HEINZMANN®

E-Bike Systems

Electric drive for light vehicles ***Classic***

Operating instructions

Contents

Congratulations! You have decided to purchase a retrofit kit to convert your bicycle to electric drive. We are pleased that you have selected this HEINZMANN product! It has been carefully conceived and designed, and combines great performance with ease of operation and maintenance and reliability. We wish you much pleasure and lots of fun riding your electric bicycle, and thank you for the confidence placed in our product.
Please read these instructions carefully all the way through to ensure that you enjoy all of the benefits which the product offers. If you intend to fit the retrofit kit yourself instead of having it fitted by a specialist dealer, you should pay careful attention to the chapter that describes the installation of the retrofit kit.

The manufacturer reserves the right to make changes to the design or construction of the product for its technical improvement.
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© 2013 HEINZMANN GmbH & Co. KG
Elektrische Antriebe
Am Haselbach 1
D-79677 Schönau (Schwarzwald)

1 General

1.1 Symbols used in this document

Important information for your safety is marked by special symbols. Please follow this information to avoid injury and damage to the product.

WARNING:
This symbol warns of hazards to your health and points to potential risks of injury.

CAUTION:
This symbol points to potential risks to the product or other items of property.

Note:
This symbol indicates tips and special information.

2 Bicycle types

All the types of electric bicycle that are mentioned below can be ridden either just by pedalling like a normal bicycle or by combined pedal power and motor power in hybrid mode.

2.1 Pedelec

The *Pedelec* (Pedal Electric Cycle) is a bicycle with an integrated electric drive. Its motor assists forward pedalling up to a maximum speed of 25 km/h (15.5 mph), depending on type. The degree of assistance provided by the motor is controlled by the rider using the proportional control twist grip (throttle).
The *Pedelec* can also be fitted with an assisted pull-away function to assist pulling away up to a speed of 6 km/h (3.7 mph). This is activated by turning the twist grip without pedalling.
Powered cycling alone without pedalling is not possible except in assisted pull-away mode.
For vehicle registration purposes in Great Britain, the *Pedelec* is an "Electrically Assisted Pedal Cycle" (EAPC).

2.2 E-bike

The *E-bike* is a bicycle with an integrated electric motor. Depending on type, it can be ridden at speeds up to 20 km/h (12,5 mph) in powered mode without pedalling. The speed is adjusted by the rider using the twist grip.

2.3 E-Bike speed

The *E-bike speed* is a bicycle with an integrated electric motor. Depending on type, it can be ridden at speeds up to 20 km/h (12,5 mph) in powered mode without pedalling. The speed is adjusted by the rider using the twist grip. The electric motor also assists forward pedalling up to speeds of 45 km/h max. (28 mph) on the level.

3 Safety information

Carefully read through all of these instructions before using the product!
Keep these instructions in a safe place! If the product is passed on to a third party, the instructions must be passed on with it.
Failure to follow these instructions may result in injury or damage to the components. The manufacturer can accept no liability for losses arising as a result of failure to follow these instructions.

WARNING:
Although if it may be not required by law to wear a helmet, we strongly recommend that you wear a suitable helmet for your personal safety whatever type of vehicle you use.

CAUTION:
The retrofit kit should be installed by a specialist dealer since incorrect or improper fitting can impair the operation of the electric drive. You should only attempt installation yourself if you have sufficient expertise.

CAUTION:
A damaged motor can result in the failure of structural parts and will have to be replaced.

CAUTION:
Damaged electrical modules and cables can cause short circuits and must be replaced.

3.1 Hazards for special groups of persons

- The use of electric bicycles on public roads by children and persons under 14 years of age is not permitted.
- The product must be stored where it cannot be accessed by children and persons who are unable to appreciate the attendant hazards.
- Packing materials are not items for children to play with! There is a risk of injury and suffocation. Seek medical help immediately if small parts are swallowed.

3.2 Intended use

The retrofit kit is used to convert a bicycle into an electric bicycle.
Use in other products is possible (e.g. wheelchair tractors, disabled vehicles).
If required, please contact the manufacturer of the drive.

CAUTION:
The following are examples of improper use:

- Combination with unlicensed components
- Improper or unauthorised modifications to the components
- Overloading the motor, e.g. cycle racing or locking up the motor by force while it is running, e.g. running up against an obstacle

3.3 Driving licence, vehicle registration, insurance

The relevant legal requirements and third party insurance must be complied with when using an electric bicycle.
It is the duty of the vehicle's keeper to find out about legal requirements, to apply them and comply with them.

Requirements that apply in Great Britain:

- *Pedelec* without assisted pull-away:
  Minimum age 14, driving licence and insurance are not required, no requirement to wear a helmet.

WARNING:
Although regulations do not require the rider to wear a helmet for "Electrically Assisted Pedal Cycles" (EAPC), we nevertheless strongly recommend the use of a suitable bicycle helmet for your personal safety.

