

## Specifications of MULTIFIRE® burners

### Gas firing

Typical burner data											
Fuel: natural gas at 60 °F with 1000 Btu/ft <sup>3</sup> <sub>(st)</sub> HHV - sg = 0.6 [1]											
Combustion air: 160 °F - 21% O <sub>2</sub> - 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.											
Burner size & type	MULTIFIRE® II							6"-HC MULTIFIRE®		MULTIFIRE® III	
	2"		3"		4"				6"	8"	
Comb. air differential pressure	"wc	25	32	25	32	25	32	24	38	24	24
Max. cap. [2]	for closed chamber	0.68	0.74	1.45	1.6	2.83	3.0	8.02	10.07	8.02	15.18
	air heating	0.74	0.85	1.85	1.93	2.86	3.0	18.43	23.37	11.60	21.84
Min. capacity	10% excess air	0.06		0.14		0.42		0.68		0.68	1.02
Combustion air flow for closed chamber max. firing	scfm	114	123	242	367	471	500	1471	1854	1471	2766
Gas pressure for closed chamber heating	"wc [3]	22	27	13	15	26	30	4	6	28	25
Gas pressure for air heating	"wc [3]							6	8	60	55
Flame length	ft	3.2		4.2		5		16	19	10	13
Flame diameter	ft	0.6		1		1.3		3	3.3	3	3

[1] sg (specific gravity) = relative density to air (density air = 0.0763 lb/ft<sup>3</sup><sub>(st)</sub>).

[2] Max. capacity for closed chamber is based on firing with no available secondary air, with balanced or slight static overpressure in combustion chamber. This would be typical for applications with high temperature furnaces (1472 °F and above).

Max. capacities for air heating are valid only when fresh secondary air (21 vol % O<sub>2</sub> if ambient temperature, min 15 vol % O<sub>2</sub> for temperatures exceeding 842 °F) is available from the passing process air stream.

Combustion air flow valid for all listed maximum capacities.

[3] Gas pressure is the differential pressure between burner gas test connection and process pressure. The indicated gas pressures correspond with the highest listed capacities (air heating).



**If burner fires into a high moisture, inert, or recirculating air stream (low oxygen), max. capacities may decrease approximately 10% from those shown for closed chamber firing.**

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## Oil firing

All MULTIFIRE® burners are capable of firing on light oil (#2 oil) and kerosene. Heavy oils (#4 oil or heavier) may only be fired in 6"-HO MULTIFIRE® burners. Heavy oils must be heated to maintain a viscosity of 50 SSU or less to the burner inlet of the 6"-HO MULTIFIRE® burner. All oils different from #2 oil should be checked for compatibility with the 6"-HO MULTIFIRE® burner.

Typical burner data														
Fuel: light oil (#2 oil): 140,000 Btu/gallon - viscosity to be max. 50 SSU														
Combustion air : 160 °F - 21% O <sub>2</sub> - 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.														
Burner size & type		MULTIFIRE® II						6"-HO		6"-HC		MULTIFIRE® III		
		2"		3"		4"		MULTIFIRE®		MULTIFIRE®		6"	8"	
Comb.air diff.pressure [2]	"wc	25	32	25	32	25	32	25	38	24	38	24	24	
Max.cap. [3]	for closed chamber	MBtu/h	0.73	0.74	1.45	1.60	2.84	2.95	9.3	10.7	9.9	12.45	8.7	16.2
	air heating	MBtu/h	0.8	1.1	1.82	1.96	2.84	2.95	9.3	10.7	22.7	28.66	12.63	23.37
Min. capacity [4]	MBtu/h	0.06	0.07	0.13	0.15	0.17	0.2	1.2		2.05		0.87	1.37	
Combustion air flow for closed chamber max. firing [5]	scfm	121	124	242	267	473	492	1250	1500	1471	1854	1471	2766	
Atomizing air differential pressure [6]	"wc	25	32	25	32	25	32	38		24	38	24	24	
Atomizing air flow [7]	scfm	14	16	27	31	54	61	417		335	412	129	206	
Oil inlet pressure [8]	psi	5.5	6	20	24	16	18	8	10	7.3/40	11/60	17.5/40	8/19.3	
Flame length	ft	3		4		6		8	10	16	20	10	13	
Flame diameter	ft	0.8		1		1.3		2.8	3	2.9	3.3	2.9	2.9	

[1] sg (specific gravity) = relative density to air (density air = 0.0763 lb./ft<sup>3</sup><sub>(st)</sub>).

[2] Combustion air pressure is the differential pressure measured between the burner test connection and process.

[3] Max. capacity for closed chamber is based on firing with no available secondary air, with slight static overpressure in combustion chamber. This would be typical for applications with high temperature furnaces (1472 °F and above).

Max. capacities for air heating are valid only when fresh secondary air (21 vol % O<sub>2</sub> if ambient temperature, 15% vol O<sub>2</sub> for temperatures exceeding 842 °F) is available from the passing process air stream.

[4] Minimum capacity shown is the absolute minimum capacity possible, only possible with full atomizing air and closed combustion air valve.

[5] Combustion air flow valid for all listed maximum capacities.

[6] Atomizing air pressure is the differential pressure measured between burner test connection and process, for entire capacity range.

[7] Atomizing air flow is valid for the entire capacity range.

[8] Oil differential pressure at burner inlet, valid for the maximum listed capacity (fresh air heating). (when two figures are displayed the figure left from the dash indicates the required oil pressure for closed chamber heating. The figure right of the dash indicates the requested oil pressure for air heating.)

### Pilot burner specification

MULTIFIRE® burners are ignited by means of an externally mounted gas pilot. Igniting the burner on oil only is not possible, natural gas or propane should always be available for ignition.

The burner body allows for the mounting of 2 pilot burner types : the sealed port pressure pilot and the boosted pilot. The boosted pilot option offers increased flexibility for most applications and is recommended.

Combustion air for the pilot can be compressed air which is reduced to the pressure stated in the table below by means of an adequate pressure regulator. An alternative and easier solution is to branch the pilot combustion air from the main burner combustion air blower.

