

2 Principle of Measurement

The O₂-transmitter Oxytrans TR measures continuously and exactly the content of oxygen in liquids and gases. The sensor is especially designed for breweries and further applications with high requirements, e.g. power plants or bioreactors.

The optical principle of measurement is based on the effect of dynamic luminescence quenching by molecular oxygen. The indicator layer on the glass installed in the measuring head is illuminated with a blue-green-light. With this, the indicator molecules are transferred into an excited state and emit a red light and detected by the internal detector.

If oxygen is in the medium, this luminescence effect is prevented by energy transfer to the oxygen molecule. After the collision with the indicator molecule the oxygen molecule is transferred from its ground state (triplet state) to its excited singlet state. As a result, the indicator molecule does not emit luminescence and the measurable luminescence signal decreases linear to existing oxygen concentration. This decrease is the basis for the oxygen calculation.

The O₂-concentration can be displayed in different units like ppb, ppm, etc.

3 Technical Data

Measuring range (liquid phase):	I: 1 ppb – 2 ppm or II: 50 ppb – 30 ppm
Measuring range (gas phase*):	I: 0 – 4,2 %O ₂ or II: 0 – 50 %O ₂
Accuracy (liquid phase):	I: +/- 1 ppb or II: +/- 50 ppb
Accuracy (gas phase*):	I: +/- 0,002%O ₂ or II) +/- 0,03%O ₂
Response time:	t ₉₀ < 10 s
Temperature compensation:	Pt 100
Temperature range: Medium	Measurement: -5 °C - +55 °C (+23 °F - +131 °F) (other measurement ranges on request) Resistance: max. 130 °C (max. 266 °F)
Environment	-20 °C - +70 °C, (-4 °F - +158 °F)
Pressure range:	Max. 12 bar
Material of parts in contact with medium:	Stainless steel 1.4404 (316L), EPDM, PTFE
Process connections:	compatible to Varivent®-Inline-Housings DN 40 (1,5") – DN 150 (6"); others on request
Electrical connections:	
Input	- 3x digital (24 VDC) [3x not used]
Output	- 3x digital (24 VDC) - 2x analog (4-20 mA)
Power Supply	24 V DC
Dimensions:	WxHxD: 160x90x160mm
Enclosure rating:	IP 65

***Remark to gas measurement:**

The sensor can be run in the gas phase under atmospheric conditions to reach the mentioned values. In case of higher or varying pressure an additional pressure measurement for compensation is required.

4 Installation Guidelines

4.1 General Information

The sensors are watertight and can be installed in rooms with high humidity. Degree of protection is IP 65.

Correct installation is a requirement for retention of the degree of protection. The listed working steps and information must be observed.

1. The maximum permissible ambient temperature and temperature of the medium must never be exceeded.
2. If the surface of the sensor/metering tube can become hotter than 70 °C in an application, a warning must be provided and/or a guard to protect against accidental contact.
3. When installing outdoors, provide protection from direct solar radiation.



Warning!

For Cleaning (CIP) used oxidation agents like Peracetic Acid, Chlorine Dioxide, etc. at high concentrations and temperatures can lead to slow response time (reversible, for a short time) up to accelerated ageing behaviour of the optical window coating. Should any particular problems occur, please contact your local Centec office or representative.

Pipe work

The Oxytrans TR should be preferably built into a vertical pipe with flow from the bottom to the top. For the sensor installation into the product line an Inline housing (e.g. type Varivent®) is suitable. If installation point is a horizontal pipe, than the housing windows have to be located at the sides (not on top or bottom of the pipe).



Warning!

When installation work is complete it is advisable to thoroughly flush out the sample pipes so that the system is totally free of metal particles or other solids.

4.2 Sensor Mounting

To install the Oxytrans TR sensor, Centec is able to supply a suitable Varivent®-Inline-Housing. Suitable clamp-rings as well as tools has to be used by qualified person.



Figure 1: Sensor installation

The Oxytrans TR can be installed directly into an Inline housing type Varivent® for diameters DN 40 – DN 150.



