**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 07.17**

The following chapters have been changed:
- Checking the usage
- Wiring
- Maintenance

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</tr>
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Checking the usage

Intended use
Ionization-controlled gas pilot for safely igniting gas burners. The capacity of the gas pilot should be 2 to 5% of that of the main burner. Can also be used as independently operated burner. 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.

ZMI

Type code

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZMI</td>
<td>Ionization pilot with forced air supply and one electrode</td>
</tr>
<tr>
<td>28</td>
<td>Burner size</td>
</tr>
<tr>
<td>B</td>
<td>For natural gas</td>
</tr>
<tr>
<td>G</td>
<td>For LPG</td>
</tr>
<tr>
<td>D</td>
<td>For coke oven gas, town gas</td>
</tr>
<tr>
<td>200–1000</td>
<td>Flame tube length</td>
</tr>
<tr>
<td>R</td>
<td>Rp internal thread</td>
</tr>
</tbody>
</table>

Part designations

1. Burner housing
2. Interference-suppressed terminal boot with protective cap
3. Air nozzle
4. Gas nozzle
5. Burner bracket
6. Flame tube
7. Enclosed documentation: operating instructions and flow rate curves

Burner size, gas type, rated capacity $P_{\text{max}}$, flame tube length, connection – see type label.
Checking the gas type

1. Check if the gas nozzle diameter is suitable for the required gas type.

<table>
<thead>
<tr>
<th>Gas type</th>
<th>Nozzle dia. [mm (inch)]</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZMI 16</td>
<td>0.94 (0.037) 1.40 (0.055)</td>
</tr>
<tr>
<td>ZMI 25</td>
<td>0.76 (0.029) 1.05 (0.041)</td>
</tr>
<tr>
<td>ZMIC 28</td>
<td>1.30 (0.051) 1.78 (0.070)</td>
</tr>
</tbody>
</table>

▷ When changing the nozzle, remove the residue of sealant from the burner housing.
▷ Suitable nozzles – see page 7 (Accessories).

Installation

⚠️ DANGER
Risk of explosion! Ensure the connection is air-tight.

❗️ CAUTION
Burner fault! If used as gas pilot, the gas and air pressures must be higher than the connection pressures of the main burner.

▷ Install the gas pilot so that reliable ignition of the main burner is guaranteed.
▷ Attach the gas pilot securely.
▷ We recommend that a filter be installed in the gas and air supply line respectively.
▷ Install pressure regulators and adjusting cocks in the air and gas supply lines upstream of the burner so that the air and gas pressures can be adjusted.

ZMI
▷ Recommended inlet pressures:
gas: up to 80 mbar (up to 32 "WC),
air: up to 120 mbar (up to 47 "WC).

ZMIC
▷ Recommended inlet pressures:
gas: up to 100 mbar (up to 40 "WC),
air: up to 120 mbar (up to 47 "WC).

Insulating the ceramic tube

▷ Protect the ceramic tube from thermal stress.
▷ Insulation with enclosed insulation strips.

1. Remove transport safety device.
2. Compress insulation strips by wrapping adhesive foil around them tightly until they press tightly against the ceramic tube.
Check that the burner block hole is not blocked, e.g. using a wooden stick.

Position the burner before tightening the burner bracket.

Follow the reverse procedure when dismantling.

Outlet the PE wire directly to the automatic burner control unit.

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.

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.

Flame control and ignition by a single electrode (single-electrode operation).
**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.

⚠️ **DANGER**

**Risk of explosion!** 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.

- 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.
  5 Set the ionization current by adjusting the air volume.
  6 The ionization current must be at least 5 µA and must not vary.

⚠️ **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!

- Set the pressure regulators for the gas and air supply pressures to the maximum admissible values, whereby the gas and air supply pressures should be identical.


**ZMI**

- Inlet pressure:
  - gas: up to 80 mbar (up to 32 "WC),
  - air: up to 120 mbar (up to 47 "WC).

