

## Manual electronic speedometer Ø 48 / 60 / 80 mm with stepper motor

Dear Customer,

you made a good selection buying this new **MMB** device. This gauge features a General Operating Permit as speedometer for two- or three-wheeled vehicles according to §22 in combination with §20 of the StVZO. Each product of **MMB** is checked on quality and functioning before dispatch. All products are manufactured in the facilities of **MMB** and are signed as **Made in Germany**. Please check the received goods on completeness and possible transport damages. In case of claims please contact our sales department immediately.

Scope of delivery :

- electronic speedometer
- micro push button
- manual
- 2 fixing screws + 2 washers

### 1. PRELIMINARIES

#### 1.1 Safety instructions

To install the electric cables, use existing cable ducts and looms, but do not run the cables parallel to ignition cables or parallel to cables leading to powerful consumers. Secure the cables with cable binders or adhesive tape. When you install the electric cables please also note:

- Do not run the cables over moving parts.
- Ensure that the cables are not exposed to any tensile, compressive or shear forces.
- Use only cable stripper to strip the cables, adjust the cable stripper so that the individual strands are not damaged or cut off
- Crimped connections should be made only by using a cable crimping pliers.
- Insulate exposed leads in such a way that short circuits cannot occur

Caution: Risk of short circuits through faulty junctions or damaged cables. Please check all cables and connections for short circuits after you have finished the installation. Short circuits in the electrical system can cause cable fires, battery explosions and damages to other electronic systems. Incorrect connections can lead to short circuits.

Use suitable tools for building in the gauge and note the safety instruction of the tool manufacturers. If you use a reed sensor with magnets, note the safety instructions of the glue manufacturer when installing the magnets.



**The shown speed must never be lower than the real speed! You are responsible for the correct adjustment of the wheel pulses. The electronic speedometer D48/D60/D80 as additional instrument is not subject to registration. If the device shall be used as single speed indicator in public traffic, an individual acceptance or rather a registration in the bike documentation is mandatory.**

### 2. MOUNTING

For installation a cutout is needed:

Ø48	of D = 48,5 mm + 0,5 mm
Ø60	of D = 60,5 mm + 0,5 mm
Ø80	of D = 80,5 mm + 0,5 mm

Please use a rubber ring (O-ring) from **MMB** for installation.

Installation brackets with O-ring and mounting kits for the handlebar are available as accessories in our catalogue.

For mounting we recommend our standard holders in black or chrome-plated with the suitable covering cap. If this holder does not work for fitting on your bike, a suitable holder needs to be made. Therefore a solid metal sheet is needed. Please take care of the right positioning of the fixing bolts M5 and uncovering of the 3 box-nuts M4.

**Don't remove the box nuts! Use liquid bolt lock for fixation by the M5 bolts. Don't exceed the max. screwing torque of 4Nm. Don't mount the instrument to heavy vibrating, mechanical moved or hot vehicle parts.**

#### 2.1 Electrical connection

Wire colour	Function	Connection	Original MMB hall-sensor
red	voltage supply	permanent plus (+)	
black	voltage supply	ground (-)	
red/yellow	input ignition lock	switched plus (+)	
green	input push button	push button	
red/white	voltage supply	plus speed sensor (+)	brown (sensor-plus)
orange	input speed sensor	impulse cable speed sensor	black (sensor-impulse)
black/white	voltage supply	ground speed sensor (-)	blue (sensor-ground)
blue/green	input warning light	warning light/ warning contact on the sensor (-)	
white/orange	input turning light	turning light/ relais/ turning light bulb (+)	
grey	input idle gear light	idle gear switch (-)	
blue/white	input high beam light	High beam control lamp/ directly to bulb (+)	
blue/black	input fuel reserve	fuel reserve contact (-)	

Before starting the electrical installation clamp the battery to disconnect it. Please observe the above mentioned rules of safety.

If a cable lengthening is necessary please use wires with a cross section of at least 0,5 mm<sup>2</sup> with PVC-insulation. The instrument must be fused with a 1A fuse for the connections permanent plus and switched plus. Connect the provided push button (see wiring diagram), otherwise there is no possibility for calibration and switching the information showing in the display.

Not used connections must be isolated (see safety instructions).

