Fuji Electric

ZKMX-ZFKX O_2 zirconia analyser for ATEX area

DATA SHEET ZKMX-ZFKX

EX-PROOF IN SITU ZIRCONIA OXYDE OXYGEN ANALYSER FOR COMBUSTION CONTROL

1. ATEX/IECEx Zone1 IIB+H2 T3 Gb Probe
2. Field-replaceable Flame-arrestor
3. Compact & Light Design
4. Excellent accuracy and dependability
5. Remote electronics and calibration

ZFKX probe

ZKMX controller

ANALYSER OVERVIEW

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

Fuji Electric O_2 Analyser is adapted to hazardous areas and can withstand critical environments such as:

- Refinery process heaters
- Petrochemical reactor furnaces
- Industrial large scale boilers

The in situ O_2 Analyser includes the following parts (see typical assembly p.3):

- 1 ZFKX probe type ZPF2
- 1 Remote ZKMX transmitter type ZTF2
- 1 Guide tube
- 1 Junction box and connection cable if probe-transmitter distance > 2m
- 1 Calibration kit

In-situ ZFKX probe type ZPF2 is ATEX and IECEx certified to be used in hazardous areas classified up to Zone 1IIB+H2 T3 Gb, meaning that it complies with the very demanding international standards of ex-proof security.

The ZFKX probe design ensures low maintenance costs and long life-time with excellent accuracy and dependability. It is compact and light (<4kg) to be easily carried for installation and maintenance operations in difficult-to-reach places on site. Its full 316L stainless steel design ensures excellent resistance to saline, humid and corrosive atmospheres over time.

The probe features a "flame-arresting nose" which is consumable and replaceable on site. INCONEL 600 flame-arrestors are available to improve the probe lifetime with very corrosive applications.

In situ measurement is done thanks to a guide 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 guide tube technology enables the O_2 analyser to operate at process temperatures up to 1500°C with highly corrosive or dusty flue gas. The guidetube should be selected in order to fit the process specifications (see gas analyser brochure).

ZFKX probes type ZPF2 are compatible with all Fuji Electric guide tubes and O_2 transmitters already installed.

ZKMX O_2 transmitter type ZTF2 is ATEX certified Zone 1IIC T5 Gb. It 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 ZFKX probes to their operation temperature. Then it turns the sensor's signal (mV) into O_2 (%vol.) concentration.

The measured values are displayed on the transmitter's screen and can be sent to control rooms with 4-20mA line with Hart Protocol. The ZKMX controller can also provide 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 offered to the probe from a remote calibration system. Recommended calibration gases are the following:

- 1% O_2 in N_2 balances - ZERO calibration
- 20.9% O_2 in N_2 balance - SPAN calibration

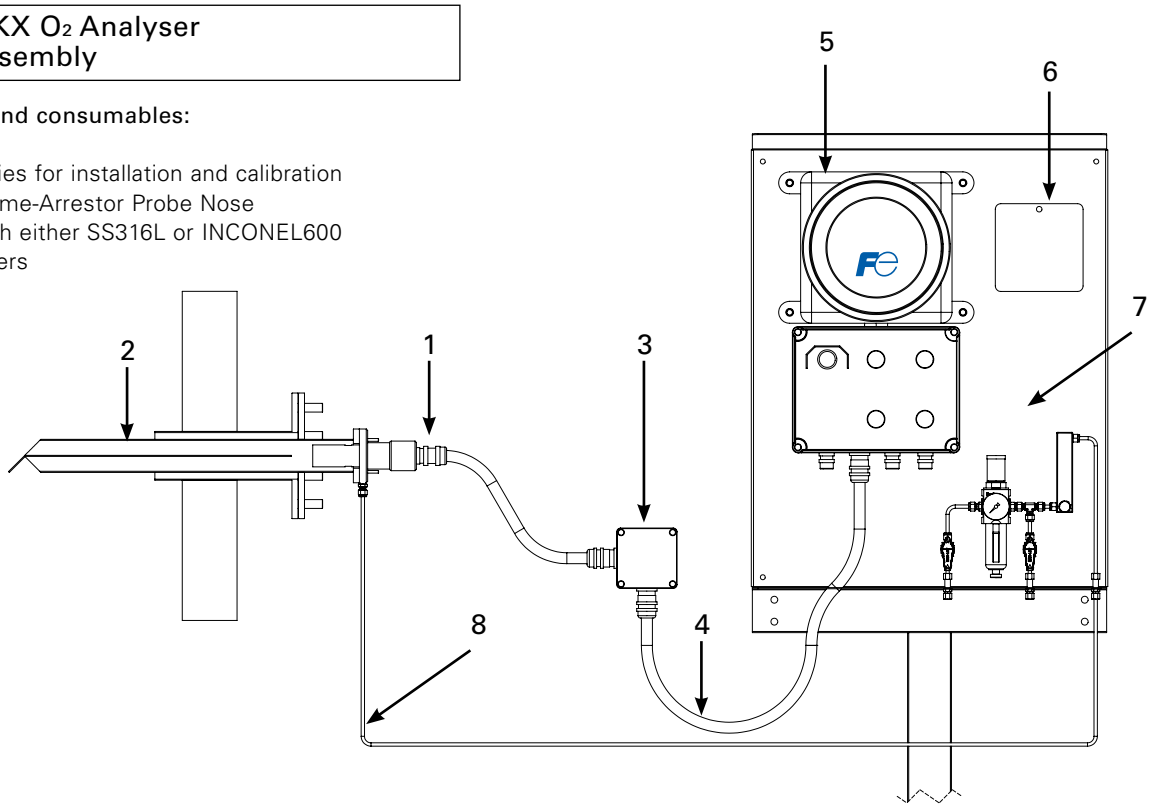
Reference air reaches the sensor through an ex-proof vent mounted on the probe body. As a consequence, instrument air is not required as reference air.

