

impulse 2.0 ergo

Original User Manual Pedelec Impulse 2.0 Ergo

English



Item no. 1973K0014009

Contents

1 Safety	4	7.3 Programming and settings	22
1.1 General	4	7.3.1 Drive data	22
1.2 Statutory requirements	5	7.3.2 Delete trip data	23
1.2.1 Requirements for the rider	5	7.3.3 Delete overall data	23
1.3 Battery	5	7.3.4 Device settings	23
1.4 Motor	6	7.3.4.1 Display	23
1.5 Adjustments/maintenance/repair	6	7.3.4.2 Drive	24
1.6 Transportation of the Pedelec	6	7.3.4.3 Miscellaneous	24
1.6.1 The Pedelec and your car	6	7.3.5 Personalize	24
1.6.2 The Pedelec on trains	6	7.3.6 Target cost	25
1.6.3 The Pedelec on aeroplanes	6	7.3.7 ERGO settings	25
		7.3.7.1 Target heart rate	26
		7.3.7.2 Warning heart rate	26
2 Components of the Pedelec	8	8 NuVinci Harmony gears	26
		8.1 Automatic mode	27
		8.2 Manual mode	27
3 First steps	9	9 The motor	28
3.1 Checking the tightening torques	9	9.1 Operation	28
3.2 Fitting the pedals	9	9.2 Range	28
3.3 Adjusting the saddle height	9	9.3 Riding your Pedelec efficiently	29
3.3.1 Clamping bolt	9	9.4 Warranty and service life	29
3.3.2 Quick-release device	9		
4 Quick start	10	10 Troubleshooting	30
4.1 Riding in the ERGO power-assist mode	11		
5 Battery	14	11 Cleaning	32
5.1 Charging the battery	14	11.1 Battery	32
5.1.1 Removing the battery	15	11.2 Motor	32
5.1.2 Charging the battery	15	11.3 Display	32
5.1.3 Installing the battery	16	11.4 Control unit	32
5.2 Battery information system	17	11.5 Charger	32
5.2.1 Checking the charge state	17		
5.2.2 Checking the capacity	17	12 Technical data	33
5.3 Battery management	18		
5.3.1 Sleep mode	18		
5.4 Warranty and service life	18		
5.5 Storage	19		
5.6 Shipping	19		
5.7 Disposal	19		
6 Charger	19		
7 Control unit and display	20		
7.1 Control unit	20		
7.1.1 Switching on/off	20		
7.1.2 Push assist	20		
7.1.3 ⊕/⊖ buttons	20		
7.2 Display	21		
7.2.1 Assistance indicator	21		
7.2.2 Battery charge state indicator	22		
7.2.3 Remaining range indicator	22		
7.2.4 Units	22		

Introduction

Thank you for choosing the Impulse Ergo Pedelec from our company. This bike is equipped with an innovative electric drive that assists you when you are cycling. This will make your trip much more enjoyable if you are riding up hills, carrying loads or riding into the wind. You can decide yourself how much you want to use it. This bike has all of the functions of the Impulse Pedelec 2.0, but has one special feature: The **Ergo System**.

With this bike, your heart rate controls the drive when you use the ERGO mode. If your heart rate falls below the preset value, the assistance provided by the drive is automatically reduced. If your heart rate rises above the set value, the assistance provided by the drive increases. This enables an optimal heart rate range to be maintained whilst riding, thus avoiding dangerous peaks in the heart rate and training your endurance.

This system is complemented by NuVinci Harmony gears. If your speed reduces or increases, the gears automatically adjust the gear ratio in automatic mode. This means that you always pedal with the same pedalling cadence irrespective of the speed.



The pedalling cadence describes how many times the pedal crank of your Pedelec revolves in one minute. Experts simply call it cadence.

The purpose of this User Manual is to help you get the most out of your Pedelec Impulse 2.0 Ergo and use it correctly.

Structure of the User Manual

If you want to get started right away, refer to the brief introduction in ► *Chapter 4 “Quick start”*.

The most important components of your Pedelec are described in detail in the following chapters.

You will find the technical data for your Pedelec Impulse 2.0 Ergo in ► *Chapter 12 “Technical data”*.

