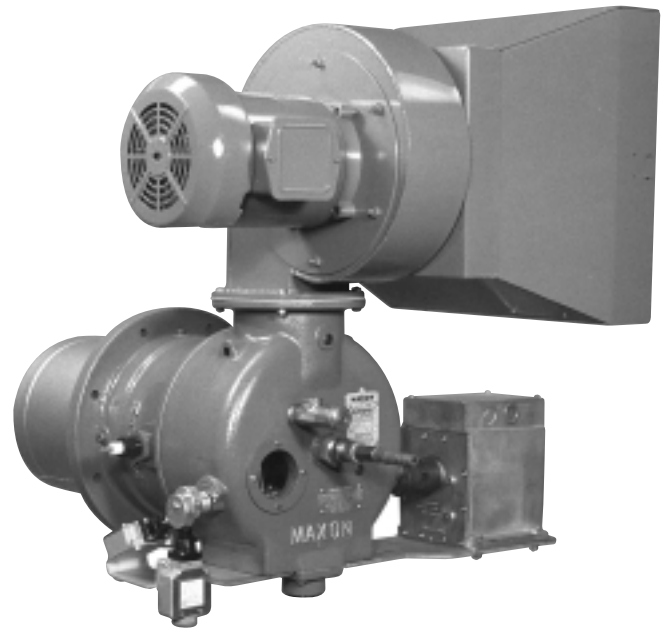
OVENPAK®-II Burners are nozzle-mixing gas burners for many industrial direct-fired applications where clean combustion and high turndown are required. They are simple and versatile for use on a variety of heating applications.

The Model "400" OVENPAK®-II Burner (shown at right) includes a face-mounted motor, blower with non-sparking paddle wheel-type impeller, pilot, spark ignitor, stainless steel discharge sleeve, mixing cone, self-contained internal air and gas proportioning valves, and provision for your flame safeguard sensor.

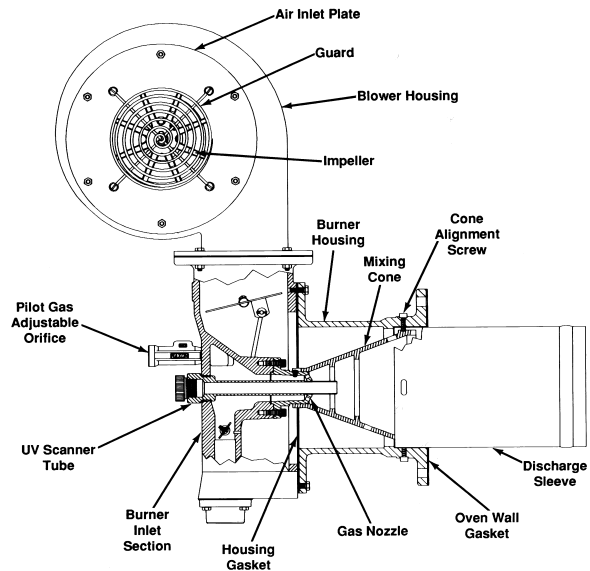
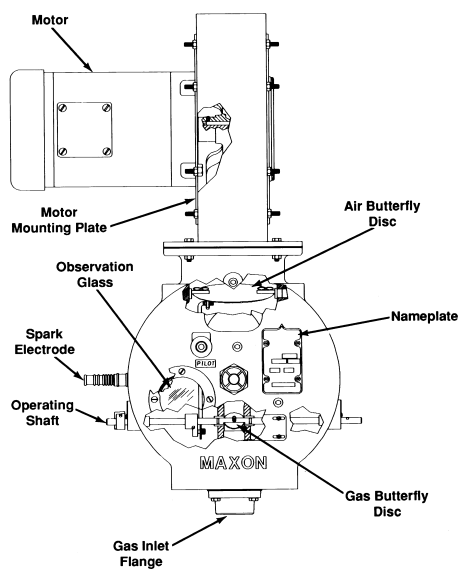
The blower housing can be rotated and mounted in three alternate locations in 90° increments around the burner air inlet center line. Control motor and low fire start switches may be mounted on either the right or left hand side of burner body.

Principle of operation (illustrated below)

The OVENPAK®-II Burner is designed for industrial air heating applications. It is available in two basic versions: 1) packaged with integral combustion air blower, or 2) for use with an external blower. Both versions include a gas and air valve, internally linked together to control the gas-air ratio over the full operating range. The gas flows through the nozzle, then along the inside of the burner cone where combustion air is progressively and tangentially mixed with the gas. This produces a very wide turndown range and a highly stable flame under a variety of operating conditions.



