

gearsensor.com

GearSensor.com assembly instructions

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www.gearsensor.com

General description

This unique patent pending system developed and made in Czech Republic is based on intelligent GearSensor fixed on the shifting cable, which cuts off the motor drive when the rider activates gear shifting. This brand new technical solution eliminates user-unfriendly and noisy rear derailleur shifting which is caused by chain over straining. GearSensor in combination with the front derailleur allows smooth shifting even if the e-bike is equipped by double/triple chain wheel mid-motor. In addition GearSensor in combination with the internal gear hubs allows perfect shifting performance.

Programmable processors enable individual time setting for shifting gears up and down and adjust micro movement sensitivity of the inner cable to avoid the motor cutting out caused by cable vibration during riding the e-bike.

GearSensor models

The GearSensor is divided into these different models:

1) Model GS-D is a universal model for both derailleurs (front and rear). On this model restarting of the motor depends on the FINISH of the shifting cable movement. This is because system has to wait until the movement of the chain is finished to choose a sprocket or a chainring. MODEL GS-D IS MARKED ON THE CABLE WITH A WHITE STICKER (samples marking).

2) Model GS-I is the model for INTERNAL GEAR HUBS. On this model restarting of the motor depends on the START of the shifting cable movement, plus defined time period. This is because system does not need to wait until the end of the movement of the chain to choose a sprocket or a chainring. MODEL GS-I IS MARKED ON THE CABLE WITH A RED STICKER (samples marking).

GearSensors are marked using zlaser technology. Example shown below.

gearsensor.com
made in Czech Republic
GSI 05V - 15.18 - 12345

Legend	
Character position	Description
1+2	letter GS (permanently)
3	letter I or D (model)
4	space
5+6+7	Voltage (05V or 12V)
8+9+10	space + dash + space
11+12	year of production
13	dot
14+15	week of production
16+17+18	space + dash + space
19+20+21+22+23	Production batch number

GearSensor assembling to the e-bike

- Do not open the GearSensor housing.
- How do you know that gear sensor is working properly? If the gear sensor is connected correctly, after turning on the control unit on your e-bike (display) the gear sensor LED indicator will flash twice. Also when the shifting process is activated, then LED indicator blinks once.
- When fixing GearSensor to the shifting cable choose the best position on straight cable section as much as it is possible (avoid a section where the shifting cable is bent). Cut 50mm of the outer casing, and place caps on the both ends of outer casing. GearSensor should be positioned away from a place which is directly splashed by mud or water.
- For e-bikes with internal gear hubs we recommend to place the GearSensor near chain stay. For e-bikes with derailleur system with down tube shifting cable we recommend to position the GearSensor near the chain stay or near handlebars. For derailleur e-bikes with top shifting cable routing we recommend that you place the GearSensor near handlebars.

First step A

Just for GS-I (internal gear hubs)

