

Low NO_x burner BIC..M

TECHNICAL INFORMATION

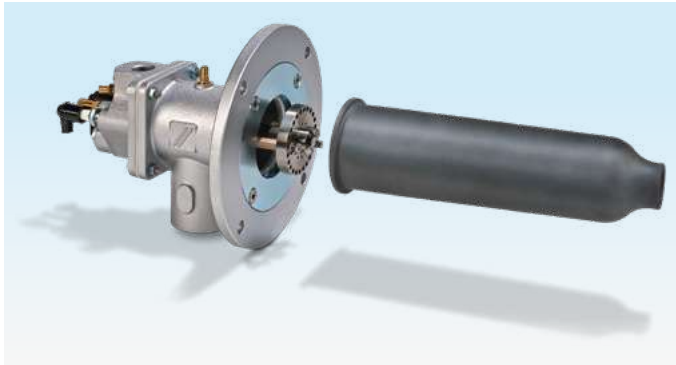
- Low polluting level in menox[®] low NO_x mode at furnace temperatures from 850°C (1562°F) thanks to flameless combustion
- Safe flame control in Flame mode thanks to flame rod and reliable electrical ignition
- Capacity range from 35 to 360 kW (132 bis 1360 kBTU/h) in Flame mode
- Air preheating to 500°C (930°F)
- Length increments enable individual adjustment to the wall thickness of the system



Contents

Contents	2	6.8 Capacity increase in menox low NO _x mode	21
1 Application	3	6.9 Hot air operating mode	22
1.1 Application examples	4	6.10 Purge/cooling air	23
1.1.1 Staged ON/OFF control (different capacities)	4	6.11 Emissions	23
1.1.2 Staged ON/OFF control (same capacity)	5	6.12 Gas line connection	24
2 Certification	6	6.13 Air line connection	24
2.1 Certificate download	6	6.14 Condition on delivery	24
2.2 Eurasian Customs Union	6	6.15 Intermittent operation	24
2.3 Patents	6	6.16 Build up of noise	24
3 Mechanical construction	7	6.17 Contaminated fuel gases	24
3.1 Burner body (furnace flange)	7	7 Technical data	25
3.1.1 With internal insulation	7	7.1 Dimensions	26
3.2 Burner insert	8	7.1.1 BIC..M [mm]	26
3.3 Ceramic tube set TSC and burner extension	8	7.1.2 BIC..M [inch]	27
4 Function	9	7.1.3 BICW..M [mm]	28
5 Selection	10	7.1.4 BICW..M [inch]	29
5.1 Burner type	10	8 Maintenance cycles	30
5.2 Burner size	10	9 Accessories	31
5.3 Burner head	11	9.1 Burner control unit BCU 465..MENOX	31
5.4 Ceramic tube set TSC made of SiC	12	9.2 Adapter set	31
5.4.1 SiC material	13	9.3 Ceramic paste	31
5.5 Burner length	14	10 Legend	32
5.6 Selection table	15	For more information	33
5.7 Ceramic tube set TSC selection table	16		
6 Project planning information	17		
6.1 Installation	17		
6.2 Clearances	18		
6.3 Burner system design/Selecting components	19		
6.4 Non-return gas valve	19		
6.5 Burner control unit BCU for menox	20		
6.6 Flame control	21		
6.7 Safety temperature monitor	21		

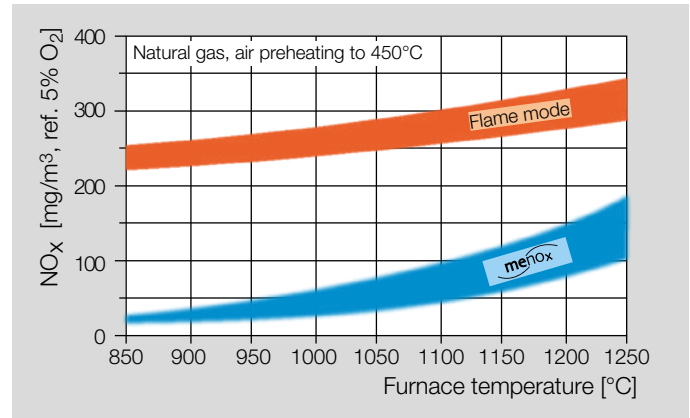
1 Application



Modular construction consisting of the burner BIC..M or BICW..M and the ceramic tube TSC

Suitable for use in industrial furnaces and firing systems in the iron and steel industries in the precious, non-ferrous and light metal sector.

The burner can be used in conjunction with the ceramic tube set TSC in brick-lined or fibre-lined furnaces. No burner block is necessary.



The burners are ignited by the spark electrodes and heat up the furnace in traditional Flame mode. To reduce NO_x emissions, the burner can be switched to menox low NO_x mode with flameless combustion from a furnace temperature of > 850°C (1562°F).

menox low NO_x mode is only possible in conjunction with (ON/OFF) cyclic control. In order to switch to menox low NO_x mode, a special burner control unit BCU 465..MENOX, see page 20 (6.5 Burner control unit BCU for menox), with (ON/OFF) cyclic control is required. The high outlet velocity of burners BIC..M and BICW..M thereby ensures uniform temperature distribution in the furnace.



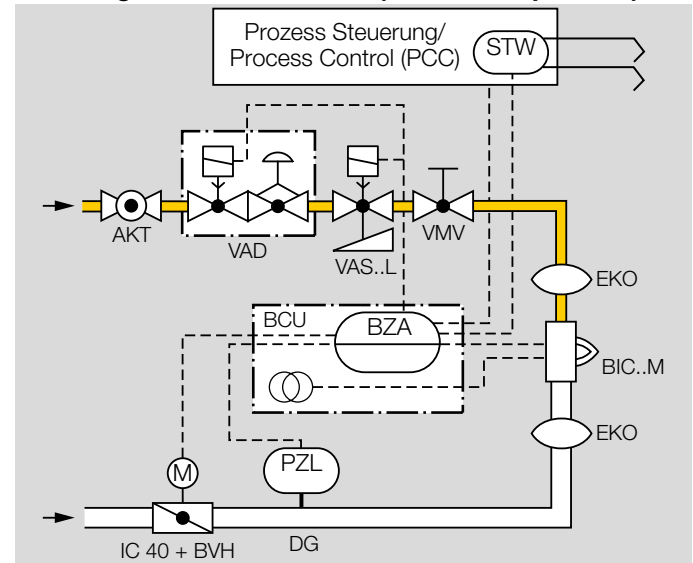
Heat treatment



Roller hearth furnace

1.1 Application examples

1.1.1 Staged ON/OFF control (different capacities)



Burners BIC..M are switched ON/OFF by the burner control unit. Burners BIC..M and BICW..M are controlled without pneumatic air/gas ratio control system. The gas supply pressure is controlled by a gas pressure regulator VAD; the required burner capacity is set using the fine-adjusting valve VMV. The air volume is set via the opening angle of the air valve. An air pressure switch upstream of the burner monitors the functioning of the air valve.

In addition, air/gas ratio monitoring for the zone or the furnace is required.

As soon as the safety temperature monitor STM signals a furnace temperature of $\geq 850^{\circ}\text{C}$ (1562°F), the burner can be

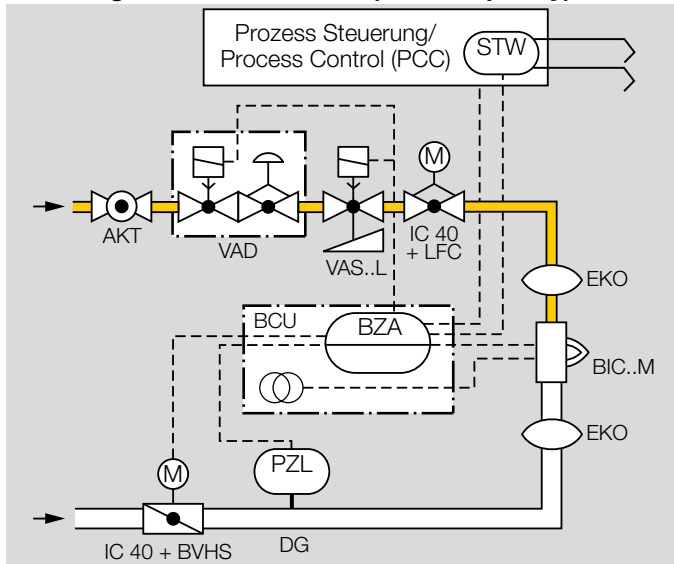
1 Application

switched to flameless combustion (menox low NO_x mode) to significantly reduce NO_x emissions.

