

# Mounting instructions electronic speedometer Ø 48 / 80 / 100 mm with stepper motor

Dear Customer,

you made a good selection buying this new **MMB** device. 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
- manual
- fixing screws + 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
Ø80	of D = 80,5 mm + 0,5 mm
Ø100	of D = 100,5 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 and uncovering of the 3 nuts.

**Don't remove the nuts! Use liquid bolt lock for fixation by the 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

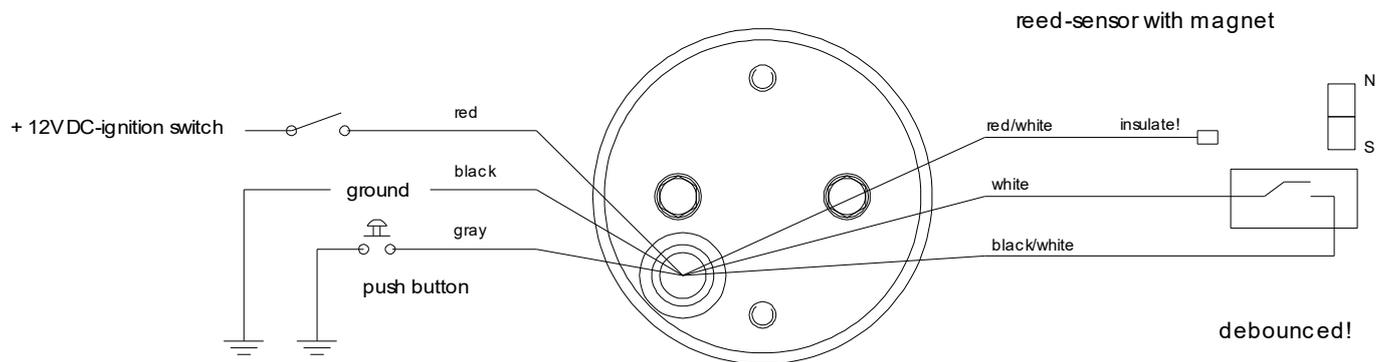
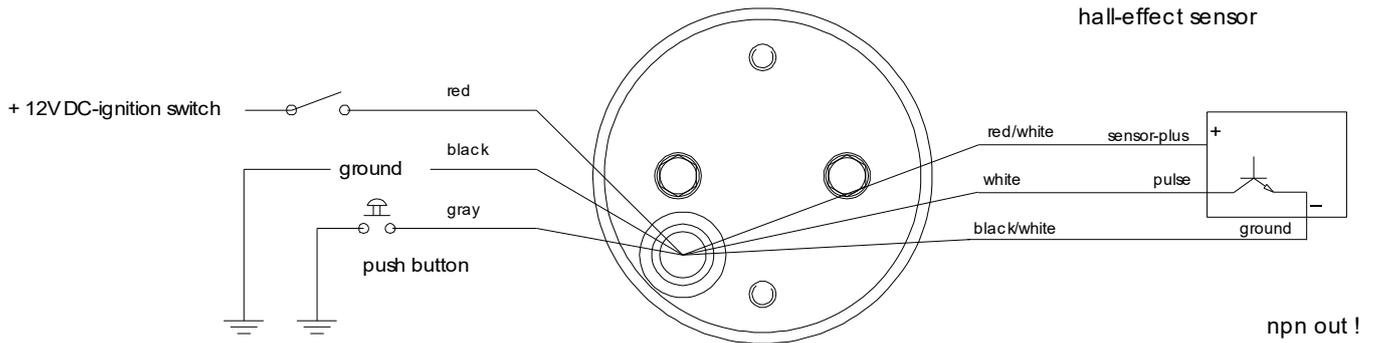
Wire colour	Function	Connection	Original MMB hall-sensor
Red	voltage supply	switched plus (+)	
black	voltage supply	ground (-)	
grey	input push button	push button	
red/white	voltage supply	plus speed sensor (+)	brown (sensor plus)
white	input speed sensor	impulse cable speed sensor	black (sensor impulse)
black/white	voltage supply	ground speed sensor (-)	blue (sensor ground)
orange (not with D48)	voltage supply	illumination / switched plus (+)	
black (not with D48)	voltage supply	illumination / ground	

**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 one 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.



### 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.

#### 3.2 Reed-sensor with magnets

Please position and fix the reed-sensor and the magnets according to the drawing.

