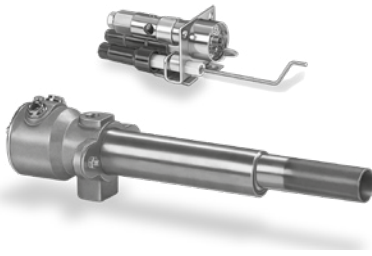


# Pilot burners ZAI, ZKIH

## OPERATING INSTRUCTIONS

· Edition 06.24 · EN · 03250560



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## 1 SAFETY

### 1.1 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](http://www.docuthek.com).

### 1.2 Explanation of symbols

**1, 2, 3, a, b, c** = Action

→ = Instruction

### 1.3 Liability

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

### 1.4 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.

### 1.5 Conversion, spare parts

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

## 2 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 6 (10 Technical data). Any other use is considered as non-compliant.

### ZAI

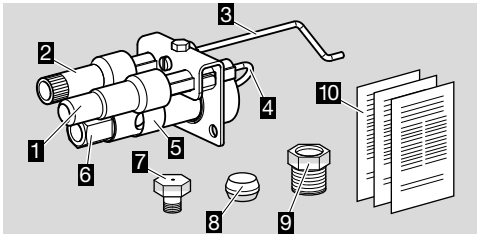
#### Type code

**ZAI** Thermo ionization pilot burner 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** Pilot burner

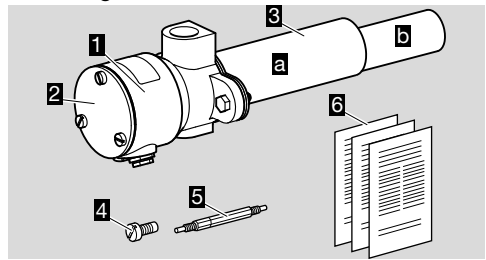
**ZKIHB** For igniting high-velocity burners

**150-930** Protective tube length in mm

**/100** Flame tube length in mm

**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.

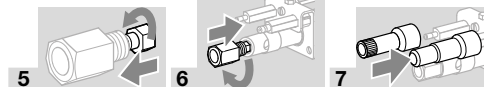
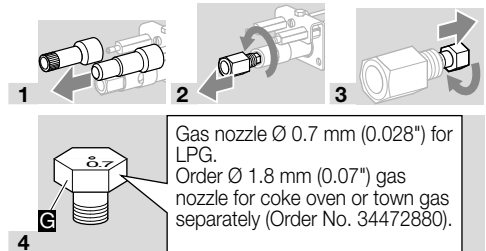


## 3 SETTING THE GAS TYPE

### 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

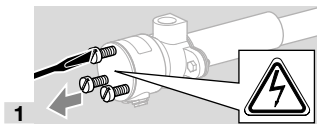
## ⚠ DANGER

### Electric shocks can be fatal!

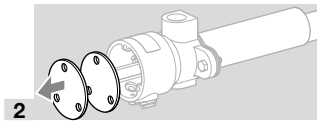
Live components in the housing connection chamber. The burner backplate must be fitted during ignition.

→ Pilot burners ZKIH are set for natural gas on delivery.

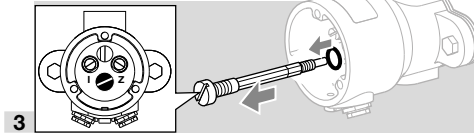
→ If the pilot burner is to be used with a different type of gas, retrofit the burner for its use.



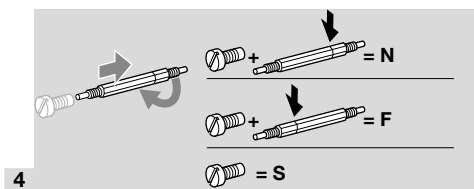
1  
→ **Attention!** Live components.



2

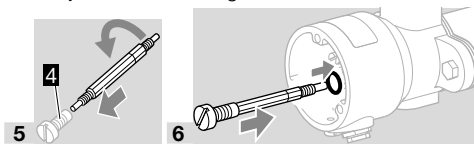


3

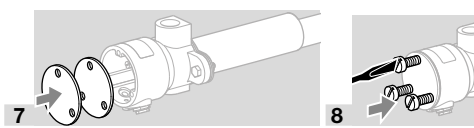


4

→ **N** = natural gas, **F** = LPG, **S** = coke oven gas, town gas.  
→ For operation with coke oven gas or town gas (**S**), screw the retaining screw back in without the nozzle insert – do not store the nozzle insert in the junction box: danger of short-circuits.



