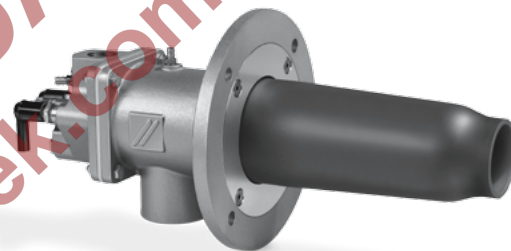


Low NO_x burner BIC..M

Technical Information · GB

7 Edition 08.16

- 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*10³ to 1360*10³ BTU/h)
- Air preheating to 450°C (842°F)
- Length increments enable individual adjustment to the wall thickness of the system

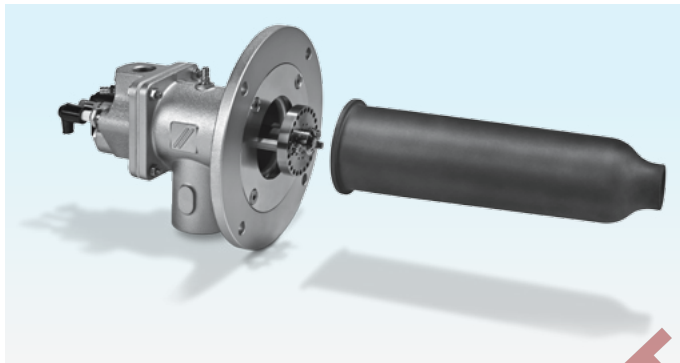


menox[®]

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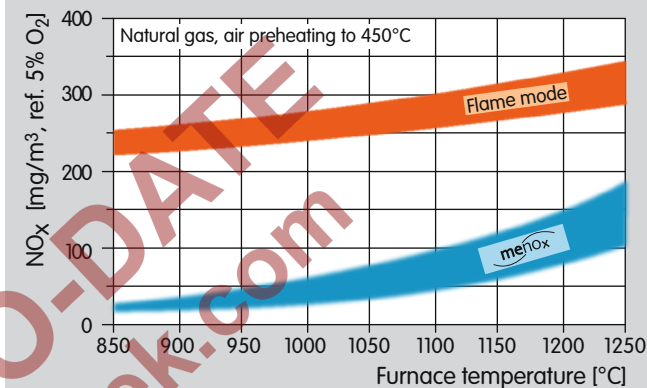
1 Application



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 quarl is necessary.



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



Heat treatment

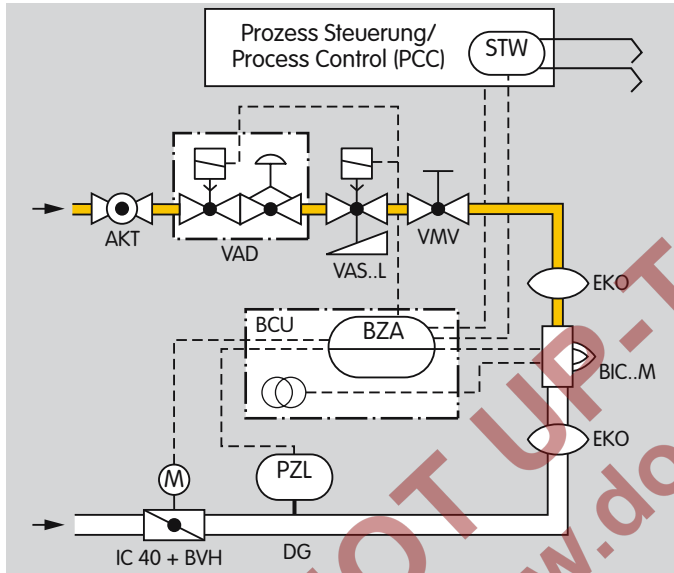


Roller hearth furnace

1.1 Examples of application

Explanation of symbols, see page 36 (Legend).

1.1.1 Staged ON/OFF control



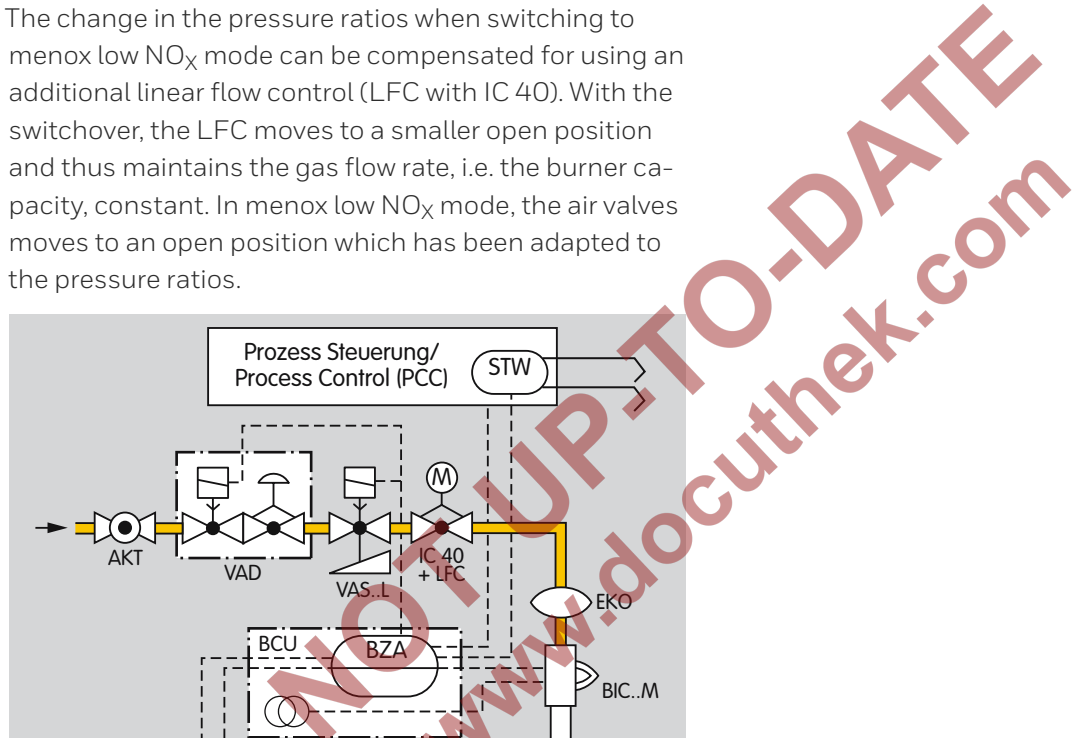
Burners BIC..M are switched ON/OFF by the burner control unit. Burners BIC..M and BICW..M are controlled without pneumatic air/gas ratio control system. The gas supply pressure is controlled by a gas pressure regulator VAD; the required burner capacity is set using the fine-adjusting valve VMV. The air 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 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 valve moves to a smaller open position which has been adapted to the pressure ratios.

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 (Project planning information).

The change in the pressure ratios when switching to menox low NO_x mode can be compensated for using an additional linear flow control (LFC with IC 40). With the switchover, the LFC 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 which has been adapted to the pressure ratios.



2 Certification

Approval for Russia



Certified by Gosstandart under Technical Regulations.

Approved by Rostekhnadzor (RTN).

