Operating instructions

RPM8000-OBD2 v4

RPM and SPEED measurement in cars via CAN “On-Board Diagnostics” interface with analog and pulse outputs

NEW: Now with galvanic isolated powering from board net!

- No sensor installation required
- Direct reading of RPM and SPEED
- 16-8-4-2 or 1 pulse / engine revolutions
- 16 Hz / km/h
- Analogue and pulse output
- Display of RPM and SPEED
- Max. 10000 RPM and 250 km/h
- Galvanic ISO from vehicle ground!

INSTRUCTIONS FOR QUALIFIED PERSONNEL ONLY!
RPM8000-OBD2 offers a discerning solution for automotive RPM measurement without an additional sensor. The information will read directly from the CAN-OBD2- interface (ISO 15765 CAN, 11/29Bit ID, 250/500 kBaud). The instrument is simply connected to the standard OBD2 connector and the RPM or SPEED is shown directly on the LCD display. You even have the choice to output the data as an analog voltage (0-5V) or as a digital pulse sequence (TTL).

**Technical details:**

- **Input source**: CAN-OBD2 Interface (ISO 15765 CAN BUS) CAN 11 ident 250 KB, CAN 11 ident 500 KB CAN 29 ident 250 KB, CAN 29 ident 500 KB
- **Supply voltage**: via CAN-OBD2 connector or 8-30 VDC
- **Current consumption**: 200 mA at 12V
- **RPM resolution**: 0.25 RPM
- **RPM Analog output**: 0-5V, 0.5 V per 1000 RPM, max. 10000 RPM max. delay 50 ms (car timeout), min. delay 4ms, typ. delay 10 ms accuracy 0.5 % (tested with calibrator) load > 1k ohm
- **RPM Digital output**: 16 (1:1) per engine revolutions max. 10000 RPM RPM frequency divider 1:1, 1:2, 1:4, 1:8 or 1:16
  - DIV 1:1 = 2666,66 Hz at 10000 RPM = 16 pulse/rev.
  - DIV 1:2 = 1333,33 Hz at 10000 RPM = 8 pulse/rev.
  - DIV 1:4 = 666,66 Hz at 10000 RPM = 4 pulse/rev.
  - DIV 1:8 = 333,33 Hz at 10000 RPM = 2 pulse/rev.
  - DIV 1:16 = 166,66 Hz at 10000 RPM = 1 pulse/rev.
- **TTL level**: output impedance 130 ohm accuracy 0.5 % (tested with calibrator) max. delay 50 ms (car timeout), min. delay 4ms, typ. delay 10 ms jitter 0.1 – 1 %
- **SPEED resolution**: 1 km/h
- **SPEED Analog output**: 0-5V, 0.02 V per km/h, max. 250Hz max. delay 50 ms (car timeout), min. delay 4ms, typ. delay 10 ms accuracy 0.5 % (tested with calibrator) load > 1k ohm
- **SPEED Digital output**: 16Hz/km/h max. 250km/h = 4000Hz TTL level output impedance 130 ohm accuracy 0.5 % (tested with calibrator) max. delay 50 ms (car timeout), min. delay 3ms, typ. delay 10 ms jitter 0.1 – 1 %
- **Synchronization time**: ~ 2 seconds
- **Displays**: graphic display: Divider, numeric and graphic RPM and SPEED
  - LED green: Power ON
  - LED green/red: RPM supported over CAN YES / NO (green/red)
  - LED green/red: SPEED supported over CAN YES / NO (green/red)
- **Rotary switch**: frequency divider for RPM 1:1, 1:2, 1:4, 1:8 or 1:16 Rotary switch can switch-OFF the SPEED function (only RPM measurement possible)

The RPM measuring range of the analog output is 0.5 Volt per 1000 RPM. The standard TTL frequency output of 16 pulse per engine revolution can scaled with a frequency divider of 1:1, 1:2, 1:4, 1:8 or 1:16. The SPEED measuring range of the analog output is 0.020V per km/h (0-5V = 0-250km/h) The TTL frequency output is 16Hz/km/h max. 250km/h.
**Functions and display:**

**To OBD-2 interface**

Pin connection:  
5. Signal Ground  
6. CAN-High  
14. CAN-Low  
16. Battery (+)  

**Sub-D9- connector**

Pin connection:  
1. Signal Ground  
3. CAN-High  
4. CAN-Low  
9. Battery (+)  

**Divider Function for RPM TTL output**

- F1 = DIV 1:1 = 2666.66 Hz / 10000 RPM  
- F2 = DIV 1:2 = 1333.33 Hz / 10000 RPM  
- F4 = DIV 1:4 = 666.66 Hz / 10000 RPM  
- F8 = DIV 1:8 = 333.33 Hz / 10000 RPM  
- F16 = DIV 1:16 = 166.66 Hz / 10000 RPM  

**RPM**

Display the actual RPM

**Resp. Time (ms)**

Display the averages response of ask/answer of CAN BUS information

**SPEED**

Display the actual SPEED

**PWR LED**

Lights up green when powering is applied at the OBD-2 interface

**RPM LED**

Lights up green when RPM is available at CAN  
Lights red when RPM is not available at CAN

**SPEED LED**

Lights up green when SPEED is available at CAN  
Lights red when SPEED is not available at CAN  
Dark if switch off by RPM TTL DIV switch!

**RPM TTL DIV rotary switch**

Divide the RPM TTL output frequency.  
- F1 = DIV 1:1 = 2666.66 Hz / 10000 RPM  
- F2 = DIV 1:2 = 1333.33 Hz / 10000 RPM  
- F4 = DIV 1:4 = 666.66 Hz / 10000 RPM  
- F8 = DIV 1:8 = 333.33 Hz / 10000 RPM  
- F16 = DIV 1:16 = 166.66 Hz / 10000 RPM

You can switch off the SPEED function by RPM TTL DIV switch! At only RPM you can reach faster response time!

**RPM analog output**

5V at 10000 RPM  
30mV/ revolutions

**RPM TTL output**

2666.66Hz at 10000 RPM  
16 pulse/revolutions (DIV:1:1)

**SPEED analog output**

5V at 250km/h  
20mV per 1 km/h

**SPEED TTL output**

4000Hz at 250km/h  
16Hz per 1 km/h

Technical Data are subject to change without notice!
First steps

1) Connect the RPM8000-OBD2 with the OBD2 interface in the car which is normal positioned in the area below the steering wheel.

* Avoid any obstructions through the RPM8000-OBD2 connection cable in your driver’s cabin!
* Make sure that you don’t get any driving affects through the connection cable or RPM8000-OBD2 device!
* The RPM8000-OBD2 is only for authorized test people e.g. from R&D departments.
* Not suitable for general use on public streets!

2) Switch on your car electronic by the car key. Now the RPM8000-OBD2 will start to search the OBD2. It will take about 2-3 sec. When the RPM8000OBD2 detects **ISO 15765 CAN** than the RPM- and SPEED-LED will lights up green. If the RPM8000-OBD2 search routine will take more than 10 seconds, the OBD2 protocol is not compatible.

Supported protocol:

ISO 15765 CAN:
CAN 11 ident 250 KB, CAN 11 ident 500 KB
CAN 29 ident 250 KB, CAN 29 ident 500 KB
First steps

3) Now you can start your car engine and follow up with the measurement.

4) With the RPM TTL DIV rotary switch one can divide the RPM TTL output frequency and switch Off the SPEED function to reach a faster response time. When switching Off the RPM measurement the SPEED LED is dark!