For support use the circuit diagram of your vehicle.

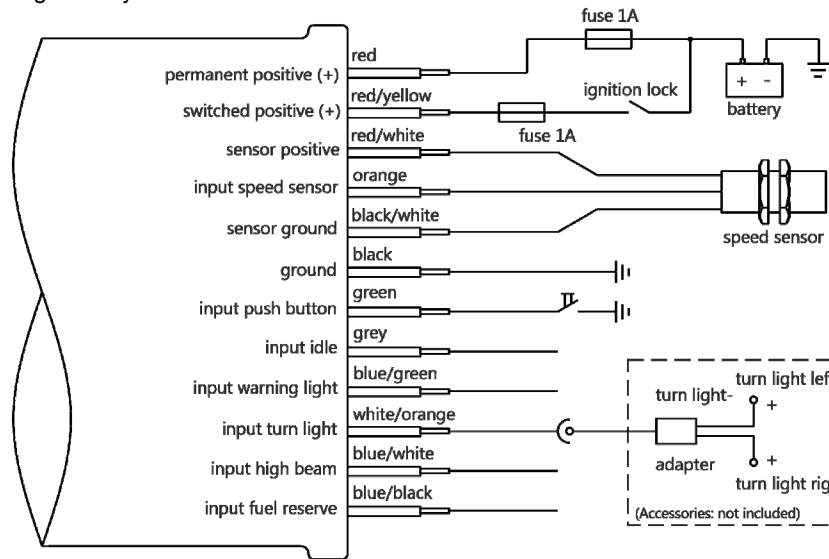


figure 1: wiring diagram

## 2.2. Symbols

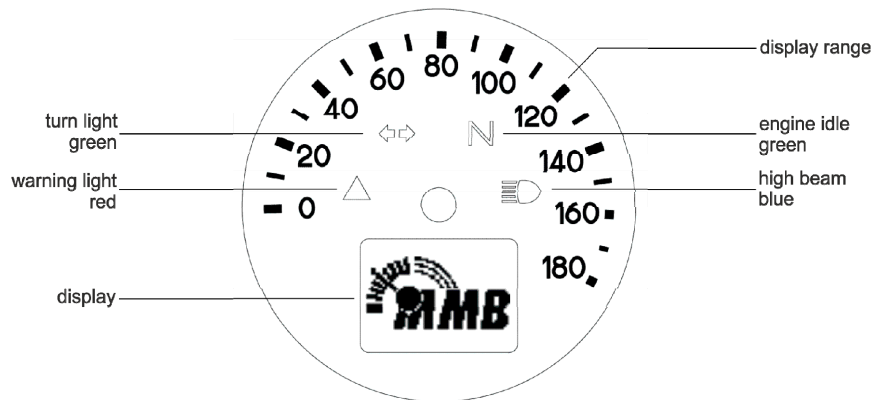


figure 2: symbols

## 3. SENSORS

Please use sensors from the **MMB** as impulse counters. We can't guarantee the function of other sensors.

### 3.1 Hall-Sensor

In the accessories section you can find 2 types of hall-sensors (outer thread M12 or plain tube with fixing plate). It must be connected according to the schematic (figure 3 or printed on the sensor's bag).

The hall-sensors detect ferromagnetic parts (no stainless steel screws) with a switching distance of 1-2mm.

When using neodymium iron boron magnets Ø5x3 or Ø8x4 the max. switching distance is enlarged. When mounting the magnets the polarity must be observed (sensor must pull on the magnet).

**Please take care that the magnets are not stuck in, directly beside or on a level with ferromagnetic elements. These influence the magnetic field, the switching distance and the switching characteristics of the sensor.**

OEM hall-gearsensors (npn-switching) with 3 cables can generally be used if they work with a 12V operating voltage.

Harley Davidson® models from approx. manufacturing year 1996 and Buell® from approx. 1999 already have a hall-sensor, which is applicable with our speedometers. The sensor is located in the gear box and is steered by a gear-wheel of the output shaft.

