This oxygen analyzer is used to continuously measure oxygen concentration in combustion exhaust gas of industrial boilers or furnaces, and is ideally suited for combustion management and control.

The analyzer system is comprised of the detector and converter coupled together as a complete system. Detector setting configuration includes the detector flow guide tube and detector sensor. The flow guide tube is inserted directly into the gas and directs gas to the sensor for measurement. The converter (ZKM) is comprised of the signal processor, input/output and communications, display and system controls.

The converter provided with an unconventional sensor-diagnostic function ensures long-term stable detecting operation.

FEATURES
1. No need for gas sampling devices
   Since the sensor unit is directly inserted into a flue, gas-sampling devices such as gas aspirator and dehumidifier are not required, which ensures fast response.

2. Easy maintenance
   The sensor in a unit structure mounted to the detector can be replaced easily. Since the detector and the flow guide tube are installed separately, you can easily replace the filter at the tip of the detector and maintain the detector and the flow guide tube separately according to the degree of corrosion.

3. High reliability ensured by the sensor diagnostic function
   To check the degree of sensor depletion due to gas components in the target gas, the converter is equipped with the sensor diagnostic function, so that you know when to replace the sensor.

4. Improved safety
   The converter cuts off the power supply for the detector when detecting a burnout of thermocouple for heat control. The converter also cuts off the power supply at emergency, in response to an external contact input. These functions along with the key lock function are equipped as standard to ensure improved safety.

5. Simple operation
   A user can operate the converter or make various settings on an interactive basis. Display language is available in English, Japanese, or Chinese.

6. HART communication is available as an option
   The HART communication enables remote control.
   *HART® is a registered trademark of the HART Communication Foundation.

SPECIFICATIONS

<table>
<thead>
<tr>
<th>General Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring object: Oxygen in noncombustible gas</td>
</tr>
<tr>
<td>Measuring method: Directly insert type zirconia system</td>
</tr>
<tr>
<td>Measuring range: 0 to 2 ... 50 vol% O₂</td>
</tr>
<tr>
<td>(in 1 vol% O₂ steps)</td>
</tr>
<tr>
<td>Linearity: Within ±0.5%FS</td>
</tr>
<tr>
<td>Response time: Within 4 to 7 sec, for 90% (from calibration gas inlet)</td>
</tr>
<tr>
<td>Warmup time: More than 10 min</td>
</tr>
<tr>
<td>Analog output: 4 to 20mA DC (allowable load resistance less than 500Ω) or 0 to 1V DC (output resistance more than 100Ω)</td>
</tr>
<tr>
<td>Digital input (option): RS-485 or HART communication</td>
</tr>
<tr>
<td>Power supply (option): Rated voltage; 100 to 120V AC (operating voltage 90 to 132V AC) 200 to 240V AC (operating voltage 190 to 264V AC)</td>
</tr>
<tr>
<td>Rated frequency: 50/60Hz</td>
</tr>
<tr>
<td>Power consumption: During warm-up 255VA During operation 70VA</td>
</tr>
<tr>
<td>When the power supply voltage is 100 or 220 V AC</td>
</tr>
</tbody>
</table>
Detector Specifications (ZFK)

**Measured gas temperature:**
Flow guide tube system; −10 to +600ºC
(for general-use, corrosive gas)
Ejector system; −10 to +1500ºC (for high-temperature gas)
−10 to +800ºC (for general-use)

**Measured gas pressure:**
−3 to +3kPa

**Flow guide tube:**
With or without blow-down nozzle
Flange; JIS5K 65A FF
(JIS5K-80AFF for high particulate gas)
Insertion length; 0.3, 0.5, 0.75, 1m

**Ejector (general-use):**
Probe for guiding measured gas to detector
Flange; JIS10K 65A RF
Insertion length; 0.5, 0.75, 1, 1.5m (according to customer’s specification)

**Ejector air inlet flow rate:**
5 to 10 L/min

**Ejector exhaust gas processing:**
Into furnace, returned to flue

**Ejector heater temperature drop alarm output:**
Alarm output when below 100ºC Mechanical thermostat
N.O. (1a) contact, 200V AC, 2A

