# MANUAL HEINZMANN DIRECT POWER

# Contents

Congratulations! You have chosen a bicycle with the *DirectPower* electric drive system. 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 electrically assisted 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.
The manufacturer reserves the right to make changes to the design or construction of the product for its technical improvement.


# Notes on bicycle and electric drive system

| |
|---|
| **Frame number:** |
| **Motor serial number:** |
| **Key number (accumulator):** |
| **Date of purchase.:** |
| **Bicycle dealer:** |
| **Notes:** |

**Info:**
Note down the accumulators key number and the serial number of your drive system *DirectPower*. The serial number is a unique, individual number used to identify the motor. It can be used to identify the equipment uniquely (e.g. in case of queries with the dealer etc.).

# 1 Preliminary remarks on safety instructions

## 1.1 Symbols used

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.


**NOTE:**
Indicates possible material damage.

**CAUTION:**
Provides general instructions for safe function and special technical features or regulations.

**Info:**
This symbol indicates tips and special information.

# 2 Safety instructions

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.


**Danger of bearing parts breaking**

A damaged motor can cause bearing parts to break!

This could result in a fall.

- Stop riding the bicycle immediately and replace the damaged motor right away.

An incorrectly mounted drive wheel can cause the drive wheel or the frame to brake!

This could result in a fall!

- When mounting the drive wheel, always tighten the wheel nuts with the specified torque.

An incorrectly mounted or overloaded luggage carrier can lead to breakage!

This could result in a fall!

- The maximum load limit for the carrier is **30 kg**!


**Risk of operational faults or fires**

Damaged electrical assemblies and cables can lead to short circuits.

This could result in operational faults and, in the worst case, fire.

- Damaged electrical assemblies and cables must be replaced.


**Danger due to unintentional motor activity and rotating parts**

The motor can move unintentionally if the drive system remains switched on when work is being carried out on the electric bicycle. Clothing could be pulled into the rotating parts of the drive. This could result in injury.

- Always disconnect the battery from the bicycle before carrying out work on the electric bicycle.
- When re-commissioning for the first time after installation or repair, set up the bicycle so that the drive wheel can turn freely. Only then should the battery be inserted again and the drive checked for correct function.

**CAUTION:**

You may be required to wear a helmet when riding a bicycle with electric auxiliary drive, depending on the type and model. Whether or not it is required by law, it is always advisable to wear a suitable bicycle helmet when riding an electric bicycle!

## 2.1 Intended use

The *DirectPower* drive system is used as a wheel hub drive for converting bicycles to electric bicycles. The drive system is also suitable for use in other products (e.g. lightweight vehicles, such as mopeds, rickshaws, wheelchair pulling aids, disabled person vehicles).
Where necessary, approval for the relevant use must be obtained from the drive manufacturer.

**CAUTION:**
The following are examples of improper use:
- Combination with unlicensed components
- Improper or unauthorized 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

## 2.2 Hazards for special groups of persons

- The use of electric bicycles on public roads by children and young persons may not be permitted. Follow the laws of the country where the bicycle is used.
- The product must be stored where it cannot be accessed by children and persons who are unable to appreciate the attendant hazards.

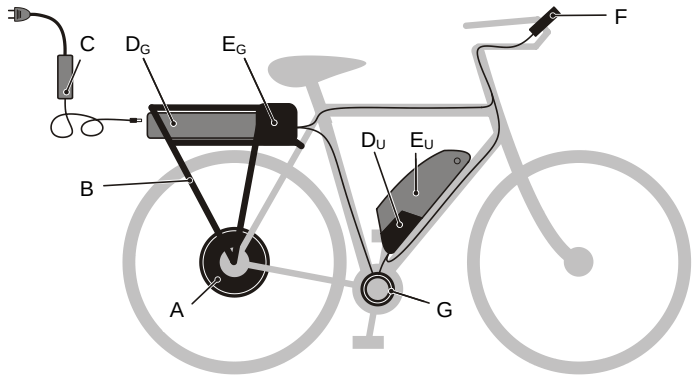
## 2.3 Driving license, vehicle registration, insurance

When riding an electric bicycle, the laws, licensing and insurance regulations of the country where the bicycle is used apply.
It is the duty of the vehicle's keeper to find out about legal requirements, to apply them and comply with them.

## 2.4 Specific driving characteristcs of electric bicycles

- Electric bicycles are different to ride than bicycles without electric assistance. It is therefore advisable to practice handling the electric bicycle away from other traffic first of all.

