

Maxon Model "500-SP" OVENPAK® Gas/Oil Burners



Model 515-SP OVENPAK® Burner
with connecting base and linkage
assembly and automatic electric
control motor

- Burns clean fuel gases, light oils, or both simultaneously
- Provides stand-by or alternate fuel capabilities
- Gas-only version converts easily to combination fuel firing
- Low horsepower requirements reduce initial and operating costs
- Uses compressed air for oil atomization
- Clean combustion with low NOx levels
- Compact design for easy installation and maintenance

Model "500-SP" OVENPAK® Burner applications have included:

Air heating in ovens and dryers, paint finishing lines, paper and textile machines, food baking ovens, coffee roasters, grain dryers, and fume incinerators. Manufactured under U.S. patent #3,574,508; Canadian and European patents granted and pending.



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Maxon Model "500-SP" OVENPAK® Gas/Oil Burners

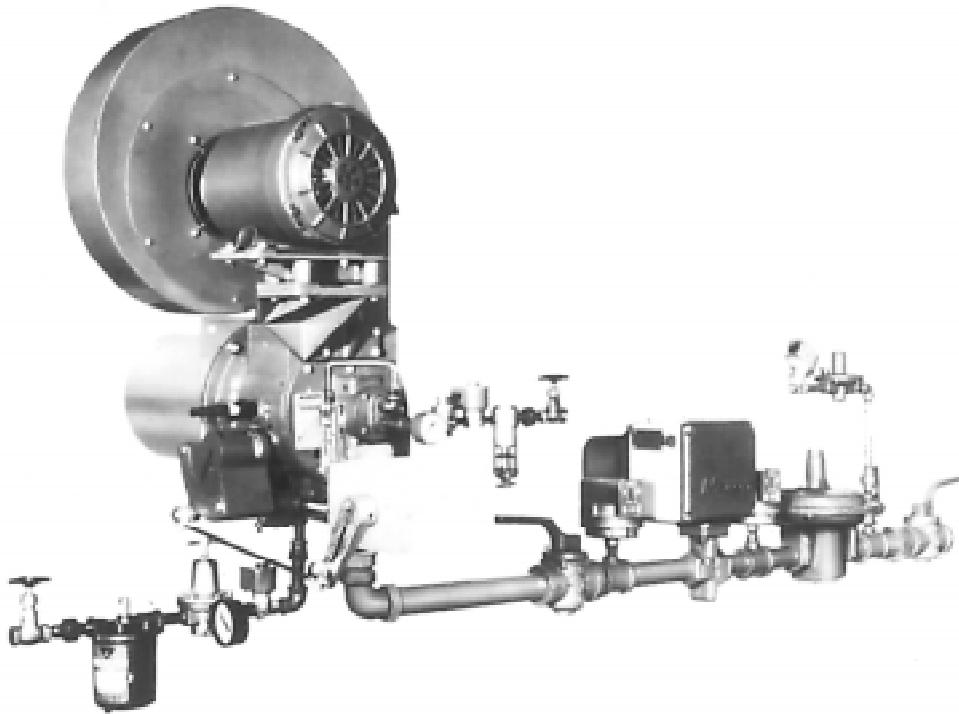


Model EBC-4-SP OVENPAK® Combination Gas/Oil Burner with automatic electric control motor

Provides application flexibility with:

- Turndown up to 20:1
- Heat releases to 10,500,000 Btu/hr
- Over 40 different styles and sizes
- Pre-assembled pipe train accessory options for easy installation and start-up
- Cost-effective external blower (EB) version

Typical pipe train components required for combination fuel firing of Model "500-SP" OVENPAK® Burner system



Design and Application Details

Maxon OVENPAK® Burners are nozzle-mixing burners specifically designed for direct-fired applications in ovens and dryers where clean combustion is required.

Typical applications for Model "500" OVENPAK® Burners include air heating in ovens and dryers, paint lines, paper and textile machines, food-baking ovens, coffee roasters, grain dryers and fume incinerators.

Principle of operation

Model "500" OVENPAK® Burners are available in gas-only (500-G) and combination gas/oil (500-SP) versions. Both incorporate a fuel and air valve linked together to control the fuel-air ratio over the full operating range.

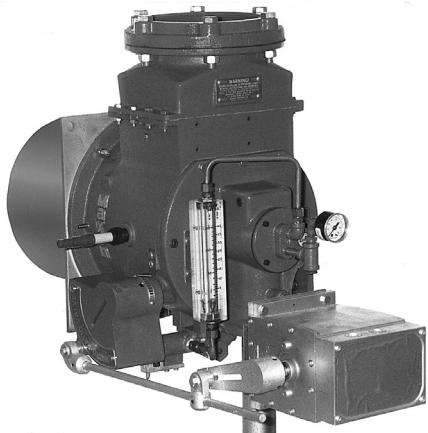
The combination (500-SP) burner also has an integrated oil control valve mounted into the burner body. All valves work together. The choice of fuels is up to you: gas, oil, or both at the same time.

Both gas-only and combination burners are available in two basic versions: 1) packaged with integral combustion air blower, or 2) for use with an external blower (EB versions).

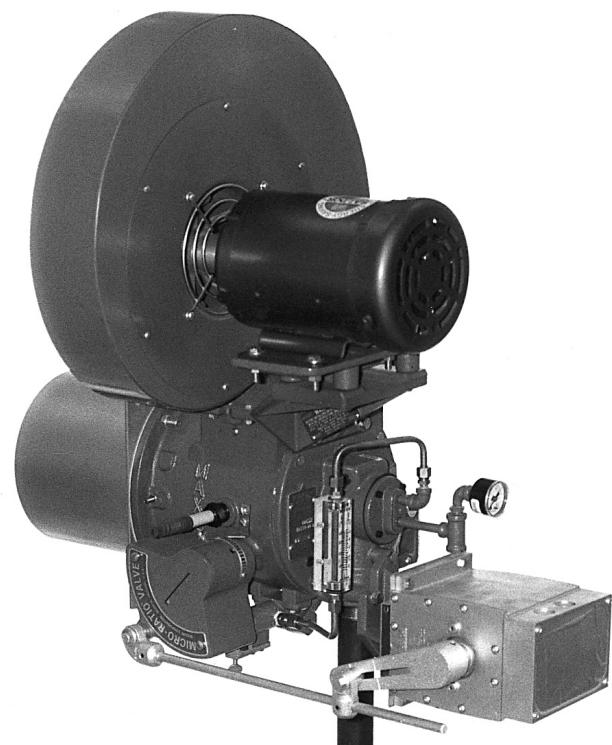
When firing on oil, compressed air provides good atomization. The oil flow pattern inside the mixing cone results in intimate mixing with the combustion air.

In combination fuel firing, gas is introduced around the patented oil nozzle and both gas and oil are controlled in conjunction with the air damper.

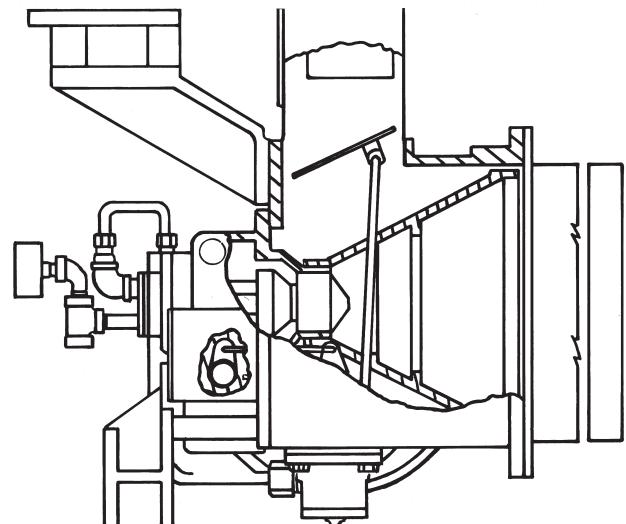
"EB-MRV" versions of OVENPAK® Burners permit air/fuel ratio control via an externally-mounted Maxon MICRO-RATIO® control valve throughout the firing range. They differ from standard "EB" (external blower) versions in that internal gas and air butterflies and the related shafts and linkages are omitted.



Model "EBC-4 SP" OVENPAK® Gas/Oil Burner



Model "515-SP" OVENPAK® Gas/Oil Burner



Cross sectional view of a Model "500-SP" OVENPAK® Burner

Capacities and Specifications – 60 Hertz

The standard Model "500-SP" OVENPAK® Burner package includes a combustion air blower with motor in a variety of voltages. You may select from:

Horsepower	Type	115/230/1/60	230/460/3/60	575/3/60
3/4 HP & 1 HP	Totally Enclosed	X	X	X
1-1/2 HP, 2 HP & 3 HP	Totally Enclosed	Not Available	X	X

Capacities and operating data are summarized in the table below and on page 2305.

Broad operating flexibility allows firing against positive chamber pressures of 1" wc or less (higher for EB versions) or with as much as 5" wc suction. Air stream velocities of up to 2000 fpm (firing across flow) or 3000 fpm (firing parallel to air flow) are tolerated.

Capacities for 60 hertz applications

Burner Model Number		508-SP	515-SP	525-SP	535-SP	550-SP
Motor Horsepower and Frame Number		3/4 HP FR #56	3/4 HP FR #56	1 HP FR #56	1-1/2 HP FR #143T	3 HP FR #182T
Maximum capacity	1000's Btu/hr	800	1500	2500	3500	5000
Fuel flow volumes	Cubic feet per hour natural gas	800	1500	2500	3500	5000
	Gallons per hour #2 fuel oil	5.7	11	18	25	36
Minimum capacity (1000's Btu/hr) with compressed air off	Natural gas pilot (only)	18	38	40	50	70
	Natural gas main (only)	40	75	100	175	250
Minimum capacity (1000's Btu/hr) with compressed air on	Natural gas pilot (only)	72	114	125	200	250
	#2 fuel oil (only)	224	280	224	238	406
	Gallons per hour	1.6	2.0	1.6	1.7	2.9
Compressed air required (for oil firing only)	Pressure (PSIG)	60	60	60	60	60
	Volume (SCFM)	5.2	7.8	8.0	8.0	12.6
Differential natural gas pressure required ("w.c.)	At burner inlet	2.4	6.2	3.1	4.9	3.8
	At burner test connection	2.0	3.0	2.4	3.8	3.0
#2 oil pressure required	At control valve (PSIG)	30	22	42	48	54
Sound level dB(A)	Burner Only - Natural Gas	84	85	87	90	95
	Burner w/ silencer - Natural Gas	76	76	75	79	85
	Burner Only - #2 Oil	85	85	87	91	96
	Burner w/ silencer - #2 Oil	78	76	77	79	85
Flame Length	Inches, in still air	20	56	58	60	60

NOTE: Since the maximum capacity of the OVENPAK® Burner is affected by the static pressure within the duct or combustion chamber, **do not attempt** to operate a Model "500" OVENPAK® Burner beyond this static pressure range. For higher back pressure applications, select from Model "EBC", "EBG", or "EB-MRV" OVENPAK® Burner options.