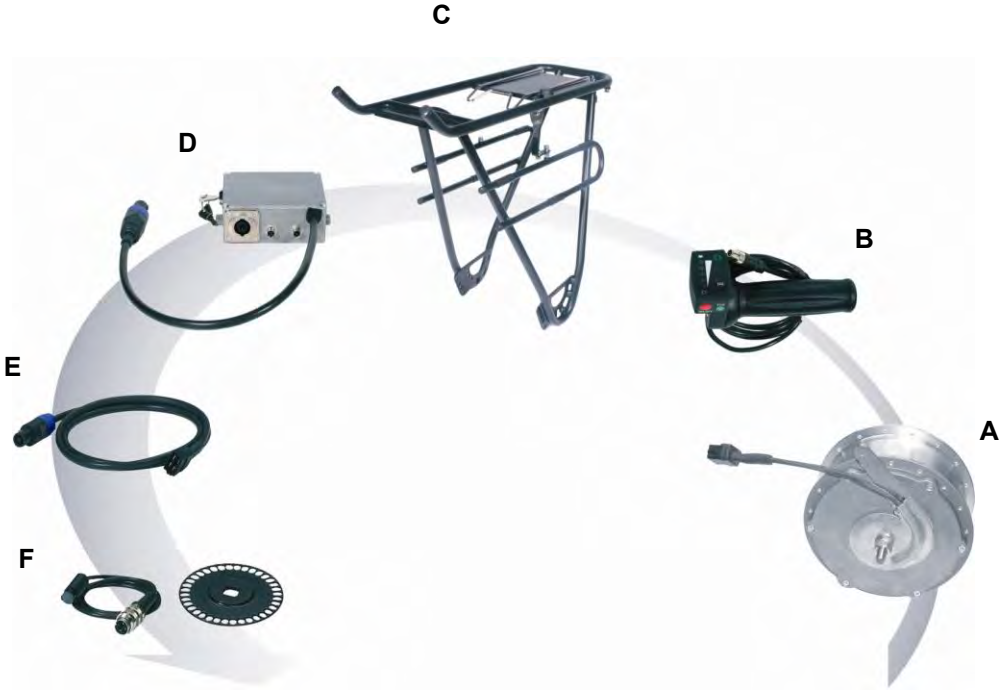
3.4 Weights, luggage

Statutory maximum vehicle weights.

Vehicle type	Gross vehicle weight	Max. unladen weight
Pedelec	No requirement	No requirement
E-bike	120 kg	30 kg
E-Bike speed	120 kg	30 kg

- For the E-bike and E-bike speed the maximum unladen weight includes one battery. Any second battery that is carried but not used counts as luggage.
- The maximum load limit for the carriers is 15 kg!

4 Components of the retrofit kit



- Unpack the components and remove the packaging materials.
- Checks that the components are complete and undamaged.
  If damage has occurred in transit you should contact the sender immediately.
  The retrofit kit contains:

  A Hub motor
  B Twist grip with cable
  C Luggage carrier with saddlebag and battery
  D Control unit
  E Connection cable (for front wheel motor)
  F Sensor complete, consisting of sensor and perforated pulse disk (for *Pedelec* and *E-bike speed*)

- Make a note of the serial numbers
  The serial numbers on the motor, control unit and twist grip will be found on their nameplates.

Note

Note:
The serial numbers are unique, individual numbers with which the components are marked. They can be used to identify the parts uniquely (e.g. in case of queries with the dealer, warranty claims, theft).

Caution

CAUTION:
Always transport or ship the components in their original packing to prevent damage. The packing should be retained for this purpose.
Packing materials that are no longer required should be disposed of according to the applicable regulations.

5 Installing the retrofit kit

5.1 Requirements and preparations

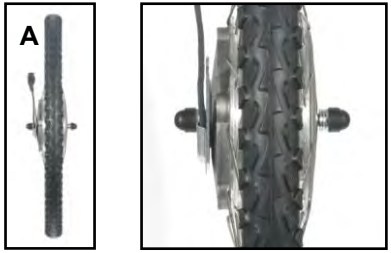
- The fork of the bicycle should preferably be made from steel.
  The fork must not be distorted.
  Aluminium forks can only be used with the fork manufacturer's approval.
  With sprung (shock absorber) forks, please consult your dealer before installing the kit.
- Required fitting widths: Front wheel min. 100 mm
  Rear wheel min. 135 mm (standard)
- Only 36-hole rims can be used. We recommend hollow section rims that are punched and eyeletted.
- The twist grip must be fitted on the right-hand end of the handlebar. This means that gear controls (if any) must be mounted on the left-hand side of the handlebar.
- For the *Pedelec* and *E-bike speed* retrofit kits, the pulse disk for the pedalling sensor must be mounted on the bottom bracket spindle. For this purpose the bicycle must be fitted with a square-taper bottom bracket with a right-hand (or left-hand) stop collar and enough length of square taper for the right-hand (or left-hand) crank arm.

WARNING:
If necessary, you should have a specialist dealer check whether the bicycle is suitable for installing the retrofit kit and has the required degree of strength.

5.2 Spoking in the motor

Warning

WARNING:
The motor should only be spoked into the rim by a specialist dealer! An incorrectly spoked rim can cause the wheel to collapse and result in an accident.



The required spoke lengths are different and will depend on:
- Rim type
- Wheel diameter
- Front or rear wheel drive
- Right or left hand side of the wheel

The spoke lengths for the right and left hand side of the wheel are different because the two spoke flanges are at different distances from the centre of the rim.

A : Front-wheel drive,
B : Rear-wheel drive

5.3 Fitting the drive wheel

WARNING:
When the front or rear wheel has been fitted to the bicycle, the torque support of the spoked motor must always be on the left in the direction of travel.

Introduce the front wheel with the spoked-in motor into the front fork or the rear wheel into the rear triangle.

Attach the torque support to the fork or left-hand rear strut with a clip, screw and nut loosely at first so that the position of the torque support can still be adjusted.

Tighten both nuts on the motor shaft with a spanner.
Torque setting 35 Nm.

Now tighten the screw connection on the clip of the torque support.

Lift up the wheel and rotate it in the direction of travel.
The wheel must spin freely and without any obstructions. If the wheel stops after a short while, there is a fitting fault and the motor's installation must be checked. The motor housing must not be in contact with any other components
(e.g. the screw that retains the mudguard stay).

Connect motor and motor cable with the plug and use cable ties to fix the cable:
Front-wheel motor: To the fork
Rear-wheel motor: To the left-hand rear seat stay.

CAUTION:
Never pull cable to disconnect plug!

5.4 Mounting the luggage carrier

Warning

WARNING:
The maximum load on the luggage carrier must not exceed 15 kg!

The luggage carrier can be adjusted to suit the particular model of bicycle:

- With adjustable mounting rails at the top attachment
- With different holes at the dropout ends of the luggage carrier and on the extension plates at the bottom attachment

The particulars given in the operating instructions for the model of bicycle must also be followed when fitting the luggage carrier.

