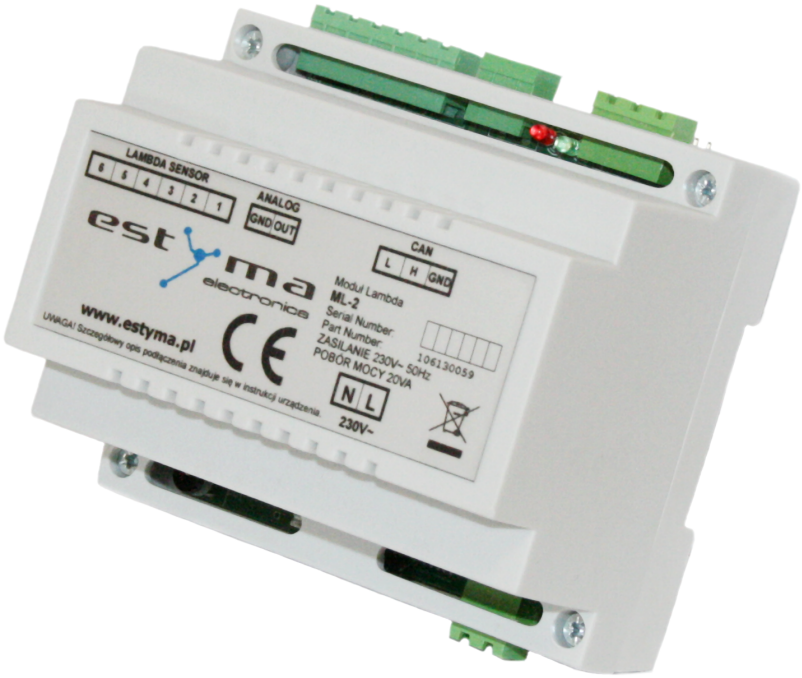
USER MANUAL



LAMBDA PROBE MODULE

ML-2

estyma electronics

Spis treści

1 General information

Thank you for choosing our product and congratulations on a good decision. We will be grateful for comments concerning the unit's performance.

ESTYMA electronics
Team

1.1 Introduction

Lambda probe module is used to measure the amount of oxygen in the exhaust. Using the oxygen sensor module carries a number of advantages:

- is limited emission of carbon monoxide into the atmosphere,
- decreases fuel consumption,
- boiler component life is extended.

The module has two communication options:

- analog voltage output (0-5V),
- known for its automotive CAN bus.

Using the latest generation of broadband Bosch oxygen sensor can accurately measure the oxygen content throughout its range (0-20,9%).

Precise measurements of such a wide range of the controller is able to precisely control the combustion process the full range of power.

Applied Lambda probe is equipped with electric heater, which ensures proper warming probe measurements, regardless of the exhaust temperature.

1.2 Contents

1. Lambda Module ML-2
2. Wideband Lambda sensor from Bosch
3. CAN communication cable in length 1.5 m
4. Probe connecting cable with socket
5. Terminal connections
6. Power cord

1.3 Safety precautions

Warning – risk of electric shock!

- Read this operation manual carefully and thoroughly before using the unit.
- Keep this operation manual and refer to it whenever you work with this unit in the future.
- Apply all the rules and heed all the warnings included in the unit operation manual.
- Make sure that the unit is not damaged. In case of any doubts, do not use the unit and contact the supplier.
- In case of any doubts concerning the safe operation of the unit, contact the supplier.
- Pay special attention to all warning signs on the unit casing and its package.
- Use the unit as intended.
- The unit is not a toy. Do not allow children to play with it.
- Under no circumstances children should be allowed to play with any parts of the package of the unit.
- Access to small parts such as clamping screws or bolts should be secured against children. Such elements may be delivered with the unit and may result in choking when swallowed by a child.
- Do not make any mechanical or electrical changes to the unit. Such changes may cause the unit to malfunction and fail to meet the relevant standards, leading to an adverse impact on the performance of the unit.
- Do not insert any objects into the unit through openings (e.g. ventilation grills), as this may cause short circuiting, electric shock, fire or damage to the unit.
- Do not allow water, humidity or dust to enter the unit, as this may cause short circuiting, electric shock, fire or damage to the unit.
- Provide adequate ventilation of the unit, do not cover or block the ventilation grills, and ensure that there is free flow of air around the unit.
- The unit should be installed indoors unless it is adapted for outdoor operation.
- Do not expose the unit to mechanical impacts and vibrations.
- When connecting the unit to power supply, make sure that the parameters of the supply network are within the unit’s operating range.
- All electrical connections must be as shown in the electrical assembly drawings and must comply with national and/or local regulations concerning electrical connections.