Please connect it according to the schematic

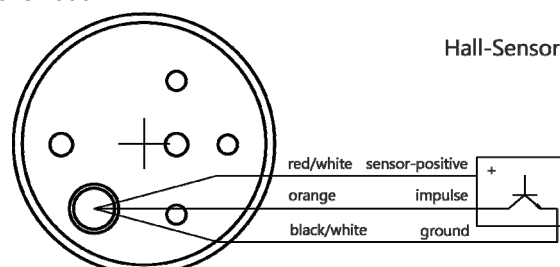


Figure 3: Hallsensor NPN

### 3.2 Reed-Sensor with magnets

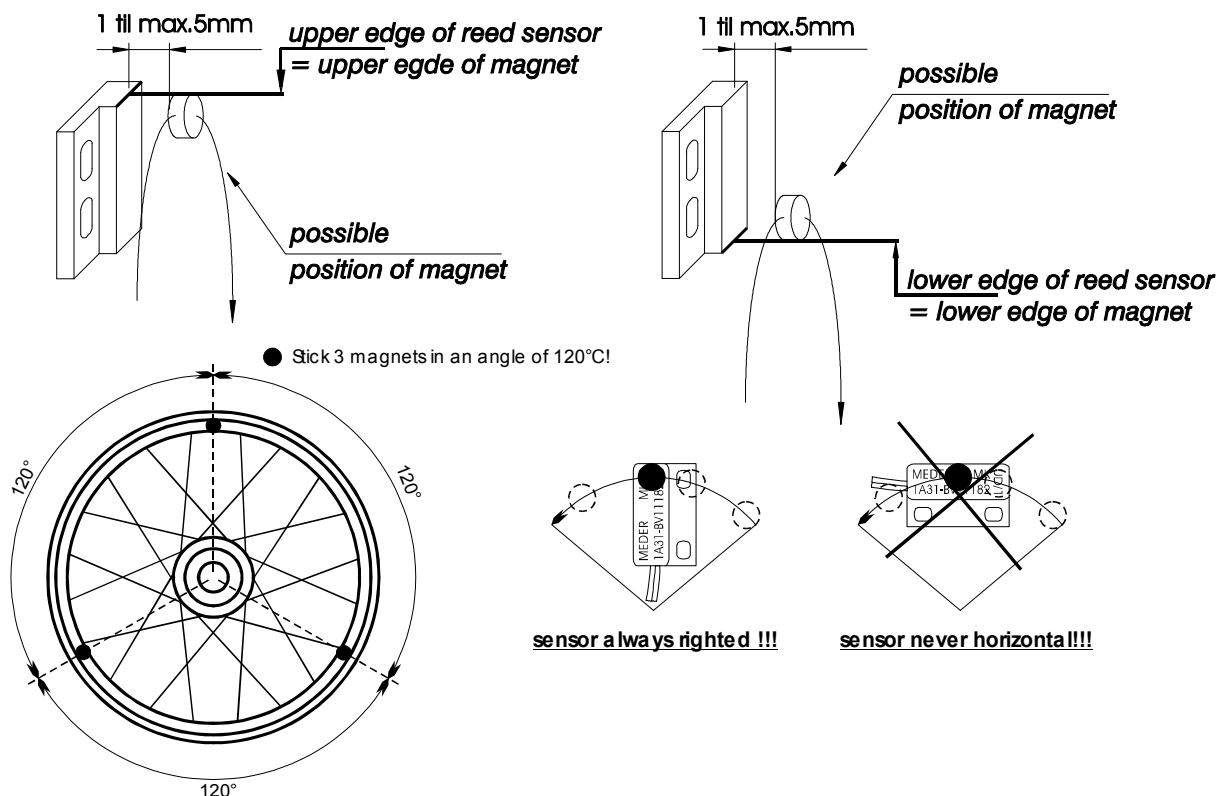


Figure 4: Mounting the magnets

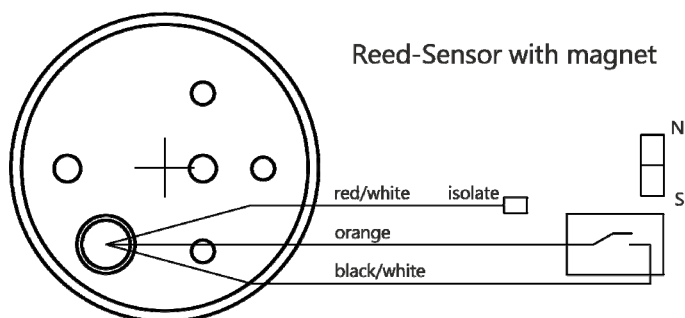


Figure 5: schematic reed-sensor

Please position and fix the reed-sensor and the magnets according to the drawing. The shown dimensions are valid for sensors and magnets from **MMB**.