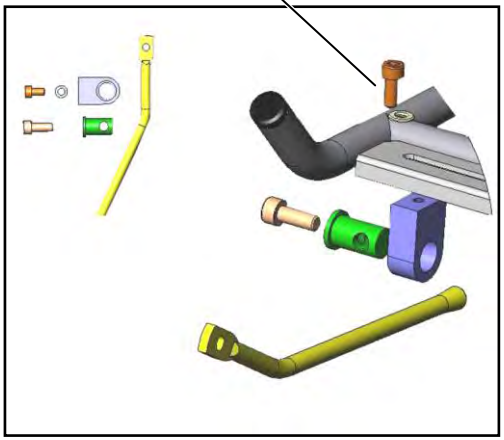
Mount the luggage carrier so that the luggage carrying area is horizontal. Make sure that sufficient clearance is left between the luggage carrier and the mudguard to allow subsequent mounting of the control unit at the end of the luggage carrier.
Attach the top of the luggage carrier by its attachment rails using two socket head screws (Allen screws) to the seat stays of the rear triangle, just loosely at first.

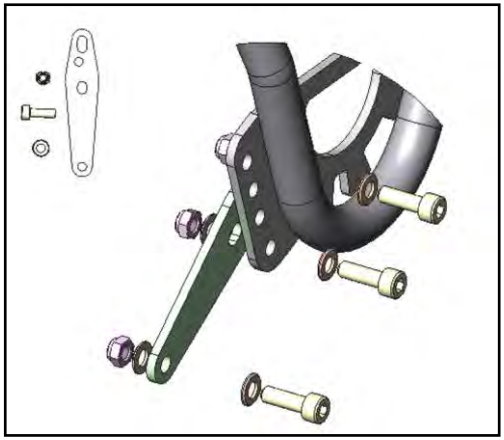
Now attach the bottom of the luggage carrier with two socket head screws (Allen screws) and self-locking nuts to the dropout ends of the rear triangle on both sides, using the extension plates.

Finally, tighten down all screws so as to secure the luggage carrier in its position.

Details for mounting the luggage carrier

Lock the screw!
We recommend:
Loctite 221





5.5 Fitting the twist grip

Remove the handlebar grips.
If necessary, move the gear selection lever from the right-hand end to the left-hand end of the handlebar.

Select the correct grub screws for mounting the twist grip (2 each):
- Aluminium handlebar: Grub screws with a cup point
- Steel handlebar: Grub screws with a pointed tip

(grub screws with a cup point are already fitted.)

Insert the grub screws a short way into the twist grip. Ensure that the two grub screws are not screwed in so far that they project through into the hole in the twist grip. Otherwise you will not be able to push the grip onto the end of the handlebar.

Now push the twist grip onto the right-hand end of the handlebar as far as it will go, then back it off by approx. 5 mm. If the twist grip is pushed on too far it can stick and obstruct the grip's automatic return!
Now tighten the two grub screws. Torque setting 1.5 Nm

Check the automatic return function of the twist grip. To do this, twist the grip to the rear (see photo) and then release it.
The twist grip must immediately return to its initial (zero) position.

Fit the covering cap in the recess for the grub screw on the side of the grip facing the rider.

Tie the twist grip cable and the brake and gear cables together with cable ties or coiled cable. Make sure that the cables do not restrict handlebar lock-to-lock movement.

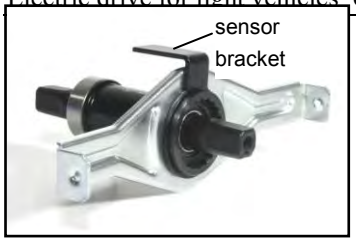
Mount the second grip on the left-hand end of the handlebar.
Shorten the grip if necessary.

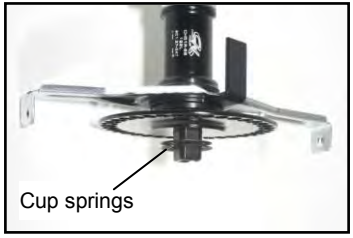
5.6 Fitting the pedalling sensor (*Pedelec* and *E-bike speed* only)

WARNING:
The pedalling sensor can only be fitted to bicycles that have a screwed-in square-taper inside bearing in the bottom bracket.
If in doubt, have a specialist dealer check whether the sensor can be fitted. Holes must not be drilled in the bicycle frame as this may affect the cycle's strength and stability.

NOTE:
A suitable puller will be needed to remove/fit the crankset or pedal cranks.
A suitable bottom bracket tool is required for removing and fitting the bottom bracket spindle.
Consult a specialist dealer if you have any queries.

The pedalling sensor is usually mounted on the right-hand side of the bottom bracket because with most bottom brackets the stop collar for the chain guard support is on the right.
With some bottom brackets the stop collar is on the left-hand bearing sleeve (e.g. FAG bottom bracket).
Although mounting the sensor on the left-hand side of the bottom bracket is easier, the sensor's pulse disk will be exposed and unprotected and more prone to damage.
Mounting the sensor on the right-hand side is trickier but the disk will be protected and out of the way concealed behind the chainwheel.





Right-hand mounting:

Remove chain guard, if any.

Dismantle the chain and crankset.

Unscrew the bottom bracket from the bottom bracket shell with a suitable bottom bracket tool (caution: left-handed thread!).

Remove the chain guard support,
Push the sensor bracket onto the bottom bracket as far as the stop collar,
Push the chain guard support back onto the bottom bracket.

Now screw the bottom bracket back into its shell and tighten with the bottom bracket tool (torque setting as directed by manufacturer).
Ensure that the sensor bracket is in an easily accessible position.

Push the pulse disk with its flat, non cambered side first onto the bottom bracket shaft.

Push both cup springs onto the bottom bracket spindle so that their teeth are pointing to each other. If necessary use the spring washer instead of the cup springs.
Once the crankset or pedal cranks have been tightened, the cup springs press against the pulse disk and keep it in the optimum position. The pulse disk should run true and without any 'wobble' if fitted properly.

Fit crankset and chain (torque setting as directed by manufacturer).
Fit chain guard, if any.

Line up the sensor on the foam pad on the bracket in such a way that
- it is parallel with the bottom bracket spindle
- the gap between the end face of the sensor and the pulse disk is 0.5 to 1.5 mm wide
- the 'nose' on the side of the sensor points toward the bottom bracket spindle, otherwise the sensor will not correctly detect forward pedalling motion

Attach the sensor to its bracket with cable ties.

