

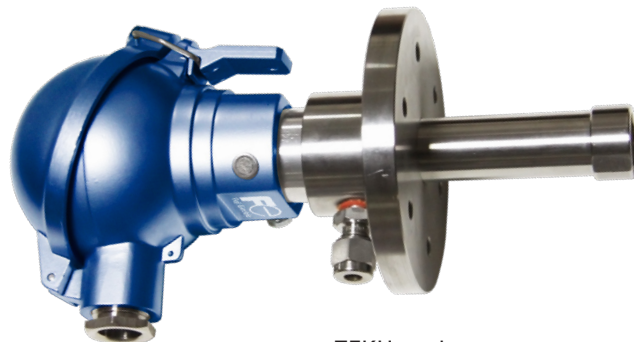
ZFKH high temperature O₂ zirconia in situ analyser

DATA SHEET

ZFKH

ZIRCONIUM OXYDE OXYGEN PROBE FOR HIGH TEMPERATURE APPLICATIONS

1. Compact & Light Design
2. Excellent accuracy and dependability
3. Remote electronics and calibration
4. Field-replaceable filters



ZFKH probe

ANALYSER OVERVIEW

The oxygen measurement enables the control of burner fuel/air ratios to ensure combustion efficiency and process safety.

Fuji Electric ZFKH in situ O₂ analyser is adapted to be installed in safe areas and to withstand critical environments and high process gas temperature in:

- Incineration furnaces
- Biomass boilers
- Industrial large scale boilers

The in situ O₂ analyser includes the following parts (see typical assembly p.3):

- 1 ZFKH high temperature probe
- 1 ZRZX high temperature cable
- Remote O₂ ZKM transmitter (see ZKM/ZFK8 Datasheet)
- 1 Deflecting tube (see Gas Analyser Brochure)

If configuration requires, the analyser may also include:

- 1 ZFCS automatic calibration and back-purge module (see Gas Analyser Brochure)

The ZFKH probe design ensures low maintenance costs and long life-time with excellent accuracy and dependability. It is compact and light to be easily carried for installation and maintenance operations in difficult-to-reach places on site.

The in situ measurement sampling is done thanks to a deflecting tube mounted on the flue gas duct mating flange. The tube deflects some of the process flue gas from its main stream and drives it to the probe. This assembly provides fast, highly accurate and reliable measurement while keeping the probe away from the aggressive furnace core.

No extractive sampling system is required, avoiding excessive maintenance job typical of ejection pump systems. Also the probe remains easily accessible for maintenance operations.

This flexible technology enables the O₂ Analyser to operate at process temperatures up to 1500°C with highly corrosive or dusty flue gas, depending on the type and material of deflecting tube or ejector. Each deflecting tube is designed and made-to-order in order to fit the unit's specifications (see Gas Analyser Brochure for the tube selection).

The O₂ transmitter linked to the ZFKH probe can be either ZKMA or ZKMB. See ZKM/ZFK8 datasheet for details concerning the transmitter. O₂ transmitter is to be installed remotely from the probe, either on self standing racks at ground level or on wall-mounted panels on platform.

This device supplies the power for heating the probe sensor to its operation temperature. Then it turns the sensor's signal (mV) into O₂ (%vol.) concentration.

The measured values are displayed on the transmitter's screen and can be sent to the plant control system through 4-20mA signal, Hart protocole and Modbus RTU.

The transmitter also provides several helpful functions:

- Analyser Default Contacts
- Alarm contacts (Very Low, Low, High, Very High)
- Automatic Blow down
Automatic guide tube cleaning with compressed air
- Auto calibration gas sequencer

Maintenance operations such as calibration and analyser settings are performed from the transmitter. Calibration gases are sent to the probe from a remote calibration system.

Recommended calibration gases are the following:

- 1% O₂ in N₂ balances- ZERO calibration
- 20.9% O₂ in N₂ balance- SPAN calibration

Reference air reaches the sensor through a vent mounted on the probe body. It is then not necessary to offer instrument air.