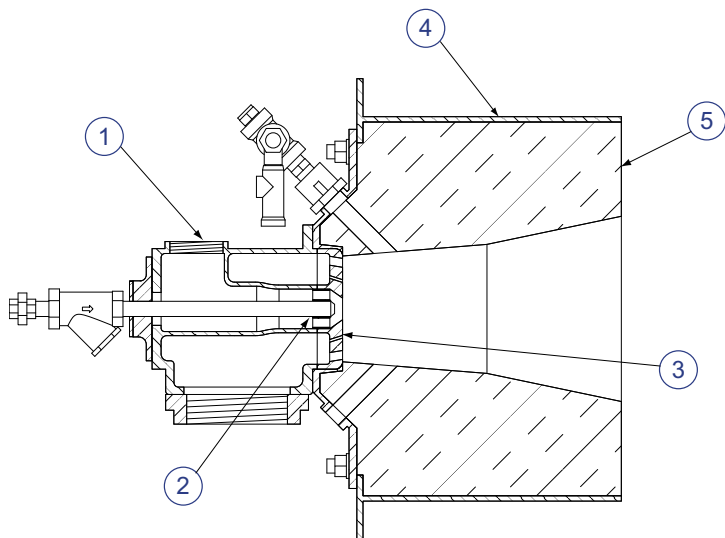
The pilot gas line should be equipped with a pilot gas pressure regulator.

Both pilot versions contain a fine adjustment gas needle valve for easy commissioning.

Refer to page 3-11.3-20 for dimensional sketches on these pilot burners.

		burner size	2"	3"	4"	6"	8"	
Sealed port pressure	gas pressure	psi	0.14...0.29	0.14...0.29	0.14...0.29	0.03	0.03	
	air pressure	psi	0.5...1.0	0.5...1.0	0.5...1.0	0.21	0.21	
	capacity	MBtu/h	0.04	0.04	0.04	0.04	0.04	
Boosted pilot	gas pressure	psi	0.14...0.43					
	air pressure	psi	0.5...1.45					
	capacity	MBtu/h	0.1					

### Materials of construction



1	Housing	gray iron
2	Gas nozzle	carbon steel
3	Air orifice plate	carbon steel
4	Block sleeve	carbon steel or stainless steel AISI 304 (1.4301)
5	Block	castable refractory

## Selection criteria

### MULTIFIRE® burner versions

MULTIFIRE® burners are able to operate on both gas and light oil (not simultaneously). Each type has different sizes available to cover a broad range of capacities to suit all heating applications.

One exception is the MULTIFIRE® 6"-HO - version. This burner is an oil burner only and can not operate on gas. It will however allow the use of heavy oil (HO).

All burners are available in ANSI and ISO version. Connections larger than 2" are available as threaded or flanged. (see detailed drawings on page page 3-11.3-13).

Burner blocks are available in different materials and geometry:

- standard version with refractory block for installation in refractory walls. For sizes up to 4" this block will be square. Larger sizes will have cylindrical blocks.
- complete with block sleeve to provide additional block support in thin chamber walls or soft wall constructions which do not support the burner block, typical in air heating applications. Block sleeves are available in stainless or carbon steel. Blocks with sleeve will always be round.

### Application details

In high temperature furnaces MULTIFIRE® burners can be used wherever good temperature uniformity is required. Among the typical applications are forge furnaces, annealing furnaces, melting furnaces, lehrs, kilns, ceramic furnaces, fume incinerators, etc.

MULTIFIRE® burners are an ideal solution in air heating applications, when oil or dual fuel operation is requested. The burner is capable of firing in fresh air streams if sufficient attention is paid to the design of the system. In air heating applications, the flame should be protected by a short additional protection sleeve to avoid quenching of the flame by the air entering the combustion chamber. The flame needs to develop itself in a quiet air stream with sufficient oxygen. The additional protection sleeve should allow a part of the process air to flow across the flame within the sleeve at low velocity. In this way, the temperature within the sleeve is about 1470 °F to 1650 °F. Contact MAXON for more details.

### Maximum capacities

MULTIFIRE® burners will have different maximum capacities depending on burner size, application and fuel.

Refer to tables page 3-11.3-6 for max. capacities at gas firing and oil firing.

Capacities are stated for closed chamber firing and air heating applications. The max. capacities for air heating applications are considerably higher because of the presence of oxygen in the process air, which can be used as secondary combustion air.

Maximum capacity for a specific burner is a function of differential air pressure supplied to the burner air inlet as read between air test connection and combustion chamber. Combustion air blower rating must be sized to allow for manifold pressure losses.

### Minimum capacities

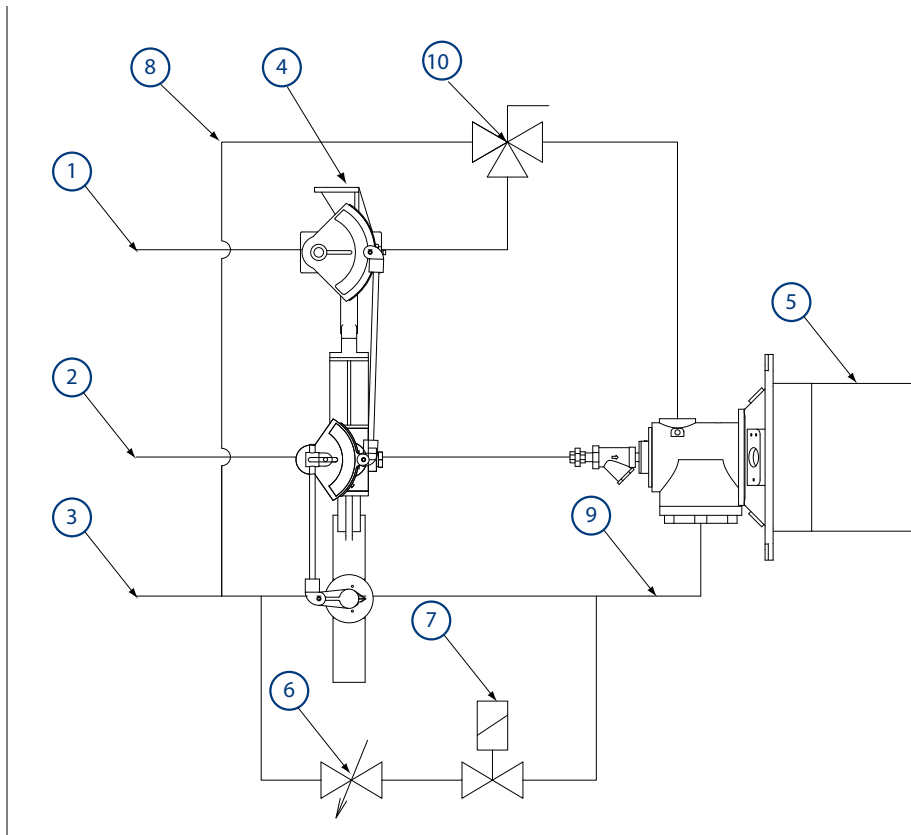
The minimum stated capacities on oil operation in table at page 3-11.3-7 are only possible with combustion air control valve at its absolute minimum position. Since this absolute minimum position will not allow enough combustion air for gas firing, special consideration should be taken in case minimum capacities are critical on both gas and oil firing.

