

## rpm-SET

## Universal rpm-converter-Kit

rpm-tapping on vehicles, trucks and omnibusses

rpm-tapping on standard vehicles and prototypes

rpm-tapping via diagnostic interfaces OBD2, FMS and vehicle-CAN

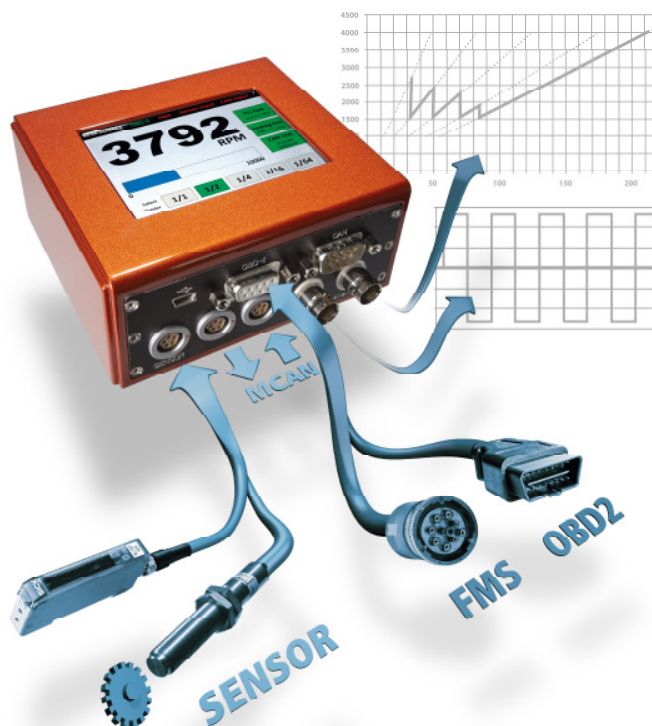
Direct connection of inductive sensors and optical sensors

Numerical and graphical display

Analog rpm-signal output in mV/rpm

Digital signal-output, TTL-pulse/rpm, frequency divider 1:64

rpm-signal output via CAN-ID / looping in CAN-measurement chains



### Engine speed used for reference

The rpm is the central reference variable of the vehicle measurement technology. Using the common procedures for the direct tapping of the rpm signal via inductive or optical sensors means considerable tooling times and efforts; nevertheless these provide the most accurate results, even concerning measurements with high atomic numbers.

The rpm-tap via the vehicle-CAN and the standardised OBD2- and FMS-jacks is convenient and time-saving. Practise has shown, however, that the OBD2-protocol has often not been available on the prototypes or pre-production models of cars, commercial vehicles and coaches. Concerning trucks and coaches the use of the FMS-protocol may be an alternative.

### Flexible rpm-measurement – “rpm-SET”, the case for every kind of rpm-measurement

With the new rpm-SET, TBJ-Dynamische Messtechnik has combined all the previously named technologies, including the adapted inductive and opto-reflex-sensor, in one compact case.

Basic is the new measurement module *rpm-MultiSENS* which contains both the protocol decoding for the OBD2 according to the ISO standard 15765 and the FMS-standard according to SAE J1939 as well as the signal processing for external rpm sensors. The system automatically recognises the connected signal source. If no OBD2-protocol is detectable at a early development-state or close-to-standard prototype vehicles, a known CAN-identifier can be entered via the configtool for direct rpm-tap by accessing to the vehicles CAN.

### rpm-tap using an optical sensor

The supply voltage required for the direct connection of the optical sensorsystem contained in the rpm-SET, is procured at a lockable round socket. At the same time, a fiberoptic of a length of up to two metres could be led to the rpm-mark. Optionally, a fiberoptic coated in stainless steel is available for thermally critical areas with ambient temperatures of up to +300°C. The rpm-signal detected by the sensor is supplied to a system-internal edge regeneration and is available for further processing. If technically suitable, the costumer may use his already existing sensors.



### rpm-tap using an inductive sensor

The supply voltage required for the direct connection of the inductive sensor contained in the rpm-SET is procured at a lockable round socket. The rpm-signal detected by the inductive-sensor is supplied to a system-internal edge regeneration and is available for further processing. If technically suitable, the costumer may use his already existing inductive sensors.