# 3 Components of the drive system DirectPower




| | |
|---|---|
| A | Motor |
| B | Luggage carrier |
| C | Charger |
| $D_G$ | Luggage carrier battery |
| $D_U$ | Downtube battery |
| $E_G$ | Control housing with control, luggage carrier type |
| $E_U$ | Control housing with control, downtube type |
| F | Display and control unit |
| G | Pedalling sensor |

- Motor

The brushless electric motor is the power source of the *DirectPower* drive system. The design offers both powerful torque in continuous operation, as well as substantial peak torques (e.g. during start-up). Mechanical losses are negligible, as the motor is designed without a gearbox.

- Battery & charger

Working as power source for the *DirectPower* drive system there are two different types of batteries. A downtube or a luggage carrier lithium-ion type. The high capacity of this type of battery offers maximum driving performance and range. These batteries have no memory effect and can be recharged at any time with no problems. A suitable charger for charging both battery types from the electric grid is included with the system.

- Control housing and control

The electric control is like the brain of the *DirectPower* drive system. Its task is to evaluate all signals and activate the motor in accordance with the legal parameters so that it provides the relevant power. The plastic control housing protects the control reliably from wet and moisture, as well as impacts and similar influences.

- Display

The display and the control unit together make up the control centre of the *DirectPower* drive system. The user selects the degree of assistance or energetic recovery as desired and makes all other settings. The user also receives all necessary information on the operating state of the system with regard to the trip and range.

- Pedalling sensor

The pedalling sensor is combined with and built discreetly into the bottom bracket. It passes on the pedal torque signals, pedal frequency and the pedalling direction of rotation to the control. The pedalling sensor is completely maintenance-free and does not require setting.

- Luggage carrier

The solid luggage carrier made from aluminium is designed to carry luggage or saddle bags, as well as hold the battery securely and safely. The control housing containing the system control is also mounted on it.

# 4 Battery

## 4.1 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 in an insert on the luggage carrier.

Lithium-ion batteries may only be charged using a special charging circuit! Charging the battery correctly and protecting it from deep discharge and overheating help to significantly extend the service life. A suitable charge regulator that takes all these requirements into account is therefore already built into the supplied charger. It guarantees optimal and safe function. Therefore, only this charger may be used for charging the battery.


**Risk of fire**

Charging the lithium-ion battery incorrectly can cause the battery or charger to heat up significantly. This could result in fire!

- Only use the charger supplied to charge the battery. The charger is designed for indoor use only.
- Before connecting the charger to the electric grid, always check whether the mains voltage corresponds to the connection voltage of the charger. The supply voltage of the charger is indicated on the nameplate on the back of the device.
- The lithium-ion battery may only be charged in a dry, non flammable environment and if possible do not leave battery unattended.

Mechanical damage to the lithium-ion battery or charger can lead to functional faults and short circuits. This could result in fire!

- Any form of manipulation on the housing of the lithium-ion battery or charger is prohibited.
- Replace damaged batteries immediately and dispose of them safely.


**Risk of electric shock**

A charger with a damaged plug or cable could result in electric shock!

- Never connect damaged plugs or cables to the electric grid.
- Damaged electrical assemblies and cables must be replaced immediately.
- Water and moisture must not be allowed to penetrate the charger under any circumstances. If water has entered the charger, disconnect it from the mains supply immediately and have it checked by a specialist dealer.
- Condensation water can develop on the charger if there is a sudden change in temperature from cold to hot. If this happens, wait until the device has come up to the temperature of the warm room before connecting it to the mains. The charger should be stored where it is used.
- The charger may only be used to charge the lithium-ion battery supplied. Other uses of the charger are not permitted.

## 4.2 Battery charging

The battery should be charged fully before the first use. A suitable charger with integrated charge regulator is included with the system. Charging can be done either on the luggage carrier or off the bicycle with the battery removed.

When the end of the charging is complete, the charge regulator switches to trickle charging automatically. The battery can be left connected to the charger 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.

**CAUTION:**
To guarantee correct polarity when charging, the charging socket has a slot. The corresponding spring of the charge plug must slide into this slot. Only then correct polarity is guaranteed.
Never try to insert the charging plug in a different position with force!

**WARNING:**
- When connecting the charger, note the routing of the cables and avoid trip hazards!

The following ambient temperature ranges must be maintained to ensure that the battery works correctly:

| Operating mode | Normal operation | Charging | Storage |
|---|---|---|---|
| Temperature range | -10 … 45 °C | 10 … 35 °C | -10 … 45 °C |

**Info:**
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.

During the charging process, the ambient temperature should not lie below 10°C or above +35°C. Charging outside this temperature range reduces the available battery capacity and therefore the range. 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 must be avoided.

