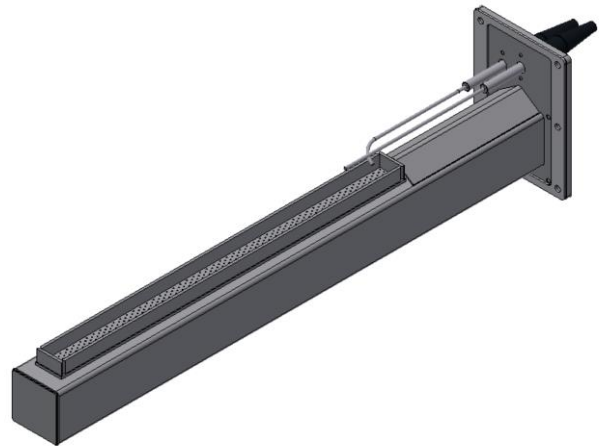
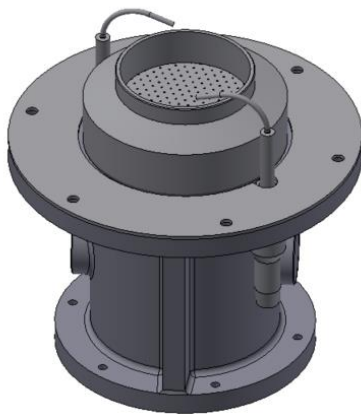


Operating and assembly instructions

DUNGS Burner head HEPM-BH



Designation:

HEPM-BH-P (Point-style burner head)
HEPM-BH-L (Line-style burner head)

Date of issue:

2024-02-22

Publication version:

Version 2

Contents:

1	Overview	3
2	General safety instructions.....	3
3	Technical specification.....	4
4	Intended use.....	4
5	Transport and storage.....	4
6	Installation and commissioning.....	5
6.1	General installation instructions.....	5
6.2	Leak test.....	5
6.3	Mounting and positioning of the electrodes.....	5
6.4	Initial commissioning	6
6.5	Final commissioning.....	7
7	Operation	7
8	Maintenance and repair	8
8.1	Spare parts list	9
8.2	Replacement instructions	11
8.2.1	Replacement of the electrode(s)	11
8.2.2	Replacement of the flame tube.....	12
8.2.3	Replacement of the burner pad	13
9	Decommissioning and disposal.....	15

1 Overview

The DUNGS HEPM-BH burner head has been designed and developed for process heating applications, based on premix combustion technology.

The HEPM-BH burner head comprises:

- Housing with connecting and sealing elements
- Ignition/flame sensing electrodes
- Flame arrestor
- Burner mounting flange
- Burner pad (sintered metal fibre mesh of heat resistant stainless steel 1.4841 or AISI 314)

The design of the HEPM-BH burner head allows the gas/air fuel mixture to uniformly propagate through the burner pad, providing a compact and stable flame throughout the turndown range, whilst preventing inadmissible flame lift off during operation.

If the information contained in these operating instructions is insufficient, please contact your DUNGS representative at Karl Dungs GmbH & Co. KG, the DUNGS Support Center (+49 7181 804-804, supportcenter@dungs.com) or DUNGS Global Service (+49 7181 804-0, servicecenter@dungs.com).

Further information is also available on the DUNGS website: www.dungs.com.

2 General safety instructions

Danger	
	Flammable gas/air mixture: Ensure gas pipework and connections are tight; check for leaks using foam-forming agents or similar.
Danger	
	High voltage: During ignition, a high-voltage spark > 7kV is generated from the ignition electrode.

3 Technical specification

The HEPM-BH burner head is suitable for the following process conditions:

Requirements & Conditions	min.	max.
Process chamber pressure	-5 mbar (-2 "WC)	+3 mbar (+1 "WC)
Process temperature	20 °C (70 F)	450 °C (840 F)
Ambient temperature	-15 °C (+5 F)	60 °C (140 F)
Gas inlet pressure	30 mbar (0.5 psig)	65 mbar (1 psig)
Process air flow velocity	2 m/s (6.5 ft/sec)	5 m/s (16 ft/sec)
Position des Brennerkopfes	All (vertical, horizontal, upside-down)	
Fuel	• Erdgas H oderr L • LPG, Propan (Butan < 5 %) • Biogas (auf Anfrage)	
Emmissionen @ 17 % O ₂	NO ^x < 10 ppm über gesamten Modulationsbereich CO < 13 ppm über gesamten Modulationsbereich (< 5 ppm if turndown is not fully utilized)	

4 Intended use

The DUNGS HEPM-BH burner head is designed for incorporation in industrial thermoprocessing equipment. The burner head should be securely fixed, with the transmission of vibration and heat minimised.

For installation and operation of the burner head in a system or in a higher-level machine, the relevant application standards and/or guidelines must be complied with, e.g. EN 746-2 or ISO 13577-2.

