Caerbont Automotive Instruments

"The original makers of SMITHS instruments"

Instructions for 80mm & 100mm 12volt Smiths Programmable Tachometers

Caution
Disconnect the negative battery cable prior to any installation

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Products designed and manufactured under ISO 9001:2008 quality standard.

Installation Guide

For all programmable tachometers ***except*** SMITHS Flight, Prism and Motorsport types.

Application Notes

- For fitment to **negative earth** vehicles ***only.***
- Operating voltage: 11 – 17volts DC
- Input signal:
  Petrol Engines
  - Contact breaker ignition (coil)
  - ECU tachometer output

  Diesel Engines
  - Alternator (W terminal)
- Calibration switch 8 should always be in the 'on' position.

Caution
Disconnect The Negative Battery Cable Prior To Any Installation

Harness connections		
Wire Colour	**Pin No.**	**Connect to**
Brown/slate	1	Pull up for open collector ECU output
Red/white	2	Illumination 12volt supply (side light feed)
Red/blue	3	Tacho output from ECU or contact breaker or alternator 'W' terminal
White/black	4	If your tacho fails to operate smoothly, the signal may be of a high sensitivity. Use the white/black wire ***instead*** of red/blue wire (above).
Black	5	Ground/Chassis or battery negative
Green	6	Switched ignition positive 12volt supply (via 3A fuse)

Calibration

The tachometer is calibrated/programmed by setting a combination of seven switches located under the grommet on the back case. Remove the grommet to access the switches.
Notes:
- The switch setting ***must*** be completed with the power off.
- Set the switches prior to installing the tachometer.

The table overleaf shows the switch settings relative to the number of pulses per engine revolution.

To assist with the switch setting, the table below shows the number of pulses per engine revolution versus the number of cylinders for both single spark and 'wasted' spark ignitions.

Petrol Engines Only

	PPR - Pulses per Revolution	
Number of Cylinders	*Single Spark Ignition*	*Wasted Spark Ignition*
1	0.5	1
2	1	2
3	1.5	3
4	2	4
6	3	6
8	4	8
10	5	10
12	6	12

Diesel Engines Only

Pulses per engine revolution (PPR) is equal to the number of alternator pole pairs multiplied by the crank to alternator pulley ratio.

