

AUTRONIC

Multi Sensor Air Fuel Ratio Meter



Autronic Analyzer Manual

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General Information.

The analysers will display either air fuel ratio or lambda.

You can select the following fuels to be displayed in air fuel ratio.
Petrol, Diesel, LPG, Alcohol.

The analysers are manufactured with factory default settings, which in 99% of cases require no changes to effectively use the analyser.

The analyser will automatically sense the type of sensor connected.

When power is applied to the analyser, the analyser will display "Sensor Type" then "Sensor Cold" during sensor warmup. Warm up time for the UEGO sensor will be faster than the Bosch wide band sensor. The Bosch will take around 3 to 4 minutes to warm up when cold.

If any errors occur with the sensor or analyser they will also be displayed.

The analyser has two displays, a digital display as well as a bar graph.

Both analysers have two analog outputs. These can be used to input a O₂ signal into a data logger or ECU. To use these you need to order a PWR/LOG cable, or follow the instructions in the "Analog Output Modifications for A & B Model" section. The outputs are a 0 to 5 Volt and a 0 to 1 Volt (See function section for Volt to air fuel ratio relationship). The air fuel ratios to voltage values can be modified by using functions 9 and 10.

Both analysers are supplied with either a cigarette lighter power cable or a cable with Alligator clips for connection to battery terminals

Sensor Care.

1. Avoid the use of leaded fuels.
2. Use only sensor save engine sealant.
3. Exposing hot sensor to moisture will cause sensor destruction.
4. Do not leave sensor in exhaust if heater is de-energized.
5. Do not make/break sensor connections while power is on.

Sensor Calibration.

When using the UEGO sensor with the B Model analyser, the sensor can be air calibrated. This requires the sensor to be allowed to warm-up in air for a minimum of 10 minutes, then press the two SET buttons when AIR is displayed.

Analyser Care.

If the analyser is connected to a battery, and the analyser is allowed to stay connected until it completely drains the battery of all power, damage can occur to the analyser, requiring it to be returned to the manufacturer for repair.

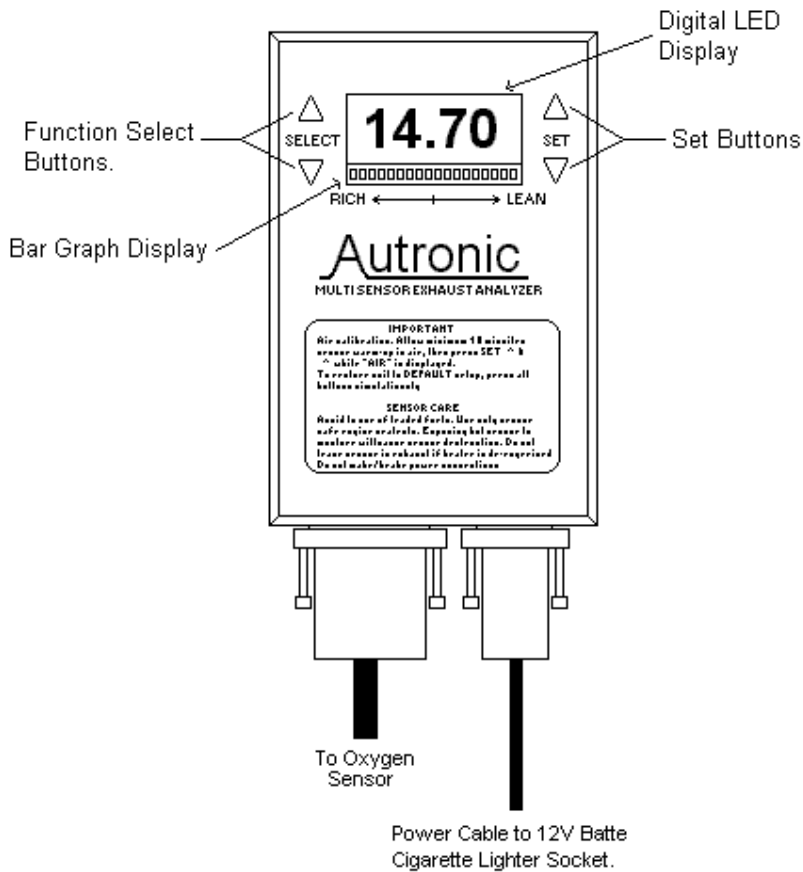
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Function Select and Set Buttons.