The burner head is intended for a gas/air mixture, and is suitable for the following fuel gases:

- Natural gas (H or L)
- LPG (Propane with <5% Butane)
- Biogas (dehumidified, on request)

5 Transport and storage

Care should be taken when storing, transporting, and off-loading the HEPM-BH burner head to prevent damage. Any sign(s) of damage should be reported immediately as this may affect correct operation.

Product should be stored in a dry and clean environment, within the permissible temperature range -15°C to 60°C.

6 Installation and commissioning

6.1 General installation instructions

When mounting the DUNGS HEPM-BH burner head, ensure that only the burner mounting flange provided for this purpose is used. The burner head must be securely fixed without being subjected to a tensile load.

It is assumed that the HEPM-BH burner head will also be supplied with a DUNGS MBC-WND WhirlWind system and associated MPA 41xx burner controller. The gas/air supply pipework from the MBC-WND to the HEPM-BH burner head, must be securely fixed without being subjected to a tensile load

Note	
	A dead weight of up to 100kg can apply to each HEPM-BH burner head depending on the design and size. The use of appropriate lifting gear is recommended and working under a suspended load must be avoided. When assembling and disassembling the HEPM-BH burner heads, there may be a risk of crushing and entrapment, depending on the installation location/position. Always use suitable tools and the necessary personal protective equipment.

6.2 Leak test

Following installation of the DUNGS HEPM-BH burner head, a leak test should be performed with foaming agents or similar.

If, due to the machine design/insufficient accessibility, performing a leak test is not possible, a leak test prior to installation must be completed with air at 150% the fuel operating pressure.

6.3 Mounting and positioning of the electrodes

- The ignition electrode must be positioned to allow the ignition spark against the HEPM-BH burner head housing, which includes a ground connection; an ignition spark against the burner pad is not permitted. To ensure a suitable ignition spark, the distance between the ignition electrode and the burner head housing should be approx. 2 mm (cf. Figure 1). The ignition electrode is fixed by a bushing/holder, which should be checked for sufficient strength and adequate clamping effect.



Figure 1: Spark Gap Measurement

- The ionisation electrode is preset at the factory and should be positioned that it reliably detects the flame.

6.4 Initial commissioning

Following successful installation and leak test, the following should be completed prior to final commissioning:

- Check all electrical connections are complete and secure, in particular the earthing of the burner head.
- Check the exhaust gas connection/flue is complete; exhaust gases should be discharged from the machine in the intended direction (please refer to associated machine/furnace drawings).
- Check that there are no flammable materials (e.g. packaging residues, loose insulation, stickers, etc.) in the combustion chamber or around the burner.

It is assumed that the HEPM-BH burner head will also be supplied with a DUNGS MBC-WND WhirlWind system and associated MPA 41xx burner controller.

- Check the setting of the gas pressure switch according to the setting instructions of the system supplier.
- Connect the electrical power supply to the DUNGS MBC-WND WhirlWind system and check the display of the associated MPA 41xx burner controller.
- Check the burner request signal from the machine/system control to the burner controller (MPA 41xx).
- Finally, the gas supply pipework isolation should be removed; the burner system is ready for operation.

Note	
	The burner can now start as normal; pre-purge, ignition and subsequent flame formation.

During initial commissioning, the gas supply pipework must be filled with fuel. As a result, several ignition attempts may be required until a stable flame is formed. If, after 3 attempts to light the burner, no flame is formed, the following should be checked:

1. Fuel supply
2. Setting of the ignition position
3. Ignition electrode and positioning

Following successful ignition, the burner output should be checked through the operating range. Burner output should be checked at low, medium, and high loads, with the following recorded and checked against the burner-specific setting values:

- Gas inlet pressure
- Combustion air fan speed
- Mixture pressure

In addition, attention should also be given to the following:

- Unusual noise development.
- Formation of the burner flame, in particular that the flame is sited directly on the burner pad without oscillation or pulsation.
- Record a power measurement at each of the load levels mentioned above, using suitable measuring equipment (e.g. gas meter).
- Due to the various factors, a visual assessment of the flame pattern is possible only to a limited extent, however attention should still be given to the typical blue colouring of the flame at all loads.

When the burner operates at a low output, it is important that the burner pad is loaded so that a maximum surface area of 30% is glowing. If the burner pad glows too much (i.e. surface area significantly more than 50%), this can lead to a thermal overload and damage/failure. In such instances, the burner output at low load will need to be decreased. This can be completed by either decreasing the combustion air fan speed, or by changing the associated gas valve setting to reduce the gas flow accordingly.

All settings should be recorded for future reference.

Following completion of the initial commissioning, the gas supply pipework should be isolated and the power supply to the burner system disconnected.

6.5 Final commissioning

Final commissioning of the burner head is conducted according to the same procedure as described in the previous chapter, "Initial commissioning". It is assumed that this process forms part of the higher-level machine commissioning at the customer/end site.

It can be assumed that the factory settings correspond as far as possible to the requirements on site, therefore only a check of the setting values should be required.