**Operating temperature:**
−10 to +60ºC for Primary detecting element
−5 to +100ºC for ejector section
125ºC or less at detector flange surface with power applied

**Storage temperature:**
Sensing element: −20 to +70ºC
Ejector: −10 to +100ºC

**Structure:**
Dust/rain-proof structure (IEC IP66 equivalent)

**Filter:**
Alumina (filtering accuracy 50µm) and quartz paper

**Main materials of gas-contacting parts:**
Detector; Zirconia, SUS316, platinum
Flow guide tube; SUS304 or SUS316
Ejector (general use); SUS316, SUS304
Ejector; (for high temperature) SiC, SUS316, SUS304

**Calibration gas inlet:**
φ6mm tube join, φ1/4-inch tube join, or ball valve (as specified)

**Reference air inlet (option):**
φ6mm tube join or φ1/4-inch tube join (as specified)

**Detector mounting:**
Horizontal plane ±45º, ambient surrounding air should be clean.

**Outer dimensions:**
(L x max. dia.) 210mm x 100mm (detector)

**Mass (approx.) (weight):**
Detector: 1.6kg
Ejector: 15kg (insertion length 1m)
Flow guide tube (general-use, 1m); 5kg

**Finish color:**
Silver and SUS metallic color

Calibration gas flow:
1.5 to 2 L/min

Blowdown air inlet pressure:
200 to 300kPa (2 to 3 kgf/cm²)

Converter specification (ZKM)

**Concentration value indication:**
Digital indication in 4 digits

**Contact output signal:**
(1) Contact specification; 6 points, 1a 250V AC/3A or 30V DC/3A
(2) Contact function:
  - Under maintenance
  - Under blowdown Note3)
  - Span calibration gas valve
  - Zero calibration gas valve
  - Instrument anomalies Note1)
  - Alarm Note2)
  - Range identification output Note4)

**Note1)** The following Instrument errors:
(1) Thermocouples break (2) Sensor break (3) Temperature fault
(4) Calibration fault (5) Zero/span adjustment fault
(6) Output error turn the contact-ON

**Note2)** Alarm selects just one as mentioned below:
(1) High (2) Low (3) Upper and Lower (4) High-high
(5) Low-low, it turns ON while operating.

**Note3)** Under blow down is available in case of option, and it turns ON while operating.

**Note4)** It turns ON during range selection, and turns OFF when the range 1 is selected.

Contact input signal:
(1) Contact specification; 3 points (the following option)
  - ON; 0V (10mA or less), OFF; 5V
(2) Contact function:

  - External hold
  - Calculation reset
  - Heater OFF
  - Blow down (option)
  - Inhibition of calibration
  - Calibration start
  - Range change

**Calibration method:**
(a) Manual calibration with key operation
(b) Auto. calibration (option) Calibration cycle; 00 day 00 hour to
99 days 23 hours
(c) All calibration

**Calibration gas:**
Available range settings
Zero gas: 0.010 to 25.00% O₂
Span gas: 0.010 to 50.00% O₂
Recommended calibration gas concentration
Zero gas; 0.25 to 2.0% O₂
Span gas; 20.6 to 21.0% O₂
(oxygen concentration in the air)

**Blowdown:**
A function for blowing out with compressed air dust that has deposited in the flow guide tube. Blowdown can be performed for a predetermined time and at predetermined intervals.
Blowdown cycle; 00 hour 00 minute to
99 hours 59 minutes
Blowdown time; 0 minute 00 second to 0 minutes 999 seconds
Output signal hold:
Output signal is held during calibration, processing diagnosis of sensor, warm-up, PID auto tuning, under set up maintenance mode “available” and blowdown. The hold function can also be released.

Valve and Flow meter (option):
Selects zero or span gas during manual zero or span calibration. Mounted on the side of the converter.

Communication function:
HART communication (option)
RS485 (MODBUS) (option)

Combustion efficiency display (option):
This function calculates and displays combustion efficiency from oxygen concentration and measured gas temperature.
Thermocouple (R) or thermocouple (K) is required for temperature measurement.
Range: 0 to 1000°C, Accuracy: ±5°C.
On the version with combustion efficiency display, an alarm function of “rich mode” indication is also available.