The information in this User Manual specifically refers to your Pedelec Impulse 2.0 Ergo. For general information, on the bike technology, for example, refer to the General User Manual (CD).

CD with important information

On the enclosed CD, you will find versions of the User Manual for the Pedelec Impulse 2.0 Ergo in various languages. In addition, the CD also contains the General User Manual with general information on the bike technology.

You can download the latest version of the User Manual from the Internet. There you will also find manuals for the individual bike components.

You can run the CD using any commercially available PC or laptop. Proceed as follows:

METHOD A:

1. Insert the CD.
2. Double-click on the file shelexec.exe using the left mouse button.
3. Select the desired language.
4. Select “Open User Manual from CD” or “Check for new version of User Manual online”.

METHOD B:

1. Insert the CD.
2. Using the mouse, right-click once on: “Open folder to display files.”
3. Double-click on “Start” using the left mouse button.
4. Select the desired language.
5. Select “Open User Manual from CD” or “Check for new version of User Manual online”.

To call up the files, you need the program Adobe Reader. It has been included on the CD or can be downloaded free of charge from www.adobe.com.

If you would like a printed copy of the General User Manual, you can have the document sent to you free of charge by requesting it from the following address:

Derby Cycle GmbH
Siemensstrasse 1-3
49661 Cloppenburg, Germany
+ 49 (4471) 966-0
info@derby-cycle.com



- › Even if you can't wait to go for a ride, in the interest of your own safety you should at least read ➡ *Chapter 1 “Safety”* and ➡ *Chapter 4 “Quick start”* before use.
- › Moreover, we strongly recommend reading this manual and the General User Manual in their entirety.



Keep this User Manual for your information and future reference.

1 Safety

The User Manual contains the following symbols that denote dangers or important information.



WARNING
regarding possible physical injury, increased risk of falls or other injuries.



NOTE
regarding possible damage to property or the environment.



IMPORTANT ADDITIONAL INFORMATION
or special information on using the Pedelec.

1.1 General



- › If children are present, keep a close eye on them, especially if there is a possibility they could insert objects into the motor through apertures in the housing. This poses the danger of fatal electric shock.
- › If you have reason to suspect a safety problem with your Pedelec, do not ride it, and make sure nobody else can use it until you have it checked by a specialist cycle shop. Safe use is not possible if electrical components or the battery show signs of damage.



If you wish to make any adjustments to the ride characteristics of your Pedelec, please consult your specialist cycle shop.

1.2 Statutory requirements



The Pedelec, like all other bikes, must comply with the national regulations for road safety. Please observe the relevant explanations and general information provided in the General User Manual (CD).

These statutory requirements apply for a Pedelec:

- The motor is designed only to provide pedalling assistance, i.e. it can only “assist” the rider when he/she turns the pedals.
- The average motor output must not exceed 250 W.
- As the speed increases, the rate at which the motor output reduces must also increase more intensely.
- The motor must switch off once the bike reaches a speed of 25 km/h.

1.2.1 Requirements for the rider



- You do not legally have to wear a helmet. However, in the interest of your own safety, you should **never** ride without a helmet.
- You do not legally have to have a driving licence.
- You do not legally have to have insurance.
- No age restriction applies for a Pedelec.
- The regulations governing the use of cycle paths are the same as for normal bikes.

These regulations apply to you wherever you are in the European Union. It is possible that different regu-

lations exist in other countries, also inside the EU in individual cases. Before using your Pedelec abroad, find out about the applicable legislation in the relevant country.

1.3 Battery



- Never attempt to repair your battery. Specialists are responsible for performing such repairs. If your battery is damaged, contact your specialist cycle shop. The specialists here will discuss the next steps with you.
- Never transport damaged batteries. The safety of damaged batteries cannot be guaranteed. Scratches and small chips in the housing do not constitute serious damage.
- Have the battery checked at a specialist cycle shop if you have fallen off your Pedelec. You must also consult your specialist cycle shop if the battery has fallen or fallen off. Damaged batteries must neither be charged nor used for another application.
- During the charging process, the battery and charger must be placed on a flat, non-flammable surface. The battery and charger must not be covered to ensure that the hot air produced during the charging process does not accumulate and lead to overheating or even a fire. There must be no highly combustible materials in the immediate vicinity. This also applies when charging the battery on the Pedelec. In this case, you must place the Pedelec so as to prevent any fire from spreading quickly (exercise caution with carpeted floors!).
- Lithium reacts very strongly upon direct contact with water. Caution is therefore required in the case of damaged batteries which have become wet, as they may catch fire.
- Water should be used to extinguish any flames in the immediate vicinity, but not the battery itself. Extinguishers with metal fire powder (Class D) are better suited to this task. If the battery can be safely moved outdoors, the fire can also be suffocated using sand.



