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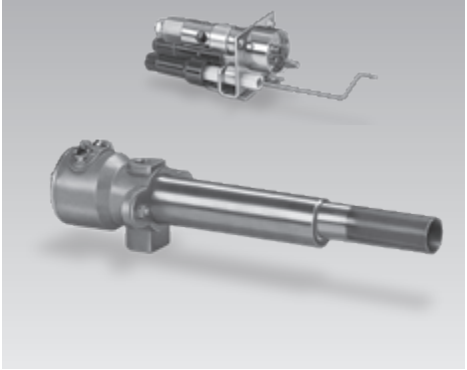
Operating instructions
Pilot burners ZAI, ZKIH



Contents

Safety

Please read and keep in a safe place

Please read through these instructions carefully before installing or operating. Following the installation, pass the instructions on to the operator. This unit must be installed and commissioned in accordance with the regulations and standards in force. These instructions can also be found at www.docuthek.com.

Explanation of symbols

•, **1**, **2**, **3**... = Action
▷ = Instruction

Liability

We will not be held liable for damage resulting from non-observance of the instructions and non-compliant use.

Safety instructions

Information that is relevant for safety is indicated in the instructions as follows:

⚠ DANGER
Indicates potentially fatal situations.

⚠ WARNING
Indicates possible danger to life and limb.

! CAUTION
Indicates possible material damage.

All interventions may only be carried out by qualified gas technicians. Electrical interventions may only be carried out by qualified electricians.

Conversion, spare parts

All technical changes are prohibited. Only use OEM spare parts.

Changes to edition 03.16

The following chapters have been changed:
– Installation
– Wiring
– Technical data
– Logistics
– Declaration of Incorporation

Checking the usage

Intended use

Ionization-controlled pilot burners for safely igniting gas burners. The capacity of the pilot burner should be 2 to 5% of that of the main burner.

Can also be used as independently operated burners. For natural gas, coke oven gas, town gas and LPG. Other types of gas on request.

This function is only guaranteed when used within the specified limits – see also page 7 (Technical data). Any other use is considered as non-compliant.

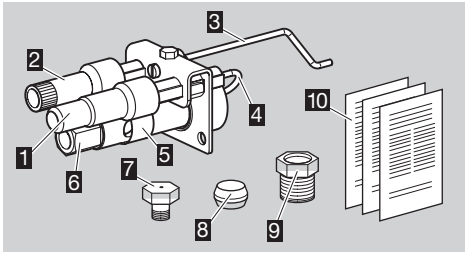
GB

ZAI

Type code

ZAI	Thermo ionization pilot with two electrodes
K	Double-cone olive for 8 mm tube
TN	1/4" NPT internal thread

Part designations



1 Interference-suppressed terminal boot for spark electrode
2 Terminal boot for flame rod
3 Flame rod
4 Spark electrode
5 Air slide valve
6 Gas connection
7 0.7 mm gas nozzle for LPG
8 Cone olive (only for ZAI K)
9 Cap screw (only for ZAI K)
10 Enclosed documentation: operating instructions

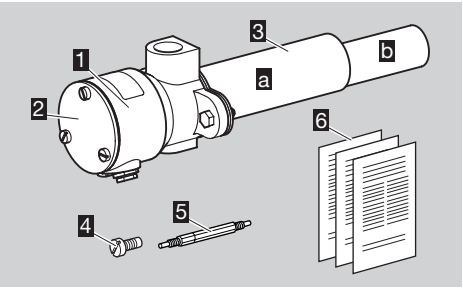
Gas connection – see type label.

ZKIH

Type code

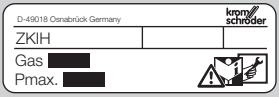
ZKIH	Ionization pilot with forced air supply
150–1000	Burner tube length
/100	Flame tube length
R	Rp internal thread

Part designations



1 Burner body
2 Burner backplate
3 Burner tube set, comprising protective tube a and flame tube b
4 Retaining screw for nozzle insert (in burner body)
5 Nozzle insert (in burner body)
6 Enclosed documentation: operating instructions and flow rate curves

Rated capacity $P_{max.}$, gas type – see type label.