Before long periods of inactivity, e.g. in winter, the battery has to be fully charged up and stored in a dry, frost-free place. Charge the battery completely before using again.

The battery delivers maximum performance at room temperature. When starting a journey, the temperature of the battery should therefore not lie below 10°C or higher than +25°C.

The battery can become quite hot on long journeys using a lot of motor power. Temperature monitoring inside the housing prevents charging in excessively high temperatures. The charger can be connected in this case. Charging will start automatically when the battery has cooled down sufficiently. The battery can easily take up to an hour to cool down following a long uphill ride.

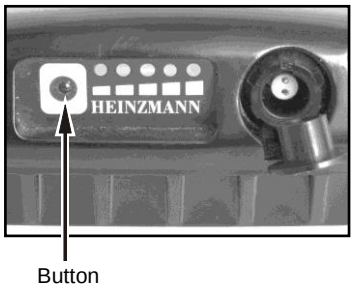
### 4.2.1 Luggage carrier battery


To charge the battery, proceed as follows:

- Remove the dust cap from the charging socket on the battery housing
- Plug the charger into a mains socket outlet
- Connect the charging plug to the socket,
  the charge status indicator LEDs start to flash

**Charge status display on the luggage carrier battery while charging:**

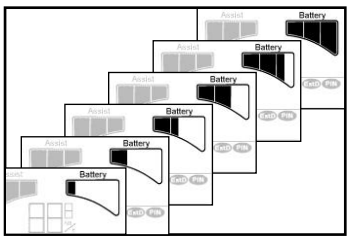
| LED status | Battery status |
|---|---|
| All five LEDs flash on one after the other and go out again at the same time | Battery is charged,<br>number of LEDs lighting up represents the capacity already charged. |
| All LEDs permanently off | Charging is complete,<br>battery is 100% charged, |




The charge status can be seen at any time directly on the battery. Simply press the button to the left of the display LEDs. A number of LEDs lights up according to the relevant charge status.

**Charge status display on the charger:**

| | |
|---|---|
| LED on the charger lit up red | Battery charging |
| LED on the charger lit up green | Charging complete,<br>trickle charging active |



When the battery is charged on the luggage carrier the charge status can be seen at the display as well.

**Charging time:**

Fully charging the discharged battery takes **approx. 5½ hours**.

### 4.2.2 Downtube battery

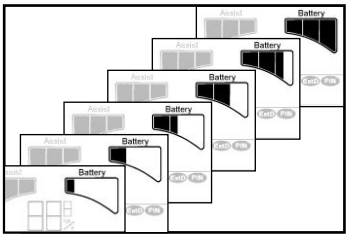
Dust cap

To charge the battery, proceed as follows:

- Remove the dust cap from the charging socket on the battery housing
- Plug the charger into a mains socket outlet
- Connect the charging plug to the socket

**Charge status display on the charger:**

| | |
|---|---|
| LED on the charger lit up red | Battery charging |
| LED on the charger lit up green | Charging complete,<br>trickle charging active |



When the battery is charged on the downtube the charge status can be seen at the display as well.

**Charging time:**

Fully charging the discharged battery takes **approx. 7 hours**.

## 4.3 Mounting and disconnecting the battery

### 4.3.1 Luggage carrier battery

- Push the battery into the luggage carrier from behind on the carriage rail until it has audibly engaged in the lock.

**CAUTION:**
Before starting out on your journey always take out the key from the batteries lock!

- To disconnect and remove the battery, turn the key on the left side of the luggage carrier clockwise and hold. This releases the lock. Then release the battery from the connection by pulling hard on the rear handle and pull out of the luggage carrier to the back.

**Danger due to unintentional motor activity and rotating parts**
The motor can move unintentionally if the drive system is switched on after work carried out on the electric bicycle. This could result in injury.
- Mount battery only when work on the electric bicycle is completely finished.
- When re-commissioning for the first time after installation or repair, set up the bicycle so that the drive wheel can turn freely.

### 4.3.2 Downtube battery

- Turn the key of the battery counterclockwise until positive stop. This releases the lock.
- Set downtube battery onto the metal rail from above in a way that its electrical contacts head towards the control box. The cut-outs in the downtube batteries bottom have to lock into the lateral extentions at the rail.
- Push downtube battery towards control box until it has audibly engaged in the lock.
- Turn the key clockwise until positive stop.