Declaration of Incorporation pursuant to the Machinery Directive

Burners BIC..M and BICW..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.

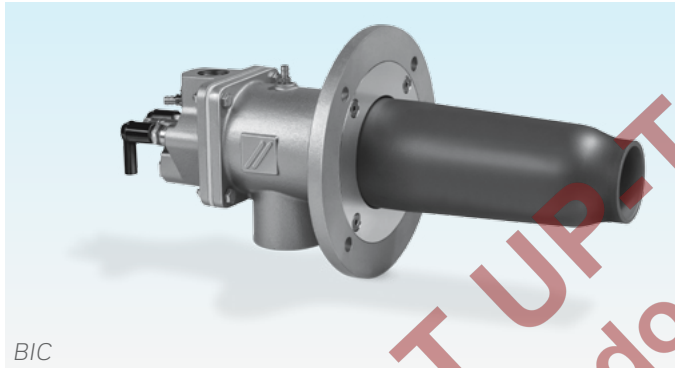
Patents

A European patent has been issued under No. EP 1 893 915 B1 for the low NO_x solution menox.

When using the burner in the USA, US patent No. 6,824,383 must be observed in particular.

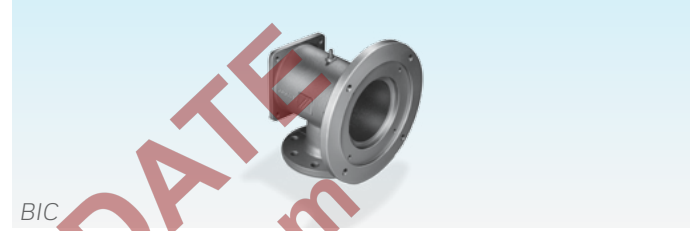
3 Mechanical construction

The burner is composed of the following modules: burner housing, 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.



BIC

3.1 Burner housing (furnace flange)



BIC

The burner is secured to the furnace by the burner housing. The burner housing 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.

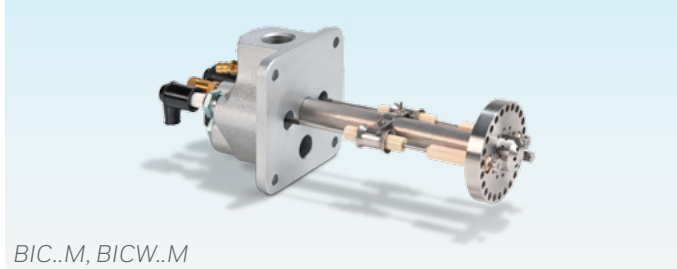
3.1.1 With internal insulation



BICW

The burner housing 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-shaped 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



BIC..M, BICW..M

The combustion gas is supplied to the burner head via the gas connection and the gas pipe. The gas connection flange comprises of the sight glass, ground screw and spark plugs with angle plugs.

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

The ignition and ionization electrodes are screwed into the connection flange and can be replaced without removing the burner insert.

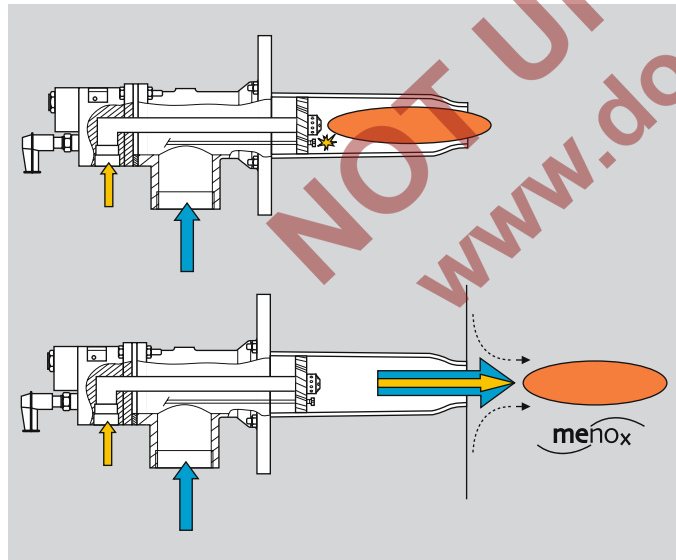
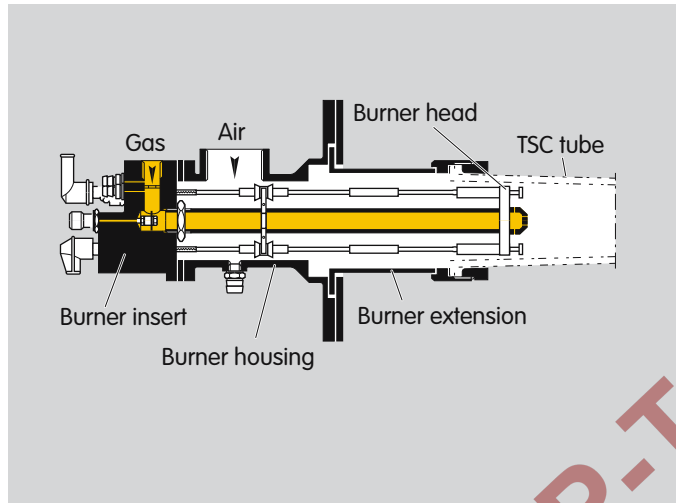
Burners BIC..M and BICW..M are nozzle-mixing burners. Gas and air are mixed only once they are in the burner head. This prevents explosive gases from being generated in the pipelines.

3.3 Ceramic tube set TSC and extension set



BIC, BICW

A SiC ceramic tube, lightweight in design, serves as combustion chamber. The ceramic tube ensures complete combustion so that no burner quarl 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 housing as far as the nozzle-mixing burner head.

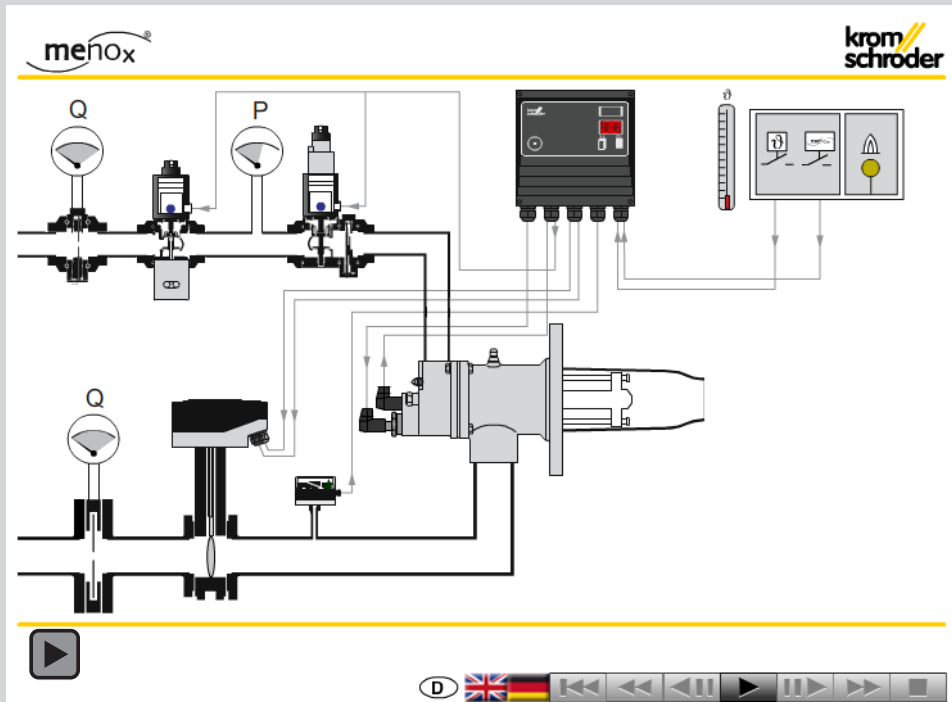
The combustible gas/air mixture is produced downstream of the burner head. Depending on the gas type, the geometry of the gas nozzle varies.