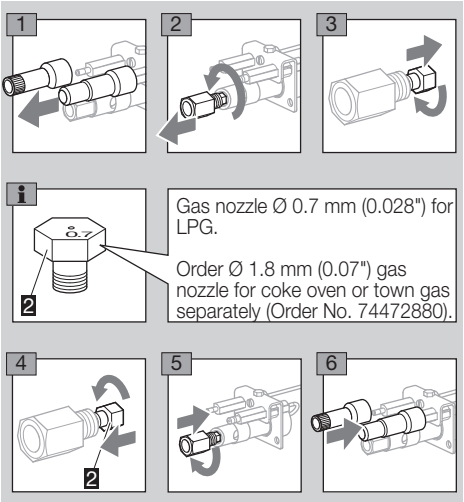


Setting the gas type

ZAI

▷ Pilot burners ZAI are set for natural gas on delivery.

▷ If the pilot burner is to be used with a different type of gas, retrofit the burner for its use.

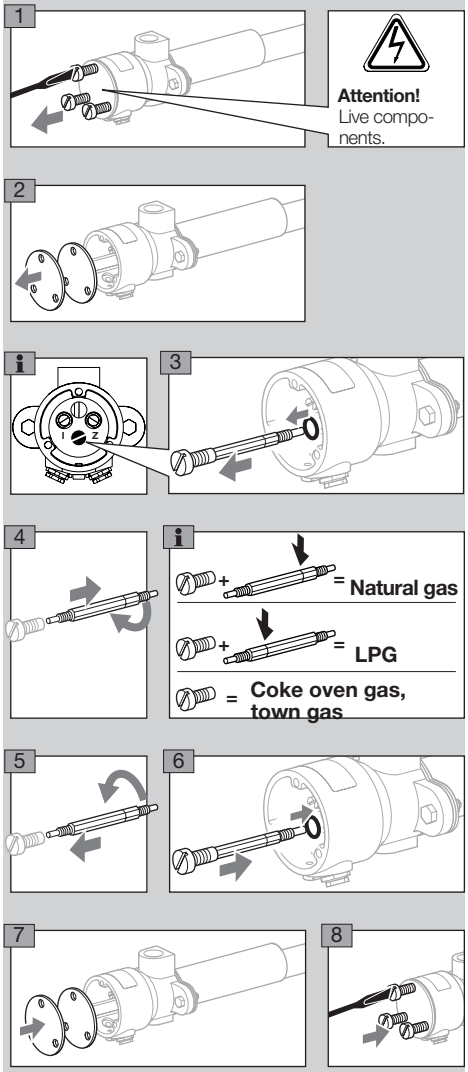


ZKIH

⚠ DANGER

Electric shocks can be fatal! Live components in the body connection chamber. The burner backplate must be fitted during ignition.

- ▷ Pilot burners ZKIH are set for natural gas on delivery.
- ▷ If the pilot burner is to be used with a different type of gas, retrofit the burner for its use.



- ▷ For operation with coke oven gas or town gas, screw the retaining screw back in without the nozzle insert – do not store the nozzle insert in the junction box: danger of short-circuits.

9 After conversion to another type of gas, adjust the inlet pressures – see page 5 (Commissioning).

Installation

⚠ DANGER

Risk of explosion! Ensure the connection is airtight.

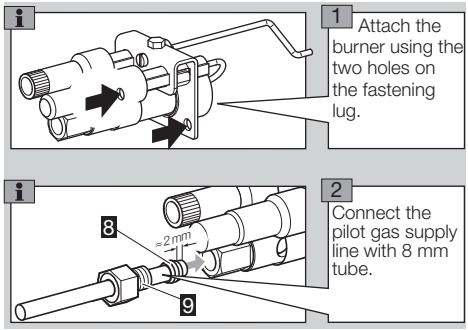
- ▷ Installation position as required.
- ▷ Install the pilot burner so that reliable ignition of the main burner is guaranteed.
- ▷ Attach the pilot burner securely.
- ▷ We recommend that a filter, a restrictor and a pressure tap be installed in both the gas and air supply line. Order: filter, restrictor, pressure tap, pilot burner.
  Distance between the restrictor and pressure tap and between pressure tap and pilot burner: min. 5 x DN.