In this case a combustion air bypass valve and a balancing valve shall be mounted parallel to the combustion air control valve. This bypass valve shall be open on air firing and closed on oil firing. On gas firing the balancing valve shall be adjusted in such a way that it will provide the burner with sufficient combustion air on minimum capacity.

Burner size	BV Balancing Valve		Air by-pass solenoid valve	
	Size	Cv flow	Size	Cv flow
2" MULTIFIRE®	Rp 1/2	5	Rp 1/2	5
3" MULTIFIRE®	Rp 1	18	Rp 1	21
4" MULTIFIRE®	Rp 1-1/4	42	Rp 1-1/4	32

Typical schematic illustration for air by-pass system

- 1) Gas
- 2) Oil
- 3) Air
- 4) MICRO-RATIO® gas/oil/air control valve
- 5) MULTIFIRE® burner
- 6) Balancing valve
- 7) By-pass air solenoid valve
- 8) Atomizing air
- 9) Combustion air
- 10) 3-way diverter cock



Dual fuel operation

The MULTIFIRE® burner gas inlet and atomizing air inlet for oil firing, are physically one and the same connection. On dual fuel installations, switching from oil firing to gas firing or vice versa, will therefore require a 3-way diverter cock or an automated valve arrangement which will divert either gas or atomizing air to the burner connection point.

Preheated air

Preheated combustion air up to 800 °F can be accommodated by standard MULTIFIRE® burners, resulting in lower fuel consumptions.

Process temperature

Standard refractory block permits operation at combustion chamber temperatures of 2600 °F. Special refractory block material is available which will extend the operation temperatures up to 3000 °F.

When blocks with support sleeve are used in thin wall constructions and air heating applications, the temperatures of the upstream and downstream temperatures are limited.

Process air temperature limits for blocks with sleeve (°F)		
Sleeve material	upstream	downstream
Carbon steel	600	900
Stainless steel	1000	1500

## Piloting and ignition

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MULTIFIRE® burners require an externally mounted gas pilot for easy pilot flame adjustment and maintenance. Spark ignitor is easily accessible.

Two types are available, refer to page 3-11.3-8 for pilot capacities and required pilot gas and pilot air pressures. Refer to page 3-11.3-20 for dimensional sketches of these pilot burners.

Direct ignition is not possible. Igniting the pilot with oil instead of pilot gas is not possible. Natural gas or propane should always be available to feed the pilot burner.

Pilots shall be used only for ignition of the main flame (interrupted pilot).

Permanent pilot operation is not advised (no permanent or intermittent pilot). Use the main burner at minimum capacity for continuous operation.

Use minimally 5000 V/200 VA ignition transformers for sparking of the spark ignitor.

Locate pilot gas valves as close as possible to the pilot burner gas inlet, to have fast ignition of the pilot burner.

## Typical ignition sequences

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- Pre purge of burner and installation, according to the applicable codes and the installation's requirements.
- Combustion air control valve shall be in the start position to allow minimum combustion air flow to the burner. For oil firing the air control valve should be at its absolute minimum position, for gas firing the air control valve should be slightly opened. For dual fuel burner installations, the by-pass valve should be opened in gas firing mode / closed in oil firing mode.
- In case of oil firing: Atomizing air should be applied to the burner.
- Pre-ignition (typically 2 s sparking in air).
- Open pilot gas and continue to spark the ignitor (typically 5 s).
- Stop sparking, continue to power the pilot gas valves and start flame check.
- Check pilot flame stability (typical 5 s to prove the stable pilot).
- Open main gas or oil valves and allow enough time to have main gas or oil in the burner. (typical 5 s + time required to have main gas or oil in the burner).
- Close the pilot gas valves.
- Release to modulation (allow modulation of the burner).

Above sequences shall be completed to include all required safety checks during the start-up of the burner (process & burner safeties).

## Ratio control

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Changes in combustion air temperature, system back pressure and other parameters can influence fuel/air ratio if the control system is not designed for compensation. Contact MAXON for more details and/or assistance.

MAXON advises to use 1 fuel/gas ratio valve per burner head. Especially on oil, it is required to foresee 1 oil control valve for each single burner. The use of common gas- or air control valves for multiple burners is possible, however will reduce turndown and flexibility.

Accurate air, gas and oil fuel control can be accomplished with MAXON MICRO-RATIO® control valves and MAXON SMARTLINK® technology.

## Flame supervision

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MAXON advises to use a UV-scanner for flame supervision on all MULTIFIRE® burner sizes and types.

Burner design incorporates one UV-scanner port suitable for supervision of both pilot and main flames.

Pay attention to possible pick-up of strange flames (if any in the furnace) when using UV-scanner for flame detection. Allow some purge or cooling air to the scanner connections (typically 70 scfh of fresh clean air).

Scanners should be installed as close to the burner as possible. Flame supervision by means of a flame rod is only possible on a limited range of low temperature applications where only gas firing is used.

## Flame development

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MULTIFIRE® burners shall be installed in combustion chambers or furnaces that allow full development of the burner flame.

Protection of the flame from process flows may be required in some applications when using oil. Contact MAXON for consultation on flame protection shrouds or sleeves.

Cylindrical combustion chambers or flame protection sleeves shall be sized correctly.

Consult MAXON for proper combustion chamber lay-out.

## Combustion air, gas and oil piping

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Combustion air piping to the burner shall be done in such way that the air flow to the burner will not disturb the flame. For optimum performance, the first elbow in combustion air piping must be at least six pipe diameters from burner test connection. Location of air control valves directly on the burner inlet is not advised. If mounting of a control valve directly at burner inlet connection is inevitable, an air straightener between air control valve and burner inlet is necessary. When possible, locate the air/gas/oil control valves in a position that allows viewing of burner flame during adjustment. Protect control valve operator from excessive radiant and/or ambient heat.

Oil piping should be piped below the burner to prevent oil leakage towards burners when oil valves are shut.

In multi-burner installations, MAXON advises to install a separate oil, gas and air control valve for each burner.

