ZIROX
Sensoren und Elektronik GmbH

MANUAL

E2010

ELECTRONIC UNIT FOR

ZIROX - PROBES

Power supply: 24 V DC

Table of contents

1 General information

1.1 How to use this manual

This manual describes composition, mode of operation and use of the ELECTRONIC UNIT E2010 of the ZIROX GmbH.

Proper operation of the E2010 can only be ensured if the contents of this manual are known. Therefore, all chapters of this manual must be read carefully prior to operating the E2010.

The values on the device display in this manual are examples or preset parameters of the manufacturer. Process-specific parameters must be set by the user.

Pages, charts and figures are numbered consecutively.

1.2 Copyright

1.3 Commonly used symbols

Symbol for imminent danger:

This symbol refers to imminent danger to persons' life and health.

In case of disregard fatal injuries may result.

Symbol for indirect danger:

This symbol indicates indirect danger.

The degree of the damage depends on the circumstances and the actions of the persons involved.

In case of disregard destruction or damage of the E2010, its single components or other material assets as well as minor injuries may result.

Symbol for proper handling:

This symbol appears where the manual refers to the adherence to rules, instructions and proper operation.

Note

In case of disregard, damage or destruction of the E2010 or its single components may result.

2 Safety instructions

The following regulations for industrial safety provide basic information about potential danger during the operation of the E2010. Therefore, they must be observed and strictly followed by the responsible staff.


attention

- A failure-free and functional operating of the E2010 can only be guaranteed with knowledge of this manual. Therefore, all chapters of this manual must be read carefully before the installation and initiation of the E2010.
- The E2010 is to be used for the functional operation only (see chapter 3.1).
- The E2010 may only be installed, operated, and maintained by trained staff.
- Special safety instructions for potential danger during certain working processes are given in relevant text passages.

3 Application and technical data

3.1 Application

The electronic unit E2010, developed for panel mounting, provides the power supply for ZIROX® sensors, evaluates signals and displays measuring results in the form of a standard signal (4-20 mA) for process control.

The electronics realizes the following functions:

- Power supply and control of sensor heating
- Processing of the thermoelectric and cell voltage of the probe to the oxygen concentration
- Output of the oxygen concentration as a standard signal
- Calibration
- Reference air supply by internal pump (option)

3.2 Technical data

Power supply	24 V DC +/- 10%
Power consumption	2 W + sensor heating power
Fuse	2.5 A resetting
Protection degree	IP 30 **(Front IP52)**
Working temperature	0...40 °C
Storage temperature	0...50°C
Set temperature	700 °C (depends on connected sensor)
Display	Double-spaced LCD-display, 2 x 16 digits
Input signal	Sensor and thermoelectric voltage (+/- 1500 mV, polarity adjustable), thermocouple type B (400 – 1500 °C) or thermo-couple type K (0 – 1000 °C)
Output signal	4...20 mA (0…10 V option)

Dimensions W x H x D	96 mm x 96 mm x 125 mm
Weight	Approx. 650 g
Keypad	2 keys (membrane keypad)
Alarm indication	Current output goes to 0 mA
Interface (option)	RS232

4 Composition

4.1 Front, keys

The display and the keys for parametrization are located on the front.

Menu key: scroll or select the requested parameter

ENTER key: activate or enter adjusted parameter (save change)

Fig. 1: *Front view E2010 with keys and display*

4.2 Rear, connections

All connections and outputs are located on the rear.

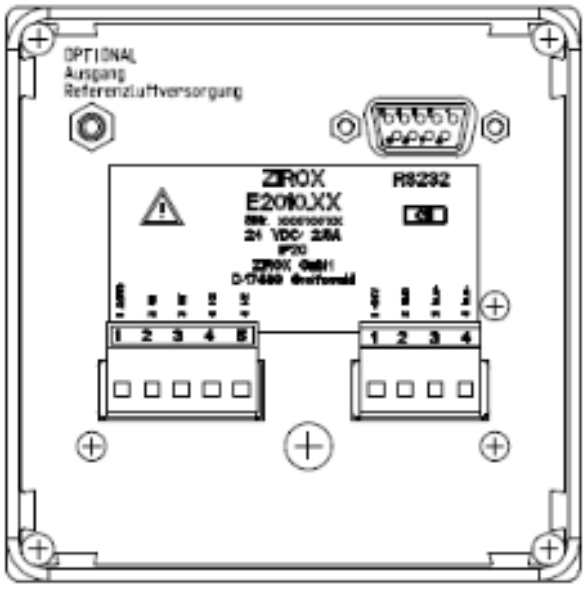


Fig. 2: *Rear view E2010 with connections*

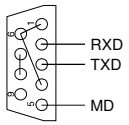
Terminal strip X1 — Sensor connections

Pin	Description	cable
1	AINCOM	brown
2	Vz	white
3	Vt	blue
4	Heating+	black
5	Heating-	grey

Terminal strip X2 — Power supply/output signal

Pin	Description
1	+24V DC
2	GND
3	OUT +
4	OUT -

Digital output:…… RS 232-Interface (9600 Baud)



Pin assignment RS 232

The RS232 interface must be connected with a computer by SUB-D-cable (9pol., 1:1, uncrossed)!

