Specifications of APX® burners

APX® Burner - STRAIGHT - packaged blower [1]

Typical burner data [2] Fuel: natural gas with 1000 Btu/ft³ HHV - sg = 0.6 [3] Combustion air: 60° F - 21 % O_2 - 50 % humidity - sg = 1.0 [3] Stated pressures are indicative. Actual pressures are a function of air humidity, altitude, type of fuel and gas quality.									
Burner size [4]	Differential gas pressure Standard drilling [5] "wc	Differential gas pressure low pressure drilling [5] "wc	Maximum capacity [6] Btu/h	Differential air pressure [7] "wc	Nominal air flow [8] scfm	Min. Capacity Btu/h	Flame length [9] in	Blower horsepower hp	Number of blowers
0.5		5.5	400,000	1.5	80	12,500	30-40	1/12	1
1	16.5	9	1,000,000	4	172	25,000	30-40	0.5	1
1.5	16.5	9	1,500,000	4	260	37,500	30-40	0.5	1
2	16.5	9	2,000,000	4	345	50,000	30-40	1	1
2.5	16.5	9	2,500,000	4	430	62,500	30-40	1	1
3	16.5	9	3,000,000	4	510	75,000	30-40	1	1
3.5	16.5	9	3,500,000	4	600	87,500	30-40	1.5	1
4	16.5	9	4,000,000	4	690	100,000	30-40	1.5	1
5	16.5	9	5,000,000	4	860	125,000	30-40	3	1
6	16.5	9	6,000,000	4	1030	150,000	30-40	1	2
7	16.5	9	7,000,000	4	1200	175,000	30-40	1.5	2
8	16.5	9	8,000,000	4	1380	200,000	30-40	1.5	2
9	16.5	9	9,000,000	4	1550	225,000	30-40	3	2
10	16.5	9	10,000,000	4	1720	250,000	30-40	3	2
11	16.5	9	11,000,000	4	1900	275,000	30-40	3	2
12	16.5	9	12,000,000	4	2060	300,000	30-40	3	3
13	16.5	9	13,000,000	4	2240	325,000	30-40	3	3
14	16.5	9	14,000,000	4	2400	350,000	30-40	3	3
15	16.5	9	15,000,000	4	2600	375,000	30-40	3	3

[1] Not for EC-market - see "Available APX® versions and options" page 4-21.9-12 and page 4-21.9-13.
[2] Burner data displayed assume blower(s) operating on 60 Hz electrical supply. Max. burner capacity will be reduced by 17 % if operated on 50 Hz. Fuel and air pressure should be reduced by 30 % while motor power will reduce 40 % with 50 Hz operation.
[3] sg (specific gravity) = relative density to air (density air = 0.0763 lbs/ft³(st).
[4] Burner size corresponds with the straight burner length in ft.
[5] Pressure differential between burner test connection and combustion chamber for natural gas to be used for burner commissioning - LP burner (Low Pressure drillings). Actual pressure differential at burner gas inlet is 5 % higher.
[6] Fresh air firing. When firing in low oxygen environment, max. capacity should be downrated.
[7] Differential combustion air pressure between burner air test connection and combustion chamber for commissioning.
[8] When firing in balanced combustion chamber.
[9] Expected flame length in fresh air firing. Flame length may vary in function of process air flow distribution, velocity, temperature, oxygen level etc. Contact MAXON for more information.

APX® burner - H - external blower conversion table to corresponding straight lengths of burner in feet

Burner size	Burner dimension (ft)	Corresponding straight length (ft)
APX 1 x 1 H	1 x 1	3
APX 1 x 1.5 H	1 x 1.5	3.5
APX 1 x 2 H	1 x 2	4
APX 1 x 2.5 H	1 x 2.5	4.5
APX 2 x 1 H	2 x 1	5
APX 2 x 1.5 H	2 x 1.5	5.5
APX 2 x 2 H	2 x 2	6
APX 2 x 2.5 H	2 x 2.5	6.5
APX 3 x 1 H	3 x 1	7
APX 3 x 1.5 H	3 x 1.5	7.5
APX 3 x 2 H	3 x 2	8
APX 3 x 2.5 H	3 x 2.5	8.5
APX 3 x 3.5 H	3 x 3.5	9.5

Example:
APX® 2 x 2.5 H corresponds with 6.5 ft straight burner length.

Use table page 4-21.9-7 and page 4-21.9-8 for typical burner data per foot of burner.

APX® burner firing on natural gas - modulated combustion air [1] - STRAIGHT and H - external blower

Typical burner data Fuel: natural gas with 1000 Btu/ft³ HHV - sg = 0.6 [1] Combustion air: 60° F - 21 % O_2 - 50 % humidity - sg = 1.0 [1] Stated pressures are indicative. Actual pressures are a function of air humidity, altitude, type of fuel and gas quality.									
	APX® natural gas firing - Capacity per foot	[3]	MBtu/h (HHV)	0.03	0.17	0.34	0.68	1.0	1.36
	Differential natural gas pressure SP burner	[4]	"wc	0.015	0.5	1.9	7.6	16.5	30.5
	Differential natural gas pressure LP burner	[5]	"wc	0.01	0.26	1.04	4.16	9	16.6
Fresh air firing	Differential combustion air pressure for fresh air firing	[6]	"wc	0.45	0.45	0.45	1.8	4	7.1
	Differential combustion air pressure at blower outlet for fresh air firing	[7]	"wc	0.7	0.7	0.7	2.8	6	11
	(Optimal) combustion air flow for fresh air firing	[8]	scfh	3500	3500	3500	7000	10300	14035
	(Optimal) combustion air factor for fresh air firing	[8]	n	11	2.2	1.1	1.1	1.1	1.1
	Flame length (fresh air firing)	[9]	ft	NA	0.98	1.6-2.7	2.7-3.6	3.6-4.6	4.6-5.6
Recirculation air with low O_2 and higher upstream temperature	Differential combustion air pressure for recirculating air firing (low O_2. n>=1.3)	[6]	"wc	0.45	0.45	0.67	2.68	5.35	10
	Differential combustion air pressure at blower outlet for recirculating air firing (low O_2. n>=1.3)	[7]	"wc	0.63	0.63	1.0	3.68	7.4	15
	(Optimal) combustion air flow for recirculating air firing (low O_2. n>=1.3)	[8]	scfh	3531	3531	4238	8476	12360	NA
	(Optimal) combustion air factor for recirculating air firing (low O_2. n>=1.3)	[8]	n	11	2.2	1.3	1.3	1.3	NA
	Flame length (recirculating air firing (low O_2. n>=1.3)	[9]	ft	NA	1.6-2.6	4-5	6.5-8.2	9.2-10	(11.5)

[1] If an APX® burner is used with constant combustion air, select the required combustion air pressure from above table for required maximum capacity per foot.
[2] sg (specific gravity) = relative density to air (density air = 0.0763 lbs/ft³(st).
[3] 34120 Btu/h is the minimum capacity for natural gas (1 control valve per burner, SP drillings see [4]). The maximum capacity is set at 1.36 MBtu/h. Overfiring in fresh air heating application is possible (up to 20 %). For low oxygen recirculating applications we advise to limit the max. capacity per foot to 1 MBtu/h, with n = 1.3
[4] Pressure differential between burner test connection and combustion chamber for natural gas to be used for burner commissioning - SP burner (Standard Pressure drillings).
Actual pressure differential at burner gas inlet is 5 % higher.
[5] Pressure differential between burner test connection and combustion chamber for natural gas to be used for burner commissioning - LP burner (Low Pressure drillings).
Actual pressure differential at burner gas inlet is 5 % higher.
[6] Differential combustion air pressure between burner air test connection and combustion chamber for commissioning.
[7] Typical differential combustion air pressure for 5 ft APX® to be used for blower selection.
[8] Advised combustion air flow and air factor "n" for best burner performance. For recirculating air heating with low oxygen, advised air factor is 20 % higher (n >= 1,1 for fresh air firing, n >= 1,3 for recirculating processes).
[9] Typical flame length for shown air amount and capacity. Flame length may vary in function of process air flow distribution, velocity, temperature, oxygen level etc. Contact MAXON for more information.

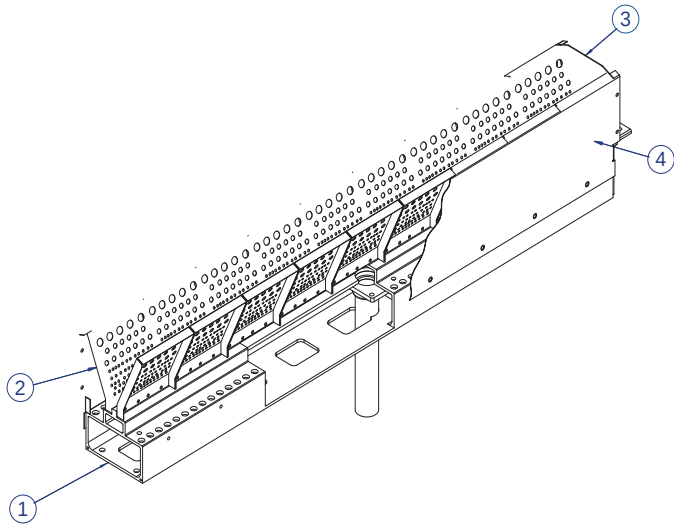
APX burner firing on propane - modulated combustion air flow [1] - STRAIGHT and H - external blower

Typical burner data
Fuels: propane with 2592 Btu/ft³ HHV - sg = 1.57 [2]
butane with 3364 kBtu/ft³ HHV - sg = 2.07 [2]
Combustion air: 15° C - 21 % O_2 - 50 % humidity - sg = 1.0 [2]
Stated pressures are indicative. Actual pressures are a function of air humidity, altitude, type of fuel and gas quality.