## Process back pressures

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Process back pressures can range from -5 psi to 5 psi

## Oil & gas flow meters for burner commissioning

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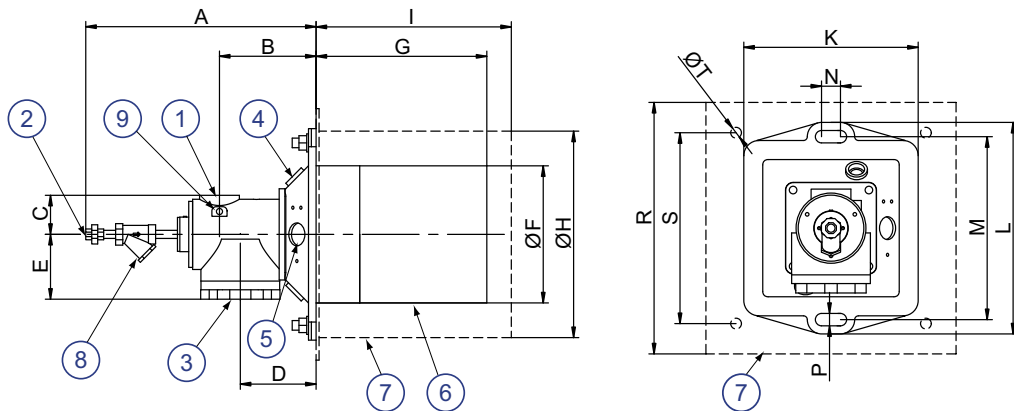
Oil fired MULTIFIRE® burners require equipment for oil flow measurement to be able to set the burner correctly during start up & commissioning.

Gas pressures of MULTIFIRE® burners may be influenced by the combustion air flow and/or air factor. Therefore MAXON advises to install a flow metering device for proper burner setting.

## Dimensions

### MULTIFIRE® size 2" - 3" - 4"

- 1) Gas/atomizing air inlet
- 2) Oil inlet
- 3) Combustion air inlet
- 4) Flame scanner connection
- 5) Pilot burner mounting port
- 6) Standard block (square)
- 7) Optional block with seal and support housing (round)
- 8) Oil filter
- 9) Atomizing air/gas test connection



Dimensions in inches unless stated otherwise											
burner size	gas / atomizing air inlet [1]	combustion air inlet [1]	oil inlet [1]	A [2]	B	C	D	E	Ø F [3]	G	
2"	1"	2"	1/4"	13.18	5.56	2.06	4.5	2.38	7.5	9	
3"	1 - 1/2"	3"	1/4"	15.19	6.38	2.56	5	4.32	9	11.25	
4"	2"	4"	3/8"	15.82	7.44	3	5.19	5.19	11.5	11.5	
burner size	Ø H [4]	I	K	L	M	N	P	R	S	Ø T	weight (lbs)
2"	11.56	9	9	13.88	10.5	1	0.6875	14.5	10.5	0.69	57
3"	13.56	11.25	11.5	13.88	12	1.25	0.6875	16.5	12.5	0.69	92
4"	17.12	11.5	13.5	16	14	1	0.6875	20.5	15.5	0.69	145

[1] All connections are standard NPT or ISO threaded, all connections sized 3" or above have optional welding flanges available.

[2] Add 7 in. clearance for tube removal.

[3] Valid only for standard blocks (square geometry).

[4] Valid only for blocks with seal and support housing (cylindrical geometry).



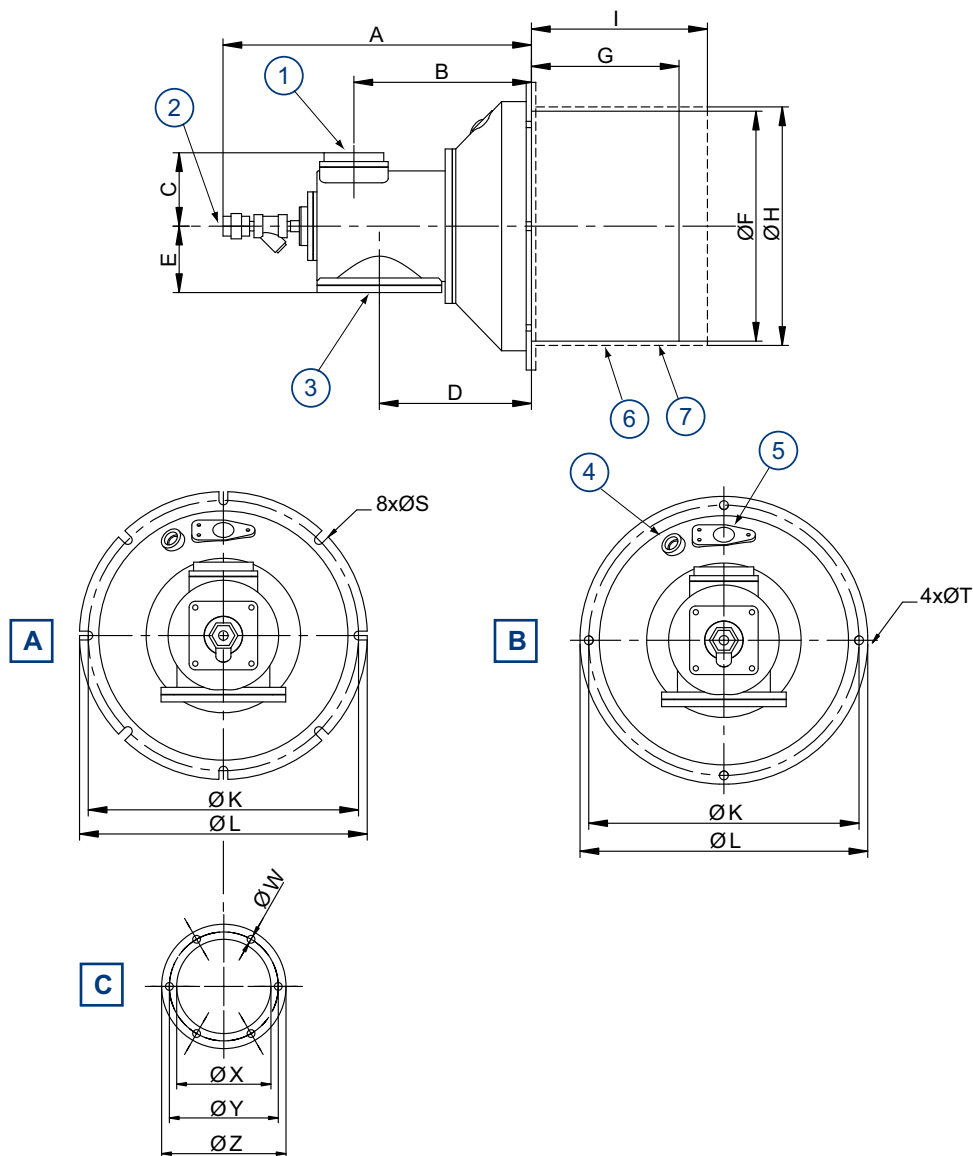
MULTIFIRE® size 6"

- 1) Gas/atomizing air inlet
- 2) Oil inlet
- 3) Combustion air inlet
- 4) Flame scanner connection
- 5) Pilot burner mounting port
- 6) Standard block
- 7) Optional block with seal and support housing

A : Standard block

B : Block with seal and support

C : Optional combustion air welding flange



Dimensions in inches unless stated otherwise

burner size	gas / atomizing air inlet [1]	combustion air inlet [1]	oil inlet [1]	A [2]	B	C	D	E	Ø F [2]	G	
6"	3"	6"	3/8"	22	12.69	5.25	10.88	5.56	16.38	10.5	
burner size	Ø H [4]	I	Ø K	Ø L	Ø S	Ø T	Ø W	Ø X	Ø Y	Ø Z	weight (lbs)
6"	17.12	16.25	19.24	20.5	0.62	0.62	0.55	6.71	7.76	8.86	200

[1] All connections are standard NPT or ISO threaded, all connections sized 3" or above have optional welding flanges available.