ZAI

- ▷ Pilot burner inlet pressure:
  Natural gas: max. 35 mbar (14 "WC),
  coke oven gas,
  town gas: max. 30 mbar (12 "WC),
  LPG: max. 60 mbar (23 "WC).
- ▷ Ensure air intake is not obstructed.
- ▷ The ZAI has bare electrodes and no flame tube. Protective tube, see page 7 (Accessories).

⚠ WARNING

Risk of injury! Observe the projecting flame rod.



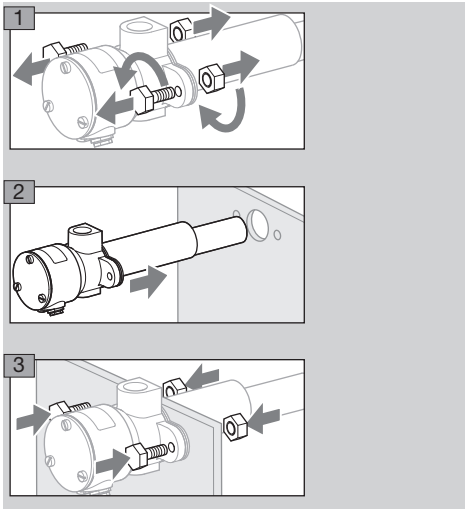
- ▷ When tightening the cap screw 9, ensure that the cone olive 8 is correctly positioned – lubricate the cone olive.
- ▷ ZAI flow rate curve – see www.docuthek.com

ZKIH

Maximum pilot burner inlet pressure:

	Gas [mbar ("WC)]	Air [mbar ("WC)]
Natural gas	23 (9)	22 (8.7)
Coke oven gas, town gas	20 (8)	80 (31.5)
LPG	50 (19.7)	80 (31.5)

- ▷ Flow rate curves – see www.docuthek.com



4 Connect the pilot gas supply line with Rp ¼ and the air supply line with Rp ½.

▷ For connecting pilot gas and air supply lines with NPT thread, order the adapter set – see page 7 (Accessories).

Wiring

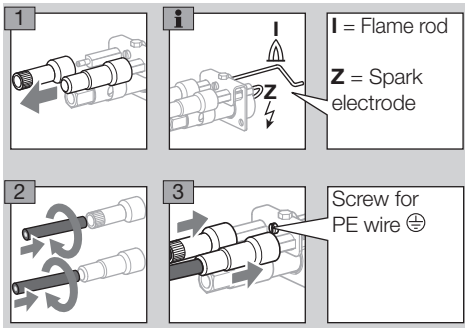
⚠ DANGER

Electric shocks can be fatal! Before working on possible live components, ensure the unit is disconnected from the power supply.

▷ For the ionization and ignition cables, use unscreened high-voltage cable:
FZLSi 1/7 -50 to +180°C (-58 to +356°F),
Order No. 04250410, or
FZLK 1/7 -5 to +80°C (23 to 176°F),
Order No. 04250409.

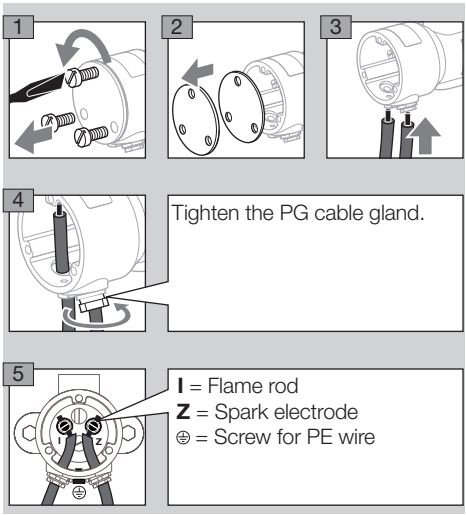
▷ Wire the burner as shown in the connection diagrams of the automatic burner control unit/ ignition transformer.

ZAI



4 Connect the PE wire for burner ground to the fastening lug on the burner insert.

ZKIH



6 Tighten ionization and ignition cables with a torque of 5 Nm (slotted head screw), locking the electrode on the hexagon to prevent it twisting.