	APX® natural gas firing - Capacity per foot	[3]	MBtu/h (HHV)	0.07	0.17	0.34	0.68	1.0	1.36
	Differential natural gas pressure SP burner	[4]	"wc	0.03	0.19	0.75	3	6.52	12
	Differential natural gas pressure LP burner	[5]	"wc	0.02	0.14	0.58	2.3	5	9.2
Fresh air firing	Differential combustion air pressure for fresh air firing	[6]	"wc	4	4	4	4	4	7.1
	Differential combustion air pressure at blower outlet for fresh air firing	[7]	"wc	6	6	6	6	6	11
	(Optimal) combustion air flow for fresh air firing	[8]	scfh	10300	10300	10300	10300	10300	14035
	(Optimal) combustion air factor for fresh air firing	[8]	n	33	6.6	3.3	1.6	1.1	1.1
	Flame length (fresh air firing)	[9]	ft	NA	0.98	1.6-2.7	2.7-3.6	3.6-4.6	4.6-5.6
Recirculation air with low O_2 and higher upstream temperature	Differential combustion air pressure for recirculating air firing (low O_2. n>=1.3)	[6]	"wc	4	4	4	4	5.35	(10)
	Differential combustion air pressure at blower outlet for recirculating air firing (low O_2. n>=1.3)	[7]	"wc	6	6	6	6	7.4	(15)
	(Optimal) combustion air flow for recirculating air firing (low O_2. n>=1.3)	[8]	scfh	10300	10300	10300	10300	12360	NA
	(Optimal) combustion air factor for recirculating air firing (low O_2. n>=1.3)	[8]	n	33	6.6	3.3	1.6	1.3	NA
	Flame length (recirculating air firing (low O_2. n>=1.3)	[9]	ft	NA	1.6-2.6	4-5	6.5-8.2	9.2-10	(11.5)

[1] If an APX® is used with constant combustion air, select the required combustion air pressure from above table for required maximum capacity per foot.
[2] sg (specific gravity) = relative density to air (density air = 0.0763 lbs/ft³(st)
[3] 68303 Btu/h is the minimum capacity for propane/butane-firing (1 control valve per burner, SP drillings see [4]). The maximum capacity is set at 1.36 MBtu/h. Overfiring in fresh air heating application is possible (up to 20 %). For low oxygen recirculating applications we advise to limit the max.capacity per foot to 1 MBtu/hr, with n = 1.3
[4] Pressure differential between burner test connection and combustion chamber for propane/butane to be used for burner commissioning - SP burner (Standard Pressure drillings).
Actual pressure differential at burner gas inlet is approx. 5 % higher.
[5] Pressure differential between burner test connection and combustion chamber for natural gas to be used for burner commissioning - LP burner (Low Pressure drillings).
Actual pressure differential at burner gas inlet is 5 % higher.
[6] Differential combustion air pressure between burner air test connection and combustion chamber for commissioning.
[7] Typical differential combustion air pressure for 5 ft APX® to be used for blower selection.
[8] Advised combustion air flow and air factor "n" for best burner performance. For recirculating air heating with low oxygen, advised air factor is 20 % higher (n >= 1,1 for fresh air firing, n >= 1,3 for recirculating processes).
[9] Typical flame length for shown air amount and capacity. Flame length may vary in function of process air flow distribution, velocity, temperature, oxygen level etc. Contact MAXON for more information.

Materials of construction



1) Air/gas mixing body	Aluminium
2) Mixing plates	AISI 430 (1.4016)
3) Endplate	Cast iron or AISI 304 (1.4301)
4) Sideplate	Galvanized or AISI 430 (1.4016)

Selection criteria

Application details

The MAXON APX® nozzle-mix line burner has been especially designed for low temperature air heating applications, where standard raw gas line burners (MAXON "NP" AIRFLO®) are not suitable.

Thanks to its unique single-piece air/gas mixing body, APX® strongly differentiate from the regular "box burner", with excellent flame stability and flexibility, also in high modulating and/or low oxygen process air flows.

Basically, APX® is available in two main versions.

A wall-mounted APX® to be externally mounted on the oven - or dryer wall. Thanks to the flame that exits the mixing chamber more than 0.5 ft downstream from the burner mounting flange, it is possible to penetrate oven panels up to 0.5 ft thickness without risking damage to oven structure from flame impingement.

The in-duct APX® is installed inside the dryer or make-up air unit to heat-up low temperature process air flows.

Available APX® versions and options

The two basic APX® versions, wall-mounted and in-duct, are available in several variations. Below tables give an overview of the different options of each version.

Note that wall-mounted APX® burners are always mounted on suction side of circulating fans, or in balanced ducts.

Whether slot or continuous flange mounted burner should be selected depends upon the desired amount of cooling/purge air around the burner.

The packaged blower option is not available on the EC-market - for EC-market, same execution can be achieved by selecting the external blower option, and mounting an appropriate European blower direct onto the air inlet connection of the burner.

To comply with local codes and directives, special provisions may be required to correctly safeguard the minimum combustion air pressure in case multiple blowers are mounted on the burner.

Wall-mounted APX® "WM" [1]							
Slot-mounted "SM"				Continuous flange mounted "CF"			
Packaged blower "PB"		External blower "EB"		Packaged blower "PB"		External blower "EB"	
0.5 ft to 5 ft Straight	[2] [3]	1 ft to 5 ft Straight	[2]	0.5 ft to 5 ft Straight	[2] [3]	1 ft to 5 ft Straight	[2]
5.5 ft to 15 ft Straight	[2] [3]	5.5 ft to 15 ft Straight	[2]	5.5 ft to 15 ft Straight	[2] [3]	5.5 ft to 15 ft Straight	[2]
NA		(1 x 1) to (1 x 2.5) ft H	[2] [4]	NA		(1 x 1) to (1 x 2.5) ft H	[2] [4]
NA		(2 x 1) to (2 x 2.5) ft H	[2] [4]	NA		(2 x 1) to (2 x 2.5) ft H	[2] [4]
NA		(3 x 1) to (3 x 3.5) ft H	[2] [4]	NA		(3 x 1) to (3 x 3.5) ft H	[2] [4]

[1] All burners are available with constant or modulated combustion air flow.
All burners are available with SP and LP drillings (standard pressure / low pressure - see tables page 4-21.9-7 and page 4-21.9-8).
[2] Available with incremental of 0.5 ft (0.5 / 1 / 1.5 / 2 ….ft).
[3] Not available on EC-market.
[4] H-style burners. Contact MAXON for other grid-configurations.

Example: "APX® SM-EB-SP-7.5 ft STRAIGHT"
= wall-mounted APX® of 7.5 ft straight, slot mounted for external blower, with standard pressure drillings.

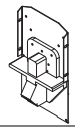
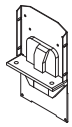
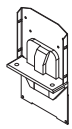
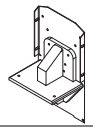
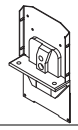
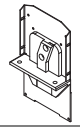
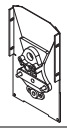
In-duct APX® "ID" [1]					
Packaged blower "PB"		External blower "EB"		Slide-in-unit "SU"	
0.5 ft to 5 ft Straight	[2] [3]	0.5 ft to 5 ft Straight	[2]	0.5 ft to 5 ft Straight	[5]
5.5 ft to 15 ft Straight	[2] [3]	5.5 ft to 15 ft Straight	[2]	5.5 ft to 15 ft Straight	[5]
NA		(1 x 1) to (1 x 2.5) ft H	[2] [4]	NA	
NA		(2 x 1) to (2 x 2.5) ft H	[2] [4]	NA	
NA		(3 x 1) to (3 x 3.5) ft H	[2] [4]	NA	

[1] All burners are available with constant or modulated combustion air flow.
All burners are available with SP and LP drillings (standard pressure / low pressure - see tables page 4-21.9-7 and page 4-21.9-8)
[2] Available with incremental of 0.5 ft (0.5 / 1 / 1.5 / 2 ….ft)
[3] Not available on EC-market.
[4] H-style burners. Contact MAXON for other grid-configurations.
[5] In-duct APX® "Slide-in-units" with mounting plug or plate to be flanged onto the duct.

Example: "APX® ID-SU-LP-14 ft STRAIGHT"
= in-duct APX® burner slide-in-unit of 14 ft with low pressure drillings.

Endplate set options

Different types of endplates are available for MAXON APX® burners.
Refer to the table below for selection of the most appropriate pilot endplates.

Overview Endplate set options MAXON APX® burners				
Description	Designation [1]	Wall-mount	In-duct	3D-View
Raw gas pilot endplate set with air by-pass (incl. SI, pilot gas connection, FR or provision for UV-scanner) [2]	FIG1-FR	yes	no	
	FIG1-UV	yes	no	
Endplate set with FR only	FIG2-FR	yes	yes	
Endplate set with sight glass only	FIG2-SG	yes	yes	
Plain endplate set	FIG2-PLN	yes	yes	
Endplate set for direct ignition (with SI only)	FIG3-SI	yes	yes	
Raw gas pilot endplate set (incl. SI, FR or provision for UV-scanner)	FIG4-FR	yes	no	
	FIG4-UV	yes	no	
In-duct raw gas pilot endplate set (incl. SI, FR or provision for UV-scanner)	FIG5-FR	no	yes	
	FIG5-UV	no	yes	
In-duct feed through raw gas pilot endplate set [3]	FIG6-FR	no	yes	
	FIG6-UV	no	yes	
External mounting plate kit for external UV/FR and external SI	EMP-EXT	no	yes	
External mounting plate kit for external UV/FR and external SI	EMP-INT	no	yes	
In-duct endplate set for direct ignition (incl. SI, FR and provision for UV) [4]	NP-EP SI FR/UV	no	yes	
In-duct plain endplate set [5]	NP-EP PLN	no	yes	

[1] Refer to tables on page 4-21.9-17 and page 4-21.9-18 for information on SI and flame rods included in each endplate.
[2] Use this pilot endplate set on stable back-pressure application only. When fluctuating oven pressures can be expected, use FIG.4.
[3] Select these endplate sets when externally mounted SI and FR/UV are required, or to prevent the use of ignition and/or ionization cable inside the duct (internally mounted SI and FR). To be used together with the external mounting plate sets EXT-MTG.
[4] Direct ignition endplate set to accommodate SI and FR/UV on 1 single endplate set (standard not possible for wall-mounted burners - contact MAXON).
[5] To be selected together with NP-EP SI FR/UV.