Model 415 OVENPAK®-II Gas Burner with optional combustion air filter, high and low fire position switch set, spark ignitor, provision for customer's UV scanner and with connecting base and linkage for electrical control motor



Cross-sectional views of a Model "400" OVENPAK®-II Gas Burner

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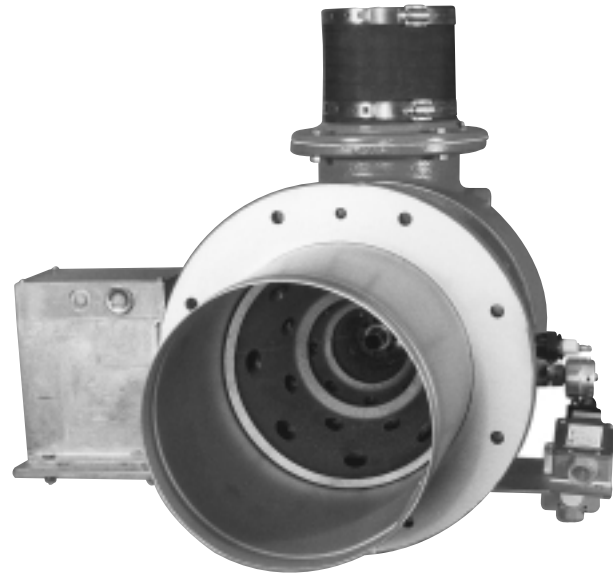
Model "EB" (external blower) OVENPAK®-II Burners (shown in photos), like all OVENPAK® Burner assemblies, are designed to deliver heat through a patented mixing cone and stainless steel sleeve.

Flanged burner body design on all OVENPAK® Burner assemblies simplifies mounting and installation on your application. Burner can be installed in any position that does not conflict with your control motor or flame detector requirements.

Minimal torque requirements permit use of most electric or air operators in conjunction with the optional (Maxon supplied) connecting base and linkage assemblies.



Model EB-3 OVENPAK®-II Burner with large viewing port, spark ignitor, standard pilot gas adjustable orifice, optional low fire start switch arrangement, and connecting base and linkage for mounting customer's control motor



View into metallic cone of Model EB-3 OVENPAK®-II Burner, arranged for external blower source, with connecting base and linkage assembly to adapt customer's automatic control motor, and optional low fire start switch arrangement. Inlet air piping uses flexible connector set.

Capacities and Specifications

Standard Model "400" OVENPAK®-II Burner includes a combustion air blower with face-mounted motor.

Maximum capacity of Model "400" OVENPAK®-II Burner is affected by the static pressure within the combustion chamber. Data shown assumes firing in the open, or into an airstream with enough oxygen to complete the combustion process. If burner is fired into an oxygen-starved chamber or airstream, capacities may be reduced as much as 25-30%. Do not attempt to operate beyond the duct static pressure range shown. For higher back pressure applications, select from Model "EB" OVENPAK®-II Burner options.

All gas pressures are differential pressures and are measured at the gas pressure test connection on the backplate of each OVENPAK®-II Burner. Differential pressures shown are approximate.

Motor Voltages Available (60 Hz & 50Hz)

Horsepower	Type	60 Hz	115/208-230/1/60	208-230/460/3/60	575/3/60
		50 Hz [1]	190-200/1/50	380-415/3/50	500/3/50
1/3	Totally Enclosed		X	X	X
3/4 & 1	Totally Enclosed		X	X	X
1-1/2, 2, & 3	Totally Enclosed		Not Available	X	X

[1] Possible net extra cost

For operation on 50 Hz, reduce OVENPAK®-II Burner capacities by 83% and pressures to 70% of those shown.

Capacities and Operating Data

OVENPAK®-II Burner Model		405	408	415	425	435	445	456	470	487	
Motor Specification	Horsepower:	1/3	1/3	1/3	3/4	3/4	1	1-1/2	2	3	
	Frame Number:	56C	56C	56C	56C	56C	56C	143TC	145TC	145TC	
Maximum Capacities (1000's Btu/hr) <i>with Natural Gas Pressures</i> ("wc)	Duct Statics	-5.0 to -0.5" wc	550 <i>2.8"</i>	880 <i>3.4"</i>	1650 <i>1.7"</i>	2750 <i>2.7"</i>	3850 <i>2.2"</i>	5175 <i>3.4"</i>	6400 <i>3.6"</i>	8050 <i>3.7"</i>	10060 <i>4.6"</i>
		±0" wc	500 <i>2.3"</i>	800 <i>2.8"</i>	1500 <i>1.4"</i>	2500 <i>2.2"</i>	3500 <i>1.8"</i>	4500 <i>2.6"</i>	5600 <i>2.8"</i>	7000 <i>2.8"</i>	8700 <i>3.4"</i>
		+1.0" wc	475 <i>2.1"</i>	760 <i>2.6"</i>	1425 <i>1.3"</i>	2375 <i>2.0"</i>	3325 <i>1.6"</i>	4280 <i>2.3"</i>	5340 <i>2.3"</i>	6570 <i>2.5"</i>	8400 <i>3.2"</i>
		+2.0" wc	450 <i>1.9"</i>	720 <i>2.3"</i>	1350 <i>1.1"</i>	2250 <i>1.8"</i>	3150 <i>1.4"</i>	4125 <i>2.2"</i>	5200 <i>2.4"</i>	6300 <i>2.3"</i>	8200 <i>3.0"</i>
		+3.0" wc	---	---	---	---	---	---	5000 <i>2.2"</i>	5500 <i>1.7"</i>	7500 <i>2.5"</i>
		+4.0" wc	---	---	---	---	---	---	4600 <i>1.9"</i>	5000 <i>1.4"</i>	6200 <i>1.7"</i>
		+5.0" wc	---	---	---	---	---	---	4100 <i>1.5"</i>	4500 <i>1.2"</i>	5500 <i>1.4"</i>
		+6.0" wc	---	---	---	---	---	---	---	3500 <i>0.7"</i>	5000 <i>1.1"</i>
Minimum Capacities (1000's Btu/hr)	Main plus pilot	15		37	60	87	110	125	150	175	
	Pilot only	10		20	35	45	90	105	115	117	
Required natural gas differential pressure to burner inlet ("wc)		2.8	3.3	3.0	2.4	2.7	3.5	5.1	5.2	7.6	
Approximate flame length in still air		1/2 to 1 ft.		2-1/2 to 3-1/2 ft.		3-1/2 to 5 ft.	4 to 6 ft.	5 to 7 ft.	6 to 8 ft.	8 to 10 ft.	