**MMB** provides 2 reed-sensoren (Square / thread tube M5). For fixation (square sensor) please use the provided cable straps.

**Caution: There are glass bodies in both sensors! Sensors mustn't be strained by bracing or similar mechanical strengths. Take care of the max. force of 1,6 Nm for the locknuts of the M5 sensor.**

For fixation on the rear wheel the cable can be extended. A shielding in the range of ignition is recommended.

Stick 2 magnets in an angle of 180° or 3 magnets in an angle of 120° in the near of the hub (to minimize the centrifugal force) on a plane, clean and greaseless surface. Please use appropriate glue. As additional security an elastic silicone film should be laid around the magnets. The bearing of the brake disc is suitable. Avoid higher temperatures than 100°C on the magnets.



**If you lose one or more magnets the shown speed doesn't correspond the real speed, it's lower (Caution: risk of speed fine due to higher speed than allowed).**

#### 4. FIRST STARTUP SPEEDOMETER Ø48 / 60 / 80

##### 4.1 Connection

Connect the batterie after correct wiring of all parts.

After turning on on the ignition the pointer makes a full-scale deflection (self-test). If it makes no self-test check the wiring or contact an authority.



##### 4.2 General

The speedometer is calibrated and operated by the provided push button.

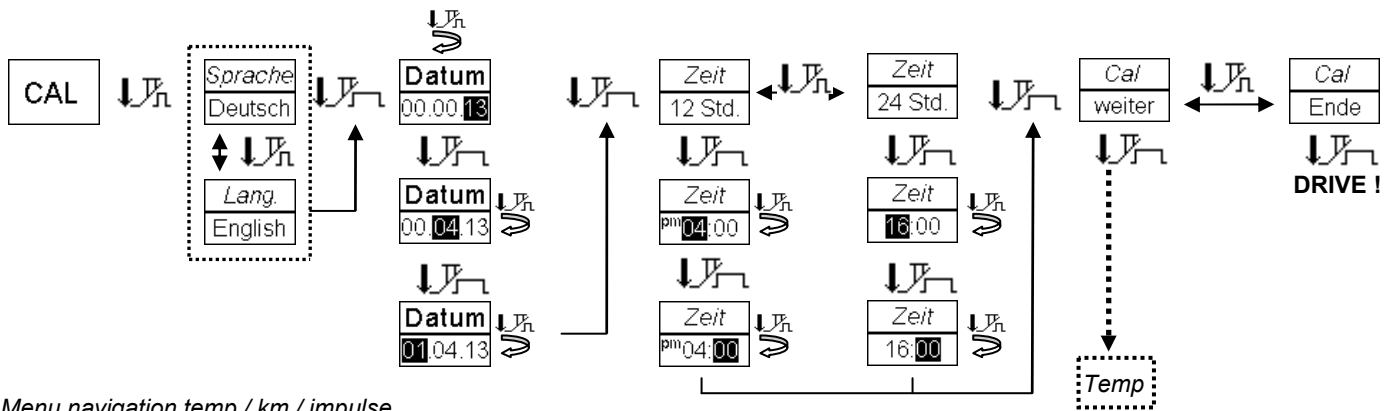
- short push (approx. 1 s): changes function while driving, changes values in calibration mode
- long push (approx. 3 s): Reset (Trip1, Trip2) while driving, change / save in calibration mode

