

## General notes

The valid "General Conditions for the Supply of Products and Services of the Electrical and Electronics Industry" (ZVEI conditions) including supplementary clause "Extended Retention of Title" apply as the exclusive General Terms and Conditions.

The following points must also be complied with:

- These instructions must be read before installation and putting into operation and all instructions contained therein must be observed!
- Devices must only be connected to safety extra-low voltage. Use shielded cables to avoid damage to the device and faults (e.g. resulting from voltage induction); avoid parallel routing with live lines and comply with the EMC directives.
- This device must be used for its intended purpose only. Respective safety regulations issued by the VDE, the states, their control authorities, the TÜV and the local energy supply company must be observed. The purchaser must ensure that the relevant building and safety regulations are complied with, and must avoid hazards of all kinds.
- No warranties or liabilities will be assumed for defects and damage arising from improper use of this device.
- Consequential damage caused by a fault in this device is excluded from warranty or liability.
- The devices must be installed by authorised specialists only.
- The technical data and connecting conditions of the mounting and operating instructions delivered together with the device are exclusively valid. Deviations from the catalogue representation are not explicitly mentioned and are possible in terms of technical progress and continuous improvement of our products.
- In case of any modifications made to the devices by the user, all warranty claims are forfeited.
- This device must not be installed close to heat sources (e.g. radiators) or be exposed to their heat flow. Direct solar irradiation or heat irradiation by similar sources (powerful lamps, halogen spotlights) must be avoided.
- Operating this device close to other devices that do not comply with EMC directives may influence functionality.
- This device must neither be used for monitoring applications, which solely serve the purpose of protecting people against hazards or injury, nor as an emergency stop switch for systems or machinery, nor for other similar safety-relevant purposes.
- Dimensions of housings or housing accessories may show slight tolerances on the specifications provided in these instructions.
- It is not permitted to modify these documents.
- In case of complaints, only complete units returned in original packing will be accepted.

## Notes

- The voltage output is short-circuit proof. Applying overvoltage will destroy this device.
- In case of contamination, we recommend cleaning and recalibration in the factory.
- The device operating range covers 10...95 % relative humidity, or 0...50 °C. Outside this range, mismeasurements or increased deviations may occur.
- The device performs an automatic calibration at an interval of 7 days. To ensure this function, the device needs to be supplied with fresh air (O<sub>2</sub> content of 20.9 %) at least for 10 minutes during this interval. Negative deviations are compensated for by normalising the maximum value from the interval to 20.9 %; concentrations greater than / equal to 20.9 % in the interval prevent auto-calibration.
- If this device is operated beyond the specified range, all warranty claims are forfeited.

## ATTENTION!

The O<sub>2</sub> concentration of outdoor air in green areas with low levels of industry is usually 20.9 %. This corresponds to an output voltage of 8.36 V. Gas exchange in the sensor element happens by diffusion. Depending on the change in concentration and the flow velocity of the air in the sensor environment, the reaction of the device to the change in concentration may be delayed.

## Mounting and operating instructions

# CONS<sup>ENS</sup>

### External surface-mounted O<sub>2</sub> meter

with voltage output of 0...10 V

### C-AO2-U

#### Options/designs:

Relay (potential-free changeover contact)  
Display  
Display + relay

C-AO2-UR  
C-AO2-UD  
C-AO2-URD

The external surface-mounted oxygen meter C-AO2 measures the O<sub>2</sub> concentration of the ambient air from 0...25 % and converts the measurement signal into the standard signal 0...10 V.

A potential-free changeover contact and/or a backlit display are optionally available. The switching threshold of the changeover contact is set by means of a 270° adjustment knob and always represents the range from 0 % (left stop) to 25 % (right stop). The display content can be rotated by menu in 90° steps (installation position of the device is thus unrestricted); measured value, set switching threshold, switching status and MIN/MAX of the selected interval (1 h / 6 h / 12 h or 24 h) can be displayed.

If the display option is selected, the hinged cover housing BC" L90 W80 H47 mm (without probe attachments, cable glands, etc.) is used.

Symbol photo



Areas of application include: Ventilation and air conditioning, filter monitoring, O<sub>2</sub> monitoring at workplaces, medical facilities, HVAC applications.

The sensor used is characterised by its high level of accuracy, long-term stability and reliability. Auto-calibration can be activated via DIP switch (default setting). In addition, it is possible to calibrate the system manually to 20.9 % O<sub>2</sub> by pressing a button.

**These instructions must be read before installation and putting into operation and all instructions contained therein must be observed!**

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### Technical data:

Electrical connection: screw terminals, max. 1.5 mm<sup>2</sup>  
 Operating voltage: 24 V AC/DC, half-wave rectifier, read the instructions!  
 Current consumption: Ø 20 mA, peak current up to 50 mA  
 Output O<sub>2</sub> content: 0...10 V corresponding to 0...25 %  
 Alarm output, optional: potential-free changeover contact, max. 48 V, 1 A  
 Display, optional: LCD display 128 x 64 pixels, backlight On/Off/Auto