Capacities and Specifications External Blower (EB) versions

EB-1 OVENPAK®-II Burner	Combustion and Cooling Air Required	Differential Air Pressure ("wc)	3	4	5	6	8	9	10	11
		Volume (SCFM)	150	170	190	210	240	255	270	280
	Heat Releases (1000's Btu/hr)	Maximum Capacity	460	580	715	780	870	910	960	1000
		Minimum & pilot	60	60	60	60	60	60	60	60
		Pilot only	45	45	45	45	45	45	45	45
	Natural Gas Differential Pressures ("wc)	At burner inlet	2.1	3.4	5.1	6.1	7.6	8.3	9.2	10.0
		At burner gas test connection	2.0	3.1	4.7	5.6	7.0	7.6	8.5	9.2
Flame Lengths	In still air	4" to 15" beyond end of discharge sleeve								

EB-2 OVENPAK®-II Burner	Combustion and Cooling Air Required	Differential Air Pressure ("wc)	3	4	5	6	8	9	10	11
		Volume (SCFM)	220	250	280	310	355	375	395	415
	Heat Releases (1000's Btu/hr)	Maximum Capacity	750	980	1200	1330	1450	1500	1550	1600
		Minimum & pilot	60	60	60	60	70	70	75	80
		Pilot only	25	25	25	25	30	30	35	35
	Natural Gas Differential Pressures ("wc)	At burner inlet	3	5.2	7.8	9.5	11.3	12.1	12.9	13.8
		At burner gas test connection	2.5	4.2	6.3	7.7	9.2	9.8	10.5	11.2
Flame Lengths	In still air	12" to 30" beyond end of discharge sleeve								

EB-3 OVENPAK®-II Burner	Combustion and Cooling Air Required	Differential Air Pressure ("wc)	3	4	5	6	8	9	10	11
		Volume (SCFM)	350	405	455	495	575	615	650	675
	Heat Releases (1000's Btu/hr)	Maximum Capacity	1620	1900	2120	2320	2670	2840	3000	3150
		Minimum & pilot	90	95	105	115	130	140	150	155
		Pilot only	45	45	50	55	65	70	75	75
	Natural Gas Differential Pressures ("wc)	At burner inlet	4.1	5.6	7.0	8.3	11.0	12.5	13.9	15.4
		At burner gas test connection	1.6	2.2	2.8	3.3	4.4	5.0	5.6	6.2
Flame Lengths	In still air	2 to 3 feet beyond end of discharge sleeve								

EB-4 OVENPAK®-II Burner	Combustion and Cooling Air Required	Differential Air Pressure ("wc)	3	4	5	6	8	9	10	11
		Volume (SCFM)	550	635	710	775	895	950	1000	1050
	Heat Releases (1000's Btu/hr)	Maximum Capacity	2320	2800	3230	3500	3950	4150	4330	4600
		Minimum & pilot	100	115	130	140	160	170	180	190
		Pilot only	40	40	40	45	50	55	55	60
	Natural Gas Differential Pressures ("wc)	At burner inlet	2.5	3.7	4.9	5.8	7.4	8.1	8.8	10.0
		At burner gas test connection	1.9	2.8	3.7	4.3	5.5	6.1	6.6	7.5
Flame Lengths	In still air	2-1/2 to 3-1/2 feet beyond end of discharge sleeve								

Capacities and Specifications External Blower (EB) versions

EB-5 OVENPAK®-II Burner	Combustion and Cooling Air Required	Differential Air Pressure ("wc)	3	4	5	6	8	9	10	11
		Volume (SCFM)	665	770	860	940	1080	1150	1210	1270
	Heat Releases (1000's Btu/hr)	Maximum Capacity	2940	3500	3980	4420	5130	5450	5740	6000
		Minimum & pilot	155	180	200	220	255	270	285	300
		Pilot only	25	30	35	35	40	45	50	50
	Natural Gas Differential Pressures ("wc)	At burner inlet	2.2	3.1	4.0	4.9	6.6	7.5	8.3	9.1
		At burner gas test connection	1.3	1.8	2.3	2.9	3.9	4.4	4.8	5.3
Flame Lengths	In still air	3 to 5 feet beyond end of discharge sleeve								

