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Electric drives

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Installation instructions

Bicycle drive system *DirectPower* for electrically driving bicycles

÷ TRANSLATION OF ORIGINAL DOCUMENT ÷

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NOTE:

For additional assistance see HEINZMANNa video about mounting on

<http://www.ebike.heinzmann.com/en/systems/directpower/retrofit>

1 Components of the drive set

- The drive set contains:
 - > Hub motor for front wheel or rear wheel with motor cable & signal cable
 - > Torque sensor built into the bottom bracket bearing with cable
 - > Display and control unit with cable
 - > Charger for Li-Ion battery
 - > Controller box with electronic control
 - Version with carrier battery:
 - > Luggage carrier and mounting parts
 - > Slide rail
 - > Carrier battery
 - Version with downtube battery:
 - > Mounting rail with controller box already installed
 - > Downtube battery

Also, depending on the model:

 - > Twist grip with cable
 - > Y-connecting cable for connecting the brake contacts for a regeneration signal
 - Bicycle lighting

- Unpack the components and remove the packaging materials
- Check that the components are complete and undamaged. Contact the sender immediately in the event of transport damage

2 Spoking in the motor

2.1 Requirements

The fork of the bicycle should preferably be made from steel. The fork must not be distorted. Aluminium forks may only be used with approval from the fork manufacturer. This also applies for suspension forks in particular.

Required fitting widths: Front wheel: min. 100 mm
 Rear wheel: min. 135 mm

Only standard wheel rims with 36 spoke holes can be used. We recommend hollow section rims that are punched and eyeletted.

2.2 Spoke lengths

The spoke lengths are identical for the rear wheel and front wheel motor. 36 spokes in the following length are required:

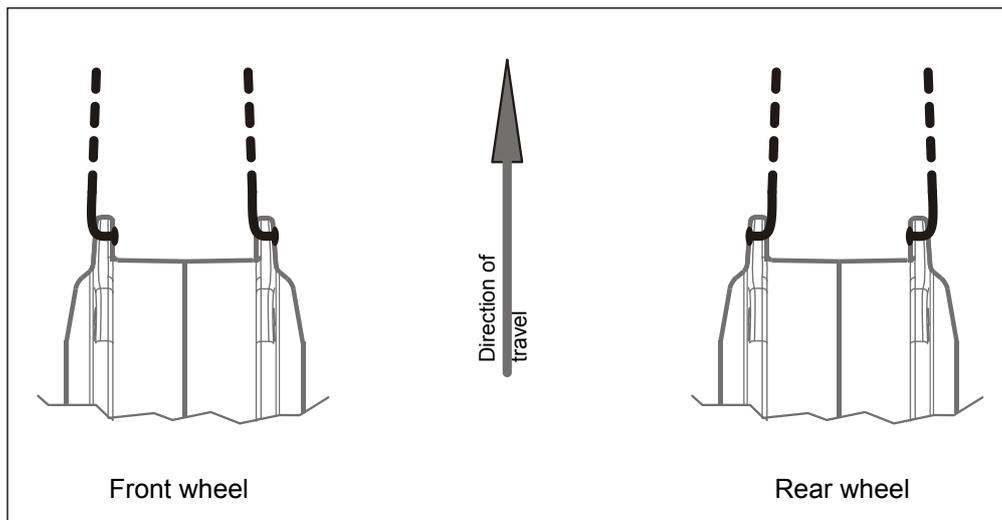
Wheel rim diameter	Spoke length
28"	200 mm
26"	170 mm
20"	102 mm

The specified spoke lengths are guide values for standard wheel rims. Different lengths may be required for special wheel rim types.

The motors are not spoked symmetrically to the centre of the wheel rim. This means that the spokes have to be pulled in and tensioned to different extents depending on the side. In the front wheel, the motor strays to the right from the centre of the wheel rim. In the rear wheel, the motor strays to the left.

