



**Instruction manual**

**AUTOMATIC  
BACKPURGE AND  
CALIBRATION  
MODULE FOR ZrO<sub>2</sub>  
ANALYSER**

**TYPE: ZFCS**



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# PREFACE

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## Warning

Read this instruction manual carefully and completely before starting any installation in order to make the best use of the equipment.

IT IS STRICTLY FORBIDDEN TO MODIFY THIS UNIT WITHOUT WRITTEN PERMISSION FROM FUJI ELECTRIC. FUJI ELECTRIC WILL NOT BE HELD RESPONSIBLE FOR ANY INCIDENTS OR ACCIDENTS THAT MAY OCCUR AS A RESULT OF THE MODIFICATIONS.

After reading the manual, be sure to keep it handy for future reference. This instruction manual should be kept with this cabinet assembly at all times.

**Manufacturer:** Fuji Electric France S.A.S.

**Type:** Automatic backpurge and calibration module for ZrO<sub>2</sub> analyser

**Date of manufacture:** Inscribed on the nameplate of the analyser

**Country of manufacture:** France

## Complement to this user guide

### Direct insertion oxygen analyser (ZKM / ZFK8)

Fuji Electric page for direct insertion oxygen analyser:

<https://www.fujielectric.fr/en/product/situ-zirconia-oxygen-gas-analysers>

### NOTES

This manual may not be copied in whole or in part without prior written permission from Fuji Electric.

This manual is subject to change without notice to conform to the technological development of the product.

### Fuji Electric France S.A.S.

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# STORAGE CONDITIONS

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## Recommendations:

Store the equipment in a place that meets the following conditions:

1. Free from vibration, dust, dirt and moisture.
2. Protected from sunlight.
3. Non-corrosive atmosphere.
4. Ambient temperature -20 to +70°C and humidity 95% RH or less.

# **AUTOMATIC BACKPURGE AND CALIBRATION MODULE FOR ZrO<sub>2</sub> ANALYSER**

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## **General :**

The ZFCS cabinet is a system for pressurized air cleaning of the probe tube, and automatic calibration of the ZFK8 in-situ zirconia oxygen analyser.

The ZKM controller is integrated in the cabinet but should be ordered separately. It allows continuous measurement of the oxygen concentration in the flue gas of boilers and industrial furnaces for combustion control and optimisation.

The analyser consists of a measuring probe (ZFK8) and a controller (ZKM). The probe is combined with a tube that is inserted into the flue gas line to channel the gases to the probe.

## **There are two versions of the cabinet:**

The standard model: ZFCS

The model with option 'P': ZFCS-P

*The latter is delivered with a backflush solenoid valve supplied outside the cabinet and mounted on a capacity fixed near the ZFK8 probe on a support plate also supplied.*

## **General characteristics:**

1. Additional integration/protection of the ZKM controller.
2. ZKM functionality (see ZKM/ZFK8 data sheet).
3. Automatic programmed or remote control of calibration and blowback functions (via ZKM).
4. Manual control of calibration and blowback functions (via push buttons integrated in the cabinet).
5. Pressure reduction and adjustment of the function gases: pressurized air, zero calibration gas, span calibration gas.
6. Enclosure with glass front panel for display of O<sub>2</sub> measurements and status information.
7. Option 'P': integrated backflush solenoid valve mounted on ZFK8 probe just downstream of a pressure tank for powerful unclogging. Without option 'P', the solenoid blowback valve is integrated in the ZFCS cabinet, and pressure tank is not provided.

# AUTOMATIC BACKPURGE AND CALIBRATION MODULE FOR ZrO<sub>2</sub> ANALYSER

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## Specifications:

**Dimensions:** 654 x 434 x 210 mm

**Materials:** Fibreglass polyester case  
glass door

**Weight:** Approximately 18 Kg

**Colour:** Grey RAL7035

### Protection

**class:** IP 55

**Temperature:** Operation: 0 to 50 °C  
Storage: -20 to 70 °C

### Flue gas

**temperature:** Refer to analyser specifications

### Supply

**voltage:** 230 V CA / 50 Hz

### Power consumption

**at start-up:** 240 VA

### Nominal power

**consumption:** 125 VA

### Short-circuit

**current:** 50 kA

### Power supply compressed

**air:** 5 bar min / 17 bar maxi

### Type of

**mounting:** Wall-mounted, supplied with 4  
mounting brackets

### Gas

**connections:** 2 inlets/ flexible tube  
connection (ø6 mm)  
(Air supply, calibration gas)  
1 or 2 outlets/ hose connection  
(ø6 mm)  
(Calibration gas, blowback air)

### Electrical connections:

3 cable glands PG 9  
2 cable glands PG 13.5

### Inputs

**contacts :** 3 assignable contact inputs  
ON; 0 V (10 mA max), OFF; 5 V

Configurable functions per contact :