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

At a furnace chamber 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 oxidation reactions take 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.

4.1 Animation



The interactive animation shows the function of the low NO_x burner BIC..M.

Click on the picture. The animation can be controlled using the control bar at the bottom of the window (as on a DVD player).

To play the animation, you will need Adobe Reader 9 or a newer version. If you do not have Adobe Reader on your system, you can download it from the Internet.

Go to www.adobe.com, click on “Adobe Reader” in the “Downloads” section and follow the instructions.

If the animation does not start to play, you can download it from the document library (Docuthek) as an independent application.

5 Selection

5.1 Burner type

Type	Housing	Air temperature		Furnace temperature	
		°C	°F	°C	°F
BIC..M	Cast steel	up to 450	up to 842	up to 1250	up to 2282
BICW..M	ST with internal insulation	up to 450	up to 842	up to 1250	up to 2282

5.2 Burner size

Burner size	Capacity in flame mode ¹⁾	
	kW ²⁾	10 ³ BTU/h ²⁾
BIC(W) 65M	35	132
BIC(W) 80M	75, 110	283, 416
BIC(W) 100M	180	681
BIC(W) 125M	260	983
BIC(W) 140M	360	1360

1) In menox mode, the burner capacity increases by up to 15%.
2) Capacities in kW refer to the lower calorific value H_u and capacities in BTU/h refer to the upper calorific value H_o.

5.3 Burner head

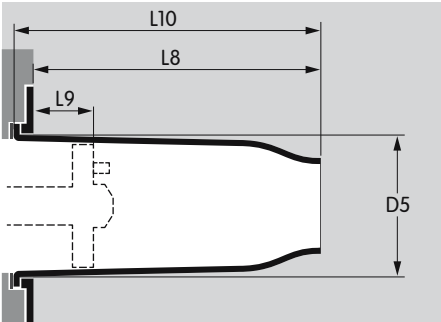
The choice of burner head depends on the use and the gas type.

Use	Burner head code letter	Air temperature		Furnace temperature		Control
		°C	°F	°C	°F	
menox low NO _x mode	M	up to 450	up to 842	up to 1250	up to 2282	ON/OFF

Gas type	Code letter	Calorific value range ²⁾		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 ¹⁾	25 – 35	2560 – 3474	2.0 – 2.7	0.118 – 0.159
Coke oven gas, town gas	D ¹⁾	4 – 5	421 – 503	0.4 – 0.6	0.024 – 0.035

1) Gas types G and D upon consultation.
2) Figures in kWh/m³(n) refer to the lower calorific value H_u and figures in BTU/scf refer to the upper calorific value H_o.

5.4 Ceramic tube set TSC made of SiC



Burner size	Burner capacity ¹⁾		Shape	Pipe dia. D5		Length L8 ²⁾	Position of burner head L9 ²⁾		Length L10 ²⁾
	kW	10 ³ BTU/h		mm	inch		300 mm (11.8")	35 mm (1.38")	
65	35	132	M	69	2.72	●	●	●	●
80	75	283	M	87	3.43	●	●	●	●
80	110	416	M	87	3.43	●	●	●	●
100	180	681	M	104	4.09	●	●	●	●
125	260	983	M	127	5	●	●	●	●
140	360	1360	M	142	5.59	●	●	●	●

● = standard, ○ = available

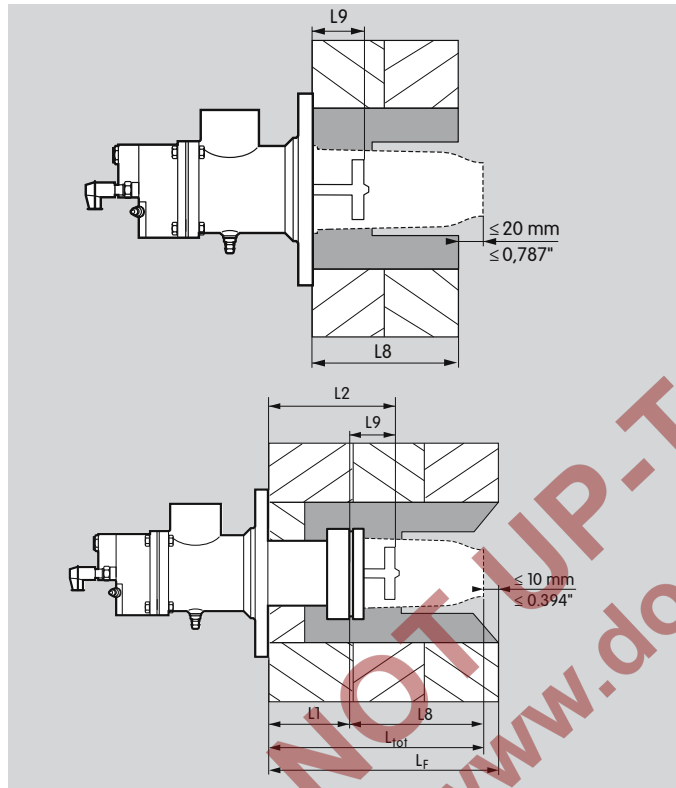
¹⁾ Capacities in kW refer to the lower calorific value H_u and capacities in BTU/h refer to the upper calorific value H_o.

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

5.4.1 SiC material

Material	Air temperature		Furnace temperature ¹⁾		Material temperature	
	°C	°F	°C	°F	°C	°F
Si-1500	≤ 450	≤ 842	< 1450	< 2642	≤ 1500	≤ 2732

¹⁾ Up to 850°C (1562°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_F = Furnace wall thickness
- L_{tot} = Total length (L_F - 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 retreat more than 10 mm (0.394") 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 (L8). It can be extended with steel extensions in increments of 100 mm (increments of 3.94").

Calculating the steel extension

Length of TSC tube (L8): L8 = 300 mm
(see page 13 (Ceramic tube set TSC made of SiC))

Length of steel extension [mm]:
(available in lengths: 100, 200, 300, 400 mm; other versions on request) $L1 = L_F - (L8 + 10 \text{ mm})$.