**CAUTION:**
Before starting out on your journey always take out the key from the batteries lock!

- To disconnect and remove the battery, turn the key of the battery counterclockwise until positive stop. This releases the lock. Then release the battery from the connection at the control box by pulling hard along the metal rail. Take off downtube battery from the rail vertically.

**Danger due to unintentional motor activity and rotating parts**
The motor can move unintentionally if the drive system is switched on after work carried out on the electric bicycle. This could result in injury.
- Mount battery only when work on the electric bicycle is completely finished.
- When re-commissioning for the first time after installation or repair, set up the bicycle so that the drive wheel can turn freely.

# 5 Normal operation

## 5.1 Instructions for riding


**Danger due to hot surfaces**

The battery can become quite hot on long journeys using a lot of power!

- Do not touch the motor after journeys under high load.

**CAUTION:**

The drive system can be damaged by increased feedback voltage from the motor if the bicycle is moving at excessively high speeds.

Following maximum speeds must not be exceeded depending on the rim size:

| Rim size | | Max. travel speed |
|---|---|---|
| 20“ | — | 50 $^{km}/_{h}$ |
| 22“ | — | 55 $^{km}/_{h}$ |
| 24“ | — | 60 $^{km}/_{h}$ |
| 26“ | — | 65 $^{km}/_{h}$ |
| 28“ | — | 70 $^{km}/_{h}$ |

- 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 drive system and the extra motor power will have quite a significant impact on the performance of the electric bicycle. You must allow for longer stopping distances because of the increased weight. You should therefore practice the safe control of your electric bicycle off the public roads to start with.
- Before starting out on your journey, test for correct function 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 loose and avoid jerky movements.
- On fast bends and uneven or sloping surfaces, 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 cycle helmet is recommended for your own personal safety.
- Avoid continuous operation in saline environments and atmospheres as they encourage corrosion damage.

## 5.2 Before every journey

Before every journey, check the following and ensure that:

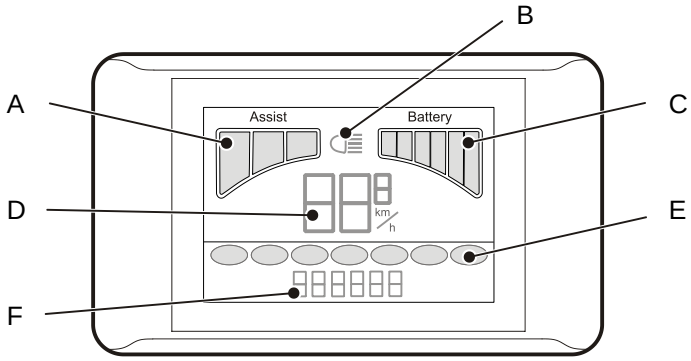
- the motor (spokes, spindle nuts) and electrical connections are fitted securely
- the battery is firmly seated on the luggage carrier or the downtube respectively
- all cables are free from damage and ensure they are securely attached to the bicycle frame
- all screws and nuts are firmly seated
- brakes are working safely, brake pads must not rub against wheel rims
- the tyres have sufficient pressure (max. pressure is marked on the relevant tyres)
- all bearings run freely (bottom bracket, wheels, steering) and wheels run quietly

**CAUTION:**
The electric bicycle should also be taken for inspection by a specialist dealer every 1,000 km and at least once a year. Always have faults repaired by a specialist dealer!

## 5.3 Display and operation

The display contains all display elements:

| | |
|---|---|
| A | Assistance level |
| B | Bicycle lighting |
| C | Battery charge status |
| D | Current travel speed |
| E | Function display |
| F | Display line |





The handlebar holds the control unit with the three buttons ***MODE***, ***Up arrow*** and ***Down arrow***.
All settings are made using these buttons. There are no other setting options.

### 5.3.1 Switching on


Press and hold the ***MODE*** button for at least 3 seconds until the display is active. Then release the button again. The need to press and hold the button is a safety measure to prevent accidental switching on.
The system is now ready for travel.

**CAUTION:**
No load must be placed on the pedals while switching on to ensure that the drive is not activated by mistake!
- Mount the bicycle and place both feet on the ground
- Switch on the drive system
- Set off

### 5.3.2 Switching off


Press and hold the ***MODE*** button for at least 3 seconds until the display goes out. Then release the button again.
The drive system is now switched off.

**Info:**

The system switches off automatically after approx. 10 minutes of inactivity.

The ***MODE*** button on the control unit must then be switched on again before the bicycle can be used again.