1 General information

- This unit contains no parts that may be replaced by the user. All maintenance work except for cleaning, fuse replacement (when the unit is de-energized), and function setting, should be performed by an authorized service provider.
- Before doing any maintenance work, you must cut off the power supply to the unit.
- Do not clean the casing of the unit with petrol, solvents or any other chemicals that may damage the casing of the unit. Using a soft cloth is recommended.

1.4 Disposal of old equipment

This electronic equipment is made of materials which are partly recyclable. Therefore, when the equipment has reached the end of its service life, take it to an electrical and electronic equipment recycling centre or to the manufacturer. The equipment must not be disposed of with other household waste.

2 Connecting to the system

2.1 General requirements

Read this operation manual carefully and thoroughly before you start using the unit.
The person installing the unit should have sufficient technical experience.
Copper wire connections should be designed to work in temperatures of up to +75ºC .

All connections made must be as shown in the electrical wiring assembly drawings and must be compliant with national and/or local regulations concerning electrical connections.

WARNING !!! *Wiring must be done with the device disconnected from the mains. Connections should be exercised by a person possessing adequate permissions in this area.*

WARNING !!! *The device must be connected to a separate electrical circuit equipped with an appropriately sized circuit breaker and residual current circuit breaker.*

WARNING !!! *With any assembly work must be absolutely disconnect the unit from the electricity grid. During normal operation of the device enclosure of the oxygen sensor heats up to high temperatures. There is a danger of burns!*