Example:

$L_F = 410 \text{ mm}$

$L8 = 300 \text{ mm}$

Required burner extension:

$L1 = 410 \text{ mm} - (300 \text{ mm} + 10 \text{ mm})$

$L1 = 100 \text{ mm}$

Selected length of steel extension: $L1 = 100 \text{ mm}$

Position of burner head: $L2 = L1 + L9$ ($L9 = 35 \text{ mm}$)

5.6 Burner selection table

	65	80	100	125	140	M	B	G	D	-0 ...	/35- ...	(1) - (99)	A - F
BIC	●	●	●	●	●	●	●	○*	○*	●	●	●	●
BICW	●	●	●	●	●	●	●	○*	○*	●	●	●	●

* Upon consultation
● = standard, ○ = available

Order example

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

5.6.1 Burner type code

Code	Description
BIC	Burner for gas
BICW	Burner for gas with internal insulation
65 - 140	Burner size
M	For menox low NO _x operation
B	Gas type: natural gas butane, propane, propane/butane town gas, coke oven gas
G	
D	
-0 -100 -200 ...	Length of burner extension (L1) [mm]
/35- /135- /235- ...	Position of burner head (L2) [mm]
(1) - (99)	Burner head identifier
A - F	Construction stage

5.7 Ceramic tube set TSC selection table

	65	80	100	125	140	M	035...	-300	/35-	Si-1500
TSC	●	●	●	●	●	●	●	●	●	●

● = standard, ○ = available

Order example

TSC 80M040-300/35-Si-1500

5.7.1 Ceramic tube set TSC type code

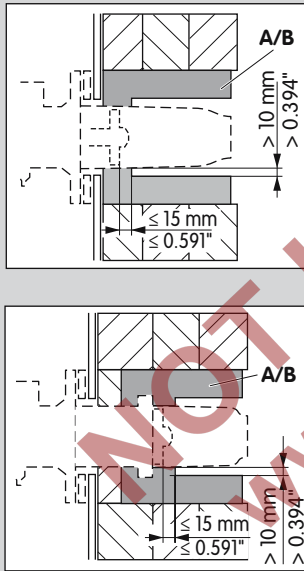
Code	Description
TSC	Ceramic tube set
65 – 140	Designed for burner size
M	Shape: for menox
035, 075, 110, 180, 260, 360	Capacity in kW
-300	Tube length (L8) [mm]
/35-	Position of burner head (L9) [mm]
Si-1500	Ceramic tube material

6 Project planning information

6.1 Installation

Installation position: any.

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



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.

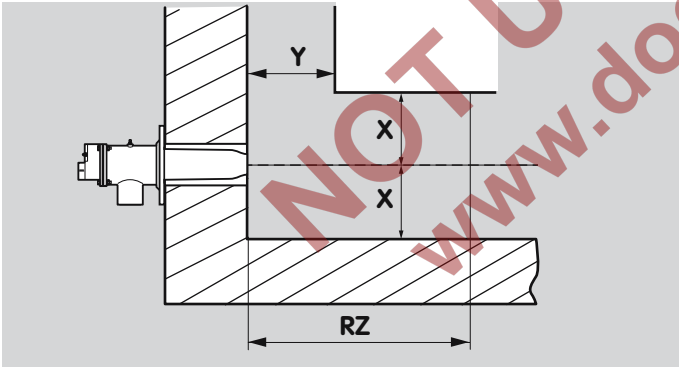
For menox low NO_x mode, the burner should be flush with the furnace lining, see page 14 (Burner length).

6.2 Clearances

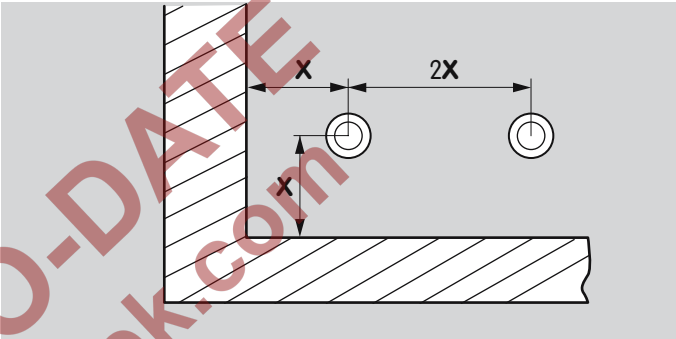
For menox low NO_x mode, a sufficiently large reaction zone (RZ) and undisturbed recirculation of the flue gas into the reaction zone are required. Operation in very small combustion chambers leads to an increase in NO_x emissions.

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 material.

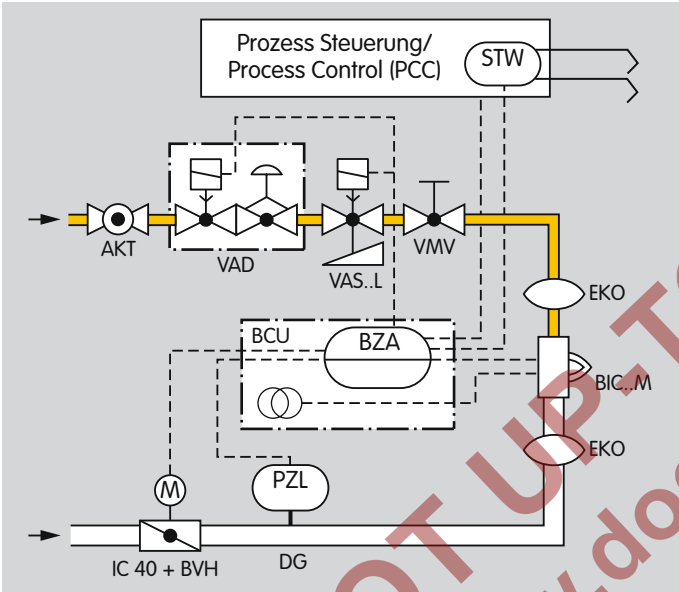


Note the distances to the furnace wall and between the burners.



The flame velocity must be noted as regards the distance between the burner and the wall opposite the burner, see page 28 (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 to adjust the gas volume. 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.

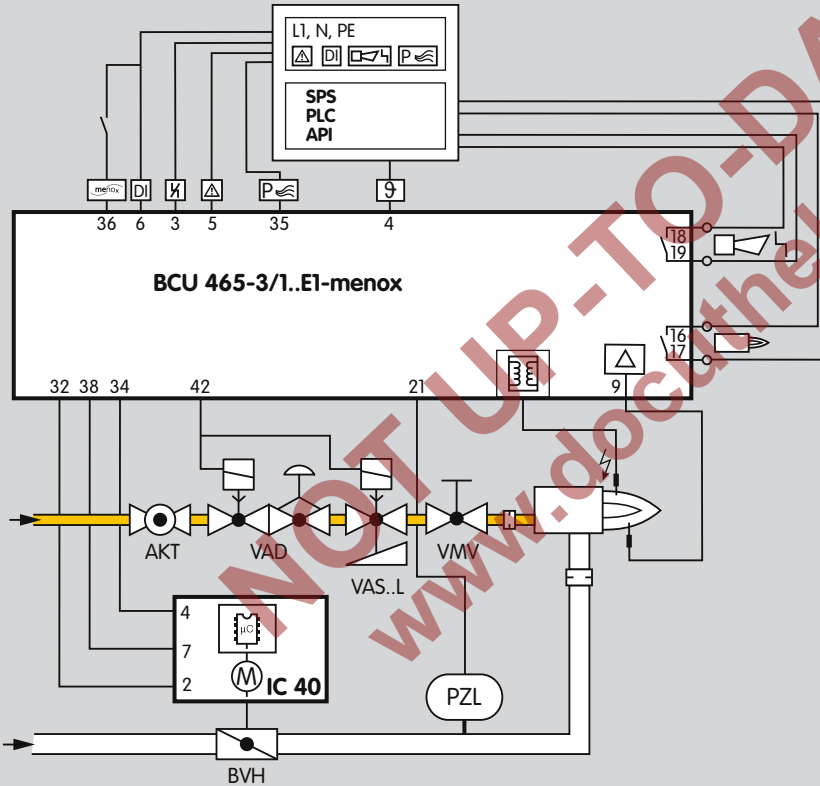
Set actuator IC 40 to operating mode 7 to move to the various valve positions for flame mode and menox low NO_x mode.

