

Lambda-DL

Oxygen sensor



Programming Installation instructions

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Safety requirements



All installation and wiring work on the controller must only be carried out in a zero volt state. The opening, connection and commissioning of the device may only be carried out by competent personnel. While doing so, they must observe all local safety requirements.

This device is state of the art and meets all necessary safety regulations. It may only be used in accordance with the technical data and the safety requirements and regulations listed below. When using the device, also observe the statutory and safety regulations apposite to the particular use. Any other use will automatically void all warranty rights.

- The device must only be installed in a **dry** interior room.
- It must be possible to isolate the controller from the mains using an omnipolar isolating facility (plug/socket or 2-pole isolator).
- Before starting installation or wiring work, the controller must be completely isolated from the mains and protected against reconnection. Never interchange the safety low voltage connections (e.g. sensor connections) with the 230 V connections. Destruction and life threatening voltages at the device and the connected sensors may occur.
- Solar thermal systems can become very hot. Consequently there is a risk of burns. Proceed with caution when fitting temperature sensors.
- For safety reasons, the outputs should only be left in manual mode when testing. In this operating mode, no maximum temperatures or sensor functions are monitored.
- Safe operation is no longer possible if the controller or connected equipment exhibits visual damage, no longer functions or has been stored for lengthy periods in unsuitable conditions. If this is the case, disable the controller and equipment and secure against unintentional use.

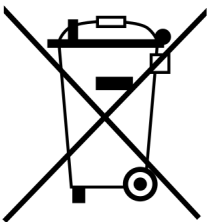
Maintenance

If treated and used correctly, the device will not require any maintenance. Use a cloth moistened with mild alcohol (such as methylated spirits) to clean. Never use corrosive cleaning agents or solvents such as chloroethylene or trichloroethylene.

No components relevant to long term accuracy are subject to loading if the device is used correctly. Consequently long term drift is extremely low. The device therefore cannot be calibrated. Thus applying any compensation is impossible.

The design characteristics of the device must not be changed during repairs. Spare parts must correspond to the original spare parts and must be used in accordance with the build version.

Disposal



- Devices no longer in use or beyond a state of repair must be disposed of in an environmentally responsible manner by an authorised collection point. They must never be treated as ordinary household waste.
- We can undertake the environmentally responsible disposal of devices sold by the Technischen Alternative company upon request.
- Packaging material must be disposed of in an environmentally responsible manner.
- Incorrect disposal may result in considerable damage to the environment, as many of the materials used require professional handling.

Function description

The Lambda-DL oxygen sensor consists of a platinum-zirconium probe and a measuring amplifier. The operating principle is akin to that of a Lambda probe. The measuring cell of the probe requires a minimum operating temperature of approx. 650 °C. It therefore has an integral heater which is switched via the DL bus. The probe heater is very economical and takes about **three** minutes to reach the operating temperature. Only then can valid measurements be expected.

The Lambda probe is suitable for measuring the oxygen concentration in all non-aggressive environments up to an ambient temperature of 300 °C, so for primary air/secondary air/flue gas fan control in boilers, for example. When taking measurements in combustion gases, ensure the sulphur content is very low. The measuring amplifier has a connection for a type "K" thermocouple (special accessory), to determine flue gas temperatures up to a maximum of 600 °C.

The sensor can only be used in conjunction with controllers with **x2 technology** (e.g. **UVR16x2**).

The measurements are transmitted to the controller via the data link (DL bus).

The Lambda probe must never be placed in an environment with an oxygen content of less than 2 %, as this will damage it.