2 Connecting to the system

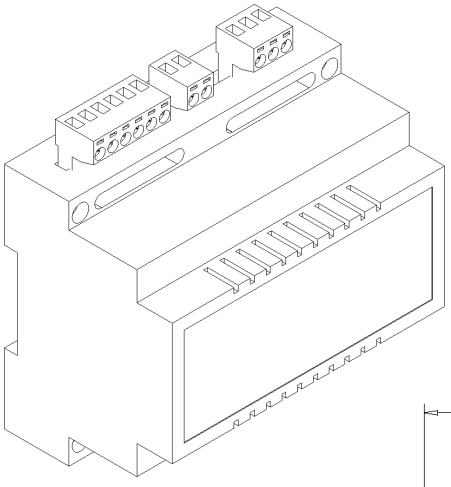
2.2 Location

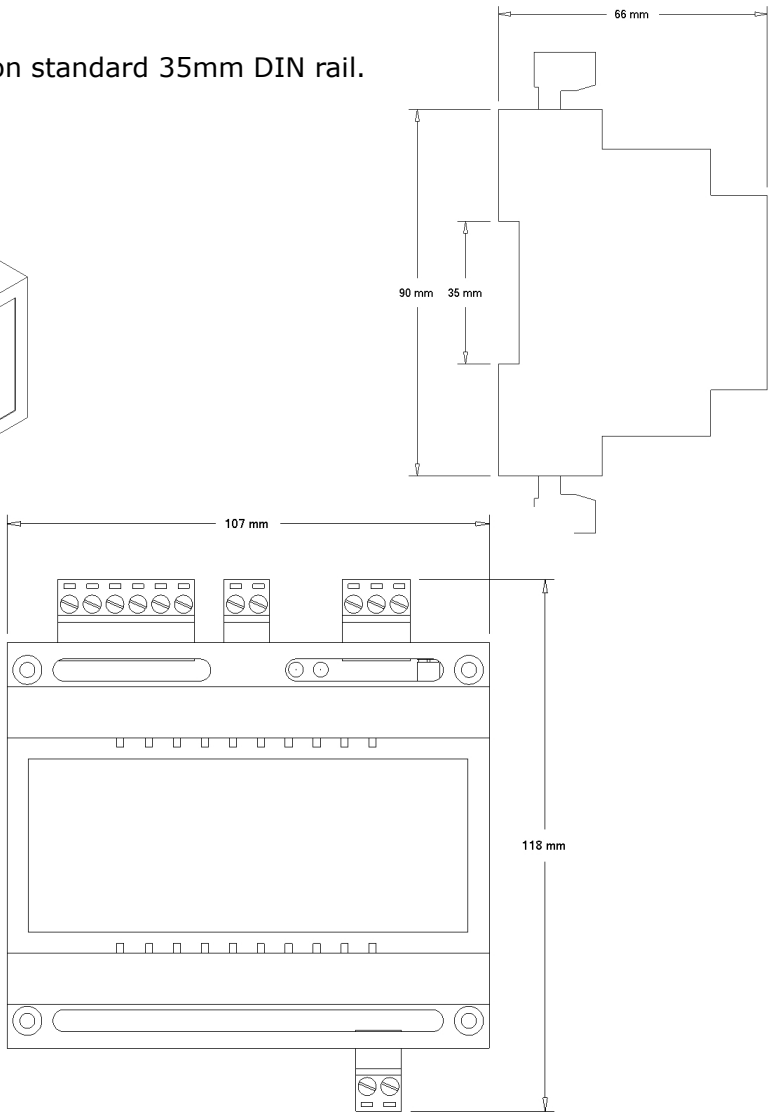
The unit is intended for indoor installation only. After selecting the location, make sure that it meets the following requirements:

1. The location must be free from excessive humidity and flammable or corrosive vapours.
2. The unit must not be installed near high power electrical equipment, electrical machines or welding equipment.
3. The temperature in the location must not exceed 60ºC and should not be lower than 0ºC. Humidity should be within the range from 5% to 95%, with no vapour condensation.