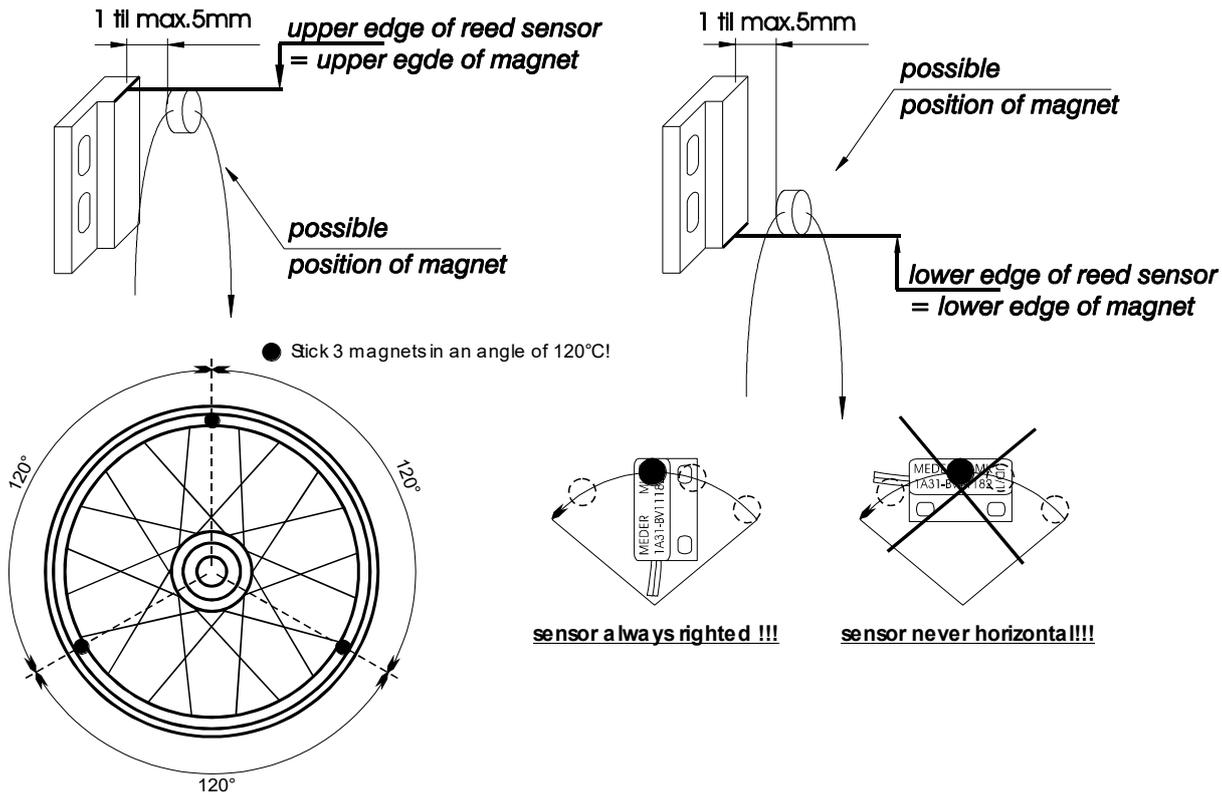
The shown dimensions are valid for sensors and magnets from **MMB**.

**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.**

# Mounting instructions electronic speedometer Ø 48 / 80 / 100 mm with stepper motor



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 / 80 / 100

### 4.1 Connection

Connect the battery after correct wiring of all parts.