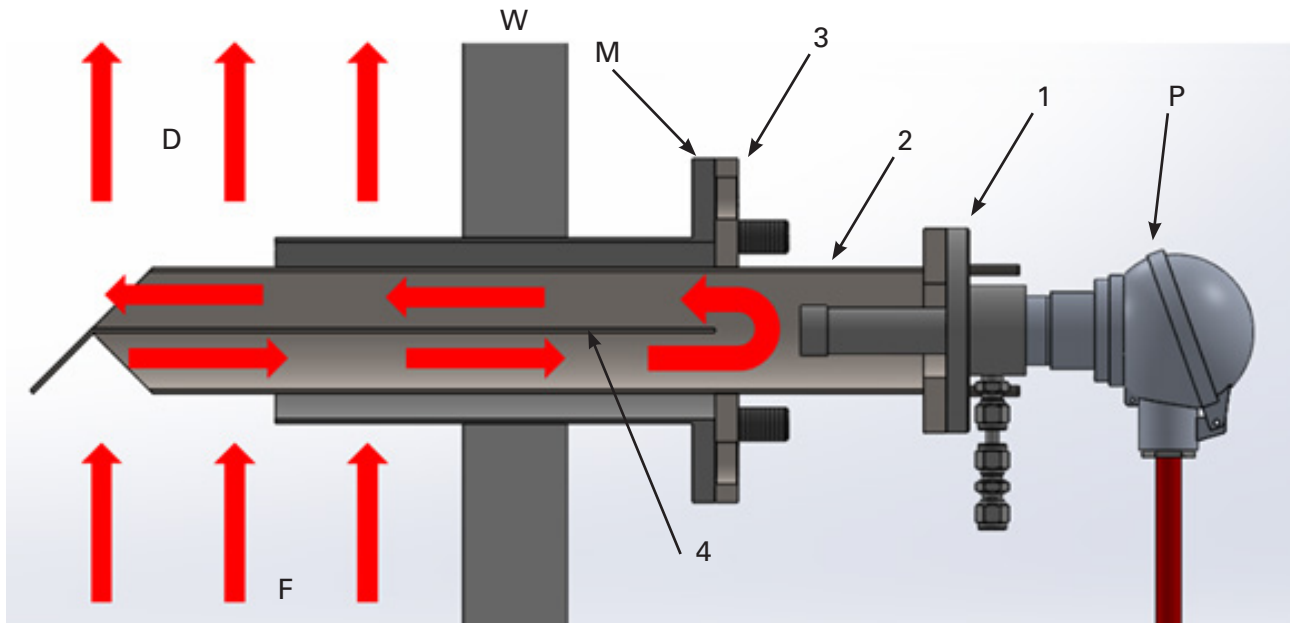


ZKMA
IP66
oxygen transmitter



ZKMB
IP67
oxygen transmitter

ZFKH O₂ analyser
Guide tube principle

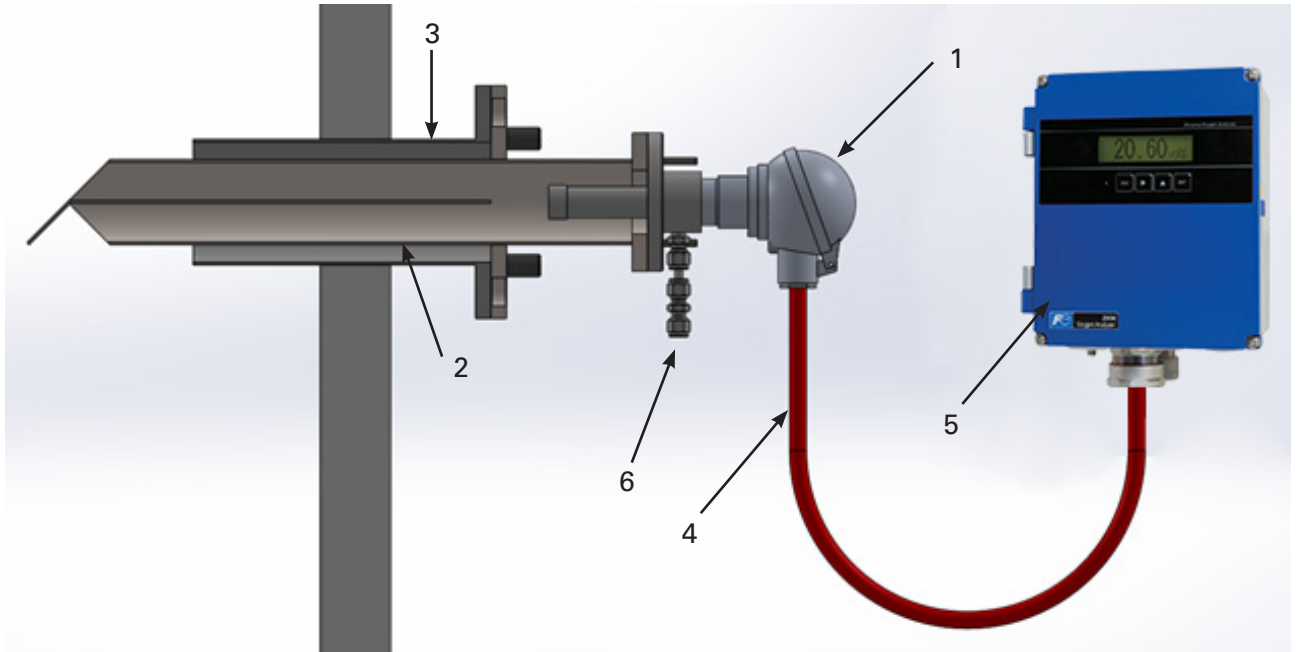


1	ZFKX probe mounting flange
2	Guide Tube
3	Process connection flange
4	Plate for flue gas deflection
P	Probe with aluminum junction box
M	Mating flange
F	Flue gas flow
D	Duct
W	Duct wall

ZFKH O₂ Analyser Typical assembly

Accessories and consumables:

- Accessories for installation and calibration
- Probe filters



1	ZFKH probe
2	Guide Tube
3	Mating
4	Interconnection cable
5	Remote O ₂ transmitter
6	Calibration Line

Analyser General Specifications

Measurement principle:

Zirconium Oxide Probe

In-situ

Measurement : Made to order Flow Guide Tube ("Guide Tube") inserted into the flue gas duct.
See Gas Analyser Brochure.

Measurement range:

From 0-2% to 0-50% O₂ freely settable by 1 vol% O₂ pitches

Measured gas T°: 120 to +1500°C depending on deflecting tube material and type

Response time: <7s for 90% of final value (From calibration gas inlet)

Repeatability: +/-0.5% of full scale

Power supply:

Rated voltage:
100 to 120 VAC
(operating voltage 90 to 132 VAC)
200 to 240VAC
(operating voltage 190 to 264 VAC)
Rated frequency:
50/60Hz

Calibration gas:

Recommended concentration:
Zero gas : 1.0% O₂
Span gas : 20.9% O₂ (Instr. Air)

Accessories:

Mounting panel or self-standing rack
Calibration kit
Sampling tube accessories

Application: In situ O₂% measurement in high temperature applications

Assembly: Protection:
IP66 transmitter and IP65 for the probe
Probe on flue gas duct
Remote transmitter up to 150m from probe

Output signal: 4 to 20mA DC (<500Ω, allowable) with HART option