Operating temperature:
−20 to +55°C

Operating humidity:
95% RH or less, non condensing

Storage temperature:
−30 to +70°C

Storage humidity:
95% RH or less, non condensing

Enclosure:
Dust-proof, rainproof (corresponding to IP66 or IP67 of IEC)
*when the specified cable gland is attached.

Material:
Aluminum case

Outer dimensions (H x W x D):
170 X 159 X 70mm (IP66, Bench type)
220 X 230 X 95mm (IP67)

Mass (weight):
IP66: Approx. 2kg (excluding cable and detector)
IP67: Approx. 4.5kg (excluding cable and detector)
Cable: Approx. 4kg/m (with rainproof flexible conduit)

Finish color:
Case: Silver
Cover: Munsell 6PB 3.5/10.5 (blue)

Mounting method:
Mounted flush on panel or on pipe

Electrical Safety:
Overvoltage category
II power supply input
1 relay interfaces
(IEC1010-1)
External overcurrent protective device
10A
Equipment interfaces are safety separated (SELV)

EC Directive Compliance
The product conforms to the requirements of the Low Voltage Directive 2006/95/EC and EMC directive 89/336/EEC (as amended by Directive 92/31/EEC), both as amended by Directive 93/68/EEC.
It conforms to following standards for product safety and electromagnetic compatibility:
EN61010-1: 2010, EN62311: 2008
Safety requirements for electrical equipment for measurement, control and laboratory use.
“Installation Category II”
“Pollution Degree 2”
“Altitude up to 2187 yard (2,000 m)”

EN61000-3-3: 2008
Electrical equipment for measurement, control and laboratory use. EMS requirements.

ZFK, ZKM
### Code Symbols

#### (Detector)

<table>
<thead>
<tr>
<th>Digit</th>
<th>Description</th>
<th>Note</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Calibration gas inlet</td>
<td></td>
<td>I</td>
</tr>
<tr>
<td>7</td>
<td>Power supply</td>
<td></td>
<td>I</td>
</tr>
<tr>
<td>9</td>
<td>Flow guide tube</td>
<td></td>
<td>I</td>
</tr>
<tr>
<td>11</td>
<td>No tube</td>
<td></td>
<td>I</td>
</tr>
<tr>
<td>12</td>
<td>Heat-retaining cover</td>
<td></td>
<td>I</td>
</tr>
<tr>
<td>13</td>
<td>Reference gas inlet</td>
<td></td>
<td>I</td>
</tr>
<tr>
<td>14</td>
<td>Filter spec</td>
<td></td>
<td>I</td>
</tr>
<tr>
<td>15</td>
<td>Instruction manual</td>
<td></td>
<td>I</td>
</tr>
<tr>
<td>16</td>
<td>Specification</td>
<td></td>
<td>I</td>
</tr>
</tbody>
</table>

#### (Converter)

<table>
<thead>
<tr>
<th>Digit</th>
<th>Description</th>
<th>Note</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Enclosure</td>
<td></td>
<td>A</td>
</tr>
<tr>
<td>5</td>
<td>Analog output</td>
<td></td>
<td>A</td>
</tr>
<tr>
<td>6</td>
<td>Communication function</td>
<td></td>
<td>A</td>
</tr>
<tr>
<td>7</td>
<td>Mounting bracket</td>
<td></td>
<td>A</td>
</tr>
<tr>
<td>9</td>
<td>Optional functions</td>
<td></td>
<td>A</td>
</tr>
<tr>
<td>10</td>
<td>Language</td>
<td></td>
<td>A</td>
</tr>
<tr>
<td>11</td>
<td>Selector valve/flowmeter</td>
<td></td>
<td>A</td>
</tr>
<tr>
<td>12</td>
<td>Cable gland</td>
<td></td>
<td>A</td>
</tr>
<tr>
<td>13</td>
<td>Thermocouple for combustion efficiency display</td>
<td></td>
<td>A</td>
</tr>
<tr>
<td>14</td>
<td>Connector device</td>
<td></td>
<td>A</td>
</tr>
<tr>
<td>15</td>
<td>Type</td>
<td></td>
<td>A</td>
</tr>
<tr>
<td>16</td>
<td>Length</td>
<td></td>
<td>A</td>
</tr>
</tbody>
</table>

#### (Replacement Detector element)

**Power supply**

<table>
<thead>
<tr>
<th>Code symbols</th>
<th>100 to 1200 AC</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZFK8YY15-0Y0YY0YY</td>
<td>200 to 240V AC</td>
</tr>
</tbody>
</table>

### Note 1

- For connection between detector and converter, use a rainproof flexible conduit.

