

# Lambda Sensor LSU 4.9

www.bosch-motorsport.com



- ▶ Application: lambda 0.65 to  $\infty$
- ▶ Wide band
- ▶ Exhaust gas temperature range (max.) for short time  $\leq 1,030^{\circ}\text{C}$
- ▶ Max. Hexagon temperature  $600^{\circ}\text{C}$

This sensor is designed to measure the proportion of oxygen in exhaust gases of automotive engines (gasoline or Diesel).

The wide band lambda sensor LSU 4.9 is a planar  $\text{ZrO}_2$  dual cell limiting current sensor with integrated heater. Its monotonic output signal in the range of lambda 0.65 to air makes the LSU 4.9 capable of being used as a universal sensor for lambda 1 measurement as well as for other lambda ranges. The connector module contains a trimming resistor, which defines the characteristic of the sensor.

The main benefit of the LSU 4.9 is the robust design combined with the high Bosch production quality standard.

This lambda sensor operates only in combination with a special LSU-IC, used in most Bosch Motorsport ECUs and lambda control units like LT4. You'll find this unit and more on our homepage at Electronics/Sensor Interfaces.

## Application

|                      |  |
|----------------------|--|
| Application          | lambda 0.65 to $\infty$                        |
| Fuel compatibility   | gasoline/Diesel/E85                            |
| Exhaust gas pressure | $\leq 2.5$ bar (higher with decrease accuracy) |

|   |                                |
|---|--------------------------------|
| Exhaust gas temperature range (operating)           | $< 930^{\circ}\text{C}$        |
| Exhaust gas temperature range (max.) for short time | $< 1,030^{\circ}\text{C}$      |
| Hexagon temperature                                 | $< 600^{\circ}\text{C}$        |
| Wire and protective sleeve temperature              | $< 250^{\circ}\text{C}$        |
| Connector temperature                               | $< 140^{\circ}\text{C}$        |
| Storage temperature range                           | $-40$ to $100^{\circ}\text{C}$ |
| Max. vibration (stochastic peak level)              | $300 \text{ m/s}^2$            |

## Technical Specifications

### Variations

#### LSU 4.9 with automotive connector

|                  |                  |
|------------------|------------------|
| Connector        | 1 928 404 687    |
| Mating connector | D 261 205 356-01 |
| Wire length L    | 950 mm           |

#### LSU 4.9 with motorsport connector

|                  |               |
|------------------|---------------|
| Connector        | AS 6-07-35PN  |
| Mating connector | AS 0-07-35SN  |
| Wire length L    | 200 to 950 mm |

**Mechanical Data**

|                   |             |
|-------------------|-------------|
| Weight w/o wire   | 120 g       |
| Thread            | M18x1.5     |
| Wrench size       | 22 mm       |
| Tightening torque | 40 to 60 Nm |

**Electrical Data**

|                                   |                  |
|-----------------------------------|------------------|
| Power supply H+ nominal           | 7.5 V            |
| System supply voltage             | 10.8 V to 16.5 V |
| Heater power steady state         | 7.5 W            |
| Heater control frequency          | ≥ 100 Hz         |
| Nominal resistance of Nernst cell | 300 Ω            |
| Max current load for Nernst cell  | 250 μA           |

**Characteristic**

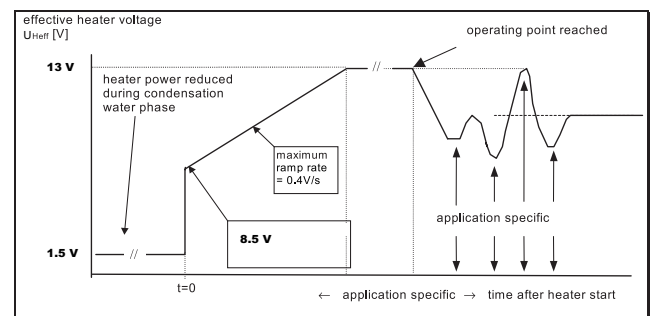
|                        |                   |
|------------------------|-------------------|
| Signal output          | $I_p$ meas        |
| Accuracy at lambda 0.8 | $0.80 \pm 0.01$   |
| Accuracy at lambda 1   | $1.016 \pm 0.007$ |
| Accuracy at lambda 1.7 | $1.70 \pm 0.05$   |

| $I_p$ [mA] | lambda | $U_A$ [V], v=17 | $U_A$ [V], v=8 |
|------------|--------|-----------------|----------------|
| -2.000     | 0.650  | -               | 0.510          |
| -1.602     | 0.700  | -               | 0.707          |
| -1.243     | 0.750  | 0.192           | 0.884          |
| -0.927     | 0.800  | 0.525           | 1.041          |
| -0.800     | 0.822  | 0.658           | 1.104          |
| -0.652     | 0.850  | 0.814           | 1.177          |
| -0.405     | 0.900  | 1.074           | 1.299          |
| -0.183     | 0.950  | 1.307           | 1.409          |
| -0.106     | 0.970  | 1.388           | 1.448          |
| -0.040     | 0.990  | 1.458           | 1.480          |
| 0          | 1.003  | 1.500           | 1.500          |
| 0.015      | 1.010  | 1.515           | 1.507          |
| 0.097      | 1.050  | 1.602           | 1.548          |
| 0.193      | 1.100  | 1.703           | 1.596          |
| 0.250      | 1.132  | 1.763           | 1.624          |

|       |        |       |       |
|-------|--------|-------|-------|
| 0.329 | 1.179  | 1.846 | 1.663 |
| 0.671 | 1.429  | 2.206 | 1.832 |
| 0.938 | 1.701  | 2.487 | 1.964 |
| 1.150 | 1.990  | 2.710 | 2.069 |
| 1.385 | 2.434  | 2.958 | 2.186 |
| 1.700 | 3.413  | 3.289 | 2.342 |
| 2.000 | 5.391  | 3.605 | 2.490 |
| 2.150 | 7.506  | 3.762 | 2.565 |
| 2.250 | 10.119 | 3.868 | 2.614 |

