LSM11B - Lambda Sensor - Industrial Uses

For Professional Use Only

Introduction

The Lambdapower LSM11B is a replacement for the discontinued Bosch LSM11 such as 0258104002 and 0258104005. This sensor can match the performance of a wideband sensor when used correctly. Suitable applications: wood / pellet burning boilers, gasification boilers, biomass fuels, diesel engines / generators, welding gas purge detectors, laboratory measurements to 1ppm accuracy (Gold graded sensors only). Not suitable for petrol engines (the sensor curve is undefined in the Rich regime). Not suitable for medical / PPE equipment.

Phase II Sensor improvements

1a) In response to customer requests, the traditional two-part "Power Timer" connector is now the default for this sensor. We recommend our Type 40 four-way connector if using screw terminals.
1b) List of relevant Part Numbers:
LSM11B-TC = Sensor 2.5m with Traditional Connector (2 part "Junior Power Timer")
LSM11B = Sensor 1m with 4 way quick-connector Male ("Type 40 TYCO Superseal")
LSM11B-CABLE = Cable 1.5m 4 way quick-connector Female to screw terminal bare wire ends
2) Phase I to Phase II modifications are as follows:
a) Thicker cables to reduce voltage losses
b) Wider vents to increase useful life against fly ash blockage and trapped moisture corrosion
c) Greater stability in free air for boiler setup procedures that require it
d) Improved transient response and better accuracy overall
e) We now recommend 12 volt DC heater supply. This is to improve stability. 12V AC can be used but may cause an output voltage offset
f) Some, but not all, sensors are fitted with calibration resistors in the cable harness, these must not be removed. Do not trim the harness.
g) This datasheet now includes example outputs and error margins to help setup "difficult" boilers. Obvious or irrelevant information has been removed.
h) Colour coding (paint dots) are now deprecated, except premium "Gold" units. All static outputs are within original LSM11 specifications in free air.

Installation Advice

3) We recommend the sensor operation is checked once per year.
4) Fans can vibrate the sensor loose. Ensure it is fully tightened. Remove corrosion from the sealing faces.
5a) Manual adjustment of calibration offset in conjunction with an independent O2 measuring device is recommended for maximum accuracy
5b) Setup procedures relying solely on the open-air static reading are prone to inaccuracy
5c) If open air static setup is the only option, proceed as follows:
5d) Set the sensor offset in open air / calibration mode as per boiler instructions. This will correct for individual sensor offset deviation same as original LSM11
5e) Manually dial in a further -5mV offset, or -1% to -1.5%. This will average out the LSM11B vs LSM11 deviation
5f) If the sensor still seems to over read, nudge the offset downwards as required
5g) To do this, the boiler interface circuitry must have a manually adjustable static offset facility of at least +/- 18mV
6) The sensor is not designed for power cycling on/off. Once installed and working, leave it running. Repeated thermal cycling from cold to hot may induce output drift. "Gold" graded sensors are available for such applications
7) This product is not for DIY use. It is not a consumer grade plug and play device. As with the original LSM11, each new sensor will require setup. Lack of relevant knowledge may risk damage to other boiler components. This product must be used only by a qualified boiler engineer with previous LSM11 experience.

Specifications (Typical)

Spanner Size	22mm AF M18 x 1.5
Torque	60Nm
Rear Clearance Required	160mm
Heater Supply	12VDC 3.5A max
Heater Resistance	2.2 Ohm COLD
Warmup time	5-20 minutes
Sensor Range	0-21% O2

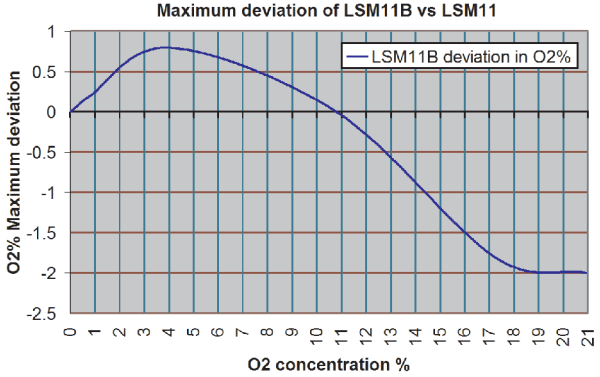
Wiring Colours:

WHITE	Heater
WHITE	Heater
BLACK	Signal Output
GREY	Signal Ground

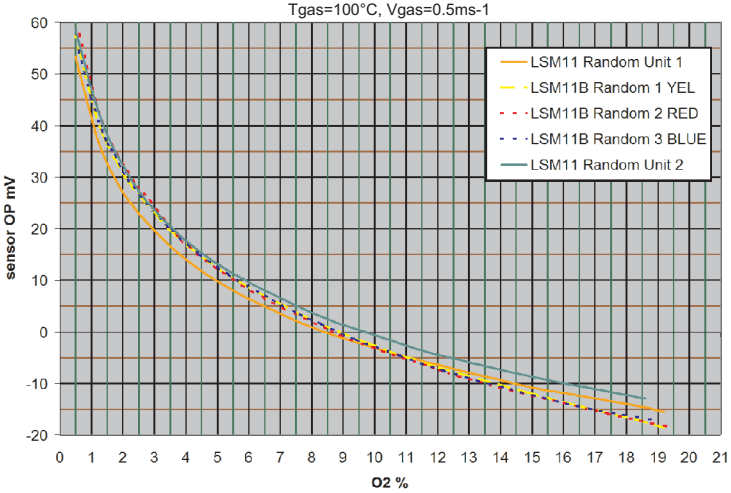
Sensor dependent:

Example Output Low O2	+80mV
Example Output High O2	-20mV
Set Point Range In Open Air	-20mV < n < -5mV
Example Output Static Open Air	-10mV
Output Rich Condition	+840mV

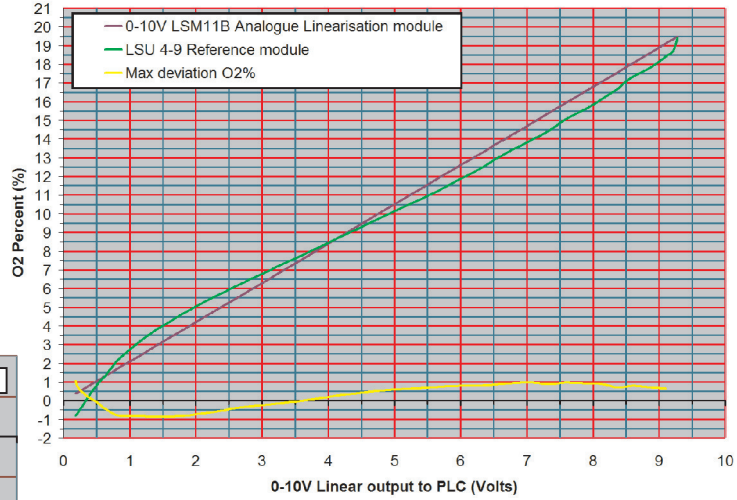
Graph 3 - Maximum typical deviation of LSM11B output from LSM11
This is NOT a measure of absolute accuracy, only of average deviation between types, to enable mapping adjustments



Graph 1 - Example Output Curves
LSM11B (dotted lines) - Three random samples (colour coded)
BOSCH LSM11 (solid lines) - Two random samples (numbered)
All LSM11B calibrated with fixed static offset
Tgas=100°C, Vgas=0.5ms-1



Graph 2 - Demonstration interface design. LSU4.9 (5-wire) vs LSM11B (4-wire, offset and curve corrected to give 0-10V linear output)
Shows example deviation curve, note LSU4.9 has inaccuracies of its own
Tgas=125°C, Vgas=0.5ms-1



Suggestions? Errors?
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