APX® endplate accessories (included in the endplate assembly)

Accessories included in the endplate sets, except not when explicitly written					
Endplate set	Flame rod	UV-tube [1]	Spark ignitor	Adjustable orifice	Gas test port
FIG1-FR [4]	FR-APX	NA	SI-APX-10mm	AO-3/8" NPT	NA
FIG1-UV [4]	NA	NA	SI-APX-10mm	AO-3/8" NPT	NA
FIG2-FR	FR-APX	NA	NA	NA	1/8" NPT
FIG2-SG	NA	NA	NA	NA	1/8" NPT
FIG2-PLN	NA	NA	NA	NA	1/8" NPT
FIG3-SI	NA	NA	SI-APX-14mm-L	NA	1/8" NPT
FIG4-FR	FR-APX	NA	SI-APX-1/2-14	AO-3/8" NPT	NA
FIG4-UV	NA	UVT-1 [1]	SI-APX-1/2-14	AO-3/8" NPT	NA
FIG5-FR	FR-APX	NA	SI-APX-14mm-S	AO-3/8" NPT	1/8" NPT
FIG5-UV	NA	UVT-2 [1]	SI-APX-14mm-S	AO-3/8" NPT	1/8" NPT
FIG6-FR [5]	[2] [5]	NA	[3] [5]	AO-3/8" NPT	1/8" NPT
FIG6-UV [5]	NA	UVT-2 [1]	[3] [5]	AO-3/8" NPT	1/8" NPT
NP-EP SI FR/UV [6][7]	NA	NA	SI-APX-14mm-L	NA	1/8" NPT
NP-EP PLN [7]	NA	NA	NA	NA	NA

[1] Only applicable for US-supplies (spark excitation)
[2] Select correct flame rod from table "Feed thru flame rods" on page 4-21.9-18.
[3] Select correct spark ignitor from table "Feed thru spark ignitors" on page 4-21.9-17.
[4] These endplate sets include a pilot nozzle and air shutter to adjust the bypass pilot air.
[5] Feed thru endplate sets FIG6 do not include SI/FR. For fresh air applications, standard spark ignitor (SI-APX-4 in.) and standard flame rod (FR-APX) can be selected. Both the standard SI/FR or the feed thru SI/FR have to be added separately.
[6] This endplate set allows direct ignition on induct APX® burners; SI and flame detection can be mounted on this endplate.
[7] For EC-market only.

Process temperature

Max. upstream process air temperature	480° F
Max. downstream process air temperature at low fire	570° F
Max. downstream process air temperature at high fire	750° F

Special attention should be paid when selecting the burner to avoid downstream process air temperatures above 570° F at low fire. Higher temperatures at minimum burner capacity may dramatically reduce life-time of the burner. At higher capacity, the burner parts are better cooled by the air- and gas flow, and allow much higher downstream temperatures.

The slide-in-units APX® can accept in specific circumstances higher process temperatures, both upstream and downstream of the burner. Contact MAXON for more information.

Combustion air requirements

MAXON APX® burners are fed with clean fresh combustion air containing 21 Vol % oxygen and a maximum temperature of 120° F.

In some installations, the use of higher temperature combustion air, or combustion air containing slightly lower oxygen levels, may be possible. This should be considered case by case. Contact MAXON for more information.

Modulated or constant combustion air

All MAXON APX® burners can operate with constant or fixed air flow, as well as with modulated air flow.

At constant air flow, the required differential combustion air pressure (refer to table on page 4-21.9-9, page 4-21.9-10 and page 4-21.9-11) is set by a fixed air damper (burner air inlet or fan) and the combustion air flow through the burner is constant for all burner firing rates (always maximum air flow).

At modulating air flow, an additional air control valve is adjusting the combustion air in function of burner capacity.

The choice whether constant or modulated air flow should be selected highly depends on the application and the desired emissions on CO and NO_x. Refer to "Emissions" on page 4-21.9-19 for more details.

Ratio control

In case the burner is operated with modulated air flow, best performance is realized when the burner is adjusted with ratio's as indicated in the table on page 4-21.9-9 and page 4-21.9-10. This can be achieved with MAXON MICRO-RATIO® valves or SMARTLINK® MRV.

Changes of combustion air temperature, system back pressure variations, and other parameters could influence gas/air-ratio if the control system is not designed for compensation. Contact MAXON for more information.

Process air flow velocity and oxygen content

	IN-DUCT (parallel velocity)	WALL-MOUNTED (cross velocity)
Min. process air velocity [1]	6 ft/s	6 ft/s
Max. process air velocity	26 (65) ft/s [2]	20 (30) ft/s [3]
Min. process air oxygen level [4]	3 - 6 Vol %	3 - 6 Vol %

[1] A minimum parallel process flow for in-duct burners, and cross process flow for wall-mounted burners is required. Burners shall not fire without process flow. Advised minimum velocity shall be above 6 ft/s.

[2] Optimal burner performance of in-duct APX® burners will be realized with a uniform process air velocity around the flame between 6 ft/s and 26 ft/s. Higher process air velocities are possible (up to 65 ft/s), however may influence emissions of CO (see page 4-21.9-19).

[3] (Higher cross-velocities (up to 9 m/s) will quench the flame and affect emissions (CO)). The use of a flame protection shield is advised to limit CO. Contact MAXON for more information.

[4] Depending on temperature, capacity and excess air, MAXON APX® burners can fire in almost inert process air environment.

Process back pressures

Max. process back-pressure - wall-mounted APX [1]	-2" wc to balanced
Max. process back-pressure - in-duct APX [2]	-40" wc to +40" wc
Max. process back-pressure - in-duct APX slide-in unit [2]	-12" wc to +12" wc

[1] Wall mounted burners can only fire in ducts under suction or in balanced atmospheres. Ducts in overpressure should be avoided.

[2] All in-duct burners, except the slide-in-unit design. Special considerations to be taken for the design of combustion air fan in case of higher back-pressures.

[3] Higher back-pressures are possible when the plug and airbox are reinforced. Contact MAXON for more information.

Piloting & ignition

APX® burners, equipped with one of the raw gas pilot endplate set (see table on page 4-21.9-14), will generate a stable pilot flame, used to ignite the burner on main flame. After the main burner is ignited, the pilot shall be interrupted. Permanent pilot is not advised. Use the main burner at minimum capacity for continuous operation.

Direct ignition of APX® burners is also possible, if accepted by local codes. Note that only in-duct APX® burners offer direct ignition endplates which accommodate spark ignitor and flame detection in the same endplate set. Direct ignition wall-mounted burners need 1 endplate set for the SI and another endplate set to mount the flame detector.

For both pilot and direct ignition, use ignition transformers min. 5000 V - 200 mA.

Available spark ignitors

Spark ignitors are included into the pilot endplate sets, except for FIG6 endplates. Refer to table on page 4-21.9-14 for exact information.

Below table will help you with the selection of the appropriate feed thru spark ignitors (in combination with FIG6 endplate set and external mounting plate (EMP).

Feed thru ignitors with carbon steel tube		Feed thru ignitors with stainless steel tube		Spark ignitors only (without tube)	
12" CS QI	12" CS quartz ignitor	12" SS QI	12" SS quartz ignitor	12" QI L/T	12" quartz ignitor
18" CS QI	18" CS quartz ignitor	18" SS QI	18" SS quartz ignitor	18" QI L/T	18" quartz ignitor
24" CS QI	24" CS quartz ignitor	24" SCS QI	24" SS quartz ignitor	24" QI L/T	24" quartz ignitor
30" CS QI	30" CS quartz ignitor	30" SS QI	30" SS quartz ignitor	30" QI L/T	30" quartz ignitor
36" CS QI	36" CS quartz ignitor	36" SS QI	36" SS quartz ignitor	36" QI L/T	36" quartz ignitor
48" CS QI	48" CS quartz ignitor	48" SS QI	48" SS quartz ignitor	48" QI L/T	48" quartz ignitor

Select your spark ignitor in function of the required length (12" to 48" in steps of 6").

Typical ignition sequence (with pilot)

- Pre-purge of burner and combustion chamber, according to the applicable codes and the installation's requirements.
- Gas control valve shall be in the minimum position.
- APX burners with modulated combustion air shall have the combustion air valve (linked with the gas control valve) also in the corresponding minimum position to allow minimum combustion air flow to the burner.
- Pre-ignition (typically 2 s sparking in air).
- Open pilot gas and continue to spark the ignitor (typically 5 s to 10 s depending on local code requirements).
- Stop sparking, continue to power the pilot gas valves and start flame check. Trip burner if no flame detected from here on.
- Check pilot flame stability (typically 5 s to 10 s to prove stable pilot).
- Open main gas valves and allow enough time to have main gas in the burner (typically 5 s + time required to have main gas in the burner).
- Close the pilot gas valves.
- Release to modulation (allow modulation of the burner).

Above sequence shall be completed to include all required safety checks during the start of the burner (process & burner safeties). We advise to position 1 pilot gas valve as close as possible to the pilot burner gas inlet for fast ignition of the pilot burner.

Flame supervision

The flame of APX® burners can be supervised with a flame rod or UV-scanner.

Depending on the application, different versions of endplate sets accommodating different types of flame rods can be selected.
Refer to table page page 4-21.9-14 (Overview endplate set options) and table page 4-21.9-15 (APX® accessories) for more information.

For poor quality propane, LPG or butane, we advise to use UV-scanners only.

Only use the appropriate positions on the MAXON endplate sets for correct and safe flame supervision. Every other position is not acceptable and may cause unsafe situations.

Refer to the user manual of the UV-scanner for correct installation and operating instructions.

Available flame rods

Also flame rods are included into the pilot endplate sets, except for FIG6 endplates. Refer to table page 4-21.9-14 for exact information.

Below table will help you with the selection of the appropriate feed thru flame rods (in combination with FIG6 endplate set and external mounting plate (EMP).