Switching to menox low NO_x mode eliminates the counterpressure by the flame in the ceramic tube TSC. At a constant gas supply pressure, the gas volume increases by approximately 15%. In menox low NO_x mode, the air valves moves to an open position tailored to the pressure conditions.

We recommend providing for hot air compensation by an increase in air pressure depending on the hot air temperature for applications with air preheating via a central recuperator, see page 17 (6 Project planning information).

1.1.2 Staged ON/OFF control (same capacity)



The change in the pressure ratios when switching to menox low NO_x mode can be compensated for using an additional

linear flow control (IFC with IC 40). With the switchover, the IFC moves to a smaller open position and thus maintains the gas flow rate, i.e. the burner capacity, constant. In menox low NO_x mode, the air valves moves to an open position tailored to the pressure conditions.

2 Certification

2.1 Certificate download

Certificates – see www.docuthek.com

2.2 Eurasian Customs Union

The logo for the Eurasian Customs Union (Eurasian Conformity) is displayed within a grey rectangular box. It consists of the letters 'EAC' in a bold, black, sans-serif font.

The products BIC..M meet the technical specifications of the Eurasian Customs Union.

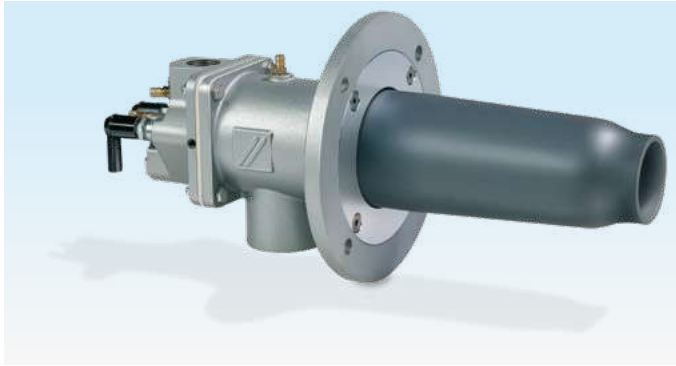
Declaration of Incorporation pursuant to the Machinery Directive

The products BIC..M comply with the requirements of EN 746-2 and the Machinery Directive 2006/42/EC. This is confirmed by the manufacturer's Declaration of Incorporation.

2.3 Patents

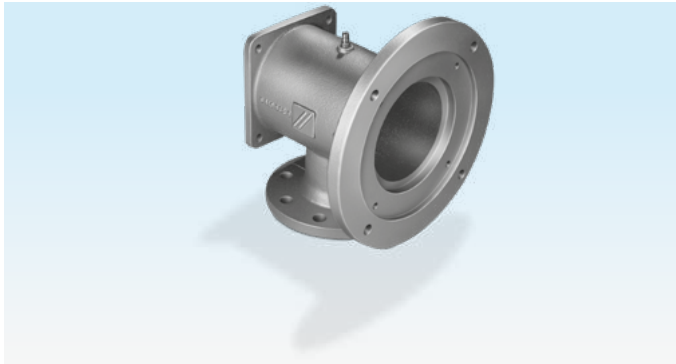
A European patent has been issued under No. EP 2 442 026 B1 for the menox low NO_x solution.

3 Mechanical construction



The burner is composed of the following modules: burner body, burner insert and ceramic tube. This structure enables easy adjustment to suit the respective process or integration into existing systems. Maintenance and repair times are reduced, and existing furnace installations can easily be converted.

3.1 Burner body (furnace flange)



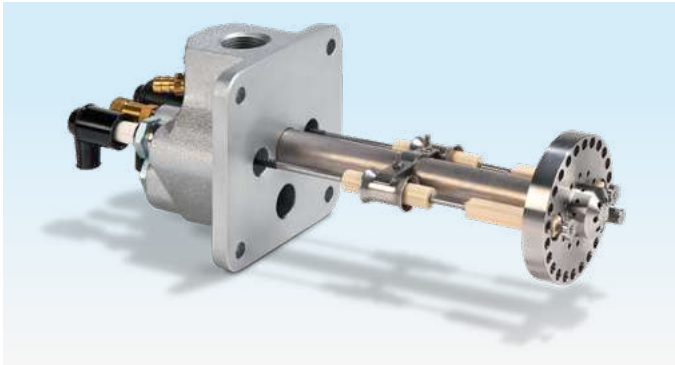
The burner is secured to the furnace by the burner body. The burner body accommodates the burner insert and the ceramic tube, and routes the combustion air. The combustion air pressure can be measured using an air pressure test nipple.

3.1.1 With internal insulation



The burner body with insulation can be used for higher hot air temperatures up to 500°C (932°F). In menox low NO_x mode, the hot air temperature is limited to max. 450°C (842°F). The insulation consists of vacuum-formed ceramic fibres (RCF = refractory ceramic fibre) with a specially hardened surface. Its purpose is to reduce the surface temperature of the housing.

3.2 Burner insert



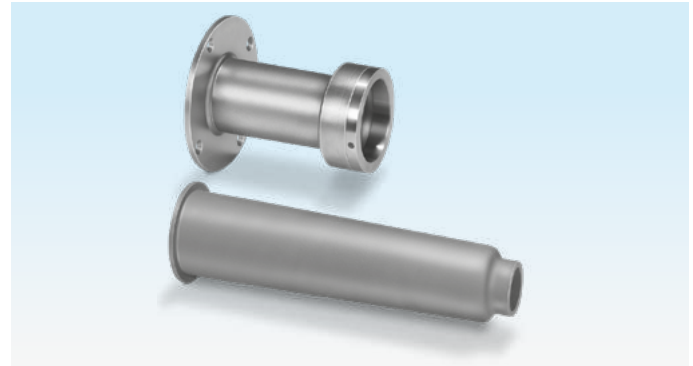
The combustion gas is supplied to the burner head via the gas connection and the gas pipe. The gas connection flange assembly includes the sight glass, ground screw and spark plugs with right-angle terminal boots.

For burner sizes 65 to 140, the connection flange is equipped with an integrated measuring orifice for easy measuring and flow adjustment for exact adjustment of the gas flow rate.

Spark electrode and flame rods are screwed into the connection flange and can be replaced without removing the burner insert.

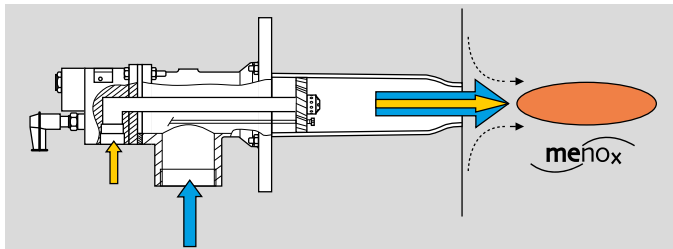
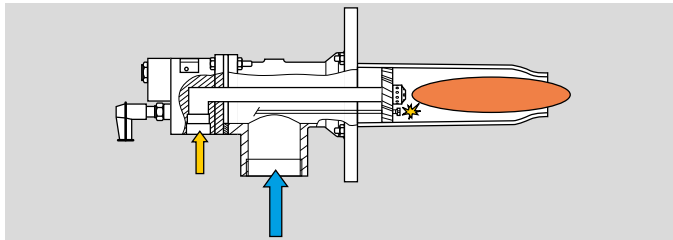
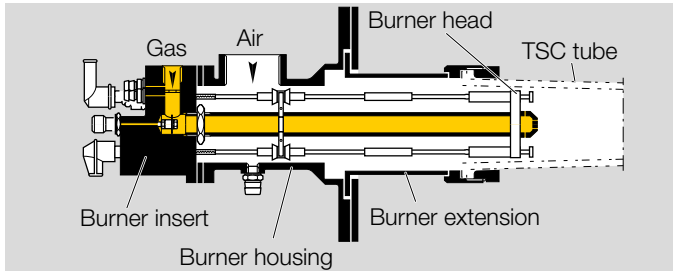
Burners BIC..M and BICW..M are nozzle-mixing burners. Gas and air are mixed only once they are in the burner head. This prevents explosive gases from being generated in the pipelines.

3.3 Ceramic tube set TSC and burner extension



A SiC ceramic tube serves as combustion chamber. The ceramic tube ensures complete combustion so that no burner block is required. The burner length can be adjusted perfectly to the furnace wall thickness using the burner extension.