5



6

9 After conversion to another type of gas, adjust the inlet pressures – see page 4 (7 Commissioning).

## 4 INSTALLATION

**⚠ DANGER**  
**Risk of explosion!**

Ensure the connection is air-tight.  
→ 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

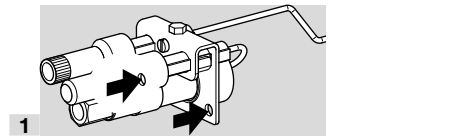
tap and between pressure tap and pilot burner: min. 5 x DN.

### 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 6 (9 Accessories).

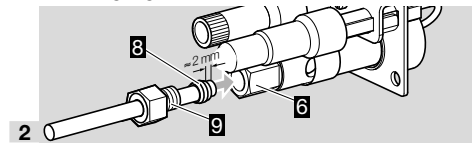
### ⚠ WARNING

**Risk of injury!**  
Observe the projecting flame rod.



1

→ Attach the burner using the two holes on the fastening lug.



2

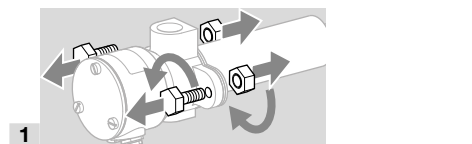
→ Connect the pilot gas supply line to the gas connection **6** with 8 mm tube.  
→ When tightening the cap screw **9**, ensure that the cone olive **8** is correctly positioned – lubricate the cone olive.  
→ ZAI flow rate curve – see [www.docuthek.com](http://www.docuthek.com)

### ZKIH

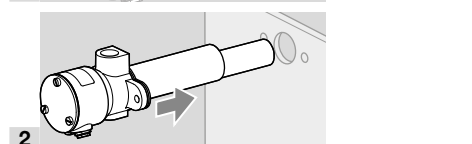
Maximum pilot burner inlet pressure:

	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)

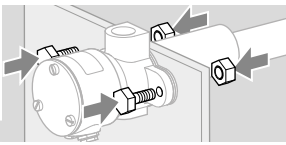
→ ZAI flow rate curve – see [www.docuthek.com](http://www.docuthek.com)



1



2



- 3**
- 4** Connect Rp ¼ pilot gas supply line and Rp ½ air supply line.
- For connecting pilot gas and air supply lines with NPT thread, order the adapter set – see page 6 (9 Accessories).

## 5 WIRING

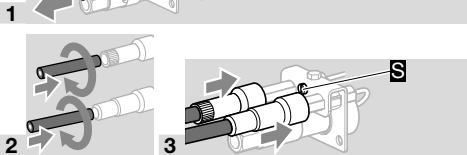
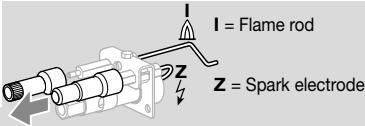
### ⚠ DANGER

#### Electric shocks can be fatal!

Before working on possible live components, ensure the unit is disconnected from the power supply.

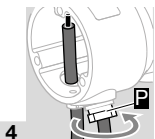
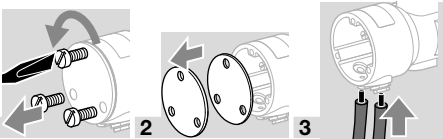
- For the ionization and ignition cables, use un-screened high-voltage cable:  
 FZLSi 1/7 -50 to +180°C (-58 to +356°F),  
 Order No. 04250410,  
 or  
 FZLK 1/7 -5 to +80°C (23 to 176°F),  
 Order No. 04250409.
- Wire the burner as shown in the connection diagrams of the automatic burner control unit/ignition transformer.

### ZAI

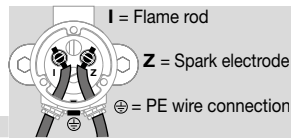


- 4** Connect the PE wire for burner ground to the fastening lug on the burner insert **S**.

### ZKIH



- Tighten the PG cable gland **P**.



- 5**
- 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.

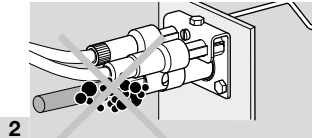
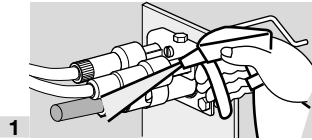
## 6 TIGHTNESS TEST

### ⚠ DANGER

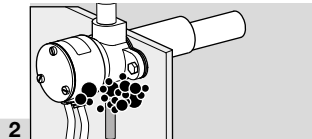
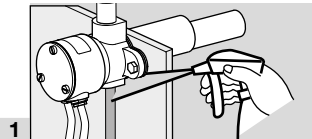
#### Risk of explosion and poisoning!