Feed thru ignitors with carbon steel tube		Feed thru ignitors with stainless steel tube		Spark ignitors only (without tube)	
12" CS FR	12" CS quartz flame rod	12" SS FR	12" SS quartz flame rod	12" FR L/T	12" quartz flame rod
18" CS FR	18" CS quartz flame rod	18" SS FR	18" SS quartz flame rod	18" FR L/T	18" quartz flame rod
24" CS FR	24" CS quartz flame rod	24" SCS FR	24" SS quartz flame rod	24" FR L/T	24" quartz flame rod
30" CS FR	30" CS quartz flame rod	30" SS FR	30" SS quartz flame rod	30" FR L/T	30" quartz flame rod
36" CS FR	36" CS quartz flame rod	36" SS FR	36" SS quartz flame rod	36" FR L/T	36" quartz flame rod
48" CS FR	48" CS quartz flame rod	48" SS FR	48" SS quartz flame rod	48" FR L/T	48" quartz flame rod

Select your flame rod in function of the required length (12" to 48" in steps of 6").

Flame development

Tables page 4-21.9-9, page 4-21.9-10 and page 4-21.9-11 are giving typical flame length of MAXON APX® burners for the shown combustion air amount, burner capacity and application (fresh air versus recirculating air).

Note that flame length is influenced by different factors, such as:

- Excess air factor (higher excess air will reduce flame length)
- Process air velocity (higher velocity will reduce flame length)
- Type of fuel (butane flames will typically be longer than natural gas flames)
- Burner length (shorter burners will give shorter flame lengths)
- Air distribution at the burner inlets - see "Piping" below etc.

In case the burner is fired with low excess air in low oxygen environment, flame may become quite radiant.
Take this into consideration for the design of combustion chambers (choice of materials, distance to the wall, expansion allowance...).

Contact MAXON for more information.

Piping

Except for the slide-in-units, where the air and gas distribution is incorporated into the burner design, special attention should be paid to the execution of air and gas manifolds, feeding the air and gas inlet(s) of all the other APX® burner versions.

Common engineering practice should be followed to equally feed the burner at each air and gas connection. Prevent too high velocities which may cause unequal pressure build-up. Burner and piping shall be independently supported to allow for thermal expansion, to prevent any stress on the burner inlets and to prevent the transmission of vibrations.

Fuels

MAXON APX® burners can fire natural gas, propane, butane, LPG and is able to fire multiple fuels simultaneously, if the control system is properly designed.

Alternative fuels may be possible. Contact MAXON for more information.

Expected Emissions

The clean hot air generated by MAXON APX® burners meets most of the local requirements of make-up air systems, over the full turndown of the burners.

Also in low temperature ovens and drying systems, MAXON APX® burners are able to fire with both low NO_x and CO, over its entire turndown, meeting the most stringent local emission requirements.

The production of pollutants can be highly dependant upon burner application and installation. Differing temperatures, process velocities, oxygen levels, fuels and other process related factors such as unequal process air distribution can all influence the actual level of emissions produced.
No guarantee of emissions is intended or implied on the above.

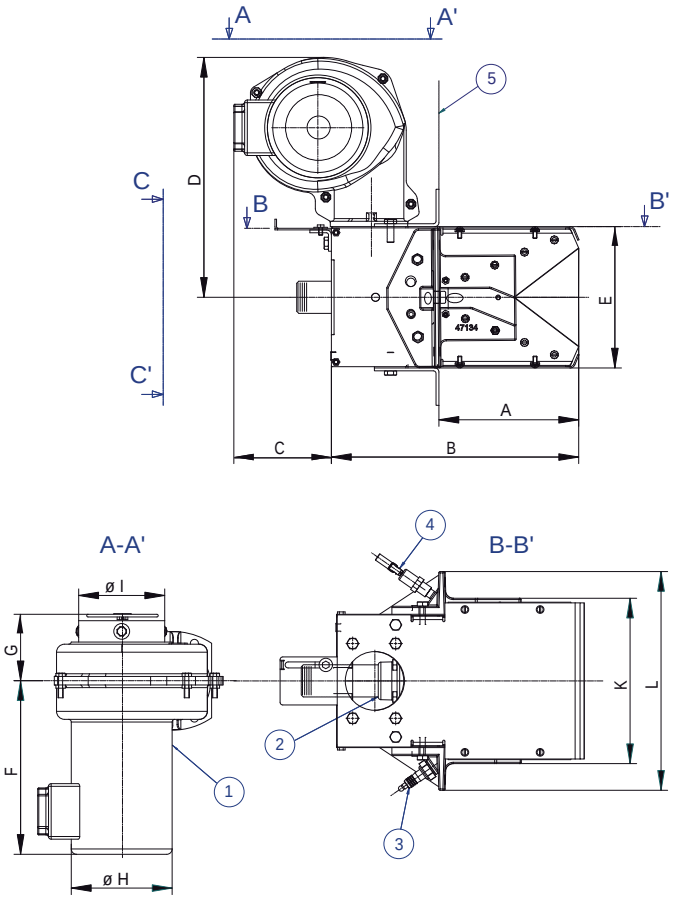
Contact MAXON for evaluation of expected emissions on your typical application.

Dimensions and weights

0.5 ft packaged blower

This burner version includes a combustion air blower. This version is not suitable for the EC-market.

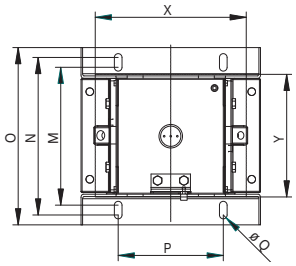
1) Combustion air blower
2) Main gas inlet flange 1" NPT
3) Spark ignitor
4) Flame rod
5) Burner mounting plane



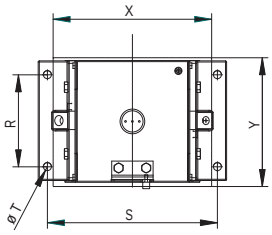
Dimensions in inches unless stated otherwise										
A	B	C	D	E	F	G	ø H	ø I	K	L
6.5	11.5	4.5	11.2	6.6	8.1	3.1	4.7	4	7.7	10.2

Mounting arrangements (view C-C')

Continuous flange mounting



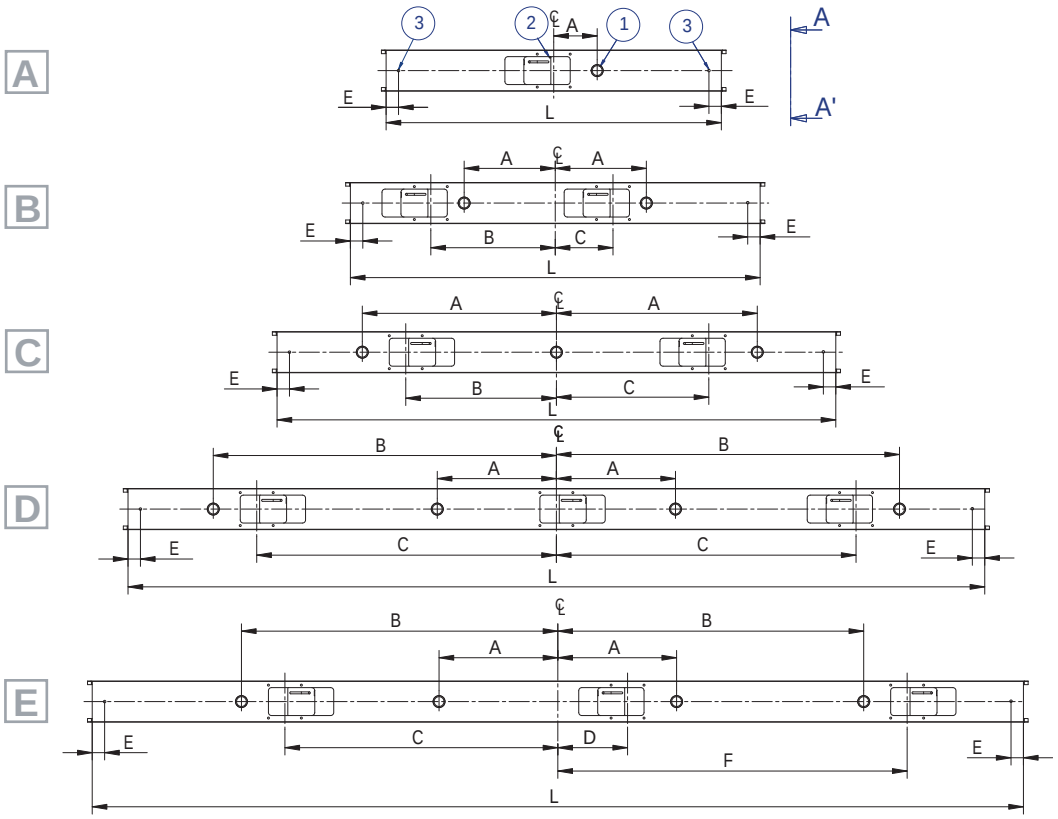
Slot mounting

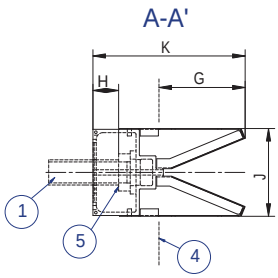


Dimensions in inches unless stated otherwise									
M	N	O	P	ø Q	R	S	ø T	X [1]	Y [1]
7.9	9	10.1	6	0.438	5	9.2	0.438	8.6	7

1 ft to 15 ft external blower

1) Gas inlet 1.1/2” NPT
2) Air inlet + shutter
3) Test connection
4) Mounting surface
5) Gas inlet flange 1.1/2”NPT