Check gas type and quality that is supplied on site.

If, contrary to expectation or due to a changed boundary condition, changes have to be made to the burner settings, these should again be recorded for future reference.

7 Operation

The HEPM-BH burner head is designed for incorporation into a fully automatic burner system, which will monitor the relevant burner safety interlocks.

An automatic burner system is designed for incorporation into a higher-level machine, which will monitor the relevant system safety interlocks and control the burner system accordingly to the process requirements.

8 Maintenance and repair

Maintenance and service work must only be completed by qualified and competent personnel. DUNGS service personnel fulfil this requirement.

DUNGS recommends maintenance every 4,000 hours of operation or at least once a year.

The ignition and flame sensing electrodes will experience wear and tear and should be replaced when necessary.

The burner pad will also experience wear and tear due to the combustion process, however, it is not possible to replace the burner pad in isolation.

The intended lifetime of the burner pad is 20,000 hours of operation or five years. Please note that the intended lifetime is not an explicit guaranteed lifetime. Use beyond this period is also possible, providing that the burner head has been properly maintained, and there are no changes in the combustion characteristics detected during maintenance and/or operation.

As part of the maintenance regime, a visual inspection of the burner pad should also be completed when not in operation. Special attention should be paid to corrosion, damaged areas and, if necessary, excessively permeable areas.

The flame should also be checked for uniformity over the entire burner pad during operation. Lifting of the flame should be avoided. In addition, the burner settings for low, medium and high loads should be checked and compared with the settings during initial commissioning or final commissioning. Any deviations should be documented and recorded for future reference.

Note: Contamination and improper operation can increase the pressure loss of the burner pad during its service life, resulting in reduced burner performance, especially at the high load points. During maintenance, the maximum firing capacity should be checked to ensure it remains within an acceptable range for the process. If burner performance has reduced, it may be possible to remove the burner head for cleaning (with a vacuum device or compressed air) before replacing it and returning it to service.

8.1 Spare parts list

Despite minor variations in design between the different burner head sizes and types, the composition of the spare parts / sets can be understood using a cross-sectional drawing of a point-style burner head, as shown in *Figure 2: Point-style burner head (cross-section)*

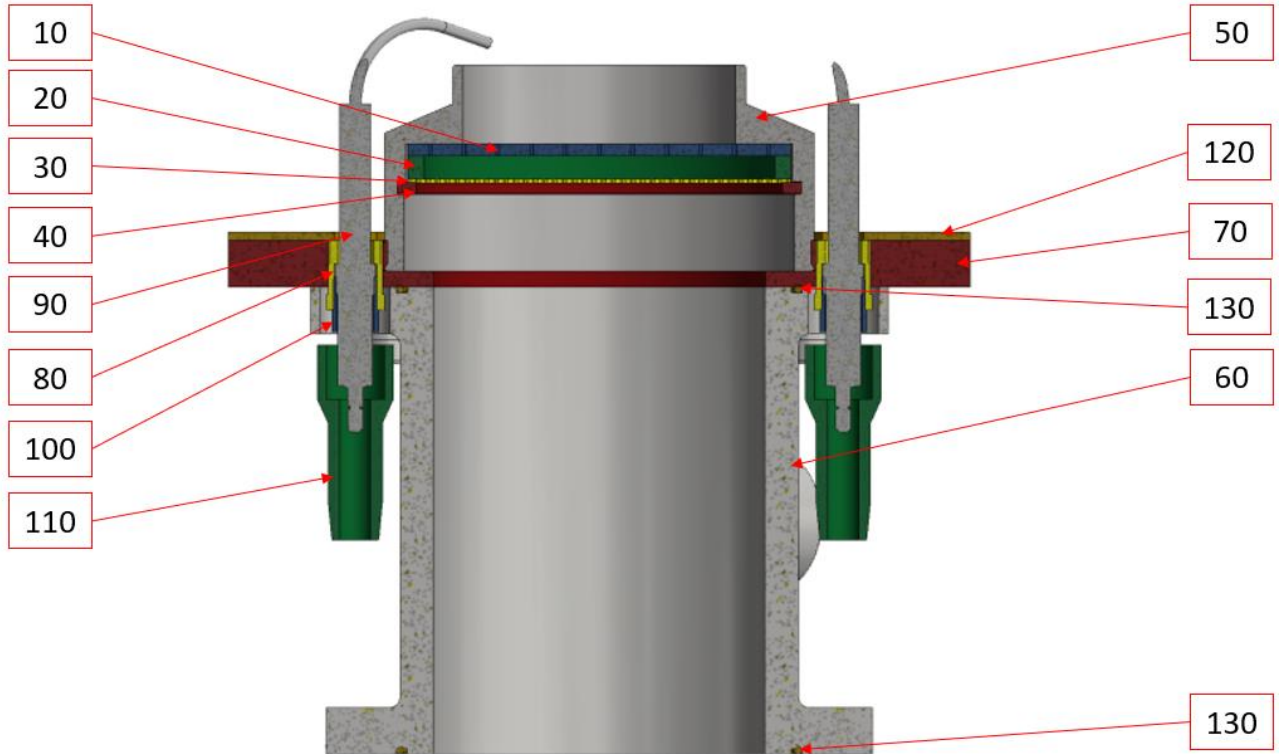


Figure 2: Point-style burner head (cross-section)