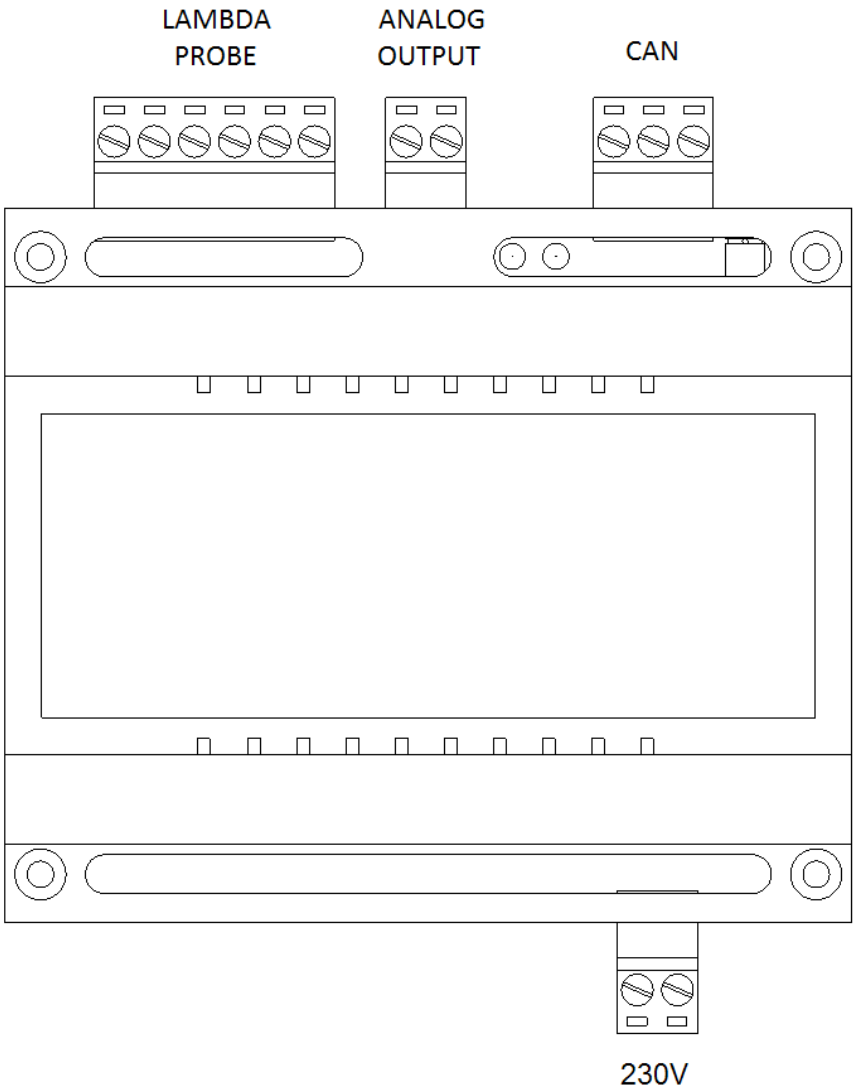
2.3 Assembly

The unit is suitable for mounting on standard 35mm DIN rail.





2.4 Connections



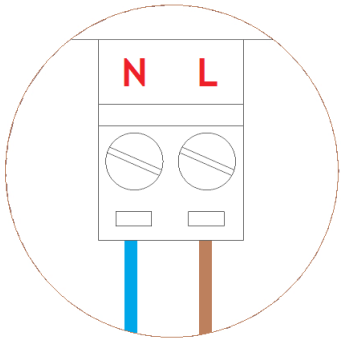
Interface description:
LAMBDA PROBE – Lambda probe connector
ANALOG OUTPUT – Analog tension output (0-5V)
CAN – CAN bus
230V – Power supply module

2 Connecting to the system

2.4.1 Power supply

The power supply is 230V.

Following diagram illustrates how to connect the power cord.

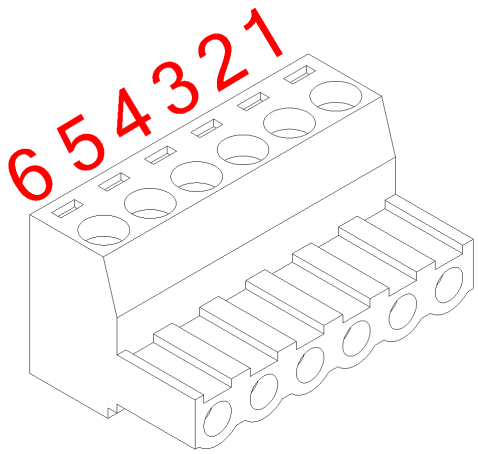


Connecting description:
N – neutral conductor (blue)
L – phase conductor (brown)

2.4.2 Lambda probe

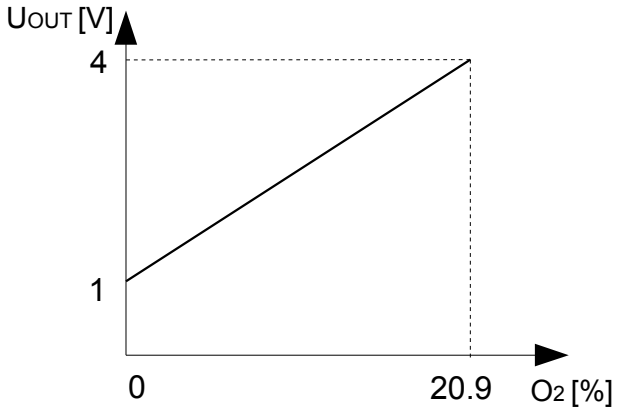
Lambda probe is connected to the module via a terminal block located at the end of the cable.

If you disconnect the connecting cables from the strip must be screwed in accordance with the schedule set out below. Any other connection may cause the unit to malfunction and even damage.