Transfer rate: max. 9600 Baud, adjustable

Stop bits	1	Parity	no
Data bits	8	Handshake	without

Protocol of the serial interface (CR = carriage return)

Set	Feedback signal (example)	Transferred measuring value	Parameter
M2CR	M2x.xxExxCR M22.06E+05	$2.06*10^5$ ppm O_2	Oxygen concentration in ppm
A1CR	A1xxx.xCR A120.9	20.9 mV	Cell voltage in mV
A2CR	A2xxx.xCR A2749.9	749.9 °C	Measuring temperature in °C

The parameters are set by software.

Additional PC-software for display and storage of the measuring values is available on request.

Error messages

ERROR0	Transfer error RS232 (or wrong command)
ERROR1	Warm-up (Cell temperature too low, < 30 min)
ERROR2	Cell temperature too low (< Set temp. – 10 °C, > 30 min)
ERROR3	Thermocouple broken
ERROR6	System error

5 Installation and initiation

5.1 Installation

The clamps on the rear must be connected with the sensor clamps (s. chapter 4.2).

The power supply is 24 V DC.

5.2 Reference air supply for ZIROX® probes

Reference air input of the sensor and the reference air output of the E2010 must be connected by a flexible hose (inner diameter 3 mm). The reference air flow is preset by the manufacturer.


ATTENTION

After starting the system (E2010 with connected sensor) the reference air flow must be checked by an inserted flow meter (5 - 10 l/h resp. approx. 100 - 200ml/min).

5.3 Waiting for operating state

Note

Depending on the connected sensor, the E2010 needs a certain period of time until the operating state is reached (for further information see technical data of sensor). Because of thermal balancing effects, the sensor needs approx. 60 minutes until the ultimate operating state after reaching the operating temperature.

The keys are locked before reaching the operating state!

6 Parametrization

6.1 Menu operation – an example

WARM UP
Temp: 555 °C

After switch-on the warm-up starts. From 400 °C on the current temperature is displayed in the second line. After reaching the working temperature the oxygen concentration is displayed in the first line.

O2: 20.6 Vol.-%
Uz: xx.x mV

By pressing  several values can be displayed in the second line. (see chapter 6.2).

Calibration

With help of both keys an offset-calibration („zero point calibration“) **in clean air** and a span gas calibration is possible. The complete menu is shown schematically in figure 3, p. 17.

The sensor can be very hot for a while after switch-off and during operation.

CAUTION – VERY HOT – DO NOT TOUCH!

6.2 Display

E2010	*Start display, approx.3sec*
Version 2.4.6	Software version

E2010	*Start display, approx.3sec*
THERMOCO. TYP B	Thermocouple type

WARM-UP	*Warm-up of the ZIROX-Sensor*
Temp: 450 °C	

O2: 20.64 Vol%
Temp: 700 °C

O2: 20.64 Vol%
Vz: -2 mV

O2: 20.64 Vol%
SETTINGS

O2: 20.64 Vol%
CALIB.ZERO POINT

O2: 20.64 Vol%
CALIB. SPAN GAS

6.3 Adjustable parameters

The following parameters are adjustable in the menu SETTINGS.

OUTPUT VALUE	*Valid for display **and** analog output!*
Vol % O2	*V**ol ppm O2, mbar O2, atm O2, Vz [mV]***

OUTPUT VALUE	
log[10]	***linear (for Vz linear only)***

OUTPUT 4 – 20 mA	*Current output*
ZERO: 400 ppm	*Zero point 400 ppm corresponds to 4 mA*

OUTPUT 4 – 20 mA	
SPAN: 206400 ppm	*Terminal value 206400 ppm corresponds to 20 mA*

RETURN ?
NO YES

SAVE VALUES ?
NO YES

6.4 Offset calibration

Note

The E2010 has a calibration function. Based on that function the zero point calibration and, if requested, the span gas calibration can be conducted (see figure 3, p. 17). The zero point calibration must be conducted in clean air.