- Control of  
Signal hold command
- Reset of the calculations  
Reset of minimum  
and maximum values
- Switching off the heating  
of the sensor
- Blowback control  
Blowback control (optional)
- Calibration stop command
- Calibration start command  
calibration start command
- Scale change  
scale change command

### Outputs

**contacts:** 6 single contacts:  
250 Vac / 3A  
or 30 VDC / 3A

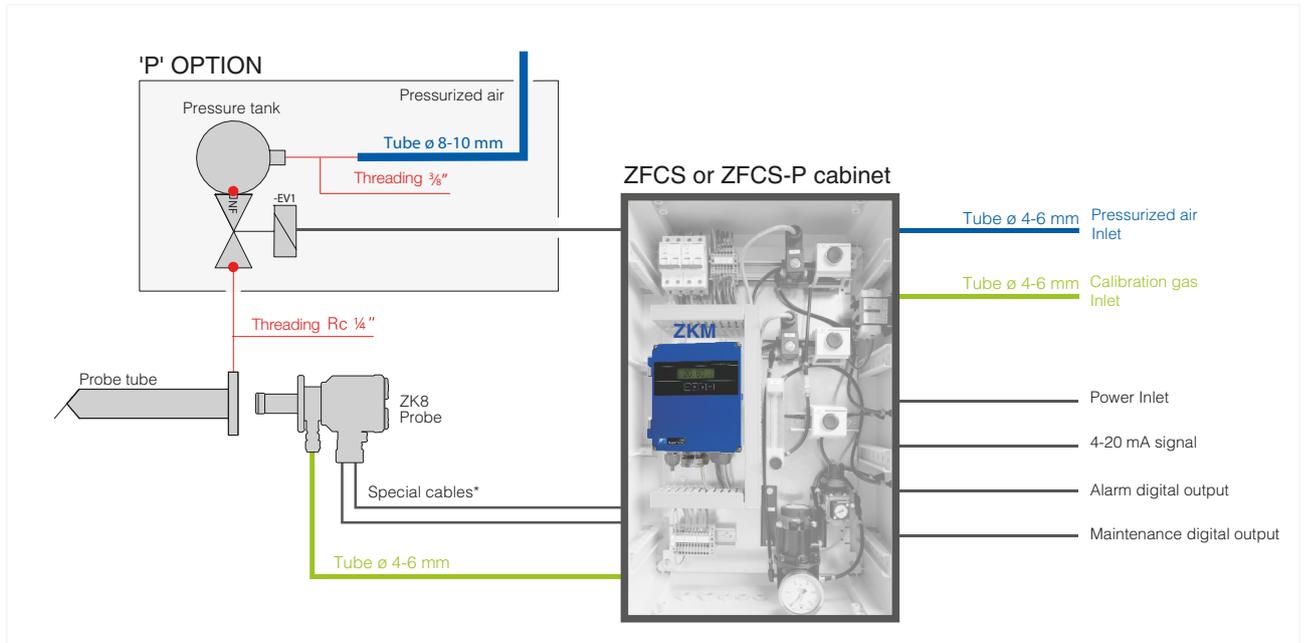
Contact function :

- In maintenance
- Blowing in progress
- Scale calibration gas
- Zero calibration gas
- Analyser faults
- Alarm
- Scale identification output

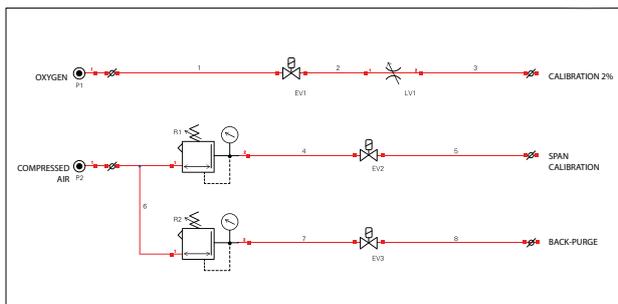
# AUTOMATIC BACKPURGE AND CALIBRATION MODULE FOR ZrO<sub>2</sub> ANALYSER