7 Replace seal and cover and screw into place.

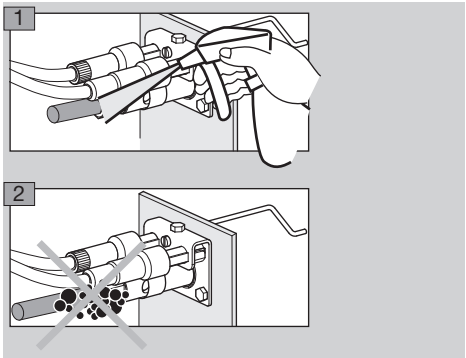
8 Connect the PE wire for burner ground to the burner.

Leak test

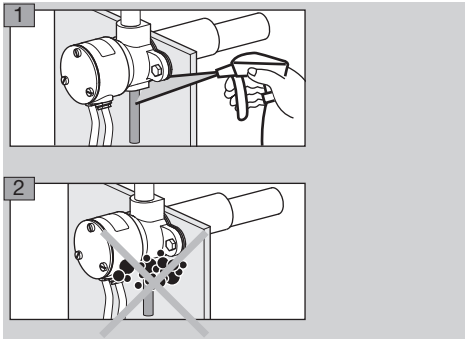
⚠ DANGER

Risk of explosion and poisoning! To ensure that there is no danger resulting from a leak, check the gas connections on the burner for leaks immediately after the burner has been put into operation.

ZAI



ZKIH



Commissioning

⚠ DANGER

Risk of explosion! Please observe the appropriate precautions when igniting the burners.
Risk of poisoning! Open the gas and air supply so that the burner is always operated with excess air – otherwise CO will form in the furnace chamber. CO is odourless and poisonous! Conduct a flue gas analysis.

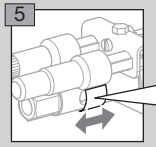
- ▷ Arrange the adjustment and commissioning of the burner with the system operator or manufacturer.
- ▷ Check the entire system, upstream devices and electrical connections.
- ▷ Pre-purge the furnace chamber with air before every ignition attempt.
- ▷ Fill the gas line to the burner carefully and correctly with gas and vent it safely into the open air – do not discharge the test volume into the furnace chamber. Risk of explosion!
- ▷ If the burner does not ignite although the automatic burner control unit has been switched on and off several times: check the entire system.
- ▷ After ignition, monitor the gas and air pressures measured on the burner and the flame. Measure the ionization current. Switch-off threshold – see automatic burner control unit operating instructions.

1 Switch on the system.
2 Open the manual valve.
3 Ignite the burner via the automatic burner control unit.
4 Adjust the burner.

⚠ DANGER

Risk of explosion in case of CO being formed in the furnace chamber! An incorrect change of the burner settings may change the gas/air ratio and lead to unsafe operating conditions. CO is odourless and poisonous!

ZAI



The air slide is open on delivery. Only close the air slide if the burner flame is not stable.

ZKIH operating pressures – see flow rate curves (www.docuthek.com).
For pressure adjustment, adjust the restrictor until the desired pilot burner inlet pressure is achieved at the pressure tap (pipe).

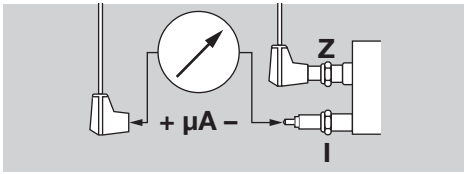
Maintenance

- ▷ We recommend an annual function check.

⚠ DANGER

Electric shocks can be fatal! Before working on possible live components, ensure the unit is disconnected from the power supply.
Risk of burning! Dismantled burner components can be hot due to outflowing flue gases.
Risk of explosion and poisoning during burner adjustment with an air deficiency! Adjust the gas and air supply so that the burner is always operated with excess air – otherwise CO will form in the furnace chamber. CO is odourless and poisonous! Conduct a flue gas analysis.

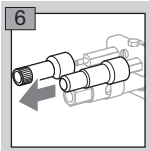
1 Check the ionization and ignition cables.
2 Measure the ionization current.
- ▷ The ionization current must be at least 5 µA and must not vary.

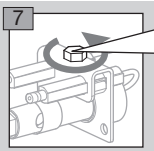


3 Disconnect the system from the electrical power supply.
4 Shut off the gas and air supply – do not change the restrictor settings.
5 Check the nozzles for dirt.