2.4.3 Analog output

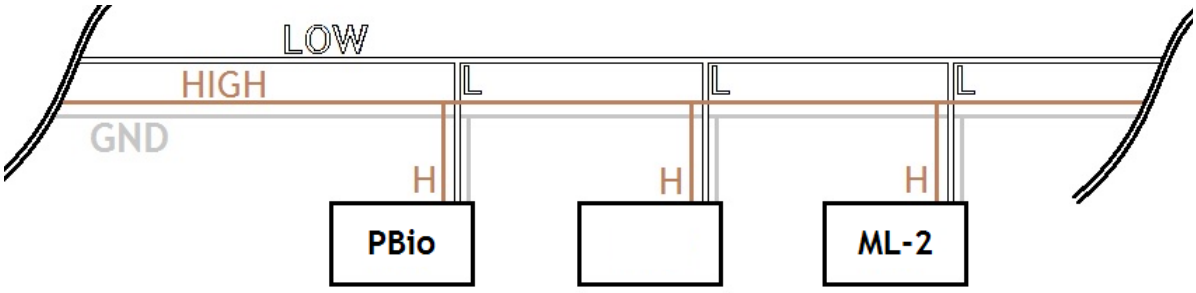
The module also has analog output voltage which varies with the change of oxygen content in exhaust gases. Permissible output is 10mA.
The chart below shows the output characteristics.



2.4.4 CAN

The CAN bus is used for communication between the Lambda module and other devices of the circuit.

For the connection to the CAN bus, use LiYCY 2x0,25 cable.
Only this type of cable gives proper operation of equipment.



Connecting description:
L – LOW line (white)
H – HIGH line (brown)
GND – ground (gray)

2 Connecting to the system

Details of transmission CAN (firmware version 2.3)

1. Introduction

   CANopen protocol is used, and the module address (node ID) is 80 (0x50 hex).

   Transmission speed is 125kb/s.

   Module sends periodically (every 1s) heartbeat frame with DLC = 1, the value of 0x5.

   Frames are sent periodically TxPDO every 200ms.

2. The content of individual TxPDO (direction of the module ML-2):

TxPDO1 (device status)		
DLC	Byte No. (from start of frame)	The importance of data
8	0	Device status byte: bit 0 - on and off the controller (after CAN or automatically) bit 1 - enabled controller itself, or the lack of communication over CAN bit 2 - initial warm-up phase, low power bit 3 - the main phase of warming, increased power bit 4 - Probe warmed up, normal operation, current control Ip, measurement of voltages, etc.
	1	Information about incorrect work probe: bit 0 - if one minute after the inclusion of the probe temperature reaches 780 ºC bit 1 - voltage outside the scope of the virtual mass
	5	PWM heater [0-255]
	6	Software version (number before the comma)
	7	The software version (the number after the decimal point)

TxPDO2 (data from A/C 0-3)		
DLC	Byte No. (from start of frame)	The importance of data
8	0-1	Pump current Ip in µA
	2-3	Heater temperature in ºC
	4-5	Voltage virtual mass VGND in samples of the ADC
	6-7	The value of oxygen in % * 100

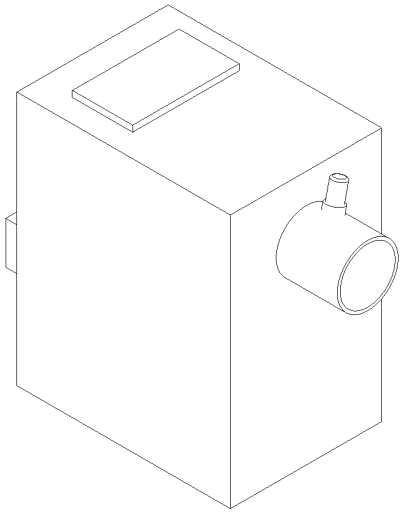
3. The content of individual RxPDO (direction to the module ML-2):

RxPDO1		
DLC	Byte No. (from start of frame)	The importance of data
8	0	bit 0 – on and off the controller, heater probe (1 – ON, 0 – OFF)