4 Function



The burner control unit opens the gas and air control valves. Gas flows through the gas connection flange and air flows through the burner body as far as the nozzle-mixing burner head.

The combustible gas/air mixture is produced downstream of the burner head. Depending on the gas type, the geometry of the gas nozzle varies.

In Flame mode, the gas/air mixture is electrically ignited directly by a spark electrode. A flame forms which is monitored using a flame rod or optionally using a UV sensor.

At a furnace temperature of more than 850°C (1562°F), the burner can be switched to menox low NO_x mode. To do so, the burner is switched off. In menox low NO_x mode, the gas valve and air control valve are opened without triggering the electrical ignition spark. Although gas and air are supplied via the same connections as in Flame mode, the mixture is no longer ignited in the combustion chamber, but the chemical combustion reaction takes place in the furnace.

In menox low NO_x mode, the reaction takes place without a visible flame, which means that only the background radiation of the hot furnace wall can be seen. The reaction zone is considerably larger compared to traditional Flame mode. The reaction density is considerably lower and the peak temperatures responsible for high NO_x values are prevented, ensuring that NO_x emissions are drastically reduced.

5 Selection

5.1 Burner type

Type	Housing	Air temperature		Furnace temperature	
		°C	°F	°C	°F
BIC..M	Grey cast iron	≤ 450	≤ 840	≤ 1250	≤ 2280
BICW..M	Steel with internal insulation	≤ 500	≤ 530	≤ 1250	≤ 2280

5.2 Burner size

Burner size	Capacity in Flame mode ¹⁾		Rated capacity in menox low NO _x mode ¹⁾	
	kW ²⁾	kBTU/h ²⁾	kW ²⁾	kBTU/h ²⁾
BIC(W) 65M	35	132	40	151
BIC(W) 80M	75, 110	283, 416	85, 130	321, 492
BIC(W) 100M	180	681	210	794
BIC(W) 125M	260	983	300	1134
BIC(W) 140M	360	1360	420	1588

¹⁾ Same supply pressure in Flame and menox mode

²⁾ Capacities in kW refer to the lower heating value H_i and capacities in BTU/h refer to the higher heating value H_s (gross calorific value).

Higher capacities on request.

5.3 Burner head

The choice of burner head depends on the **use** and the **gas type**.

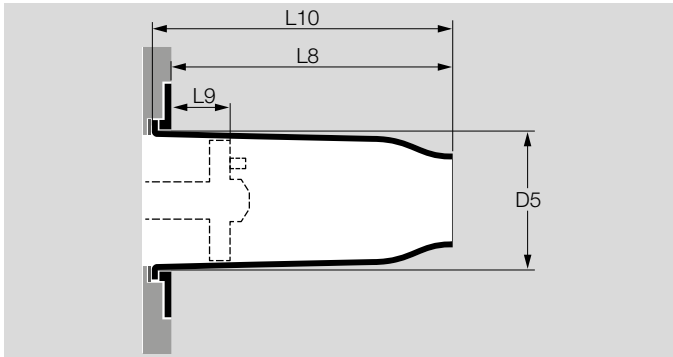
Use	Burner head code letter	Air temperature		Furnace temperature		Control
		°C	°F	°C	°F	
menox low NO _x mode	M	≤ 500	≤ 930	≤ 1250	≤ 2280	ON/OFF

Gas type	Code letter	Heating value range ¹⁾		Density ρ	
		kWh/m ³ (n)	BTU/scf	kg/m ³ (n)	lb/scf
Natural gas L and H quality	B	8–12	810–1215	0.7–0.9	0.041–0.053
Propane, propane/butane, butane	G ²⁾	25–35	2560–3474	2.0–2.7	0.118–0.159

¹⁾ Data in kWh/m₃(n) refer to the lower heating value H_i and data in BTU/scf refer to the higher heating value H_s (gross calorific value).

²⁾ Gas type G on request.

5.4 Ceramic tube set TSC made of SiC



Burner size	Burner capacity ¹⁾ Flame mode/menox		Shape	Pipe dia. D5		Length L8 ²⁾		Position of burner head L9 ²⁾		Length L10 ²⁾	
	kW	kBTU/h		mm	inch	mm	inch	mm	inch	mm	inch
65	35/40	132/151	M	69	2.72	300	11.8	35	1.38	315	12.4
80	75/85	283/321	M	87	3.43	300	11.8	35	1.38	315	12.4
80	110/130	416/492	M	87	3.43	300	11.8	35	1.38	315	12.4
100	180/210	681/794	M	104	4.09	300	11.8	35	1.38	315	12.4
125	260/300	983/1134	M	127	5	300	11.8	35	1.38	315	12.4
140	360/420	1360/1588	M	142	5.59	300	11.8	35	1.38	315	12.4

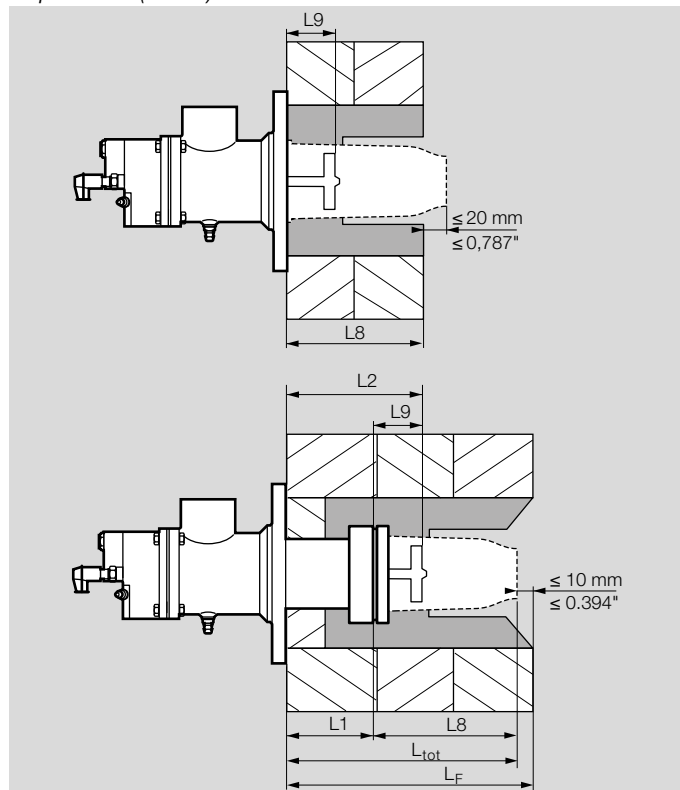
¹⁾ Capacities in kW refer to the lower heating value H_i and capacities in BTU/h refer to the higher heating value H_s (gross calorific value).

²⁾ Required length – see page 14 (5.5 Burner length).

5.4.1 SiC material

Material	Air temperature		Furnace temperature ¹⁾		Material temperature	
	°C	°F	°C	°F	°C	°F
Si-1500	≤ 500	≤ 930	≤ 1450	≤ 2640	≤ 1500°C	≤ 2730°F

¹⁾ Up to 850°C (1560°F) Flame mode



Legend

L1	Length of steel extension
L2	Position of burner head
L8	Length of TSC tube
L9	Position of burner head in TSC tube
L _O	Furnace wall thickness
L _{ges}	Total length (L _O - L _X)

5.5 Burner length

The burner length is to be selected so as to ensure that the opening of the TSC tube is flush with the interior furnace wall ($L_X = 0$).

The opening may not be more than 10 mm (0.394") back from the surface of the interior furnace wall. Provided that mechanical damage to the TSC tube can be excluded (due to moving parts in the furnace, for example), the TSC tube may protrude into the furnace chamber by max. 20 mm (0.787").

The burner head should always be surrounded by the furnace insulation. The shortest burner installation length is equal to the length of the ceramic tube (L_8). It can be extended with steel extensions in increments of 100 mm (increments of 3.94").

Calculating the steel extension

Length of TSC tube (L_8): $L_8 = 300$ mm
(see page 12 (5.4 Ceramic tube set TSC made of SiC))

Length of steel extension [mm]:
(available in lengths: 100, 200, 300, 400 mm; other versions on request) $L_1 = L_O - (L_8 + 10$ mm).