EB-6 OVENPAK®-II Burner	Combustion and Cooling Air Required	Differential Air Pressure ("wc)	3	5	8	11	16	18	22	24
		Volume (SCFM)	975	1260	1590	1870	2250	2390	2640	2760
	Heat Releases (1000's Btu/hr)	Maximum Capacity	4710	6700	9500	11200	13500	14300	15800	16500
		Minimum & pilot	335	390	490	575	695	735	815	850
		Pilot only	100	100	100	115	140	145	165	170
	Natural Gas Differential Pressures ("wc)	At burner inlet	2.8	5.6	11.3	15.7	22.8	25.6	31.3	34.1
		At burner gas test connection	2.0	4.0	8.1	11.2	16.3	18.3	22.3	24.3
Flame Lengths	In still air	3 to 8 feet beyond end of discharge sleeve				8 to 12 feet beyond end of discharge sleeve				

EB-7 OVENPAK®-II Burner	Combustion and Cooling Air Required	Differential Air Pressure ("wc)	3	5	8	11	16	18	22	24
		Volume (SCFM)	975	1260	1590	1870	2250	2390	2640	2760
	Heat Releases (1000's Btu/hr)	Maximum Capacity	4710	6700	9500	11200	13500	14300	15800	16500
		Minimum & pilot	335	390	490	575	695	735	815	850
		Pilot only	100	100	100	115	140	145	165	170
	Natural Gas Differential Pressures ("wc)	At burner inlet	1.8	3.6	7.3	10.1	14.8	16.6	20.2	22.1
		At burner gas test connection	1.0	2.0	4.1	5.6	8.2	9.2	11.2	12.2
Flame Lengths	In still air	3 to 8 feet beyond end of discharge sleeve				8 to 12 feet beyond end of discharge sleeve				

Accessory Options

Air filter assemblies and silencers

Air filter assemblies help to trap airborne particulate matter. They are offered with washable replaceable filter elements or with permanent metallic elements. Filters mount onto OVENPAK®-II Burner's blower housing and surround the combustion air inlet.

Filter silencers help reduce noise levels. They physically become a part of the OVENPAK®-II Burner's filter housing and enclose the combustion air inlet (as shown in photograph at right). They **must** be furnished in conjunction with a filter element assembly described above.

Sound levels from actual tests conducted at full-rated 60 Hz capacity are shown in table at right. Measurements are the average maximum at high fire for standard burner (natural gas, 8" discharge sleeve).

Burner Size	Sound Level (dBA)
405	80
408	83
415	84
425	86
435	86
445	90
456	90
470	93
487	93

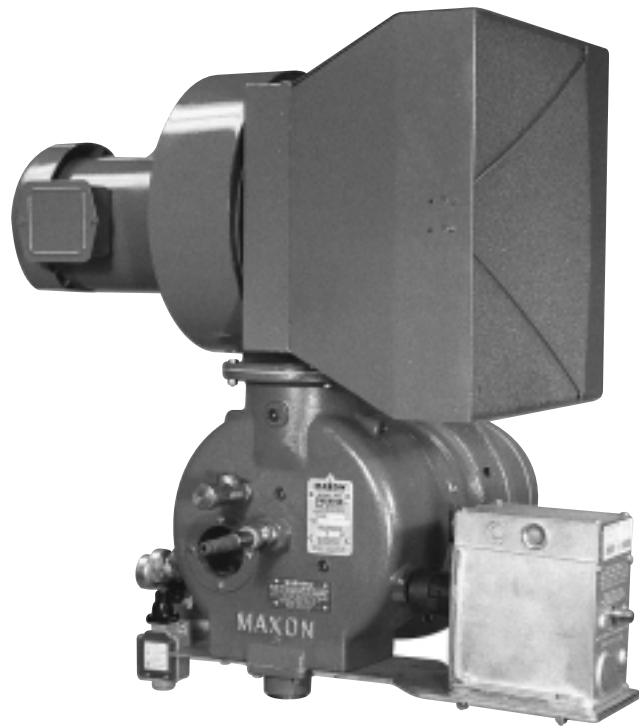
When accessories and/or options are added, use the following guidelines to calculate sound levels.

Filter (permanent)	add 2 dB (3dB)
Silencer (with permanent filter)	subtract 2 db (1 dB)
12" discharge sleeve	add 2 dB
50 Hz motor – 83% capacity	subtract 2 dB
Propane gas	add 4 dB

Combine the adds and subtracts for net change when calculating sound levels with more than one of these options/accessories. (Example: A burner with silencer and operating on propane would be 2 dB louder.)

Silencer includes filter element as standard.

NOTE: Background may affect on-site measurements.



Model 415 OVENPAK®-II Burner assembly with combustion air filter assembly (including replaceable foam filter element). **Permanent metallic filter element** may be substituted for standard foam filter element at extra cost.

Accessory Options

Auxiliary Switches

Low Fire (or Set Position) Switch Assembly includes one cam-actuated switch (2 SPST circuits) which can be set to open a circuit when burner leaves minimum (or set) position. It meets NEMA #4/IP665 standards for weatherproof, outdoors, non-hazardous locations.

High and Low Fire Position Switch Assembly includes 2 cam-actuated switches (each with 2 SPST circuits). One switch may be field-set to activate at high fire position, while the other is set to activate at low fire position.