6.4 Non-return gas valve

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

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 35 (Accessories). For switching the burners to menox low NO_x mode, high temperature operation (HT operation) 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.



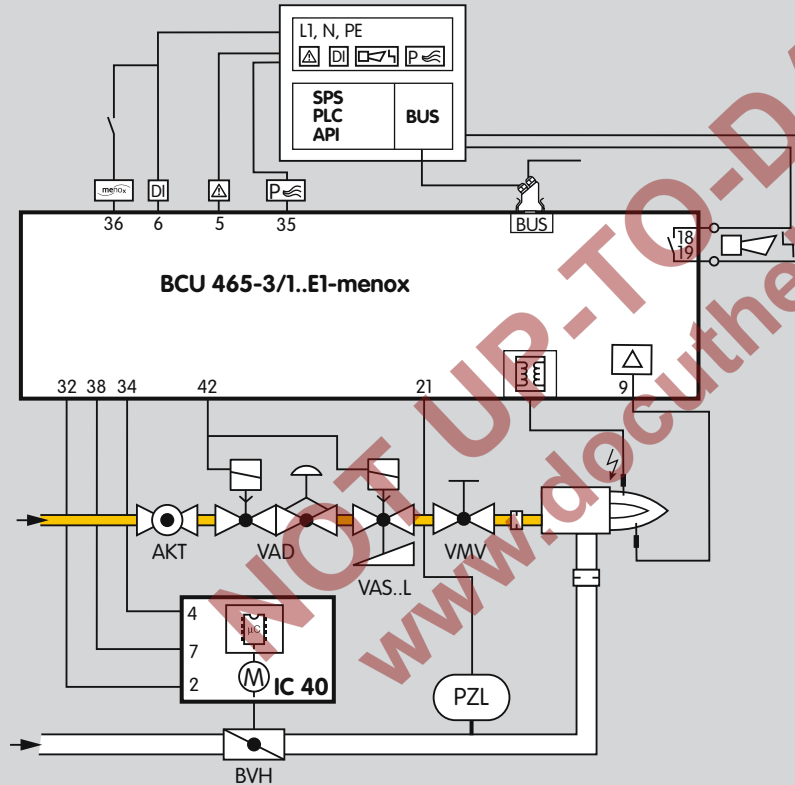


If the burner is operating (in flame mode) at the time at which it must switch to menox, the flow rates are reduced depending on the defined valve positions since the burner is not automatically switched off and restarted.

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 operation (HT operation) 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.





Profibus version

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) and the Profibus.

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 an ionization electrode.

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.

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6.8 Capacity increase in menox low NO_x mode

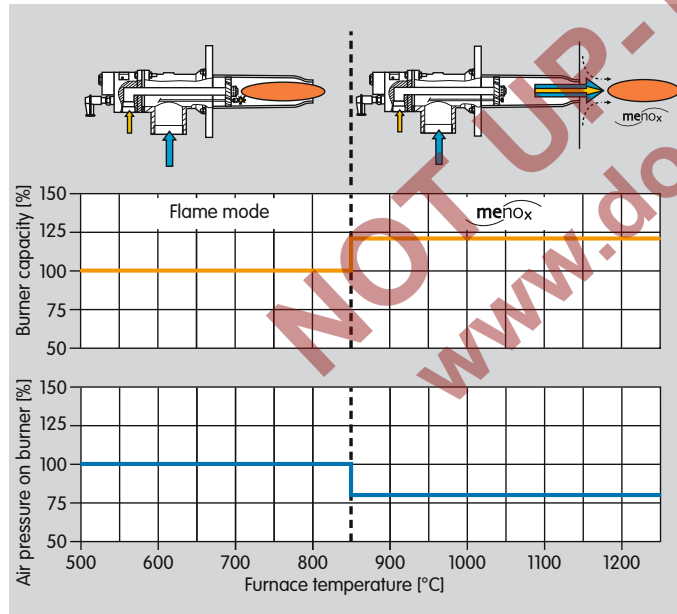
Switching from traditional flame mode to menox low NO_x mode eliminates the counterpressure by the flame in the ceramic tube TSC. At a constant gas supply pressure (setting on the VAD), the gas volume increases by approximately 15% depending on the burner setting.

At the same time, the required air pressure on the burner is reduced and to compensate for this, the air valve moves to a smaller open position in menox low NO_x mode to maintain the λ constant, see page 5 (Staged ON/OFF control).

To compensate for the increased capacity caused by switching to menox low NO_x mode, a linear flow control LFC with IC 40 can be used.

The LFC also moves to a smaller open position in menox low NO_x mode, just like the air valve, see page 6 (Staged ON/OFF control with pressure compensation). Using this type of control, the burner capacity is the same in both flame mode and menox low NO_x mode.

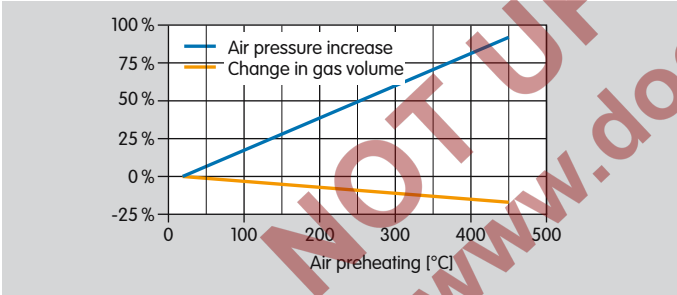
The flow rate diagrams of burners BIC..M contain separate curves for design and burner adjustment with the required pressures in flame mode and menox low NO_x mode, see www.docuthek.com.



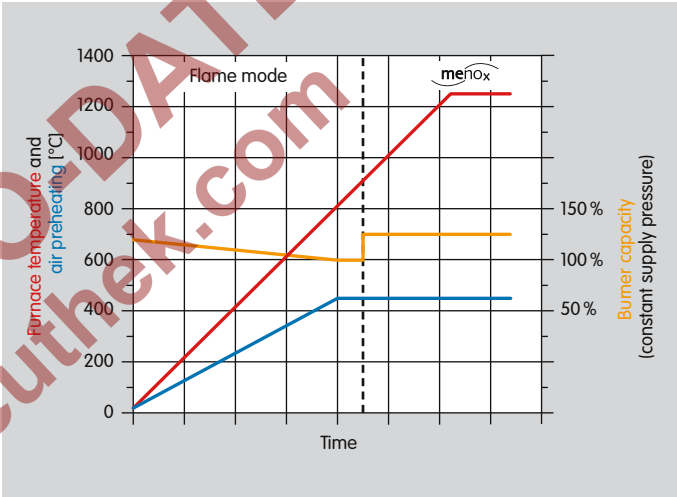
6.9 Hot air operating mode

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.