Capacity data for gas or oil firing of Model "500-SP" OVENPAK® Burners is based on use of #2 fuel oil with a maximum viscosity of 40-50 SSU, a heating value of approximately 140,000 Btu per gallon, and/or natural gas at 1000 Btu per cubic foot, .6 specific gravity.

NOTE: All fuel supply pressures are differential pressures as measured at the fuel pressure test connection on the backplate of the burner. Differential pressures shown are approximate.

Propane firing requires fuel pressures at the test connection that are 40% of those given for natural gas.

Use only UV flame sensor systems for oil firing.

Capacities and Specifications – 50 Hertz

A standard Model "500-SP" OVENPAK® Burner includes a combustion air blower with motor in a variety of voltages. You may select from:

50 Hz Motor Voltages Available (possible net extra cost)

Horsepower	Type	190-200/1/50	380-415/3/50	500/3/50
3/4 HP & 1 HP	Totally Enclosed	X	X	X
1-1/2 HP, 2 HP & 3 HP	Totally Enclosed	X	X	X

Since maximum capacity of Model "500-SP" OVENPAK® Burner is affected by the static pressure within the combustion chamber, **do not attempt** to operate beyond the duct static pressure range shown on page 2304. For higher back pressure applications, select from Model "EBC", "EBG", or "EB-MRV" OVENPAK® Burner options.

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

Capacities for 50 hertz applications

Burner Model Number	508-SP	515-SP	525-SP	535-SP	550-SP
Motor Horsepower and Frame Number	3/4 HP FR #56	3/4 HP FR #56	1 HP FR #56	1-1/2 HP FR #143T	3 HP FR #182T
Maximum capacity	1000's Btu/hr	670	1250	2100	2900
Fuel flow volumes	Cubic feet per hour natural gas	670	1250	2100	2900
	Gallons per hour #2 fuel oil	4.8	9	15	21
Minimum capacity (1000's Btu/hr) with compressed air off	Natural gas pilot (only)	18	38	40	50
	Natural gas main (only)	40	75	100	175
Minimum capacity (1000's Btu/hr) with compressed air on	Natural gas pilot (only)	72	114	125	200
	#2 fuel oil (only) Gallons per hour	224 1.6	280 2.0	224 1.6	238 1.7
Compressed air required (for oil firing only)	Pressure (PSIG)	60	60	60	60
	Volume (SCFM)	5.2	7.8	8.0	8.0
Differential natural gas pressure required ("wc")	At burner inlet	1.7	4.3	2.2	3.4
	At burner test connection	1.4	2.1	1.7	2.6
#2 oil pressure required	At control valve (PSIG)	29	20	39	44
Sound level dB(A)	Burner Only - Natural Gas	84	85	87	90
	Burner w/ silencer - Natural Gas	76	76	75	79
	Burner Only - #2 Oil	85	85	87	91
	Burner w/ silencer - #2 Oil	78	76	77	79
Flame Length	Inches, in still air	20	56	58	60

Capacities and Specifications

External Blower versions

Model EBC-2 and EBC-3 OVENPAK® Burners

EBC-2 OVENPAK® Burner	Combustion and cooling air required	Differential air pressure ("wc)	2	4	6	8	10	12	14
		Volume (SCFM)	85	120	147	170	190	208	225
	Maximum capacity	1000's Btu/hr	499	706	864	998	1116	1222	1320
	Fuel flow volumes	Cubic feet per hour natural gas	499	706	864	998	1116	1222	1320
		Gallons per hour #2 fuel oil	3.6	5.0	6.2	7.1	8.0	8.7	9.4
	Minimum capacity (1000's Btu/hr) with compressed air off	Natural gas pilot (only)	25	35	40	50	60	80	100
		Natural gas main (only)	40	56	63	75	82	88	93
	Minimum capacity (1000's Btu/hr) with compressed air on	Natural gas pilot (only)	50	70	80	90	100	120	140
		#2 fuel oil (only)	175	175	175	175	175	175	175
		Gallons per hour	1.25	1.25	1.25	1.25	1.25	1.25	1.25
	Compressed air required (for oil firing only)	Pressure (PSIG)	60	60	60	60	60	60	60
		Volume (SCFM)	5.3	5.2	5.2	5.2	5.2	5.2	5.2
	Differential natural gas pressure required ("w.c.)	At burner inlet	1.1	2.3	3.4	4.6	5.7	6.9	8.0
		At burner test connection	0.9	1.7	2.6	3.4	4.3	5.1	6.0
	#2 oil pressure required	At control valve (PSIG)	30	31	34	36	38	39	40
	Flame length	Inches, in still air	14	22	25	26	28	29	30

EBC-3 OVENPAK® Burner	Combustion and cooling air required	Differential air pressure ("wc)	6	7	8	9	10	11	12
		Volume (SCFM)	460	496	531	563	593	622	650
	Maximum capacity	1000's Btu/hr	2065	2230	2384	2529	2666	2796	2920
	Fuel flow volumes	Cubic feet per hour natural gas	2065	2230	2384	2529	2666	2796	2920
		Gallons per hour #2 fuel oil	14.7	15.9	17.0	18.1	19.0	20.0	20.9
	Minimum capacity (1000's Btu/hr) with compressed air off	Natural gas pilot (only)	75	83	99	100	102	168	240
		Natural gas main (only)	90	100	119	120	122	202	288
	Minimum capacity (1000's Btu/hr) with compressed air on	Natural gas pilot (only)	104	106	108	120	140	175	280
		#2 fuel oil (only)	350	350	350	350	350	350	350
		Gallons per hour	2.5	2.5	2.5	2.5	2.5	2.5	2.5
	Compressed air required (for oil firing only)	Pressure (PSIG)	60	60	60	60	60	60	60
		Volume (SCFM)	7.7	7.7	7.7	7.7	7.6	7.6	7.6
	Differential natural gas pressure required ("w.c.)	At burner inlet	9.6	11.2	12.8	14.4	16.0	17.6	19.2
		At burner test connection	4.8	5.6	6.4	7.2	8.0	8.8	9.6
	#2 oil pressure required	At control valve (PSIG)	24	25	26	27	28	29	30
	Flame length	Inches, in still air	35	37	40	42	44	46	48

Capacities and Specifications

External Blower versions

Model EBC-4 and EBC-5 OVENPAK® Burners

EBC-4 OVENPAK® Burner	Combustion and cooling air required	Differential air pressure ("wc)	6	8	10	12	14	16	18	20
	Volume (SCFM)	489	565	632	692	747	799	847	893	
	Maximum capacity	1000's Btu/hr	2539	2931	3277	3590	3878	4146	4397	4635
	Fuel flow volumes	Cubic feet per hour natural gas	2539	2931	3277	3590	3878	4146	4397	4635
		Gallons per hour #2 fuel oil	18.1	20.9	23.4	25.6	27.7	29.6	31.4	33.1
	Minimum capacity (1000's Btu/hr) with compressed air off	Natural gas pilot (only)	150	200	220	260	280	290	300	310
		Natural gas main (only)	200	230	255	277	297	315	332	345
	Minimum capacity (1000's Btu/hr) with compressed air on	Natural gas pilot (only)	180	200	250	285	300	320	330	340
		#2 fuel oil (only)	252	252	252	252	252	252	252	252
		Gallons per hour	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
	Compressed air required (for oil firing only)	Pressure (PSIG)	70	70	70	70	70	70	70	70
		Volume (SCFM)	7.8	7.8	7.7	7.7	7.7	7.6	7.6	7.6
	Differential natural gas pressure required ("w.c.)	At burner inlet	2.9	3.9	4.9	5.9	6.9	7.8	8.8	9.8
		At burner test connection	2.3	3.1	3.9	4.7	5.5	6.2	7.0	7.8
	#2 oil pressure required	At control valve (PSIG)	49	51	53	55	58	59	60	62
	Flame length	Inches, in still air	32	36	38	42	42	44	48	52

EBC-5 OVENPAK® Burner	Combustion and cooling air required	Differential air pressure ("wc)	6	10	12	14	16	18	20	22
	Volume (SCFM)	611	789	864	933	998	1058	1116	1170	
	Maximum capacity	1000s Btu/hr	3499	4517	4948	5345	5714	6060	6388	6700
	Fuel flow volumes	Cubic feet per hour natural gas	3499	4517	4948	5345	5714	6060	6388	6700
		Gallons per hour #2 fuel oil	25.0	32.3	35.3	38.2	40.8	43.3	45.6	47.9
	Minimum capacity (1000's Btu/hr) with compressed air off	Natural gas pilot (only)	250	260	270	280	290	300	320	350
		Natural gas main (only)	228	304	330	350	375	395	420	440
	Minimum capacity (1000's Btu/hr) with compressed air on	Natural gas pilot (only)	300	305	310	320	330	340	375	400
		#2 fuel oil (only)	266	266	266	266	266	266	266	266
		Gallons per hour	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
	Compressed air required (for oil firing only)	Pressure (PSIG)	70	70	70	70	70	70	70	70
		Volume (SCFM)	8.8	8.7	8.7	8.6	8.6	8.5	8.5	8.5
	Differential natural gas pressure required ("w.c.)	At burner inlet	4.3	7.2	8.6	10.1	11.5	12.9	14.4	15.8
		At burner test connection	3.4	5.7	6.9	8.0	9.2	10.3	11.5	12.6
	#2 oil pressure required	At control valve (PSIG)	54	60	62	64	67	68	70	72
	Flame length	Inches, in still air	38	44	48	50	54	60	60	60