### 5.3.3 Assisted pull-away


Assisted pull-away is an optional function of the drive system. It provides electrically-powered assistance during pull-away without having to pedal up to a maximum speed of 6 km/h.
To activate this feature, press and hold the *Up arrow* button.
The motor assistance activates after approx. one second.
To end the assistance, release the *Up arrow* button.

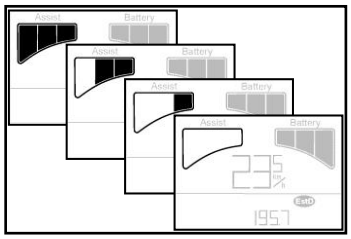
### 5.3.4 Setting the assistance level or energetic recovery level

The drive system offers three different assistance levels for normal operation.

| Assistance | Level I | Level II | Level III |
|---|---|---|---|
| Motor | ~ 30-35 % | ~ 65 % | 100 % |
| Pull-away | ● ○ ○ | ● ● ○ | ● ● ● |
| Range | ● ● ● | ● ● ○ | ● ○ ○ |


To select a higher assistance level, briefly press the *Up arrow* button.


To select a lower assistance level, briefly press the *Down arrow* button.



The assistance levels are shown as display segments under "Assist" at the top left of the display.

**Info:**

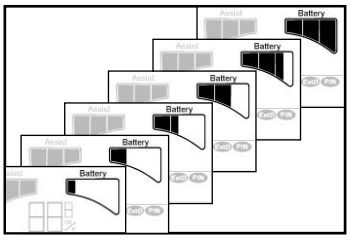
In the assistance level "0", the drive system is active, but provides no assistance. If the optional function "regenerative braking" is installed, it continues to work.

The system can also be used in energy recovery mode. In this case, the motor is operated as a generator and feeds electrical energy back into the battery. This can be useful as additional braking during long periods of down-hill travel. Here too, there are three different energy recovery levels available.


The energy recovery mode is accessed by pressing the *Down arrow* button briefly in assistance level "0".
Here too, there are three different energy recovery levels available. The energy recovery levels are shown as display segments under "Assist" at the top left of the display. To set it apart from the assistance mode, the segments flash in energy recovery mode.

### 5.3.5 Charge status indicator

The charge status of the battery is always shown at the top right of the display under "Battery". Up to six display segments light up depending on the charge status.



| Number of segments in the display | Status of the battery |
|---|---|
| 6 | Battery fully charged |
| 1<br>(flashing) | Battery almost empty |
| No display | Battery exhausted ,<br>drive system will switch off soon |

If the battery is almost empty, the last remaining segment starts to flash. The battery then only has limited reserve capacity. Once this is used up, the drive system switches off automatically. This is to prevent the battery from deep-discharging.
After this type of automatic shut-down, the drive system no longer provides any assistance. Commands issued by pressing the buttons are also no longer accepted.
The drive system is only ready for operation once the battery has been charged or a pre-charged battery is inserted.

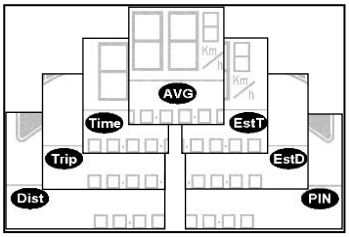
### 5.3.6 Functions

The drive system offers a range of different functions during operation
These functions are:

- Odometer (Dist)
- Trip counter (Trip)
- Time counter (Time)
- Average trip speed (AVG)
- Estimated time remaining for the assistance (EstT)
- Estimated distance remaining (EstD)
- PIN (PIN)
- Bicycle lighting (optional function)


The desired function is selected by pressing the *MODE* button the relevant number of times.

The relevant active function is shown by an oval symbol above the display line.




- Dist - Odometer

Total sum of all kilometres travelled.
Your bike has been extensively tested by the manufacturer before delivery. As a result, the odometer will not be at 0km.

- Trip - Trip counter

Sum of all kilometres travelled since the trip counter was last reset. For instructions on how to reset this counter, see Ch. 5.3.7.

- Time - Travelled trip time

Total time travelled since the time counter was last reset. The time is shown in hours and minutes. For instructions on how to reset this counter, see Ch. 5.3.7.

- AVG - Average trip speed

The average speed since the counter was last reset is shown in kilometres per hour. For instructions on how to reset this counter, see Ch. 5.3.7.

- EstT - Estimated time remaining for the assistance (EstT)

The estimated time remaining for the drive system to assist the driver is shown. The value is determined by the control from the operating values gathered since the battery was last charged. The counter cannot be reset by the user.

- EstD - Estimated distance remaining (EstD)

The estimated remaining distance which can be travelled with the remaining battery charge capacity is shown. The value is determined by the control from the operating values gathered since the battery was last charged. The counter cannot be reset by the user.