Example:

$L_O = 410$ mm

$L_8 = 300$ mm

Required burner extension:

$L_1 = 410$ mm - (300 mm + 10 mm)

$L_1 = 100$ mm

Selected length of steel extension:

$L_1 = 100$ mm

Position of burner head: $L_2 = L_1 + L_9$ ($L_9 = 35$ mm)

5.6 Selection table

Description	Code	BIC	BICW	Condition
Burner for gas, with connection for ceramic tube	BIC	•		
Burner for gas, with ceramic fibre insulation (RCF)	BICW		•	
Burner size	65-140	65, 80, 100, 125, 140	65, 80, 100, 125, 140	
Use				
For menox low NO _x operation	M	•	•	
Gas type				
Natural gas	B	•	•	
Propane, propane/butane, butane	G	•	•	Upon consultation
Length of burner extension (L1) [mm]	0, 100, 200...	-0, -100, 200...	-0, -100, -200...	
X mm distance from furnace flange to front edge of burner head (L2)	35, 135, 235...	/35-, /135-, /235-...	/35-, /135-, /235-...	
Burner head identifier	(1)...(99)	•	•	
Construction stage	A-Z	•	•	

Order example

BIC 80MB-0/35-(75)E

5.7 Ceramic tube set TSC selection table

Description	Code	TSC
Ceramic tube set	TSC	•
Burner size	65-140	65, 80, 100, 125, 140
Menox shape	M	•
Capacity in kW	35-360	035, 075, 110, 180, 260, 360
Tube length (L8) [mm]	-300	•
Distance from furnace flange to front edge of burner head [mm]	/35-	•
Silicon-infiltrated SiC	Si	•
Up to 1500°C	-1500	•

Order example

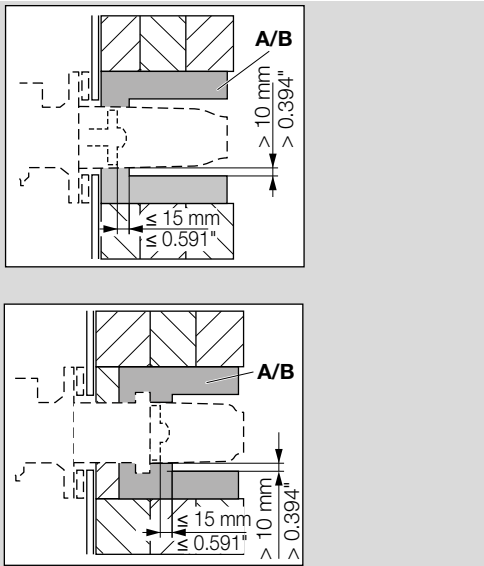
TSC 80M075-300/35-Si-1500

6 Project planning information

6.1 Installation

Installation position as required.

Gas and air connection: can be rotated in 90° steps. Install flexible tubes or bellows units to prevent mechanical stress or vibrations.



For menox low NO_x mode, the burner should be flush with the furnace lining, see page 14 (5.5 Burner length).

Insulate the TSC tube and the burner extension. Use solid shaped parts **A** or high temperature resistant ceramic fibrous material **B** for insulation. The TSC tube may be insulated to max. 15 mm (0.591") downstream of the burner head – beyond this point, the insulating material must not

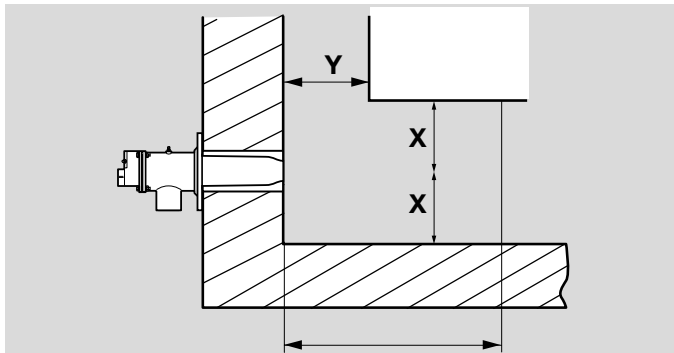
come into contact with the TSC tube in the flame formation area. Allow a gap of at least 10 mm (0.394") around the TSC tube.

6.2 Clearances

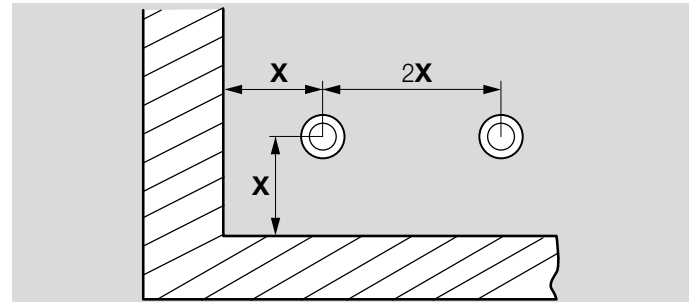
A sufficiently large reaction zone (RZ) and undisturbed re-circulation of the flue gas into the reaction zone are required for menox low NO_x mode. Operation in very small combustion chambers leads to an increase in NO_x emissions.

Burner	TSC tube	Reaction zone RZ	Distance	
			X	Y
BIC 65	M035	70 cm (27.6")	≥ 20 cm (≥ 7.87")	≥ 20 cm (≥ 7.87")
BIC 80	M075	90 cm (35.4")	≥ 30 cm (≥ 11.8")	≥ 25 cm (≥ 9.84")
BIC 80	M110	100 cm (39.4")	≥ 30 cm (≥ 11.8")	≥ 32 cm (≥ 12.6")
BIC 100	M180	140 cm (55.1")	≥ 36 cm (≥ 14.2")	≥ 40 cm (≥ 15.7")
BIC 125	M260	170 cm (66.9")	≥ 40 cm (≥ 15.7")	≥ 48 cm (≥ 18.9")
BIC 140	M360	200 cm (78.7")	≥ 45 cm (≥ 17.7")	≥ 56 cm (≥ 22")

Note the distances to the charge.

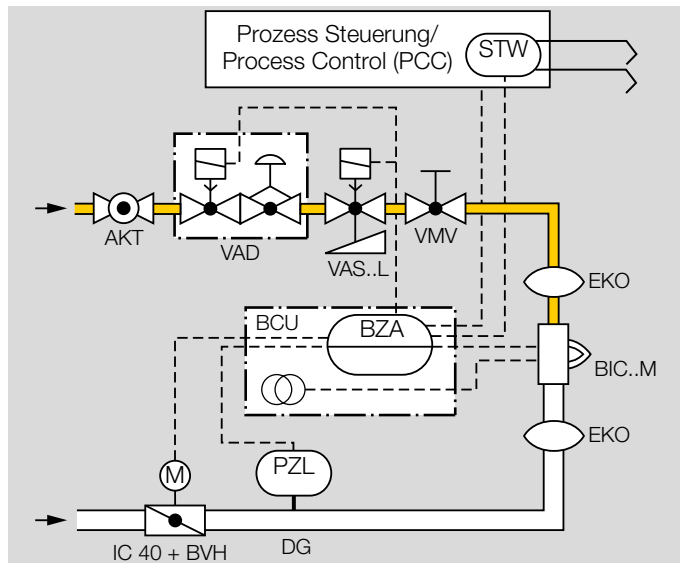


Note the distances to the furnace wall and between the burners.



The flame length must be noted as regards the distance between the burner and the wall opposite the burner, see page 25 (7 Technical data).

6.3 Burner system design/Selecting components



Burners BIC..M must be switched ON/OFF in cycles. In the case of modulating capacity control or Low/High control, it is not possible to switch the burners to menox low NO_x mode.

To transfer the combustion reaction, a selection of controls adapted to menox is required in addition to burner BIC..M with its optimized burner head. A slow opening gas solenoid valve with an upstream pressure regulator is to be used in the gas circuit.

For fine adjustment, a fine-adjusting valve VMV should also be installed. In the air circuit, a butterfly valve BVH with actuator IC 40 is recommended.