**ZMIC**

- Inlet pressure:
  - gas: up to 80 mbar (up to 32 "WC),
  - air: up to 120 mbar (up to 47 "WC).

**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 in case of 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.

- Check the ionization and ignition cables.
- Measure the ionization current.
  1 The ionization current must be at least 5 µA and must not vary.
- Disconnect the system from the electrical power supply.
- Shut off the gas and air supply – do not change the restrictor settings.
- Check the nozzles for dirt.

**Replacing the electrode**

- Check the ionization and ignition cables.
- Measure the ionization current.
  1 The ionization current must be at least 5 µA and must not vary.
- Disconnect the system from the electrical power supply.
- Shut off the gas and air supply – do not change the restrictor settings.
- Check the nozzles for dirt.
Ensure that the electrode length does not change.

8. Remove dirt from electrode and insulators.
9. If the electrode tip or insulators are damaged, replace the electrode.

Before changing the electrode, measure the total length $L$.

10. Connect the new electrode with the spark plug using the dowel pin.
11. Adjust spark plug and electrode to the measured total length $L$.
12. Screw the electrode into the burner housing.
13. Check distance $L_2$:

**ZMI**

<table>
<thead>
<tr>
<th>Burner</th>
<th>L2</th>
<th>Burner</th>
<th>L2</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZMI 16B</td>
<td>25 mm</td>
<td>ZMI 25B</td>
<td>35 mm</td>
</tr>
<tr>
<td>ZMI 16D</td>
<td>21 mm</td>
<td>ZMI 25D</td>
<td>20 mm</td>
</tr>
<tr>
<td>ZMI 16G</td>
<td>25 mm</td>
<td>ZMI 25G</td>
<td>35 mm</td>
</tr>
</tbody>
</table>

- Reconnect the terminal boot.
- Produce a maintenance report.

**ZMIC**

1. Make a mark to show the length for reinstalling.
2. Secure the bellows unit here while unscrewing the bellows unit nut.

**ZMIC..K**: replacing the bellows unit

10. Insulate the ceramic tube and reinstall the burner, see page 3 (Installation).

**ZMIC**: replacing the ceramic tube

1. Remove the ZMIC – see page 5 (ZMIC..K: replacing the bellows unit).
2. Spray screw connection with penetrating oil and unscrew clamping ring.

Thread (R1) must be facing in the direction of the furnace.

The bellows unit gasket cord must not be twisted when installing.

Lubricate thread with ceramic paste before assembly.
Replace ceramic pastes and copper ring.

50 mm

Lubricate retaining piece with ceramic paste before fitting the clamping ring.

Tighten the clamping ring with a torque of 30 Nm.

Insulate the ceramic tube.

Reinstall the burner, see page 3 (Installation).

Tighten the clamping ring with a torque of 30 Nm.

Insulate the ceramic tube.

Reinstall the burner, see page 3 (Installation).

Apply ceramic paste to the screw connections after replacing any burner components in order to avoid cold-setting.
Order number: 05012009.

### Technical data

**ZMI**
- **Capacity:**
  - ZMI 16: 1 to 2 kW (3.8 to 7.6 \(10^3\) BTU/h),
  - ZMI 25: 2.5 to 4 kW (9.5 to 15.1 \(10^3\) BTU/h)
  (1.5 to 3.3 kW in conjunction with coke oven gas, town gas).
- Capacities in kW refer to the lower calorific value \(H_l\) and capacities in BTU/h refer to the upper calorific value \(H_o\).
- Gas inlet pressure: 15 to 70 mbar (6 to 27 "WC),
  air inlet pressure: 15 to 90 mbar (6 to 35 "WC),
  each depending on the gas type (burner pressures – see www.docuthek.com,
  Type of document: Flow rate curve).
- Burner length increments: 100 mm (4").
- Gas types: natural gas, LPG (gaseous) and coke oven gas; other types of gas on request.
- For cold air only.
- Flame control: with flame rod.
- Ignition: direct spark ignition (5 kV ignition transformer).
- Right-angle terminal boot: interference-suppressed.
- Housing: aluminium.
- Flame tube: heat-resistant steel.
- Max. temperature at the tip of the flame tube:
  - \(<1000^\circ\text{C} (< 1832^\circ\text{F})\),
  - \(<900^\circ\text{C} (< 1652^\circ\text{F})\) for lambda \(<1\).
- Storage temperature: -20°C to +40°C.