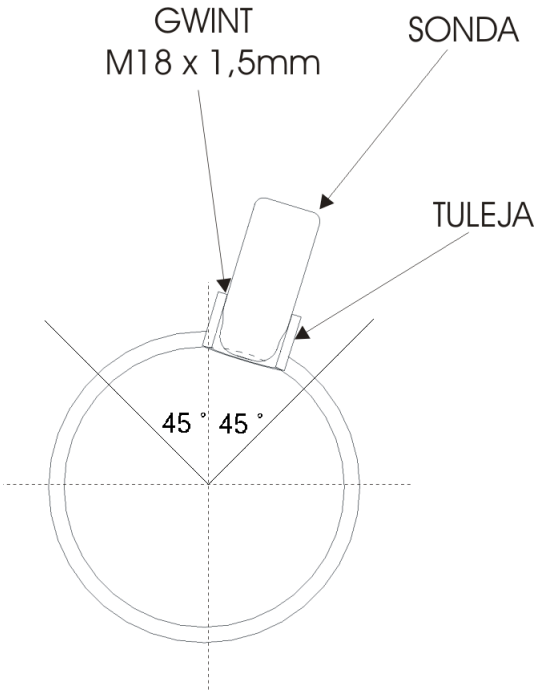
2 Connecting to the system

2.5 Mounting Lambda probe

Lambda probe must be placed at the outlet from the boiler exhaust.

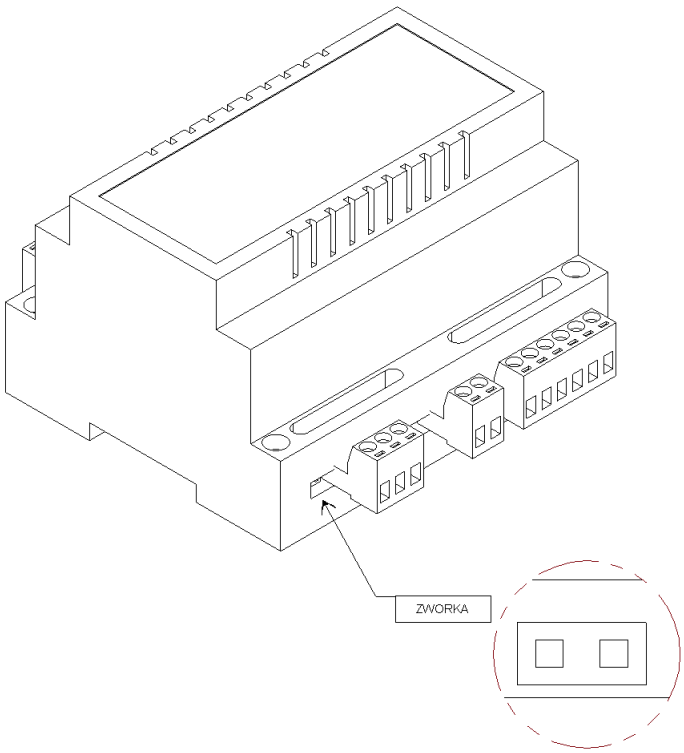


For proper installation is required bushing on threaded M18 x 1.5 mm, in which screw the probe. Recommended setting the probe should be between 0-45°. Exceeding these values may result in shortening the life of the probe.



3 Configuration and usage

3.1 Terminator



Jumper is used to set the terminator.

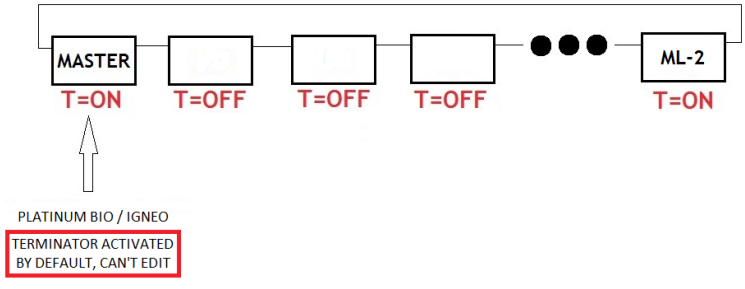
In the whole CAN network **must be** 2 terminators:

1. Normally includes a main unit, such as Platinum Bio.
2. Must be set manually on the last module.

Terminator must be included on the module farthest from the MASTER unit.

The Lambda probe module ML-2 is activated by setting up a jumper on both pins.