[2] Add 9 in. clearance for tube removal.

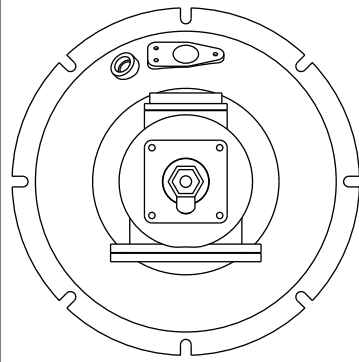
[3] Valid only for standard blocks (cylindrical geometry).

[4] Valid only for blocks with seal and support housing (cylindrical geometry).

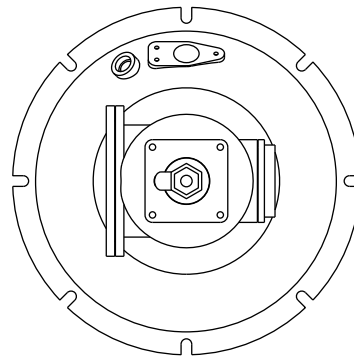
Available air inlet position

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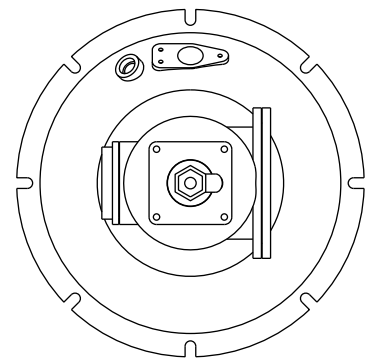
- A : position 'D'  
standard
- B : position 'L'
- C : position 'R'



A

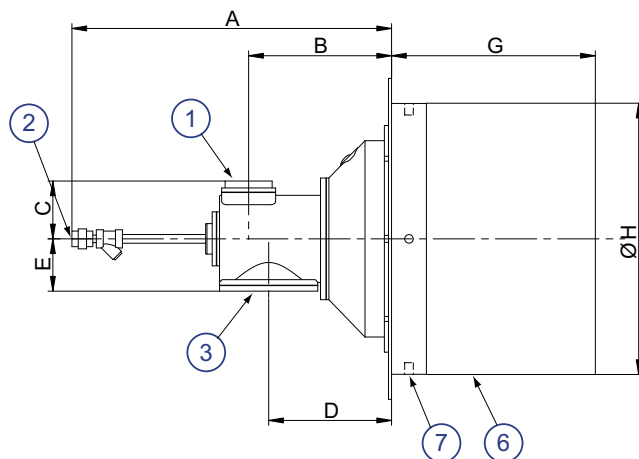


B

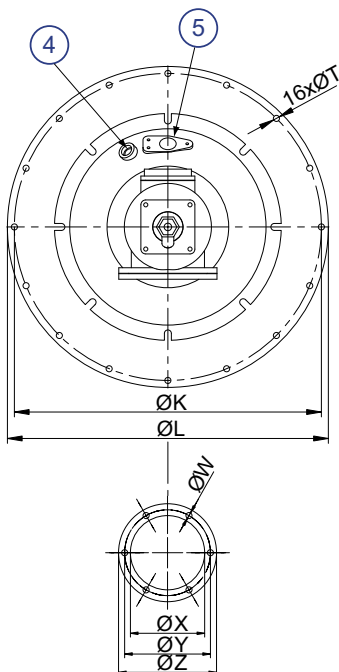


C

MULTIFIRE® size 6"-HO & 6"-HC



- 1) Gas/atomizing air inlet
- 2) Oil inlet
- 3) Combustion air inlet
- 4) Flame scanner connection
- 5) Pilot burner mounting port
- 6) Standard block
- 7) Nut for lifting 4x1/2"-13



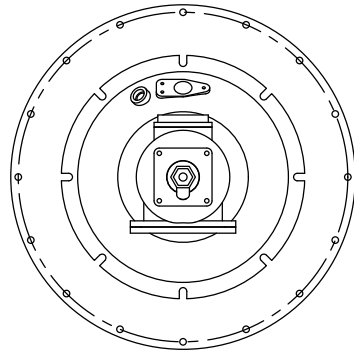
Dimensions in inches unless stated otherwise										
burner size	gas / atomizing air inlet [1]		combustion air inlet [1]		oil inlet [1]	A [2]	B	C	D	E
6"-HO	3"		6"		3/8"	21	12.94	5.25	11.13	5.56
6"-HC	3"		6"		3/8"	25	12.94	5.25	11.13	5.56
burner size	G	Ø H [4]	Ø K	Ø L	Ø T	Ø W	Ø X	Ø Y	Ø Z	weight (lbs)
6"-HO	18.44	24.5	27.6	29	0.56	0.55	6.71	7.76	8.86	200
6"-HC	18.44	24.5	27.6	29	0.56	0.55	6.71	7.76	8.86	200

[1] All connections are standard NPT or ISO threaded, all connections sized 3" or above have optional welding flanges available.

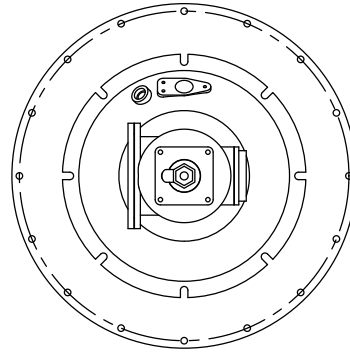
[2] Add 12 in. clearance for tube removal.