Switch settings							PPR No.
sw1	sw2	sw3	sw4	sw5	sw6	sw7	
0	0	0	0	0	0	0	0.5
1	0	0	0	0	0	0	1
0	1	0	0	0	0	0	1.5
1	1	0	0	0	0	0	2
0	0	1	0	0	0	0	3
1	0	1	0	0	0	0	4
0	1	1	0	0	0	0	5
1	1	1	0	0	0	0	6
0	0	0	1	0	0	0	8
1	0	0	1	0	0	0	8.1
0	1	0	1	0	0	0	8.2
1	1	0	1	0	0	0	8.3
0	0	1	1	0	0	0	8.4
1	0	1	1	0	0	0	8.5
0	1	1	1	0	0	0	8.6
1	1	1	1	0	0	0	8.7
0	0	0	0	1	0	0	8.8
1	0	0	0	1	0	0	8.9
0	1	0	0	1	0	0	9
1	1	0	0	1	0	0	9.1
0	0	1	0	1	0	0	9.2
1	0	1	0	1	0	0	9.3
0	1	1	0	1	0	0	9.4
1	1	1	0	1	0	0	9.5
0	0	0	1	1	0	0	9.6
1	0	0	1	1	0	0	9.7
0	1	0	1	1	0	0	9.8
1	1	0	1	1	0	0	9.9
0	0	1	1	1	0	0	10
1	0	1	1	1	0	0	10.1
0	1	1	1	1	0	0	10.2
1	1	1	1	1	0	0	10.3
0	0	0	0	0	1	0	10.4
1	0	0	0	0	1	0	10.5
0	1	0	0	0	1	0	10.6
1	1	0	0	0	1	0	10.7
0	0	1	0	0	1	0	10.8
1	0	1	0	0	1	0	10.9
0	1	1	0	0	1	0	11
1	1	1	0	0	1	0	11.1
0	0	0	1	0	1	0	11.2
1	0	0	1	0	1	0	11.3
0	1	0	1	0	1	0	11.4
1	1	0	1	0	1	0	11.5
0	0	1	1	0	1	0	11.6
1	0	1	1	0	1	0	11.7
0	1	1	1	0	1	0	11.8
1	1	1	1	0	1	0	11.9
0	0	0	0	1	1	0	12
1	0	0	0	1	1	0	12.1
0	1	0	0	1	1	0	12.2
1	1	0	0	1	1	0	12.3
0	0	1	0	1	1	0	12.4
1	0	1	0	1	1	0	12.5
0	1	1	0	1	1	0	12.6
1	1	1	0	1	1	0	12.7
0	0	0	1	1	1	0	12.8
1	0	0	1	1	1	0	12.9
0	1	0	1	1	1	0	13
1	1	0	1	1	1	0	13.1
0	0	1	1	1	1	0	13.2
1	0	1	1	1	1	0	13.3
0	1	1	1	1	1	0	13.4
1	1	1	1	1	1	0	13.5
0	0	0	0	0	0	1	13.6
1	0	0	0	0	0	1	13.7
0	1	0	0	0	0	1	13.8
1	1	0	0	0	0	1	13.9
0	0	1	0	0	0	1	14
1	0	1	0	0	0	1	14.25
0	1	1	0	0	0	1	14.5
1	1	1	0	0	0	1	14.75
0	0	0	1	0	0	1	15
1	0	0	1	0	0	1	15.25
0	1	0	1	0	0	1	15.5
1	1	0	1	0	0	1	15.75
0	0	1	1	0	0	1	16
1	0	1	1	0	0	1	16.25
0	1	1	1	0	0	1	16.5
1	1	1	1	0	0	1	16.75
0	0	0	0	1	0	1	17
1	0	0	0	1	0	1	17.25
0	1	0	0	1	0	1	17.5
1	1	0	0	1	0	1	17.75
0	0	1	0	1	0	1	18
1	0	1	0	1	0	1	18.25
0	1	1	0	1	0	1	18.5
1	1	1	0	1	0	1	18.75
0	0	0	1	1	0	1	19
1	0	0	1	1	0	1	19.25
0	1	0	1	1	0	1	19.5
1	1	0	1	1	0	1	19.75
0	0	1	1	1	0	1	20
1	0	1	1	1	0	1	20.25
0	1	1	1	1	0	1	20.5
1	1	1	1	1	0	1	20.75
0	0	0	0	0	1	1	21
1	0	0	0	0	1	1	21.25
0	1	0	0	0	1	1	21.5
1	1	0	0	0	1	1	21.75
0	0	1	0	0	1	1	22
1	0	1	0	0	1	1	22.25
0	1	1	0	0	1	1	22.5
1	1	1	0	0	1	1	22.75
0	0	0	1	0	1	1	23
1	0	0	1	0	1	1	23.25
0	1	0	1	0	1	1	23.5
1	1	0	1	0	1	1	23.75
0	0	1	1	0	1	1	24
1	0	1	1	0	1	1	24.25
0	1	1	1	0	1	1	24.5
1	1	1	1	0	1	1	24.75
0	0	0	0	1	1	1	25
1	0	0	0	1	1	1	25.25
0	1	0	0	1	1	1	25.5
1	1	0	0	1	1	1	25.75
0	0	1	0	1	1	1	26
1	0	1	0	1	1	1	26.25
0	1	1	0	1	1	1	26.5
1	1	1	0	1	1	1	26.75
0	0	0	1	1	1	1	27
1	0	0	1	1	1	1	27.25
0	1	0	1	1	1	1	27.5
1	1	0	1	1	1	1	27.75
0	0	1	1	1	1	1	28
1	0	1	1	1	1	1	28.25
0	1	1	1	1	1	1	28.5
1	1	1	1	1	1	1	28.75

Switch setting ‘1’ signifies on
Switch setting ‘0’ signifies off

Setting example:

Four cylinder, single spark engine
PPR is 2
From table, switch setting is:

Sw1	sw2	sw3	sw4	sw5	sw6	sw7
1	1	0	0	0	0	0
on	on	off	off	off	off	off

Note: Switch number 8 should always be in the ‘on’ position.

MGB / Lotus Warning Lights

Speedometer or Tachometer

The HIGH BEAM Light is the White/Blue wire, to be connected to the +12V side of the high beam circuit. The Black Wire to true 0 Volts.

Tachometer

The IGNITION Light is the Brown/Yellow wire, to be connected to the alternator charge warning light output. The Green wire goes to +12v.

Included with the gauge is a 68 Ohm 5 watt resistor as some alternators require a load resistance to get them to charge. The wire colours of the resistor are matched to the gauge wiring colours, Green=12V & Brown/Yellow to the alternator charge warning light output. If required connect one end of the resistor to the warning light output on the alternator and the other end of the resistor to switched 12 volts.

Lotus Speedometer only

The single indicator light warning light has two inputs, Green/Red for LHS & Green/White for RHS, both are positive driven from the wires to the original warning light bulb. On negative earth vehicles the common Ground connector is internal to the gauge but for positive earth there is an extra external Black wire exiting the gauge.