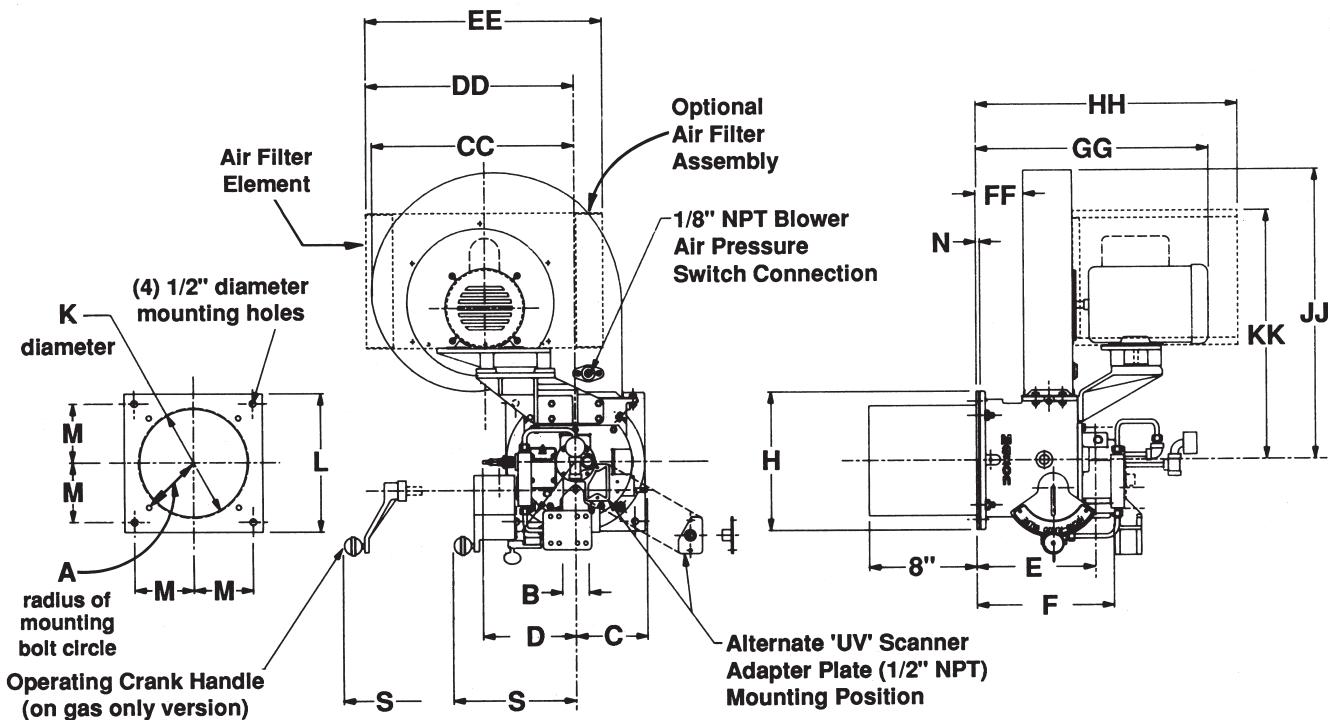
Capacities and Specifications

External Blower versions

Model EBC-6 OVENPAK® Burner

EBC-6 OVENPAK® Burner	Combustion and cooling air required	Differential air pressure ("wc)	6	8	10	12	14	16	18	20
		Volume (SCFM)	959	1107	1237	1356	1464	1565	1660	1750
	Maximum capacity	1000's Btu/hr	5505	6356	7106	7785	8408	8989	9534	10050
	Fuel flow volumes	Cubic feet per hour natural gas	5505	6356	7106	7785	8408	8989	9534	10050
		Gallons per hour #2 fuel oil	39.3	45.4	50.8	55.6	60.1	64.2	68.1	71.8
	Minimum capacity (1000's Btu/hr) with compressed air off	Natural gas pilot (only)	280	290	300	310	320	350	375	385
		Natural gas main (only)	340	380	400	420	570	650	680	700
	Minimum capacity (1000's Btu/hr) with compressed air on	Natural gas pilot (only)	300	310	320	330	340	370	400	410
		#2 fuel oil (only)	400	400	400	400	400	400	400	400
		Gallons per hour	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9
	Compressed air required (for oil firing only)	Pressure (PSIG)	70	70	70	70	70	70	70	70
		Volume (SCFM)	14.3	14.2	14.1	14.0	14.0	13.9	13.9	13.8
	Differential natural gas pressure required ("w.c.)	At burner inlet	4.1	5.5	6.9	8.3	9.7	11.0	12.4	13.8
		At burner test connection	3.2	4.2	5.3	6.3	7.4	8.4	9.5	10.5
	#2 oil pressure required	At control valve (PSIG)	56	59	63	66	68	69	71	72
	Flame length	Inches, in still air	66	72	76	78	78	80	80	80

Dimensions (in inches)

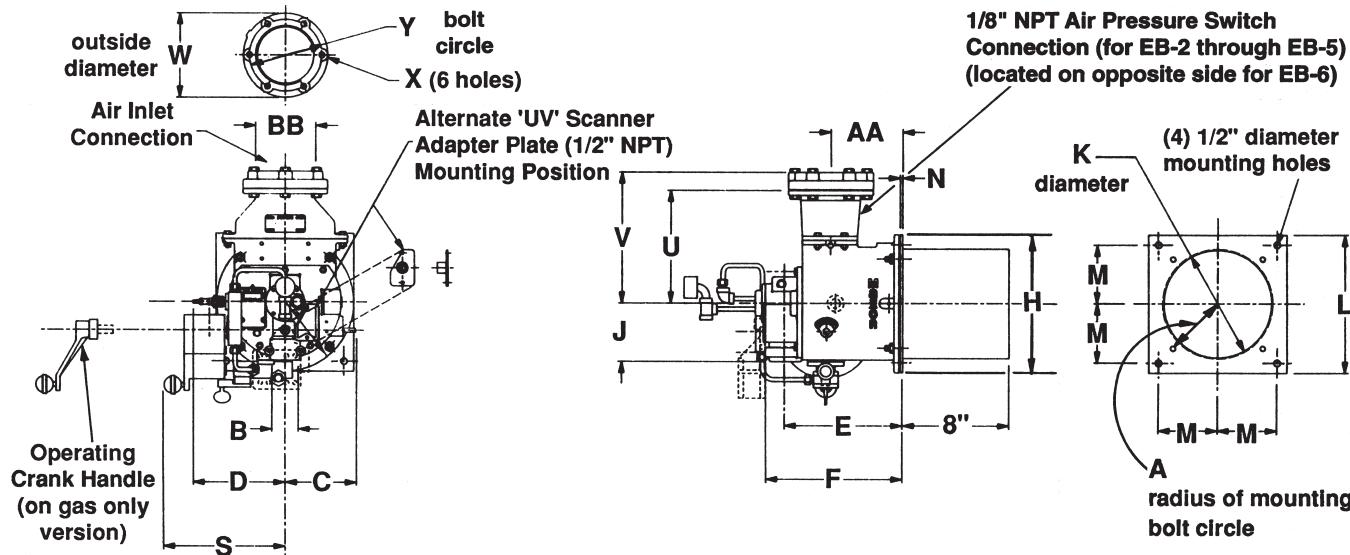
Model "500-SP" and "500-G" OVENPAK® Burners
(shown with optional filter assembly)

Burner Model	A	B	C	D	E	F	H	K	L	M
508-SP	3.75	1		6.62		12.31	8.44	6.31	8.44	3.62
515-SP	4.75	1-1/4	5.06	7.69	8.87	12.25	10.37	8.25	10.37	4.44
525-SP		1-1/2								
535-SP	5.75	2	5.69	8.62	10.06	13.87	12.5	10.25	12.5	5.62
550-SP	6.81	3			14.38	18.87	14.75	12.25	14.75	6.69

Burner Model	N	S	CC	DD	EE	FF	GG	HH	JJ	KK
508-SP	0.25	8.69			15.75	4.69	18.5			
515-SP			15.25			3.5	17.5	20	22	19
525-SP				15.87						
535-SP	0.37	9.31			17.62	2.81	18.5	22	24	30
550-SP			17.75	17.69	18.87	5.37	24.5	27	26	

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

Dimensions (in inches)

Model EBC and EBG OVENPAK® Burners
(common dimensions for EBC-MRV and EBG-MRV versions)

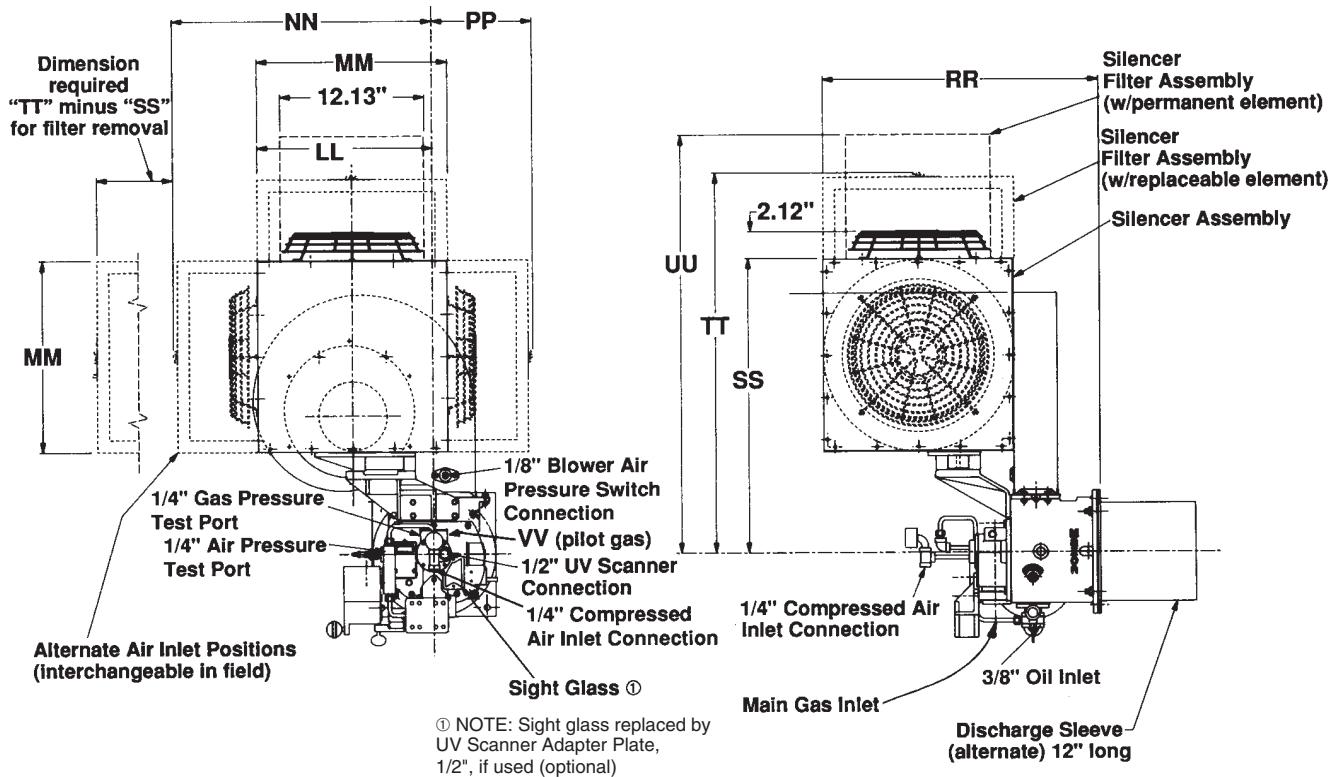
Burner Model	A	B	C	D	E	F	H	J	K	L
EB-2	3.75	1	5.06	6.62	8.87	12.31	8.44	4.37	6.31	8.44
EB-3	4.75	1-1/4		7.69		12.25	10.37		8.25	10.37
EB-4	5.75	1-1/2	5.69	8.62	10.06	13.87	12.5	5.44	10.25	12.5
EB-5		2			14.38	18.87	14.62	6.5	12.25	14.75
EB-6	6.81	3								

Burner Model	M	N	S	U	V	W	X	Y	AA	BB
EB-2	3.62	0.25	8.69	8.5	9.94	6.37	0.44	5.44	6	4
EB-3	4.44								5.37	
EB-4	5.62	0.37	9.31	10.37	11.87	8.87	0.56	7.75	5.5	6
EB-5								10.25	8.69	8
EB-6	6.69			9.62	11.12	11.75				

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

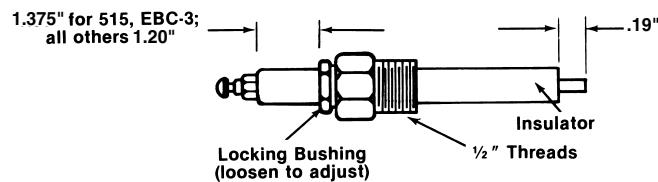
Accessory Dimensions (in inches)