Dimensions in inches unless stated otherwise																		
burner size (ft)	1	1.5	2	2.5	3	3.5	4	5	6	7	8	9	10	11	12	13	14	15
sketch	A	A	A	A	A	A	A	A	B	B	C	C	C	C	D	E	E	D
A	7	7	7	7	7	7	7	7	18	18	36	36	36	36	18	18	18	21
B	-	-	-	-	-	-	-	-	25	25	29	24, 9	29	29	54	54	54	63
C	-	-	-	-	-	-	-	-	18	18	29	24	29	29	54	47	47	56
E	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	61	61	-
G	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	1.1	1.1
H	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	6.5	6.5
J	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6		
K	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5
L	12	18	24	30	36	42	48	60	72	84	96	108	120	132	144	156	168	180
weight (lbs)	14	21	27	34	41	49	55	68	82	95	109	123	136	150	164	177	191	205

1 to 15 ft packaged blower (not for EC-market)

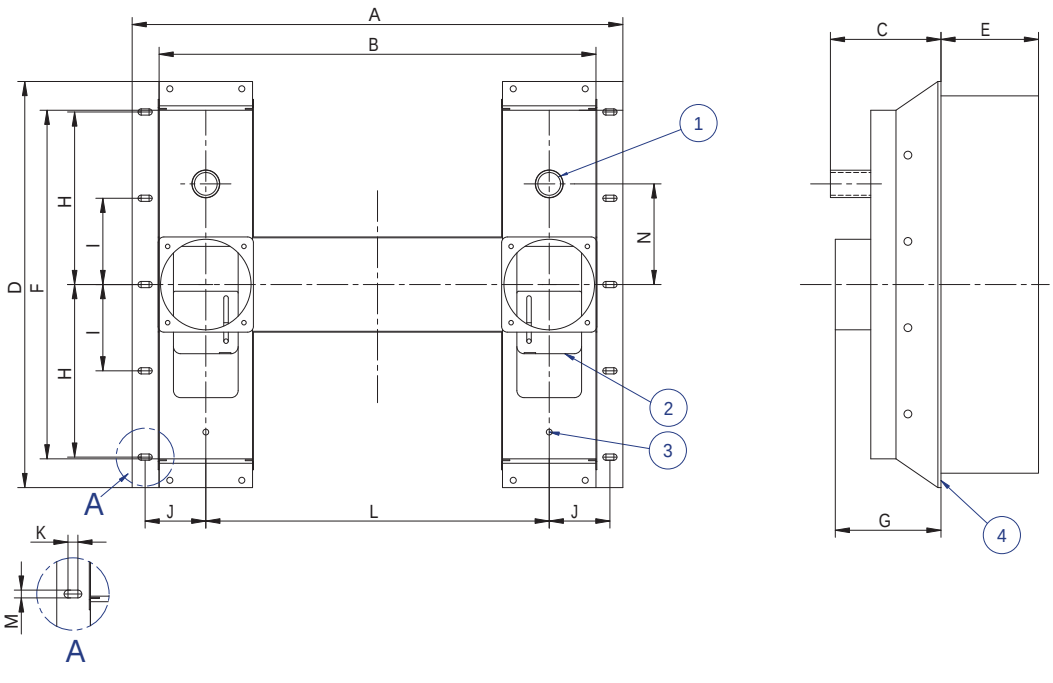
This modular straight burner includes one or more combustion air blowers. This version is not suitable for the EC-market.

The packaged burner dimensions are the same as those of the “external blower” version, see page 4-21.9-21.

Additional to the “external blower” version, the packaged version has got one or more combustion air blowers mounted directly on the back of the burner. For positions of these combustion air inlets see page 4-21.9-21.
For dimensions of blowers, see page 4-21.9-36.

APX® "H" Style burners - wall mounted

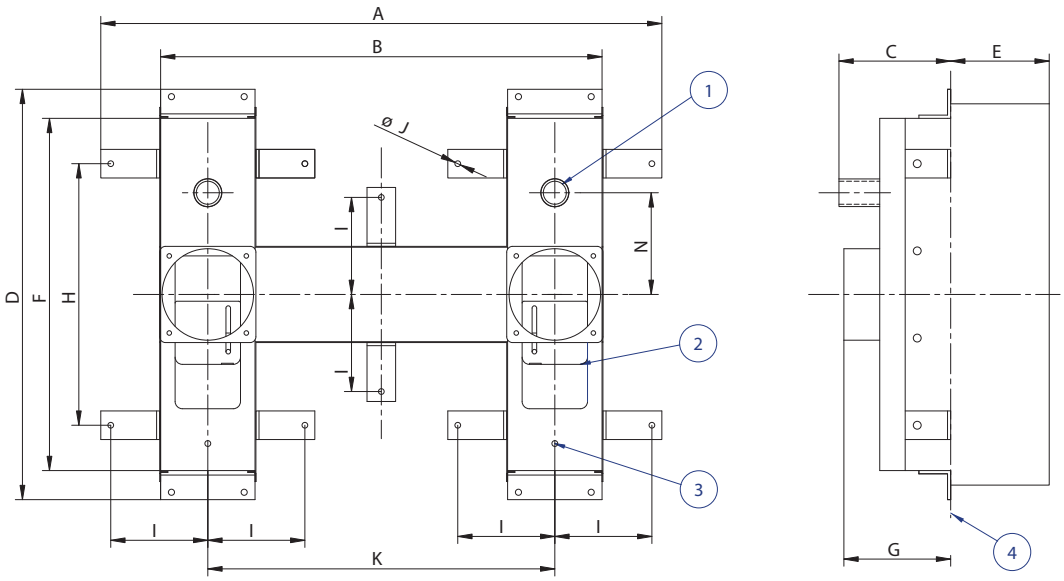
1) Gas inlet 1.1/2” NPT
2) Air inlet + shutter
3) Test connection
4) Mounting surface



Dimensions in in. unless stated otherwise															
Burner size	A	B	C	D	E	F	G	H	I	J	K	L	M	N	Weight (lbs)
1 x 1	22.12	18.5	8.48	16.24	6.45	12.24	8.06	6	-	4.22	14	12	0.44	2.5	41
1 x 1.5	28.12	24.5	8.48	16.24	6.45	12.24	8.06	6	-	4.22	14	18	0.44	2.5	48
1 x 2	34.12	30.5	8.48	16.24	6.45	12.24	8.06	6	-	4.22	14	24	0.44	2.5	54
1 x 2.5	40.12	36.5	8.48	16.24	6.45	12.24	8.06	6	-	4.22	14	30	0.44	2.5	61
2 x 1	22.12	18.5	8.48	28.24	6.45	24.24	8.06	12	6	4.22	14	12	0.44	7.12	68
2 x 1.5	28.12	24.5	8.48	28.24	6.45	24.24	8.06	12	6	4.22	14	18	0.44	7.12	75
2 x 2	34.12	30.5	8.48	28.24	6.45	24.24	8.06	12	6	4.22	14	24	0.44	7.12	82
2 x 2.5	40.12	36.5	8.48	28.24	6.45	24.24	8.06	12	6	4.22	14	30	0.44	7.12	88
3 x 1	22.12	18.5	8.48	40.24	6.45	36.24	8.06	18	6	4.22	14	12	0.44	7.12	95
3 x 1.5	28.12	24.5	8.48	40.24	6.45	36.24	8.06	18	6	4.22	14	18	0.44	7.12	102
3 x 2	34.12	30.5	8.48	40.24	6.45	36.24	8.06	18	6	4.22	14	24	0.44	7.12	109
3 x 2.5	40.12	36.5	8.48	40.24	6.45	36.24	8.06	18	6	4.22	14	30	0.44	7.12	116
3 x 3.5	52.12	48.5	8.48	40.24	6.45	36.24	8.06	18	6	4.22	14	42	0.44	7.12	129

APX® "H" Style burners - slot fired mounting

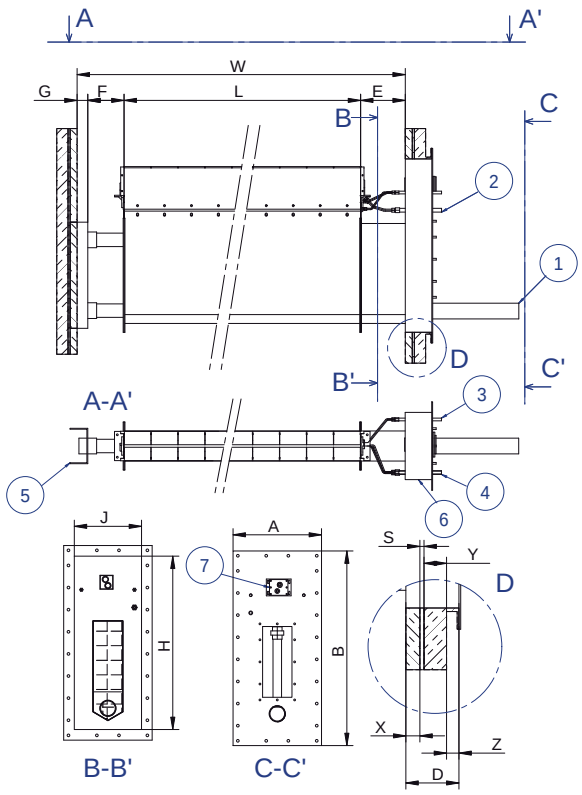
1) Gas inlet 1.1/2" NPT
2) Air inlet + shutter
3) Test connection
4) Mounting surface