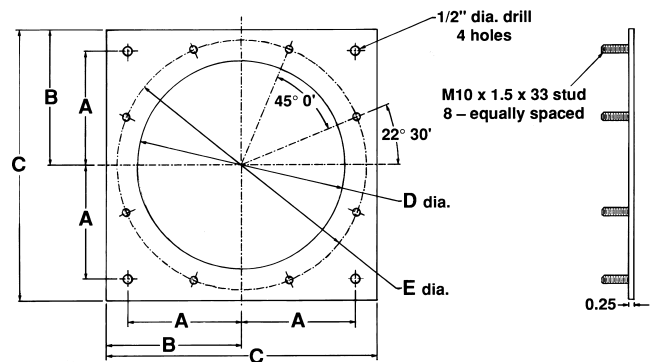
Optional high and low fire position switch set shown on OVENPAK®-II Burner assembly

Air Butterfly Position Switch Set provides one switch (2 SPST circuits) to monitor physical movement and/or position of OVENPAK®-II Burner's air butterfly control valve.

Discharge Sleeves are available in 3 versions:

- **Standard sleeve** is 8" long, made of #310 SS, and is suitable for downstream temperatures up to 1000°F (538°C).
- **For higher velocities**, specify 12" long sleeve made of #310 SS for downstream temperatures up to 1000°F (538°C).
- **For higher downstream temperatures** between 1000°F (538°C) and 1500°F (816°C), specify 8" long, #RA 330 SS sleeve.

Oven Wall Adapter Plate provides a means of mounting an OVENPAK®-II Burner in place of an older style Model "400" OVENPAK® Burner.

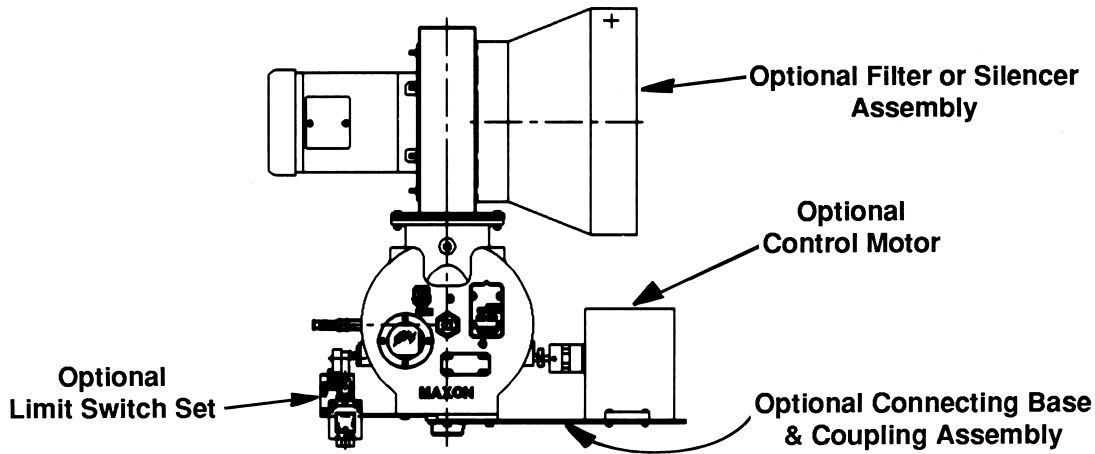


Oven wall adapter plate dimensions (in inches)

Discharge sleeve diameter	6"	8"	10"	12"
A	3.62	4.44	5.62	6.69
B	5.12	6.12	6.69	8.25
C	10.25	12.25	13.38	16.50
D	7.28	9.34	11.25	13.25
E	8.75	10.50	12.31	14.75

OVENPAK®-II Burner Configurations

Maxon OVENPAK®-II Burner provides additional application flexibility with multiple component arrangements. The standard configuration illustrated in the center of this page may easily be switched to any of these other configurations to accommodate field-site space requirements.



Standard Configuration
(as shipped from factory)