Filter with silencer for Model "500" OVENPAK® Burners



Burner Model	LL	MM	NN	PP	RR	SS	TT	UU	VV
508-SP	15	16	22	8	24	25	32	36	3/8
515-SP									
525-SP	18	22	15	11		32	39	42	
535-SP					25				
550-SP	20.25	24	30	13		34	43	48	1/2

Spark Ignitor



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

Accessory Dimensions (in inches)

3/8" NPT Pilot Gas Train

for Model 508, 515, EBC-2, and EBC-3 OVENPAK® Burners

Pipe train pressure rating: 5 PSIG

Includes: (1) 3/8" ball valve

(1) 3/8" pilot gas regulator (R400S)

(1) 3/8" pilot gas solenoid (120/60 AC)



1/2" NPT Pilot Gas Train

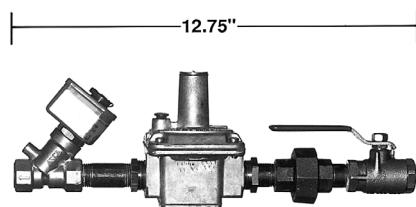
for Model 525, 535, 550, EBC-4, EBC-5, and EBC-6 OVENPAK® Burners

Pipe train pressure rating: 5 PSIG

Includes: (1) 1/2" ball valve

(1) 3/4" pilot gas regulator (R500S)

(1) 1/2" pilot gas solenoid (120/60 AC)



1/4" NPT Compressed Air Pipe Train

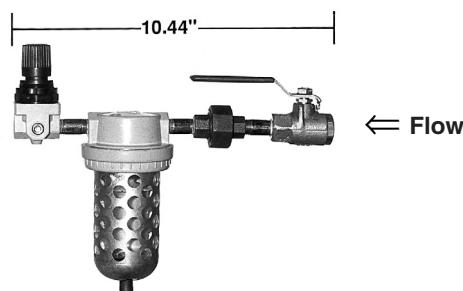
for all Model "500" and "EBC" OVENPAK® Burners

Pipe train pressure rating: 150 PSIG

Includes: (1) 1/4" ball valve

(1) 1/4" air filter (5 micron)

(1) 1/4" air pressure regulator



1/4" NPT Compressed Air Pipe Train

for all Model "500" and "EBC" OVENPAK® Burners

Pipe train pressure rating: 140 PSIG for #27084

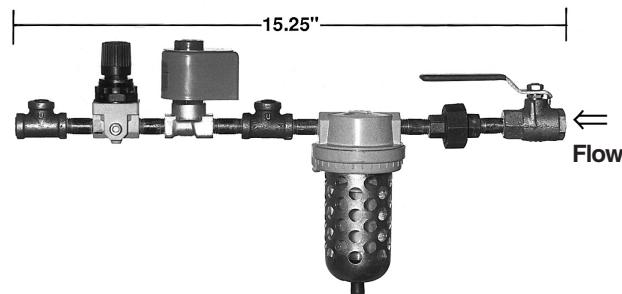
90 PSIG for #27085

Includes: (1) 1/4" ball valve

(1) 1/4" air filter (5 micron)

(1) 1/4" air solenoid valve (120/60 AC)

(1) 1/4" air pressure regulator



Accessory Dimensions (in inches)

3/8" NPT Light Oil Pipe Train options

for all Model "500" and "EBC" OVENPAK® Burners

Pipe train pressure rating: 150 PSIG

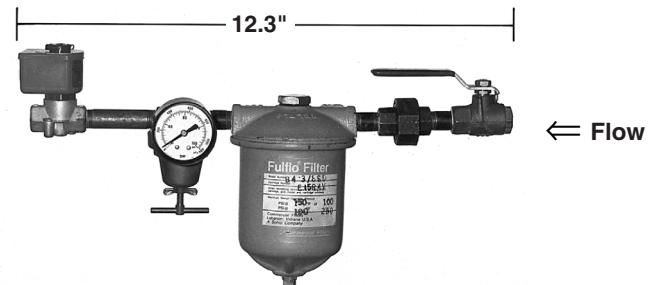
No solenoid valve option includes:

- (1) 3/8" ball valve
- (1) 3/8" oil filter (20 micron)
- (1) oil pressure gauge
- (1) 3/8" oil pressure regulator



One solenoid valve option includes:

- (1) 3/8" ball valve
- (1) 3/8" oil filter (20 micron)
- (1) oil pressure gauge
- (1) 3/8" oil pressure regulator
- (1) 3/8" oil solenoid (120/60 AC)



Double solenoid valve option includes:

- (1) 3/8" ball valve
- (1) 3/8" oil filter (20 micron)
- (1) oil pressure gauge
- (1) 3/8" oil pressure regulator
- (2) 3/8" oil solenoid valves (120/60 AC)



Flowmeter Piping Options

All gas/oil combination burner assemblies include a direct-reading oil flowmeter. **This flowmeter must be mounted vertically.**

Standard burner assemblies are equipped with the flowmeter mounted in the proper position for **horizontal-firing** of the OVENPAK® Burner.

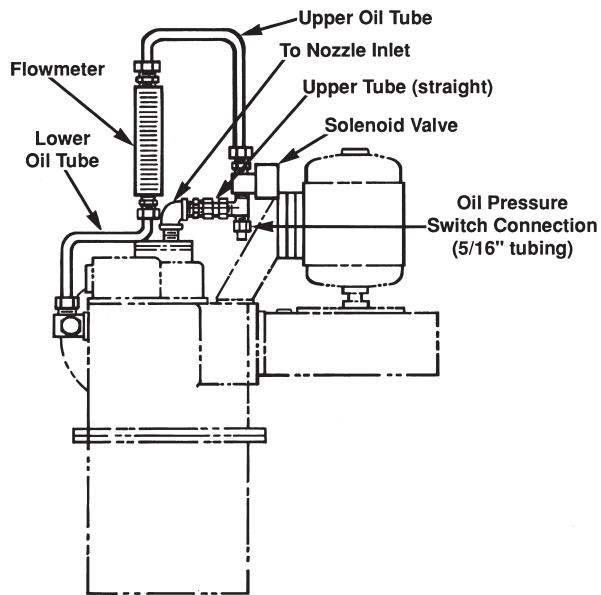
For **down-firing** or **up-firing** of the OVENPAK® Burner, alternate mounting of the flowmeter is required. If an up-firing or down-firing application is specified when ordering, the burner assembly will be equipped with the flowmeter in the proper vertical position.

If necessary, the flowmeter mounting arrangement can be altered in the field by changing the upper and/or lower flowmeter tubing arrangement. Optional **flowmeter piping sets** provide for this re-positioning.

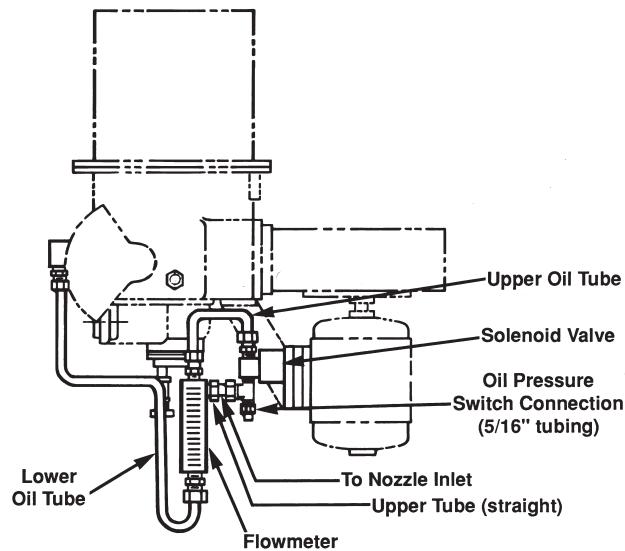
Optional **solenoid piping sets** provide necessary piping hardware to position an additional solenoid valve up as close as possible to the burner control valve. This reduces the residual volume of oil between the shut-off valve and the oil nozzle tip at time of shutdown.

An optional solenoid valve may also be re-positioned for down-firing and up-firing burner applications.

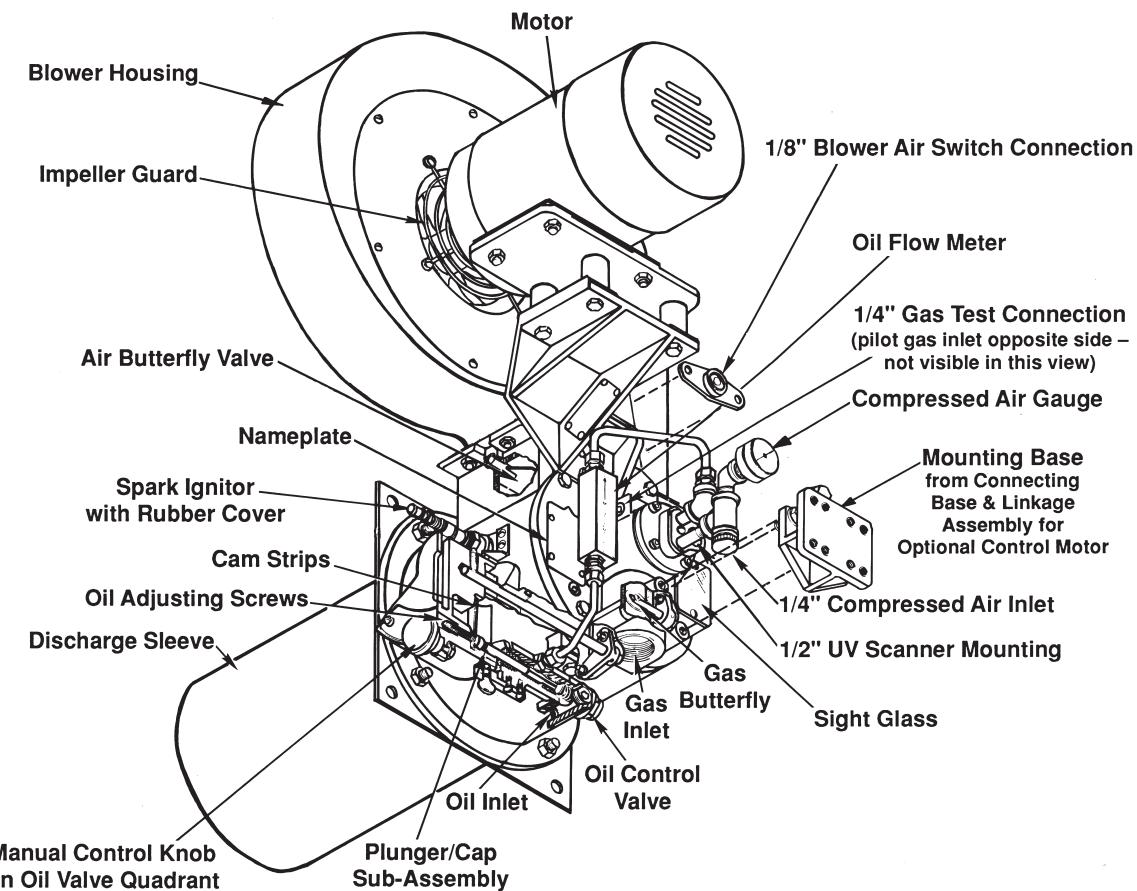
Typical arrangement for all Model "500" down-firing OVENPAK® Burners



Typical arrangement for all Model "500" up-firing OVENPAK® Burners



Component Identification



To order replacement parts:

1. Specify parts by name from accompanying sketches and indicate quantity desired.
2. SEE BURNER NAME-PLATE:
 - Indicate burner size and assembly number
 - Indicate date of manufacture stamped to right of assembly number (Some older burners may have date stamped into bottom or left edge of nameplate, or no date. REPORT ANY OF THESE VARIATIONS.)
3. Indicate serial number stamped on nameplate of Maxon Shut-Off Valve controlling fuel to burner.