Burner	1 st gas valve	2 nd gas valve	Air valve at hot air* of 450°C
BIC(W) 65MB TSC 65M035	VAD 115..B	VAS 110L	BVHS 40 IC 40SA3
BIC(W) 80MB TSC 80M075	VAD 115..B	VAS 115L	BVHS 50 IC 40SA3
BIC(W) 80MB TSC 80M110	VAD 115..B	VAS 115L	BVHS 50 IC 40SA3
BIC(W) 100MB TSC 100M180	VAD 120..A	VAS 120L	BVHS 65 IC 40SA3
BIC(W) 125MB TSC 125M260	VAD 125..A	VAS 125L	BVHS 80 IC 40SA3
BIC(W) 140MB TSC 140M360	VAD 125..A	VAS 125L	BVHS 100 IC 40SA3

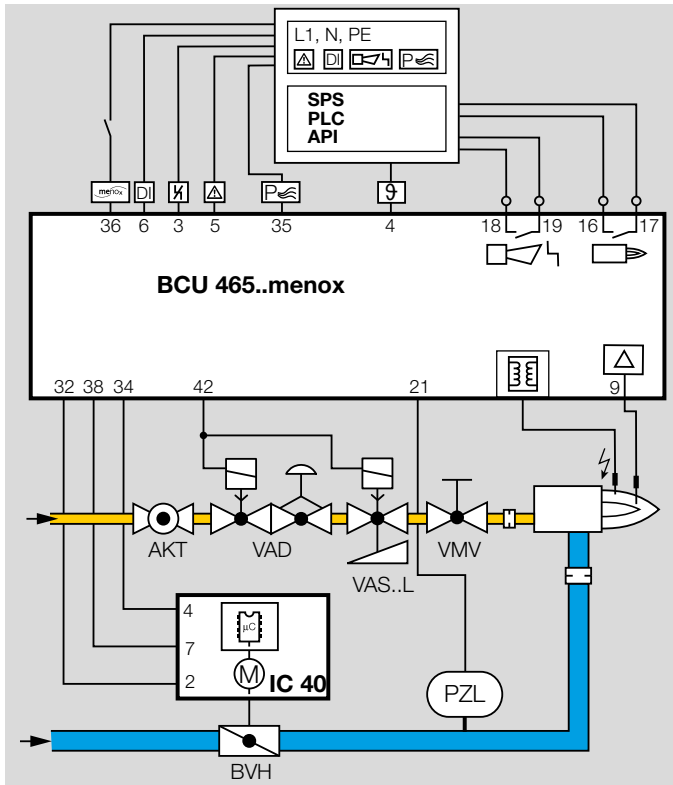
* For cold air applications, air valves of smaller sizes can be selected in some cases.

Set actuator IC 40 to operating mode 7 to move to the various valve positions for Flame mode and menox low NO_x mode.

6.4 Non-return gas valve

Non-return gas valves are not required, since the burners are of the nozzle-mixing type.

6.5 Burner control unit BCU for menox



Specially modified burner control units BCU 465..menox with digital input for high temperature operation in which all parameters have been correspondingly pre-assigned for menox are available for menox mode, see page 31 (9 Accessories). For switching the burners to menox low NO_x mode, High temperature mode (HT mode) must first be activated on the BCU (see TI BCU 465). For menox, a higher switching point of 850°C is thus required. To switch

to menox low NO_x mode, an additional input is available on the BCU (terminal 36). Ignition by the ignition transformer installed in the BCU is deactivated via this input and the next burner start is performed in menox low NO_x mode. Furthermore, setting the valve positions for menox is triggered via the menox input.

If the burner is operating (in Flame mode) at the time at which it must switch to menox, the flow rates are reduced depending on the defined valve positions since the burner is not automatically switched off and restarted.

We recommend switching the burner to menox low NO_x mode when it is switched off or initiating a restart of the burner(s) in the corresponding control zone after the switchover (of the control zone) via the normal furnace control unit.

If the enable signal for High temperature mode (HT mode) drops in the case of decreasing furnace temperature, the burner is automatically restarted by the BCU.

To avoid a pressure surge in the gas supply due to several burners being switched off at the same time, it is recommended that the normal furnace control unit switch the burners to Flame mode again zone by zone, for example.

The BCU 465..menox has a different terminal assignment to the standard version of the BCU 465. The air valve input (terminal 23) is inactive. The air valve can be activated (e.g. for cooling) via the purge input (terminal 35).

An ignition transformer TZI 7-25/20 is installed in the BCU 465..menox. To protect the unit against overload by frequent cycling, the BCU can be started a maximum of 3 times per minute.

6.6 Flame control

In Flame mode, the flame is monitored by a flame rod.

6.7 Safety temperature monitor

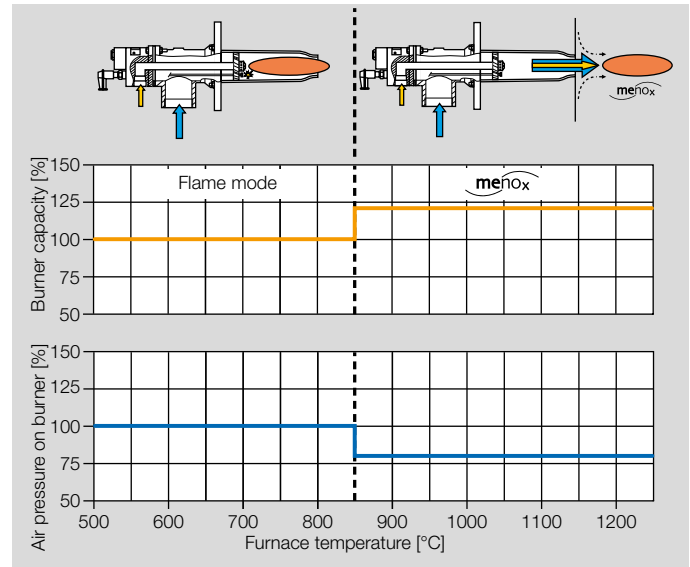
The thermocouple must be positioned at the coldest point in the furnace so that it can determine a representative value for the furnace temperature.

Positioning the thermocouple directly opposite the burner must be avoided.

6.8 Capacity increase in menox low NO_x mode

Switching from traditional Flame mode to menox low NO_x mode eliminates the counterpressure by the flame in the ceramic tube TSC. At a constant gas supply pressure (setting on the VAD), the gas volume increases by approximately 15% depending on the burner setting.

The open position of the air valve must be adjusted in low NO_x mode to keep the lambda value constant, see page 4 (1.1.1 Staged ON/OFF control (different capacities)).



To compensate for the increased capacity caused by switching to menox low NO_x mode, a linear flow control IFC can be used.

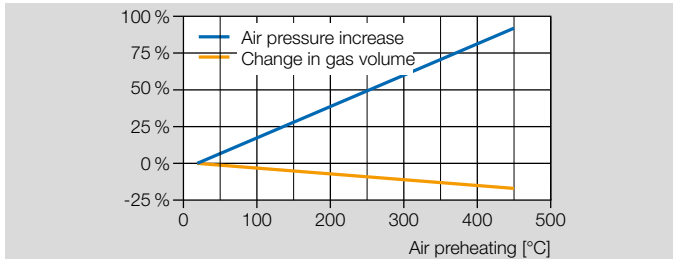
The IFC moves to a smaller open position in menox low NO_x mode, just like the air valve, see page 5 (1.1.2 Staged ON/OFF control (same capacity)). Using this type of control, the burner capacity is the same in both Flame mode and menox low NO_x mode.

The flow rate diagrams of burners BIC..M contain separate curves for design and burner adjustment with the required pressures in Flame mode and menox low NO_x mode, see www.docuthek.com.

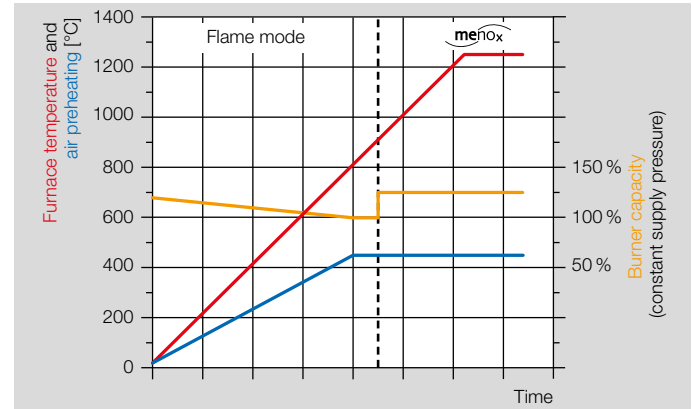
6.9 Hot air operating mode

For applications with air preheating via a central recuperator, hot air compensation is performed by changing the air pressure depending on the hot air temperature. In order to maintain the air index λ constant, the combustion air pressure is increased as the preheat temperature increases.

As the hot air temperature increases in Flame mode, the counterpressure by the flame also increases in the ceramic tube TSC. At a constant gas supply pressure (setting on the VAD), the gas volume decreases as the hot air temperature increases. Accordingly, the air pressure must be increased less than at a constant gas volume.