Left-hand mounting:

Dismantle the left-hand pedal crank.

Remove the left-hand bottom bracket sleeve with the bottom bracket tool.

Push the sensor bracket onto the bearing sleeve as far as it will go.

Screw the bearing sleeve back into the bottom bracket shell using the bottom bracket tool. Ensure that the sensor bracket is easily accessible.

Push the pulse disk with its non cambered side first onto the bottom bracket shaft.
Push both cup springs onto the bottom bracket spindle so that their teeth are pointing to each other. If necessary use the spring washer instead of the cup springs. Once the crankset or pedal cranks have been tightened, the cup springs press against the pulse disk and keep it in the optimum position. The pulse disk should run true and without any 'wobble' if fitted properly.

Fit the left-hand pedal crank. Use a torque setting as directed by the manufacturer.

Line up the sensor on the foam pad on the bracket in such a way that
- it is parallel with the bottom bracket spindle
- the gap between the end face of the sensor and the pulse disk is 0.5 to 1.5 mm wide
- the 'nose' on the side of the sensor points away from the bottom bracket spindle, otherwise the sensor will not correctly detect forward pedalling motion

Attach the sensor to its bracket with cable ties.

5.7 Laying the cables to the control unit

Note

Note:
Because the control unit is mounted under the luggage carrier, it is advisable to lay the cables first and connect the plugs to the control unit before it is installed by way of trial. The control unit can then be installed once the required cable lengths have been established. The cables are attached using the cable ties supplied.

Warning

WARNING:
To prevent accidents, all cables must be installed so that they
- do not restrict handlebar lock-to-lock movement
- obstruct rotating parts (chain drive, pedal cranks, wheels)
- cannot entangle feet when pedalling
- do not hang loose, are not too tight and do not chafe

WARNING:
When running the extension cable for the motor's power supply on the front wheel between the fork and the down tube, ensure that the cable has a sufficient bending radius of approx. 6 cm! Otherwise the full lock-to-lock movement of the fork will be restricted.

Front-wheel motor:

Plug the extension cable and motor cable together and attach to the fork.

Attach the extension cable together with the twist grip cable to the down tube. With *Pedelec* and *E-bike speed* models, run both cables from the bottom bracket and up the seat tube together with the pedalling sensor cable.

Rear-wheel motor:

Attach the twist grip cable to the down tube.

With *Pedelec* and *E-bike speed* models, run the cable from the bottom bracket and up the seat tube together with the pedalling sensor cable.

5.8 Connecting the cable to the control unit

Note

NOTE:
Correct position of the control unit:
The key-operated switch must be on the left looking in the direction of travel, with the cover facing down.

- Sensor connector
  (for *Pedelec* or *E-bike speed* only):
  Plug the connector into the sensor jack and secure by turning the screw sleeve clockwise.
  To disconnect: Unscrew the screw sleeve and disconnect the plug.

- Twist grip connector:
  Plug the connector into the twist grip jack, turn screw sleeve clockwise to secure.
  To disconnect: Unscrew the screw sleeve and disconnect the plug.

- Motor cable / extension cable (with front wheel motor):
  Plug the connector into the motor jack and turn clockwise until you hear the latch engage.
  To disconnect: Push the latch on the connector back, turn the connector anti-clockwise as far as it will go,
  unplug connector.

5.9 Fitting the control unit

Note

NOTE:
In the area between the seat tube and the control unit, tie the cables that are connected to the control unit together with cable ties so that they do not hang down loose.

Insert two countersink screws through the countersunk holes in the top of the luggage carrier and through the lugs on the left and right of the control unit.

Fit the screws with self-locking nuts, and tighten.

6 Battery

6.1 Lithium-Ion battery

This type of battery combines lightness in weight with a very high charge capacity. It is therefore very compact in design and will fit easily into the saddlebag provided.

Lithium-ion batteries may only be charged using a special charging circuit! The reasonable use and above all correct charging of the battery as well as protection from deep discharge and overheating will greatly help to prolong its life. A suitable charging controller which takes all of these requirements into account is already incorporated into the battery box to ensure optimum, safe operation. A mains adapter without its own charge controller is therefore all that is needed to charge the lithium-ion battery.

WARNING**:**
Use only the mains adapter supplied to charge the battery.

Before connecting the mains adapter to the mains, you must check whether the mains voltage matches the supply voltage of the adapter. The adapter's supply voltage is indicated on the nameplate on the back of the adapter.
The adapter is designed for indoor use only.

The lithium-ion battery may only be charged in a dry, non flammable environment.

WARNING:

A mains adapter with a damaged mains plug or mains lead must not be connected to the mains and must be repaired immediately by a specialist dealer. The same applies to extension cables that are not technically perfect.

The mains adapter and battery can become warm when charging lithium-ion batteries. The mains adapter should therefore be removed from the storage recess in the battery box during charging.

Water and moisture must not be allowed to penetrate the mains adapter under any circumstances. If water has entered the adapter, disconnect it from the mains supply immediately and have it checked by a specialist dealer.

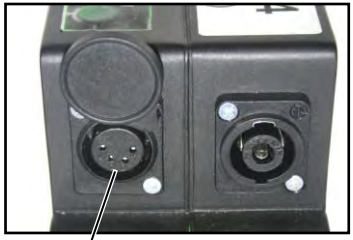
Condensation may form on the mains adapter if there is a sudden change in temperature from cool to warm. If this happens, wait until the adapter has come up to the temperature of the warm room before connecting it to the mains. This situation is best avoided by storing the mains adapter where you use it.

The mains adapter may only be used to charge up the battery supplied.
Other uses of the adapter are not permitted.

Any tampering of any kind with the mains adapter or battery box is strictly prohibited!

Mechanical damage to the battery must be avoided at all cost (explosion hazard!).

6.2 Battery charging



charging socket

All batteries usually leave the factory fully charged. However because there is always a certain amount of self-discharge (typically ~1% per day at room temperature) the battery should be charged up before being used for the first time.

Charging can be done either on the luggage carrier or off the bicycle with the battery bag removed.
The charge status is shown on the display and operating unit on the twist grip and on the battery itself.