Position	Distance (d) between the hub flange and the centre of the wheel rim	Spoke tension	
Front left	9 mm	1000 N	max. 1200 N
Front right	26 mm	800 N	
Rear left	21 mm	800 N	
Rear right	14 mm	1000 N	

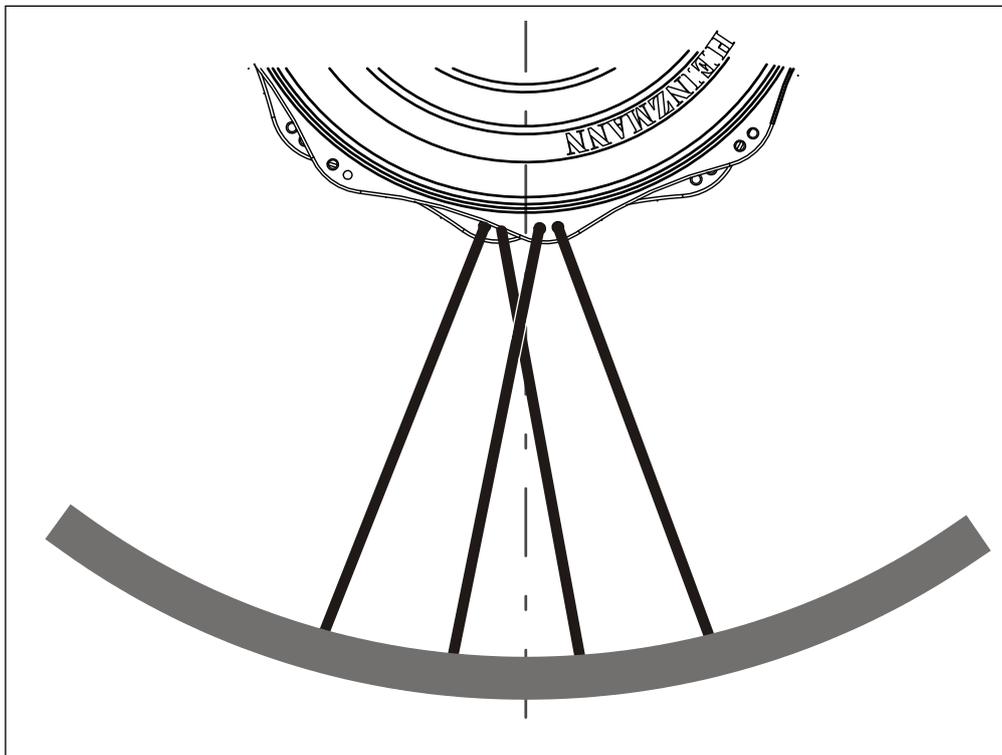
2.3 Spoke sample



All spokes on the relevant wheel always point in the same direction in both flanges!

- In the front wheel, all point to the left
- In the rear wheel, all point to the right

All spokes lead to the wheel rim without crossing!

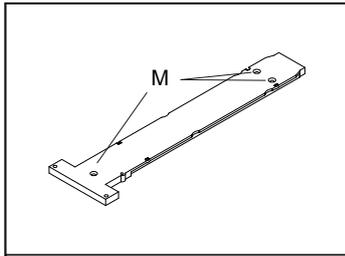


3 Installing the drive set

3.1 Mounting the luggage carrier

- The luggage carrier contains:
 - > Luggage carrier
 - > 2× head stays
 - > 2× head stay mountings (*K*)
 - > 4× M6 carriage bolts and washers





- First of all, fix the slide rail onto the luggage carrier with three countersunk-head screws M4×18, nuts and washers in the assembly holes (M).
Mounting torque: 1.4 Nm ± 0.1 Nm.
- Mount the luggage carrier on the bicycle.
Once complete, the packing area should be horizontal.
Set the head stay mountings (K) accordingly to align the luggage carrier.

**CAUTION:**

All screw connections on the luggage carrier must be secured!

We recommend: Loctite 221

3.2 Mounting the motor

**CAUTION:**

The motor may only be installed in forks or frames, which are approved by the manufacturer for use with electric auxiliary drives!

Fork or frame must have sufficiently measured dropouts to guarantee a secure and reliable mounting of the motor axle and in particular the torque support. Between the drive wheel nuts and the dropouts of frame or fork a washer has to be installed on each side.

Tightening torque of the drive wheel nuts during installation:

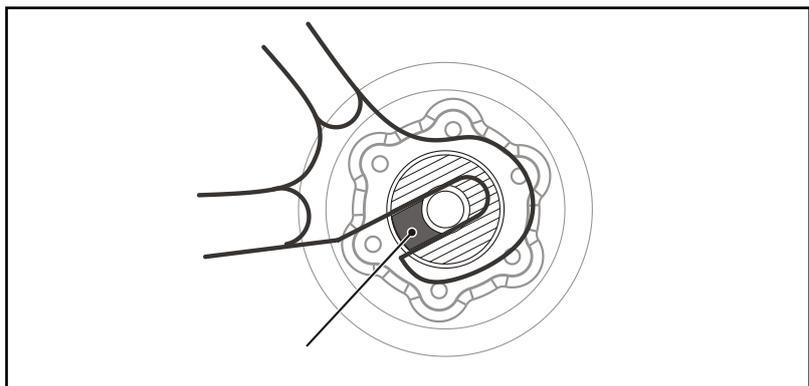
$$45 \text{ Nm} \pm 5 \text{ Nm}$$

The torque support must be completely surrounded by the dropout.