- › The battery may heat up during charging. A maximum temperature of 45°C may be reached. If the battery becomes any hotter than this, stop the charging process immediately.
- › The Pedelec operates using extra-low voltage (36 volts). Never attempt to operate the Pedelec using power from a source other than a genuine Pedelec battery. The designations of approved batteries are listed in ► *Chapter 12 “Technical data”*. Only use the original charger provided!
- › When removing the battery from your Pedelec, ensure that it does not fall out. This may cause irreparable damage to the battery housing.

1.4 Motor



- › Bear in mind that the motor can heat up on long ascents. Be careful not to touch it with your hands, feet or legs. You could burn yourself.
- › Live parts may be exposed when you open covers or remove parts. Connection points may also be live. Maintenance or repairs on the motor when it is open must only be carried out by a professional bike workshop.

1.5 Adjustments/maintenance/repair



- › When carrying out adjustments and maintenance or when cleaning, avoid crushing cables or damaging them with sharp edges.
- › Please have all installation and adjustment work carried out by your specialist cycle shop. In case you have to fasten something in place or change something yourself, you will find an exhaustive list at the end of the General User Manual (CD)

detailing the tightening torques which must always be adhered to.

1.6 Transportation of the Pedelec



For the transportation of your Pedelec, we recommend removing the battery from the Pedelec and packaging it separately. A suitable transport container can be obtained from your specialist cycle shop.

1.6.1 The Pedelec and your car

If you transport your Pedelec on a bike rack, ensure that it is designed for the higher weight of a Pedelec. To reduce the load on the rack, and for protection against the weather, the battery must be transported inside the car.

1.6.2 The Pedelec on trains

In Germany, you can take your Pedelec with you on trains which are marked with the bike symbol. On German Intercity (IC) and EuroCity (EC) trains, you must book a place for your bike in advance. As a rule, you may not take bikes with you on German Intercity Express (ICE) trains.

1.6.3 The Pedelec on aeroplanes

Your Pedelec is generally subject to the policies of the respective airline concerning bikes. Batteries are subject to dangerous goods legislation. Therefore, they must not be carried on passenger planes – neither in the cargo hold, nor the cabin. Please contact the relevant airline for detailed information.

Recommendations

Disclaimer

The contents described hereafter are merely recommendations. Liability claims relating to damage or injury caused by the use or disuse of the information presented therein are strictly excluded. It is imperative that illnesses and other physical disorders are brought to the attention of a physician for diagnosis and treatment. The following information in no way serves as a replacement for medical treatment.

Question: For whom is the Impulse Ergo Pedelec particularly suitable?

The Impulse Ergo Pedelec is particularly suitable for people

- with a low endurance capacity.
- who are unable to ride any faster than 25 km/h for an extended period on a flat stretch.
- with medical conditions who have undergone a medical examination and have been instructed by a physician as to the exercise parameters (heart rate ranges) according to which they should train.

Question: What are the possible goals in heart rate-controlled training?

Possible goals include

- improvement in endurance capacity.
- reduction in body fat.
- increased mobility.

Question: What is the intended field of application of the Impulse Ergo Pedelec?

The intended field of application is

- heart rate-controlled training within the range of a preset target heart rate irrespective of the profile of the route (→ Chapter 12 “Technical data”).



If you are unsure, it is imperative that you ask your doctor whether you may use the Impulse Ergo Pedelec.

Question: For which field of application is the Impulse Ergo Pedelec not suitable?