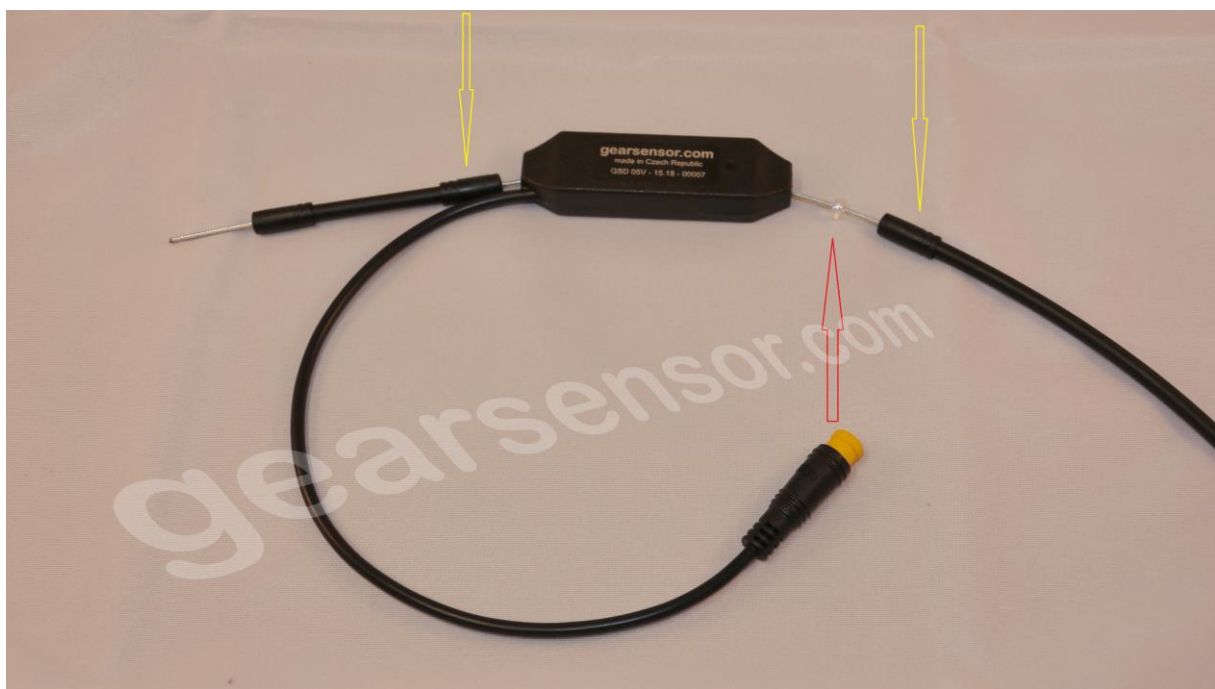
In this picture you can see where to fix the small rubber o-ring. The small rubber o-ring has to be fixed on one side only – where cable goes in to the case and it has to be orientated on the side of the shifter (not to the internal gear hub direction). Please note that this small rubber o-ring is supplied **only** for **GS-I**. Do not use it for **GS-D**.

Here is the reason why the small rubber o-ring is used:

Peddalling is associated with torque on the crank set. When the rider activates shifting, the internal gear hub does not change gear until the torque on crank set is reduced to a level which allows to internal gear hub system change the gear. This is a typical situation when riding up a hill and the rider activates the shifter in order to change the gear from a higher gear number to a lower gear number. In this situation the shifter has already released the inner cable, but the internal gear hub mechanism could not tighten on the inner cable, because the torque on cranks is over the limit.

Solution:

1. during gear shifting the rider has to apply standard pedalling style (same style as on standard bike without central drive system). It means the rider's legs have to reduce the force applied when changing gear.
2. The O-ring is made of a flexible material, this flexibility helps the cable routing system avoid undesirable inner cable and outer casing releasing.



First step A,B:

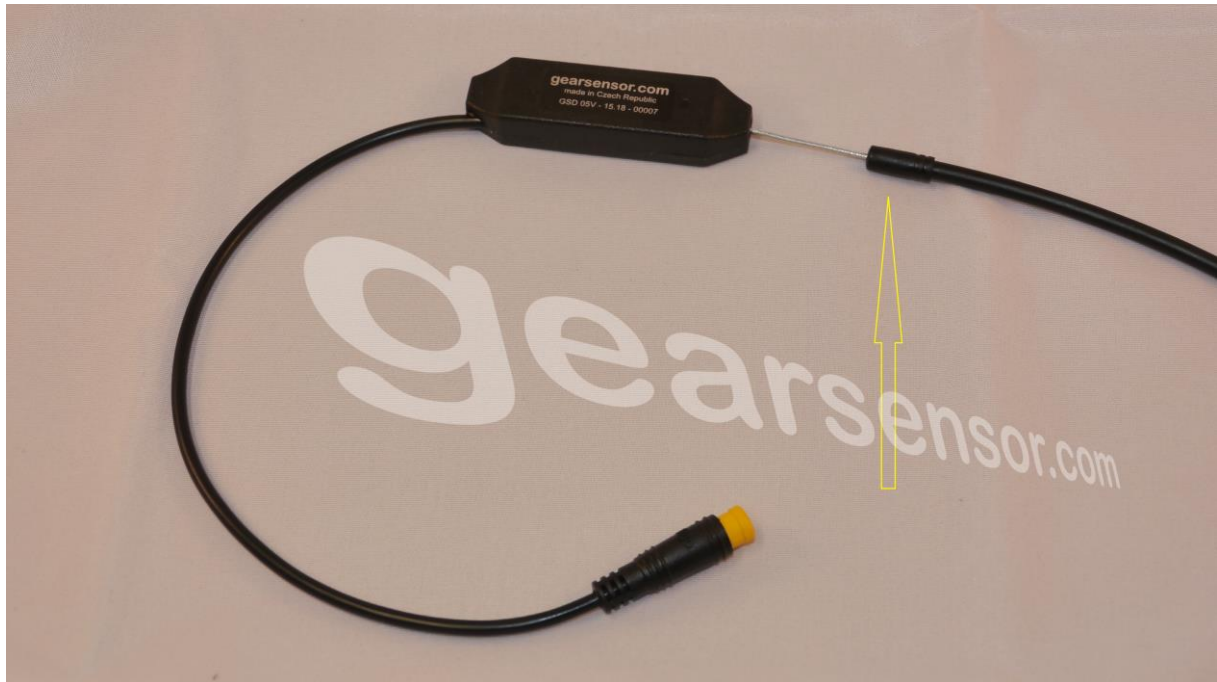
Just for GS-D (front and rear derailleurs)

Start pushing the inner cable into the plastic housing from any of GearSensor sides (example in the picture from left or right side) to fit cable direction to the controller input. When you choose the side where the LED is situated, up and down time delay parameter for restart of the motor are correct. If you choose opposite side than the LED, then the parameters up and down will be opposite - this is important just in case when time parameter values are different for shifting up and down from factory setting. Factory setting has the same time settings for shifting up and down, **this means that for factory setting it does not matter which side for assembling you choose**. Please note that the inner cable has to be pushed into the case in line with the longitudinal axis of the case (as you can see on the picture). When pushing inner cable into the case, keep inner cable in line and as much as possible parallel with longitudinal and with axis of the housing.



Second step A,B:

Now that you have the shifting cable inside of the housing and you have to push harder until the shifting cable goes out of the case on the other side of GearSensor. When pushing inner cable into the housing please keep the inner cable in line and as much as possible parallel with the housing longitudinal axis.



Third step A,B:

In this picture the inner cable is correctly fixed into the case.



Fourth step A,B:

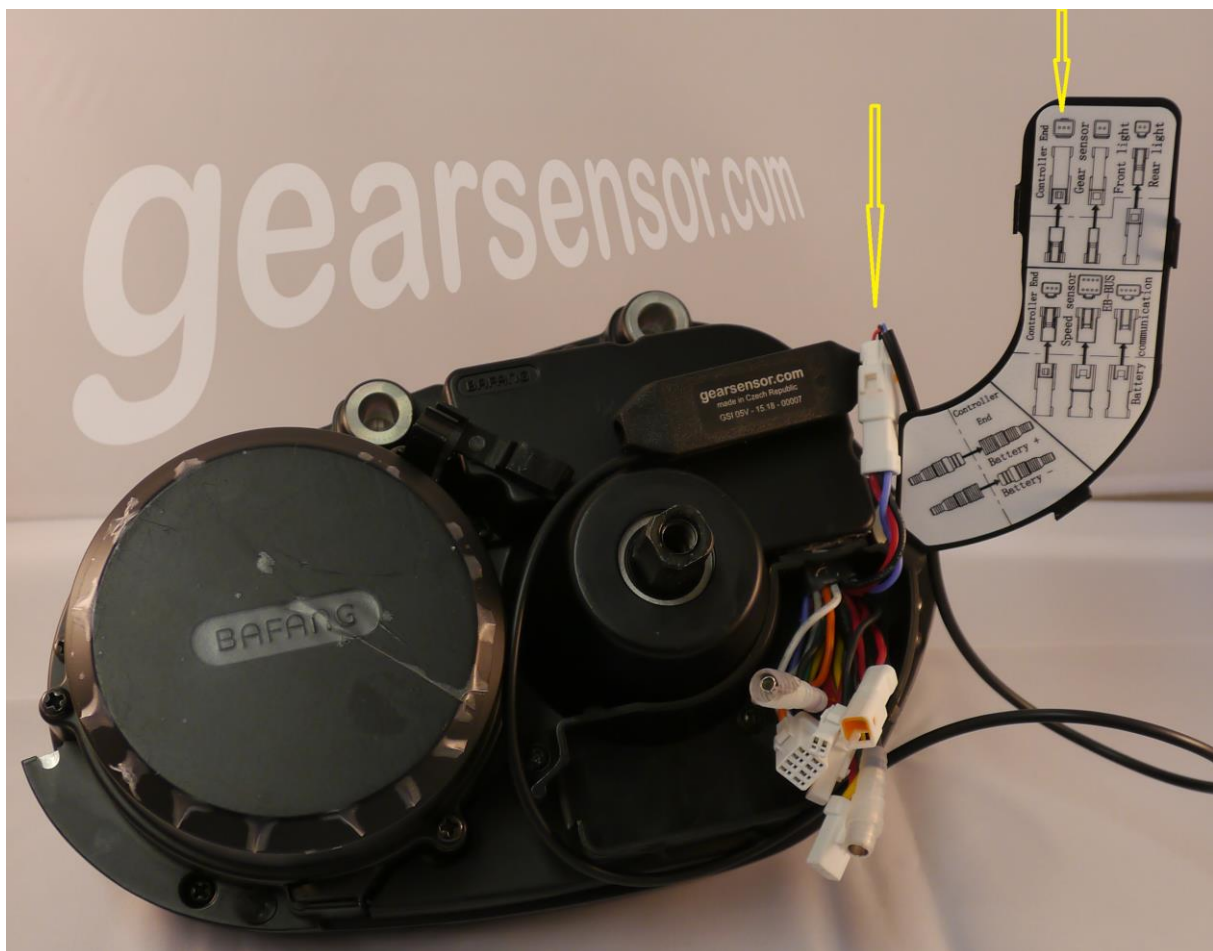
Fix the cable outer casing.

GearSensor connectivity to the different drive units

1. Bafang MAX drive system:

All the Bafang MAX drive systems are equipped by special connector just for GearSensor. This is a KST connector. When you order GearSensor for the MAX drive system, you will receive from us GearSensors with the KST connector. It is a simple plug and play connection.

For perfect GearSensor compatibility with the Bafang MAX drive system please upload the SW update for the MAX drive which we can provide. Bafang can also provide this SW. By uploading this SW you will get a very fast restart of the motor.



2. Bafang BBS01 and BBS02 systems:

Every Bafang BBS motor is equipped with two connectors for brake sensors (HIGO, yellow 3-pin). GearSensors which are compatible with BBS motors are also supplied with the same HIGO connectors. First option is to connect the GearSensor directly to one of these connectors for brakes. Please note that if you do connect GearSensor into this connector, then the restart of the motor could possibly be longer than it should be, because this connector was programmed for brake sensors. The other option is to order directly from Bafang BBS motors with a connector especially programmed for GearSensor, so the restart of the motor will be very fast. For further details please contact us by e-mail and we will help you with the specification of this order.



3. MPF drive 6.x

Currently MPF is preparing new mid-motor (MPF 6.0) which is expected to have a connector for GearSensor. Please contact us or MPF if you are interested in obtaining more information.

We will produce our GearSensor for this mid-motor with a compatible connector.

4. DAPU mid-motor (MD250)

Our GearSensor is already compatible with DAPU mid-motor, please contact us for further details.

5. GearSensor without connector

If you do need to connect GearSensor to any mid-drive unit without a connector, then see below the description of the wires:

Black wire – Ground (earth)

Green or Blue wire – signal

Red wire - Voltage supply