Available air inlet position

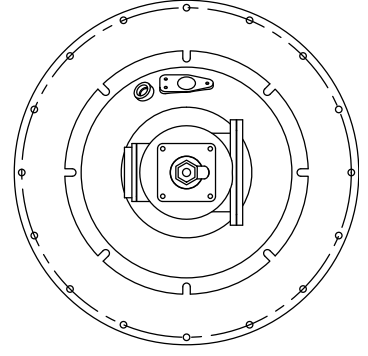
- A : position 'D'  
standard
- B : position 'L'
- C : position 'R'



A

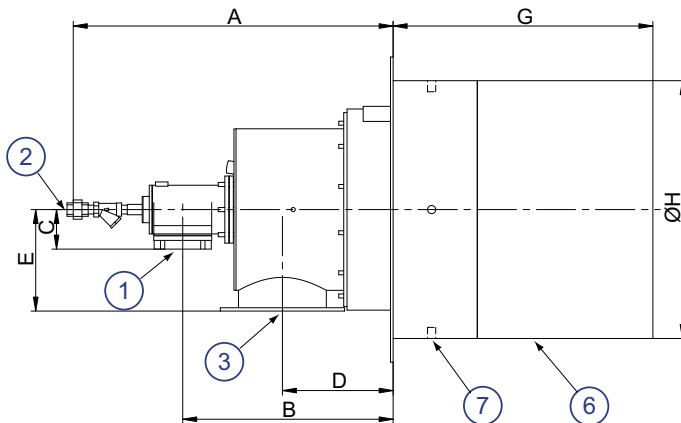


B

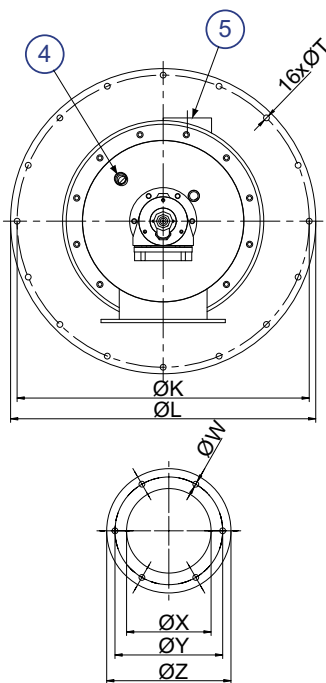


C

MULTIFIRE® size 8"



- 1) Gas/atomizing air inlet
- 2) Oil inlet
- 3) Combustion air inlet
- 4) Flame scanner connection
- 5) Pilot burner mounting port
- 6) Standard block
- 7) Nut for lifting 4x1/2"-13



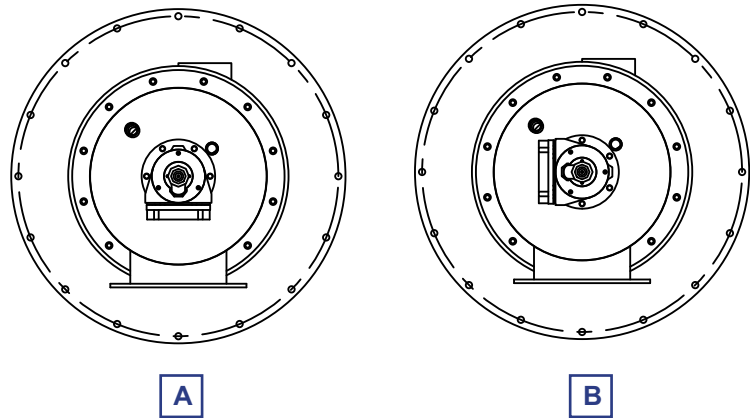
Dimensions in inches unless stated otherwise										
burner size	gas / atomizing air inlet [1]		combustion air inlet [1]		oil inlet [1]	A [2]	B	C	D	E
8"	4"		8"		1/2"	31.31	20	3.75	10.5	9.62
burner size	G	Ø H [4]	Ø K	Ø L	Ø T	Ø W	Ø X	Ø Y	Ø Z	weight (lbs)
8"	24.69	24.5	27.76	29	0.56	0.56	8	10.24	11.75	530

[1] Gas/atomizing air connection is standard NPT or ISO threaded but has optional welding flange available, combustion air has a flanged connection.

[2] Add 15 in. clearance for tube removal.

Available air inlet positions

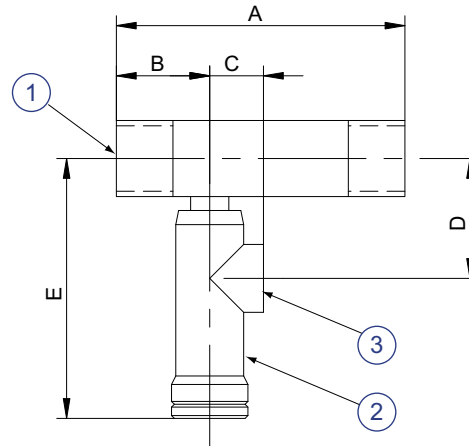
- A : position 'D' standard
- B : position 'L'



Optional cooling tee set

This set can be mounted directly onto the burner UV scanner port. It has a connection for cooling air and a needle valve for adjustment of the cooling air flow for the UV scanner.

- 1) Scanner tube connection 3/4"
- 2) Adjustable orifice (hex key size)
- 3) Cooling air connection 3/8"

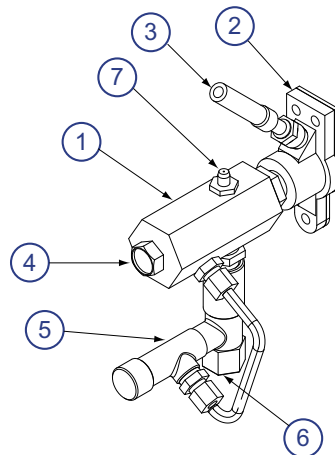
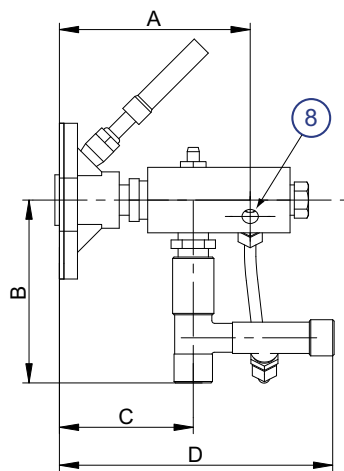


Dimensions in inches unless stated otherwise					
burner size	A	B	C	D	E
2" ...6"	4	1.31	0.75	1.75	3.62
8"	7.5	1.31	0.75	1.75	3.62

### Boosted pilot burner

This pilot can be mounted directly onto the MULTIFIRE® burner pilot connection. It includes the spark ignitor and mounting gasket and is suitable for all burner sizes.