To check the charge status, briefly press the button on top of the battery. Up to four LEDs will then light up for a few seconds to indicate the charge status.

To charge the battery, proceed as follows:

- Gain access to the charging socket on the battery box by pushing the protective cover to the left
- Plug the mains adapter into a mains socket outlet
- Connect the charging plug to the socket,
  the charge status indicator LEDs start to flash

Note

NOTE:
The mains adapter and battery can become warm when charging up lithium-ion batteries. The mains adapter should therefore be removed from the storage recess in the battery box during charging.

Charge status display on the battery while charging:

1 LED flashes, up to 3 LEDs lit up	Battery is charging, the number of lit LEDs corresponds to the capacity already charged. The number of flashing LEDs corresponds to the capacity still to be charged.
4 LEDs lit up	Battery is nominally fully charged, re-charging active.
All LEDs off	Charging is complete, battery is 100% charged, trickle charging active.

Charging time:

Fully charging the discharged battery takes
- approx. 7.5 h with 9 Ah battery
- approx. 11 h with 13.5 Ah battery

When charging is complete, the charge controller switches over to trickle charge. The battery can be left connected to the mains adapter indefinitely. The advantage of this is that the battery is always fully charged.

The battery can be used with the drive at any time, even if charging is not complete. However you will not achieve the same range that is possible with a fully charged battery.

Note

Note:

Unlike other types of battery, the lithium-ion battery has no 'memory effect' of any kind. This means that it does not need to be fully discharged before it can be charged up again. It actually helps to prolong the battery's life if the charging cycles are flat, in other words if the battery is always charged up again immediately after use.

The ambient temperature during charging should be between +10°C and +30°C. Charging above or below this temperature range reduces the available battery capacity and hence the range of travel. it is advisable to charge the battery in a heated room when outdoor temperatures are below zero. Direct sunlight and proximity to sources of heating such as radiators should be avoided.

Before long periods of inactivity, e.g. in winter, the battery should be fully charged up and stored in a dry, frost-free place. The battery should be fully charged before use after long periods of inactivity.

The battery can become quite hot on long journeys using a lot of motor power. A temperature monitor inside the battery box prevents charging of the battery when temperature is too high. The mains adapter can be connected in this case. Charging will start automatically when the battery has cooled down sufficiently in its box. The battery can easily take up to an hour too cool down following a long uphill ride.

6.3 Connecting the battery

Note

NOTE:
The battery cable should always be run coming from below under the cover and into the battery bag. This will ensure that water cannot enter the bag. Use the Velcro® tapes on the sides of the battery bag to secure the cable.

Make sure that the key-operated switch on the control unit is set to OFF.

Connect the plug on the battery cable from the control unit to the socket on the battery.

Twist the plug clockwise until you hear the latch engage.

Releasing the plug:
- Push back the latch on the plug,
- Twist the plug anti-clockwise as far as it will go,
- Disconnect the plug.

6.4 Attaching the battery to the luggage carrier

WARNING:
Use caution when hooking the battery bag onto and unhooking it from the luggage carrier. There is a risk of your fingers being squeezed!

Attaching the battery bag:
The battery bag can be attached to the right or left hand side of the luggage carrier. At the back of the bag are two attachment hooks and two lugs.
The lugs may have to be adjusted when the bag is fitted for the first time. To do this, slacken the clamping screws on the top of the lugs. The lugs can now be adjusted sideways to match the struts of the luggage carrier. After adjustment, tighten the clamping screws again.

Open the locks (red) on both attachment hooks by pushing the flags in towards the bag.

Thread the lugs on the battery bag in behind the struts of the luggage carrier (adjust as necessary, see above).

Simultaneously hook the two attachment hooks on the battery bag into the upper longitudinal strut of the luggage carrier and press the bag down as far as it will go.

Close the locks by pressing the flags towards the wheel until you hear them snap in.

Removing the battery bag:
Make sure that the plug to the battery has been disconnected (refer to "Releasing the plug" above).

Open the locks (red) on both attachment hooks by pushing the flags in towards the bag.

Pull the battery bag up evenly.

Detach the bottom lugs from the luggage carrier struts.

7 Before your first trip

WARNING**:**
When the retrofit kit has been installed, a safety inspection must be carried out by a specialist dealer to make sure that the kit has been correctly fitted and that the electric bicycle is safe for use on the road. Thereafter the electric bicycle should be taken for inspection by a specialist dealer every 500 km.

You should perform a safety check on the electric bicycle before every trip to prevent accidents. You should have the bicycle's operating instructions to hand in case you need to make any adjustments to individual components of the particular model of bicycle.

Regularly check and ensure the following points:

- the torque support is firmly attached to the fork or rear triangle
- firm seating of the motor (spokes, spindle nuts) and of the motor connector
- the battery is firmly seated on the luggage carrier
- the twist grip is secure on the handlebar; check that the twist grip zeroes automatically before switching on
- check all cables for damage, ensure they are securely attached to the bicycle frame
- all screws and nuts are firmly seated
- check brakes for safe operation, brake pads must not rub against wheel rims
- check that tyres are adequately inflated (the max. pressure is marked on the tyre, approx. 3-4 bar)
- check that all bearings run freely (bottom bracket, wheels, steering) and wheels run quietly

Any faults should be attended to by a specialist dealer.

8 Cycling hints

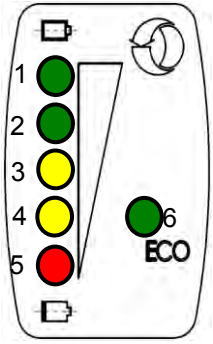
8.1 Safety information for cycling

- The electric bicycle must be in a condition that is safe for use on the road at all times so as to guarantee your own safety and that of other road users.
- A rear-view mirror should be used to enhance your awareness of the traffic situation.
- The weight of the retrofit kit and the extra motor power will have quite a significant impact on the performance of the bicycle. You must allow for longer stopping distances because of the increased weight. You should therefore practise the safe control of your electric bicycle off the public roads to start with.
- Before starting out on your journey, test the braking efficiency with a trial application of the brakes.
- When braking, always apply both brakes together. Never apply the brake of the driven wheel on its own or first.
- Always cycle carefully on surfaces that are wet, smooth or unmade. Avoid abrupt operation of the twist grip and jerky pedalling movements.
- On fast bends and uneven surfaces that slope sideways, never place the pedal on the inside of the bend down so as to avoid ground contact and the attendant risk of a crash.
- Never ride hands-free.
- Use your cycle's lights in darkness and poor light so as to enhance your visibility for other road users.
- Wearing a suitable helmet is recommended for your own personal safety.
- Avoid continuous operation in saline environments and atmospheres as they encourage corrosion damage.