- PIN

Edit menu for setting a PIN. See Ch. 5.3.10

- Bicycle lighting

Optional function for activating the front and rear bicycle lighting.
A lamp symbol on the display shows when the bicycle lighting is switched on.

### 5.3.7 Resetting counters

The following counters on the display can be reset by the user:
- Trip counter (Trip)
- Time counter (Time)
- Average trip speed (AVG)

The counters can only be reset together at the same time.


To access the settings mode, press the *Up arrow* and *Down arrow* buttons at the same time with the drive system switched on. A PIN entry window appears on the display first of all.


To reset the counters, press and hold the *Up arrow* button for at least 3 seconds until the word ***CLEAR*** appears in the display line. The counters are now reset to zero.


Press the ***MODE*** button to return to the operating mode.

### 5.3.8 Switching the display brightness

The display lights up after being switched on. The brightness can be changed to adapt to the ambient conditions.


To access the settings mode, press the *Up arrow* and *Down arrow* buttons at the same time with the drive system switched on. A PIN entry window appears on the display first of all.


Press the *Down arrow* button to access the brightness setting. A choice of seven different brightness levels is available. Press the *Down arrow* button repeatedly to move through the values in sequence. The relevant level is shown in the display line.

| Level | Display | Brightness | |
|---|---|---|---|
| 1 | BL - off | No lighting | |
| 2 | BL-AT1 | low | Display lights up after the system is switched on or if one of the buttons is pressed for approx 4 seconds. |
| 3 | BL-AT2 | medium | |
| 4 | BL-AT3 | bright | |
| 5 | BL-on-1 | low | Permanent lighting |
| 6 | BL-on-2 | medium | |
| 7 | BL-on-3 | bright | |


Press the ***MODE*** button to return to the operating mode.

### 5.3.9 Switching on the bicycle lighting


This optional function enables the bicycle lighting to be operated with the drive system battery.
To activate this function, press and hold the *Down arrow* button.
The bicycle lighting is switched on after approx. one second.
The function is indicated with a lamp symbol on the display between the assistance level display and the charge status display.
To switch off the light, press and hold the *Down arrow* button. The bicycle lighting is switched off again after approx. one second.

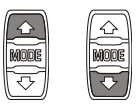
### 5.3.10 Setting a PIN

If a PIN has been defined by the user, the drive system asks for this PIN after the system is switched on. The system is only ready for operation once this PIN has been entered completely and correctly.

**Info:**
The system is supplied without a PIN and is ready for use immediately after it is switched on.


To access the settings mode, press the *Up arrow* and *Down arrow* buttons at the same time with the drive system switched on. A PIN entry window appears on the display first of all.


Press the *MODE* button to return to the entry mode.
Four digit spaces are shown, with the first one flashing.




Press the *Up arrow* or *Down arrow* button to increase or decrease the relevant number by one. Confirm the desired number by pressing the *MODE* button and the next digit space starts to flash.


When all the numbers have been entered, press the *Up arrow* and *Down arrow* buttons at the same time. The set PIN is saved now.

Each time the drive system is switched on, it now asks for the PIN.
The PIN can be changed at any time when the system is switched on.

# 6 Maintenance, cleaning and repair

## 6.1 Maintenance


**Risk of incorrect functions if maintenance is carried out incorrectly**

Incorrect maintenance work on an electric bicycle could result in damage to key components!
This could result in a fall.

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


**Danger due to unintentional motor activity**

The motor can move unintentionally if the drive system remains switched on when work is being carried out on the electric bicycle.

- Always disconnect the battery from the bicycle before carrying out work on the electric bicycle.
- When recommissioning for the first time after installation or repair, set up the bicycle so that the drive wheel can turn freely. Only then should the battery be inserted again and the drive checked for correct function.

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 1000 kilometres.
The following items should be checked:

- Secure attachment of all cables and components
- Operation of the complete electrical system
- Operational safety of the battery

## 6.2 Cleaning


**Danger due to rotating parts**

The motor can move unintentionally if the drive system remains switched on when cleaning work or similar manipulations are being carried out on the electric bicycle.

- Remove the battery before carrying out any cleaning or assembly work on the electric bicycle.

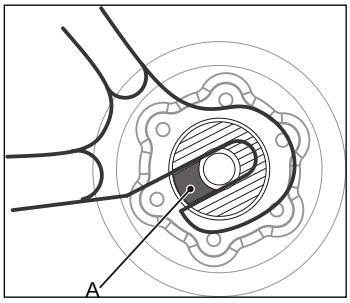
The parts of the retrofit kit can be cleaned using a damp - but not wet - soft cloth and normal commercial cleaners or soapy water.
To clean the bicycle, follow the directions given in the bicycle's operating instructions.


