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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!

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RPM8000-OBD2 offers a discerning solution for automotive RPM measurement without an additional sensor. The information will read direct 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).

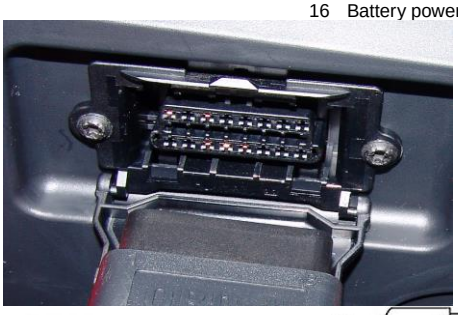
Technical details:

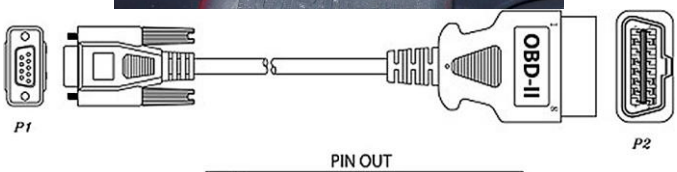
Input source	CAN-OBD2 Interface (ISO 15765 CAN BUS) CAN 11 ident 250 KB, CAN 11 ident 500 KB CAN 29 ident 250 KB, CAN 29 ident 500 KB Update rate 10-20Hz (typical) or better RPM8000OBD2 unit scan up to 400Hz update rate, if supported from the car Engine control unit (ECU)
Supply voltage	via CAN-OBD2 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 **rev**olutions 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 = 16pulse/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)

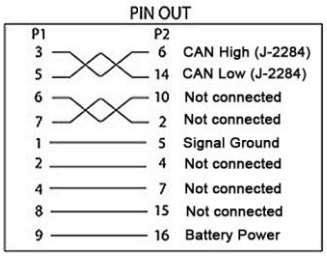
The RPM measuring range of the analog output is 0.5 Volt per 1000 RPM. The standard TTL frequency output of 16 pulse per engine revolution can scaled with a frequency divider of 1:1, 1:2, 1:4, 1:8 or 1:16.

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.

Connectors:	BNC OUT for analog RPM and SPEED BNC OUT for TTL frequency RPM and SPEED **OBD2 Plug** for INPUT with **1.8m** cable	
Pin connection: OBD2 PLUG	5	Signal Ground
	6	CAN-High (J-2284)
	14	CAN-Low (J-2284)
	16	Battery power (+)







Pin connection from 1.8m cable OBD2/9p-SUB-D

Dimensions:	150 x 100 x 30mm
Weight:	0.5kg without connection cable
Material:	anodized aluminum
Operating temperature:	-20°C to +70°C
Storage temperature:	-30 to +80°C
Humidity:	20 – 80%
Vibrations:	5g
Shock:	in all directions 100 g

RPM8000OBD2 – in transport case

Technical Data are subject to change without notice!

Functions and display:

To OBD-2 interface

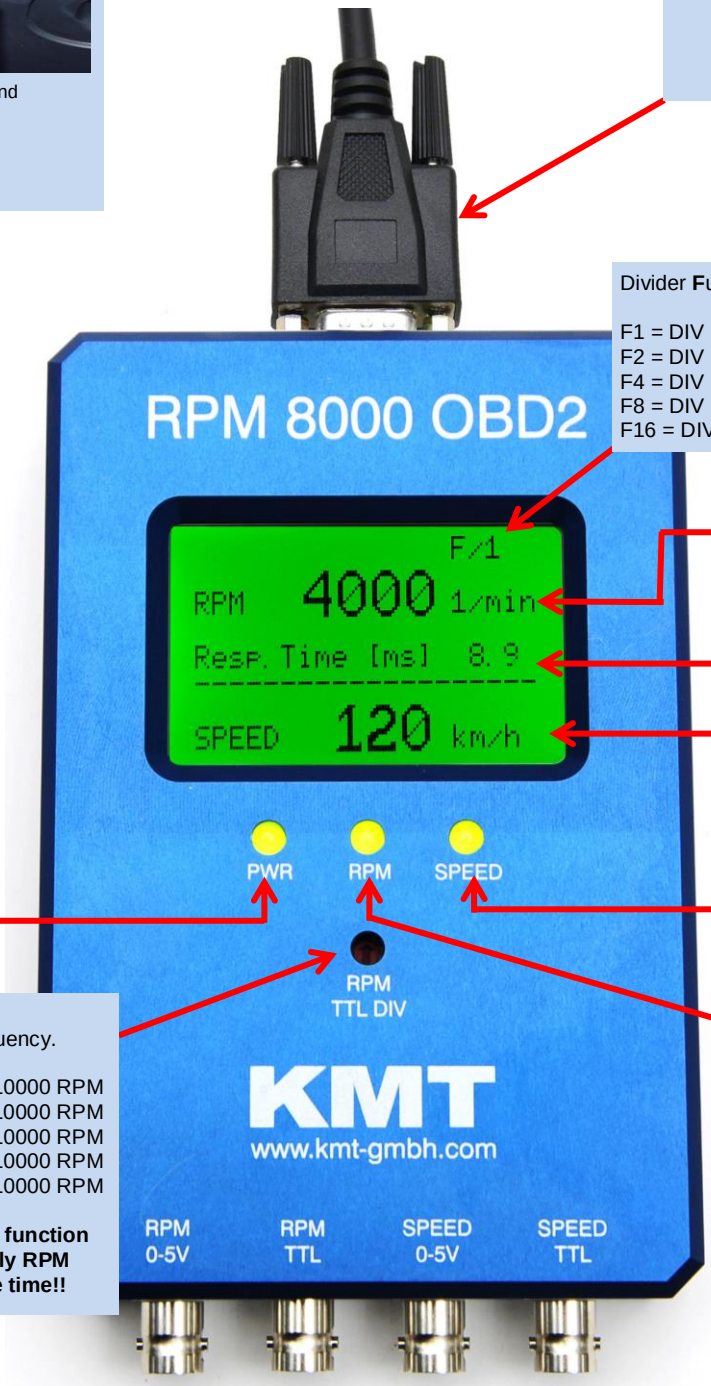
Pin connection:

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 **F**unction 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 <u>averages</u> response of ask/answer of CAN BUS information

SPEED
Display the actual SPEED

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

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

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 at10000 RPM
=
30mV/ revolutions

RPM TTL output

2666.66Hz at 10000 RPM
=
16pulse/revolutions (DIV1:1)

SPEED analog output

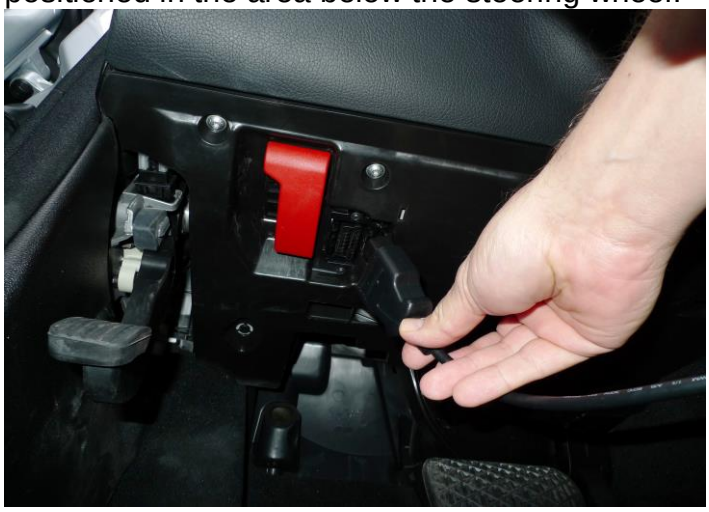
5V at 250km/h
=
20mV per 1 km/h

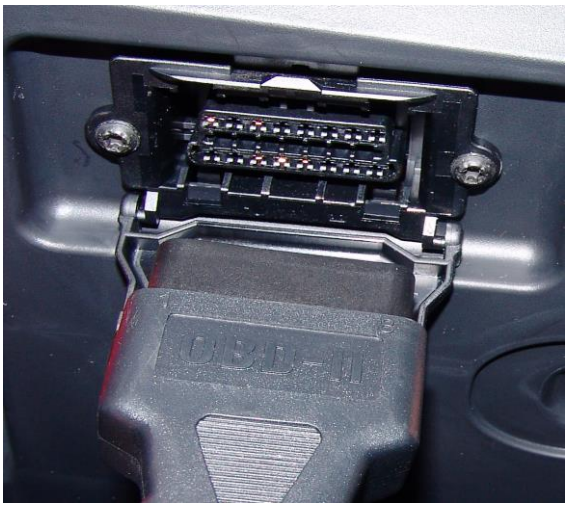
SPEED TTL output

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

First steps

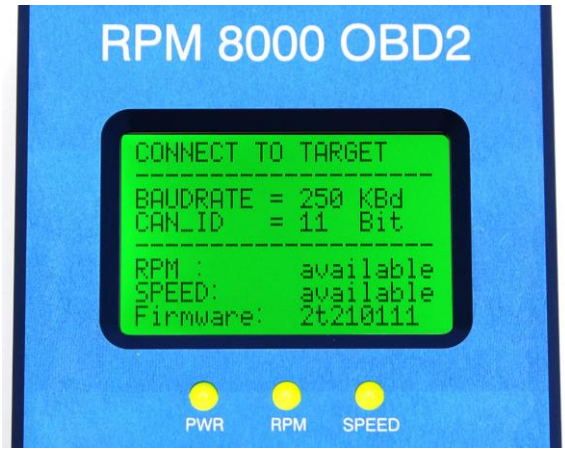
1) Connect the RPM8000-OBD2 with the OBD2 interface in the car which is normal positioned in the area below the steering wheel.





*** Avoid any obstructions trough the RPM8000-OBD2 connection cable in your driver's cabin!**
*** Make sure thant 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 puplic 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

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!

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