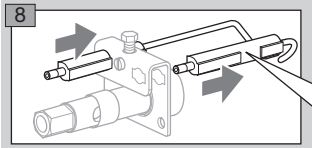
Replacing the electrodes

ZAI

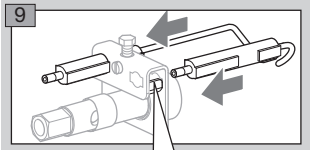




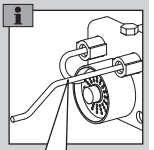
Loosen the screw of the retaining plate by turning it approx. 3 turns.



Groove for correct positioning of the electrode.



For correct positioning, slide in the electrodes until the projection of the retaining plate engages into the groove.



When sliding in the electrodes, ensure they are aligned.

10 Once the electrodes have been positioned, hand tighten the retaining plate screw using a spanner (approx. 3 turns).

▷ After tightening, the electrodes cannot be moved any more.

ZKIH

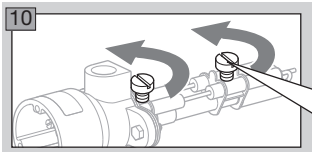
6 Undo the backplate bolts, remove seal and backplate.

7 Unscrew the ionization and ignition cables.

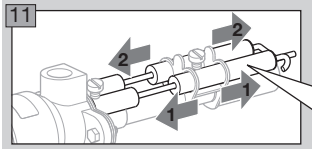
8 Unscrew the PE wire for burner ground from the burner.

9 Remove the burner – see page 3 (Installation).

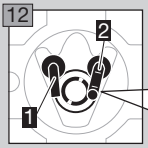
▷ Removal and reassembly of the electrodes is facilitated, when the body is placed in a vertical position on a smooth working surface.



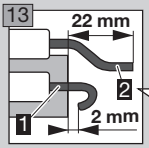
Loosen the screws ½ a turn.



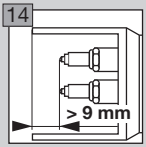
Replace the electrodes one after the other.

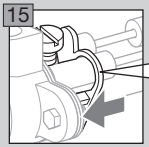


Align the spark electrode **1** and the flame rod **2**.

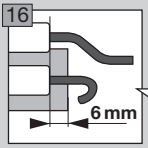


Adjust the spacing of the electrode tips.

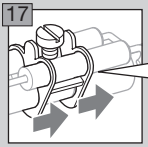




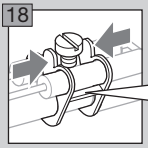
Slide the rear guide lug as far as it will go in the direction of the burner body. Hand tighten the screw.



Align the insulators.



Slide the front guide lugs as far as they will go in the direction of the burner head. Hand tighten the screw.



For longer burners, slide the other guide lugs against the retaining plate. Hand tighten the screw.

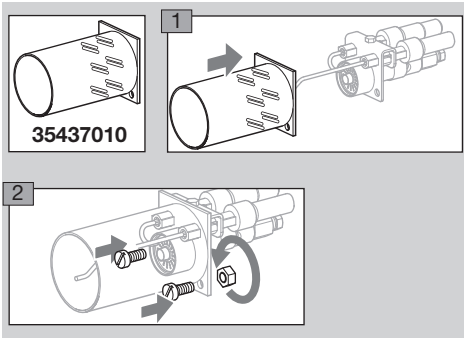
ZAI, ZKIH

- Reconnect the electrode terminal bootl(s).
- Produce a maintenance report.

Accessories

Protective tube set

▷ For ZAI, heat-resistant.



Gas nozzle

For ZAI:

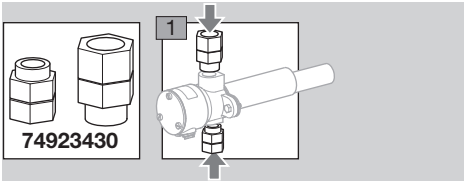
▷ 1.8 mm.

▷ For operation with coke oven gas or town gas.

Order No. 74472880

NPT adapter set

▷ For connecting the pilot burner ZKIH to NPT pilot gas and air supply lines. Comprising one adapter with 1/4-18 NPT internal thread and one adapter with 1/2-14 NPT internal thread.