### Note 2

- On the version with combustion efficiency display, an alarm function of "rich mode" indication is also available.

---

**Code symbols**

1. **ZFK8**
2. **ZKM-2**
3. **ZTA**

---

**Digit Description**

- **6 Calibration gas inlet**
- **7 Power supply**
- **9 Flow guide tube**
- **11 No tube**
- **12 Heat-retaining cover**
- **13 Reference gas inlet**
- **14 Filter spec**
- **15 Instruction manual**
- **16 Specification**

**Note 1**

- For a 6mm tube (SUS)
- For a 1/4 inch tube (SUS)
- With ball valve
- For ø 6mm tube (SUS)
- For ø 1/4 inch tube (SUS)
- With ball valve
- With ball valve
- With ball valve
- With ball valve
- With ball valve
- For ø 6mm tube (SUS)
- For ø 1/4 inch tube (SUS)
- With ball valve
- With ball valve
- With ball valve
- For ø 6mm tube (SUS)
- For ø 1/4 inch tube (SUS)
- With ball valve

---

**Digit Description**

- **4 Measured gas temperature**
- **6 Insertion length (mm)**
- **7 Power supply voltage**
- **8 Revision No.**

**Note 2**

- On the version with combustion efficiency display, an alarm function of "rich mode" indication is also available.

---

**Replacement Detector element**

**Code symbols**

- **ZFK8**
- **ZKM**
- **ZTA**

**Power supply**

1. **100 to 1200 AC**
2. **200 to 240V AC**
SCOPE OF DELIVERY

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detector (ZFK)</td>
<td>Detector main unit</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Viton O ring</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Mounting screw (M5 x 16)</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Thermal sticker</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Ceramic filter</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Instruction manual</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Flow guide tube (as specified)</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Heat-retaining cover (as specified)</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Reference gas inlet port (as specified)</td>
<td>2</td>
</tr>
<tr>
<td>Converter (ZKM)</td>
<td>Converter main unit</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Fuse (2.5A)</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Ferrite core</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Instruction manual</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Metal fittings</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&lt;For panel mounting&gt;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>M8 sems screw (stainless steel)</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>&lt;For pipe mounting&gt;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>U bolt (stainless steel)</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>M8 nut and washer (stainless steel)</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Support (stainless steel)</td>
<td>2</td>
</tr>
<tr>
<td>Ejector (ZTA)</td>
<td>Ejector main unit</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Insertion tube</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Packing</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>M16 nut and washer (stainless steel)</td>
<td>4</td>
</tr>
<tr>
<td>Dedicated cable (ZRZ)</td>
<td>Cable (of the specified length)</td>
<td>1</td>
</tr>
</tbody>
</table>

Items to be prepared separately:

1. Standard gas for calibration
   - Type ZBM□SH4-01 (up to 5% O₂ range)
   - Type ZBM□SH4-01 (over 5% O₂ range)
2. Pressure regulator for standard gas (type ZBD61003)
3. Flowmeter
   - Type; ZBD42203, 0.2 to 2L/min (for calibrating gas)
   - Type; ZBD42403, 1 to 10L/min (for ejector)

DEVICE CONFIGURATION

The device to be combined differ according to the conditions of the gas to be measured. Select the devices to be combined with reference to the following table.