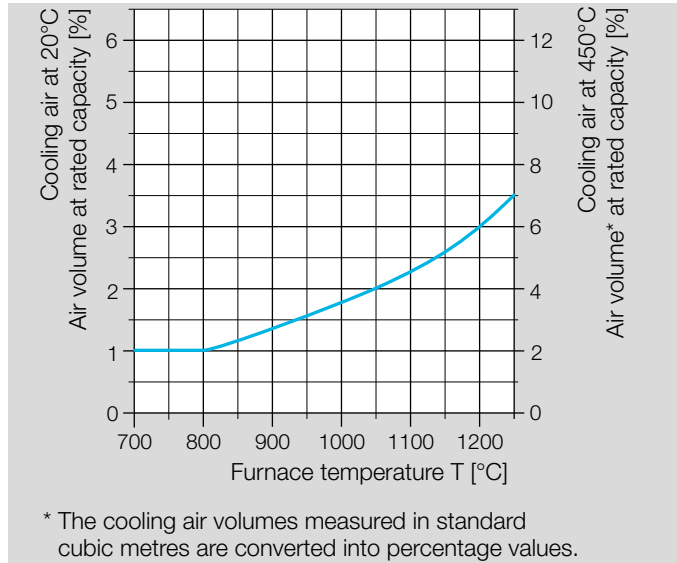
Switching from traditional Flame mode to menox low NO_x mode also eliminates the counterpressure by the flame in the case of hot air so that the gas volume increases again.



Mixture control

An air pressure switch upstream of the burner monitors the function (the opening) of the air valve. If no air pressure is detected at the end of the safety time, the burner will suffer a fault lock-out. The air pressure switch should be set to around 65% of the required air pressure for cold air. In addition to monitoring the air valve on each burner, air/gas ratio monitoring must be provided as a safety measure for the furnace, for example using mass flow measurements or flue gas analyses. The ratio monitoring system should be designed on the basis of the results of the risk assessment for the furnace.

6.10 Purge/cooling air

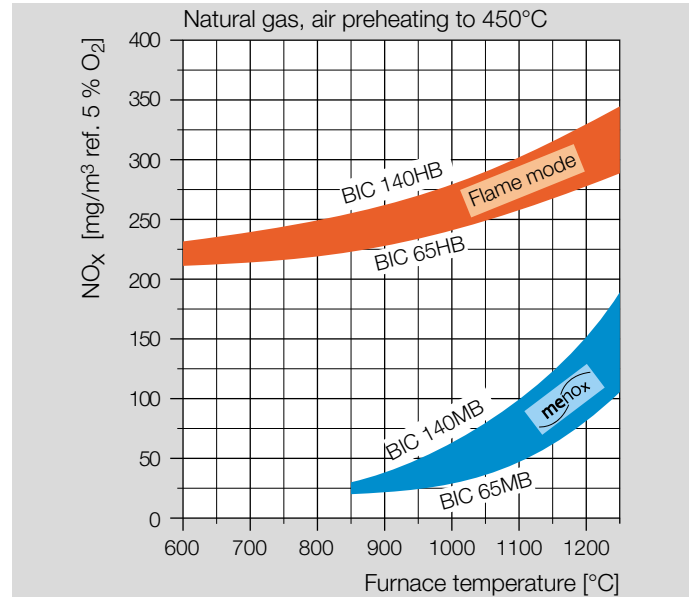


While the burner is switched off and depending on the furnace temperature, there must be some air flow for cooling the burner components.

The relative air volume in percentage values, based on the air volume for the rated capacity of the relevant size, is given in the “Purge/cooling air volume for burners” diagram. For hot air, the values on the right-hand axis are based on the standard air volume for the relevant rated capacity.

The air fan must remain switched on until the furnace has cooled down completely.

6.11 Emissions



The emission values depend on the furnace temperature, burner size, set burner capacity, air preheating and excess air.

At 1200°C, a value of 150 mg/Nm³ (ref. 5% O₂) can be achieved. In Flame mode, emissions at a furnace temperature of 850°C are less than 300 mg/Nm³ (ref. 5% O₂). Other application-specific emission values on request.

6.12 Gas line connection

We recommend the following to ensure optimum flow, avoid incorrect measurements and the resulting burner adjustment with excess gas:

- Do not screw the manual valve directly into the burner.

To ensure an accurate measurement of the pressure differential on the integrated gas measuring orifice for the burner BIC (size 65–140), the following applies to the design of the gas connection:

- Ensure undisturbed flow to the gas connection on the burner inlet for a distance of ≥ 5 DN.
- A bellows unit or pipe bend must be installed in the burner with the same nominal dimensions as the gas connection on the burner.
- Only use reducing nipples with an external thread on both sides to change the nominal dimension on the the actual burner gas connection.

6.13 Air line connection

Ensure there is a bellows unit upstream of the burner. It is recommended to install a measuring orifice FLS to determine the air flow rate.

6.14 Condition on delivery

Gas and air connections are fitted opposite one another at the factory.

6.15 Intermittent operation

Note the opening and closing times of the control elements when determining the cycle times. Unnecessarily high numbers of operating cycles should be avoided.

Minimum pause time: ≥ 10 s

Minimum burner on time: ≥ 15 s

6.16 Build up of noise

The noise volume of a burner in the open air is approx. 95 dBA at a distance of 1 m from the burner tube end (measured at an angle of $< 45^\circ$ to the flame).

If the burner is installed in a furnace, the noise volume is greatly reduced by the furnace insulation (with a 300 mm (11.8") fibre lining, the noise volume is approx. 75 dBA).

In menox low NO_x mode, the noise volume is reduced to the ambient sounds of the furnace.

6.17 Contaminated fuel gases

Maximum allowable amount of impurities

Impurities	Density
Sulphur (S)	≤ 300 mg/m ³
Hydrogen sulphide (H ₂ S)	≤ 1500 mg/m ³
Naphthalene (C ₁₀ H ₈)	≤ 200 mg/m ³
Tar	≤ 500 mg/m ³

Condensation in wetted components is prohibited. Details on further or other impurities available upon request.

7 Technical data

Gas supply pressure and air supply pressure each depend on the use and gas type (gas and air pressures: see operating characteristic diagrams and flow rate curves at www.docuthek.com)

Registration in the Docuthek required.

Overall lengths:

0 to 400 mm (0 to 15.7"),

100 mm (3.94") length increments

(other lengths available on request).

Gas types: natural gas; other types of gas on request.

Control type:

staged: On/Off.

Control: with flame rod (UV control as an option).

Ignition: direct spark ignition.

Burner body:

BIC..M: grey cast iron,

BICW..M: steel + internal insulation.

Most of the burner components are made of corrosion-resistant stainless steel.

Maximum furnace temperature: 1250°C (2282°F); higher temperatures on request.

Maximum air temperature: 500°C (930°F); higher temperatures on request.

The flame diameter is one to two times that of the burner tube outlet diameter.

REACH Regulation

applies to BICW only

Information pursuant to REACH Regulation

No. 1907/2006, Article 33.

Insulation contains refractory ceramic fibres (RCF)/aluminium silicate wool (ASW).

RCF/ASW are listed in the Candidate List of the European REACH Regulation No. 1907/2006.

Burner	Ceramic tube	Rated capacity in Flame mode ¹⁾		Flame shape/ code letter	Visible flame length ²⁾		Flame velocity ³⁾	
		kW	10 BTU/h		cm	inch	m/s	ft/s
BIC(W) 65M	M035	35	132	M	45	17.7	141	462
BIC(W) 80M	M075	75	283	M	60	23.6	185	607
BIC(W) 80M	M110	110	416	M	70	27.6	174	571
BIC(W) 100M	M180	180	681	M	90	35.4	182	597
BIC(W) 125M	M260	260	983	M	110	43.3	182	597
BIC(W) 140M	M360	360	1360	M	130	51.2	186	610

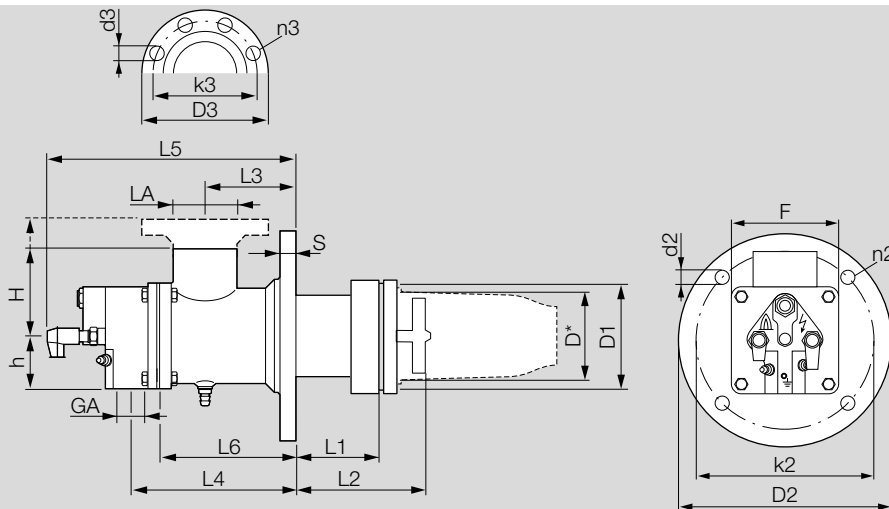
¹⁾ Capacities in kW refer to the lower heating value H_i ; and capacities in BTU/h refer to the higher heating value H_s (gross calorific value).