Guide tube

ZKMX-ZFKX O_2 Analyser
Typical assembly

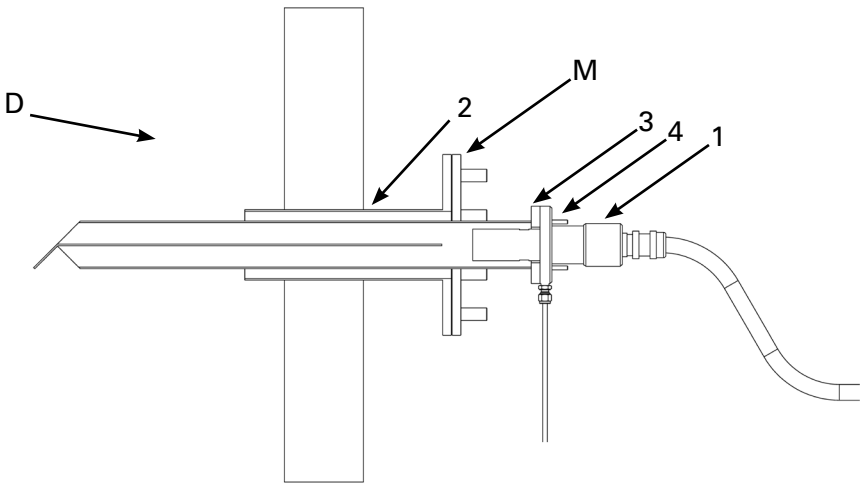
Accessories and consumables:

- Accessories for installation and calibration
- Spare Flame-Arrestor Probe Nose
  made with either SS316L or INCONEL600
- Probe filters



1	ZFKX probe
2	Guide Tube
3	Intermediary Junction Box - *To be used if Probe-Controller distance > 2m*
4	Interconnection cable
5	ZKMX Remote O_2 controller with push button Junction box
6	Labelling
7	Calibration Kit
8	Calibration Line

ZFKX probe
Guide tube deflection principle



1	ZFKX probe
2	Guide Tube
M	Mating Flange

3	Probe gasket
4	x6 Mounting M5 Nuts
D	Process Duct

Analyser
General Specifications

Measurement principle: Zirconium Oxyde Probe

Probe certification: Ex II2G Ex db IIB+H2 T3 Gb
(Ta :-20°C to +60°C)
LCIE 13 ATEX 3045X IECEx LCIE 13.0027X

In-situ system: Flow Guide Tube ("Guide Tube") Inserted into the flue gas duct.
See gas analyser brochure for guide tube selection.