6.5 Span gas calibration

After calling the SPAN GAS concentration in the calibration menu (see figure 3, p. 17), the setting options are activated by pressing the enter key. The flashing digit can be set by pressing the menu key. After changing all the digits, this menu is deactivated by ENTER and left by the menu key.

Now the calibration can be started.

6.6 Reset calibration

If in the main menu **CALIB.ZERO POINT** or **CALIB. SPAN GAS** is displayed and both keys are pressed for 3 seconds, **RESET CAL.ZERO?** and **RESET CAL.SPAN** respectively will be displayed.

By pressing ENTER the calibration values will be reset to 0 resp. 1.

6.7 Error messages during calibration

CALIBR. FAILED **OUT OF RANGE**

//limits: ±50mV resp.. ±50% of Vz

CALIBR. FAILED *** TIMEOUT ***

//no steady measuring value in 20sec.

6.8 Menu navigation of calibration (diagram)

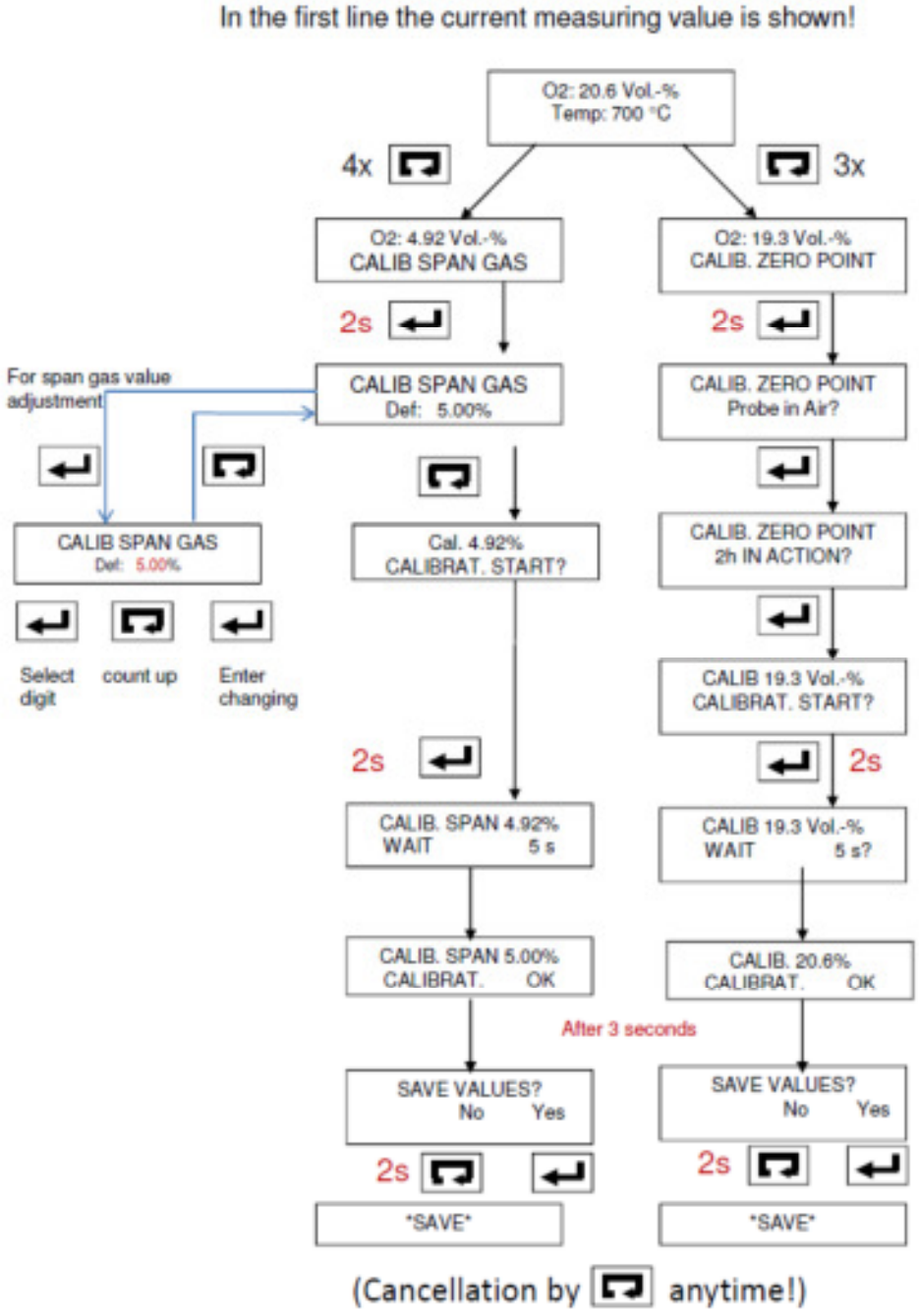


Fig. 3: *Chart offset and span gas calibration*

7 Maintenance

7.1 General information

Zirox sensors and probes with thermocouple type B are calibration- and maintenance-free. Only special products with thermocouple type K (e.g. oxygen probe SS51 for measurements in flue gases) must be calibrated periodically.