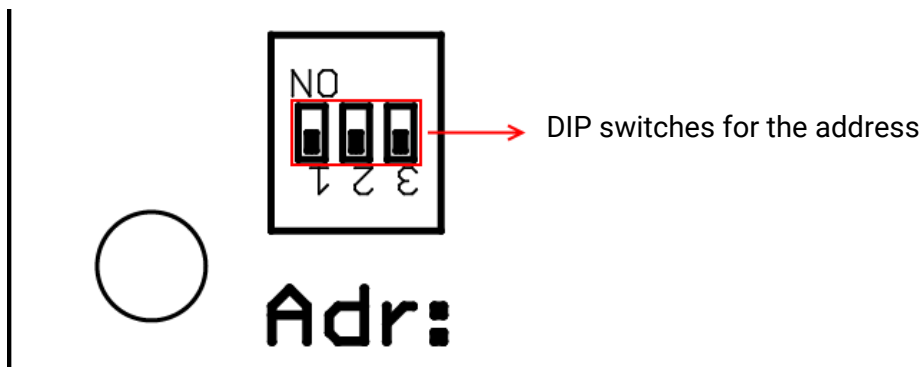
Measurements

The oxygen sensor is supplied via the 230 V mains connection and an integral switching power supply unit. After activation, it reports the measurements at the request of the controller.

The request is made up of the **address** of the sensor and the **index** of a measurement captured there.

Every DL sensor must have its own address in the DL bus network.

The **address** is determined on the PCB with DIP switches, which are labelled 1, 2 and 4. These are located on the outer edge of the PCB. If the DIP switches are not in the "ON" position, address 1 is assigned to the sensor (factory setting). Provided no other sensors are connected to the DL bus, no change of address is required.



The new address is derived from address 1 (= factory setting) plus the sum of all the values cut.

Example: Required address 6 = 1 (from factory setting) + 1 + 4
= conductors 1 and 4 must be cut

Index allocation

The **index** of each measurement is fixed:

Index	Measurement	Note
1	Oxygen content [0.1 %]	Lambda probe
2	Temperature [0.1 °C]	Type "K" thermocouple
3	Heater current [10 mA = 1]	
4	Temperature [1 °C]	Type "K" thermocouple
5	Status	0 = Sensor inactive 1 = Sensor heating in progress 2 = Sensor active 4 = Sensor calibrated 6 = DL timeout 7 = Probe error

Notes on index 2 and 4 (temperature):

The measurement **index 2** is shown to one decimal place, i.e. the temperature is displayed **correctly** in the controller.

The measurement **index 4** results in a value reduced by a **factor of 10**.

Example: "25.0 °C" is shown for 250 °C. This corresponds to the readout of a thermocouple with a measuring amplifier (type THEL...). This allows the value to be used in the same way as an input variable in functions.

Special displays in DL bus index 1 (O₂)

The following display values can be shown instead of the O₂ content:

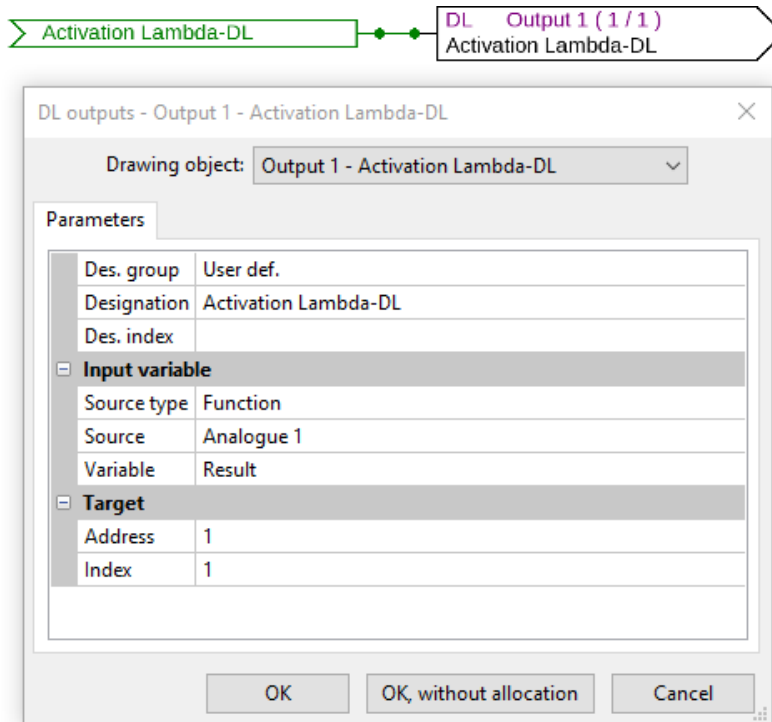
Display value	Meaning
0	Sensor switched off via DL bus
9999	Calibration not successful

In addition, index 1 shows the progress of the calibration process from 0 to 100 %.