##### 4.3 Calibration mode

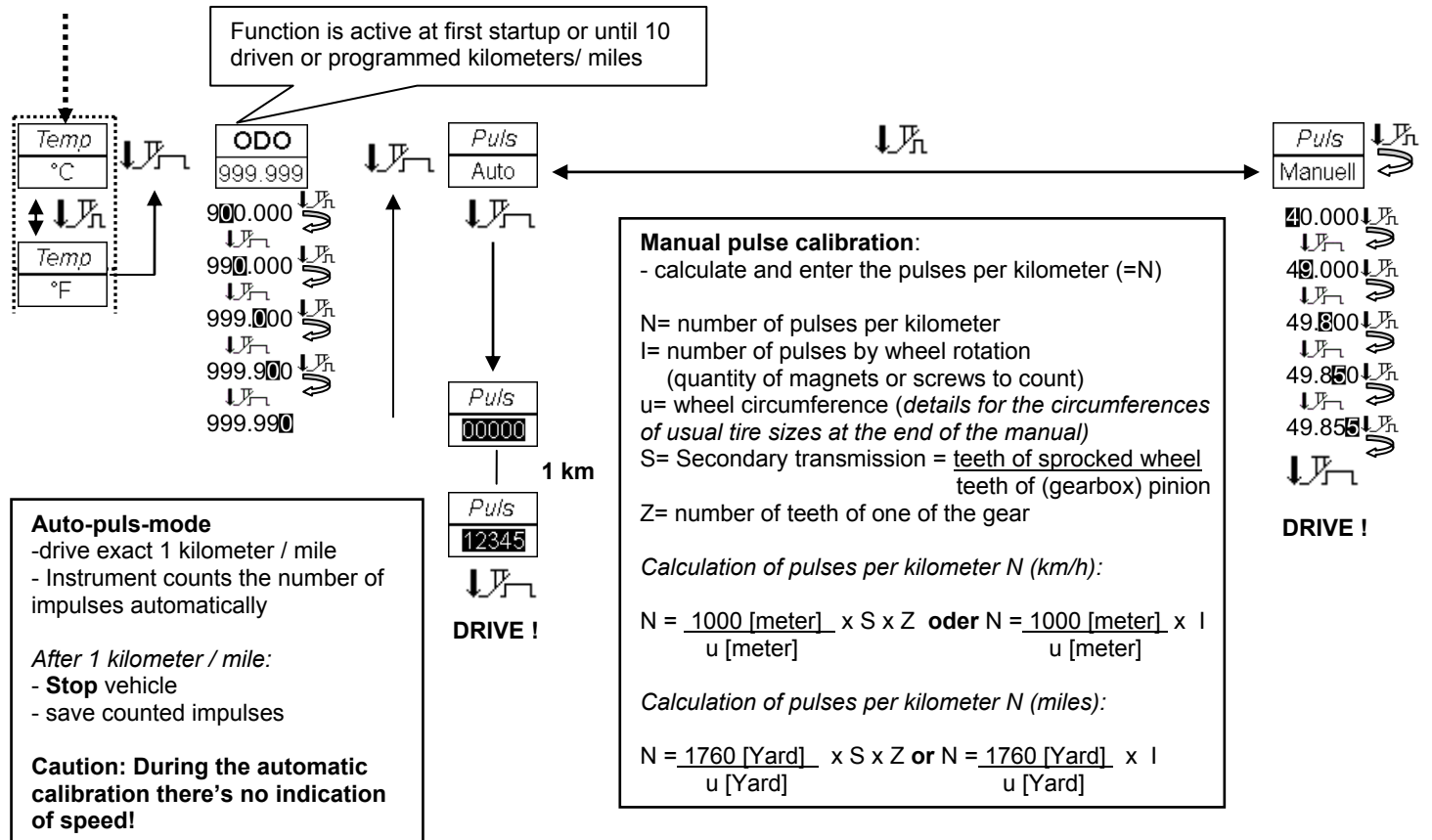
Turn on the ignition while holding down the button → you can now enter the calibration mode (display: **CAL**)

- short push on the button (approx. 1s):  changes value
- long push on the button (approx. 3s):  changes function

Menu navigation language / date / time:



Menu navigation temp / km / impulse



**Example for Harley Davidson® Sportster with Evolution V-Twin motor model year 2003 (original condition)**

- XLH Sportster 883
  - XLH Sportster 883 Hugger
  - XL Sportster 883
  - XL 53C Sportster Custom 53
- number of teeth sprocket wheel / pinion  $z1/z2 = 61/27$
  - number of teeth of the 5th gear on the mainshaft:  $z5 = 42$
  - tire rear wheel: 130/90 B16: rolling circumference:  $U=1933 \text{ mm} = 1,933 \text{ m}$
  - brake disc fixation: 5 steel screws