The recess (A) of the torque support must always point to the open side of the dropout!

The torque support must be mounted completely free from play.

The dimensions and tolerances from the current valid customer drawing from HEINZMANN must be complied with!

**NOTE:**

The mounting screws of brake disc might abrade the motor cable. Therefore the motor cable should be fixed to the motor axle with a cable tie.

When running the motor cable at the frame, make sure that there is a bend in cable looking downward. This shall prevent e.g. rainwater to get into the motor or the plug along the cable.

3.3 Mounting the torque sensor / pedal sensor



- The torque sensor is an external product and does not come from HEINZMANN. It may come from different manufacturers depending on the system setup. The documents and instructions published by the relevant manufacturer must therefore be consulted.
- In all cases, the bottom tube on the frame must be given a hole big enough to fit the cable or plug of the torque sensor through.



NOTE:

Directing this hole straight downwards has proven to be a successful solution. The torque sensor cable should be fed directly from the sensor out of the bottom tube where possible and not wrapped around the sensor.

Only correct installation of the torque sensor ensures its proper and reliable function. In particular the torque sensors adequate orientation in relation to the crank is highly important. Strictly refer to advice in the installation manual of the torque sensor manufacturer. (TDCM, BBTS)

3.4 Mounting the display and control unit



The control unit can be mounted either on the left side or the right side or even in the middle of the handlebar. The control elements (e.g. gears) may have to be mounted on the opposite side. The fixing clamp is available for handlebar diameter Ø22 mm or Ø31,8 mm optionally.

- Remove the handles on the handlebar, along with any switch or control elements.
- Fix the control unit on the handlebar using the mounting clip. The centre button must be positioned so that the "*Mode*" label is legible and not upside down. The control unit can be mounted on the right or left side of the handlebar as desired. The display is positioned to the right or left of the centre of the handlebar depending on the cable length.
- Fix the display on the handlebar using the mounting clip.
- Mount the switch or control elements again and re-attach the handlebar handles.

3.5 Mounting the control housing

3.5.1 Version with carrier battery

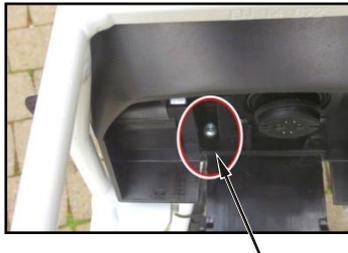


Control unit

The controller box is mounted on the luggage carrier close to the saddle. It is already prepared for the electrical connection of the components. All cables are already led out. Except the cable for bicycle lighting all are fitted with plug connectors.

These are:

- > Display
- > Torque sensor
- > Motor supply cable
- > Motor signal cable
- > Bicycle lighting
- > Cable for the regeneration signal from the brakes, where applicable



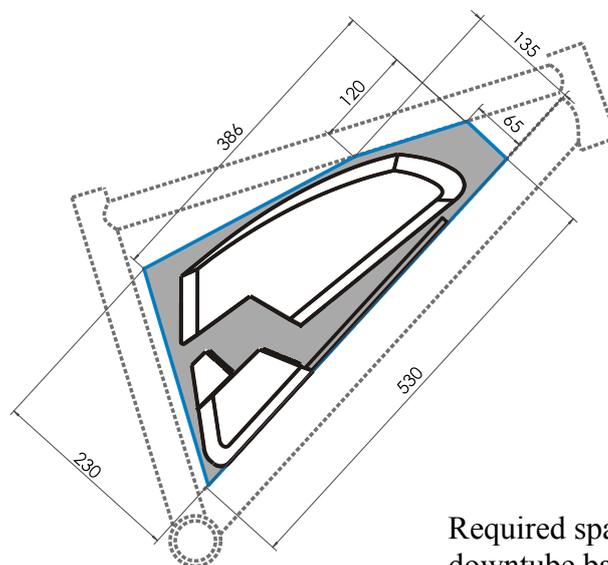
- Screw the controller box onto the luggage carrier.
2 pcs. M4×16 countersunk-head screw, through the slide rail from below.
Mounting torque: 1 Nm ± 0.1 Nm
1 pc. panhead screw, self-cutting, through the housing section into the slide rail from above (see Fig.).