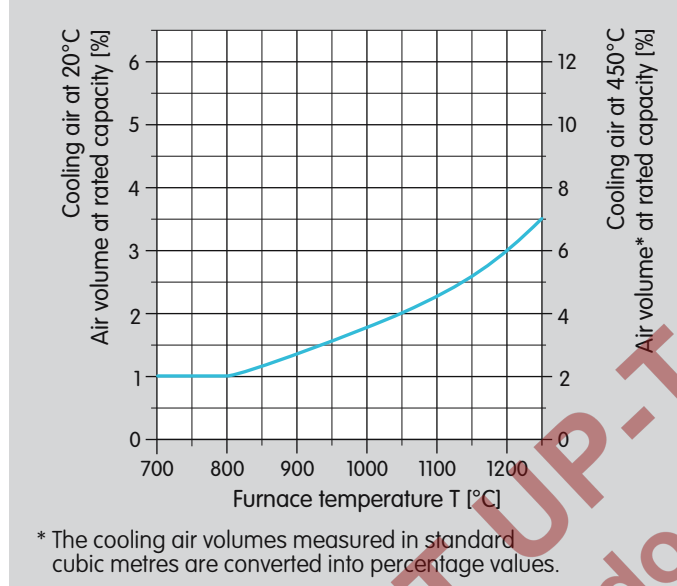
As the hot air temperature increases in flame mode, the counterpressure by the flame also increases in the ceramic tube TSC. At a constant gas supply pressure (setting on the VAD), the gas volume decreases as the hot air temperature increases. Accordingly, the air pressure must be increased less than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



6.10 Purging air/cooling air

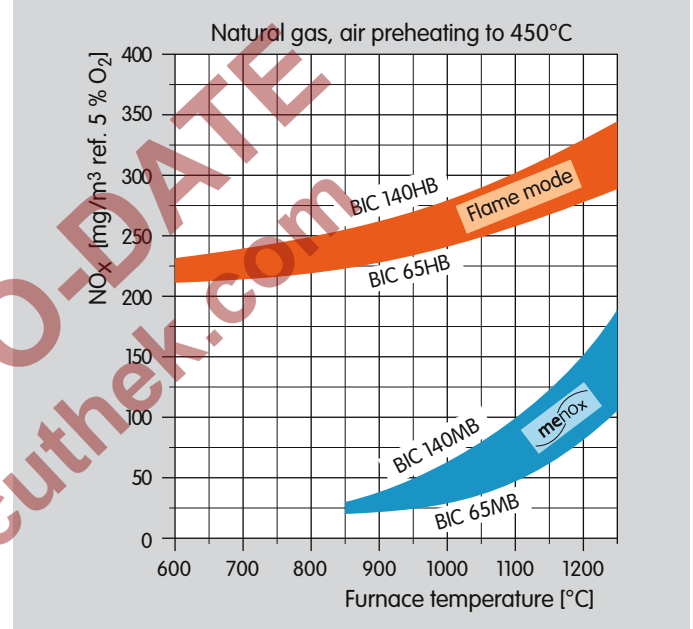


While the burner is switched off and depending on the furnace temperature, there must be some air flow for cooling the burner components.

The relative air volume in percentage values, based on the air volume for the rated capacity of the relevant size, is given in the “Purging/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

To ensure accurate measurements of the pressure differential on the integrated gas measuring orifice for burners BIC/BICA as from construction stage E, the following applies for the design of the gas connection:

- Ensure undisturbed flow to the gas connection on the burner inlet for a distance of $\geq 5 \times \text{DN}$.
- Use a bellows unit with the same nominal dimensions as the gas connection on the burner.
- Use a pipe bend up to an angle of 90° with the same nominal dimensions as the gas connection on the burner.
- Only use reducing nipples with an external thread at both ends in order to reduce the nominal diameter on the burner (e.g. from 1" to $\frac{3}{4}$ ").

To ensure optimum flow and to avoid incorrect measurements and burner operation with excess gas, we recommend the following:

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

6.13 Air line connection

Ensure there is a bellows unit and an air adjusting cock upstream of the burner.

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 in flame mode).

If the burner is installed in a furnace, the noise volume is greatly reduced by the furnace insulation (in the case of 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.

7 Technical data

Gas supply pressure and air supply pressure each depend on the use and gas type (gas and air pressures: Operating characteristic diagrams and flow rate curves see 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.

Operating range in menox low NO_x mode, see

www.docuthek.com, Kind of document: Operating characteristic diagram.

Registration in the Docuthek required.

Flame control: with ionization electrode (UV control as an option).

Ignition: direct spark ignition.

Burner housing:

BIC..M: cast steel,

BICW..M: ST + 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:

up to 450°C (842°F).

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

REACH Regulation

applies to BICW only

Information pursuant to REACH Regulation

No. 1907/2006, Article 33.

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

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

Technical data

Burner	Ceramic tube	Rated capacity in flame mode ¹⁾		Code letter/flame shape	Visible flame length ²⁾		Flame velocity ³⁾	
		kW	10 ³ 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

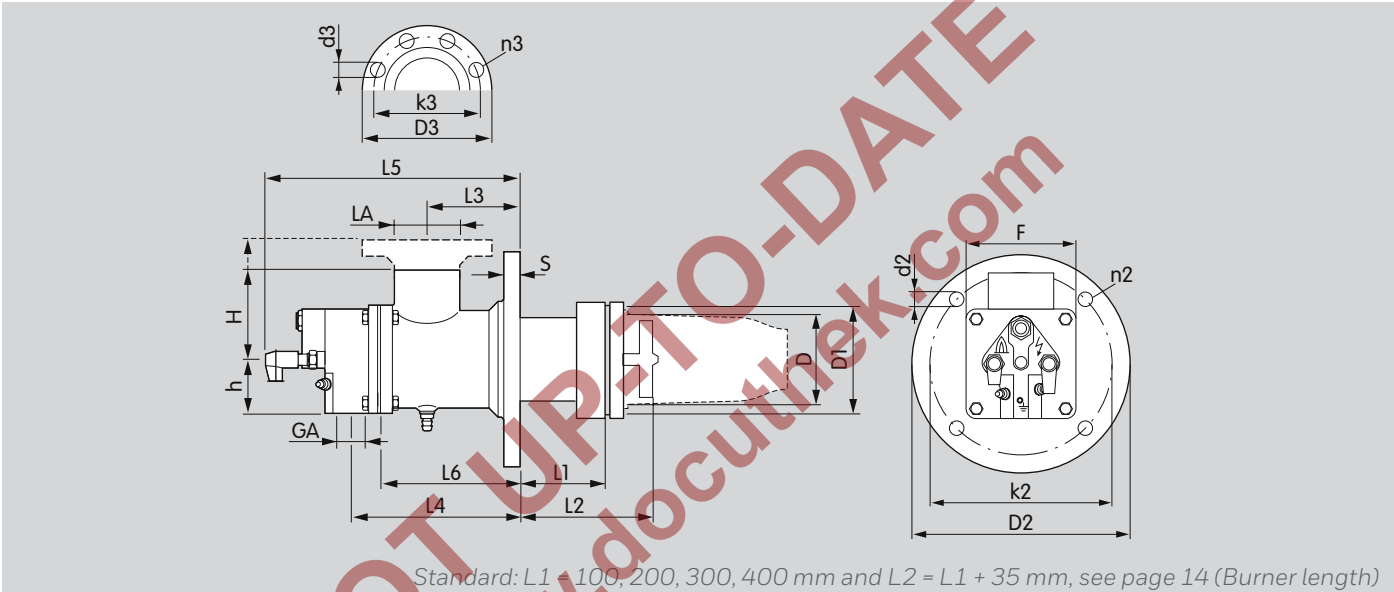
1) Capacities in kW refer to the lower calorific value H_u and capacities in BTU/h refer to the upper calorific value H_o .