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



## 7 COMMISSIONING

### ⚠ DANGER

#### Risk of explosion!

#### Risk of poisoning!

Please observe the appropriate precautions when igniting the burners.

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.

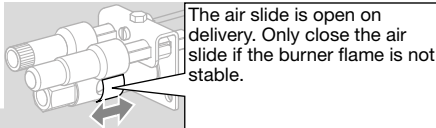
- Agree on settings and commissioning of the burner with the system operator or manufacturer.
  - Check the entire system, upstream devices and electrical connections.
  - Pre-purge the furnace chamber with air before every ignition attempt.
  - Fill the gas line to the burner carefully and correctly 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**



ZAIH operating pressures – see flow rate curves at [www.docuthek.com](http://www.docuthek.com).

For pressure adjustment, adjust the restrictor until the desired pilot burner inlet pressure is achieved at the pressure tap (pipe).

## **8 MAINTENANCE**

- We recommend an annual function check.

### **⚠ DANGER**

#### **Electric shocks can be fatal!**

#### **Risk of burning!**

#### **Risk of explosion and poisoning in case of burner adjustment with an air deficiency!**

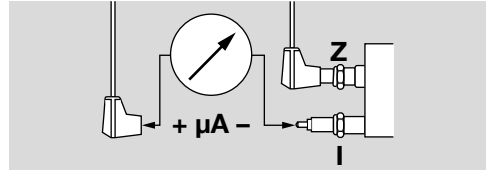
Before working on possible live components, ensure the unit is disconnected from the power supply.

Dismantled burner components can be hot due to outflowing flue gases.

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.

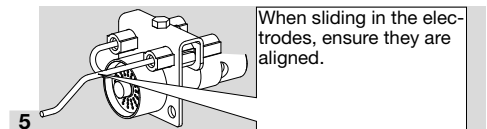
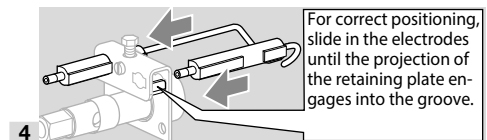
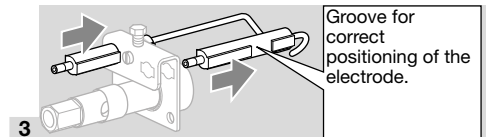
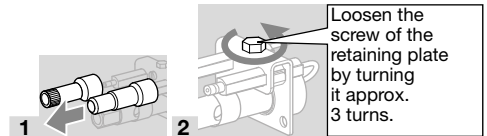
- 1 Check the ionization and ignition cables.
  - 2 Measure the ionization current.
- The ionization current must be at least 5  $\mu\text{A}$  and must not vary.



- 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**

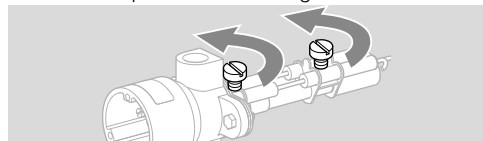


- 6 Once the electrodes have been positioned, hand tighten the retaining plate screw using a spanner (approx. 3 turns).
- After tightening, the electrodes cannot be moved any more.

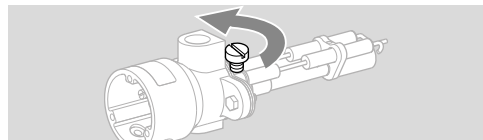
#### **ZKIH**

- 1 Undo the backplate bolts, remove seal and backplate.
  - 2 Unscrew the ionization and ignition cables.
  - 3 Unscrew the PE wire for burner ground from the burner.
  - 4 Remove the burner – see page 3 (4 Installation).
- Removal and reassembly of the electrodes is facilitated, when the body is placed in a vertical position on a smooth working surface.