or 0 to 1V DC (>100Ω output resistor)
Digital RS232C or RS485 (option) with Modbus protocols

Measured gas pressure: -3 to +3kPa (-306 to +306mmH₂O)

Warm-up time: Recommended >30min

Linearity: +/- 2% of full scale

Power consumption (controller +Sensor): Max. 240VA (200VA + 40VA)
Normal 70VA (50VA + 20VA)

Measured gas T°: 120 to +1500°C depending on guide tube material and type

Calibration gas consumption: Average 5L of each calib. gas per calibration cycle at recommended 30-40NL/h flowrate.

Maintenance functions: Blow Off, Auto-calibration, Output contacts, Output Hold

CODES SYMBOLS

ZFKH O₂ zirconia probe for High Temperature application

1	2	3	4	5	6	7	8	9	10	11	DESCRIPTION		
Z	F	K	H	R				-					High Temperature O ₂ probe
													(6) CALIBRATION GAS INLET
				1									Stainless steel fitting for 6mm tube
				2									Stainless steel fitting for 1/4" tube
													(7) POWER
				1	5								110/115 VAC 50/60Hz
				3	5								200/240 VAC 50/60Hz
													(9) GUIDE TUBE
								0	Y	0			The guide tube is selected in the relevant price list.
													None

CODES SYMBOLS

ZRZX high temperature cable
between ZKM controller and ZFKH probe

1	2	3	4	5	6	7	8	9	DESCRIPTION	
Z	R	Z	X				1	-		High temperature (Teflon/Silicone), armoured and shielded cable for ZFKH O ₂ probe
				R						(5) THERMOCOUPLE TYPE Thermocouple type R
					0	6				6m
					1	0				10m
					1	5				15m
					2	0				20m
					3	0				30m
					4	0				40m
					5	0				50m
				X	X					Other length
										(8) CABLE TERMINATIONS TREATMENT
							1	-	0	None
							1	-	1	Only probe side
							1	-	2	Controller and probe sides



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