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

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

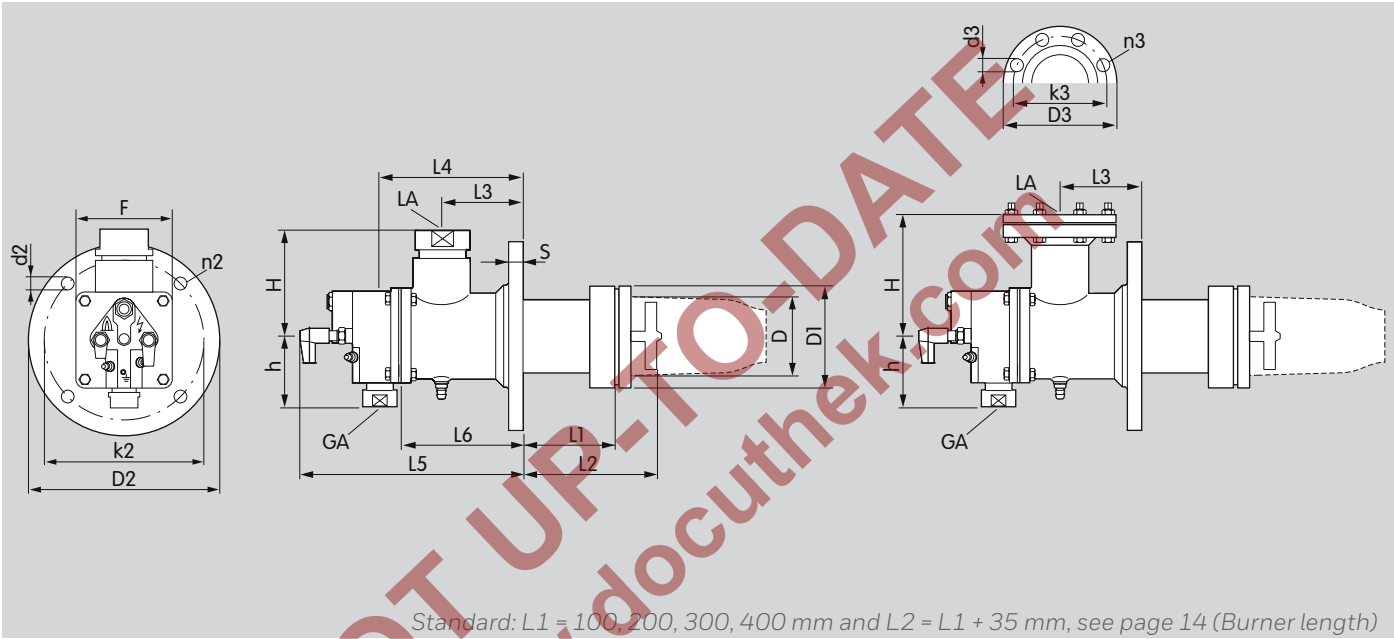
7.1 Dimensions

7.1.1 BIC..M [mm]



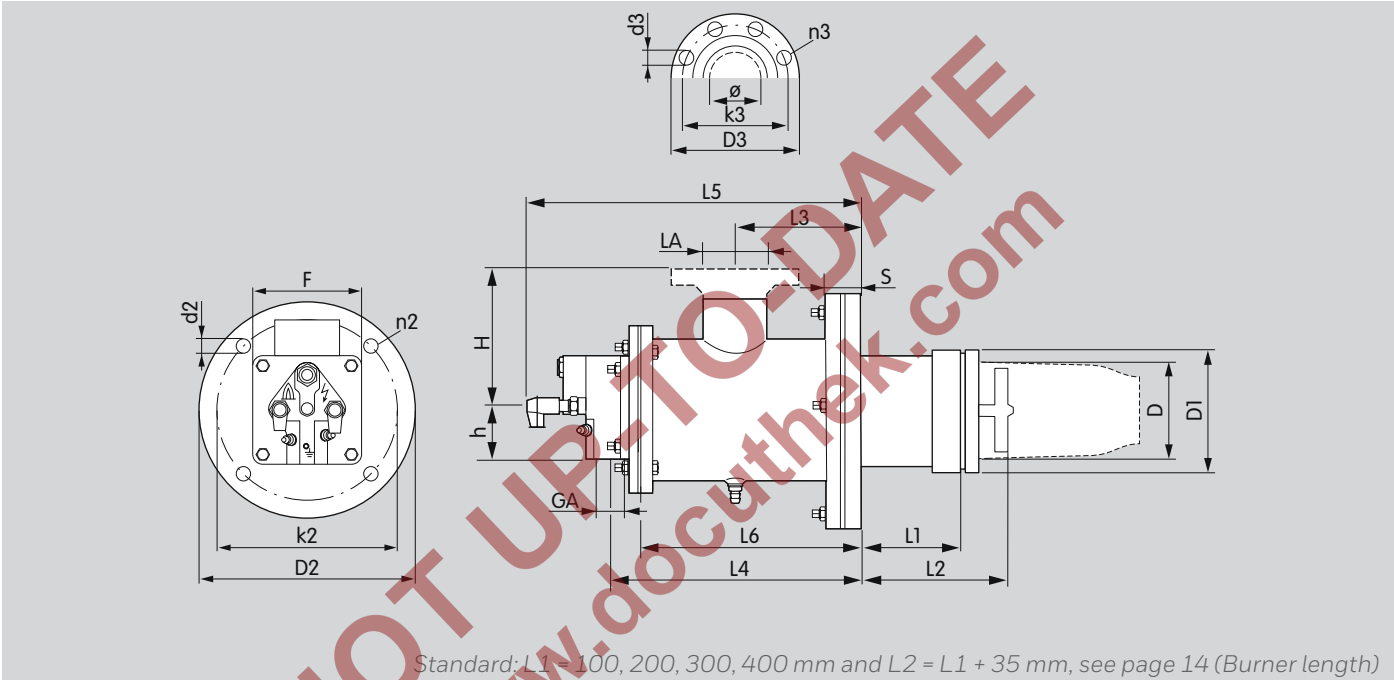
Type	Connections		Dimensions [mm]																No. of drillings		Weight
	Gas	Air	D	D1	H	h	S	L3	L4	L5	L6	D2	k2	d2	F	D3	k3	d3	n2	n3	[kg]
BIC 65M	Rp ¾	Rp 1½	69	90	62	48	12	73	156	246	127	195	165	12	95	–	–	–	4	–	6.6
BIC 80M	Rp ¾	Rp 2	86	114	112	55	14	90	172	272	140	240	210	14	110	–	–	–	4	–	10.7
BIC 100M	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]