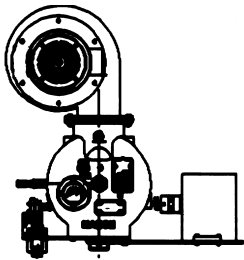


Figure 1
Blower scroll case to
LEFT with control motor
on RIGHT

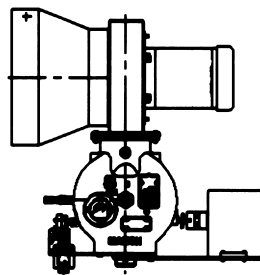


Figure 2
Combustion air filter
housing to LEFT with
control motor on RIGHT

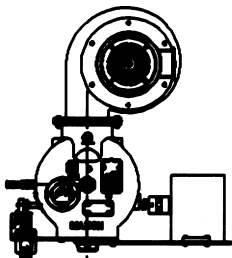


Figure 3
Blower scroll case to
RIGHT with control
motor on RIGHT

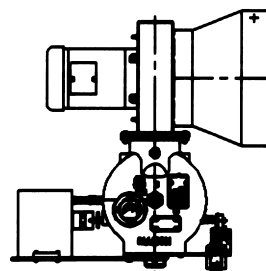
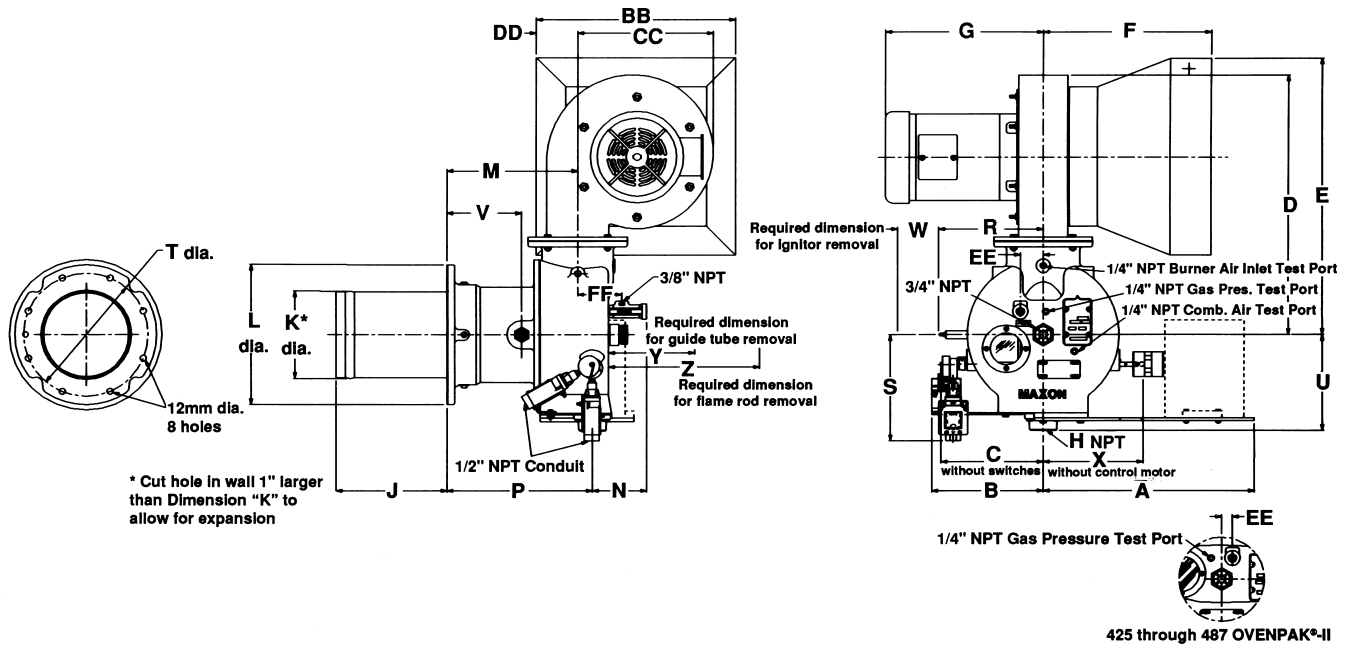


Figure 4
Combustion air filter
housing to RIGHT with
control motor on LEFT

NOTE: Optional switch sets are always on opposite side from mounted control motor

Dimensions (in Inches)

Model "400" OVENPAK®-II Burners



Model	A	B	C	D	E	F	G	H	J	K	L	M	N	P
405								1	8.0	6.25	10.0	9.38	4.00	10.38
408	15.25	7.88	7.25	18.62	19.75	11.75	11.19	1-1/4	8.0	8.31	12.0	9.31	4.00	10.31
415										8.31	12.0	9.31		
425	16.25	7.81	7.88	23.3	27.4	17.25	11.44	1-1/2	7.85	10.25	13.31	10.94	6.06	11.94
435								2	7.62	12.25	16.25	15.56	6.44	16.56
445				26.7	30.0	17.38	14.44							
456	15.06	6.69	6.81	28.9	31.2	17.38	15.38	3	7.62	12.25	16.25	15.56	6.44	16.56
470							16.44							
487							17.31							