Dimensions in in. unless stated otherwise													
Burner size	A	B	C	D	E	F	G	H	I	ø J	K	N	Weight (lbs)
1 x 1	26.62	18.5	8.41	16.24	6.45	12.24	8	6	6.68	0.4	12	2.5	41
1 x 1.5	32.62	24.5	8.41	16.24	6.45	12.24	8	6	6.68	0.4	18	2.5	48
1 x 2	38.62	30.5	8.41	16.24	6.45	12.24	8	6	6.68	0.4	24	2.5	54
1 x 2.5	44.62	36.5	8.41	16.24	6.45	12.24	8	6	6.68	0.4	30	2.5	61
2 x 1	26.62	18.5	8.41	28.24	6.45	24.24	8	18	6.68	0.4	12	7	68
2 x 1.5	32.62	24.5	8.41	28.24	6.45	24.24	8	18	6.68	0.4	18	7	75
2 x 2	38.62	30.5	8.41	28.24	6.45	24.24	8	18	6.68	0.4	24	7	82
2 x 2.5	44.62	36.5	8.41	28.24	6.45	24.24	8	18	6.68	0.4	30	7	88
3 x 1	26.62	18.5	8.41	40.24	6.45	36.24	8	30	6.68	0.4	12	7	95
3 x 1.5	32.62	24.5	8.41	40.24	6.45	36.24	8	30	6.68	0.4	18	7	102
3 x 2	38.62	30.5	8.41	40.24	6.45	36.24	8	30	6.68	0.4	24	7	109
3 x 2.5	44.62	36.5	8.41	40.24	6.45	36.24	8	30	6.68	0.4	30	7	116
3 x 3.5	56.62	48.5	8.41	40.24	6.45	36.24	8	30	6.68	0.4	42	7	129

APX® Slide-in-units

1) Gas inlet
2) Pilot gas connection 1/2”
3) Combustion air test connection 1/4”
4) Gas test connection 1/4”
5) Burner support (custom made)
6) Burner mounting plug (custom made - drawing shows typical lay-out)
7) Mounting plate
to be used in case of external ignitor and flame scanner option



Dimensions in in. unless stated otherwise															
Burner size	**0.5**	**1**	**1.5**	**2**	**2.5**	**3**	**3.5**	**4**	**4.5**	**5**	**5.5**	**6**	**6.5**	**7**	**7.5**
L	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90
Gas inlet [1]	1"	1"	1 1/2"	1 1/2"	1 1/2"	1 1/2"	2"	2"	2"	2"	2 1/2"	2 1/2"	2 1/2"	2 1/2"	2 1/2"
A	16.54	16.54	16.54	16.54	16.54	16.54	16.54	16.54	16.54	16.54	16.54	16.54	16.54	20.47	20.47
B	24.41	24.41	28.35	28.35	28.35	28.35	36.22	36.22	36.22	36.22	36.22	36.22	36.22	44.09	44.09
J [2]	11.81	11.81	11.81	11.81	11.81	11.81	11.81	11.81	11.81	11.81	11.81	11.81	11.81	15.75	15.75
H [2]	19.69	19.69	23.62	23.62	23.62	23.62	31.50	31.50	31.50	31.50	31.50	31.50	31.50	39.37	39.37
weight (lbs)	129	147	157	174	185	199	242	254	268	281	294	307	389	404	422

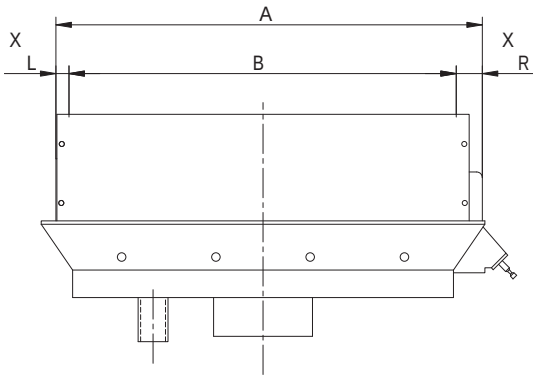
Dimensions in in. unless stated otherwise															
Burner size	**8**	**8.5**	**9**	**9.5**	**10**	**10.5**	**11**	**11.5**	**12**	**12.5**	**13**	**13.5**	**14**	**14.5**	**15**
L	96	102	108	114	120	126	132	138	144	150	156	162	168	174	180
Gas inlet [1]	3"	3"	3"	3"	3"	3"	3"	4"	4"	4"	4"	4"	4"	4"	4"
A	20.47	20.47	20.47	20.47	20.47	20.47	20.47	20.47	20.47	20.47	20.47	20.47	20.47	20.47	20.47
B	44.09	44.09	44.09	44.09	44.09	44.09	44.09	44.09	51.97	51.97	51.97	51.97	51.97	51.97	51.97
J [2]	15.75	15.75	15.75	15.75	15.75	15.75	15.75	15.75	15.75	15.75	15.75	15.75	15.75	15.75	15.75
H [2]	39.37	39.37	39.37	39.37	39.37	39.37	39.37	39.37	47.24	47.24	47.24	47.24	47.24	47.24	47.24
weight (lbs)	440	455	471	572	594	616	632	651	715	735	755	775	794	815	832

[1] Gas inlet connection standard ISO-threaded for sizes up to and including 2". Larger sizes standard have DIN PN10 flanged connections. NPT threaded and ANSI 150lbs flanges available on request.
[2] Plug to be mounted in an opening with min. dimensions J x H

For complete burner dimension information, following application depending dimensions should be defined:

W: internal duct width
D: max. 2 ft (D = X + Y + Z + S)
X: internal insulation thickness
Y: external insulation thickness
Z: flange elevation (default = 4 in.)
S: duct wall thickness
E: min. 0.5 ft
F: min. 0.5 ft
G: default G = X

Wall mounting: opening dimensions



A = wall opening

B = burner length (refer to burner dimensions on page 4-21.9-20)

XL = endplate width mounted on left side of the burner

XR = endplate width mounted on right side of the burner

A = B + XL + XR

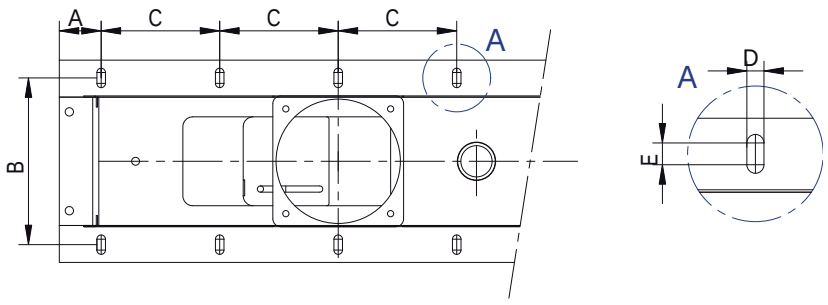
XL and XR depending on the endplate type, use the table below for determination.

Note that Fig. 4 endplates need a special wall opening shape if full seal is required. Contact MAXON for details.

Dimensions in in. unless stated otherwise	
Endplate Fig. #	X
1	2.2
2, 3, 4, 5, 6	1.3
4	3

Mounting flange dimensions

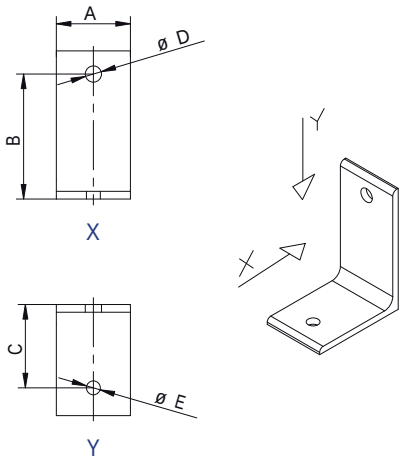
Use this sketch to determine fixing points for flange mounted burner parts.



Dimensions in in. unless stated otherwise				
A	B	C	D	E
2.1	8.4	6	0.4	0.6

Slot mounting tabs

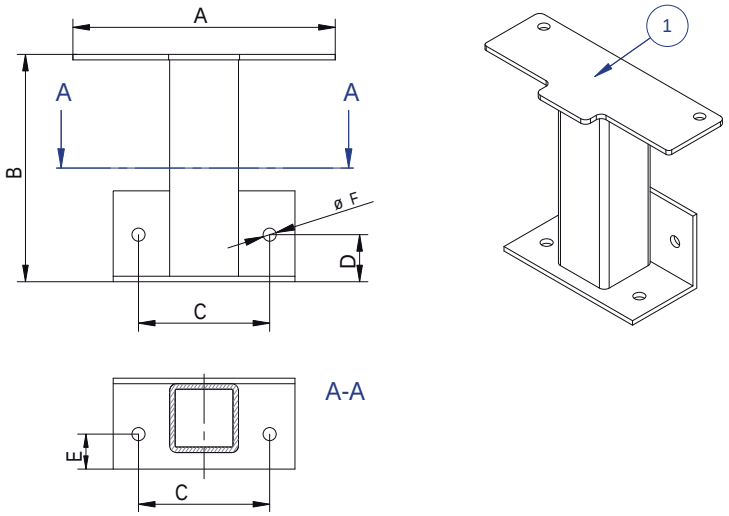
These support tabs can be mounted at various locations on the burner body at 6 in. spacings. They are suggested to be used for burners longer than 4 ft. Burners with a maximum length of 4 ft can be supported using the fixation holes in the endplates.



Dimensions in in. unless stated otherwise				
A	B	C	D	E
2	3.4	2.3	0.4	0.4

Universal mounting bracket

These brackets can be used to support burners in horizontal orientation (use 1 bracket per 5 ft burner) and in vertical orientations (use 1 bracket per 3 ft burner and install brackets on both sides of the burner).