The Impulse Ergo Pedelec is not intended for

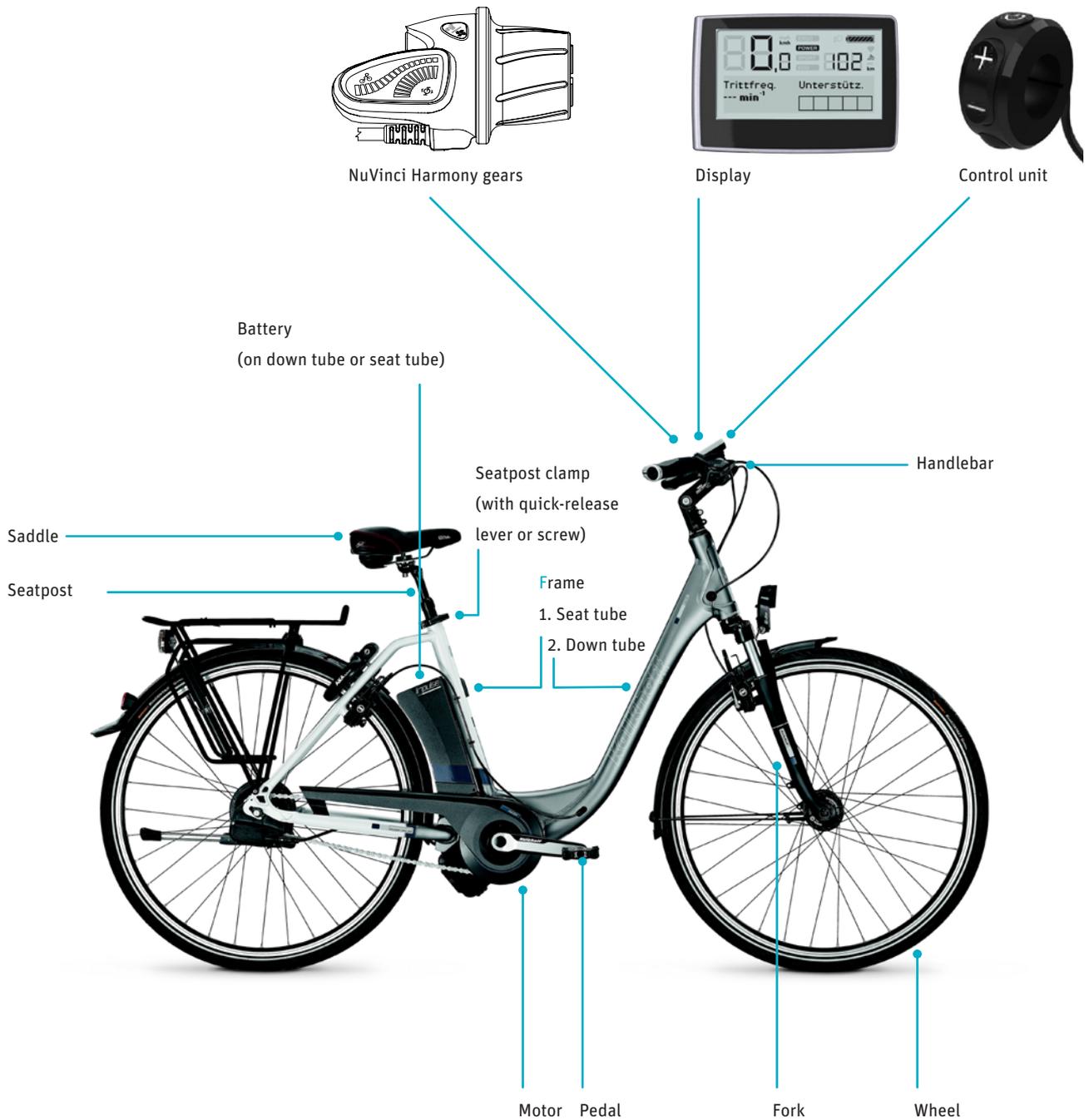
- medical rehabilitation (rehab).

Question: When should I terminate training?

Terminate your ride if

- you begin to feel sick, dizzy or in any way unwell.

2 Components of the Pedelec



Chest belt

3 First steps

3.1 Checking the tightening torques

Check that all screws and important components are fastened securely and correctly. You will find a table with the prescribed tightening torques in ► Chapter 12 “Technical data” of the General User Manual (CD).