7.2 Calibration

Depending on the sensor type, a regular zero point calibration and (if sensor with thermocouple type K) a span gas calibration is necessary (see chapter 6). The corresponding frequency is outlined in the technical data of the sensor.

7.3 Error indication

During operation the sensor is permanently monitored and typical errors identified.

The following error messages can appear:

WARM UP
TEMP: 543 °C

LOW PROBE TEMP. **TEMP: 688 °C**	< T_{set} (e.g. 700 °C) – 10°C

+++ ERROR +++ **THERMOCOUPLE**	Thermocouple broken

+++ ERROR +++ **COLD JUNCTION**	*Only thermocouple Typ K*

7.4 Storage

The device must be stored in a dry and dust-free room at 0…50 °C. ***Please use the original packing!***

8 Warranty

ZIROX Sensoren & Elektronik GmbH warrants that the products manufactured and sold are free from manufacturing and material defects at the time of dispatch. In case of defects and faults within 12 months (probe) and 24 months (electronics assembly) respectively after dispatch, ZIROX will clear faults at its own option by repair or replacement. The purchaser must give prompt written notice to ZIROX. The purchaser is not entitled to claim other legal remedies based on this warranty.

ZIROX does not warrant supplied products which are subject to normal wear and tear (e.g. reference gas pump).

Corrosive gases and solid particles may cause damage and require repair or replacement due to normal wear and tear.

The contact of the products with explosive gas compounds, halogens in high concentrations and sulphuric gases (e.g. SO_2) is not permitted.

The contact of the products with siliconic or phosphoric compounds is not permitted either.

A connection of ZIROX and non-ZIROX products voids any warranty claims.

Warranty and warranty claims are only accepted if they are in accordance with the "General Sales and Delivery Conditions" of the manufacturer.

Warranty and liability claims for damage to persons and/or property are void if they are subject to the following:

- Normal wear and tear
- Improper use of the product
- Disregard of the manual's instructions
- Improper installation, initiation, operation and maintenance of the product
- Operation of the product without protective measures
- Unauthorized functional and technical modification of the product
- Dismantling of parts as well as installation of spare parts or additional units which are not delivered or permitted by the manufacturer
- Improper repairs or faulty operation
- External impact
- Acts of God

Attention: When installing the equipment, the customer must ensure that all necessary supply lines are connected and the operating temperature of the probe is reached. Experience has shown that products installed but not in use may be damaged by the process or by external influence. ZIROX will not accept any responsibility for such damage.

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9 Declaration of conformity

EG - Konformitätserklärung

Dokument- Nr.: 27 **Dezember 2010**

Hersteller: **Zirox Sensoren & Elektronik GmbH**

Anschrift: **Am Koppelberg 21**
D - 17489 Greifswald

Produktbezeichnung: **E2010**

Die Übereinstimmung des bezeichneten Produktes mit den Vorschriften der Richtlinien des Rates

2006/108/EG Elektromagnetische Verträglichkeit

wird nachgewiesen durch:

Der Hersteller hat die in den oben aufgeführten Richtlinien genannten harmonisierten Normen angewandt und die Übereinstimmung des Produktes festgestellt.

harmonisierte europäische Normen:

Nummer:	Text:
DIN EN 61000-6-2	Elektromagnetische Verträglichkeit (EMV) Teil 6-2: Fachgrundnorm: Störfestigkeit für Industriebereich
DIN EN 61326	leitungsgeführte Störaussendung Gestrahlte Störaussendung

Diese Erklärung bescheinigt die Übereinstimmung mit der genannten Richtlinie, beinhaltet jedoch keine Zusicherung von Eigenschaften. Die Sicherheitshinweise der mitgelieferten Produktdokumentation sind zu beachten.

Aussteller: **Zirox Sensoren & Elektronik GmbH**

Ort, Datum: Greifswald 3.12.2010

Rechtsverbindliche Unterschrift: D. Uhlig

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