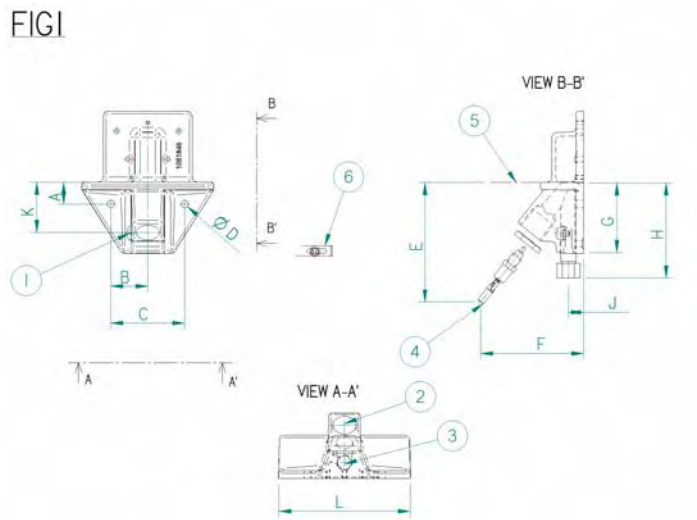
1) Mounting surface to be attached to burner

Dimensions in in. unless stated otherwise					
A	B	C	D	E	F
7.5	6.5	3.75	1.4	1	0.4

Endplates

FIG 1

1) Spark ignitor connection M10x1
2) UV/flame rod connection 1"NPT
3) Pilot gas connection 3/4-16 UNF
4) Flame rod
5) Mounting surface
6) Pilot air shutter

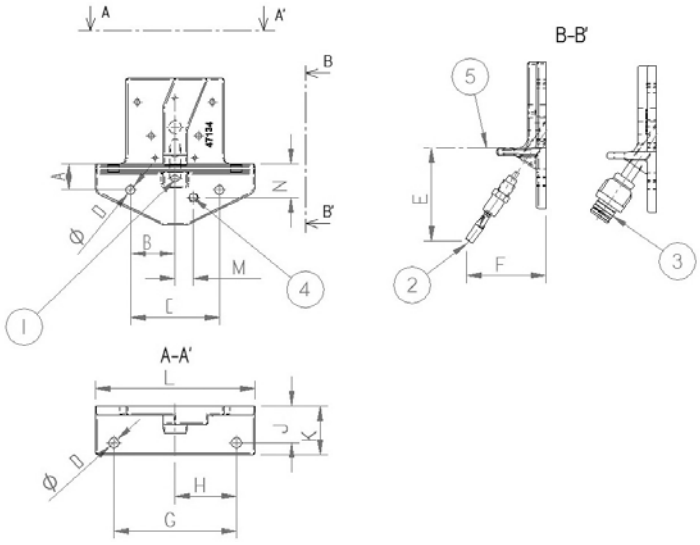


Dimensions in in. unless stated otherwise										
A	B	C	D	E [1]	F [1]	G	H	J	K	L
1.1	1.8	3.6	0.4	10.8	9.4	3.4	6.0	0.8	2.5	6.5

[1] Clearance for flame rod removal

FIG 2

1) Flame rod connection1.1/4"NPT
2) Flame rod
3) Optional sight glass
4) Gas test connection 1/8" NPT
5) Mounting surface

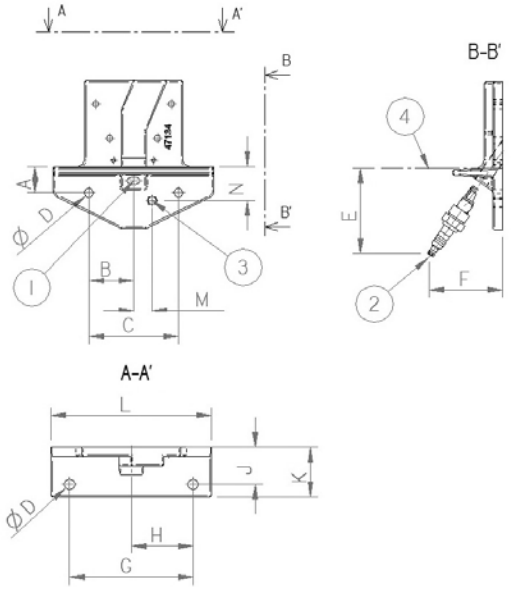


Dimensions in in. unless stated otherwise												
A	B	C	D	E [1]	F [1]	G	H	J	K	L	M	N
1.1	1.8	3.6	0.4	9.3	6.9	5	2.5	1.5	2	6.5	0.8	1.4

[1] Clearance for flame rod removal

FIG 3

1) Spark ignitor connection M14x1.25
2) Spark ignitor
3) Gas test connection 1/8"NPT
4) Mounting surface

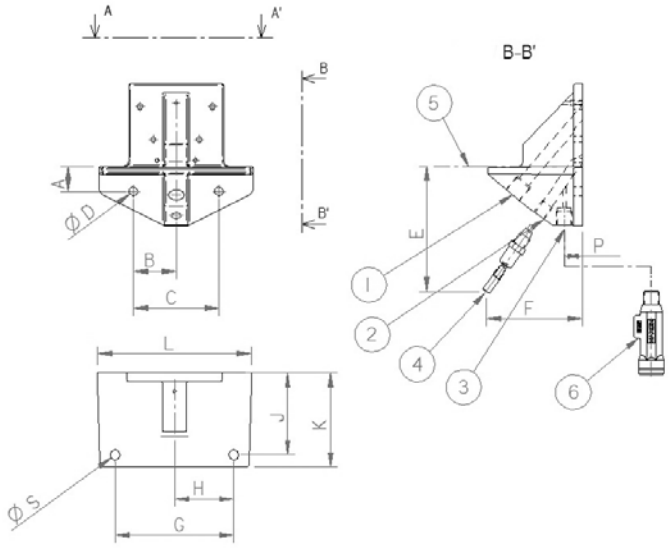


Dimensions in in. unless stated otherwise												
A	B	C	D	E [1]	F [1]	G	H	J	K	L	M	N
1.1	1.8	3.6	0.4	3.3	2.7	5	2.5	1.5	2	6.5	0.8	1.4

[1] Clearance for spark ignitor removal

FIG 4

1) Spark ignitor connection 3/4"-16
2) UV/flame rod connection 1/4"NPT
3) Pilot gas connection 3/8"NPT
4) Flame rod
5) Mounting surface
6) Pilot gas adjusting needle valve

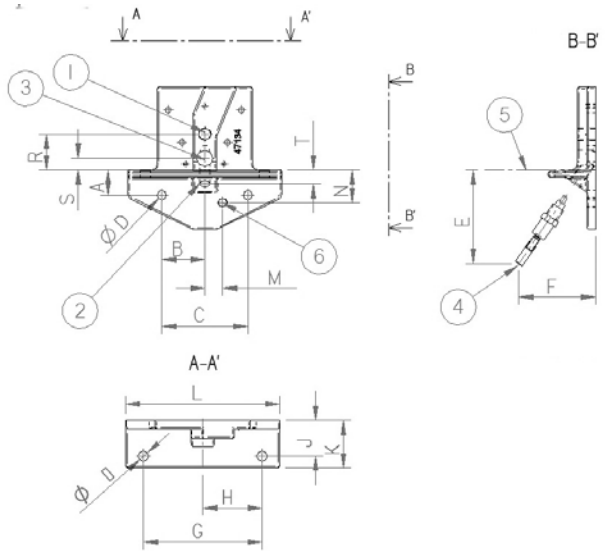


Dimensions in in. unless stated otherwise											
A	B	C	D	E [1]	F [1]	G	H	J	K	L	P
1.1	1.8	3.6	0.4	10.7	7.9	5.0	2.5	3.5	4.0	6.5	0.8

[1] Clearance for flame rod removal

FIG 5

1) Spark ignitor connection M14x1.25
2) UV/flame rod connection 1/4"NPT
3) Pilot gas connection 3/8"NPT
4) Flame rod
5) Mounting surface
6) Gas test connection 1/8"NPT

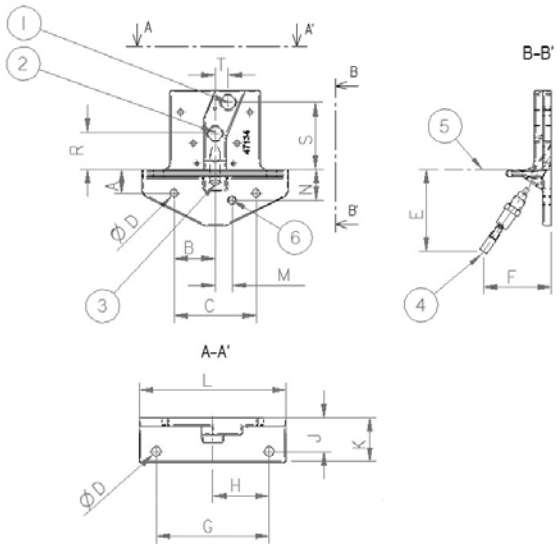


Dimensions in in. unless stated otherwise															
A	B	C	D	E [1]	F [1]	G	H	J	K	L	M	N	R	S	T
1.1	1.8	3.6	0.4	9.3	6.9	5	2.5	1.5	2	6.5	0.8	1.4	1.5	0.5	0.6

[1] Clearance for flame rod removal

FIG 6

1) Spark ignitor connection 3/4" - 10UNC
2) UV/flame rod connection 3/4" - 10UNC
3) Pilot gas or local flame rod connection 1/4" NPT
4) Flame rod
5) Mounting surface
6) Gas test connection 1/8" NPT



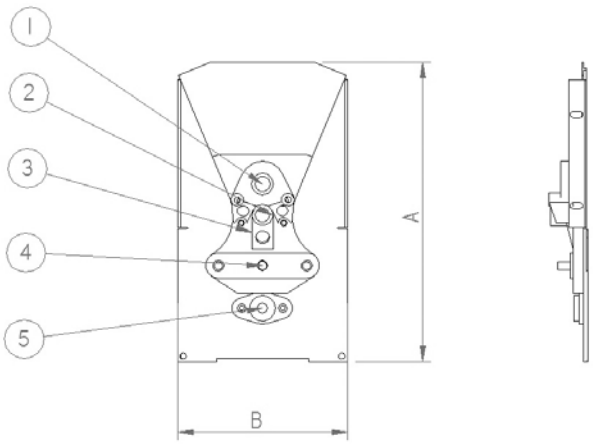
Dimensions in in. unless stated otherwise															
A	B	C	D	E [1]	F [1]	G	H	J	K	L	M	N	R	S	T
1.1	1.8	3.6	0.4	9.2	7.0	5.0	2.5	1.5	2.0	6.5	0.8	1.4	1.6	3.0	0.6

[1] Clearance for flame rod removal

INDUCT ENDPLATE SET

1) Scanner connection Rp1/2”
   Flame rod connection Rp1/4” (bushed)
2) Spark ignitor connection M14x1.25
3) Pilot gas connection Rp 1/4”
4) Gas test connection 1/8”NPT
5) Combustion air test connection 1/8” NPT

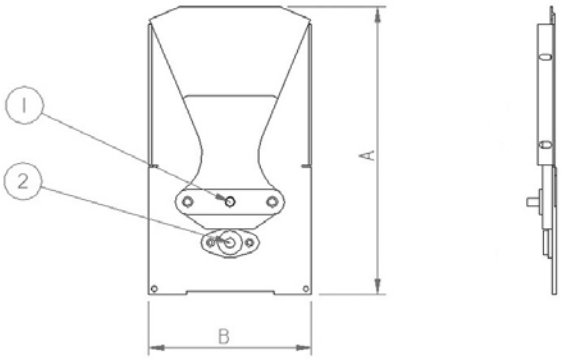
A = 11.5 in.
B = 6.5 in.