3.2 Fitting the pedals

It may be that the pedals for your Pedelec have yet to be fitted on delivery:

The right pedal (marked with an “R”) is screwed clockwise into the right crank arm. The left pedal (marked with an “L”) is screwed anticlockwise into the left crank arm. Both pedals are screwed in tightly in the direction of the front wheel using a size 15 open-ended spanner or a suitable Allen key. The tightening torque is 40 Nm.



If the pedals are not screwed in straight, the thread in the crank arm may be severely damaged.

3.3 Adjusting the saddle height

3.3.1 Clamping bolt

If a torque is specified (in Nm) on the seatpost clamp, tighten the clamping bolt to this torque. If no tightening torque is specified, tighten an M6 bolt (dia. 6 mm) and an M5 bolt (dia. 5 mm) to 5.5 Nm.

3.3.2 Quick-release device

For opening, the quick-release lever must be folded back through 180° – you will see the lettering “OPEN”. For closing, fold the quick-release lever back in through 180° – you will see the lettering “CLOSE”.



Opening the quick-release lever



Closing the quick-release lever



- As a rule of thumb, you can be confident that the saddle clamp is sufficiently secure if the quick-release lever can only be closed using the heel of the hand and a certain level of force. You will feel increasing resistance from the lever, beginning when it is at approx. 90°. If the seatpost is not clamped firmly or securely enough, tighten the clamping nut or turn the screw clockwise by another half a turn respectively while the quick-release lever is open. Close the quick-release lever and check that the saddle is securely fastened once more.
- Check that all quick-release levers are fastened correctly and securely before every journey and every time you return to your bike having left it unattended.
- With regard to the saddle height, there is a simple test procedure: Whilst sitting on the saddle, the heel of your fully-stretched leg should reach the lowest pedal position. By contrast, the balls of your feet should reach the centre of the pedal in the lowest pedal position with your leg bent slightly.

4 Quick start

1. Charge the battery completely before riding for the first time. Charge temperature: 0°C to 45°C.



SEAT TUBE BATTERY
Charging the battery

2. Remove the cover from the charging socket.
3. Connect the plug of the charger to the battery.



DOWN TUBE BATTERY



SEAT TUBE BATTERY

Charging the battery

4. Plug the charger in at the wall socket.



- › You must charge the battery completely before using it for the first time. Depending on the manufacturer of the cells, the batteries will have a charge state of between 30 and 50%.
- › You can also remove the battery from your Pedelec and charge it elsewhere. For more information, refer to ➔ Chapter 5 “Battery”.

5. Once all of the battery LEDs have gone out, the battery is fully charged. Pull the plug of the charger out of the charging socket and unplug the charger at the wall socket.
6. a) **Down tube battery:** If you removed the battery for charging, replace it in the holder from the front/above. At the same time, the key must be in the lock and must be turned anticlockwise. Press the battery down into the holder until the locking mechanism engages.

6. b) **Seat tube battery:** If you removed the battery for charging, reinsert the battery into the holder on the Pedelec from the left-hand side. Tilt the battery outwards at an angle of roughly 45° as you do so. Swivel the battery into the upright position until the locking mechanism engages. Now turn the key clockwise and remove it. The battery is now locked in place.



DOWN TUBE BATTERY



SEAT TUBE BATTERY

Installing the battery

7. Now turn the key clockwise and remove it. The battery is now locked in place.



DOWN TUBE BATTERY



SEAT TUBE BATTERY

Locking the battery

8. Make sure that the battery is securely positioned and that the key is no longer in the lock.
9. Press the  button on the control unit to switch on the drive system.
10. a) **Pedelec without backpedal function:** After the welcome screen, the display shows the power-assist mode that was last set. Press the / buttons to select the level of assistance: *ECO* (low), *SPORT* (medium), *POWER* (high), *ERGO* (heart-rate-controlled) or no assistance. Pressing once changes the level of assistance by one level. This works both ways, depending on which of the buttons you press.

10. b) **Pedelec with backpedal function:** After the welcome screen, the display shows “Please move the pedals”. This instruction will disappear as soon as you start riding. Press the ⊕/⊖ buttons to select the level of assistance: *ECO* (low), *SPORT* (medium), *POWER* (high), *ERGO* (heart-rate-controlled) or no assistance. Pressing once changes the level of assistance by one level. This works both ways, depending on which of the buttons you press.