3.5.2 Version with downtube battery



NOTE:

Installation of a downtube battery requires definite dimensions of the bicycle frame. See following figure for details!

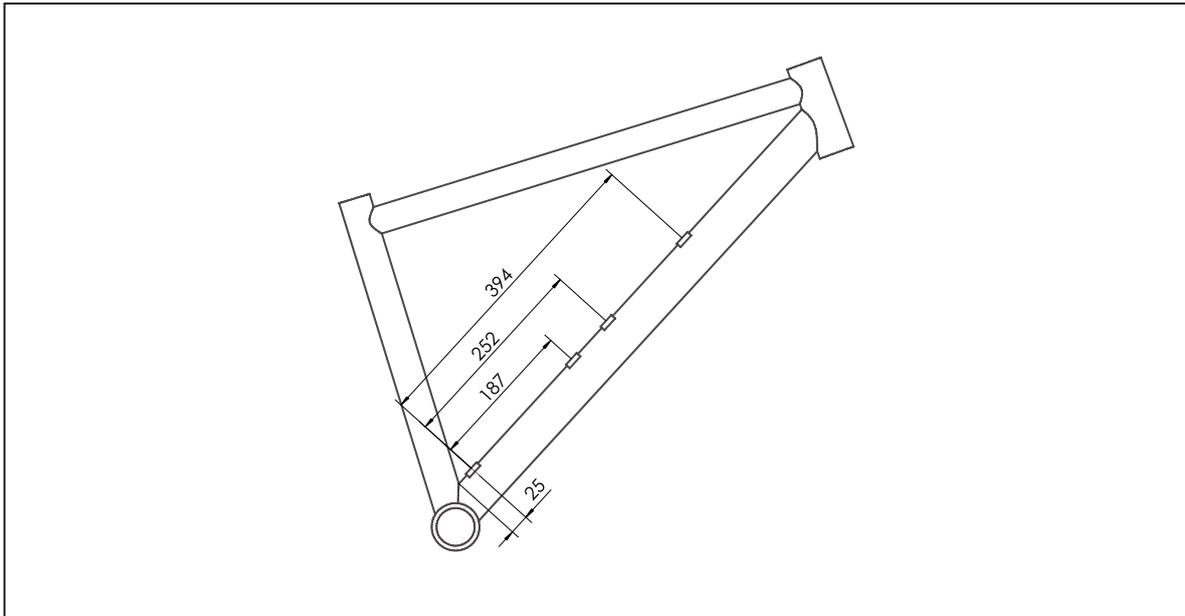


Required space for installation of
downtube battery in a bicycle frame

The mounting rail with the preassembled controller box is fixed to the downtube with screws.
The controller box is already prepared for the electrical connection of the components. All cables are already led out. Except the cable for bicycle lighting all are fitted with plug connectors.