**Please note:**  $U_A$  is not an output signal of the lambda sensor, but the output of the evaluation circuit. Only  $I_p$  correlates with the oxygen content of the exhaust gas. Amplification factor  $v=17$  is typically used for lean applications ( $\lambda > 1$ ), amplification factor  $v=8$  is typically used for rich applications ( $\lambda < 1$ ).

**Heater Strategy**



**Connectors and Wires**

|                  |                               |
|------------------|-------------------------------|
| Connector        | Please see variations         |
| Mating connector | Please see variations         |
| Sleeve           | fiber glass / silicone coated |
| Pin 1            | Pump current APE / IP         |
| Pin 2            | Virtual ground IPN / VM       |
| Pin 3            | Heater voltage H- / Uh-       |
| Pin 4            | Heater voltage H+ / Uh+       |
| Pin 5            | Trim resistor RT / IA         |
| Pin 6            | Nernst voltage UN / RE        |
| Wire length      | Please see variations         |

Various motorsport and automotive connectors are available on request.

### Installation Notes

This lambda sensor operates only in combination with a special LSU-IC, used in most Bosch Motorsport ECUs and lambda control units like LT4. You'll find this unit and more on our homepage at Accessories/Expansion Modules.

The lambda sensor should be installed at point which permits the measurement of a representative exhaust-gas mixture, which does not exceed the maximum permissible temperature.

Install at a point where the gas is as hot as possible.

Observe the maximum permissible temperature.

As far as possible install the sensor vertically (wire upwards).

The sensor is not to be fitted near to the exhaust pipe outlet, so that the influence of the outside air can be ruled out.

The exhaust-gas passage opposite the sensor must be free of leaks in order to avoid the effects of leak-air.

Protect the sensor against condensation water.

The sensor is not to be painted, nor is wax to be applied or any other forms of treatment. Use only the recommended grease for lubricating the thread.

Please find further application hints in the offer drawing at our homepage.

### Safety Note

The sensor is not intended to be used for safety related applications without appropriate measures for signal validation in the application system.

### Ordering Information

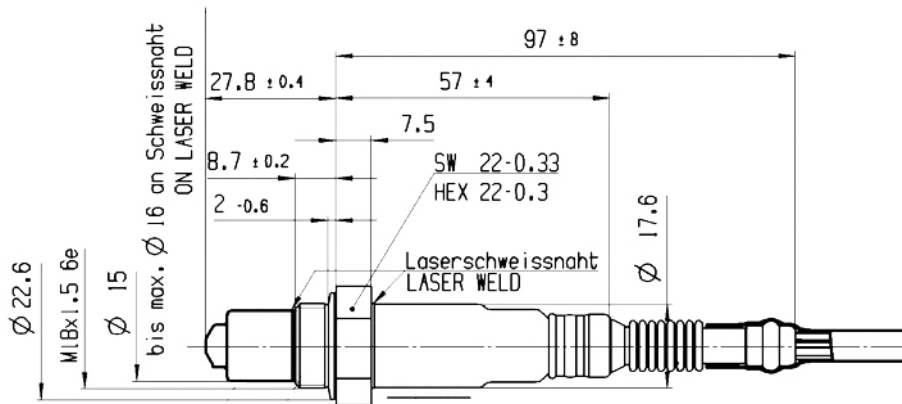
#### **Lambda Sensor LSU 4.9**

With automotive connector  
Order number **0 258 017 025**

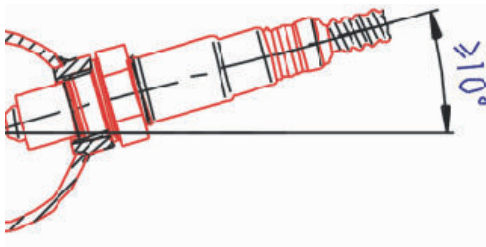
#### **Lambda Sensor LSU 4.9**

With motorsport connector  
Order number **B 261 209 358-03**

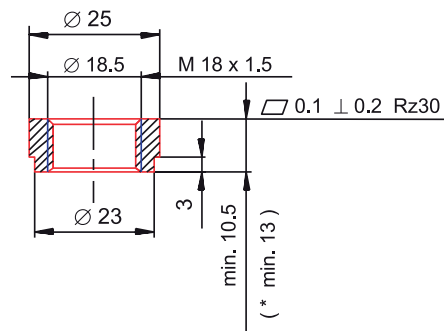
Dimensions



Mounting recommendation



Recommended materials for the mating thread in the exhaust pipe  
 \*: THexagon  $> 600^{\circ}\text{C}$  or  
 TGas  $> 930^{\circ}\text{C}$



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