If you cannot feel any assistance, simply backpedal briefly and then pedal forwards again to trigger the system check. If there is still no assistance being delivered, the instruction “Please move the pedals” will continue to be displayed. In this case you should consult your specialist bike shop.

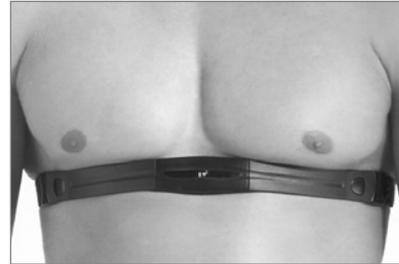
11. You can now ride off just as you would if you were riding a normal bike. The motor starts providing assistance as soon as the rear wheel starts turning.



From the first moment, you have full assistance. This is unfamiliar but comfortable. Practice starting up in a safe location before venturing into the road traffic.

4.1 Riding in the ERGO power-assist mode

1. Follow steps 1 to 9 in ➡ *Chapter 4 “Quick start”*.
2. Put on the chest belt supplied. Ensure that it does not slip and that the electrodes are always in contact with the skin.



Chest belt



Moisten the reverse of the chest belt with electrode gel or water before putting it on.

3. Navigate to the ERGO power-assist mode using the ⊕/⊖ buttons. The notification “Determine heart rate ...” appears on the display.



As soon as the heart rate is displayed, you can adjust the settings further.





If the display does not detect the chest belt, the prompt “Please put on chest belt” appears.



In this case, please refer to [Chapter 10 “Troubleshooting”](#) to find out how to rectify this problem.

- Now press the **SET** button for a minimum of four seconds. You are taken to the menu sub-items.
- Navigate to the menu sub-item “ERGO settings” using the **+**/**-** buttons. Press the **SET** button.



Now you can set both **a. the target heart rate** and **b. the warning heart rate**. Navigate to the desired item using the **+**/**-** buttons and press the **SET** button.



Setting the target heart rate:

- Select your optimal **target heart rate** using the **+**/**-** buttons.
- Press the **SET** button.



Observe the following points to determine your optimal target heart rate:

- If necessary, you should undergo a sports-medical exercise test on a bicycle ergometer in order to determine your performance level and physical condition (ask your health insurance provider whether they will bear the cost of such a test).
- If no data from sports-medical tests is available, then you should use the following table as a guide:

AGE	TARGET HEART RATE	AGE	TARGET HEART RATE
20	125	55	110
25	123	60	107
30	121	65	105
35	119	70	103
40	116	75	100
45	114	80	98
50	112	85	96

Heart rates differ from person to person. Variations occur as a result of illness (such as functional disorders of the thyroid gland), for example, or the intake of bradycardia- or tachycardia-inducing medication (such as digitalis, calcium antagonists or beta blockers).

Setting the warning heart rate:

1. Select your optimal **warning heart rate** using the \oplus/\ominus buttons.
2. Press the SET button.



With a target heart rate in the range of the basic endurance, a warning heart rate of 10 beats (target heart rate + 10) is recommended. This means: If the target heart rate is exceeded by 10 beats, an acoustic warning signal sounds immediately, which repeats every six seconds. If the target heart rate is exceeded by 15 beats, two acoustic warning signals sound, which repeat every five seconds. If the target heart rate is exceeded by a minimum of 20 beats, three acoustic warning signals sound, which repeat every four seconds.

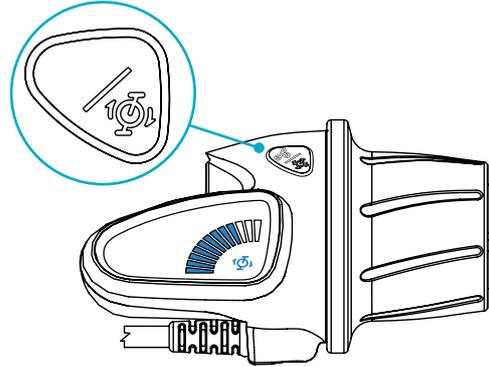
6. Once you have set the target and warning heart rates, you can navigate to the item “Back” using the \oplus/\ominus buttons.



