

# Lambda Sensor Mini-LSU 4.9



- ▶ Application: lambda 0.65 to  $\infty$
- ▶ Exhaust gas temperature: 930°C (1,030 for a short time)
- ▶ Hexagon temperature: 700°C
- ▶ Thread: M16x1.5
- ▶ Weight: 28 g

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

The wide band lambda sensor Mini-LSU 4.9 is a planar ZrO<sub>2</sub> dual cell limiting current sensor with integrated heater. Its monotonic output signal in the range of lambda = 0.65 to air makes the LSU capable of being used as a universal sensor for lambda = 1 measurement as well as for lean and rich ranges.

The connector housing contains a trimming resistor, which defines the characteristic of the sensor. The main benefit of the Mini-LSU 4.9 is its very compact design in combination with the high Bosch production quality standard. The Mini-LSU is produced and tested in a handmade process.

The complete light weight housing is made of Inconel which makes it resistant against high temperatures. The sensor element is more than 50 % smaller than it is in the production lambda sensor. It is connected over silver coated steel cables to make it more reliable against vibrations.

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	≤ 2.5 bar (higher with decrease accuracy)
Exhaust gas temperature range (operating)	< 930°C

Exhaust gas temperature range (max.) for short time	< 1,030°C
Hexagon temperature	≤ 700°C
Wire and protective sleeve temperature	< 250°C
Connector temperature	< 150°C
Storage temperature range	-40 to 100°C
Max. vibration (stochastic peak level)	300 m/s <sup>2</sup> (see Installation Notes)

## Technical Specifications

### Variations

#### Mini-LSU 4.9 with automotive connector

Connector	1 928 404 682
Mating connector	D 261 205 356-01
Wire length L	950 mm

#### Mini-LSU 4.9 with motorsport connector

Connector	AS607-35PN
Mating connector	AS007-35SN
Wire length L	200 to 1,400 mm

### Mechanical Data

Weight w/o wire	28 g
Thread	M16x1.5
Wrench size	17 mm
Tightening torque	60 Nm

### Electrical Data

Power supply H+ nominal	7.5 V
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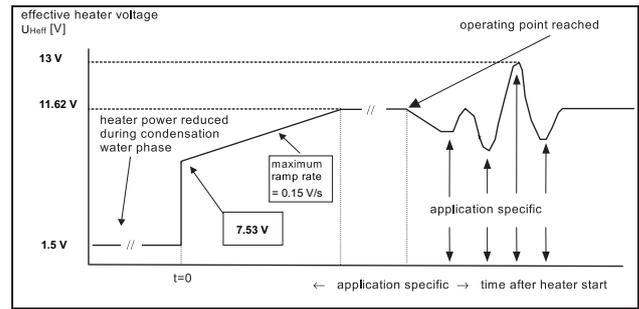
System supply voltage H+ (min)	10.8 V
Heater power steady state	7.5 W
Heater control frequency	100 Hz
Nominal resistance of Nernst cell	300 Ohm
Max. current load for Nernst cell	250 $\mu$ A

**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		
<b><math>I_p</math> [mA]</b>	<b>lambda</b>	<b><math>U_A</math> [V], <math>v=17</math></b>	<b><math>U_A</math> [V], <math>v=8</math></b>
-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**



**Resistance/LSU Temperature**

R (Ohm)	Temp (°C)
80	1030
150	888
200	840
250	806
300 [operating point]	780
350	761
400	744
450	729
550	703
650	686
800	665
1000	642
1200	628
2500	567

**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 and 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.  
 Sensors should be installed as close to vertical as possible (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 system up stand and surrounding the sensor must be sealed in order to avoid the effects of leakage 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.

A higher maximum vibration profile is possible and should be determined by the customer's individual application.

**Safety Note**

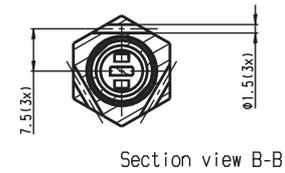
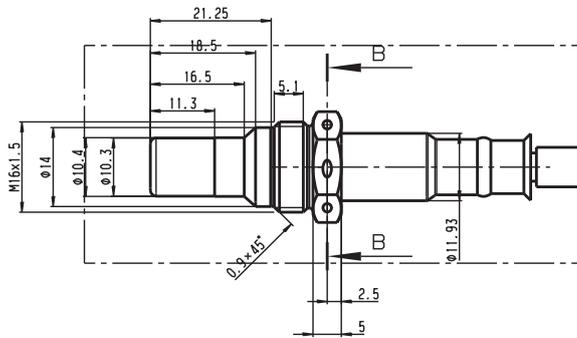
The sensor is not intended to be used for safety related applications without appropriate measures for signal validation in the application system.

**Ordering Information**

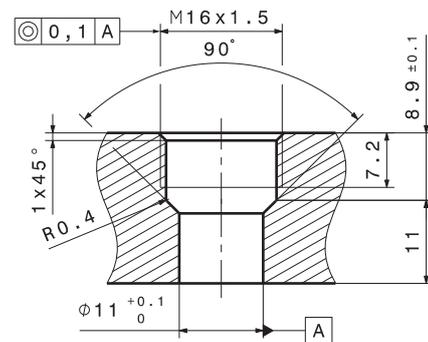
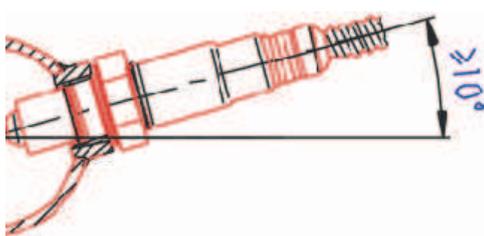
**Lambda Sensor Mini-LSU 4.9**  
 With automotive connector  
 Order number **B 258 490 103-30**

**Lambda Sensor Mini-LSU 4.9**  
 With motorsport connector  
 Order number **F 02U V02 227-02**

**Dimensions**



**Mounting recommendation**



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