Parameter settings with UVR16x2

Activating the sensor by switching on the heater

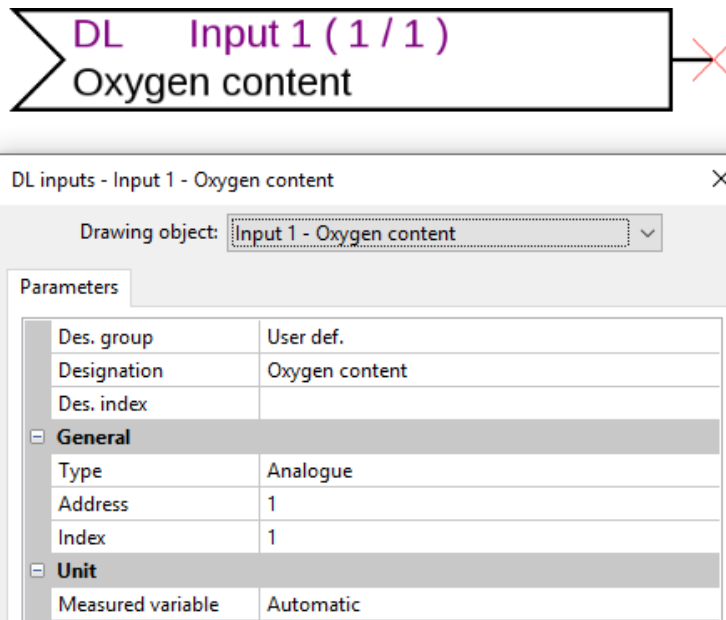
For activation, a **digital DL output** is programmed.



Example: Activation of a Lambda DL with DL address 1 via index 1.

Adopting measurements with UVR16x2

The measurements are adopted as **analogue DL inputs**.

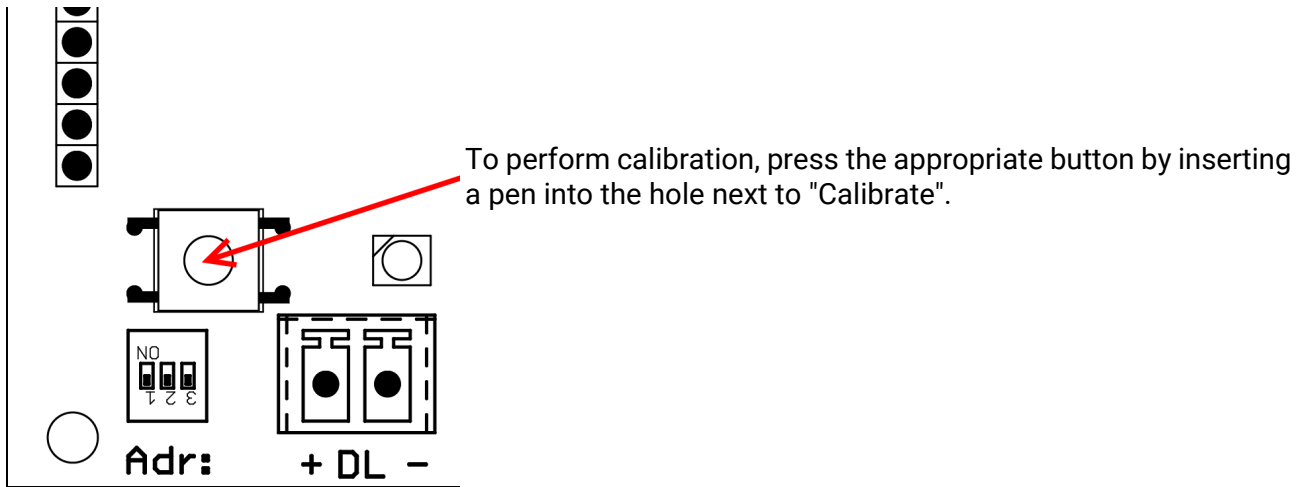


Example: Reading the oxygen content of a Lambda DL with address 1 via its index 1.