**Never use a high-pressure cleaner**

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

### 6.3 Repair work

Repair work, which is not carried our by a specialist dealer is carried out at users own risk and discretion!




**CAUTION:**

When reinstalling the drive wheel, e.g. after changing a tyre, the wheel nuts must be tightened with a torque of **45 Nm ± 5 Nm**!

The torque support must be completely surrounded by the dropout. The reserve in the assembly groove for the wheel axle in the dropout must be **at least 5 mm**!

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

## 7 Disposal

Electrical and electronic devices and batteries must not be disposed of together with household waste. The end user 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 dealer. Details depend on the laws in the country where the bicycle is used. You will make a significant contribution to protecting our environment by re-using or properly recycling old appliances.

The components must be disposed of in accordance with the valid environmental regulations in the country where the usage takes place.
You can contact your local authority or specialist stockist for advice about recycling.

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## 8 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. Remove the battery for transportation and transport in a cool place in the vehicle.

# 9 Warranty and limitations of liability

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 sale to the immediate purchaser. Wearing parts are excluded. The date of manufacture is shown on the nameplate. For the battery this is valid if in the course of normal use it provides less than 80% of its initial capacity within the warranty period or within 700 charging cycles alternatively.

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 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. Claims for defects expire as outlined in point 1.
   In case of injuries to life, body or health, injuries caused by intentional or negligent violation of duties on our part, as well as in the case of fraudulent concealment of a defect, the statutory periods of limitation apply.
   The statutory periods of limitation also apply for recourse actions in accordance with § 479 Section 1 of the Civil Code.

## 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.

# 10 Error codes and trouble-shooting

If eventually some trouble might occur when running drive system *DirectPower* „ **Error** “ may appear in the display line. Simultaneously a fault number is displayed instead of current speed on the display.
Following table informs about error codes, fault numbers, corresponding possible cause of trouble and appropriate trouble-shooting.

| **1** | **ERROR_HARDWARE_BRAKE** |
|---|---|
| Fault | Current overload |
| Remedy | Restart drive system. If error persists contact your stockist. |
| **2** | **ERROR_HALL** |
| Fault | Faulty motor signal |
| Remedy | Inspect motor signal cable, restart drive system. If error persists contact your stockist. |
| **3 & 4** | **ERROR_GRIP_OFFSET** |
| Fault | Twist grip not in its initial position when drive system is switched on |
| Remedy | Set twist grip to initial position, restart drive system.<br>If error persists twist grip is defect probably, contact your stockist. |
| **5** | **ERROR_TORQUE_OFFSET** |
| Fault | Torque sensor not free of load when drive system is switched on |
| Remedy | Do not engage pedals when drive system is switched on.<br>If error persists torque sensor is defect probably, contact your stockist. |

| **6** | **ERROR_I_OFFSET** |
|---|---|
| Fault | Faulty current signal |
| Remedy | Restart drive system. If error persists contact your stockist. |
| **7** | **ERROR_FAST_OVER_VOLTAGE** |
| Fault | Transient overvoltage of intermediate circuit |
| Remedy | Restart drive system. If error persists contact your stockist. |
| **8** | **ERROR_SLOW_OVER_VOLTAGE** |
| Fault | Persistent overvoltage of intermediate circuit |
| Remedy | Restart drive system. If error persists contact your stockist. |
| **9** | **ERROR_FAST_UNDER_VOLTAGE** |
| Fault | Transient undervoltage of intermediate circuit |
| Remedy | Restart drive system. If error persists contact your stockist. |
| **10** | **ERROR_SLOW_UNDER_VOLTAGE** |
| Fault | Persistent undervoltage of intermediate circuit |
| Remedy | Restart drive system. If error persists contact your stockist. |
| **11** | **ERROR_OVER_TEMP_MOTOR** |
| Fault | Motor overheated |
| Remedy | Let motor cool down, restart drive system.<br>If error persists after approx. 2 h contact your stockist. |
| **12** | **ERROR_OVER_TEMP_CONTROLLER** |
| Fault | Motor control overheated |
| Remedy | Let motor control cool down, restart drive system.<br>If error persists after approx. 2 h contact your stockist. |