## Connection diagrams:

### Description drawing



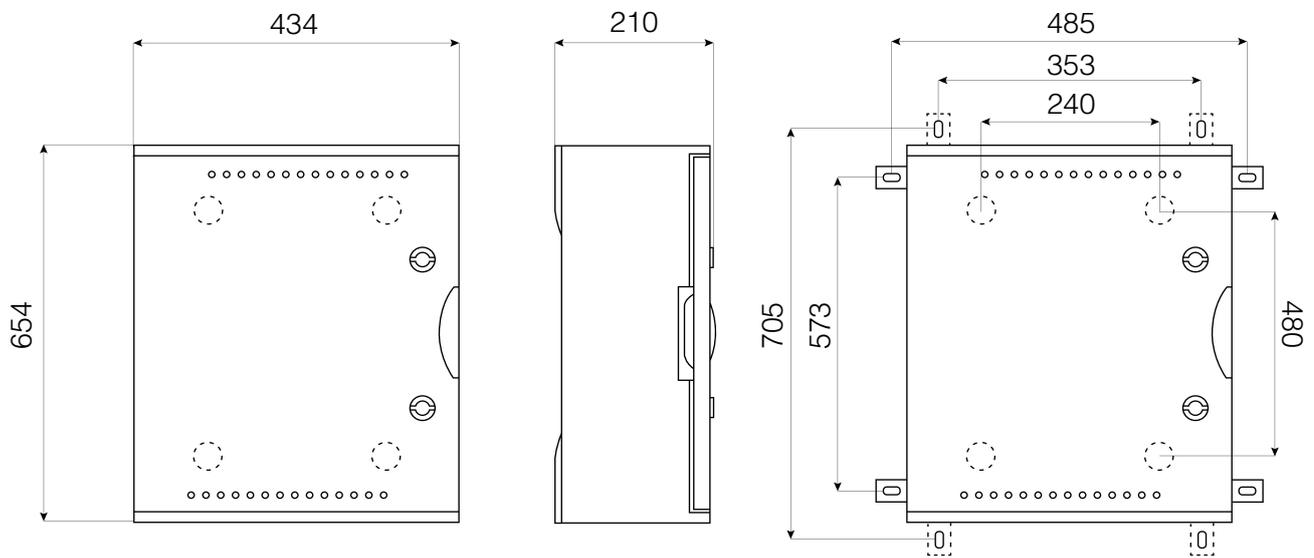
### Cabinet ZFCS



# AUTOMATIC BACKPURGE AND CALIBRATION MODULE FOR ZrO<sub>2</sub> ANALYSER

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Dimensions (unit: mm):



# AUTOMATIC BACKPURGE AND CALIBRATION MODULE FOR ZrO<sub>2</sub> ANALYSER

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## **Installation:**

If necessary, refer to the documents listed below and supplied with the system:

- Electrical and pneumatic diagrams.
- Connection diagram and product specifications.
- Instruction manual for direct insertion oxygen analyser (ZKM / ZFK8).

## **Procedure :**

1. Install the enclosure in a clean, shock-proof location, in an upright position and accessible at ground level. Mounting brackets are supplied with the system.
2. Make the electrical connection in accordance with the applicable standards and using the electrical wiring diagram supplied. It is essential to connect the earth conductor to the system earth (green/yellow terminal). Tighten the PG13.5 cable gland of the power supply cable entry to 3 Nm.
3. Then proceed with the wiring of the ZKF8 probe directly to the ZKM controller terminals with the dedicated specific cable. The "alarm, maintenance" information signals and the O<sub>2</sub> analog signal of the ZKM controller are available in terminal block X1. Tighten the PG9 cable glands for the signal cables passage to 2Nm. Refer to the enclosed wiring diagram for the different connections.
4. Proceed with the pneumatic connection (flexible tube Ø6 mm). Refer to the enclosed pneumatic diagram and follow the identification labels on the enclosure.
5. Power up by activating the circuit breakers Q1 and Q2, then the general disconnecter S1.

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## Operation:

The operations may be performed with the following two methods:

- Blowing operations according to pre-programmed cycles and intervals using the ZKM controller.
- Manual blowing operation using the push buttons/actuators located inside the cabinet.

## Procedures:

**1 - The 2% O<sub>2</sub> calibration procedure of the probe is performed according to the following steps:**

- Connect the 2% oxygen standard gas cylinder to the 2% O<sub>2</sub> INLET.
- Connect the calibration inlet tube of the ZFK8 probe to the CALIBRATION OUTLET.
- Check the pressure and flow settings (2L/min).
- Pressing BP1 activates the "2% concentration" gas in the ZFK8 probe.

**2 - The procedure for for the span calibration of the probe is carried out according to the following steps:**

- Connect the instrument air to the INSTRUMENT AIR INLET.
- Check the pressure (~130 mbar) and flow (2L/min) settings.
- Pressing BP2 activates the span gas flow in the ZFK8 probe.

**3 - The procedure for blowing back the probe is carried out according to the following steps:**

- Connect the instrument air to the INSTRUMENT AIR INLET.
- Connect the BLACKFLUSH OUTLET to the flange of the backflush type guide tube (standard version) or to the external backflush solenoid valve ('P' version).
- Check or adjust the desired pressure with the pressure regulator R2 to 4 bar.
- Pressing BP3 activates the backflush.

## "Gas inlets / outlets"



# AUTOMATIC BACKPURGE AND CALIBRATION MODULE FOR ZrO<sub>2</sub> ANALYSER

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## Maintenance:

**Check and inspect after a period of operation of about 50 h,  
and annually thereafter the following points:**

- Keeping the tube connections in place in the various pneumatic connections.
- The tightening and wiring of the electrical connections.
- The correct operating pressures applied by the R1 (130 mbar) and R2 (4 bar) pressure reducers.
- The correct operation of the circuit breakers Q1 and Q2 as well as the general disconnecter S1.

**If problems are detected, replace the defective component(s).  
Refer to the spare parts list on the last page of the electrical diagram.**



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