

# 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-OBDD2 offers a discerning solution for automotive RPM measurement without an additional sensor. The information will read direct from the CAN-OBDD2- interface (**ISO 15765 CAN, 11/29Bit ID, 250/500 kBaud**) . The instrument is simply connected to the standard OBDD2 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-OBDD2 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  
 RPM8000OBDD2 unit scan up to 400Hz update rate, if supported from the car Engine control unit (ECU)

Supply voltage via CAN-OBDD2 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 = 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)

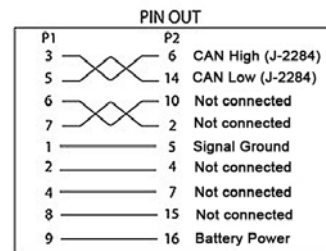
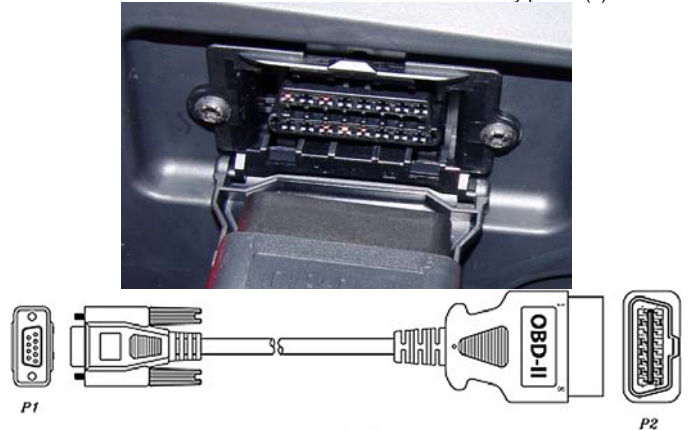
Rotary switch: frequency divider for RPM 1:1, 1:2, 1:4, 1:8 or 1:16  
 Rotary switch can switch-OFF the SPEED function (only RPM measurement possible)

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
- OBDD2 Plug** for INPUT with 1.8m cable
- Pin connection: 5 Signal Ground
- OBDD2 PLUG 6 CAN-High (J-2284)
- 14 CAN-Low (J-2284)
- 16 Battery power (+)



**Pin connection from 1.8m cable OBDD2/9p-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



RPM8000OBDD2 – in transport case

# Functions and display:

## To OBD-2 interface

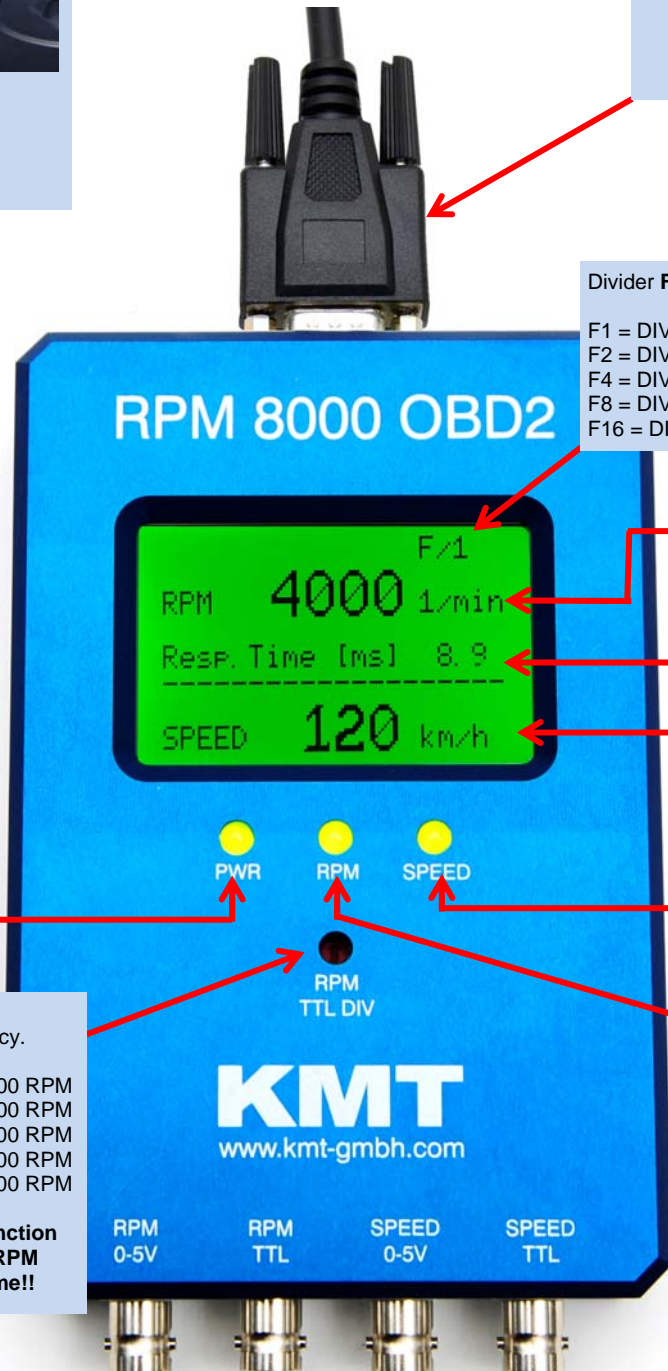


Pin connection: 5 Signal Ground  
6 CAN-High  
14 CAN-Low  
16 Battery (+)

## Sub-D9- connector



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



# RPM 8000 OBD2



## 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

**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!!

**KMT**  
www.kmt-gmbh.com

RPM 0-5V    RPM TTL    SPEED 0-5V    SPEED TTL

<b>RPM analog output</b> 5V at 10000 RPM = 30mV/ revolutions	<b>RPM TTL output</b> 2666.66Hz at 10000 RPM = 16pulse/revolutions (DIV1:1)	<b>SPEED analog output</b> 5V at 250km/h = 20mV per 1 km/h	<b>SPEED TTL output</b> 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 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!