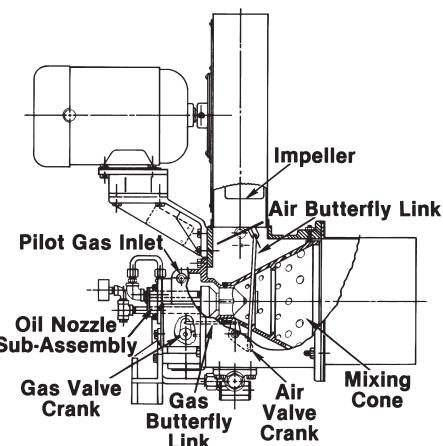


NOTE: Older versions of this burner may include slightly different oil nozzle sub-assemblies, mixing cones and discharge sleeves. Current components may be used as replacements and will provide the same or superior performance.

For new oil nozzle sub-assembly:

For burners built before 5/13/02, contact Maxon with assembly number and date of manufacture (stamped into nameplate). A new mixing cone may also be required.

Complete internal linkage replacement kits are also available.



Suggested Maintenance/Inspection Procedures

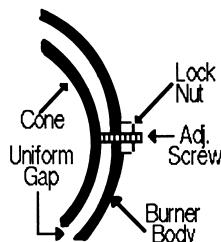
Discharge sleeve and cone alignment

Centering of the mixing cone provides a small annular opening for the flow of some cooling combustion air along and inside the discharge sleeve wall. We suggest periodic inspection from the discharge side of the burner to assure this critical alignment is maintained.

Inside inspections (from discharge end of burner) can spot possible mixing cone or discharge sleeve deterioration before performance is drastically affected.

Check specifically that mixing cone is centered within burner body and discharge sleeve, so as to give the intended flow of cooling air along the sleeve. If necessary, re-adjust by loosening the four lock nuts (see sketch) and turning the four adjusting screws to center cone within the opening.

Back each screw off 1/4 turn (to allow for thermal expansion of hot mixing cone) then hold in position and turn all four lock nuts down snugly.



CAUTION: OVER-TIGHTENING ADJUSTING SCREWS CAN GREATLY REDUCE CONE AND DISCHARGE SLEEVE LIFE.

Critical check points in oil line:

1. Pump (wear, lubrication)
2. By-pass valve (loose packing)
3. Strainer (filled with scale, etc.)
4. Filters (plugged)
5. Regulator (not bottomed)
6. Viscosity no higher than 50 SSU (about 45°F with #2 oil)

Critical check points in compressed air line:

1. Compressor (lubrication, water accumulation)
2. Filters (plugged)
3. Water traps (full)
4. Regulator (set to give desired pressure)

Critical check points on burner:

1. Oil control valve (working smoothly)
2. Oil nozzle stem (clean, no nicks or scratches, or pluggage)
3. Oil nozzle mix chamber (not plugged)
4. Universal screw carrier snug on operating shaft
5. Set collar tight and snug on operating shaft
6. Set screws holding cone backed off 1/4 turn and locked
7. Cone mounted concentrically in housing
8. Cam strips and/or plunger cap wear

WARNING: If burner is run on oil, but subject to long intervals of gas-only firing, the oil line, components and piping should be blown clear at shutdown to prevent start-up difficulties during later oil light-off.

Filter maintenance

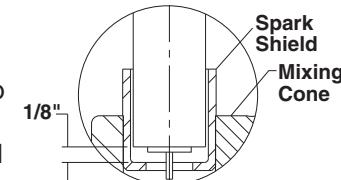
Filters MUST be kept clean for optimum burner performance. They should be inspected regularly (experience will dictate the required frequency) and cleaned as needed.

To clean washable/replaceable elements, remove from burner, then vacuum to remove dry accumulations. Wash in warm soapy water, wring gently and dry before replacing in filter assembly.

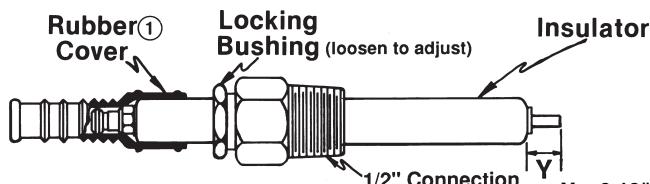
To clean permanent elements, remove from burner, vacuum or blow clean of excess dirt, then wash in soap and water (or solvent, if necessary), dry, re-coat (if desired) and re-install.

To replace spark ignitor

1. Check table below for dimension "Y" and cut tip if necessary.
2. Insert 1/2" NPT collar into burner and snug into position.
3. Insert insulator through collar into burner, rotating if necessary, to engage in burner cone. Insert spark ignitor until insulator bottoms in spark shield then retract 1/8" to establish proper gap.
4. Tighten locking bushing until insulator is held in place.



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

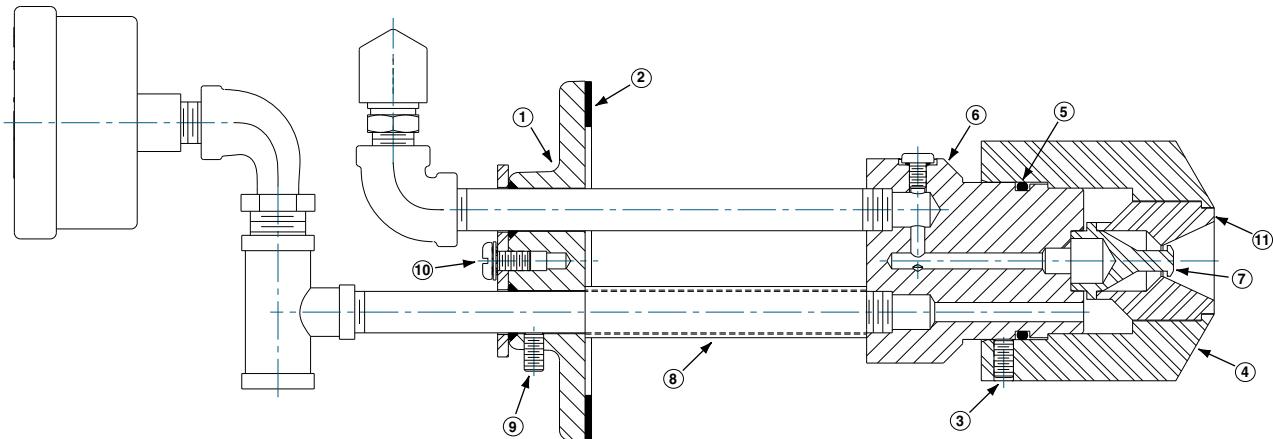


① Standard on Burner Assembly, must be ordered separately with replacement ignitor.

Suggested Maintenance/Inspection Procedures

To clean oil nozzle sub-assembly:

1. Disconnect the oil and compressed air lines at burner and remove the four socket head cap screws holding tube retainer [1] to burner.
2. Carefully withdraw the oil nozzle sub-assembly. Save the gasket [2].
3. If a new nozzle sub-assembly is to be installed, replace gasket [2] and reverse steps 1 and 2. If the nozzle itself is to be changed or cleaned, loosen the set screw [3].
4. Unscrew nozzle cap [4] from nozzle sub-assembly. Be careful not to damage the O-ring [5], stem [7], or mix chamber [11]. Remove the O-ring [5] and save if undamaged.
5. Clean nozzle cap [4], stem [7], and mix chamber [11]. Do not nick or dent edges or surfaces. Use compressed air or a solvent that will remove all foreign particles. **Do not use an abrasive.**
6. Re-install VITON O-ring [5] or **replace if damaged.** For a replacement, use a VITON O-ring, size #122 (1-1/8" x 3/32") on 508, 515, EBC-2, and EBC-3 burners (including older versions). On larger burners, such as the 525, 535, 550, EBC-5, and EBC-6, use size #126 (1-3/8" x 1-9/16" x 3/32").
7. Spacer bushing [8] should be tightly held between nozzle body [6] and tube retainer [1]. If adjustment is necessary, loosen Allen screw [9] and cap screw [10], then slide tube retainer [1] towards nozzle body [6] as far as possible. Retighten Allen screw [9] and cap screw [10].
8. Re-install stem [7], mix chamber [11], and nozzle cap [4] on the body [6]. A drag will be felt when the nozzle contacts O-ring. Continue to screw the nozzle onto the body until mix chamber [11] is contacted. Torque to 125 ft-lbs. **Do not use pipe dope, permatex, etc. on threads.**
9. Tighten set screw [3]; **it must not protrude from nozzle.**
10. Insert oil nozzle sub-assembly in burner. Make sure gasket [2] is in place, then re-install and tighten the four socket head cap screws, holding tube retainer [1] in place.
11. Reconnect the oil and compressed air lines, then fire burner and check compressed air pressure and oil flow to insure that nothing has changed. Following established light-off procedure, check pressures, oil flow, main flame, etc.



Notes

Installation Instructions

General Instructions

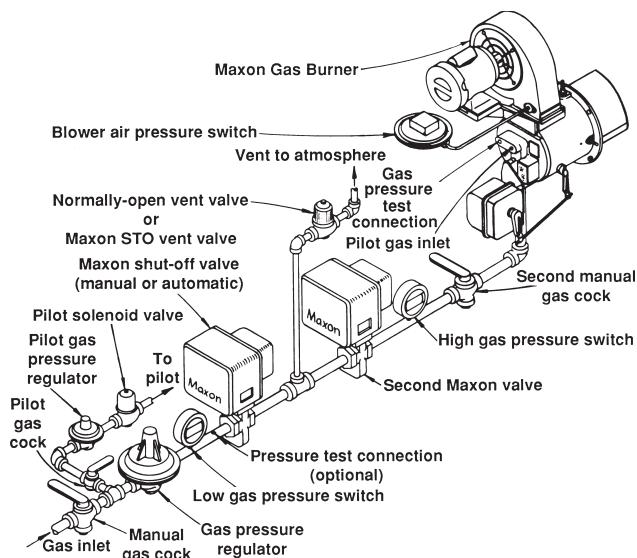
Important: Do not discard packing material until all loose items are accounted for.

To prevent damage in transit, the oil flowmeter, spark ignitor, discharge sleeve, mounting gaskets, flame rod and connecting linkage components may be packed separately and shipped loose with your new Maxon OVENPAK® Burner.