- 1) Boosted pilot body
- 2) Pilot burner nozzle and mounting gasket
- 3) Spark ignitor and insulating cap
- 4) Sight glass
- 5) Premix air adjusting needle valve
- 6) Air connection 3/8" NPT
- 7) Pressure test nipple
- 8) Gas connection 1/4" NPT

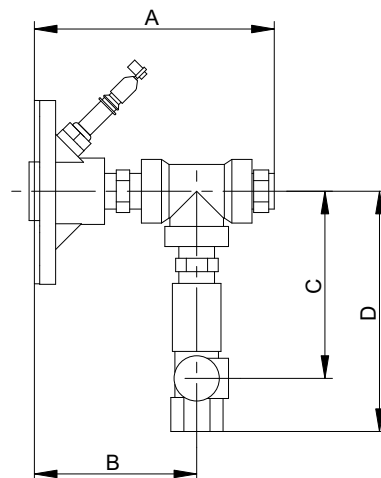
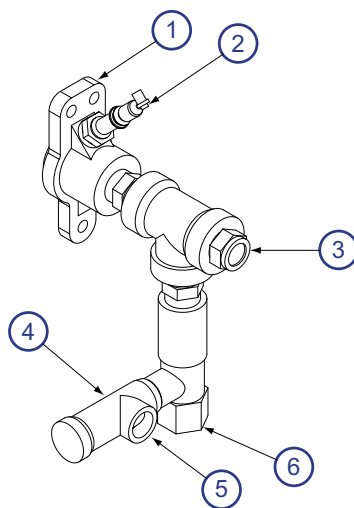


Dimensions in inches unless stated otherwise			
A	B	C	D
5.3	5.1	3.7	7.7

### Sealed port pressure pilot burner

This pilot can be mounted directly onto the MULTIFIRE® burner pilot connection. It includes the spark ignitor and mounting gasket and is suitable for all burner sizes.

- 1) Pilot burner nozzle and mounting gasket
- 2) Spark ignitor
- 3) Sight glass
- 4) Gas adjusting needle valve
- 5) Gas connection 3/8" NPT
- 6) Air connection 3/8" NPT



Dimensions in inches unless stated otherwise			
A	B	C	D
5.7	3.8	4.4	5.6

# Installation and operation instructions for MULTIFIRE® burners

## Application requirements

### View port

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A view port to observe burner flame is essential to inspect the flame aspect. Locate the view port downstream of the flame, looking back to the burner block. Make sure the complete flame can be evaluated.

### Supporting burner air and gas piping

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The MULTIFIRE® burner shall not be used as support for the piping to the burner. Gas and air piping shall be supported in such way that no additional loads will be created on the burner.

### Burner mounting flange loads

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Check burner weight and reinforce burner mounting flange or combustion chamber/furnace back wall if necessary to take the complete burner weight.

## Installation instructions

### Storage of MULTIFIRE® burners

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MULTIFIRE® burners shall be stored dry (inside). Burner blocks have been cured carefully before shipment and shall be kept dry. Wetting of the blocks could result in premature failures.

### Handling of MULTIFIRE® burners

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MULTIFIRE® burners are shipped as complete units. Handle burners with care, using proper equipment during unpacking, transport, lifting and installation. Any impact on the burner could result in damage. To prevent damage in transit, accessories such as flame rods, control valves, UV-scanners, may be packed separately and shipped loose.

### Orientation of MULTIFIRE burners

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MULTIFIRE® burners can be mounted and fired in any direction. However we advice to avoid orientations which can permit flame supervision ports to collect debris and/or moisture. Also check limitations on orientation of other components mounted on the burner head.



**In some applications, the burner housing temperature can rise during operation. Hot surfaces can cause severe burning injuries. Insure appropriate measures are taken to prevent contact and/or correct warning signs are displayed.**

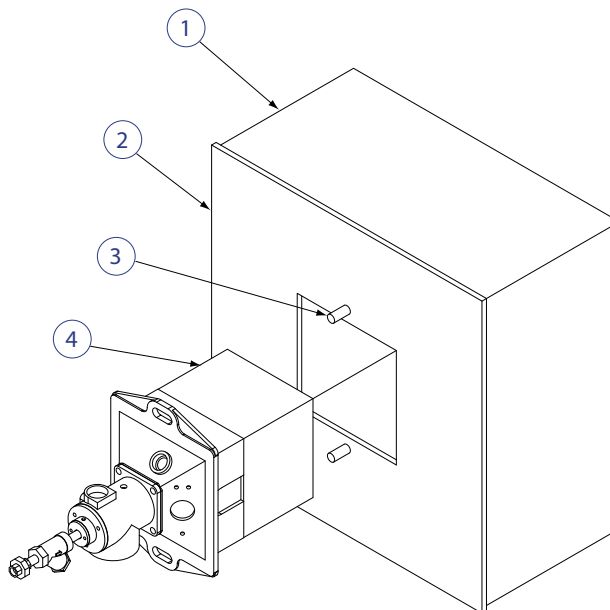


### Flange the burner to the installation

Bolt the burner to the installation's burner mounting flange. Use proper gaskets between burner and burner mounting flange when applicable. Tighten the flange bolting with correct torque. Retighten all bolts after first firing and regularly after commissioning.

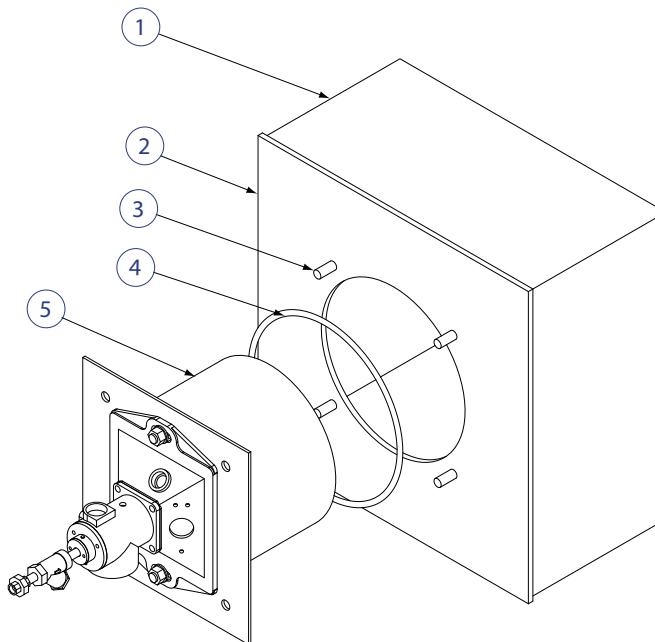
#### MULTIFIRE® with standard refractory block

- 1) High temperature refractory wall
- 2) Oven wall
- 3) Mounting studs
- 4) Burner