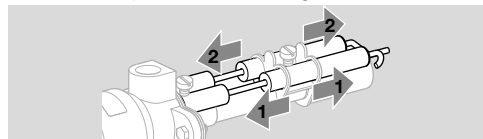
- 5 Loosen the screws ½ a turn.  
→ ZKIH with protective tube length > 300:



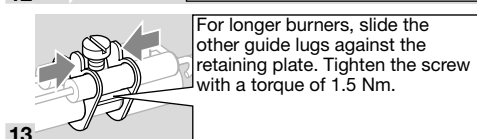
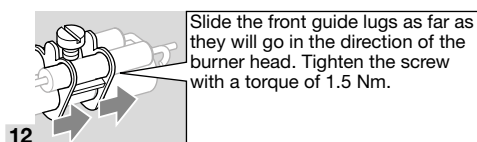
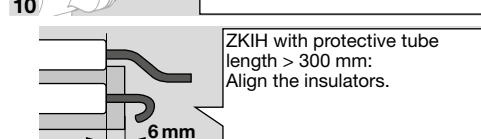
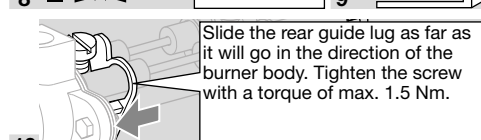
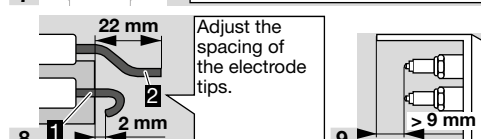
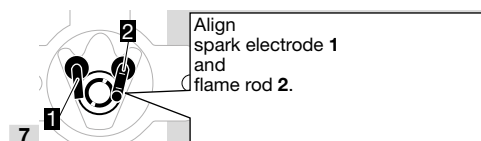
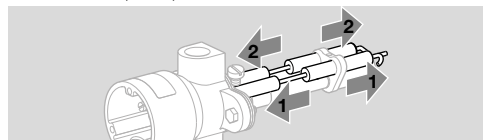
- ZKIH 150, 200, 300:



- 6 Replace the electrodes one after the other.  
→ ZKIH with protective tube length > 300:



- ZKIH 150, 200, 300:



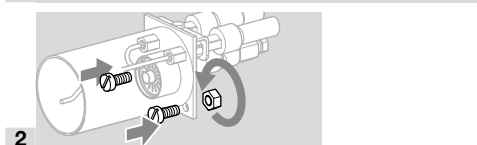
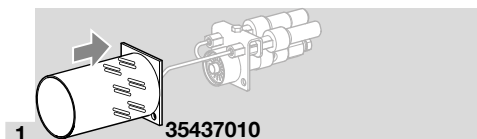
## ZAI, ZKIH

- Reconnect the terminal boots.  
→ Produce a maintenance report.

## 9 ACCESSORIES

### Protective tube set

- For ZAI, heat-resistant.



### Gas nozzle

For ZAI:

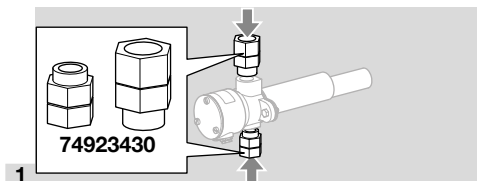
1.8 mm.

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.



## 10 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<sub>2</sub>.

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)).

Body: 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.

## 11 LOGISTICS

### Transport

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

Transport temperature: see page 6 (10 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.

### Storage

Storage temperature: see page 6 (10 Technical data).

Storage is subject to the ambient conditions described.

Storage time: 6 months in the original packaging 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.

## 12 DISPOSAL

Devices with electronic components:

### WEEE Directive 2012/19/EU – Waste Electrical and Electronic Equipment Directive



At the end of the product life (number of operating cycles reached), dispose of the packaging and product in a corresponding recycling centre. Do not dispose of the unit with the usual domestic refuse. Do not burn the product.

On request, old units may be returned carriage paid to the manufacturer in accordance with the relevant waste legislation requirements.

## 13 DECLARATION OF INCORPORATION

according 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 has been compiled in accordance with part B of Annex VII and will be sent to the relevant national authorities on request as a digital file.

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 into which 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](http://www.docuthek.com)

## 14 CERTIFICATION

### 14.1 Eurasian Customs Union



The products ZAI, ZKIH meet the technical specifications of the Eurasian Customs Union.

### 14.2 RoHS compliant



### 14.3 China RoHS

Directive on the restriction of the use of hazardous substances (RoHS) in China. Scan of the Disclosure Table China RoHS2, see certificates at [www.docuthek.com](http://www.docuthek.com).

### 14.4 REACH Regulation

The device contains substances of very high concern which are listed in the Candidate List of the European REACH Regulation No. 1907/2006. See Reach list HTS at [www.docuthek.com](http://www.docuthek.com).

## 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](http://ThermalSolutions.honeywell.com) or contact your Honeywell Sales Engineer.  
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