The burner itself is normally only a part of your complete combustion system. Additional pipe train accessories and control components will be required for a complete system installation. The sketch below shows a typical pipe train as might be used with a gas-fired Model "500-G" OVENPAK® Burner.

Piping Layout as sometimes required by insurance and standards groups

"Block and Bleed" gas train arrangement illustrated with Model "500-G" OVENPAK® Burner



Burner provides the air supply (unless it is "EB" version, which requires a separate combustion air blower). It also serves as a fuel flow control and fuel/air mixing device.

It should not be exposed to direct radiant heat or positioned where it might draw in inert gases. If problems exist, consider filters, relocation and/or use of the "EB" version and external air supply.

Electrical service must match the voltage, phase and cycle of all electrical system components and be compatible with burner nameplate ratings. Insure that all normal control safeguards are satisfied. Combustion air blower should continue to run after shutdown to allow burner to cool.

Gas supply piping must be large enough to maintain the required fuel pressures cataloged for the particular burner size used with burner operating at full-rated capacity. Gas piping pressure drops to the gas regulator should not exceed 1/2" wc at full flow for supply pressures of 8 oz. or less (10% of initial pressure if supply is higher than 1/2" PSIG).

Anything more than minimal distance or piping turns may necessitate "oversizing" piping runs to keep pressure drops within acceptable ranges.

Oil and air piping should be sized for the pressure and volume requirements of the burner, with supply pressures high enough to permit subsequent regulation at each burner. Oil and compressed air should be available to the inlet of the train at 100 PSIG, with oil heated if necessary so that viscosity does not exceed 50 SSU.

Clean fuel lines are essential to prevent blockage of pipe train components or burner gas ports.

Main Shut-Off Cock should be upstream of both the main gas regulator and pilot line take-off. Use it to shut off fuel to both pilot and main burner during shutdown periods of more than a few hours.

The fuel throttling valve contained within a Maxon burner is not intended for tight shut-off.

Main gas regulator is essential to maintain a uniform system supply pressure. If one pipe train supplies multiple burners, provide a separate regulator in the branch leading to each burner system. Care should be taken to minimize pressure drop and give maximum uniformity.

Size the regulator for full system capacity at the required pressure, carefully considering pipe train losses. Follow the instructions attached to the regulator.

Pilot take-off should be upstream of the main gas regulator, but downstream of the main gas cock. It should normally include its own pilot gas regulator, a solenoid valve and shut-off cock. A pilot adjustable orifice at the pilot inlet simplifies adjustment.

Pilot piping must be large enough to provide for the full flow and pressures shown in the catalog for your particular burner size.

Installation Instructions

Fuel Shut-Off Valves (when properly connected to a control system) shut the fuel supply off when a hazardous operating condition is sensed. Manual reset valves require operator attendance each time the system is started up (or restarted after a trip-out). Motorized shut-off valves permit automatic start-restart when used with an appropriate control system.

Test connections are essential for burner adjustment. They should be provided immediately downstream of the regulator and are included in the burner itself. **Test connections must be plugged except when readings are being taken.**

Blower location must deliver a reasonably clean and cool air supply. Inlet filters and silencers are available as options. Where external blowers are used, care must be taken to keep pressure drops to a minimum and to independently support the weight of air piping.

Gas pipe train should be located reasonably close to the burner. As much as 4" wc pressure drop at full flow is acceptable, but pressure increase at low fire will cause increased minimum and reduced turndown.

Compressed air train should be located reasonably close to the burner. A union is necessary to permit withdrawal of the oil nozzle sub-assembly. For proper operation, a low air pressure switch interlocked with the oil shut-off valve should be installed downstream of the air regulator, with no valving between the switch and the burner itself.

Oil pipe train should be located reasonably close to the burner and below the burner inlet. The oil solenoid valve must be interlocked with the low pressure compressed air switch. The oil flowmeter (included with the burner) must be installed with flow vertically upward.

Use only UV flame sensor systems for oil firing. Flame rods may be used ONLY with specially adapted GAS-ONLY burners.

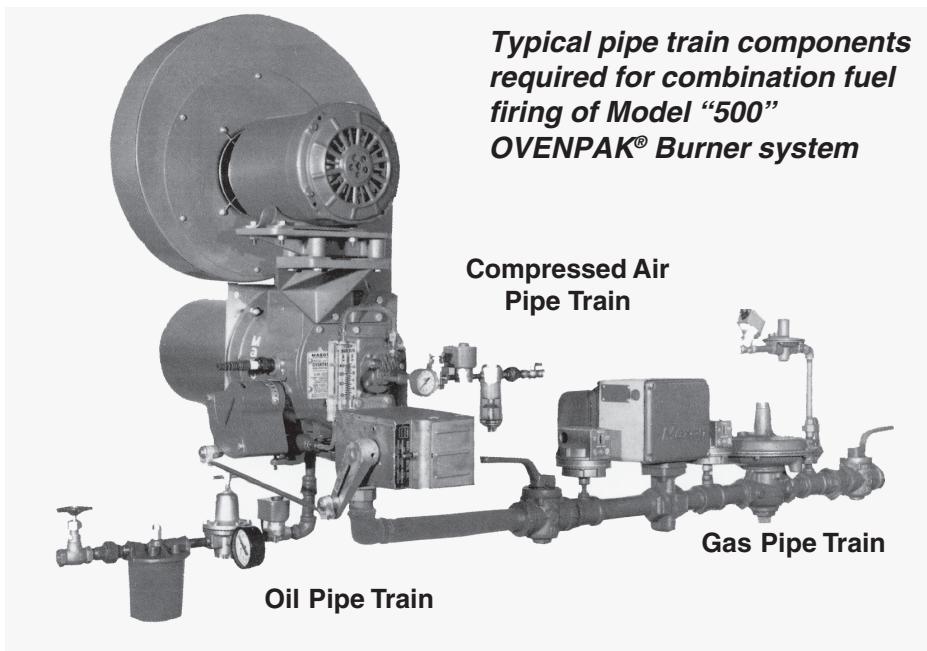
Control systems should provide all normally recommended interlocks (including operation of fuel shut-off valves). **Sequencing Control Systems** are available from Maxon that include provision for post-purge pilots during all but emergency shut-downs. This sequencing is essential to minimize risk of smoke during oil-fired shut-down.

Always re-establish pilot before shutting off oil.

For gas and oil combination firing, valves for both fuels must operate simultaneously on light-off and on shut-down.

For gas or oil firing, interlock fuel valves electrically so only one or the other can be used, **not** both together.

Low fire start and interrupted pilot are essential to obtain cataloged minimums.



Installation Instructions

Horizontal mounting is preferred, but burner may be mounted in any position suitable for automatic control motor and UV scanner.

OVENPAK® Burner will typically be installed through an oven wall or insulated air duct. Cut opening approximately 1" larger in diameter than discharge sleeve to allow for thermal expansion of sleeve.

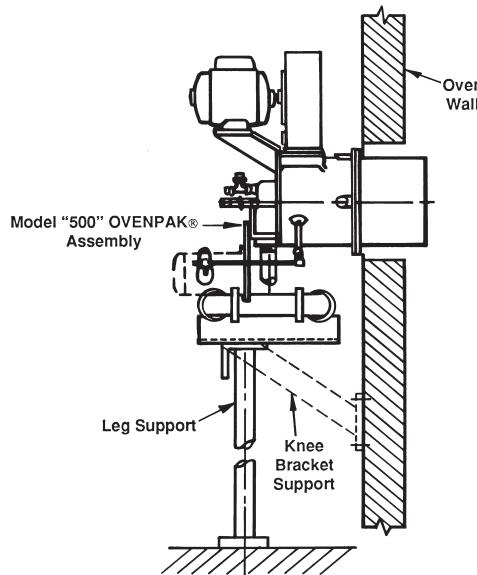
Burner mounting requires four studs and a flat mounting surface perfectly centered on the discharge sleeve. After placing burner in position over studs, add lock washers and nuts, then draw up all four hand-tight only. Check that burner is seated evenly all around the flange, filling any gaps to prevent air leakage, then tighten all nuts firmly.

For proper performance of any burner, air inlet and motor should be surrounded by clean, fresh, cool air.

Burner and pipe manifold support will be required to support weight of the burner and connected pipe train components. Air control motors, in particular, require additional support. Maxon connecting base and linkage assemblies are designed to position the control motors to work with the burner, **not** to support their weight.

The Model "500" OVENPAK® Burner requires external auxiliary support provided by the user. The support configuration may be similar to the leg support or knee bracket support illustrated below.

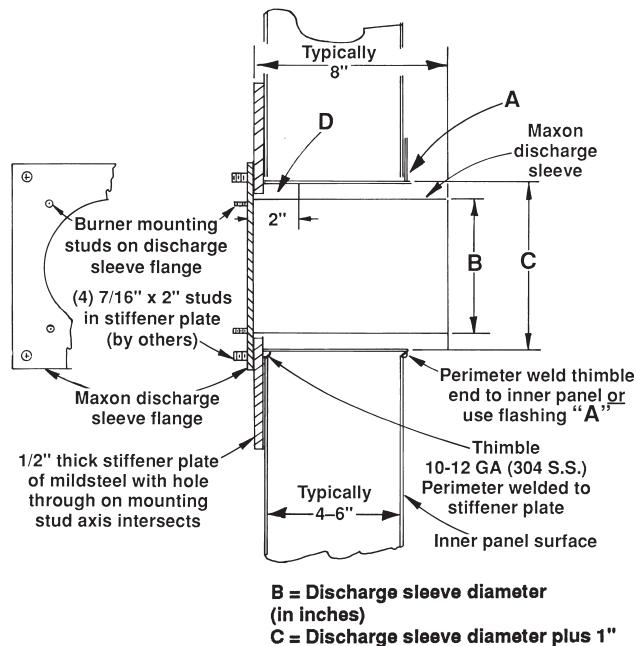
Suggested supporting arrangements for Model "500" OVENPAK® Burners:



Additional burner support may be required in conjunction with a "stiffener plate" when mounting OVENPAK® Burner (weighing 100-350 pounds) through typical thin wall of heater/oven panels.

For push-through systems, use Maxon special back pressure gasket between stiffener plate and discharge sleeve flange and use (2) ring gaskets between discharge sleeve flange and burner casting to prevent back flow of high temperature air. Fill area **D** (see sketch below) with **no more than 2"** of high temperature packing (too little will overheat mounting; too much will overheat sleeve).

Typical discharge sleeve mounting recommendations for Model "500" & "EB" OVENPAK® Burner applications



For pull-through systems, spacers may be installed on stud bolts and area **D** left empty to admit cooling air past the sleeve.

WARNING: Welding of burner flange to stiffener plate may cause warpage of burner flange and require additional seal material to prevent leakage.

Installation Instructions

Four lock screws permit centering of mixing cone within burner body and sleeve. They should be drawn up hand-tight, then backed out 1/4 turn to allow for cone expansion. **They must be re-checked after start-up**, and loosened if necessary to prevent deformation of cone. See start-up instructions for details.