There are up to 6 spare parts / sets available for each burner head size, as shown in Table 1:

Spare parts	Consists of	Quantity	Notes
Burner head complete	No. 10 - 130	1	Fully assembled and tested
Flame tube complete	No. 10 - 50	5	Fully assembled and tested, Available for point-style burner heads only
Spare parts sets	Contains	Quantity	Notes
Burner pad and FBP	No. 10 (Burner pad)	5	Available for point-style burner heads only
	No. 30 (Flashback protection)	5	
Electrodes	No. 90 (Ignition and Ionization electrodes)	10	Nr. 100 for burner heads P-D130 and L-Exxx: 20 x screws and 20 x washers
	No. 100 (Ignition electrode nut)	10	
Electrode plug	No. 110 (Electrode plug)		
Gaskets	No. 120 (Gasket between flange and process chamber)	5	Nr. 130 for burner head P-D040, P-D060 and L-Exxx: 5 x gaskets between flange and burner adapter
	No. 130 (O-Ring between flange and burner adapter as well as burner housing)	10	
	No. 140 (Gasket between burner adapter and blower, not shown)	5	

Table 1: Contents of the spare parts sets

The following spare parts / sets are available:

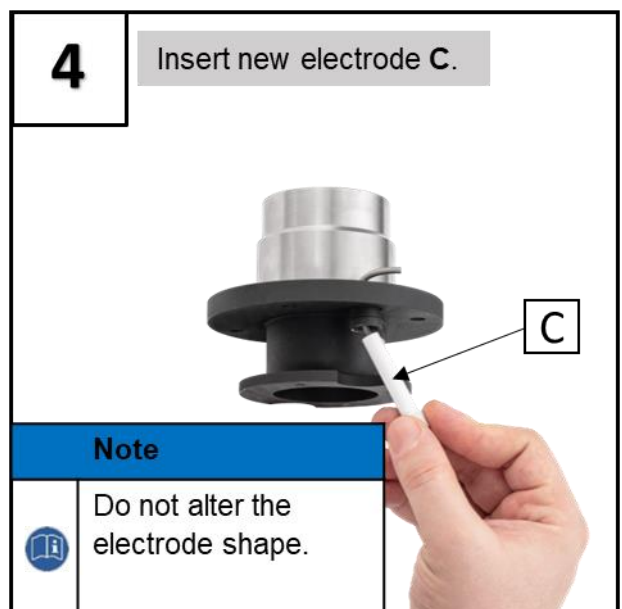
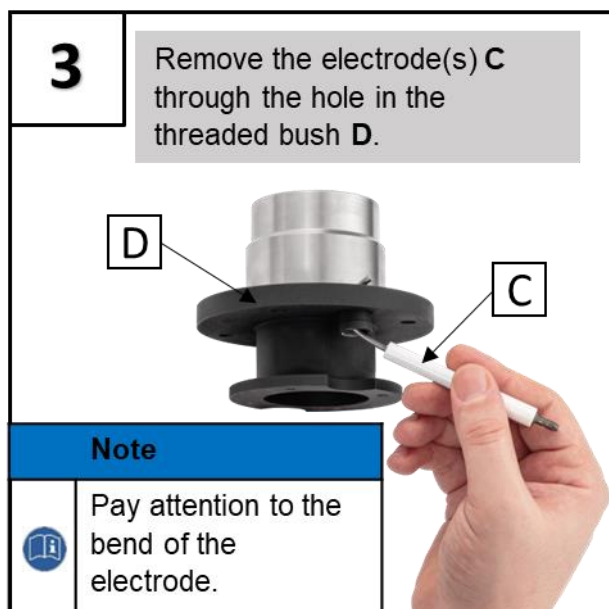
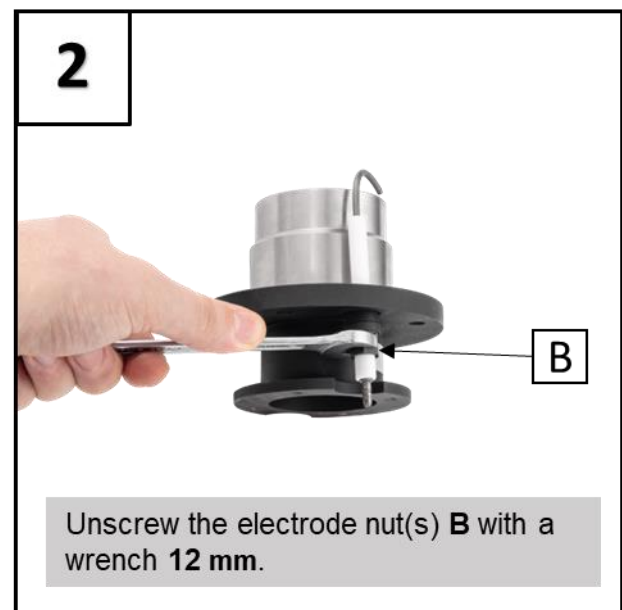
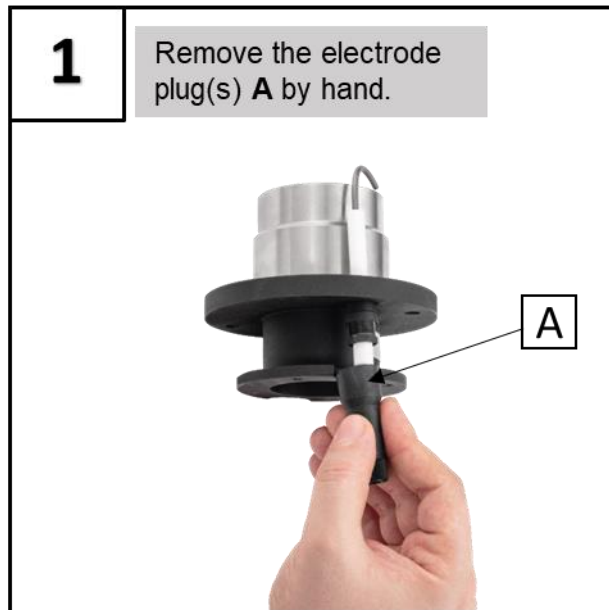
	Article designation	Order no.	HEPM-BH-P-D040	HEPM-BH-P-D060	HEPM-BH-P-D070	HEPM-BH-P-D098	HEPM-BH-P-D130	HEPM-BH-L-E200	HEPM-BH-L-E450	HEPM-BH-L-E900
Burner heads (cpl.)	Repl. Set HEPM-BH-P-D040 cpl.	303350	x							