Calibration

Manual calibration is recommended both before the first use of the probe and after each boiler service.

For each calibration, the sensor must be located in a normal indoor air environment (20.7 % O₂). The calibration procedure can take up to 15 minutes.



Throughout the entire calibration process, **4** is shown at index 5 (status) via the DL bus. In addition, index 1 displays the progress of the calibration process from 0 to 100 %.

The calibration process is aborted if the 230 V mains power supply is interrupted or there is an interruption between probe and circuit.

Caution: Probe heating is activated during calibration, so extreme temperatures occur at the probe!

Indicator lights

There are 2 LED lights on the front of the enclosure:

- **Sensor active** illuminates as soon as the switch-on command has arrived via the DL bus.
- **Power supply** illuminates when the 230 V mains supply is present.

Installation

Installation using tools such as torque wrenches or impact wrenches is not permitted, as excessive torque can damage the heating element, probe and enclosure.

Care must be taken during installation not to bend the cable, expose it to excessive tension or twist it. When making contact between components, ensure you have clean hands and a dry working environment.

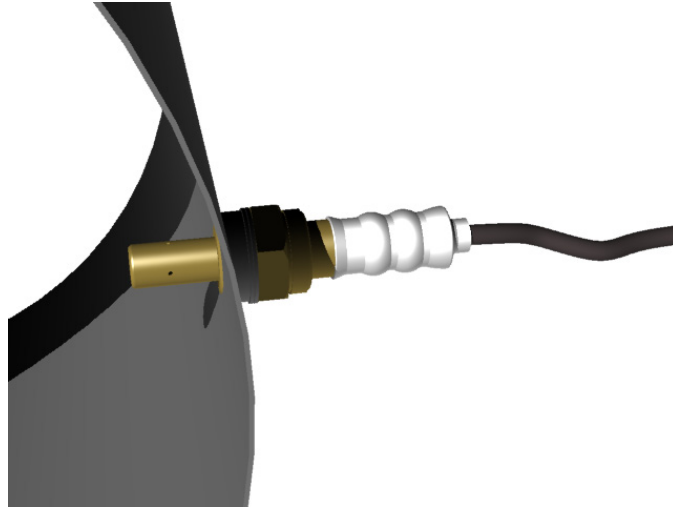
Screw the enclosure tray to the wall through the two holes provided, using the supplied fastenings.

The electronics enclosure may only be installed in dry rooms.