Over-tightening lock screws can lead to cone distortion and greatly reduce cone and discharge sleeve life.

Discharge sleeve must be flush with, or extend beyond, interior wall. Maxon can supply a 12" long discharge sleeve, but higher noise levels may result, particularly when firing on propane.

An external viewing port should be provided for flame observation, preferably in such a position that burner pilot and main flame can both be seen.

Flame sensing of oil must be accomplished by UV scanner and should be mounted as close to burner as feasible. **Do not use cooling air to scanner port**: sighting is through gas cavity. Heat block, if used, may affect signal strength with some brands of scanners.

Alternate fuels may require correction of supply pressures.

Specific piping and wiring diagrams should always be submitted to the appropriate agencies for approval on each application.

Multi-burner installations may require special piping considerations, if supplied by a common pipe train and/or air supply, to provide equal supply pressures to each burner.

Control system's circuitry must not allow main fuel shut-off valve to be opened unless combustion air is on, and must de-energize valve upon loss of combustion air pressure, along with the other usual system interlocks. Motor starter is to be interlocked with valve, whether or not a combustion air pressure switch is used.

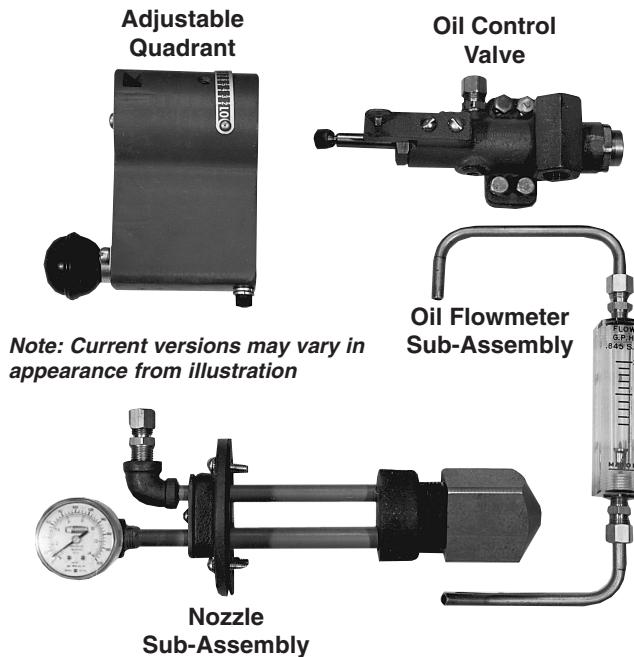


Maxon practices a policy of continuous product improvement. It reserves the right to alter specifications without prior notice.

Installation Instructions

Procedure required to convert gas-only Model "500-G" and "EB-G" OVENPAK® Burner to combination fuel version (Model "500-SP" and "EB-SP")

Oil conversion kits for Model "500-G" or "EB-G" OVENPAK® Burners include the components shown below.



To make the conversion:

1. **Disconnect the automatic control linkage** from operating crank. Save the toggle, bolt, washer, nut, etc.
2. **Loosen set screw** in operating crank. Remove crank from operating shaft and discard.
3. Remove the four #10-24 x 5/8" socket head cap screws from the retainer and cover plate.
4. **Remove the gas nozzle sub-assembly** completely from the back plate and discard. **Gas nozzle sub-assembly is comprised of:**
 - a. Retainer and cover plate
 - b. Gas nozzle
 - c. Gasket
 - d. All thread support rod
 - e. 1/4" – 20 hex nuts (2)
5. **Mount oil control valve sub-assembly** to the boss on main housing, using four 1/4" – 20 x 5/8" hex head cap screws.

6. **Insert the oil nozzle sub-assembly** into the back plate and bolt into place firmly with four #10-24 x 5/8" socket head cap screws. Be sure the oil line (line with 90° reducing elbow) is closest to the fan and the compressed air line (line with the pipe tee) is closest to the oil control valve.
7. **Connect the end of the oil tube** to the oil control valve with a brass oil tube connector and the other end to the 90° reducing elbow with a brass oil tube connector, making sure that the flowmeter is right side up and in vertical position. Be sure these connector fittings are made up tight.
8. Verify the oil control valve plunger is inserted in the oil control valve and that it will depress into the oil control valve approximately 3/4".
9. **Loosen the set screw in the operating shaft set collar** so that the set collar is loose on the operating shaft. **DO NOT REMOVE THE SET COLLAR.**
10. **Slide the spacer onto the operating shaft** on the end from which the control crank was removed.
11. **Slide the screw carrier onto the operating shaft** and tighten the set screws in the screw carrier onto the "flat" on the operating shaft. Move the shaft back and forth if necessary to locate the "flat" and the set screws.
12. **Turn the screw carrier to the minimum position** (indicator arrow pointing to "LO") and push the screw carrier firmly against the brass spacer. Slide the set collar into the burner until it is snug against the burner and tighten the set screw. Operate the screw carrier a few times between minimum and maximum to assure smooth operation. If the set collar is not snug or the screw carrier is not firmly mounted, repeat step 12.
13. **Connect the automatic control linkage** to the screw carrier using the toggle, bolt, etc. from step 1.
14. **Connect the compressed air line** to the 1/8" pipe tee on the oil nozzle sub-assembly.
15. **Double check all oil line connections to make sure they are tight.**
16. **Adjust oil firing** of the burner per catalog start-up instructions and curves.

Start-Up Instructions

Read complete instructions before proceeding, and familiarize yourself with all the system's equipment components. Verify that your equipment has been installed in accordance with the original manufacturer's current instructions.

CAUTION: Initial adjustment and light-off should be undertaken only by trained and experienced personnel familiar with combustion systems, control/safety circuitry, and with knowledge of the overall installation. Instructions provided by the company and/or individuals responsible for the manufacture and/or overall installation of complete system incorporating Maxon burners take precedence over these provided by Maxon. If Maxon instructions conflict with any codes or regulations, contact Maxon Corporation before attempting start-up.

For initial OVENPAK® Burner gas-firing start-up:

- Close all burner fuel valves and cocks.** Make preliminary adjustments to fuel gas regulators. Remove pilot and main gas regulators' adjusting screw covers. Turn adjusting screw down (clockwise) to approximately mid-position. Close pilot gas adjustable orifice screw by turning in clockwise until it stops. (Do not over-tighten.) Then back out the adjustable orifice (counter-clockwise) approximately 2-3 turns.
- Check all electric circuitry.** Verify that **all** control devices and interlocks are operable and functioning within their respective settings/ranges. Be sure all air and gas manifolds are tight and that test ports are plugged if not being used.
- Check that all duct and chamber dampers are properly positioned** and locked into operating positions.
- Disconnect the automatic control motor's linkage** from your OVENPAK® Burner's operating crank arm by loosening the control motor's connecting rod from the burner's toggle linkage.

For Model "EBG-SP-MRV" OVENPAK® Burners, the connecting linkage on the separate

control valve must be similarly loosened and disconnected. Refer to specific adjusting procedures relating to control valve adjustment in Maxon catalog.

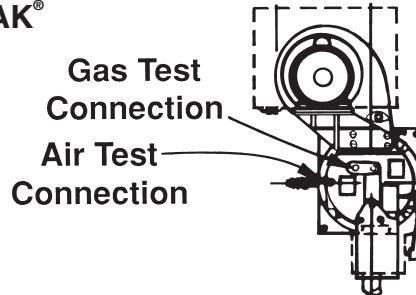
Initial start-up adjustment should only be accomplished during a "manual" burner control mode.

- Start all system-related fans and blowers.** Check for proper motor rotation and impeller direction. Verify that all control interlocks are working. Allow air handling equipment to run for adequate purge of your manifolds and combustion chamber plenums. With main gas shut off, manually advance OVENPAK® Burner's operating crank to "high fire" position so that air only flows through burner and combustion chamber.

CAUTION: Do not by-pass control panel timers typically controlling sequential operations.

- Verify differential air pressure.** With combustion air blower "on", **all** volume air fans operating, and burner at "high fire" position, connect a manometer between the air test connection on backplate of OVENPAK® Burner and your combustion chamber static pressure test connection. This will give a **direct** differential air pressure reading.

Model "500" OVENPAK® Burners



If the combustion chamber does not have a static pressure test connection, measure combustion chamber static pressure by connecting a manometer between the **gas** pressure test port on the OVENPAK® Burner's backplate and to atmosphere with the burner at "low fire" position, fuel valves closed, and all air handling systems running. Determine differential air pressure reading by taking an additional reading with

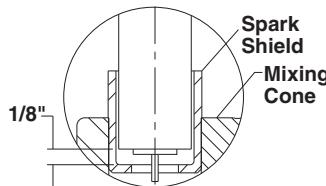
Start-Up Instructions

manometer connected between the burner's air pressure test port and atmosphere with the burner at high fire position, fuel valves closed, and all air handling systems running. Subtract the combustion chamber static pressure obtained above from this air pressure reading to determine the **differential air pressure reading**.

NOTE: The differential air pressure setting determines the burner's capacity and performance capabilities. Model EB and MA manual air OVENPAK® Burners, with their external air control valve(s), provide for the manual setting of this differential air pressure to the burner. Refer to specific adjusting procedures relating to MICRO-RATIO® and control valve adjustment in Maxon product line catalog. MA OVENPAK® Burners have an external locknut adjustment on the end of the air butterfly control valve. This lets you limit and set the differential pressure to the OVENPAK® Burner. Refer to Maxon specification tables in the catalog for the differential air settings required for your specific OVENPAK® Burner capacity.

7. **Determine the required differential gas pressure** using this differential air pressure reading obtained from step 6. High fire pressures are provided in Maxon product line catalog literature and/or read data stamped into burner nameplate.
8. **Verify that spark ignitor is properly positioned** and lines up with the appropriate dimensions required for your specific burner.

- a. Insert insulator through collar into burner, rotating if necessary, to engage in burner cone. Insert spark ignitor until insulator bottoms in spark shield then retract 1/8" to establish proper gap.
- b. Tighten locking bushing until insulator is held in place.



Check that spark ignitor arcs at the end of your properly positioned ignitor.

9. **Return burner control valve/crank to low fire position** when purge of system is complete.
10. **Open main and pilot gas cocks**, then attempt spark ignition to light pilot while slowly turning pilot gas regulator spring cap clockwise and/or adjustable orifice screw counter-clockwise to increase fuel flow. Repeat procedure as necessary until

pilot ignites, as air might have to be bled out of fuel supply lines before reliable pilot flame is established. Pilot gas regulator should normally be set for as low a pressure as possible, using fuller opening of pilot gas adjustable orifice (if used).

11. **After ignition, adjust pilot flame** for good stable flame shape. A rule of thumb is any pilot over a tennis ball size is probably too large. This assumes visual access to the pilot flame. If this is not possible, then adjust pilot to give the strongest and most stable flame signal through your flame safety circuit. This signal strength can be read with a micro-amp meter. The signal strength (or range) will be determined by the specific type of flame safeguard instrument used with your burner system.
12. **Re-check pilot ignition** by closing pilot gas cock or otherwise causing pilot outage. Re-light and refine pilot gas adjustment as necessary to get ignition within a second or two. The flame safeguard relays should now power the main fuel Shut-Off Valve(s).