| **13** | **ERROR_PARAMETER** |
|---|---|
| Fault | Common parameter error |
| Remedy | Restart drive system. If error persists contact your stockist. |
| **14** | **ERROR_UNDER_TEMP_MOTOR** |
| Fault | Motors lower temperature limit exdeeded |
| Remedy | Store system at room temperature (approx. 20°C).<br>If error persists after approx. 2 h contact your stockist. |
| **15** | **ERROR_EEPROM** |
| Fault | System memory error |
| Remedy | Restart drive system. If error persists contact your stockist. |
| **16** | **ERROR_PARAMETER_PROPERTY** |
| Fault | Parametermanagement error |
| Remedy | Restart drive system. If error persists contact your stockist. |
| **17** | **ERROR_AKKU_TEMP** |
| Fault | Battery either overheated or subcooled |
| Remedy | Let overheated battery cool down, store subcooled battery at room temperature (approx. 20°), restart drive system. If error persists after approx. 2 h contact your stockist. |
| **18** | **ERROR_UNDEFINED_BIKE_CONSTELLATION** |
| Fault | Configuration error |
| Remedy | *Restart drive system. If error persists contact your stockist.* |
| **19** | **ERROR_BMS** |
| Fault | Battery Error |
| Remedy | Contact your stockist for updating battery and inverter software. |
| **20** | **ERROR_BMS_VERSION** |
| Fault | Software version of battery and inverter not compatible |
| Remedy | Contact your stockist for updating battery and inverter software. |
| **21** | **ERROR_TORQUE_SIGNAL** |
| Fault | Intermittent contact or other fault of torque sensor |
| Remedy | Restart drive system. If error persists contact your stockist. |
| **22 … 30** | **ERROR_BMS_FAULTY_xxx** |
| Fault | Battery fault |
| Remedy | Contact your stockist. |
| **50** | **ERROR_DISPLAY_COMMUNICATION** |
| Fault | Slack connection or defect display |
| Remedy | Contact your stockist. |
| | |

# 11 Technical data

| **Control unit** | |
|---|---|
| Operating voltage | 36 V |
| Current max. | depending on version & usage 10 ... 33 A |
| **Motor** | |
| Type | PRA 180-25 |
| Motor nominal voltage | 22,8 VAC |
| Output *) | 250 W Pedelec (DIN EN 60034-1) / 500 W Speed Pedelec |
| Speed when riding on the level | depending on version & wheel diameter approx. 60 ... 330 1/min |
| Nominal torque *) | Pedelec: 11.4 Nm / Speed Pedelec: 12.6 Nm / High Torque: 13.3 |
| Impulse torque *) | up to 60 Nm |
| Thermal overload protection | Typ KTY84-130 |
| Motor diameter | Ø 220 mm |
| Weight | Front wheel motor: approx. 4.5 kg<br>Rear wheel motor: approx. 4.7 kg |
| Degree of protection | IP54 |
| *) These technical data may differ depending on version. See type plate! | |

| **Battery** | |
|---|---|
| Type | Lithium-ion battery |
| Nominal voltage | 36 V |
| Nominal capacity *) | Luggage carrier battery: 11 Ah, 400 Wh<br>Downtube battery: 14 Ah, 500 Wh |
| Charging time *) | Luggage carrier battery: appr. 5½ h with charging current 2 A<br>Downtube battery: appr. 7 h with charging current 2 A |
| Temp. ranges: Normal operation<br>Charging<br>Storage | - 10 … 45 °C<br>10 … 35 °C<br>- 10 … 45 °C |
| *) These technical data may differ depending on version. See type plate! | |

# 12 EC-Declaration of conformity

According to – EMC Directive.

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

hereby declares that the product: „E-bike drive system "*DirectPower*" consisting of:

| | |
|---|---|
| Motor: | 880-00-143-10, -11, -12, -13, -50, -51, 880-00-144-00, -10, -11, -12, 880-00-148-00, 880-00-149-00, 880-00-150-00, 880-00-151-00 |
| Control unit: | 880-80-262-00, -01, -02, -03, -10, 880-80-266-00, -01, -02, -03, -04, -10 |
| Battery: | 870-81-146-00, -01, 880-80-261-00 |
| Display: | 010-69-236-00, -01 |
| Sensor: | 870-81-134-10, 870-81-145-10, 880-81-192-00, -01, -02, 010-29-068-00, -01, -10, -11, -20 |
| Twist grip: | 870-90-069-00 |
| Year of construction: | starting with 07/2014 |

satisfies the regulations of 2014/30/EU – 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
- Transportation Testing UN 38.3

. . . . . Schönau 2016-01-31

Markus Gromer
(General Manager)

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