Measurement range: From 0-2% to 0-50% O_2 freely settable by 1 vol% O_2 pitches

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

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% O_2
Span gas : 20.9% O_2 (Instr. Air)

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

Application: In situ O_2% measurement in Combustion Flue Gas for process control

Controller certification: Ex II2G Ex d IIC T5 Gb
(Ta :-20°C to +55°C)
LCIE 13 ATEX 3066X

Assembly: Probe on flue gas duct
Remote transmitter up to 50m from probe

Output signal: 4 to 20mA DC (<500Ω, allowable) with HART protocol

Measured gas pressure: –3 to +3kPa (–306 to +306mmH_2O)

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

ZKMX O_2 controller type ZTF2 for hasardous area
Ex II2G Exd IIC T5 Gb IP66

1	2	3	4	5	6	7	8		9	10	11	12	13		14	15	16	DESCRIPTION
Z	K	M	X	B	3	1	2	-		E	Y	1		-		R	Y	
Z	K	M	X															ZKMX O2 controller type ZTF2 for hazardous area Ex II2G Exd IIC T5 Gb, protection IP66
				B														**(5) OUTPUT SIGNAL** 1 analog output 4-20mA
					3													**(6) COMMUNICATION** HART Protocol
						1												**(7) MOUTING TYPE** Panel
							2	-										**(8) VERSION**
									Y									**(9) OPTIONS** None
									2									Blowdown
									3									Auto Calibration
									6									Blowdown + Auto Calibration
										E	Y	1						**(10) INSTRUCTION MANUAL** English
										F	Y	1						French
													0	-				**(13) CABLE GLANDS SELECTION** 2 single cable glands (power & signal) 1 dual cable gland for probe cable
													1	-				2 single cable glands (power & signal) 1 dual cable gland for probe cable 1 single cable gland (Blowdown or 1 contact inlet)
													2	-				2 single cable glands (power & signal) 1 dual cable gland for probe cable 1 dual cable gland (Blowdown + Auto calibration or 2 contact inlets)
													3	-				Special request (Consult. Fuji)
															0	R	Y	**(14) CABLE GLAND TYPES** Standard Ni-Brass cable glands
															1	R	Y	Double ferrule Ni-Brass cable glands
															2	R	Y	Double ferrule stainless steel cable glands
															3	R	Y	Special request (Consult. Fuji)

Junction box for ZKMX and ZFKX

1	2	3	4		7	8	9											DESCRIPTION
P	B	J		-	F	0	1											
P	B	J																Junction box Ex IIG Exe IIT5 for ZFKX & ZKMX **Required if distance ZKMX-ZFKX > 2 m**
			L	-														**(4) BOX AND CABLE GLAND TYPES** ATEX IECEx Zone 1 IIC T6, stainless steel box / stainless steel cable gland
			X	-														ATEX IECEx Zone 1 IIC T6, aluminum box / brass-nickel cable gland
				-	F	0	1											**(4) JUNCTIONS** ZFKX - 6 pins

ZFKX O_2 zirconia probe type ZPF2 for hasardous area Ex II2G Exd IIB+H2 T3 Gb

1	2	3	4	5	6	7	8		9	10						DESCRIPTION
Z	F	K	X	R			2	-						-		
Z	F	K	X	R												ZFKX O2 probe type ZPF2 for hazardous area Ex II2G Exd IIB+H2 T3 Gb Thermocouple type R, Ta : -20 to +55°C
					0											**(6) CALIBRATION GAS FITTING**
					1											6mm OD
																1/4" OD
						1										**(7) POWER**
						3										115 VAC
																230 VAC
							2	-								**(8) VERSION**
																(9) PROBE NOSE
									Y							SS316L nose - Inconel 600 filter
									H							SS316L nose - Inconel 600 high dust filter
									D							Inconel 600 nose - Inconel 600 high dust filter
																(10) INSTRUCTION MANUAL
										E						English
										F						French

Cable ZKMX and ZFKX for hazardous area Ex II2G Exd IIB+H2 T3 g+Gb

1	2	3	4	5	6	7	8		9								DESCRIPTION
Z	R	Z	X	R			1	-									
																	Armoured and shielded cable for ZFKX type O2 probe
			X														**(4) CONTROLLER TYPE**
																	ZKMX O2 controller
				R													**(5) THERMOCOUPLE TYPE**
																	Thermocouple type R
					0	6											**(6) CABLE LENGTH**
					1	0											6m Atex
					1	5											10m Atex
					2	0											15m Atex
					3	0											20m Atex
					4	0											30m Atex
					5	0											40m Atex
					X	X											50m Atex
																	Other length Atex
							1	-	0								**(8) TREATMENT OF CABLE ENDS**
							1	-	1								None
							1	-	2								One side (detector side)
																	Both sides of the cable end treated

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