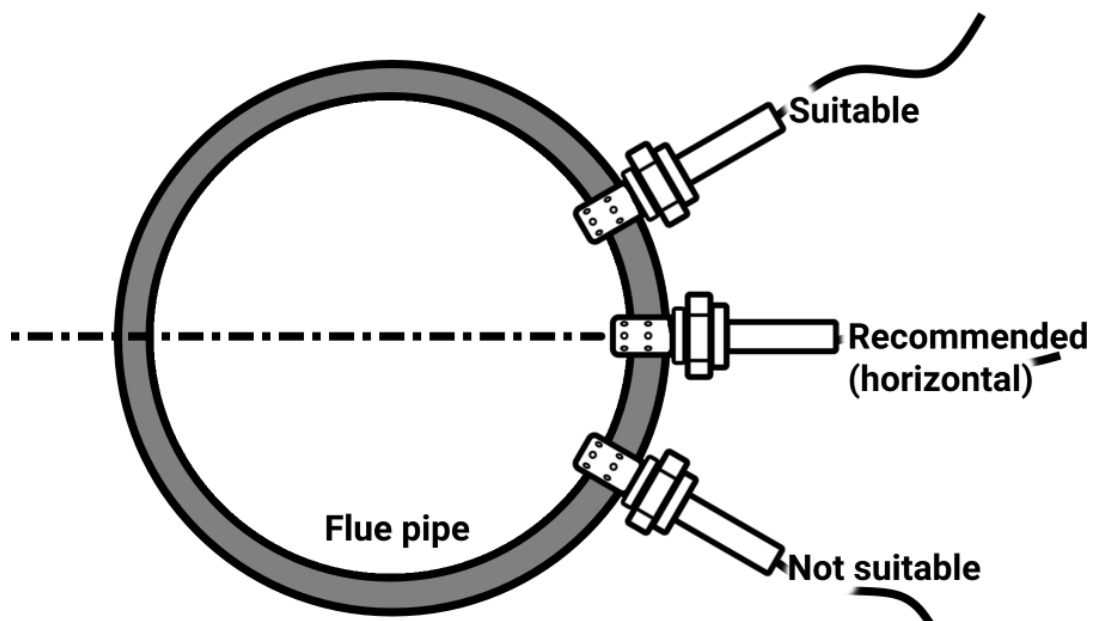
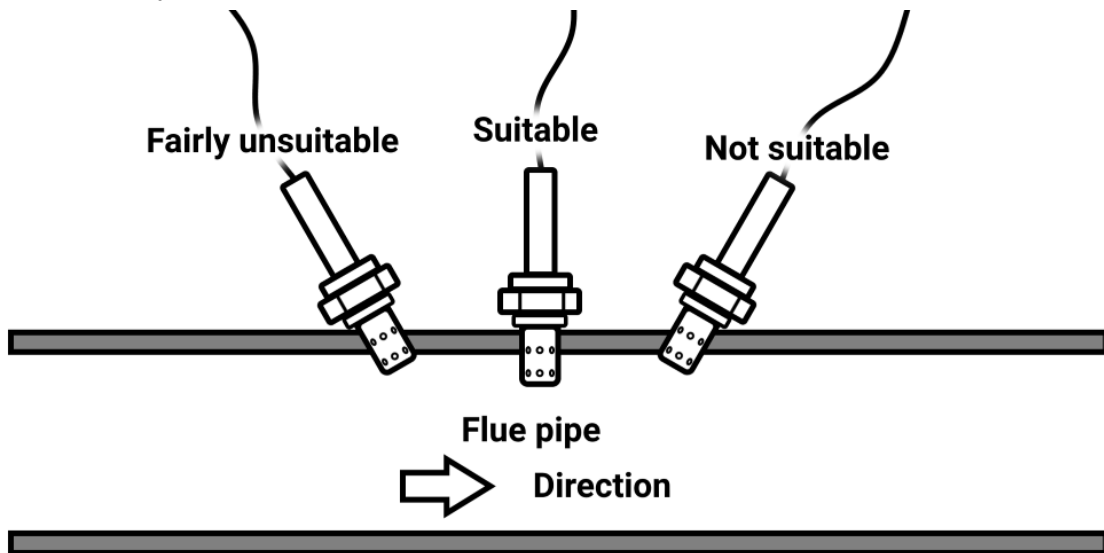
After plugging in the cables, reinsert the cover into the enclosure tray.

Use as a flue gas sensor

A tube with a suitable inside diameter and approx. 2 mm wall thickness is welded into the flue pipe. The sensor is screwed into the tube using the thread (M18x1.5).



If used as a flue gas sensor, the sensor should, as far as possible, be fitted in the flue pipe so it protrudes horizontally and at a right angle.