8.2 twist grip

The twist grip incorporates a display and operating unit with a number of pushbuttons and light-emitting diodes (LEDs).

Pushbutton:		LED:
ON/OFF	(red)	1 (green)
ECO	(green)	2 (green)
		3 (yellow)
		4 (yellow)
		5 (red)
		6 (green) - ECO



Pushbuttons
The larger red pushbutton marked "ON/OFF" is used to switch the drive on and off and to adjust the brightness of the LEDs.
The green pushbutton on the right marked "ECO" acts as a selector switch between Eco and Standard modes.

Functions
- Switching on

Press the "ON/OFF" button and hold for more than 1 second.
LED 1 (green) flashes while the button is pressed.
Release the button when the display changes.
The need to press and hold the button is a safety measure to prevent accidental switching on.
As a further safety feature, the drive can only be switched on when the twist grip is in its zero position (front stop).

If the twist grip is not in its zero position when you attempt to switch on, after approx. 1 second LED 5 (red) will start to flash alternately with LED 1. If you now turn the twist grip to its zero position, LED 5 goes out and the drive is switched on (see also the table "Fault indicators").

WARNING:
For safety, never turn the twist grip to the full throttle position in such circumstances

- Switching off

Press the "ON/OFF" button until all LEDs have gone out (approx. 1 second).

- adjusting LED brightness

When you switch on the drive the LEDs light up with a brightness to suit the daylight. This brightness can be reduced to suit dark conditions.
Press the "ON/OFF" button for about half a second with the drive switched on. LED 1 flashes while the button is being pressed. The brightness is adjusted when the button is released. The brightness will not adjust if the button is not pressed for long enough. Pressing the button again restores the initial brightness.

- Selecting Eco/Standard mode

The drive has two modes. It can be operated in Standard or in Eco mode (see the table). In Eco mode the motor current is limited more by the control unit. This can make a battery charge last longer.

Eco mode is active when the drive is first switched on, and LED 6 lights up.

Briefly press the ECO button to change modes.
LED 6 goes out, Standard mode is now active.

Press the ECO button again,
LED 6 lights up, Eco mode is active.

Characteristic	Standard mode	Eco mode
Speed	no difference	
Maximum motor power	higher	lower
Pull-away	stronger	gentler
Range	shorter	longer

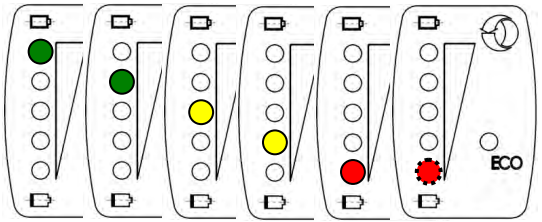
8.3 Battery status indicator

On top of the display and operating unit on the twist grip there are six differently coloured LEDs which are used to display the charge and operating status.

Continuous lighting of one of the LEDs 1 to 5 indicates the charge status of the battery as shown in the table below.

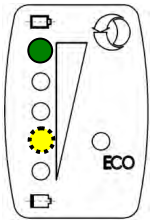
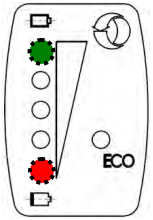
If LED 5 flashes, the battery is almost flat. If this happens, the control unit deactivates the battery after a short while to protect it from excessive discharge.

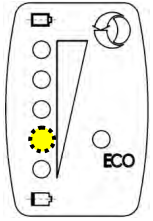
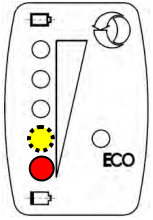
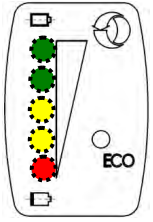
LED status	Battery charge status
1 (green) on	100 - 86%
2 (green) on	85 - 71%
3 (yellow) on	70 - 56%
4 (yellow) on	55 - 41%
5 (red) on	40 - 30%
5 (red) flashing	< 30%



8.4 Fault indicators

(Trouble-shooting is described separately in a subsequent chapter.)

LED status	Possible cause	Fault type	
1 (green) on, 4 (yellow) flashing	- Motor overheated - Control unit overheated - Motor connector not plugged in or insufficient contact	Goes out when fault is cleared	
1 (green) and 5 (red) flash alternately	Twist grip not in zero position (front stop) when switching on WARNING: Never turn twist grip to full-throttle position with this fault	Goes out when fault is cleared	

LED status	Possible cause	Fault type	
4 (yellow) flashes	No communication between control unit and battery Note: The motor can still be operated with this fault!	does not go out by itself	
4 (yellow) flashes, 5 (red) on	General fault	does not go out by itself	
all flashing (at different speeds)	No communication between control unit and twist grip	does not go out by itself	

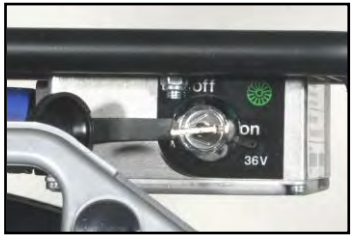
8.5 Starting up

Warning

WARNING:
The electric bicycle must not be operated if the twist grip's automatic return is faulty. The fault should be rectified by a specialist dealer.

Note

NOTE:
Always check the twist grip's automatic return before starting up.



The system must be switched off to start with! To check the automatic return, twist the twist grip backwards and then release (see photo). The twist grip must immediately return to its initial (zero) position.

Remove the protective cap from the lock on the control unit.

Place the key in the lock and switch to "ON".

Take the key out again so it cannot get lost during the journey. Replace the protective cap on the lock.

First mount the electric bicycle.