	Repl. Set HEPM-BH-P-D060 cpl.	303351		x						
	Repl. Set HEPM-BH-P-D070 cpl.	303352			x					
	Repl. Set HEPM-BH-P-D098 cpl.	303353				x				
	Repl. Set HEPM-BH-P-D130 cpl.	303354					x			
	Repl. Set HEPM-BH-L-E200 cpl.	303355						x		
	Repl. Set HEPM-BH-L-E450 cpl.	303356							x	
Flame tube (cpl.)	Repl. Set HEPM-BH-L-E900 cpl.	303357								x
	Repl. Set Flame tube cpl. BH-P_D040	303033	x							
	Repl. Set Flame tube cpl. BH-P_D060	303034		x						
	Repl. Set Flame tube cpl. BH-P_D070	303035			x					
	Repl. Set Flame tube cpl. BH-P_D098	303036				x				
Burner pad and FBP	Repl. Set Flame tube cpl. BH-P_D130	303037					x			
	Repl. Set Pad + FBP BH-P_D040	298776	x							
	Repl. Set Pad + FBP BH-P_D060	298777		x						
	Repl. Set Pad + FBP BH-P_D070-D098	301655			x	x				
Electrodes	Repl. Set Pad + FBP BH-P_D130	302912					x			
	Repl. Set Electr. + Ring BH-P_D040-D060	302913	x	x						
	Repl. Set Electr. + Ring BH-P_D070-D098	301656			x	x				
	Repl. Set Electr. + Ring BH-P_D130	302914					x			
Electr. plug	Repl. Set Electr. BH-L_E200-E900	302915						x	x	x
	Repl. Set Electr.plug BH-P_D040-D098	302916	x	x	x	x				
	Repl. Set Electr.plug BH-P_D130	302917					x			
Gaskets	Repl. Set Electr.plug BH-L_E200-E900	302918						x	x	x
	Repl. Set Gaskets BH-P_D040-D060	302919	x	x						
	Repl. Set Gaskets BH-P_D070-D098	302920			x	x				
	Repl. Set Gaskets BH-P_D130	302921					x			
	Repl. Set Gaskets BH-L_E200-E900	302922						x	x	x