After turning 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 one 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

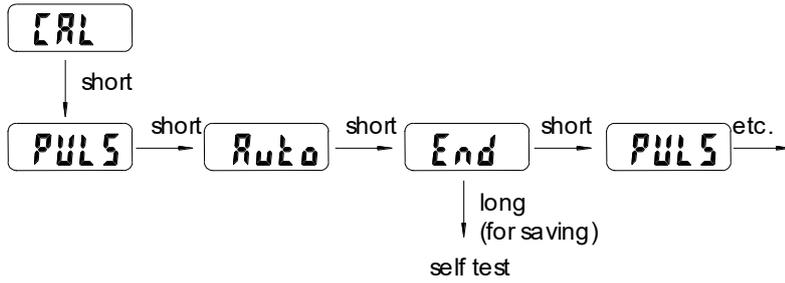
Turn on the ignition while holding down the button → you can now enter the calibration mode (display: CAL)

The calibration can be accomplished in two ways:

- "PULS" – Mode: By input of a known pulse-per-kilometer (or pulse-per-mile, if the speedometer has a mph-scale)
- "Auto" – Mode: Automatic calibration when driving on a road with the exact distance of 1 kilometer (if you have a kilometer scale) or 1 mile (if you have a mile scale) clearly defined.

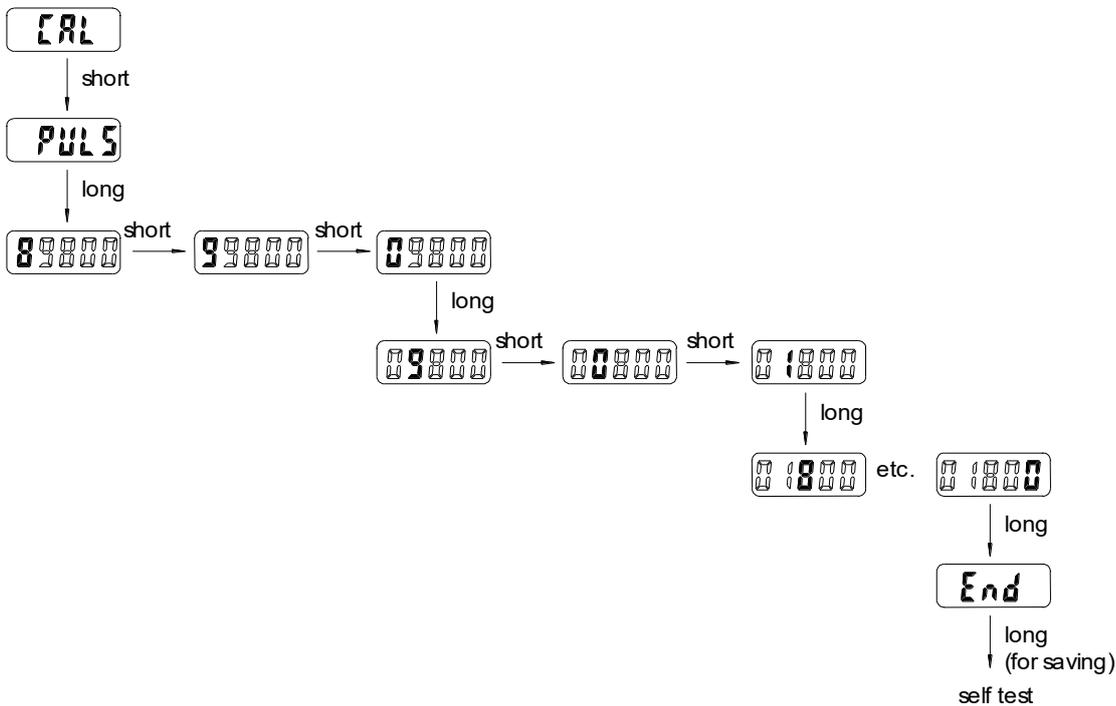
Please note, that the Pulse-per-kilometer/mile must have a minimum value of 1000.

push the button  
while switching on ignition



### 4.3.1 Manual calibration

push the button  
while switching on ignition



If you entered a wrong value unintentionally, you can cancel the calibration anytime by turning of the ignition.