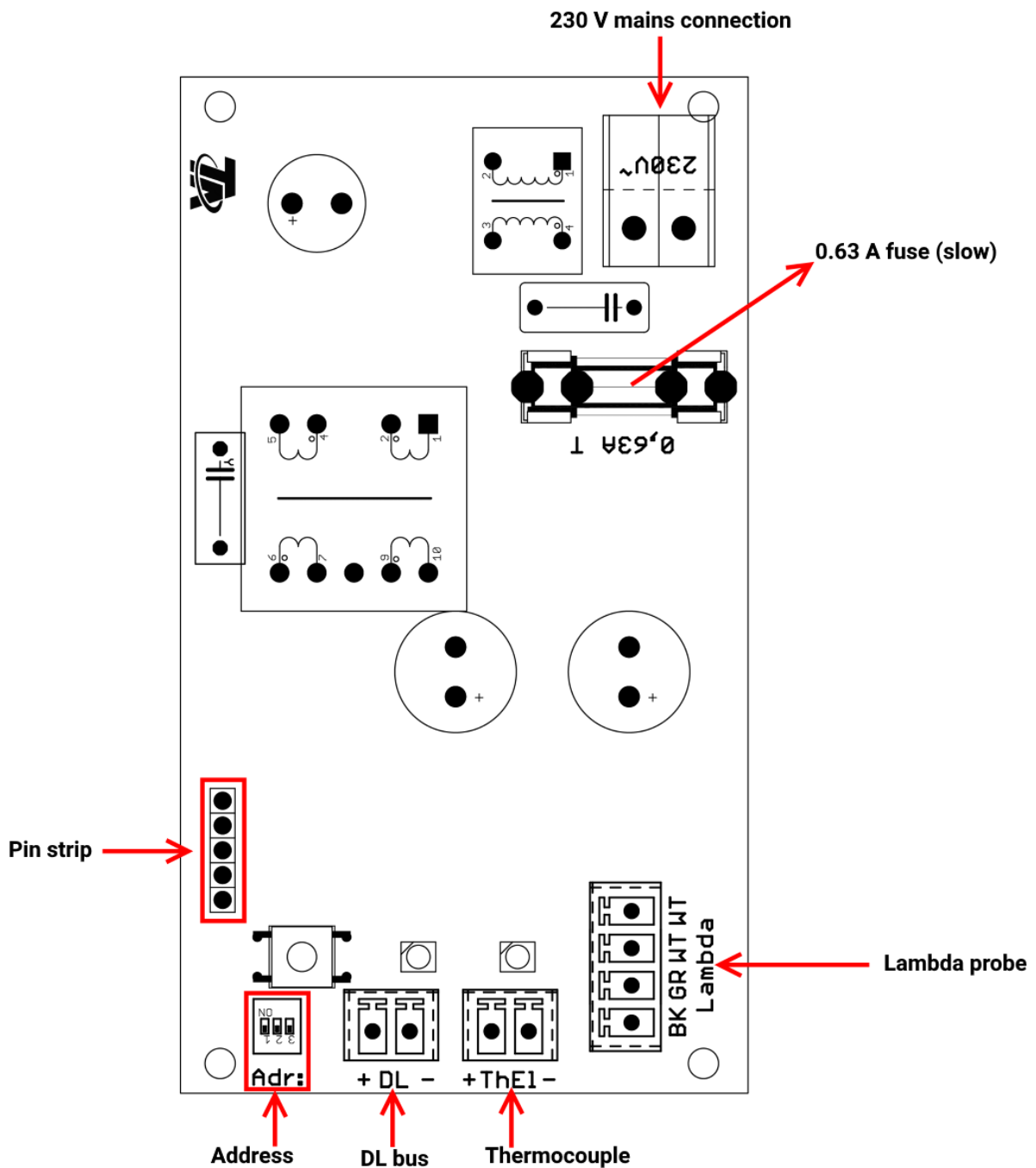


Electrical connection

Connections on the PCB:

1. **Mains connection** 230 V 50 Hz
2. **Data link (DL): The polarity must be observed.** The positive pole in the UVR1611 is connected to output 14 (DL bus); the negative pole to the sensor earth (GND). UVR16x2: Connection to terminals "DL" and "GND".
3. Any cable with a cross-section of 0.75 mm² (e.g. twin core) up to max. 30 m in length can be used for the data link. For longer cables, we recommend the use of a screened cable.
4. **Thermocouple (THEL):** Only type "K" thermocouples may be connected. **Observe the polarity:** The green core must be connected to the positive pole; the white core to the negative pole.
5. **O₂ sensor:** The 6-pin connector of the sensor is unmistakable.