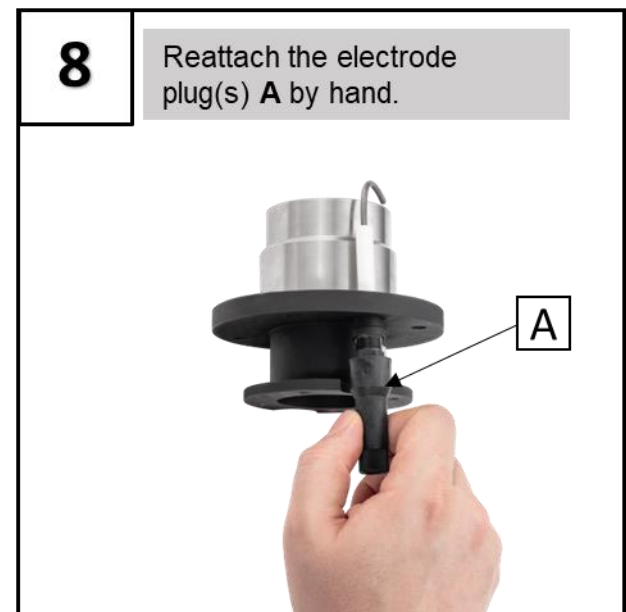
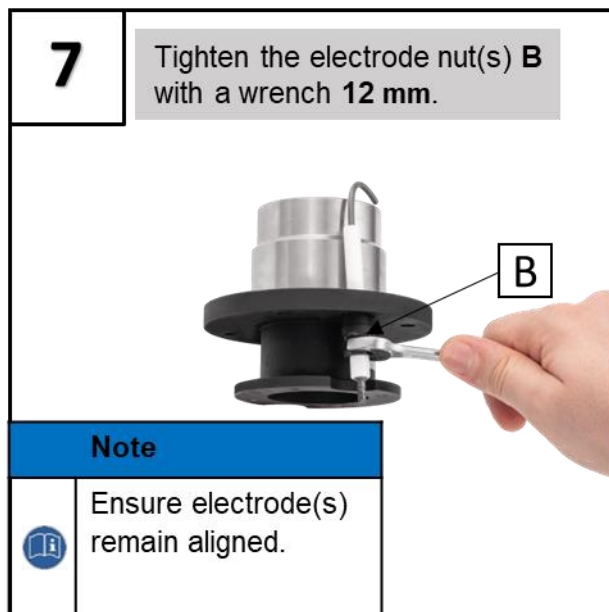
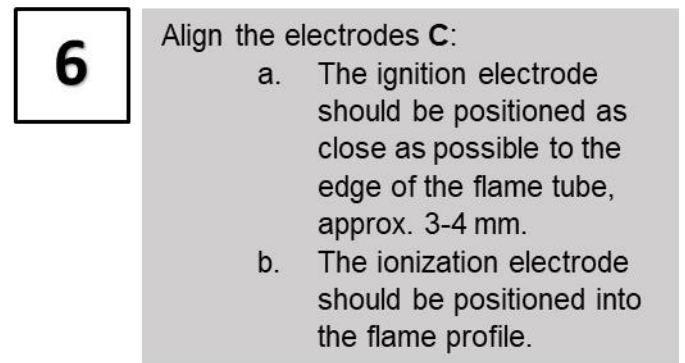
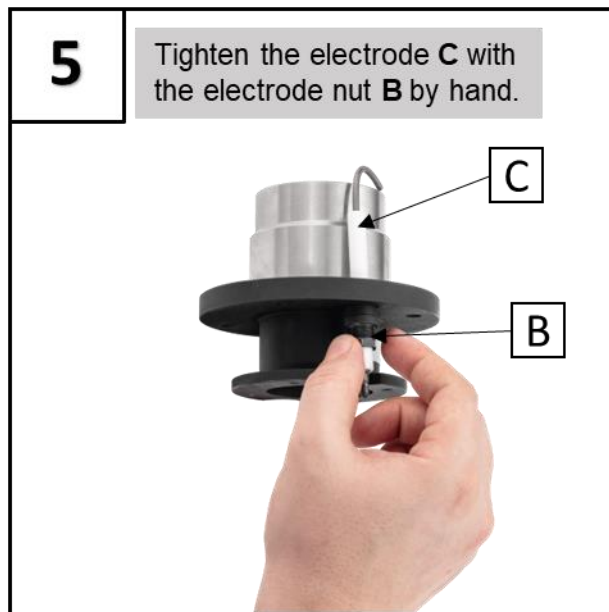
Table 2: Order numbers of the spare parts / sets

8.2 Replacement instructions

8.2.1 Replacement of the electrode(s)

Warning	
	Make sure the burner head is cold!