CAUTION: After completing steps above, re-check all interlocking safety components and circuitry to prove that they are properly installed, correctly set, and fully operational. If in doubt, shut the system down, close pilot cock and contact responsible individual before proceeding further.

To this point, gas firing and oil firing start-up procedures are identical. The gas-fired pilot that is required for both operating modes has been established.

To continue adjusting for **main gas firing only**, follow steps 13 through 20. To adjust for **combination oil firing**, follow steps 13 through 33. If OVENPAK® Burner is to fire with a **gas pilot and oil only main fuel**, proceed to steps 21 through 33.

For main gas firing only (steps 13 through 20)

13. **Establish main gas flame.** With burner at low fire position, open all manual fuel shut-off valves (automatic fuel shut-off valve should already be open) so gas flows to burner inlet. There should be little, if any, change in flame appearance.

Start-Up Instructions

Turn main regulator adjusting screw in (clockwise) to obtain outlet pressure of about 4"-6" wc higher than combustion chamber pressure (2"-4" wc for propane, considerably higher for some EB versions). Main flame should now appear larger than pilot-only flame.

14. **Establish high fire setting** on gas by slowly moving burner crank toward high fire position while observing gas pressure at burner gas test connection. Refine main gas regulator adjustment as necessary to provide correct differential gas pressure (gauge to combustion chamber, see step 7) at high fire. If pressure cannot be adjusted low enough, a different regulator or regulator spring may be necessary, or a limiting orifice valve (such as Maxon's Series BV) should be added. Do not, however, exceed 4" wc pressure drop between regulator outlet and burner inlet.

CAUTION: If burner(s) go out, close shut-off valve or shut main gas cock at once. Return to minimum setting, re-light pilots if necessary, then turn main gas on again. Check carefully that every burner is lit before proceeding.

Cycle burner from minimum to maximum and refine adjustment, if necessary.

For operation with interrupted pilot (as recommended), shut off pilots and cycle burner from minimum to maximum and back several times to verify the flame is maintained.

15. **When burner gas firing performance is satisfactory** and stable throughout the firing range, reconnect linkage to control motor.

Control linkage travel must be such that burner crank is moved throughout its complete travel, or cataloged capacities and turndowns will not be achieved.

If less than full-rated burner capacity is required, linkage can be adjusted to limit maximum output. **With interrupted pilot**, it may be necessary to set control for somewhat higher than minimum burner setting to permit hold-in of flame detection system without pilot.

CAUTION: Internal drive mechanism within the control motor may be damaged if linkage is adjusted so as to cause binding with burner in high or low fire position.

16. **Re-check differential gas pressure** with unit at operating temperature. Refine high fire setting if necessary, considering differential pressure, flame length, and appearance. Natural gas flame should normally be predominantly clear blue, but possibly with semi-luminous tips. Dust or contaminants in the air stream may affect flame color.

17. **Check for contact between mixing cone and top-most centering screw** after system has reached maximum operating temperature. If set screw touches cone, back off an additional 1/8 turn on top and both side set screws.

18. **Plug all test connections not in use to avoid dangerous fuel leakage.** Replace equipment cover caps and tighten linkage screws.

19. **Check out overall system operation** by cycling through light-off at minimum, interrupting pilot, and allowing temperature control system to cycle burner from minimum to maximum and return.

Recheck all safety system interlocks for proper setting and operation.

NOTE: Typical gas firing control sequence for Maxon burners is provided only as a guide. Instructions provided by complete system manufacturer incorporating Maxon burners take precedence.

For gas firing Model "500-G" OVENPAK® Burner

Light-off:

1. Close cocks, shut-off valve(s)
2. Verify burner at low fire
3. Start recirculating/exhaust fans
4. Start burner blower
5. Purge system per appropriate NFPA standards and/or other applicable codes and standards
6. Open pilot & main gas cocks

Shut-down:

1. Close main & pilot gas cocks
2. Keep combustion air blower running after shut-down long enough to allow burner to cool

WARNING: Test every UV installation for dangerous spark excitation from ignitors and other possible sources of direct or reflected UV radiation. Use only gas-tight scanner connections.

20. **Before system is placed into full service, instruct operator personnel** on proper start-up operation with shut-down of system, establishing written instructions for their future reference.



Maxon practices a policy of continuous product improvement. It reserves the right to alter specifications without prior notice.

Start-Up Instructions

For initial OVENPAK® Burner oil firing start-up:

Complete steps 1 through 12 to establish gas-fired pilot and steps 13 through 20 for main gas firing (if combination fuel firing is to be used).

21. **Prepare for initial oil firing start-up** by checking that all the burner valves are closed, the combustion chamber purged, combustion air is established, oil and compressed air is supplied at 90-125 PSIG, fuel selector switch is set for oil, control motor linkage is disconnected, and OVENPAK® Burner is set to "low fire" position.
22. **Set compressed air pressure** (using the regulator and gauge furnished as part of the pipe train) to the figure shown for your burner size in the table below. Re-adjust pilot gas if necessary.

Required Pressures

Burner Model		Compressed Air (PSIG) [1]		#2 Oil Pressure (PSIG) [2]	
500-SP	EBC-SP	500-SP	EBC-SP	500-SP	EBC-SP
508-SP	EBC-2SP	60	30	40	
515-SP	EBC-3SP		22	30	
525-SP	EBC-4SP		42	62	
535-SP	EBC-5SP		48	72	
550-SP	EBC-6SP		54	72	

[1] Varies with air differential pressure

[2] Based on maximum capacity

23. **Adjust low compressed air pressure switch** to break at about 5 PSIG below the desired supply pressure. (It should be electrically interlocked with the oil solenoid valve.)

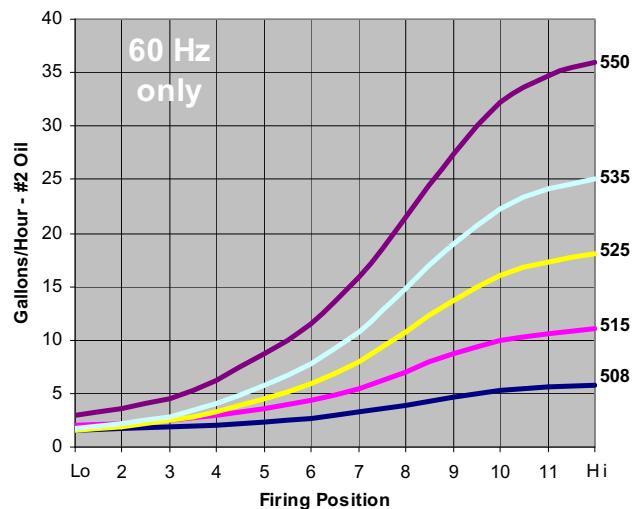
NOTE: All Model "500-SP" OVENPAK® Burners are adjusted and test-fired in the open at our factory before shipment, so simple setting of oil pressure regulator is normally sufficient to establish main flame once the manual oil valve is opened. Significant re-adjustment will normally be required only in cases of high back pressure or suction.

24. **Open manual oil valve.** When the burner lights, set the oil pressure (using the regulator and gauge furnished as part of the pipe train) to the figure shown for your burner size in the table above.

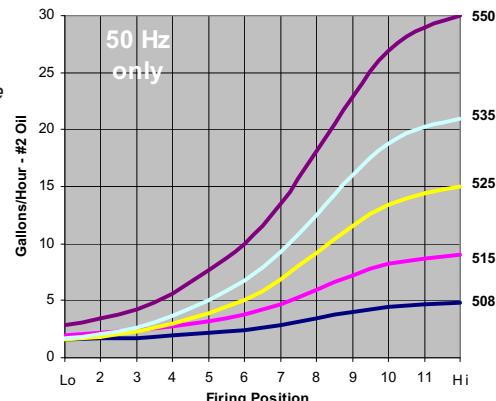
CAUTION: Oil flames are highly radiant. Use eye protection and minimize viewing.

25. **Refine main burner adjustment**, if necessary, using the flow/position curves shown below. Determine need by advancing linkage slowly from low-fire position while viewing main flame for satisfactory characteristics and the complete absence of smoke, soot, odor, or unvaporized oil. Certain firing conditions may require significantly higher or lower flows for optimal combustion.

Model "500-SP" OVENPAK® Burner



For 50 Hz operation,
these burners
are downrated
as shown in the
chart at right.



CAUTION: If burner(s) go out, close shut-off valve or main fuel cock at once. Return to minimum setting, re-light pilots if necessary, then turn main oil on again. Check carefully that every burner is lit before proceeding.

Start-Up Instructions

26. **Cycle burner from minimum to maximum** and refine adjustment, if necessary.
For operation with interrupted pilot (as recommended): **Test burner operation** by cycling to low fire position and turning off oil, then pilot. Re-light pilot and main flame, then cycle burner through its firing range while checking for suitable flame signal. Repeat as necessary.

27. **Set low oil pressure switch** (if used) to break just below the established oil pressure at the sensing point. (It should be a manual reset switch, on the low pressure side of the oil pressure regulator).

28. **When burner performance is satisfactory** and stable throughout the firing range, reconnect linkage to control motor.
Control linkage travel must be such that burner crank is moved throughout its complete travel, or cataloged capacities and turndowns will not be achieved.
If less than full-rated burner capacity is required, linkage can be adjusted to limit maximum output. **With interrupted pilot**, it may be necessary to set control for somewhat higher than minimum burner setting to permit hold-in of flame detection system without pilot.

CAUTION: Internal drive mechanism within the control motor may be damaged if linkage is adjusted so as to cause binding with burner in high or low fire position.

29. **Check for contact between mixing cone and top-most centering screw** after system has reached maximum operating temperature. If set screw touches cone, back off an additional 1/8 turn on top and both side set screws.

30. **Plug all test connections not in use to avoid dangerous fuel leakage.** Replace equipment cover caps and tighten linkage screws.

31. **Check out overall system operation** by cycling through light-off at minimum, interrupting pilot, and allowing temperature control system to cycle burner from minimum to maximum and return.

32. **Re-check all safety system interlocks** for proper setting and operation.

NOTE: Typical oil firing control sequence for Maxon burners is provided only as a guide. Instructions provided by complete system manufacturer incorporating Maxon burners take precedence.

For oil firing Model "500-SP" OVENPAK® Burners

Light-off:

1. *Purge system per appropriate NFPA standards and/or other applicable codes and standards*
2. *Combustion air on*
3. *Burner at low fire*
4. *Gas pilot lit*
5. *Compressed air on*
6. *Oil on main flame lit*
7. *Pilot gas off*
8. *Firing rate controlled to need*

Shut-down:

1. *Cycle to low fire*
2. *Re-establish pilot*
3. *Main oil off*
4. *Compressed air off*
5. *Pilot gas off*
6. *Cool down oven*
7. *Combustion air off*

WARNING: Test every UV installation for dangerous spark excitation from ignitors and other possible sources of direct or reflected UV radiation. Use only gas-tight scanner connections.

33. **Before system is placed into full service, instruct operator personnel** on proper start-up operation with shut-down of system, establishing written instructions for their future reference.