The A and B model analysers have two FUNCTION SELECT and two SET buttons. These are used to make changes to the default settings. They are also used to calibrate a UEGO sensor, and restore factory default settings.

Pressing all four buttons at the same time will reset all functions to factory defaults.

The B Model analyser can air calibrate the UEGO sensor, by pressing the two set buttons when AIR is displayed.



Changing Functions.

1. When changing functions you press either the up or down FUNCTION SELECT buttons to cycle through the functions. All analysers have functions from Function 0 to Function 10. The B Models also have functions 11 to 14. (See Calibration Functions Section).
2. When the desired function is displayed, use the SET buttons to cycle through the options.
3. After making the changes, the analyser will take a few second to return to the normal display. You can speed this up by pressing both FUNCTION SELECT buttons.

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Function Overview.

Basic Functions A and B Models.

Function 1.

Used to set the seven segment digital display to Lambda or air fuel ratio.

Options.

-LA- = Lambda

AF_P = Air fuel ratio Petrol (Gasoline).

AF_D = Air fuel ratio Diesel.

AF_G = Air fuel ratio LPG (Liquid Petroleum Gas).

AF_A = Air fuel ratio Alcohol (Methanol).

Function 3.

Used to setup bar graph display.

Cycle through the options and select the type of display required. The bar graph displays examples as you press the set buttons.

Advanced Functions A and B Model.

Function 2.

Use to set display update rate and filtering time constant.

Default value = 5

Function 4.

Use to set the period of time the bar graph updates.

Default value = 0.060 SEC.

Function 5.

Use to set the bar graph minimum range (left side of bar graph) voltage.

Default value = 0.80 volts.

Function 6.

Use to set the bar graph maximum range (right side of bar graph) voltage.

Default value = 1.20 volts.

Function 7.

Use to set Analog output error signalling mode.

Default value = 0.

Function 8.

Use to set analog output filtering.

Default value = 0.025 SEC

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Function 9.

Use to Set analog output minimum output value. This can be used to reverse the air fuel ratio in relation to output voltage. E.G:- from 0 to 5 volts = 10.0:1 to 30.0:1 to 5 to 0 volts = 30.0:1 to 10.0:1. Changes to 0 to 5 volt output are reflected in the 0 to 1 volt output.

Function 10.

Use to Set analog output maximum output value. This can be used to reverse the air fuel ratio in relation to output voltage. E.G:- from 0 to 5 volts = 10.0:1 to 30.0:1 to 5 to 0 volts = 30.0:1 to 10.0:1. Changes to 0 to 5 volt output are reflected in the 0 to 1 volt output.

Advanced Functions B Model.

Functions 11, 12, 13 and 14 used for UEGO sensor calibration.

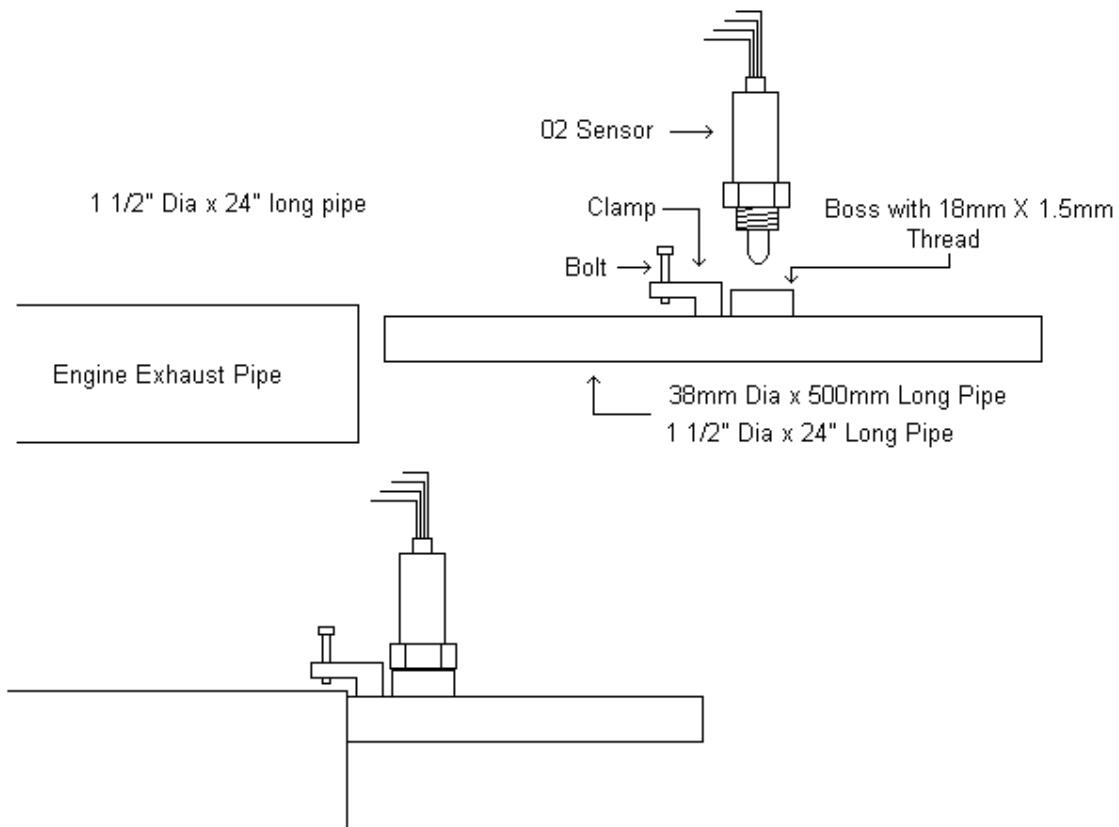
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02 Sensor Mounting Options.