#### Manual pulse calibration:

- calculate and enter the pulses per kilometer (=N)

N= number of pulses per kilometer

l= number of pulses by wheel rotation

(quantity of magnets or screws to count)  
u= wheel circumference (*details for the circumferences of usual tire sizes at the end of the manual*)

S= Secondary transmission = teeth of sprocked wheel  
teeth of (gearbox) pinion

Z= number of teeth of one of the gear

*Calculation of pulses per kilometer N (km/h):*

$$N = \frac{1000 \text{ [meter]}}{u \text{ [meter]}} \times S \times Z \quad \text{oder} \quad N = \frac{1000 \text{ [meter]}}{u \text{ [meter]}} \times l$$

*Calculation of pulses per kilometer N (miles):*

$$N = \frac{1760 \text{ [Yard]}}{u \text{ [Yard]}} \times S \times Z \quad \text{or} \quad N = \frac{1760 \text{ [Yard]}}{u \text{ [Yard]}} \times l$$

## 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  $z_1/z_2 = 61/27$
  - number of teeth of the 5th gear on the mainshaft:  $z_5 = 42$
  - 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:

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

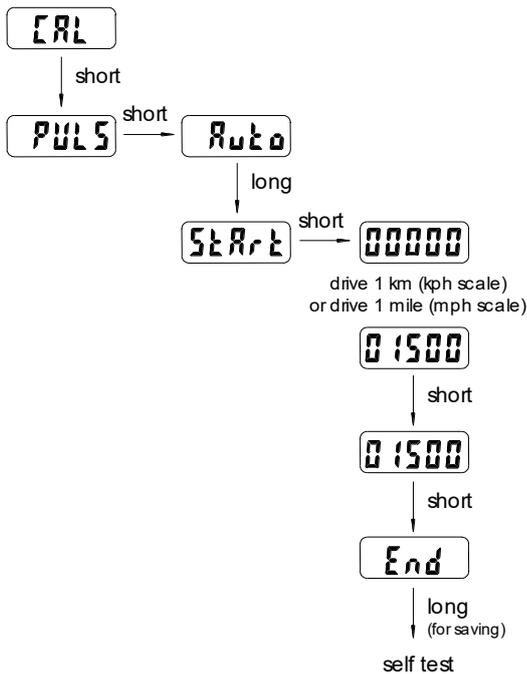
Or

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

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

### 4.3.2 automatic calibration

push the button  
while switching on ignition



#### Auto-pulse-mode

- drive exact 1 kilometer / mile
- Instrument counts the number of impulses automatically

After 1 kilometer / mile:

- Stop vehicle
- save counted impulses

**Caution: During the automatic calibration there's no indication of speed!**

## 5. OPERATING OF THE SPEEDOMETER

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 segments of the LCD flash at the same time, during the downward movement the serial number of the speedometer is indicated.



After the self-test the display shows the chosen menu.

## 5.1 Display functions

The bar above the digits indicates the current chosen menu.

### Total distance GW

- 0...99999 km (or miles)
- can't be reset

### Trip distance TR 1

0.0...9999.9 km (or miles)

reset by pushing the button long (reset will be saved after driving approx. 100 meters)

### Trip distance TR 2

0.0...99999 km (or miles)

reset by pushing the button long (reset will be saved after driving approx. 100 meters)

### Driving time

0:00....23:59 h

reset by pushing the button long, or will be reset automatically when turning off ignition

## 6. TECHNICAL DATA

Rated voltage: 12 VDC  
 Voltage range: 10V - 15 V  
 Current consumption: max. 200 mA  
 Weight: 120g / 200g / 180g  
 Operating temperature: -20°C bis +85°C

Diameter:	48mm	80mm	100mm
Height:	49mm	75mm	46mm
Mounting depth:	46mm	65mm	40mm
Fixation:	2 x M4, 12mm	2x M6, 30mm	2 x M5

Impulse range: min. 500 impulses/km ... 99999 impulses/km  
 Data back-up: at least 10 years without current

## 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.

## 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.



**The electronic speedometer D48/D80/D100 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.**