Hall-gear-sensor:

$$N = \frac{1000 \text{ m}}{1,933 \text{ m}} \times \frac{61}{27} \times 42 = 49089 \text{ [pulses per km]}$$

Or

Hall-sensor (the 5 steel screw heads of the brake disc are used for the wheel pulses)

$$N = \frac{1000 \text{ m}}{1,933 \text{ m}} \times 5 = 2586 \text{ [pulses per km]}$$

## 5. OPERATING WHILE NORMAL RIDING

When turning on the ignition, the speedometer checks his functions itself (full-scale deflection of the pointer). During the upward movement of the pointer all control function lights are illuminated.

The display shows the **MMB** logo.

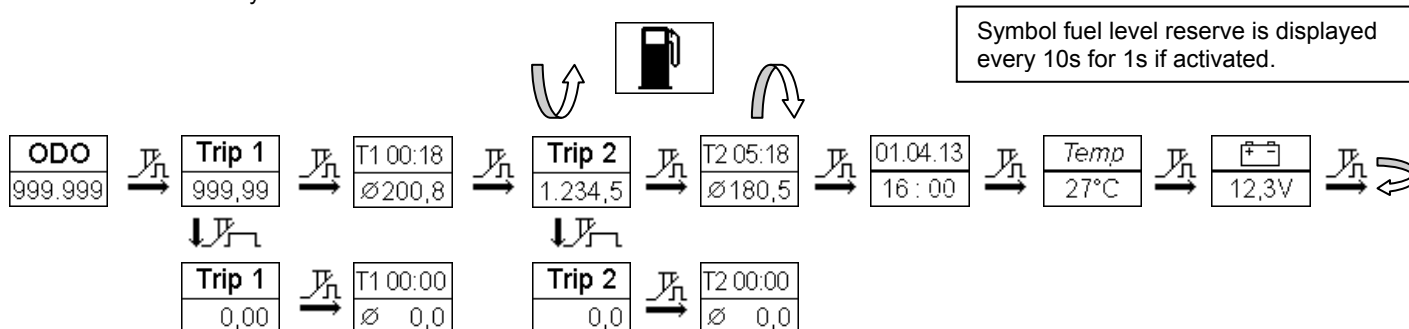


After the self-test the display shows the last chosen function.

### 5.1 Display functions

The colour display shows the following information (depends on the setup):

- odometer
- daytrip 1 or daytrip 2 (TRIP 1 or TRIP 2)
- driving time TRIP 1 or driving time TRIP 2 (T1 or T2)
- average speed TRIP 1 or TRIP 2
- date and time
- device temperature
- condition battery charge
- fuel level reserve as symbol



## 6. TECHNICAL DATA

Rated voltage:	12 VDC		
Voltage range:	6V - 15 V		
Current consumption:	max. 200 mA		
Weight:	120g / 200g / 240g		
Operating temperature:	-20°C ... +85°C		
Diameter of instrument:	48mm	60mm	80mm
Instrument height:	38mm	51mm	75mm
Mounting depth:	33mm	45mm	65mm
Distance fixing bolts:	26mm	46mm	46mm
Fixation:	2 x M5, 8mm	2x M5, 8mm	2 x M6, 30mm
Pulse range:	min. 500 l/km ... 99999 l/km		
Data back-up:	without current at least 10 years		

## 7. GENERAL INFORMATION

You are responsible for the correct adjustment and the mounting of the wheel pulse sensor. If you are not sure whether the speedometer was calibrated correctly or not, you should check it with the authorities of TÜV or Dekra.

## 8. WARRANTY NOTICE

Pulsotronic warrants the proper function from date of purchase.  
Keep the invoice for the warranty period.

In case of necessity fill out the attached form and send it with the instrument back to our facilities.

## 9. DISCLAIMER

Our products are manufactured with utmost care and they are in accordance with the relevant DIN-Standards (German Industrial Standards). Pulsotronic GmbH & Co. KG is not liable for damages arising from improper handling.

In case of any questions please contact our service.

## 10. Registration liability



**The electronic speedometer D48/D60/D80 as additional instrument is not subject to registration. If the device shall be used as single speed indicator in public traffic, an individual acceptance or rather a registration in the bike documentation is mandatory.**