The diagram below shows how to set the terminators across the network.

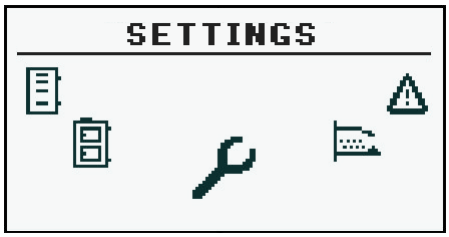


3 Configuration and usage

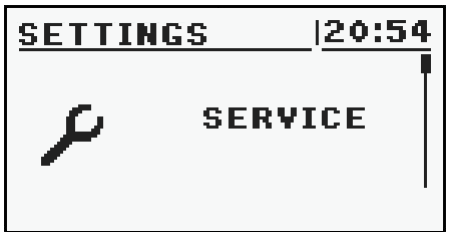
3.2 Configuration the example of controller Platinum Bio

After connecting the Lambda module must be configured the main driver yet.
Below is described how to configure the driver based on the Platinum Bio.

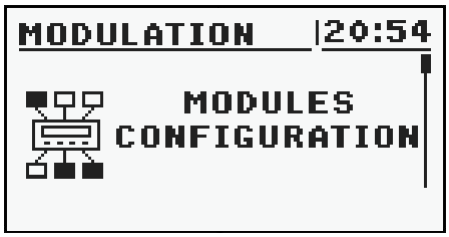
From the rotary menu choose **SETTINGS**



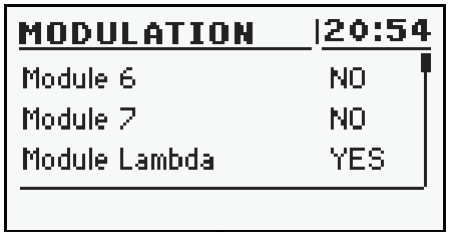
Then in the **SERVICE** mode enter the access code



After inputting the correct code, run **MODULES CONFIGURATION**

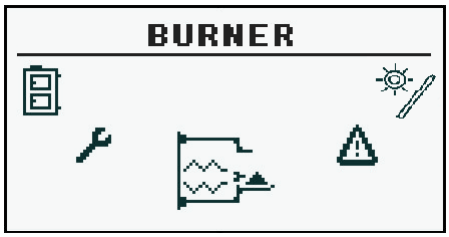


Find **Module Lambda** and change setting to **YES**

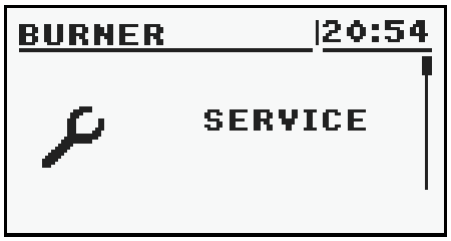


The second step of configuration is to change the settings for the burner.

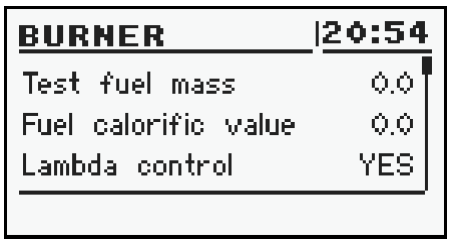
From the rotary menu choose **BURNER** then we get to the settings