The O2 sensor must be mounted so that only exhaust gases contact the sensor. It is important that no external air come in contact with the sensor. If this occurs incorrect readings will result.

Mounting Options.

- Option 1. Mount sensor in exhaust pipe more than 500mm or 24" from the end of exhaust pipe. Weld a boss or a nut with a 18mm x 1.5mm pitch thread on to the exhaust pipe.
- Option 2. Make a pipe that can be inserted into the exhaust outlet pipe that has the sensor attached. This is the easy way to be able to use the analyser on any engine quickly. See drawing below.

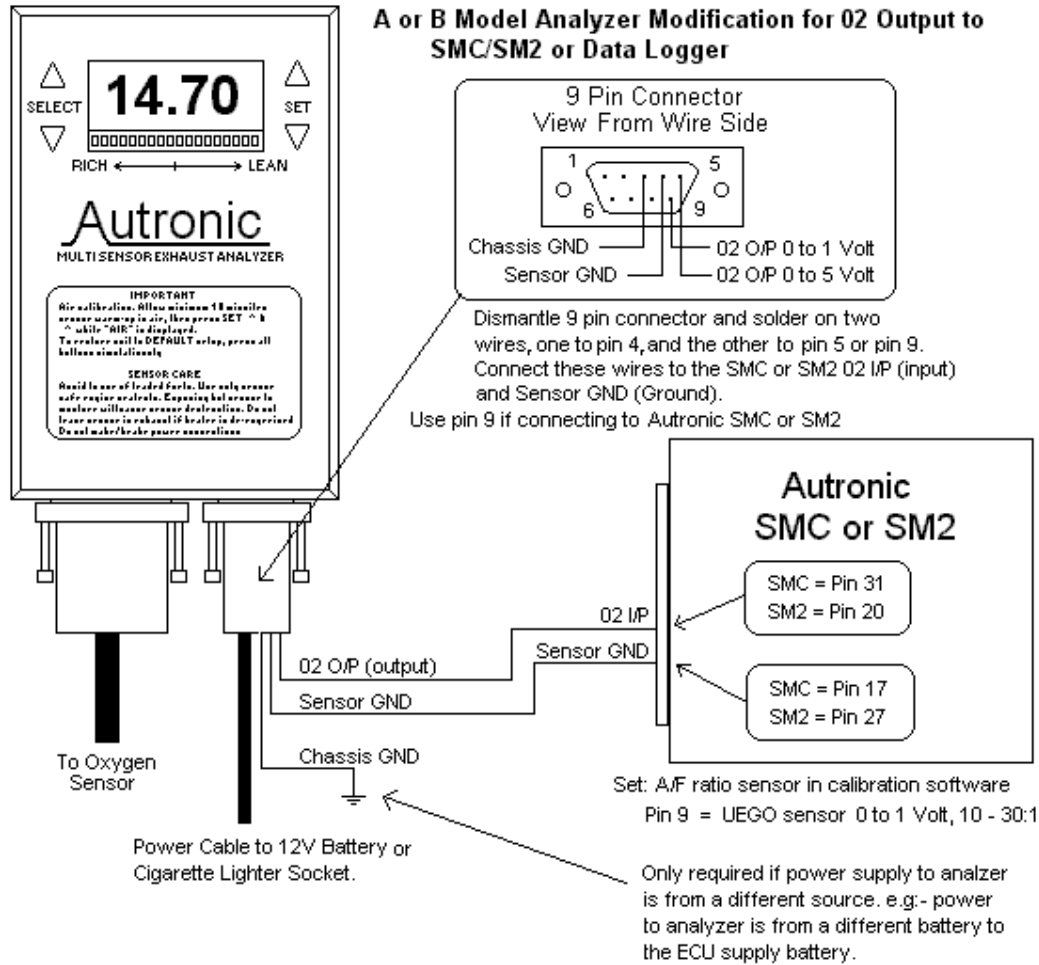


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Analyzer to SM2 & SMC

The A & B models as shipped have no analog output wire connections. These can be added to one of the supplied power cables. If you do not want to make the modifications yourself, a PWR/LOG cable is available and must be ordered as an accessory when ordering the analyzer.

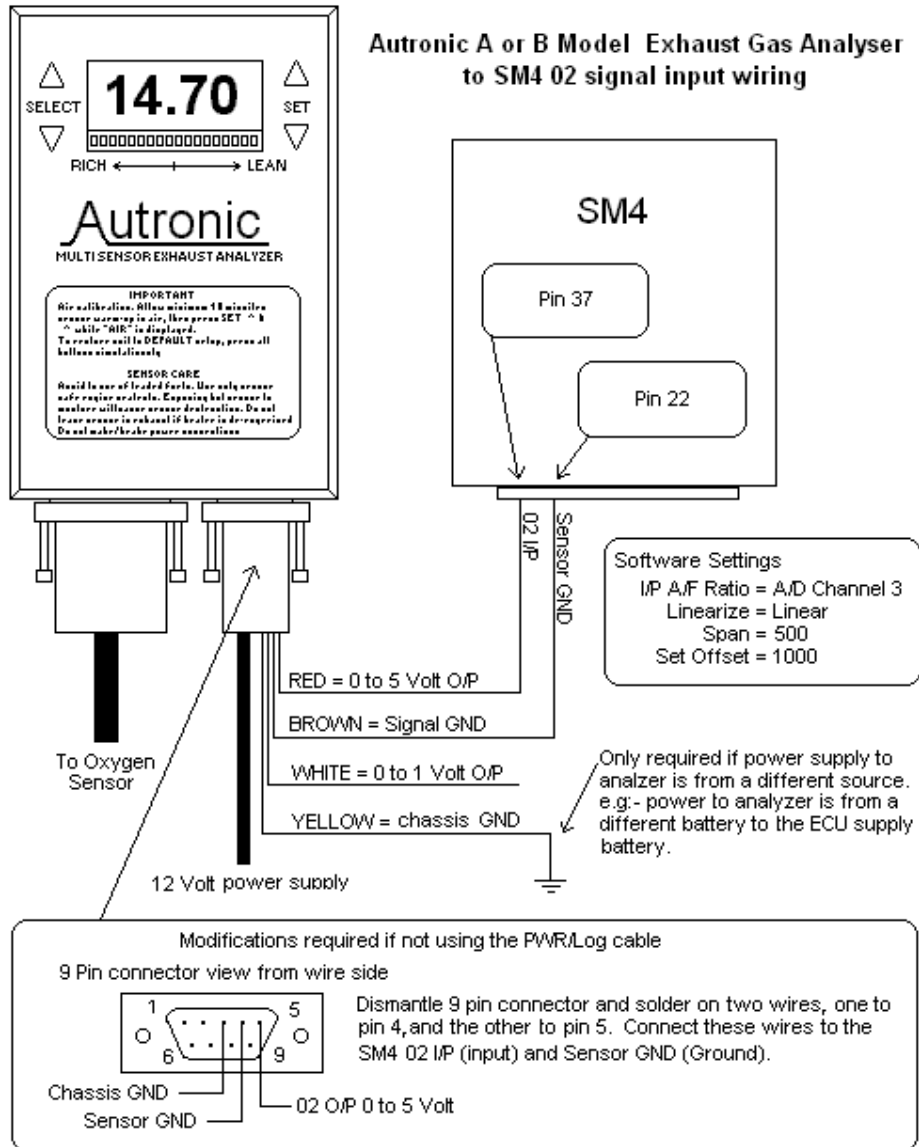
Below are the A and B Model analyser modifications to add analog output wires, that can be used to input O2 signal into a Autronic SMC or SM2 model ECU or a data logger.