<table>
<thead>
<tr>
<th>Measured gas</th>
<th>Device configuration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application</td>
<td>Detector type</td>
</tr>
<tr>
<td>General-use (boiler) 600°C or less 5 to 20m/s Less than 0.2g/Nm³</td>
<td>ZFK8R□□□-□□□□□□</td>
</tr>
<tr>
<td></td>
<td>— Fuel; gas, oil</td>
</tr>
<tr>
<td>For corrosive gas (refuse incinerator) 800°C or less 5 to 20m/s Less than 1g/Nm³</td>
<td>ZFK8R□□□-□□□□□□</td>
</tr>
<tr>
<td></td>
<td>— Included low moisture</td>
</tr>
<tr>
<td></td>
<td>&lt;Less than 10g/Nm³&gt;</td>
</tr>
<tr>
<td></td>
<td>— Included low moisture with blow down</td>
</tr>
<tr>
<td></td>
<td>&lt;Less than 25g/Nm³&gt;</td>
</tr>
<tr>
<td></td>
<td>— Included low moisture with blow down</td>
</tr>
<tr>
<td></td>
<td>&lt;Less than 25g/Nm³&gt;</td>
</tr>
<tr>
<td></td>
<td>— Included high moisture with blow down</td>
</tr>
<tr>
<td>General-use (boiler) 800°C or less Less than 1g/Nm³</td>
<td>ZFK8R□□□-0□□□□□□</td>
</tr>
<tr>
<td></td>
<td>— SUS316 tube with blow down</td>
</tr>
<tr>
<td>1500°C or less Less than 1g/Nm³</td>
<td>ZFK8R□□□-0□□□□□□</td>
</tr>
</tbody>
</table>

Note (1) Dust volume is approximate value.
(2) Instrument quality air or bottled air is available as reference air by selecting detector with reference air inlet.

CAUTIONS

- If combustible gas (CO, H₂ etc.) exists in the measured gas, error will occur due to burning at the sensor section. The inclusion of corrosive gas (Si vapor, alkaline metal, P, Pb etc.) will shorten the life of the sensor.
- When the measured gas temperature is high (+300°C or higher), the flange should be separated from the furnace wall in order to bring the detector flange surface temperature below the specified value +125°C. The flow guide should be attached in the direction in which the gas flow to the detector decreases.
- When much dust is included in the gas, the flow guide tube should be attached at an inclination so that the flow goes from below to above. And the flow guide tube should be attached in the direction in which the gas flow to the detector decreases.
- In the case of a refuse incinerator, automatic blow down of the flow guide should not be performed (to prevent corrosion of the flow guide tube due to drainage). Blow-down should be performed manually when change in the indication has become very little with the furnace stopped.
**CONFIGURATION**

Flow guide tube system (with valve)

- **Gas temperature. 600°C max.**
- **Sample gas outlet**
- **Flow guide tube for high particulate with cover**
- **ø6mm or ø1/4 inch tube for calibration gas (not supplied)**
- **RS485 (option)**
- **Heat-retaining cover**
- **15ASGP tube equivalent or ø10/ø8 PTFE pipe or copper pipe (not supplied)**
- **Supply air**
- **Pressure regulator (unnecessary when supply air pressure is 200 to 300kPa)**
- **15ASGP tube equivalent or ø10/ø8 PTFE pipe or copper pipe (not supplied)**
- **AC power supply**

**Converter (ZKM)**

- **AC power supply**
- **Pressure regulator**
- **Fault contact output**
- **Calibrating gas contact output**
- **Maintenance contact output**
- **Alarm contact output**
- **Maintenance contact output**
- **Calibrating gas contact output**
- **O2 input Thermocouple input**
- **Analogue output 4 to 20mA DC or 0 to 1V DC**
- **Fault contact output**
- **BLOW Low Blow contact output**
- **Calibrating gas contact output**
- **Contact input**
- **Alarm output**
- **MAINTENANCE output**
- **DI1, DI2, DI3, DI COM**
- **ALARM MAINTENANCE**
- **AC power supply**
- **PE**

**Note:**

1. Standard gas or instrumentation air can be used in place of span gas.
2. Instrument quality air or bottled air is available as reference air instead of ambient air.
3. Protective earth.
4. Connect the shield of the exclusive cable with the ground terminal in the converter.
5. HART communication (option) uses a 4-20mA analog output terminal.
Flow guide tube system