²⁾ Measured from ceramic tube opening at rated capacity in the open air, $\lambda = 1.05$.

³⁾ Based on rated capacity, calculated using the flame temperature: 1500°C = type "M" flame shape.

7.1 Dimensions

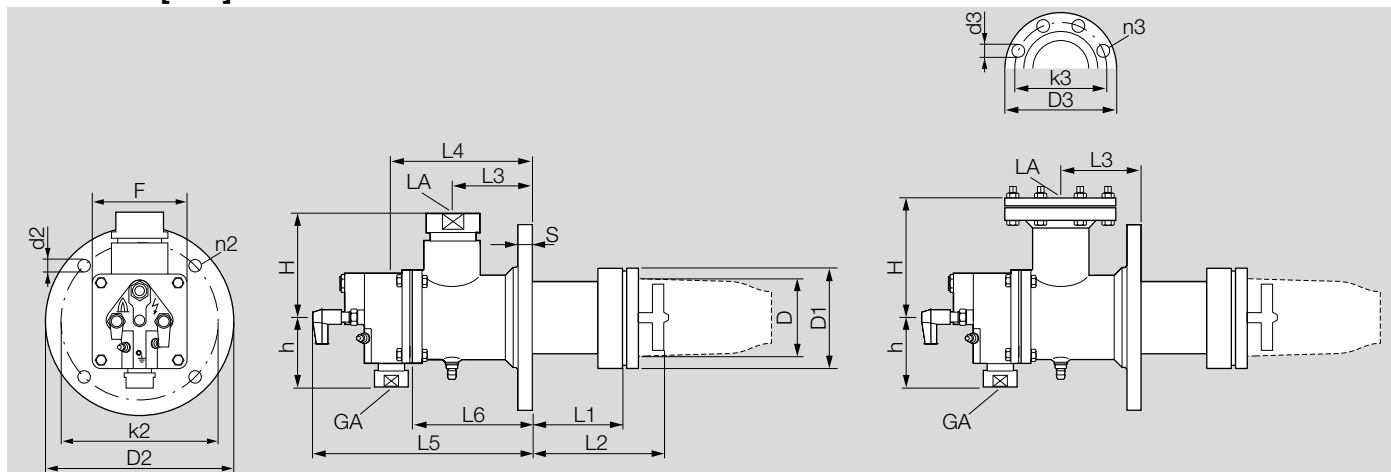
7.1.1 BIC..M [mm]



Standard: L1 = 100, 200, 300, 400 mm and L2 = L1 + 35 mm, see page 14 (5.5 Burner length)

Type	Connections		Dimensions [mm]															No. of drillings		Weight [kg]	
	Gas GA	Air LA	D	D1	H	h	S	L3	L4	L5	L6	D2	k2	d2	F	D3	k3	d3	n2		n3
BIC 65M	Rp ¾	Rp 1½	69	90	62	48	12	73	156	246	127	195	165	12	95	-	-	-	4	-	6.6
BIC 80M	Rp ¾	Rp 2	86	114	112	55	14	90	172	272	140	240	210	14	110	-	-	-	4	-	10.7
BIC 100M	Rp 1	Rp 2	104	125	100	60	16	103	185	285	153	240	200	14	120	-	-	-	4	-	11.7
BIC 125M	Rp 1½	DN 65	127	155	135	73	16	120	251	350	212	270	240	14	145	185	145	18	4	4	19.7
BIC 140M	Rp 1½	DN 80	142	168	150	80	18	130	271	381	232	300	265	14	160	200	160	18	4	8	26.7

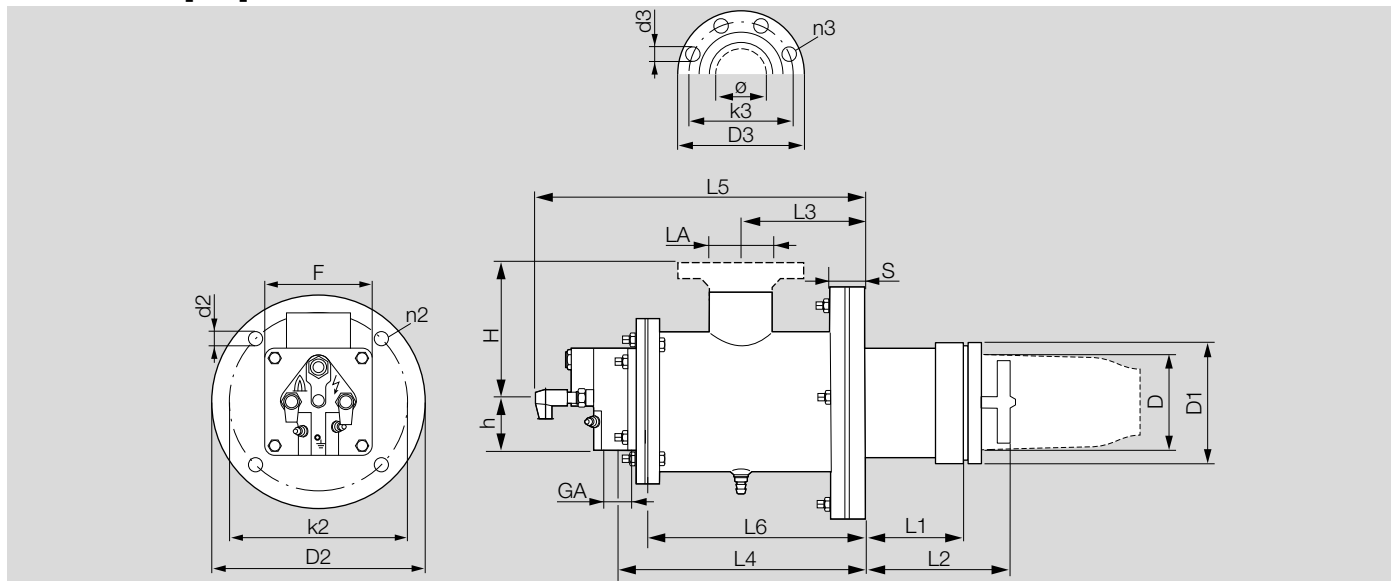
7.1.2 BIC..M [inch]



Standard: L1 = 100, 200, 300, 400 mm and L2 = L1 + 35 mm, see page 14 (5.5 Burner length)

Type	Connections		Dimensions [inch]															No. of drillings		Weight [lbs]	
	Gas GA	Air LA	D	D1	H	h	S	L3	L4	L5	L6	D2	k2	d2	F	D3	k3	d3	n2		n3
BIC 65M	¼ NPT	1½ NPT	2.72	3.54	3.7	2.89	0.47	2.87	6.14	9.69	5	7.68	6.5	0.47	3.74	-	-	-	4	-	14.5
BIC 80M	¼ NPT	2 NPT	3.39	4.49	5.71	3.19	0.55	3.54	6.77	10.7	5.51	9.45	8.27	0.55	4.33	-	-	-	4	-	23.5
BIC 100M	1 NPT	2 NPT	4.09	4.92	5.24	3.5	0.63	4.06	7.28	11.2	6.02	9.45	7.87	0.55	4.72	-	-	-	4	-	25.7
BIC 125M	1½ NPT	DN 65	5	6.1	5.79	4.13	0.63	4.72	9.88	13.8	8.35	10.6	9.45	0.55	5.71	7.28	5.71	0.71	4	4	43.3
BIC 140M	1½ NPT	DN 80	5.59	6.61	6.38	4.41	0.71	5.12	10.7	15	9.13	11.8	10.4	0.55	6.3	7.87	6.3	0.71	4	8	58.7