Technical data

Ambient conditions

Protect the unit from precipitation, dirt and dust, e.g. with a protective housing.
Do not allow any icing, condensation or dew in and on the ZAI.
Avoid direct sunlight or radiation from red-hot surfaces on the unit.
Note the maximum medium and ambient temperatures!
Avoid corrosive influences, e.g. salty ambient air or SO_2.
The unit may be stored and installed outdoors in the specified ambient conditions as long as a weather protection cover is used.
Ambient, transport and storage temperature: -15 to +60°C.
This unit is not suitable for cleaning with a high-pressure cleaner and/or cleaning products.

Mechanical data

ZAI

Gas types: natural gas, LPG (gaseous), coke oven gas, town gas and clean cold air.
Gas inlet pressure: approx. 10 – 60 mbar (4 – 24 "WC), depending on the gas type.
Condition on delivery: for natural gas, max. 35 mbar (14 "WC),
(gas inlet pressures – see www.docuthek.com, Type of document: Flow rate curve).
Ignition head made of galvanized steel.
Retaining plate made of galvanized steel.

ZKIH

Gas types: natural gas, LPG (gaseous), coke oven gas and town gas.
Gas inlet pressure: 5 to approx. 50 mbar (2 to approx. 20 "WC),
air inlet pressure: 5 to approx. 40 mbar (2 to approx. 16 "WC),
each depending on the gas type
(burner pressures – see www.docuthek.com, Type of document: Operating characteristic diagram).
On delivery: natural gas setting (gas and air pressures: 15 mbar (6 "WC)).
Housing: AlSi.
Protective tube: stainless steel.
Flame tube: heat-resistant steel.
Max. temperature at the tip of the flame tube:
< 1000°C (< 1832°F),
< 900°C (< 1652°F) for lambda < 1.
Max. temperature of the protective tube: 500°C (932°F).

Electrical data

Control: with flame rod.
Ignition: direct spark ignition (5 kV ignition transformer).

ZAI

Capacity: approx. 1.8 – 3 kW.
Spark electrode terminal boot: interference-suppressed.

ZKIH

Capacity: approx. 2 – 5 kW.

GB

Logistics

Transport

Protect the unit from external forces (blows, shocks, vibration).

Transport temperature: see page 7 (Technical data).

Transport is subject to the ambient conditions described.

Report any transport damage on the unit or packaging without delay.

Check that the delivery is complete, see page 2 (Part designations).

GB

Storage

Storage temperature: see page 7 (Technical data).

Storage is subject to the ambient conditions described.

Storage time: 2 years before using for the first time. If stored for longer than this, the overall service life will be reduced by the corresponding amount of extra storage time.

Packaging

The packaging material is to be disposed of in accordance with local regulations.

Disposal

Components are to be disposed

Declaration of Incorporation

pursuant to 2006/42/EC, Annex II, No. 1B

The products “Burners for gas ZAI and ZKIH” are partly completed machines pursuant to Article 2g and are designed exclusively for installation in or assembly with another machine or other equipment.

The following essential health and safety requirements in accordance with Annex I of this Directive are applicable and have been fulfilled:

Annex I, Articles 1.1.3, 1.1.5, 1.3.2, 1.3.4, 1.5.2, 1.7.4, 1.5.10

The relevant technical documentation pursuant to Annex VII B has been produced and will be transmitted to the competent national authorities in electronic form on request.

The following (harmonized) standards have been applied:

– EN 746-2:2010 – Industrial thermoprocessing equipment – Safety requirements for combustion and fuel handling systems
– EN ISO 12100:2010 – Safety of machinery – General principles for design – Risk assessment and risk reduction (ISO 12100:2010)

The partly completed machine may only be commissioned once it has been established that the machine where the product mentioned above is to be incorporated complies with the provisions of the Machinery Directive 2006/42/EC.

Elster GmbH

Scan of the Declaration of Incorporation (D, GB) – see www.docuthek.com

Contact

If you have any technical questions, please contact your local branch office/agent. The addresses are available on the Internet or from Elster GmbH.

We reserve the right to make technical modifications in the interests of progress.

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kromschroder

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