#### MULTIFIRE® with block with seal and support housing

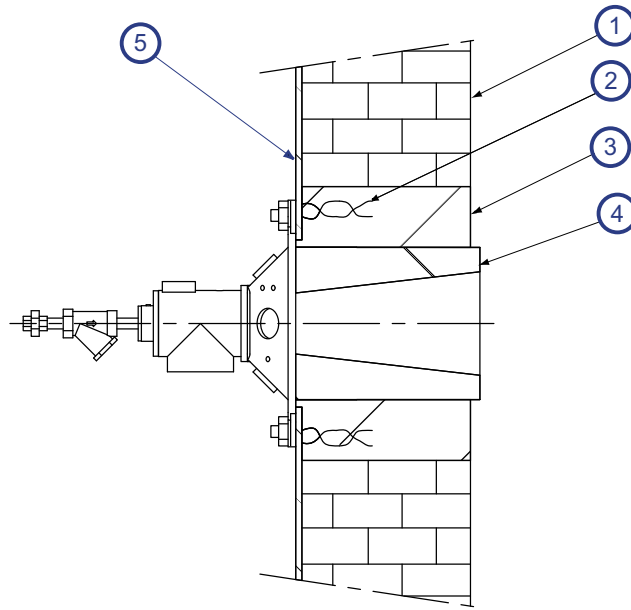
- 1) Soft wall insulation
- 2) Sheet metal wall
- 3) Mounting studs
- 4) High temperature gasket (by others)
- 5) Burner



### Refractory wall: standard blocks

MULTIFIRE® burners with standard blocks (without supporting sleeve) require supporting of the burner block by the furnace wall. The mounting hole for the burner in the furnace shell should be 1 in. larger than the burner block diameter. A gap of approximately 3 in. around the burner block should be left free in the furnace refractory wall when mounting the burner. After fixing the burner on the furnace wall, this gap should be rammed with castable refractory, retained by anchors.

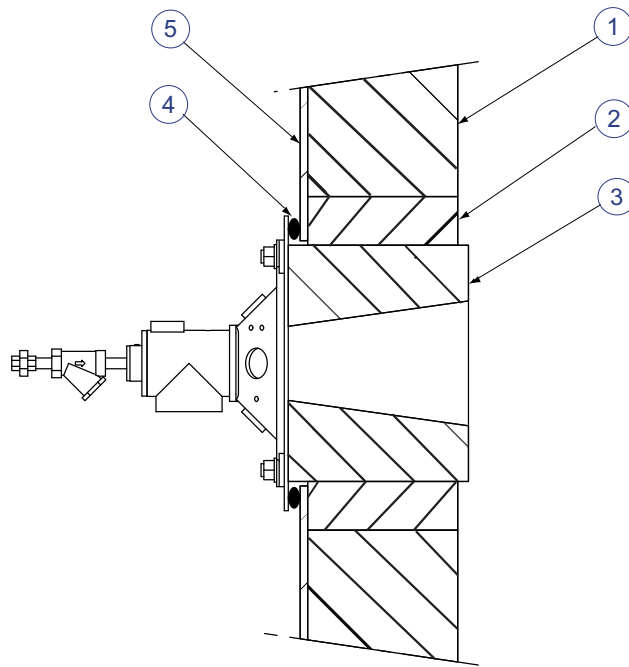
- 1) High temperature refractory wall
- 2) Anchors
- 3) Castable refractory
- 4) Burner block
- 5) Furnace shell



### Furnace wall with soft insulation: blocks with supporting sleeve

MULTIFIRE® burners which are mounted in a furnace with no internal insulation or with soft internal insulation, need to have a burner block sleeve (optional) specified. This sleeve makes the burner block self supporting. Remaining space between burner block and insulated wall should be packed tightly with ceramic fibre insulation.

- 1) Furnace fibre insulation
- 2) Fibre insulation, fitted into the space around the block
- 3) Burner refractory block with supporting sleeve
- 4) High temperature gasket
- 5) Furnace shell



## Start-up instructions for MULTIFIRE® burners

Instructions provided by the company or individual responsible for the manufacture and/or overall installation of a complete system incorporating MAXON burners take precedence over the installation and operating instructions provided by MAXON. If any of the instructions provided by MAXON are in conflict with local codes or regulations, please contact MAXON before initial start-up of equipment.



Read the combustion system manual carefully before initiating the start-up and adjustment procedure. Verify that all of the equipment associated with and necessary to the safe operation of the burner system has been installed correctly, that all pre commissioning checks have been carried out successfully and that all safety related aspects of the installation are properly addressed.

Initial adjustment and light-off should be undertaken only by a trained commissioning engineer.

### ■ First firing or restart after shut-down

During first start-up of the burner, allow extended period at low firing range to minimize potential damage from accumulated and retained moisture in refractory burner block.

During cold starts, the temperature rise shall be limited – allow the burner to fire on low fire for some time to allow the parts to heat up slowly for maximum life.

### ■ Safety interlocks

Guarantee that all the required safety locks as described in the applicable local codes or regulations, or supplementary safety blocks requested for safe operation of the overall installation, are working properly and resulting in a positive safety-lock of the burner. Do not bypass any of these safety interlocks, this will result in unsafe operation.

### ■ Checks during and after start-up

During and after start-up, check the integrity of the system. Check all bolted connections after first firing (first time on temperature) and retighten if necessary.

### ■ Purge

For safety reasons, it is required to purge the installation sufficiently long to ensure that all possible combustibles are evacuated before ignition. Refer to the applicable local codes and your specific application requirements to determine the purge time.

### ■ Pilot ignition

Adjust pilot air flow and pilot gas regulator to correct set point before pilot ignition attempt. Turn adjustable orifice screw out (counter-clockwise) several turns from its fully seated position. Refine during lighting of the pilot to a yellow/blue flame and/or strongest stable flame signal.

### ■ Main burner ignition

Adjust the main gas regulator at the correct set point before igniting the main burner. Ensure that the gas/air ratio valve is in the start position when lighting the main burner.

After ignition of main burner, allow some time on minimum capacity to allow the burner parts to heat up slowly.

### ■ Ratio adjustment

Once the main flame is ignited, adjust air/gas ratio of the burner to have the required combustion quality. Slowly increase capacity while observing the flame. Do not increase capacity too fast to avoid damage to burner parts or furnace due to excessive temperature gradient.



Oil flames are highly radiant.

Use eye protection and avoid prolonged viewing.

## Maintenance and inspection

### Safety requirements

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Regular inspection, testing and recalibration of combustion equipment according to the installation's manual are an integral part of its safety. Inspection activities and frequencies shall be carried out as specified in the installation's manual. Perform the following activities at least annually as part of a recommended preventative maintenance routine:

- Inspect burner internal parts for wear and oxidation, paying special attention to the refractory of the burner block (when applicable).
- Inspect associated control instruments and devices for function with particular attention to all safety permissive switches.
- Perform leak tests on fuel shut off valves according to any schedule established by the authority having jurisdiction.

### Visual inspections

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Regular visual inspection of all connections (air and gas piping to the burner, bolting of the burner mounting flange and burner flame shape and aspect are essential for safe operation.

### Recommended spare parts

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Keep local stock of spark igniter. It is not recommended to keep local stock of other burner parts. Consult installation manual for burner spare parts and system accessories.