Here again turn on **SERVICE** mode and if required, give access code



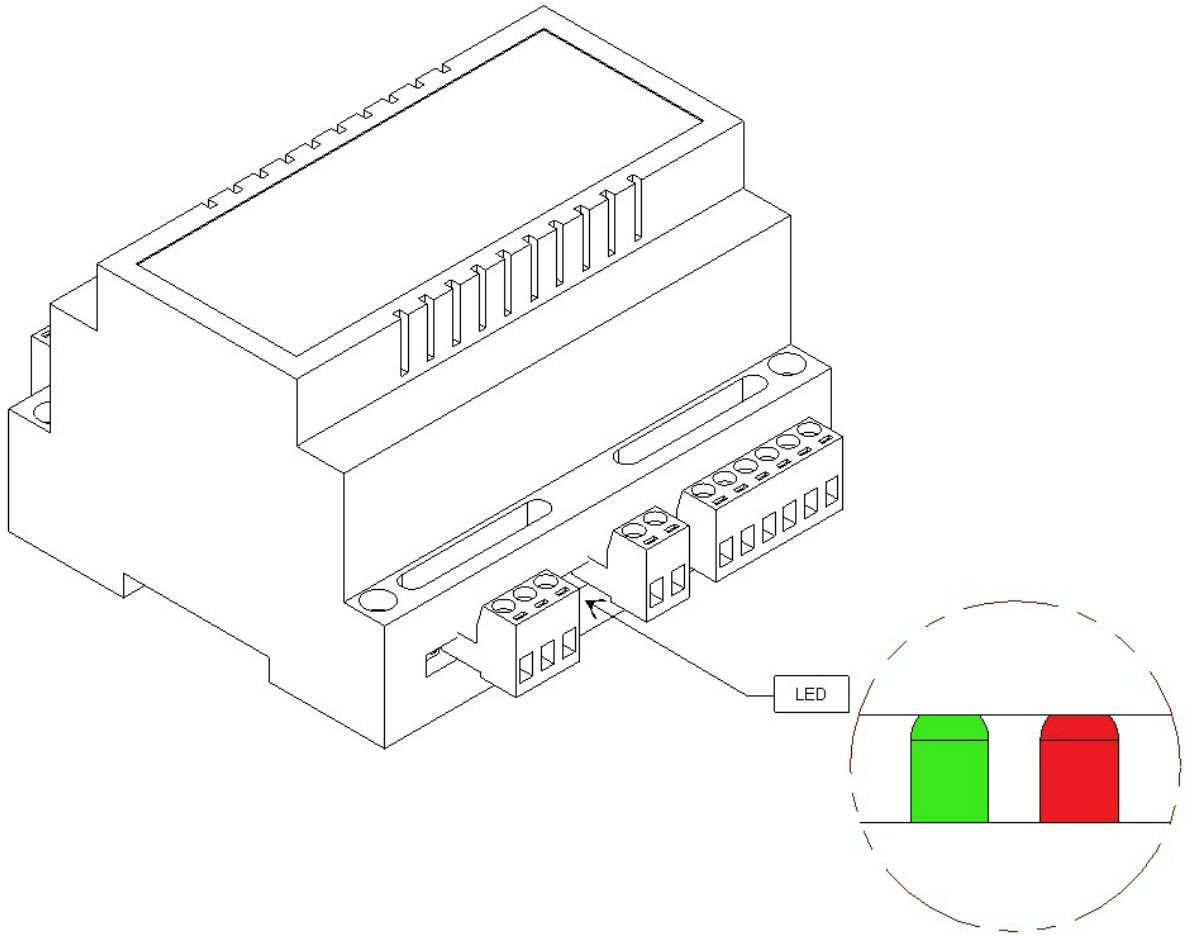
On the list, seek out the position **Lambda control**, which switch to **YES**.
You can also work with Lambda control mode off. Then the Lambda probe module will be responsible only for displaying the measurements.



After finishing configuration back to the main screen.

3 Configuration and usage

3.3 Status of LED



Status of red LED indicates the current mode of operation of the module.
Blinking LED indicates heating of the probe.
Steady light means the hot heater probe.

Periodic flashing green LED indicates proper communication with the controller.
While both devices communicate with each other, the LED lights up for a split second, then turns off until receiving the next frame.

WARNING !!! *With any assembly work must be absolutely disconnect the unit from the electricity grid. During operation, enclosure Lambda probe heats up to high temperatures. There is a danger of burns!*

4 Specification

Technical data	
Power supply	230V 50Hz
Power consumption	10W
Ambient temperature	0-60°C
Measuring range O_2	0-20,9%
Analog output	0-5V
Analog output capacity	10mA
CAN bus speed	125 kb/s
Module dimensions (L x W x H)	107mm x 66mm x 118mm
Thread Lambda probe	M18 x 1,5mm
Module mass	425g
Weight of probe	110g

CE

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