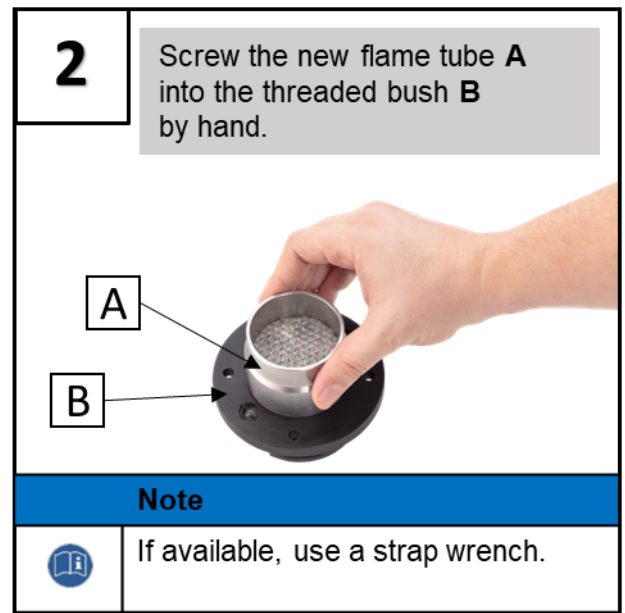
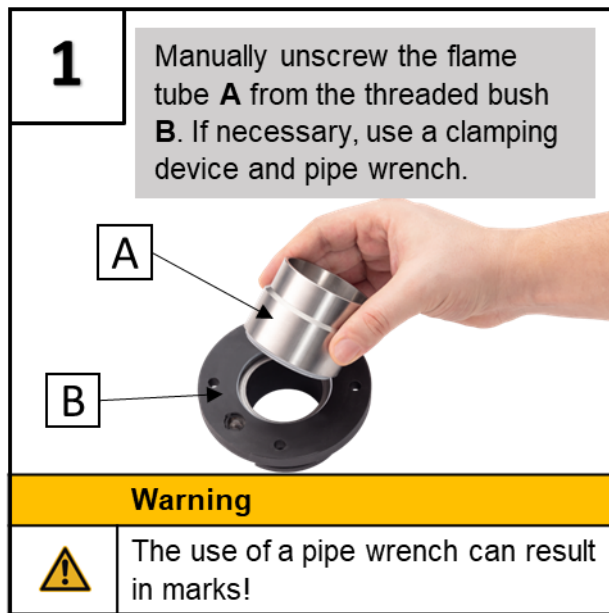




8.2.2 Replacement of the flame tube

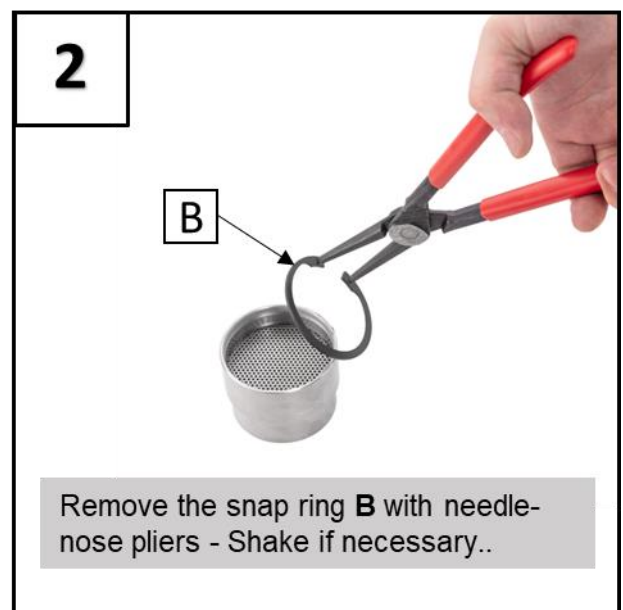
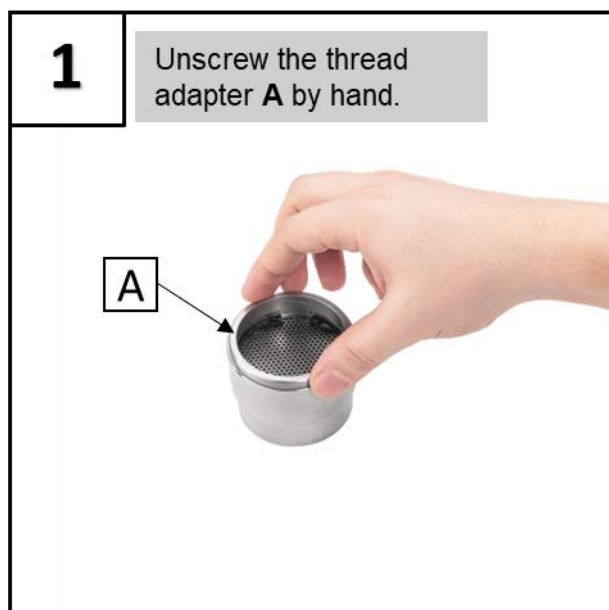
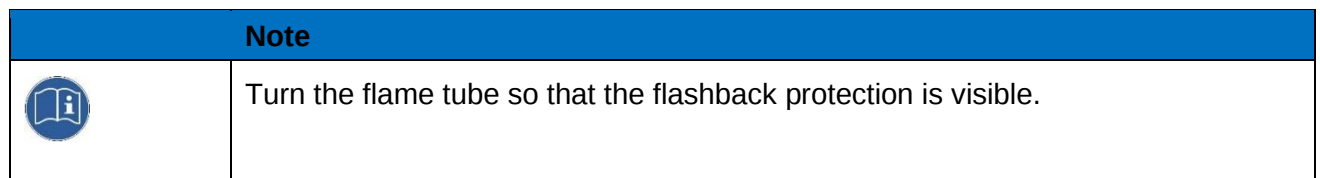
The flame tube, burner pad and flashback protection can only be replaced on point-style burner heads. If the burner pad needs to be replaced on line-style burner heads, the entire burner head must be replaced. Before the flame tube can be removed, the electrodes must be removed in accordance with the previous instructions 8.2.1 (*up to step 4*) and reattached after replacing the flame tube (*from step 5*).