Note: To protect against lightning damage, the system must be earthed in accordance with regulations and equipped with surge arresters.



Technical data

Casing dimensions:	126.8 mm x 76.5 mm x 45.5 mm
Building IP rating:	IP 20
Permiss. ambient temperature for electronics	0 °C to +45 °C
Fuse:	0.63 A (slow) (20x5 mm)
Max. permiss. ambient temperature of probe:	300 °C
Sensor cap dimensions: (length from thread)	10.5 mm x 29.5 mm
Cable length of lambda probe:	130 cm
Lambda probe thread:	M18x1.5
Standby power consumption:	0.2 W
Operating power consumption:	9 W incl. heater
DL bus load:	12 %

Subject to technical modifications as well as typographical and printing errors. This manual is only valid for devices with the corresponding firmware version. Our products are subject to constant technical advancement and further development. We therefore reserve the right to make changes without prior notice.

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EU Declaration of conformity

Document- Nr. / Date: TA19005 / 05.02.2019
Company / Manufacturer: Technische Alternative RT GmbH
Address: A-3872 Amaliendorf, Langestraße 124

This declaration of conformity is issued under the sole responsibility of the manufacturer.

Product name: Lambda-DL
Product brand: Technische Alternative RT GmbH
Product description: Oxygen sensor

The object of the declaration described above is in conformity with Directives:

2014/35/EU Low voltage standard
2014/30/EU Electromagnetic compatibility
2011/65/EU RoHS Restriction of the use of certain hazardous substances

Employed standards:

EN 60730-1: 2011 Automatic electrical controls for household and similar use – Part 1: General requirements
EN 61000-6-3: 2007 + A1: 2011 + AC2012 Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments
EN 61000-6-2: 2005 + AC2005 Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments
EN 50581: 2012 Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

Position of CE - label: On packaging, manual and type label



Issuer: Technische Alternative RT GmbH
A-3872 Amaliendorf, Langestraße 124

This declaration is submitted by

A handwritten signature in black ink, appearing to read 'Schneider Andreas', is written over a light blue horizontal line.

Dipl.-Ing. Andreas Schneider, General manager,
05.02.2019

This declaration certifies the agreement with the named standards, contains however no warranty of characteristics.

The security advices of included product documents are to be considered.

Warranty conditions

Note: The following guarantee conditions do not in any way limit the legal right to warranty, but rather expand your rights as a consumer.

1. The company Technische Alternative RT GmbH provides a two-year warranty from the date of purchase for all the devices and parts which it sells. Defects must be reported immediately upon detection and within the guarantee period. Technical support knows the correct solution for nearly all problems. In this respect, contacting us immediately will help to avoid unnecessary expense or effort in troubleshooting.
2. The warranty includes the free of charge repair (but not the cost of on site fault-finding, removal, refitting and shipping) of operational and material defects which impair operation the event that a repair is not, for reasons of cost, worthwhile according to the assessment of Technische Alternative, the goods will be replaced.
3. Not included is damage resulting from the effects of over-voltage or abnormal ambient conditions. Likewise, no warranty liability can be accepted if the device defect is due to: transport damage for which we are not responsible, incorrect installation and assembly, incorrect use, non-observance of operating and installation instructions or incorrect maintenance.
4. The warranty claim will expire, if repairs or actions are carried out by persons who are not authorised to do so or have not been so authorised by us or if our devices are operated with spare, supplementary or accessory parts which are not considered to be original parts.
5. The defective parts must be sent to our factory with an enclosed copy of the proof of purchase and a precise description of the defect. Processing is accelerated if an RMA number is applied for via our home page www.ta.co.at. A prior clarification of the defect with our technical support is necessary.
6. Services provided under warranty result neither in an extension of the warranty period nor in a resetting of the warranty period. The warranty period for fitted parts ends with the warranty period of the whole device.
7. Extended or other claims, especially those for compensation for damage other than to the device itself are, insofar as a liability is not legally required, excluded.

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