Warning

This device must only be installed and operated if a qualified person has inspect the fixing connections as well as the static conditions.

5 Electrical Connection

Warning!



- ◇ The pertinent regulations must be observed for the electrical installation.
- ◇ Ensure, that after sensor installation in the process all cable connections are shut surely to prevent the entry of moisture.

To attach the electrical connections of the Oxytrans TR sensor, the right and left covers of the display front have to be removed and the underlying four screws have to be solved. Now the cover of the sensor can be opened (Figure 2).

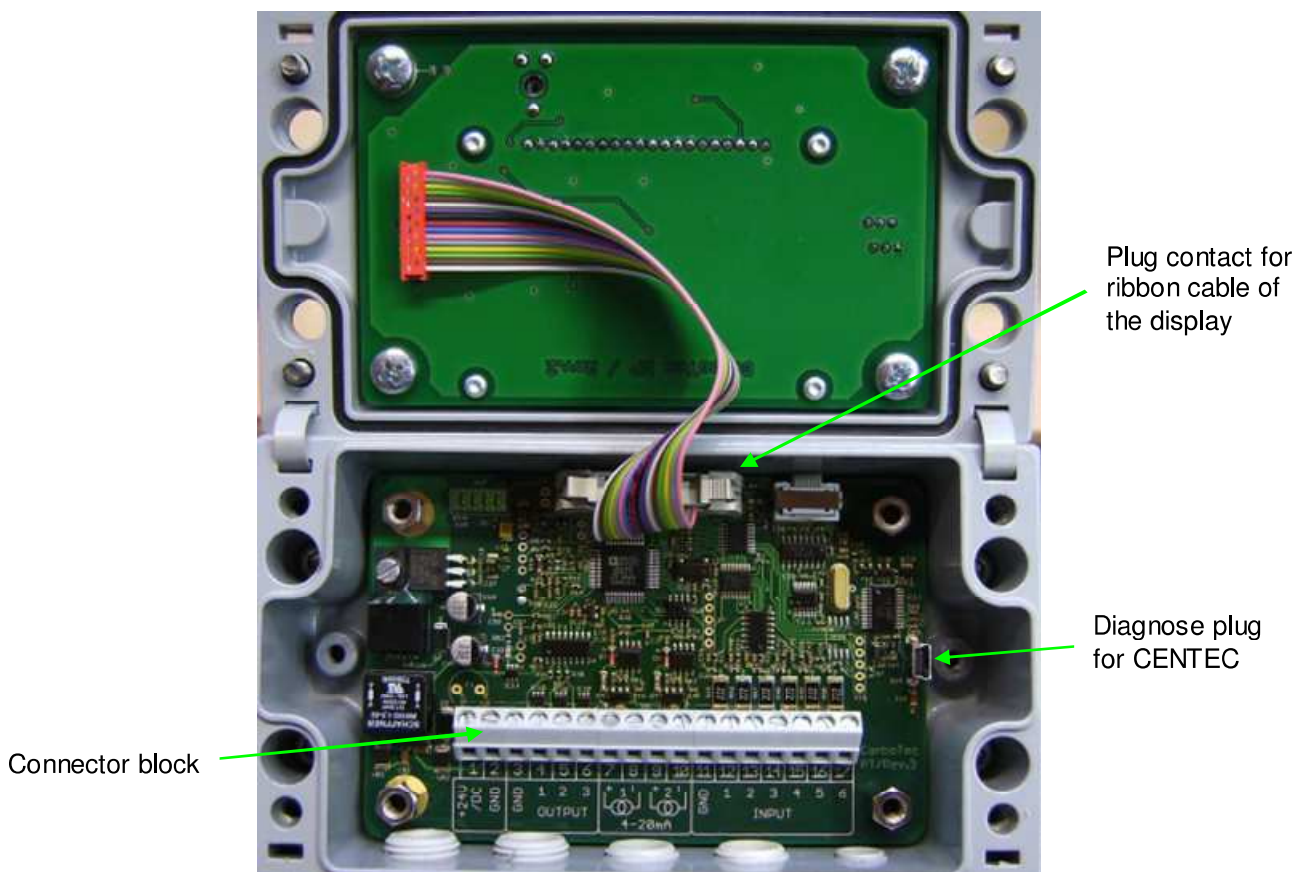


Figure 2: Electronic with electrical connections

Table 1: Electrical pin connection

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
+	-	-	1	2	3	+	-	+	-	-	1	2	3	4	5	6
+24V	GND	GND	D. OUTPUT			AO 1		AO 2		GND	DIGITAL INPUT*					