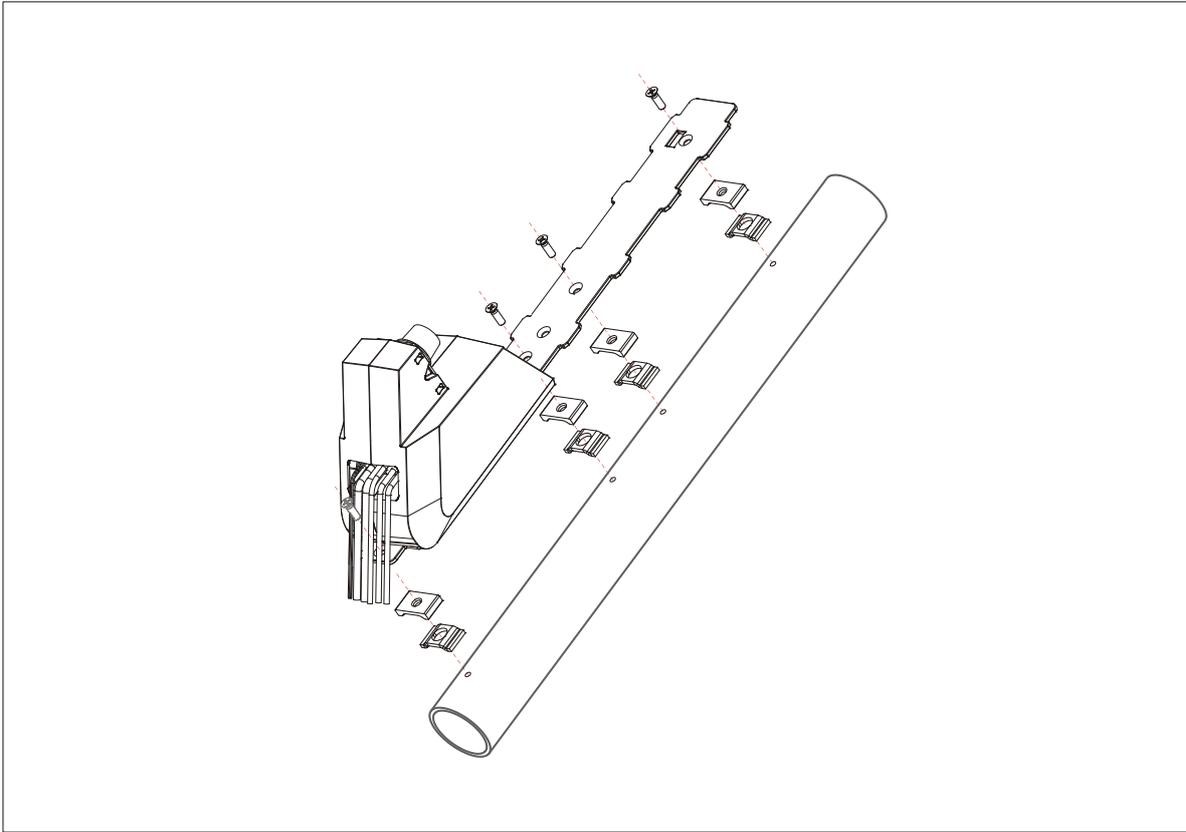
These are:

- > Display
 - > Torque sensor
 - > Motor supply cable
 - > Motor signal cable
 - > Bicycle lighting
 - > Cable for the regeneration signal from the brakes, where applicable
-
- If not existing yet the downtube has to be equipped with four screw threads size M5. See following figure for details.



- Install mounting rail with controller box at the downtube using 4 pcs. countersunk head screws, frame adapters and elastic pads. See following figure for details.

Screw size: M5×16,
mounting torque: 1 Nm ± 0,1 Nm.



3.5.3 Laying cables and creating electrical connections for both battery versions

- All component cables are prepared with the correct length and fitted with suitable plug connectors, except the cable for bicycle lighting. The cables must be laid without kinks. Cables, which are subject to movement (e.g. in the steering area) must be laid with sufficient additional length in the form of loops. Abrasion points must be avoided when laying the cables. Use additional protective casing if necessary.
- Create electrical connections using the plug connectors
- Only then all cables should be finally fixed in place on the bicycle with cable ties or similar fasteners.



CAUTION:

Cables must be laid in a way that tractive forces keep as small as possible.

Admissible tractive force: max. 80 N!

3.6 Inserting and disconnecting the carrier battery



- Push the battery into the luggage carrier on the slide rail from behind. The lock engages audibly at the stop. The electrical connection is given additional support from the magnetic force in the plug.
- To disconnect and remove the battery, turn the key on the left side of the luggage carrier clockwise and hold. Then release the battery from the connection by pulling hard on the handle and pull out of the luggage carrier to the back.



CAUTION:

Only insert the battery once the system has been completely installed! When commissioning for the first time after installation or repair, set up the bicycle so that the drive wheel can turn freely!

Before riding always lock the battery and take off the key!

3.7 Inserting and disconnecting the downtube battery



- Place downtube battery onto the mounting rail so that the contacts point towards the controller box. Feathers of mounting rail have to fit into gaps at the bottom of the downtube battery.
- Push the downtube battery onto the controller box. The lock engages audibly at the stop. The electrical connection is given additional support from the magnetic force in the plug.
- To disconnect and remove the battery, turn the key on the left side of the luggage carrier clockwise and hold. Then release the battery from the connection by pulling it back, away from the controller box. Take off the battery vertically to downtube.



CAUTION:

Only insert the battery once the system has been completely installed! When commissioning for the first time after installation or repair, set up the bicycle so that the drive wheel can turn freely.

Before riding always lock the battery and take off the key!

3.8 Parametrisation of control

- For parameter setting see separate manual on supplied CD respectively