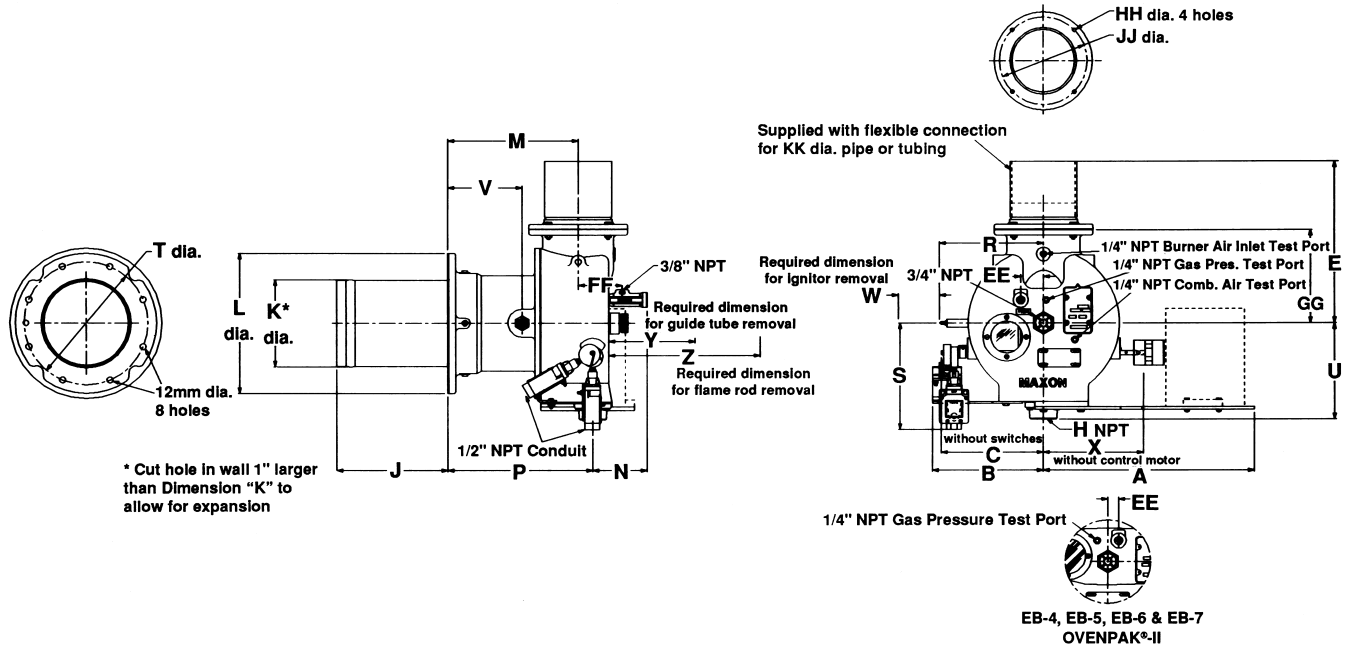
Model	R	S	T	U	V	W	X	Y	Z	BB	CC	DD	EE	FF
405														
408	8.25	8.81	8.75	6.81	5.31	3.12	7.25	5.88	13.06	14.0	8.5	2.81	1.62	3.31
415	7.5		10.5		5.25	3.88								
425	8.81	7.81	12.31	7.19	5.31	4.31	7.88	8.31	17.62	23.2	11.31	6.06		4.31
435														
445	10.56	9.69	14.75	6.38	8.88	3.69	6.81	9.88	23.6	25.1	13.44	5.5	.75	4.69
456				6.94							17.38	4.31		
470														
487														

NOTE: All OVENPAK®-II Burners use ISO standard (metric) fasteners

Pipe threads on this page conform to NPT (ANSI Standard B2.1)

Dimensions (in Inches)

Model "EB" OVENPAK®-II Burner



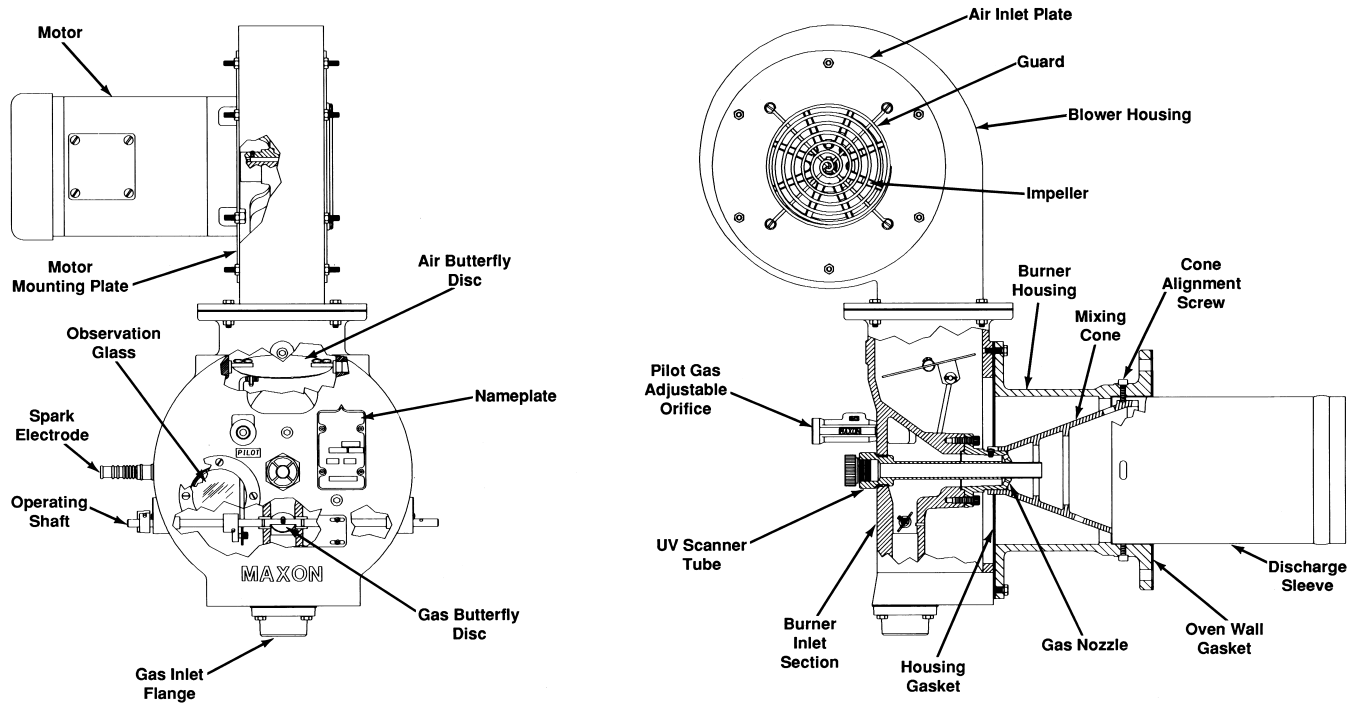
Model	A	B	C	E	H	J	K	L	M	N	P	R	S
EB-1					1		6.25	10.0	9.38		10.38	8.25	
EB-2	15.25	7.88	7.25	11.5		8.0				4.06			8.81
EB-3					1-1/4		8.31	12.0	9.31		10.31	7.5	
EB-4	16.25	7.81	7.88	15.5	1-1/2	7.85	10.25	13.31	10.94	6.06	11.94	8.81	7.81
EB-5					2								
EB-6	15.06	6.69	6.81	16.56		7.62	12.25	16.25	15.56	6.44	16.56	10.56	9.69
EB-7					3								