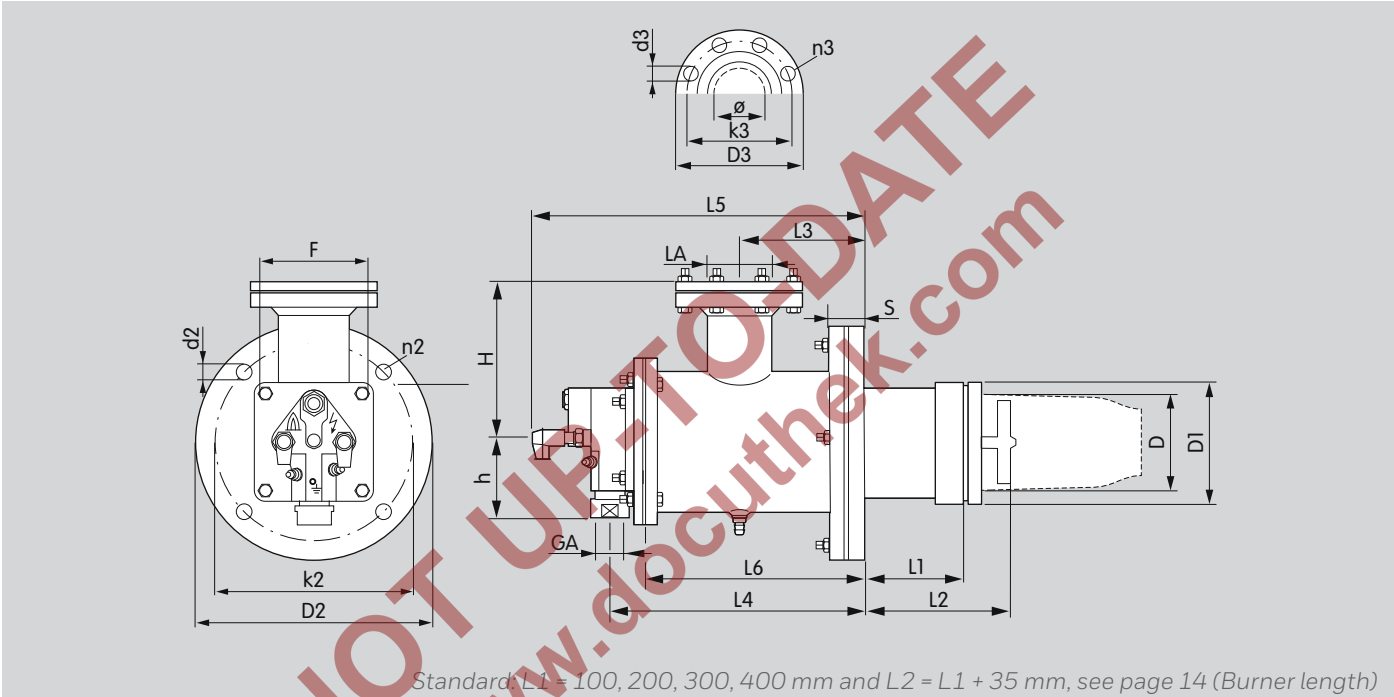
Type	Connections		Dimensions [inch]																	No. of drillings		Weight
	Gas	Air	D	D1	H	h	S	L3	L4	L5	L6	D2	k2	d2	F	D3	k3	d3	n2	n3	[lbs]	
	GA	LA																				
BIC 65M	¾ NPT	1½ NPT	2.72	3.54	3.7	2.89	0.47	2.87	6.14	9.69	5	7.68	6.5	0.47	3.74	–	–	–	4	–	14.5	
BIC 80M	¾ NPT	2 NPT	3.39	4.49	5.71	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]



Type	Connections		Dimensions [mm]																No. of drillings		Weight
	Gas	Air	D	D1	H	h	S	L3	L4	L5	L6	D2	k2	d2	F	D3	k3	d3	n2	n3	[kg]
BICW 65M	Rp ¾	Ø 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	Ø 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	Ø 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	Ø 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	Ø 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]



Type	Connections		Dimensions [inch]																No. of drillings		Weight
	Gas	Air																			
	GA	LA [inch]	D	D1	H	h	S	L3	L4	L5	L6	D2	k2	d2	F	D3	k3	d3	n2	n3	[lbs]
BICW65M	¾ NPT	Ø 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
BICW80M	¾ NPT	Ø 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
BICW100M	1 NPT	Ø 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
BICW125M	1½ NPT	Ø 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
BICW140M	1½ NPT	Ø 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.

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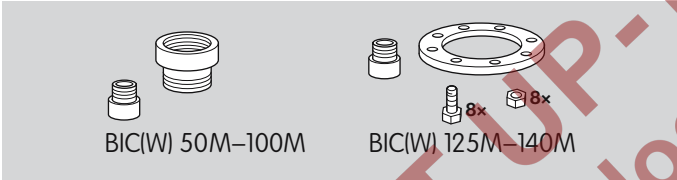
9 Accessories

9.1 Burner control unit BCU 465..MENOX

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

Burner control unit	Order No.
BCU 465-3/1LW2GBD2ACE1Z-MENOX	84404300
BCU 465-3/1LR2GBD2ACE1Z-MENOX	84404301
BCU 465-3/1LW2GBD2ACB1/1E1Z-MENOX	84404316
BCU 465-3/1LR2GBD2ACB1/1E1Z-MENOX	84404317

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	3/4 - 14 NPT	1 1/2 - 11.5 NPT	74922631
BIC 80	BR 80 NPT	3/4 - 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	1 1/2 - 11.5 NPT	Ø 2.94"	74922634
BIC 140	BR 140 NPT	1 1/2 - 11.5 NPT	Ø 3.57"	74922635


















Adapted 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
	Min. pressure switch
	Safety temperature monitor
	B = flame control Z = binary control function (safety-related) A = alarm, message
	Pressure regulator with solenoid valve
	Solenoid valve for gas, slow-opening
	Fine-adjusting valve
	Butterfly valve BVH with actuator IC 40

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Clarity

Found information quickly
Searched for a long time
Didn't find information
What is missing?
No answer

Comprehension

Coherent
Too complicated
No answer

Scope

Too little
Sufficient
Too wide
No answer



Use

To get to know the product
To choose a product
Planning
To look for information

Navigation

I can find my way around
I got “lost”
No answer

My scope of functions

Technical department
Sales
No answer

Remarks

Contact

Elster GmbH
Postfach 2809 · 49018 Osnabrück
Strothweg 1 · 49504 Lotte (Büren)
Germany
Tel +49 541 1214-0
Fax +49 541 1214-370
info@kromschroeder.com
www.kromschroeder.com

The current addresses of our international agents
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