* The Digital Inputs 3-5 of the Oxytrans TR are not connected and cannot be used.

The **power supply** voltage of the sensor (24V DC) is attached on the connector block to the pins 1 (+VCC) and 2 (GND) (see table 1: Electrical pin connection). Optionally the analogue outputs 1 and 2 can be attached; 4 - 20mA.

The **digital outputs** 1-3 are reserved for alarm messages. The allocation which alarm on which digital output is, you can see in Table 2. The voltage level amounts to 24VDC regarding GND.

Note: The digital output Dig Out 3 possesses with inverse logic, that means the output is high signal (24VDC), if no error is present!

The **digital input** 1 is reserved to apply a Start/Stop signal. At digital input 2 you can toggle the two sample rates (see chapter 6.2.1.5 Sample Rate 1 and 2). With a "True" signal (24VDC) you select the sample rate 2. A zero or not connected digital input 2 activates the sample rate 1.

With the digital input 6 a Freeze signal can be applied. The voltage level for both is as well 24VDC regarding GND. For details see table 3.

Table 2: Digital output

3	4	5	6
-	1	2	3
GND	Dig. Out 1	Dig. Out 2	Dig. Out 3
	High Limit (H) and Low Limit (L) Alarm	High High Limit (HH) and Low Low Limit (LL) Alarm	General Alarm (e.g. Humidity alarm, temperature measurement broken, etc.)

Table 3: Digital input

11	12	13	14-16	17
-	1	2	3-5	6
GND	Dig. In 1	Dig. In 2	Dig. In 3-5	Dig. In 6
	Stand-by (Start/Stop)	Change Sample Rate	Not connected	Freeze Signal
	True = Stop	True = Sample Rate 2		True = Freeze

Remarks:

1) The use of the Digital input 1 as Stand-by or Start/Stop-Signal is strongly recommended to enlarge the lifetime of the optical window.

2) The use of the Digital input 6 as Freeze signal is recommended especially in front of the filler. Additionally can be the time freely adjusted how long the displayed frozen O₂-value is effectively displayed (see chapter 6.3.3 Freeze Delay - Adjustments). The Freeze Delay is the time in seconds till the last O₂-value is still in Display after deactivating (current-less) the Digital input 6 (freeze signal).

The following rules apply generally for the signal cables:

- Use only screened, two-wire cables twisted pair
- Cables have to be separated from cables with voltages >60 V
- Avoid laying near to large electrical installations
- The specifications only apply for properly executed installations.



Warning!

After sensor connection of power supply and all signal wires are made, take care, that all cable entries are tighten well and no humidity can enter the electronic housing!

6 Handling the sensor

6.1 Main Menu



Figure 3: Standard screen

If the voltage supply of the sensor is switched on, the standard-screen with the measured values appears on the display (figure 3).

In the first line is the active sample rate shown in seconds, means after which time in seconds is a new value generated (s. page 21 ff).

In the second line the measured oxygen content of the medium with the selected unit is shown. If the measured value is outside of the measuring range, lines appear (- - - -) as shown in figure 3.

The third line shows the medium temperature in °C.

The last line is reserved for alarm messages (not visible resp. active in above figure 3). Here it is indicated whether the adjusted alarm borders are exceeded or the range limit is reached.

The measuring range is depending from the pre-setting at stage of supply and used optical type of window. It is 1 ppb to 2 ppm or 50 ppb to 30 ppm. The measuring range is not switchable by the customer, but it can be reprogrammed with support by Centec.