If connecting analyzer to Autronic SMC or SM2 always use Pin 9 (0 to 1 volt O/P) and select "UEGO sensor 0 to 1 volt, 10 – 30:1" in software, when using either a Bosch or UEGO sensor.

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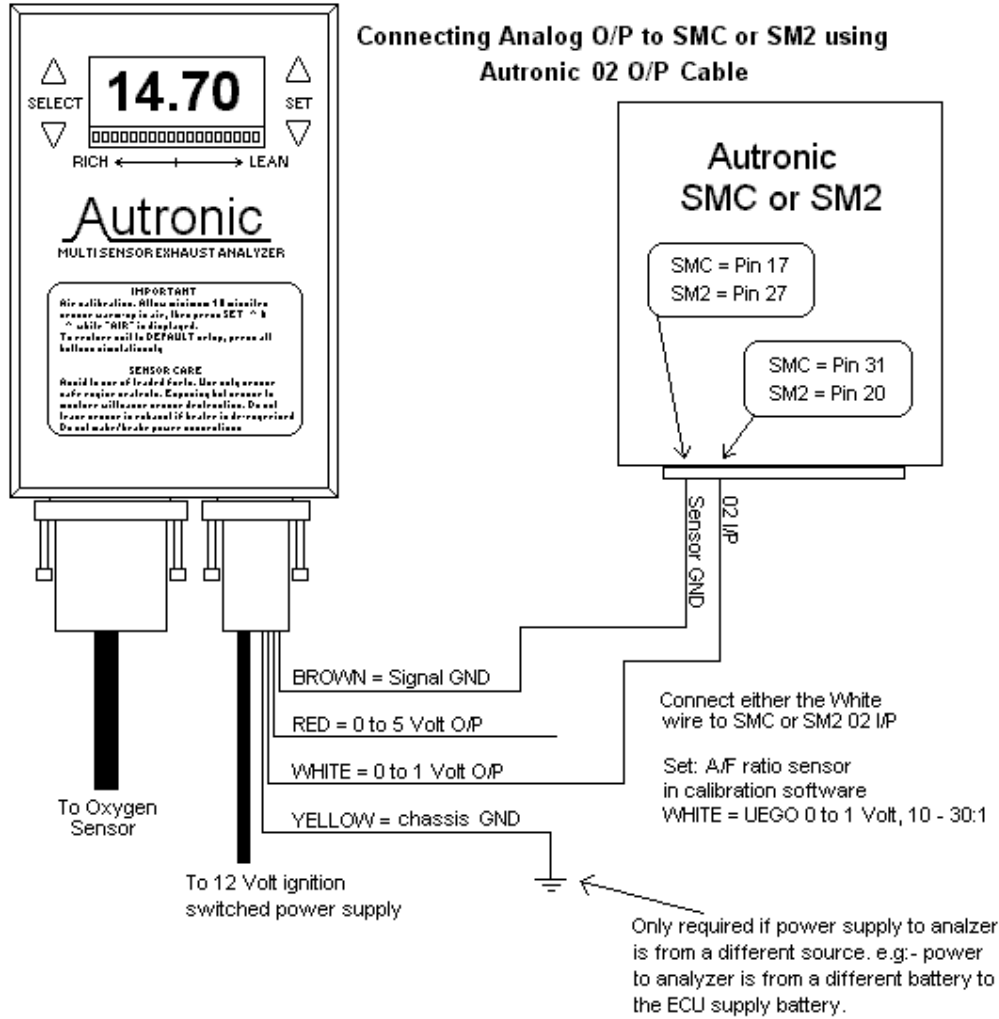
Analyzer to SM4



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Autronic Analog Output Cable

The A and B Model analysers are available with an optional analog output cable(Log/Pwr Cable). This shows connecting the analog output to a Autronic SMC or SM2.



If connecting analyzer to Autronic SMC or SM2 always use WHITE wire (0 to 1 volt O/P) and select "UEGO sensor 0 to 1 volt, 10 – 30:1" in software, when using either a Bosch or UEGO sensor.