Now press the "ON/OFF" button on the twist grip
(for more than 1 second, see also 7.2 Twist grip/ Pushbuttons / Functions / Switching On).

Pedal to start off, just as with a conventional bicycle.
At the same time, activate the motor by gently turning the twist grip back towards you.

8.6 Cycling

WARNING:
You should never block or obstruct the twist grip's automatic return while riding the electric bicycle!

Once you are under way, to increase the assistance provided by the motor and to continue accelerating, turn the twist grip more towards you while pedalling faster.

To reduce the assistance provided by the motor and reduce speed, slowly turn the twist grip forwards.

If your speed increases while you are pedalling, you should change up to a higher gear. The control unit turns the drive off if you pedal too slowly. You should change down to a lower gear if your speed decreases (e.g. riding uphill).

To deactivate the electric drive while your are riding, e.g. if you wish to just pedal the cycle without any motor assistance or during long rides on the level or downhill, proceed as follows:

- Gently turn the twist grip forwards to its zero position
- Press the "ON/OFF" button on the twist grip for at least 1 second until all the LEDs go out.

NOTE**:**
With the *Pedelec* that has assisted pull-away, you can start off at speeds of up to 6 km/h without pedalling.
The assisted pull-away with the *Pedelec* is useful for pushing the cycle too (assisted pushing).
With the *E-bike* and *E-bike speed* you can start off at speeds of up to 20 km/h without pedalling.

Note

NOTE:
The electric drive shuts off automatically when:

- The battery has reached the deep discharge limit.
- The motor or control unit overheat. This can happen for example after a long steep uphill ride or a long period of operation with a second carried battery.
  The drive is ready for use again after a brief cooling down period (approx. 5-10 min).

8.7 Ending the journey

Gently turn the twist grip forwards to its zero position
(front stop)

Using the front and rear brakes, bring the electric bicycle to a complete stop.

Press the "ON/OFF" button on the twist grip for at least 1 second until all the LEDs go out.

Remove the protective cap from the lock on the control unit.

Place the key in the lock and switch to "OFF".

Take the key out of the lock if you are taking a longer break
(this will prevent unauthorised use) and replace the protective cap on the lock

Note

NOTE:
If you forget to switch the drive off the control unit switches itself off automatically after 16 minutes.
You must then switch the drive on again with the "ON/OFF" button on the twist grip before further use.

9 Maintenance and cleaning

WARNING:
Maintenance work may only be carried out by a specialist dealer.

The electric drive is maintenance free provided it is used properly and with care.

A safety inspection should be carried out by a specialist dealer every 500 kilometres.
The following items should be checked:

- Secure attachment of all cables and components
- Operation of the complete electrical system
- Battery condition

WARNING:
Switch the key-operated switch to OFF before carrying out any cleaning work!

CAUTION:
The use of a steam jetter, high-pressure cleaner or water hose for cleaning is not permitted. Components can be destroyed if water is allowed to enter the electrical system or motor.

The parts of the retrofit kit can be cleaned using a damp - but not wet - soft cloth and normal commercial cleaners or soapy water.
To clean the bicycle, follow the directions given in the bicycle's operating instructions.

10 Carrying by car

Aggressive road dirt, rainwater or a saline atmosphere will shorten the life of an electric bicycle. It should therefore always be protected with a tarpaulin when carried on a car. The batteries should be removed from the bicycle and carried at a cool place in the car.

11 Trouble-shooting

WARNING:
Trouble shooting and rectification in a faulty component must always be carried out by a specialist dealer.
Work on the battery and mains adapter may also only be carried out by a specialist dealer.

WARNING:
All work may only be carried out with the drive switched off and at a complete standstill.

WARNING:
Before the unit is re-used following repairs etc., ensure that all covers, screw fittings and safety devices have been correctly fitted and function tested.

NOTE:
The directions given in the operating instructions of the bicycle must also be followed when trouble-shooting and rectifying faults.

In case of a fault, first check the following table to see whether you can deal with it yourself. If not, you should consult a specialist dealer.
If the drive develops a fault while you are riding the bicycle, you can continue riding by pedalling with the motor switched off.

Fault	Possible cause	Remedy
Drive cannot be switched on - LEDs on twist grip do not light up	Key-operated switch still OFF	Turn key-operated switch to ON
	Battery flat	Charge the battery
	Faulty battery	Have battery checked by specialist dealer, replace if necessary
	Twist grip or battery connector has insufficient contact	Check that connectors are plugged in properly
	Faulty twist grip	Consult a specialist dealer
	Faulty control unit	Consult a specialist dealer
The motor cannot be started after switch on – LED 1 and LED 5 flash alternately	Twist grip not in zero position (sticking or slightly turned)	If the twist grip is sticking, do not attempt to start off with the motor, consult a specialist dealer. Otherwise, release the twist grip so that it returns to its zero position WARNING: Never twist the grip to the full-throttle position with this fault
LED 4 flashes when you switch on	No communication with the battery	Consult a specialist dealer; you can ride with the motor but the battery charge status cannot be shown on the twist grip
When you switch on, LED 4 flashes and LED 5 lights up	General fault	Switch the drive off and then on again; if the fault persists consult a specialist dealer
When you switch on all LEDs flash (at different speeds)	No communication with the twist grip	Switch the drive off and then on again; if the fault persists consult a specialist dealer

Fault	Possible cause	Remedy
The drive cuts out while you are riding	Motor or control unit overheated LED 1 lights up, LED 4 flashes	Switch the drive off and allow to cool down for approx. 5-10 min
	Battery flat	Charge the battery
	Plug connectors have insufficient contact	Check that all connectors are plugged in properly
	Faulty control unit	Consult a specialist dealer
Insufficient range	Battery flat	Charge the battery
	Faulty battery	Have battery checked by specialist dealer, replace if necessary
	Condition of bicycle or way of riding may not be ideal	▪ Check the technical condition of the bicycle (tyre pressure, ease of movement) ▪ If necessary change your way of riding (pedal faster)
Pedelec or E-bike speed: Motor runs with assisted pull-away but does not speed up when you pedal or only speed up in jerks	Pedalling sensor not correctly set	▪ Check gap between sensor and pulse disk and correct as necessary ▪ Check the direction that the 'nose' on the sensor is pointing, correct as necessary ▪ Check that pulse disk runs true, correct as necessary
	Faulty sensor	Replace the sensor or consult a specialist dealer
	The pedalling sensor connector has insufficient contact	Check that connectors are plugged in properly
	Faulty control unit	Consult a specialist dealer