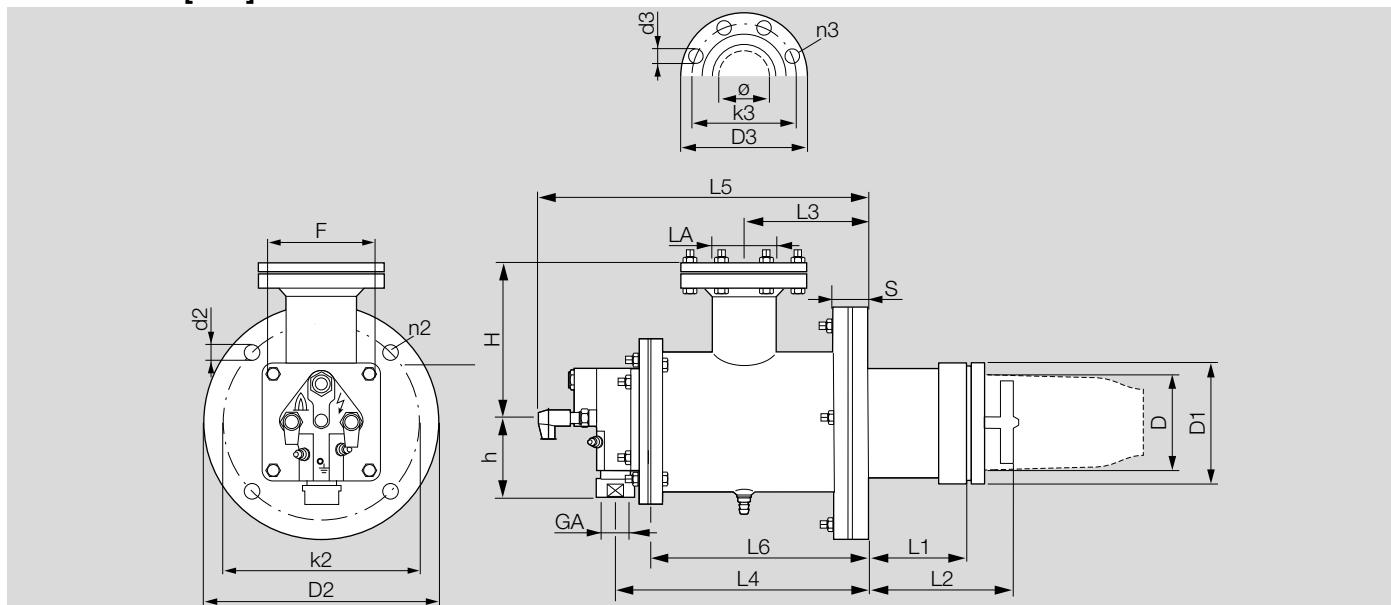
7.1.3 BICW..M [mm]



Standard: L1 = 100, 200, 300, 400 mm and L2 = L1 + 35 mm, see page 14 (5.5 Burner length)

Type	Connections		Dimensions [mm]																No. of drillings		Weight [kg]
	Gas GA	Air LA	D	D1	H	h	S	L3	L4	L5	L6	D2	k2	d2	F	D3	k3	d3	n2	n3	
BICW 65M	Rp ¾	58	68	90	142	47	22	121.5	256	344	216	195	165	12	138	185	145	18	4	8	13
BICW 80M	Rp ¾	70	87	114	152	54	22	139	272	368	229	240	210	14	156	200	160	18	4	8	18.3
BICW 100M	Rp 1	70	104	125	152	59	22	139	285	382	242	240	200	14	172	200	160	18	4	8	19.5
BICW 125M	Rp 1½	83	127	155	182	72	22	170	351	450	299	270	240	14	200	220	180	18	4	8	29.5
BICW 140M	Rp 1½	106	142	168	195	79	22	180	371	480	319	300	265	14	215	250	210	18	4	8	38

7.1.4 BICW..M [inch]



Standard: L1 = 100, 200, 300, 400 mm and L2 = L1 + 35 mm, see page 14 (5.5 Burner length)

Type	Connections		Dimensions [inch]															No. of drillings		Weight [lbs]	
	Gas GA	Air LA	D	D1	H	h	S	L3	L4	L5	L6	D2	k2	d2	F	D3	k3	d3	n2		n3
BICW 65M	¼ NPT	2.28	2.68	3.54	5.59	2.89	0.87	4.78	10.1	13.5	8.5	7.68	6.5	0.47	5.43	7.28	5.71	0.71	4	8	28.6
BICW 80M	¼ NPT	2.76	3.43	4.49	5.98	3.19	0.87	5.47	10.7	14.5	9.02	9.45	8.27	0.55	6.14	7.87	6.3	0.71	4	8	40.3
BICW 100M	1 NPT	2.76	4.09	4.92	5.98	3.5	0.87	5.47	11.2	15	9.53	9.45	7.87	0.55	6.77	7.87	6.3	0.71	4	8	42.9
BICW 125M	1½ NPT	3.27	5	6.1	7.17	4.13	0.87	6.69	13.8	17.7	11.8	10.6	9.45	0.55	7.87	8.66	7.09	0.71	4	8	64.9
BICW 140M	1½ NPT	4.17	5.59	6.61	7.68	4.41	0.87	7.09	14.6	18.9	12.5	11.8	10.4	0.55	8.46	9.84	8.27	0.71	4	8	83.6

8 Maintenance cycles

Twice per year, but if the media are highly contaminated, this interval should be reduced.

9 Accessories

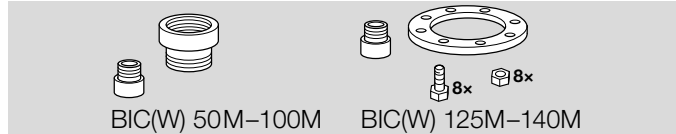
9.1 Burner control unit BCU 465..MENOX

For menox low NO_x mode, modified burner control units must be used.

Version	BCU	Order No.	Bus module	Order No.
230 V	BCU 465W2P2C0D2010K1E1-/LM400WF300E1-	88680437		
230 V with PROFIBUS*	BCU 465W2P6C0D2010K1E1-/LM400WF300E1-	88683741	BCM 400S0B1/1-0 BCU 4series (2019)	74960690
230 V with PROFINET*	BCU 465W2P2C0D2010K1E1-/LM400WF300E1-	88682194	BCM 400S0B2/3-0 BCU 4series (2019)	74960691
120 V	BCU 465Q2P2C0D2010K1E1-/LM400QF300E1-	88680438		
120 V with PROFIBUS*	BCU 465Q2P6C0D2010K1E1-/LM400QF300E1-	88683742	BCM 400S0B1/1-0 BCU 4series (2019)	74960690
120 V with PROFINET*	BCU 465Q2P2C0D2010K1E1-/LM400QF300E1-	88683743	BCM 400S0B2/3-0 BCU 4series (2019)	74960691

* Order a suitable bus module.

9.2 Adapter set



For connecting BIC..M and BICW..M burners to NPT/ANSI connections

Burner	Adapter set	Gas connection	Air connection	Order No.
BIC 65	BR 65 NPT	¾-14 NPT	1½-11.5 NPT	74922631
BIC 80	BR 80 NPT	¾-14 NPT	2-11.5 NPT	74922632
BIC 100	BR 100 NPT	1-11.5 NPT	2-11.5 NPT	74922633
BIC 125	BR 125 NPT	1½-11.5 NPT	Ø 2.94"	74922634
BIC 140	BR 140 NPT	1½-11.5 NPT	Ø 3.57"	74922635


















Adapter set for BICW on request

9.3 Ceramic paste

For avoiding cold-setting on screw connections after replacing burner components.

Order No.: 050120009.

10 Legend

	Safety interlocks (limits)
	Start-up signal
	Controlled air flow
	Ignition transformer
	Purge
	Flame signal
	Operating signal
	Fault signal
	Reset
	menox input
	Pressure switch for minimum pressure
	Safety temperature monitor
	B = flame control Z = binary control function (safety-related) A = alarm, message
	Air/gas ratio control with solenoid valve
	Gas solenoid valve, slow opening
	Fine-adjusting valve
	Butterfly valve BVH with actuator IC 40

For more information

The Honeywell Thermal Solutions family of products includes Honeywell Combustion Safety, Eclipse, Exothermics, Hauck, Kromschroder and Maxon. To learn more about our products, visit ThermalSolutions.honeywell.com or contact your Honeywell Sales Engineer.

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