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Calibration Functions

Fn 0 "NORMAL" Readout

Fn 1 Select 7 SEG display mode:-
Lambda, A/F petrol, A/F gas, A/F alky

Fn 2 Select 7 SEG display update rate & filtering Time Constant

Setting	Filtering TC	Update rate
0	6.4 SEC	1.25/SEC
1	3.2 SEC	2.5 /SEC
2	1.6 SEC	2.5 /SEC
3	0.8 SEC	2.5 /SEC
4	0.8 SEC	5 /SEC
5	0.4 SEC	5 /SEC
6	0.2 SEC	5 /SEC
7	0.03SEC	5 /SEC

Fn 3 Select BAR GRAPH Display mode

Setting	
0	OFF
1	LEFT TO CURRENT
2	LEFT TO CURRENT & MAX
3	MIN TO MAX
4	MIN & MAX
5	MIN & MAX & CURRENT
6	CURRENT VAL

Add 6 to value for filtering. TC 9 (peak hold time / 10) + 40mSEC
(range 0.05 to 0.20 SEC)

Fn 4 Select BAR GRAPH peak hold time
Setting range 0.1 to 1.60 SEC

Fn 5 Select BAR GRAPH display range minimum
Value for 0.00 volts left end of Bar Graph

Fn 6 Select BAR GRAPH display range maximum
Value for right end of Bar Graph

Fn 7 Use to test Analog output voltage. The three options are 0, 1 or 2.
These settings can be used to see if the software span and offset for the analog 02 input are correct.

0 to 1 volt output

0 = 0 volts = 10:1 A/F ratio

1 = 0.5 volts = 20:1 A/F ratio

2 = 1 volts = 30:1 A/F ratio

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0 to 5 volt output
0 = 0 volts = 10:1 A/F ratio
1 = 2.5 volts = 20:1 A/F ratio
2 = 5 volts = 30:1 A/F ratio

- Fn 8** Select ANALOG O/P O/P filter TC
Setting range 0.005 to 0.500 SEC
- Fn 9** Select ANALOG O/P min val
Value for 0.00 volts O/P
- Fn 10** Select ANALOG O/P max val
Value for 5.00 volts O/P
- Fn 11** Select Cal UEGO Air Cal O₂
% O₂ in AIR for sensor calibration in Air. Setting range is – 22%.
Nominal val 20.9%. (After setting % value press both setting buttons
while "AIR" displayed to effect calibration)
- Fn 12** Select UEGO rich side calibration
+/- 12.7 % rich side span correction.
- Fn 13** Select Cal UEGO @ stoic
Offsets all UEGO CALIBRATION +/- 0.127 LAMBDA. Best set @ Stoic.
- Fn 14** Select UEGO lean side calibration
+/- 12.7 % lean side span correction.

NOTES:- To restore unit to factory default settings depress all buttons
simultaneously. For fast return from "Function setting to "Normal"
operation depress both "FUNCTION SELECT" buttons.

ANALOG O/P CONNECTIONS:-

RED 0 to 5volt O/P = 10.0:1 to 30.0:1 Air fuel ratio (default setting).
WHITE 0 to 1 volt O/P = 10.0:1 to 30.0:1 Air fuel ratio (default setting).
BROWN Signal Ground
YELLOW Chassis Ground

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Specifications

Digital Readout Range	4 Digit 0.56" Hi-intensity red LED
Update Rate	0.68 to 2.1 Lambda or 10 to 40 A/F (petrol)
Effective Filtering, Time Constant	1.25 to 5 samples/sec (user selectable)
Bar Graph Readout Range	0.1 to 6.4 sec (user selectable)
Response Time	20 Segment multicolor LED
Display Mode	10 to 40 A/F or 0.62 to 2.1 Lambda
Max, Min Hold Time	40mSEC approx.
	Instantaneous value and/or max value, min and max, min & actual, min to max.
	0.1 to 1.6 sec.

Analog Output

Twin voltage O/P that is tolerant of system grounding errors.

Output Range	0 to 1 & 0 to 5 volts (both available simultaneously) user can define A/F values for min & max O/P limits.
Resolution	Better than 0.1% FSD
Effective Filtering, Time Constant	0.04 to 6.4 SEC (user selectable)
Signal Ground Voltage Range	+/- 3.0 volts

Supply Voltage

Normal Operation	10.3 to 23 volts
Safe Limits	+/- 24 volts (5 min) +/- 80 volts (alternator load dump 0.5 sec) +/- 1000 volts (inductive spike 10 usec)
Current Drain	1 amp + sensor heater current (approx.)

Operating Temperature Range

Minimum	-25 deg C (non condensing)
Maximum	+70 deg C

Weight	< 0.5 kg
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