### **rpm-tap via OBD2 according to ISO 15765**

Effective October, the 1<sup>st</sup> 2010, the legislator has required all the newly registered cars, trucks and coaches (petrol and diesel!) be equipped with the OBD2 (on board diagnosis) according to ISO 15765. Among others, this regulation specifies the output of an rpm signal with an update rate of 20 Hz. rpm-MultiSENS checks the conformity of the OBD2-protocol output by the vehicle ECU according to ISO 15765, deduces the rpm of the engine and supplies the system with it for further processing and for the desired signal output.



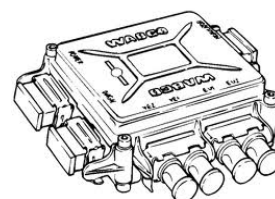
### **rpm-tap via the FMS according to SAE J1939**

Besides the OBD2-jack, trucks and coaches provide various measurands for the fleet management, among others the rpm signal, via the standardised FMS-protocol. This protocol rests on the standardised FMS-round socket. rpm-multiSENS checks the conformity of the FMS-protocol output by the vehicle-ECU according to SAE J1939, deduces the rpm-signal and provides the system with it for signal output.



### **rpm-tap via the vehicle-CAN**

A complementary feature of the rpm-MultiSENS is the possibility to tap the rpm information directly from the vehicle-CAN. To do so, the relevant CAN-ID or CAN-message is required. The CAN-ID can be entered via the touch screen of the rpm-MultiSENS by the configtool on your PC.



### **Looping of the rpm signal into a CAN-measurement chain**

Optionally, the measurement module rpm-MultiSENS can be equipped with two lockable connection sockets, as common on CAN-measurement chains. (MCAN via Fischer or Lemos, socket type as agreed upon. Via the internal CAN-transceiver of the rpm-MultiSENS the connecting and commissioning of the rpm-signal to the entire measurement chain is now available. Since the rpm-information so is imprinted on the looped CAN-data stream, it is led to "one" target-CAN-node. So it results in a very economically and cost-savingly measurement assembly.



### **Output of the detected rpm signal via a CAN-ID**

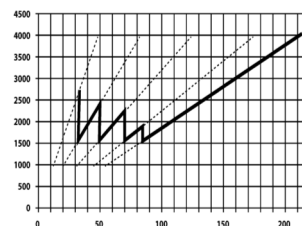
A complementary feature of the rpm-MultiSENS is that the rpm information can be output via it's CAN-output. To this, the user has to assigns an individually adjustable CAN-identifier on the touch screen.



#### **rpm-signal analog output:**

The resulting rpm information can be tapped at a BNC-socket as a proportional analog voltage. Scaling > 0.305 mV/rpm.

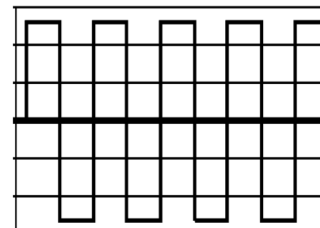
The current scaling factor of the analog output is continuously displayed on the integrated touchscreen.



#### **rpm-signal TTL-output:**

The resulting rpm information can be tapped at a BNC-socket as a proportional frequency signal. Scaling > Hz/rpm.

The current scaling factor of the Digital-output is continuously displayed on the integrated touchscreen.



#### **Scope of delivery: rpm-SET**

- \* Basic unit *rpm-MultiSENS*
- \* Inductive sensor "Rheintacho"
- \* 2 metres of connection cable for inductive sensor configured ready to use
- \* Opto-sensorsystem "SICK", connection cable configured ready to use
- \* Reflex mode fibre cable, -30°C up to 80°C, length of 2 metres
- \* OBD-cable, length of 2 metres. Configured for ready to use
- \* CAN-cable, length of 2 metres, Configured with 2 test cords for ready to use
- \* USB-cable
- \* DC-cable, length of 2 metres, with board plug (cigarette lighter)
- \* Transport case, aluminium with foam outfit

#### **Basic unit: rpm-MultiSENS**

- \* OBD2-signal converter according to ISO 15765
- \* rpm-converter FMS according to SAE J1939, for trucks and coaches
- \* rpm-converter via CAN-tap (dbc-input or manual ID required!)
- \* Provision +12 volts sensorexcitation for Opto-sensor and inductive sensors
- \* Edge regeneration at the sensor input
- \* Scaling analog output: rpm=0.305 mV/rpm
- \* Scaling TTL-output: Hz/rpm
- \* Frequency divider 1:64
- \* Accuracy: better +/- 0.8% of rpm full scale
- \* Supply voltage: +8 > +32V DC, via OBD-jack or DC-adaptor cable
- \* Operating temperature: -10°C to +60°C