Fault	Possible cause	Remedy
Pedelec or E-bike speed: More pedal power is needed to keep going	Wrong gear, too high	Select a lower gear; pedal without force as you do so
	Gradient or weight too great	▪ Change to a lower gear ▪ Pedal harder, ▪ Turn twist grip back more
	Faulty motor	Consult a specialist dealer
Not enough motor-power, motor does not run at all or only very slowly and feebly	Battery flat	Charge the battery
	Motor overheated	Switch the drive off and allow motor to cool down for approx. 5-10 min
	Plug connectors have insufficient contact	Check that all connectors are plugged in properly
	Faulty motor temperature sensor	Consult a specialist dealer
	Faulty control unit	Consult a specialist dealer
	Battery has reached the end of its life	Have battery checked by specialist dealer, replace if necessary
Unusual motor noise	Damaged motor	Do not continue riding with the motor, consult a specialist dealer
Motor runs with audible running noise but does not propel the bicycle	Damaged gears (sprockets, freewheel)	Consult a specialist dealer
Twist grip sticks	The grip has slipped, is incorrectly fitted or has a mechanical fault	Do not continue riding with the motor, consult a specialist dealer

12 Warranty and limitations of liability

We, HEINZMANN GmbH & Co. KG (manufacturer), shall in the event of a defect that occurs in our product provide the following services to the immediate purchaser of our product as part of our statutory warranty obligation:

1. Rectification of defects that occur as a result of material or manufacturing deficiencies, by repair or replacement of the affected part according to the statutory warranty regulations within a period of 24 months from the date of manufacture to the immediate purchaser. Wearing parts are excluded. The date of manufacture is shown on the nameplate.

2. If repair or replacement is unsuccessful, the immediate purchaser may at his discretion demand a reduction of the price (abatement) or revocation of the contract (withdrawal). Minor defects shall not confer a right of withdrawal.

3. Claims for defect shall not exist if they are causally related to the fact
   - that these installation and operating instructions are not followed
   - that modifications are made to our product or our product is used improperly
   - that our product is unsuitable for the application owing to unusually high mechanical or thermal stress or is otherwise overloaded, according to Chapter 3
   - that our product is unsuitable for installation in the vehicle owing to unusual installation conditions
   - that natural wear and tear or wear through improper use has occurred
   - that our product has sustained corrosion or oxidation due to environmental influences

4. If the immediate purchaser claims damages as a result of defects occurring to the product, then the following limitations of liability apply.

5. Warranty claims lapse as described in Point 1.
   The statutory periods of limitation apply in the event of injuries of life, body or health, also in the event of a deliberate or grossly negligent breach of duty on our part, and in the event of the malicious concealment of a defect.

Limitations of liability

- We accept no liability on any legal grounds for damage not sustained by the supplied product itself.
- However this disclaimer does not apply in the event of premeditation or gross negligence, culpable injury of life, body or health, defects that have been maliciously concealed, the acceptance of a guarantee or a procurement risk, the breach of essential contract obligations or in the event of defects of the supplied object, in so far as we are liable under the product liability law for personal injury or damage to privately used objects.
- In the event of a culpable breach of essential contract obligations, the claim for damages in the event of slight negligence is limited to the reasonably foreseeable losses typical for this type of contract.
- The above provisions relating to limitation of liability apply analogously in the event of a breach of ancillary contract obligations such as for example duties to inform and advise.

13 Disposal

Electrical and electronic devices must not be disposed of together with household waste. The consumer is required by law to return electrical and electronic devices at the end of their life to the public collection points provided for this purpose, or to the specialist stockist. You will make a significant contribution to protecting our environment by re-using or properly recycling old appliances.
The above disposal requirements may also apply to batteries.

Components must be disposed of according to the environmental regulations that apply in your own country. You can contact your local authority or specialist stockist for advice about recycling.

14 Technical Data

Motor	
Type	RN120
Voltage	36 V
Output	depending on version 200 … 250 W S1 / 500 W S2
speed when riding on the level	depending on version approx. 60 ... 330 rpm
Max. torque	depending on version 35 ... 60 Nm (rating plate)
Thermal overload protection	yes
Spoke hole pitch circle	164 mm
Spoke hole diameter	$3.1^{+0.1}$ mm
Inner spoke flange distance	58 ±1 mm
Outer spoke flange distance	66 mm
Dimensions (Ø x w)	178 mm x 127 mm
Weight	3.5 kg
Control unit	
Voltage	36 V
Current max.	depending on version 20 .. 33 A (rating plate)
Dimensions (l x w x h)	115 × 100 × 45 mm
Weight	0.7 kg

15 Declaration of conformity

according to 2004/108/EC – Electromagnetic Compatibility Directive

Manufacturer : HEINZMANN GmbH & Co. KG
Am Haselbach 1
D-79677 Schönau
Tel.: +49 7673-8208-0

hereby declares that the product: „ Electric drive for light vehicles *CLASSIC*“ consisting of:

Motor:	870-00-285-6626
Control unit:	870-00-349-20 / 870-00-349-23
Sensor:	870-00-330-03
Twist grip:	870-90-024-09
Cable harness:	870-90-023-42
Year of manufacture:	starting with 01/2011

satisfies the regulations of 2004/108/EC – EMC Directive.

In addition the following harmonised European Directives have been used:

- Rotating electrical machines, DIN EN 60034
- Cycles - Electrically power assisted cycles - EPAC Bicycles, DIN EN 15194

HEINZMANN® Motor- und Turbinenmanagement Elektrische Antriebe Am Haselbach 1, D-79677 Schönau, Tel.: +49 7673 8208-0, www.heinzmann.com

Schönau, 2011-03-30

Markus Gromer
General Manager

www.ebike.heinzmann.com

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