- **Flow guide tube**
- **Gas temperature. 600ºC max.**
- **Sample gas outlet**
- **Flow guide tube for high particulate**
- **Heat-retaining cover**
- **Solenoid valve** (not supplied)
- **Pressure regulator** (unnecessary when supply air pressure is 200 to 300kPa)
- **AC power supply**
- **Blow-down, 200 to 300kPa**
- **15ASGP tube equivalent or ø10/ø8 PTFE pipe or copper pipe** (not supplied)
- **Supply air**

- **O2 input**
- **Thermocouple input**
- **Contact input**
- **Alarm contact output**
- **Maintenance contact output**
- **Calibrating gas contact output**

- **AC power supply**
- **Converter (ZKM)**

- **Flowmeter (ZBD4)** (1 to 1.5L/min)
- **Joint**
- **Solenoid valve (not supplied)**
- **Standard gas for zero point (ZBM)**
- **Pressure regulator (ZBD6)**
- **Span point**
- **Standard gas for span point (ZBM)**
- **Pressure regulator (ZBD6)**

---

**Note:**
- *1 Standard gas or instrumentation air can be used in place of span gas.
- *2 Instrument quality air or bottled air is available as reference air instead of ambient air.
- *3 Protective earth.
- *4 Connect the shield of a exclusive cable with the ground terminal in the converter.
- *5 HART communication (option) uses a 4-20mA analog output terminal.
Ejector system (with valve)

- Gas temperature: 1500ºC max.
- Ejector (ZTA) Ejector (5 to 10L/min)
- Copper pipe ø6/ø4mm (not supplied)
- Copper pipe ø10/ø8mm (not supplied)
- Flowmeter (ZBD)
- Rainproof flexible conduit. (Max. 20m)
- RS485 (option)
- TM-2
- AC power supply
- Heater temperature drop
- Alarm

Note: *1 Standard gas or instrumentation air can be used in place of span gas.
*2 Instrument quality air or bottled air is available as reference air instead of ambient air.
*3 Protective earth.
*4 Connect the shield of an exclusive cable with the ground terminal in the converter.
*5 HART communication (option) uses a 4-20mA analog output terminal.
**Ejector system**

- **Gas temperature.** 1500ºC max.
- **Ejector (ZTA)**
  - Ejector (5 to 10L/min)
- **Copper pipe ø6/ø4mm** (not supplied)
- **Copper pipe ø10/ø8mm** (not supplied)
- **Flowmeter (ZBD)**
- **Solenoid valve** (not supplied)
- **Ac power supply**
- **Pressure regulator** (unnecessary when supply air pressure is 200 to 300kPa)
- **Rainproof flexible conduit.** (Max. 20m)
- **RS485** (option) TM-2
- **Detector (ZFK8)**
  - Joint
  - Supply air
- **Solenoid valve** (not supplied)
- **AC power supply**
- **ø6mm or ø1/4 inch tube** for calibration gas (not supplied)
- **O2 input Thermocouple input**
- **Analog output 4 to 20mA DC or 0 to 1V DC**
- **Fault contact output**
- **Blow contact output**
- **Maintenance contact output**
- **Calibrating gas contact output**
- **HEATER**
- **Thermocouple for combustion control**
- **Contact input**
- **Alarm contact output**
- **Maintenance contact output**
- **Calibrating gas contact output**
- **AC power supply**
- **PE**

**Note:**
- *1 Standard gas or instrumentation air can be used in place of span gas.
- *2 Instrument quality air or bottled air is available as reference air instead of ambient air.
- *3 Protective earth.
- *4 Connect the shield of an exclusive cable with the ground terminal in the converter.
- *5 HART communication (option) uses a 4-20mA analog output terminal.
Flow guide tube

Flow guide tube (with blow-down nozzle)
Flow guide tube (for corrosive gas)

Oxygen detector

Flow guide tube

Gas inlet

Gas outlet

6-MS detector side

8-M 15 MTG. holes

Approx. L

Approx. 40

12

3

67

155

130

Viewed from P direction

Gas inlet

Ejector air outlet (Rc1/4)

4-M16 bolt

Approx. L

190

170

Gas inlet

Ejector air outlet (Rc1/4)

