

# SPARTAN Lite

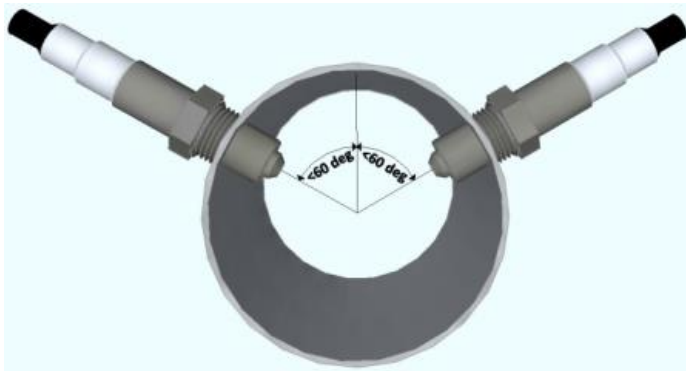
## 1. Warning

- Do not connect or disconnect the Lambda Sensor while Spartan 3 Lite is powered.
- The Lambda Sensor will get very hot during normal operation, please be careful when handling it.
- Do not install the Lambda Sensor in such a manner that the unit is powered before your engine is running. An engine start can move condensation in your exhaust system to the sensor, if the sensor is already heated this can cause thermal shock and cause the ceramic internals inside the sensor to crack and deform.
- While the Lambda Sensor is in an active exhaust stream, it must be controlled by Spartan 3 Lite. Carbon from an active exhaust can easily build up on an unpowered sensor and foul it.
- Lambda sensor life when used with leaded fuels is between 100-500 hrs.
- Spartan 3 Lite should be located in the driver's compartment.

## 2. Package Contents

1x Spartan 3 Lite, 8ft lambda cable, 2x blade fuse holder, two 1 Amp blade fuse, two 5 Amp blade fuse.

## 3. Exhaust Installation



The Lambda sensor should be installed between the 10 o'clock and the 2 o'clock position, less than 60 degrees from vertical, this will allow gravity to remove water condensation from the sensor.

For all Oxygen sensor installations, the sensor must be installed before the catalytic converter.

For normally aspirated engines the sensor should be installed about 2ft from the engine exhaust port. For Turbocharged engines the sensor should be installed after the turbocharger. For Supercharged engines the sensor should be installed 3ft from the engine exhaust port.

## 4. Wiring



Terminal #	Name	Connects to	Note
1	Electronics Power	Switched 12[v]	Use fuse holder with 250ma glass fuse, 12[v] should be live only when engine is running. Electronics Power and LSU Heater Power can be the same source.
2	Electronics Ground	Ground	Ground where interfacing device is grounded; ECU, datalogger, gauge, etc...
3	LSU Heater Power	Switched 12[v]	Use fuse holder with 5 Amp blade fuse, 12[v] should be live only when engine is running. Electronics Power and LSU Heater Power can be the same source.
4	LSU Heater Ground	Ground	Ground to chassis away from where Terminal #2 (Electronics Ground) is grounded
5	Std Perf Linear Output		Factory Default is simulated narrowband output with a switch point of 1[Lambda]. Output is an RC filtered 8 bit PWM signal.
6	High Perf Linear Output	Interfacing device; ECU, Gauge, datalogger, etc...	Factory Default is 0[v] @ 0.68 [Lambda] Linear to 5[v] @ 1.36 [Lambda]. Output is a 12 Bit DAC with a 0.1% voltage reference.
7	Not Applicable		
8	Not Applicable		
9	UART TX		5v logic, 9600 Baud, 8 Data Bits, 1 Stop Bit, No Parity, No Flow Control
10	UART RX		5v logic, 9600 Baud, 8 Data Bits, 1 Stop Bit, No Parity, No Flow Control

## 6. Sensor Temperature LED

Spartan 3 Lite has an onboard red LED, which can be observed through the case slits, to show LSU Temperature. Slow blink means the sensor is too cool, Solid light means the sensor temperature is ok, fast blink means the sensor is too hot.

## 7. Serial Commands (For advanced users only)

Serial Command	Usage Note	Purpose	Example	Factory Default
GETHW		Gets Hardware Version		
GETFW		Gets Firmware version		
SETTYPEx	If x is 0 then Bosch LSU 4.9 If x is 1 then Bosch LSU ADV		SETTYPE1	X=0, LSU 4.9
GETTYPE		Gets LSU sensor type		
SETLAMFIVEVx.xx	x.xx is a decimal exactly 4 characters long including decimal point. Minimum value is 0.60, maximum value is 3.40	Sets Lambda at 5[v] for the linear output	SETLAMFIVEV1.36	x=1.36[Lambda]
GETLAMFIVEV		Gets Lambda at 5[v]		
SETLAMZEROVx.xx	x.xx is a decimal exactly 4 characters long including decimal point. Minimum value is 0.60, maximum value is 3.40	Sets Lambda at 0[v] for the linear output	SETLAMZEROV0.68	x=0.68[Lambda]
GETLAMZEROV		Gets Lambda at 0[v]		
SETPERFx	If x is 0 then standard performance of 20ms. If x is 1 then high performance of 10ms. If x is 2 then optimize for lean operation.		SETPERF1	x=0, standard performance
GETPERFx		Gets performance		
SETSLOWHEATx	If x is 0 then sensor is heated at normal rate during initial power up. If x is 1 then sensor is heated at 1/3 the normal rate during initial power up. If x is 3 then wait, a max of 10 min, for exhaust gas to heat sensor to 350C before heating, requires Firmware 1.05 and above		SETSLOWHEAT1	X=0, normal sensor heatup rate
GETSLOWHEAT		Gets slowheat setting		
MEMRESET		Reset to factory settings.		
SETLINOUTx.xxx	Where x.xxx is a decimal exactly 5 characters long including decimal point, greater than 0.000 and less than 5.00. Linear Output will resume normal operation on reboot.	Allows the user to set the High Perf Linear Output to a specific voltage	SETLINOUT2.500	
SETCANFORMAT4	Requires Firmware 1.04 and above	Sets Linear Output to %O2: 0v@0%O2 linear to 5v@21%O2	SETCANFORMAT0	x=0
GETCANFORMAT	Requires Firmware 1.04 and above	Gets CAN format		
DOCAL	Requires Firmware 1.04 and above	Do Free Air Calibration and display the value. Recommended for clone sensors only.		
GETCAL	Requires Firmware 1.04 and above	Gets Free Air Calibration value		
RESETCAL	Requires Firmware 1.04 and above	Resets Free Air Calibration value to 1.00		

\*All commands are in ASCII, case does not matter, spaces do not matter.

## 8. Bootloader

When Spartan 3 Lite is powered up without the LSU Heater Ground connected, it will enter bootloader mode. Powering up Spartan 3 Lite with the Heater Ground connected will not trigger the bootloader and Spartan 3 Lite will work as normal. When Spartan 3 Lite is in Bootloader mode there is an onboard LED, which can be observed through the case slits, that will shine a solid green.

### To enter bootloader mode for a firmware upgrade:

1. Make sure Spartan 3 Lite is off, no power to Pin 1 or Pin 3 of the screw terminal
2. Disconnect the sensor
3. Disconnect LSU Heater Ground from Pin 4 of the screw terminal
4. Power on Spartan 3 Lite,
5. Check if the onboard LED is shining a solid green, if it is then your Spartan 3 Lite is in bootloader mode now

### Warranty

14Point7 warrants Spartan 3 Lite to be free from defects for 2 years.

### Disclaimer

14Point7 is liable for damages only up to the purchase price of its products. 14Point7 products should not be used on public roads.