INDUCT PLAIN ENDPLATE SET

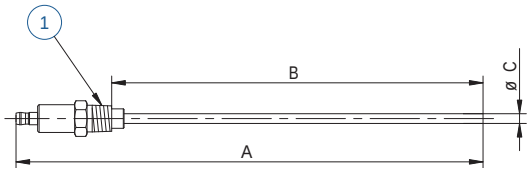
1) Gas test connection 1/8”NPT
2) Combustion air test connection 1/8” NPT

A = 11.5 in.
B = 6.5 in.



Flame rod - FR-APX

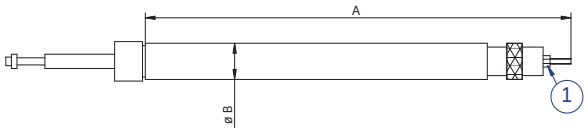
1) 1/4" - 18 thread



Dimensions in in. unless stated otherwise		
A	B	øC
9.6	7.5	0.2

Flame rod - FR-Quartz

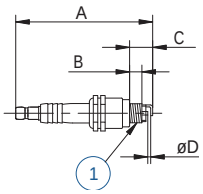
for use with external mounting plate kit.



Dimensions in in. unless stated otherwise		
Size	A	B
12"	12	1
18"	18	1
24"	24	1
30"	30	1
36"	36	1
48"	48	1

Spark ignitor - SI-APX-10 mm

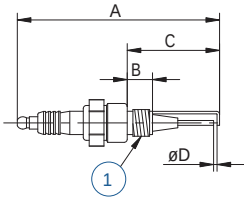
1) 1/4" - 18 thread



Dimensions in in. unless stated otherwise			
A	B	C	øD
2.75	0.25	0.4	0.125

Spark ignitor - SI-APX-14 mm-Long

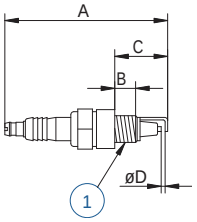
1) 14 mm thread



Dimensions in in. unless stated otherwise			
A	B	C	øD
4.09	0.51	1.87	0.08

Spark ignitor - SI-APX-14 mm-Short

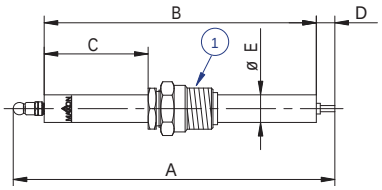
1) 14 mm thread



Dimensions in in. unless stated otherwise			
A	B	C	øD
3.3	0.51	1.07	0.08

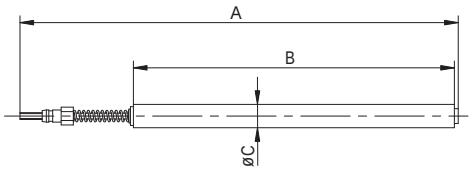
Spark ignitor - SI-APX-1/2-14

1) 1/2”-14 thread



Dimensions in in. unless stated otherwise				
A	B	C	D	øE
6.5	5.51	1.25	0.375	0.56

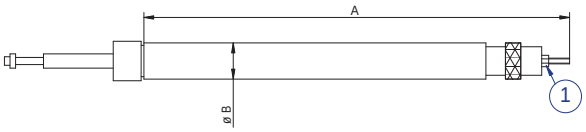
Spark ignitor - quartz less tube



Dimensions in in. unless stated otherwise		
A	B	øC
8.4	6.5	0.472

Spark ignitor - quartz with tube

Available in different sizes. Each size available in either carbon steel or stainless steel.

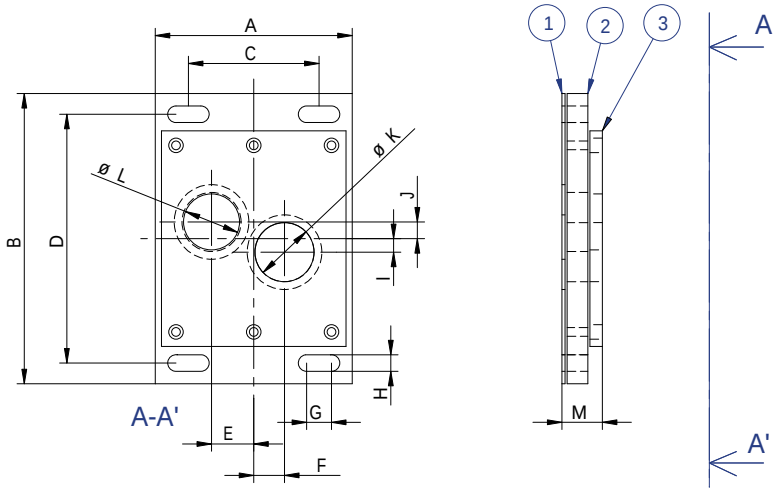


Dimensions in in. unless stated otherwise		
Size	A	B
12”	12	1
18”	18	1
24”	24	1
30”	30	1
36”	36	1
48”	48	1

Mounting plate kits for spark ignitor and flame detection

External SI/UV

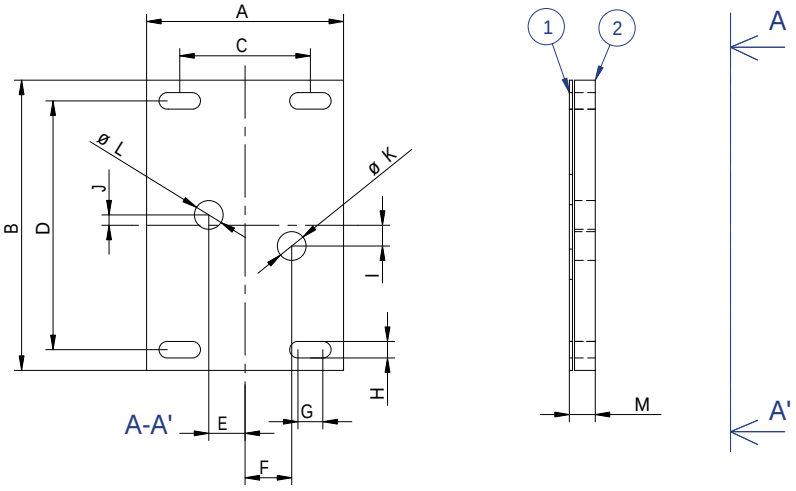
1) Gasket
2) Cover plate
3) Sealing plate



Dimensions in in. unless stated otherwise													
A	B	C	D	E	F	G	H	I	J	ø K	ø L	M	Weight (lbs)
3.74	5.51	2.48	4.72	0.80	0.58	0.47	0.31	0.26	0.32	1.12	1.12	0.77	2.60

Internal SI/UV

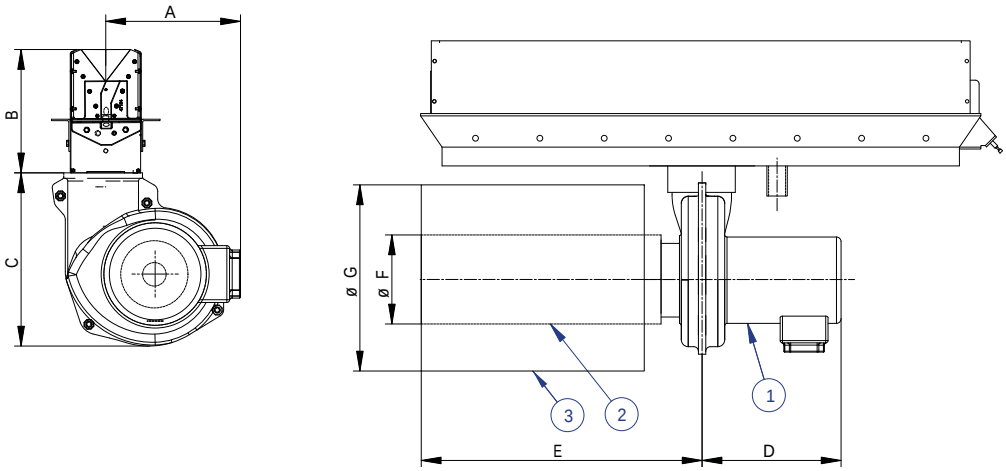
1) Gasket
2) Cover plate



Dimensions in in. unless stated otherwise													
A	B	C	D	E	F	G	H	I	J	ø K	ø L	M	Weight (lbs)
3.74	5.51	2.48	4.72	0.69	0.89	0.47	0.31	0.39	0.20	P_g 9	P_g 9	0.49	2.20

Blowers and accessories

1) Blower
2) Filter
3) Silencer



Dimensions in in. unless stated otherwise							
Burner size ft	A	B	C	D	E	ø F	ø G
1	12.7	11.5	15.2	14.4	20.3	7.0	11.8
1.5	12.7	11.5	15.2	14.4	20.3	7.0	11.8
2	16.4	11.5	19.0	14.6	20.5	7.0	11.8
2.5...15	16.4	11.5	19.0	14.6	27.8	9.0	16.4

Adjustable pilot gas orifice

1) Gas outlet 3/8" NPT
2) Gas inlet 3/8" NPT
3) Protection cap: remove to access flow adjustment screw HEX 3.8 mm

A = 1.5 in.
B = 3.44 in.
C = 0.75 in.