Hole 5-M5

Detector (ZFK8)

Viewed from P direction

Ejector air inlet (Rc1/4)

Blow-down air inlet (Rc1/4)

Cable gland (A15C)

AC power supply
AC100/110V
AC200/220V
AC230V

Power consumption: 150 W

Table:

<table>
<thead>
<tr>
<th>Code 11th</th>
<th>3</th>
<th>5</th>
<th>7</th>
<th>1</th>
<th>Z</th>
</tr>
</thead>
<tbody>
<tr>
<td>L (m)</td>
<td>0.3</td>
<td>0.5</td>
<td>0.75</td>
<td>1.0</td>
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</tr>
<tr>
<td>MASS</td>
<td>3.3</td>
<td>4.5</td>
<td>6.1</td>
<td>7.6</td>
<td></td>
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<tr>
<td>L (to order)</td>
<td></td>
<td></td>
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</tbody>
</table>

EXTERNAL CONNECTION DIAGRAM

1 2 3 4 5
**ZFK8, ZKM-2, ZTA**

**Converter (ZKMA)**

*<IP66 enclosure>*

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**EXTERNAL TERMINAL (TM1) / Terminal M3**

<table>
<thead>
<tr>
<th>Terminal</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>O₂ sensor input</td>
</tr>
<tr>
<td>2</td>
<td>O₂ sensor heater power output</td>
</tr>
<tr>
<td>3</td>
<td>O₂ sensor thermocouple input</td>
</tr>
<tr>
<td>4</td>
<td>Analog output 4-20mA DC or 0-1V DC</td>
</tr>
<tr>
<td>5</td>
<td>Fault contact output 250V AC/3A 30V DC/3A</td>
</tr>
<tr>
<td>6</td>
<td>Blow contact output 250V AC/3A 30V DC/3A</td>
</tr>
<tr>
<td>7</td>
<td>Di1</td>
</tr>
<tr>
<td>8</td>
<td>Di2</td>
</tr>
<tr>
<td>9</td>
<td>Di3</td>
</tr>
<tr>
<td>10</td>
<td>DICOM</td>
</tr>
<tr>
<td>11</td>
<td>Alarm contact output 250V AC/3A 30V DC/3A</td>
</tr>
<tr>
<td>12</td>
<td>Maintenance contact output 250V AC/3A 30V DC/3A</td>
</tr>
<tr>
<td>13</td>
<td>Calibrating gas contact output 250V AC/3A 30V DC/3A</td>
</tr>
<tr>
<td>14</td>
<td>Power supply input 100 to 120V AC 200 to 240V AC</td>
</tr>
</tbody>
</table>

**Note 1)** The heater power supply is the same as the converter power supply.

**Note 2)** Be sure to connect the shield of the cable to the ground in the main body.

**Note 3)** HART communication (option) uses a 4-20 mA analog output.
Converter (ZKMA)  
<IP66 enclosure> with selector valve

Support (option)
Spring washer, washer, nut (option)
U bolt (option)

2.5  77.1  2.5

Valve (option)

Cable gland (option)  
for ø6-ø12 mm tube

Earth terminal (M4)
Waterproof connector for connection to detector

Cable gland (option)  
for ø5-ø10 mm tube

Cable gland (option)  
for ø5.5 mm tube  
or ø1/4 inch tube
Converter (ZKMA)
<IP66 enclosure> with selector valve and flowmeter
Converter (ZKMB)
<IP67 enclosure>

Note 1) The heater power supply is the same as the converter power supply.
Note 2) Be sure to connect the shield of the cable to the ground in the main body.
Note 3) HART communication (option) uses a 4-20 mA analog output.
Converter (ZKMB)  
<IP67 enclosure> with selector valve

Support (option)
Spring washer, washer, nut (option)
U bolt (option)

Waterproof connector for connection to detector

Earth terminal (M4)

Valve (option)

For ø6 mm tube or ø1/4 inch tube

Cable gland (option) × 4
for ø6-ø12 mm tube
Converter (ZKMB)  
<IP67 enclosure> with selector valve and flowmeter
Caution on Safety

*Before using this product, be sure to read its instruction manual in advance.

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