Warning	
	Make sure the burner head is cold!



8.2.3 Replacement of the burner pad

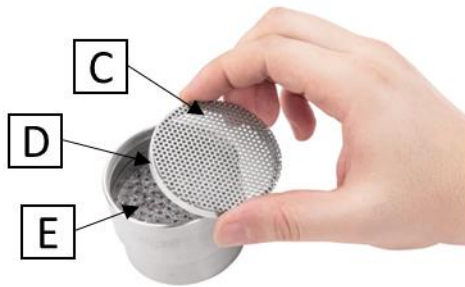
The flame tube, burner pad and flashback protection can only be replaced on point-style burner heads. If the burner pad needs to be replaced on line-style burner heads, the entire burner head must be replaced. Before the burner pad can be removed, the electrodes and flame tube should be removed in accordance with the previous instructions 8.2.2 (*up to step 2*), and replaced after the burner pad has been replaced (*from step 3*).





3

Remove the flashback protection **C** (*perforated plate*), ring **D** and burner pad **E**.



4

Insert new burner pad **E**.



Note



The side with protrusions points towards the burner head opening.

5

Insert the ring **D** between the burner pad **E** and the flashback protection **C**.



6

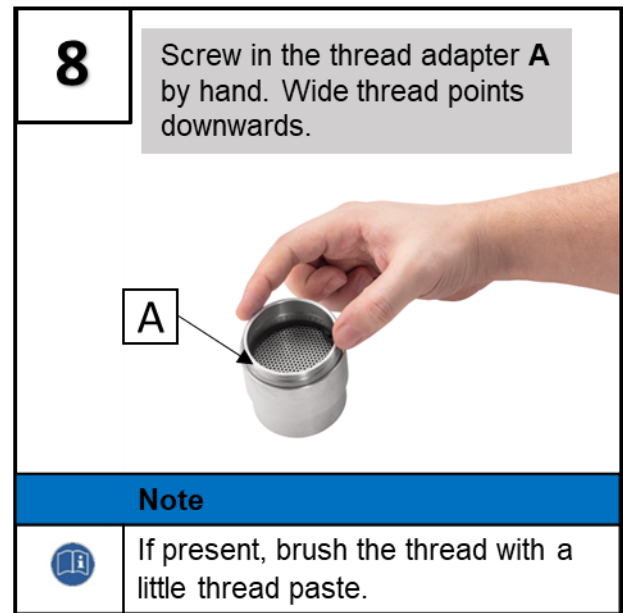
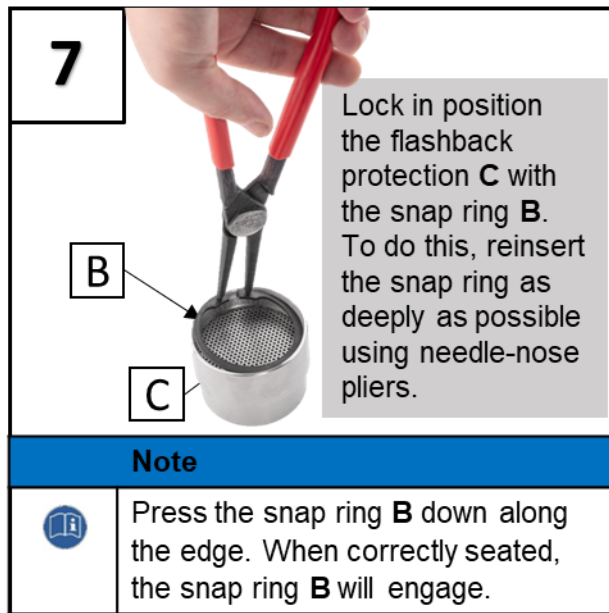
Insert new flashback protection **C** - The sharp-edged side faces inwards.



Note



The holes in the burner pad **E** and the flashback protection **C** should not be aligned.



9 Decommissioning and disposal

After reaching the end of the intended service life, or within the scope of decommissioning, the DUNGS HEPM-BH burner head can be disposed of separately, according to each components material/construction:

- Housing - Steel
- Ignition/flame sensing electrodes - Kanthal and ceramic
- Burner mounting flange - Steel
- Burner pad - Stainless steel 1.4841 or AISI 314

If necessary, please check local guidelines or regulations concerning the disposal of these materials.

DUNGS®

Combustion Controls

Karl Dungs GmbH & Co KG

Karl-Dungs-Platz 1

73660 Urbach, Germany

Phone: +49 7181 804-0

Fax: +49 7181 804-166

E-mail: [info\(@\)dungs.com](mailto:info(@)dungs.com)