**ZMIC**
- **Capacity:**
  - 2.5 to 4.2 kW (9.5 to 15.9 \(10^3\) BTU/h).
- Capacities in kW refer to the lower calorific value \(H_l\) and capacities in BTU/h refer to the upper calorific value \(H_o\).
- Gas inlet pressure: up to 100 mbar (up to 40 "WC),
  air inlet pressure: up to 120 mbar (up to 47 "WC),
  each depending on the gas type (burner pressures – see www.docuthek.com,
  Type of document: Flow rate curve).
- Burner length increments: 100 mm (4")
- Length increments of the ZMIC 28..K: 50 mm (2")
- Gas types: natural gas, LPG (gaseous) and coke oven gas; other types of gas on request.

### Accessories

**Gas nozzle**

<table>
<thead>
<tr>
<th>Burner Type</th>
<th>Gas Type</th>
<th>mm (inch)</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZMI 16</td>
<td>B</td>
<td>0.94 (0.037)</td>
<td>75455010 75442157</td>
</tr>
<tr>
<td>ZMI 16</td>
<td>G</td>
<td>0.76 (0.029)</td>
<td>75455147 75448032</td>
</tr>
<tr>
<td>ZMI 16</td>
<td>D</td>
<td>1.30 (0.051)</td>
<td>75455146 -</td>
</tr>
<tr>
<td>ZMI 16</td>
<td>B</td>
<td>1.40 (0.055)</td>
<td>75455012 75443157</td>
</tr>
<tr>
<td>ZMI 25</td>
<td>G</td>
<td>1.05 (0.041)</td>
<td>75455149 75448031</td>
</tr>
<tr>
<td>ZMI 25</td>
<td>D</td>
<td>1.78 (0.070)</td>
<td>75455148 -</td>
</tr>
<tr>
<td>ZMIC 28</td>
<td>B</td>
<td>1.40 (0.055)</td>
<td>75455012 -</td>
</tr>
<tr>
<td>ZMIC 28</td>
<td>G</td>
<td>1.05 (0.041)</td>
<td>75455149 -</td>
</tr>
<tr>
<td>ZMIC 28</td>
<td>D</td>
<td>1.78 (0.070)</td>
<td>75455148 -</td>
</tr>
</tbody>
</table>

* B = Natural gas
  G = LPG
  D = Coke oven gas, town gas

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**Ceramic paste**

Apply ceramic paste to the screw connections after replacing any burner components in order to avoid cold-setting.
Order number: 05012009.
For cold air only.
Flame control: with flame rod.
Ignition: direct spark ignition (5 kV ignition transformer).
Terminal boot: interference-suppressed.
Housing: aluminium.
Flame tube: ceramic flame tube.
Max. temperature at the tip of the flame tube: 1450°C (2642°F).
Storage temperature: -20°C to +40°C.

**Logistics**

**Transport**
Protect the unit from external forces (blows, shocks, vibration). On receipt of the product, check that the delivery is complete, see page 2 (Part designations). Report any transport damage immediately.

**Storage**
Store the product in a dry and clean place. Storage temperature: see page 7 (Technical data). Storage time: 2 years before using for the first time. If stored for longer than this, the overall service life will be reduced accordingly (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 of separately in accordance with local regulations.

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**Declaration of Incorporation**

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

The products “Burners for gas ZMI and ZMIC” 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 requirer in accordance with Annex I of this Directive a plicable 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 fuel and fuel handling systems

These products comply with the substance restrictions of RoHS II, but they are not within the scope of Directive RoHS II (2011/65/EU).

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


Certification

Eurasian Customs Union

EAC

The product ZMI, ZMIC meets the technical specifications of the Eurasian Customs Union.
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.