Model	T	U	V	W	X	Y	Z	EE	FF	GG	HH	JJ	KK
EB-1													
EB-2	8.75	6.81	5.31	3.12	7.25	5.88	13.06	1.62	3.31	6.69	7mm	6.25	4.5
EB-3	10.5		5.25	3.88									
EB-4	12.31	7.19	5.31	4.31	7.88	8.31	17.62		4.31	8.50		8.25	6.62
EB-5								.75			12mm		
EB-6	14.75	6.38	8.88	3.69	6.81	9.88	23.6		4.69	9.50		10.25	8.62
EB-7		6.94											

NOTE: All OVENPAK®-II Burners use ISO standard (metric) fasteners

Pipe threads on this page conform to NPT (ANSI Standard B2.1)

Component Identification



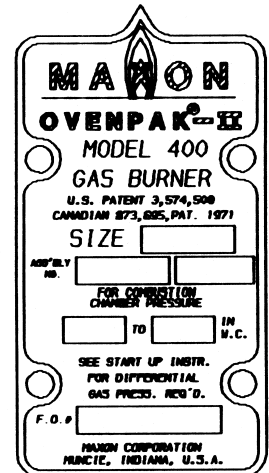
Suggested spare parts

- Spark Ignitor
- Flame Rod, if used
- Motor
- Impeller
- Gas/Air Valve Linkage Kit
- Discharge Sleeve
- Oven Wall Gasket
- Filter Elements, if used
- Mixing Cone

To order parts for an existing OVENPAK®-II Burner assembly, list:

1. Name(s) of part(s) from above illustration
2. Quantity of each required
3. OVENPAK®-II Burner nameplate information:
 - size of burner
 - assembly number and date
 - Factory Order number

Nameplate



Suggested Maintenance/Inspection Procedures

Discharge sleeve and cone alignment

The mixing cone is self-centering within the burner housing and discharge sleeve to provide a small annular opening for the flow of some cooling combustion air along the discharge sleeve wall. We SUGGEST periodic inspection from the discharge side of the burner to assure that this clearance is maintained.

Blockage of the annular opening will lessen burner service life.

Filters should be inspected regularly and cleaned, using a vacuum to remove loose/dry accumulations, then washing and/or degreasing as appropriate for the filter type used.

To replace flame rod or spark ignitor:

1. Check Table 1 at right for dimension Y and cut tip to length shown.
2. Insert 1/2" NPT collar into burner and snug into position.
3. Insert insulator through collar into burner.
4. Check table for dimension X, position accordingly, and tighten locking bushing until insulator is held firmly.

WARNING: Over-tightening locking bushing may damage ceramic insulator.

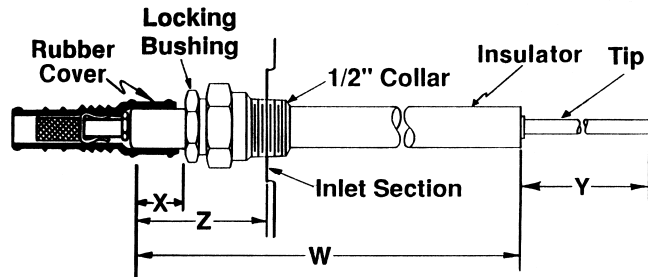


Table 1: Flame rod and spark ignitor dimensions for all Model "400" OVENPAK®-II Burners

Burner Model		Spark Ignitor Dimensions (in inches)			Flame Rod Dimensions (in inches)		
		X	Y	W	X	Y	Z
EB-1	405	2	0.4	5.5	.9	6	3.2
EB-2	408						
EB-3	415	1.2		6.5	.9	10.8	3.2
EB-4	425	1.8					
EB-5	435	2.4	0.4	8.25	1.0	11.75	---
EB-6	445						
EB-7	456						
	470						
	487						