### Sensor, measuring ranges / deviation

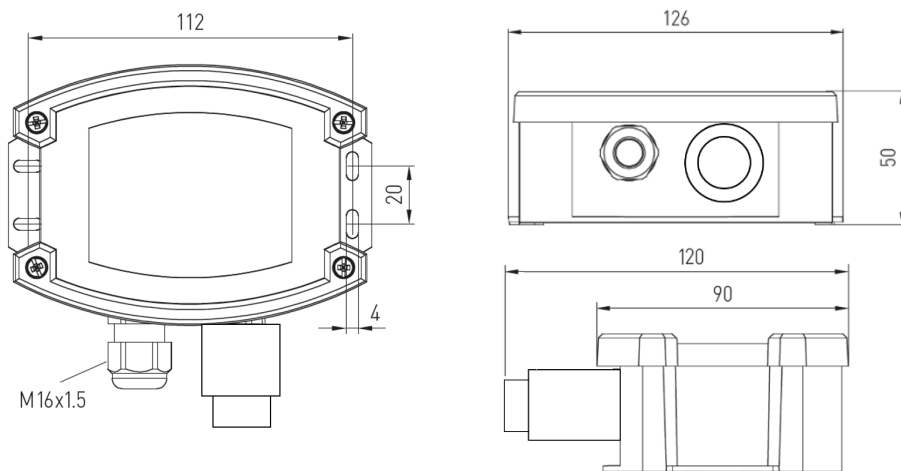
Sensor element: electrochemical O<sub>2</sub> sensor  
 Measuring range: 0...25 %  
 Measuring accuracy: ± 1.0 % plus ± 0.5 % final value  
 @ 20 °C, 45 % RH, 1,013 mbar, auto-calibration activated  
 Temperature dependence: ± 0.1 % of final value / K, based on 20 °C  
 Long-term stability: ± 0.2 % of final value / year, auto-calibration activated  
 Sensor drift: < 3 % / month (relevant for operation without auto-calibration)  
 Warm-up time: < 10 min  
 Response time: < 1 min  
 Gas exchange: by diffusion

### Connection conditions

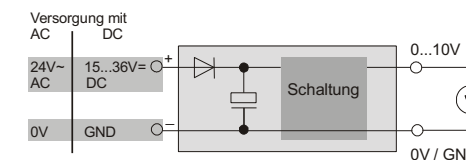
Ambient temperature: 0...+50 °C  
 Work area RH: 10...95 %, non-precipitating air free of harmful substances  
 Storage temperature: -20...+50 °C  
 Turn-on/warm-up time: 20 minutes

### Miscellaneous

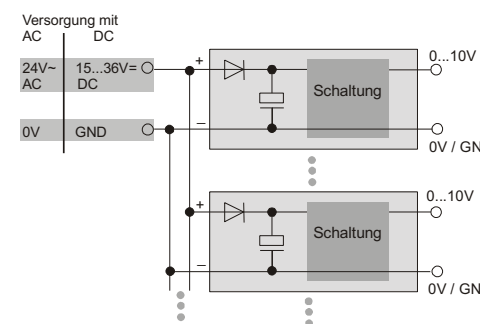
Sensor protection: integrated filter  
 Housing: Tyr 2 plastic, UV-resistant, quick-locking screws  
 Housing dimensions: L126 W90 H50 mm (without probe attachments, cable glands, etc.)  
 Probe attachment: Ø 30 x L40  
 Housing/probe protection type: IP 65/20  
 Protection class: III  
 Scope of delivery: operating instructions, device, transport box  
 Standards: CE, RoHS



For operating voltage reverse polarity protection, a half-wave rectifier or reverse polarity protection diode is integrated in this device version. This internal half-wave rectifier also allows operation with AC supply voltage. The output signal must be tapped by a measuring instrument. Here, output voltage is measured against zero potential (0 V) of the input voltage! If this device is operated with DC supply voltage, the operating voltage input UB+ for 15...36 V DC supply and UB- or GND as the earth cable must be used!



If several devices are supplied by one 24 V AC voltage supply, it must be ensured that all "positive" operating voltage input terminals (+) of the field devices are connected with each other and all "negative" operating voltage input terminals (- = reference potential) are connected with each other (in-phase connection of field devices). All outputs of field devices must be referenced to the same potential!



In case of reversed polarity of the supply voltage at one field device, a supply voltage short-circuit would be caused by that device. The resulting short-circuit current flowing through this field device may cause damage to it.

**Therefore, pay attention to correct wiring!**

### Automatic calibration (default, DIP 1 = on)

The system-related negative drift of electrochemical sensors (consumption) leads to a constant reduction of the sensor output signal. This drift is largely compensated for by the activated auto-calibration (DIP 1 = on). The device performs an automatic calibration at an interval of 7 days. To ensure this function, the device must be supplied with fresh air (20.9 % O<sub>2</sub> content of the air) for at least 10 minutes in a period of approx. 7 days (interval). For self-calibration, the maximum measured value of the interval for the O<sub>2</sub> content in a period of 7 days is stored internally in the device. After the interval has elapsed, this maximum value is normalised to 20.9 % O<sub>2</sub> and the output signal is corrected accordingly. Each time 20.9 % is reached or exceeded within this interval, the auto-calibration for this interval is interrupted.

### Manual calibration (per DIP 2 = on)

Manual calibration can be started independently of the DIP switch setting for activation/deactivation of the O<sub>2</sub> measurement. After connecting the device, ensure that it is operated continuously for at least 10 minutes with fresh air (O<sub>2</sub> content 20.9 %). Manual calibration of the output signal to 20.9 % O<sub>2</sub> (calibration point) is initiated by switching DIP 2 from "off" to "on". After approx. 5 seconds, the new characteristic line is saved and the output is set accordingly. The DIP switch must now be set to "off" again and the device switches to measuring mode.

C-AO2-U, C-AO2-UD

Supply	AC	DC
→ 1	24 V~	15...36 V DC
→ 2	0 V	GND
Output		
3 → (O <sub>2</sub> )	0...10 V	0...10 V

C-AO2-UR, C-AO2-URD

Supply	AC	DC
→ 1	24 V~	15...36 V DC
→ 2	0 V	GND
Output		
3 → (O <sub>2</sub> )	0...10 V	0...10 V
6 / 7 / 8 →	NC / C / NO	NC / C / NO