7. Pressing the SET button will take you back to the menu sub-items.



8. Now you can adjust the settings further under the other menu sub-items \Rightarrow Chapter 7.3 “Programming and settings” or navigate to the item “Back” using the \oplus/\ominus buttons. Pressing the SET button takes you back to the main menu.
9. Now switch your NuVinci Harmony gears to automatic mode. As soon as you move the twist-grip shifter, the gears switch on. Press the motor symbol on the mode button.



Automatic selection of the pedalling cadence



In order to effectively maintain a steady heart rate whilst riding, we recommend the automatic mode. Because as soon as you start to ride in manual mode, you have to shift gear manually to ensure that you do not exceed your target heart rate.

10. Set the desired pedalling cadence using the twist-grip shifter. The further forward you move the twist-grip shifter, the faster the pedalling cadence becomes. The number of boxes lit up in blue increases. The further back you move the twist-grip shifter, the slower the pedalling cadence becomes. The number of boxes lit up in blue decreases. Once you have found your ideal pedalling cadence, you can ride without even having to change gear once. The automatic mode adapts the gear ratio to the pedalling cadence you have set.



- When the bike is stationary, you cannot switch from minimum to maximum pedalling cadence, or vice versa. You can only do this whilst riding.
- If you cannot feel any assistance, simply back-pedal briefly and then pedal forwards again to trigger the system check. If there is still no as-

sistance being delivered, the instruction “Please move the pedals” will continue to be displayed. Consult your specialist cycle shop

11. You can now ride off just as you would if you were riding a normal bike. The motor starts providing assistance as soon as you begin to pedal.



From the first moment, you have full assistance. This is unfamiliar but comfortable. Practice starting up in a safe location before venturing into the road traffic.



- › As you begin your ride, it is highly probable that your actual heart rate is below your target heart rate. You receive very little assistance from the drive or none at all. You move your Pedelec either totally or almost exclusively by means of your own effort. As a result, your heart rate rises and you keep moving closer to your target heart rate. If you have reached your target heart rate or even exceeded it, the motor provides assistance according to the riding situation. You can call up the output delivered by your motor in the information area.

➡ Chapter 7.2 “Display”



- › Riding steadily for extended periods allows the ERGO system to learn how you handle the bike and adapt better to your own personal handling style and the behaviour of your heart rate. It may take some time to do so and the system must “learn” these behaviours all over again if the ERGO settings are readjusted.

Observe the following points to avoid major short-term variations in your heart rate:

- › Pedal evenly with a constant level of effort.
- › If you come to a hill, do not try to maintain the same speed. But do try to maintain the same level of physical effort. Of course, your speed decreases as the incline becomes steeper
- › Do not sprint when riding.

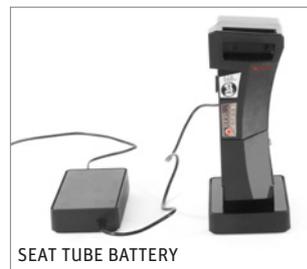
5 Battery

Your battery is a lithium-ion battery, the ideal type for this application. One of the main benefits is its low weight combined with a high capacity.

5.1 Charging the battery

You can charge the battery whilst it is on the Pedelec ➡ Chapter 4 “Quick start”.

Alternatively, you can take the battery out of its holder and charge it in a separate location. This is recommended if it is cold outside, in order to charge the battery in a warmer room. The battery can be charged at temperatures between 0°C and 45°C.



Battery in the charger

5.1.1 Removing the battery

1. Grip the battery by the handle, insert the key into the lock and turn it anticlockwise. The battery is now unlocked.



Unlocking the battery

2. a) **Down tube battery:** Grip the battery with both hands and lift it forwards/upwards out of its holder. Hold the battery tight to avoid dropping it. Place the battery down on a suitable surface, which should be dry, flat and non-flammable.
2. b) **Seat tube battery:** Grip the battery by the handle and remove it from the Pedelec by tilting it sideways. Hold the battery tight to prevent it from falling out.



Removing the battery

3. You should now remove the key and keep it in a safe place to prevent it from breaking off or being lost.

5.1.2 Charging the battery



Before charging the battery, read the information on the charger carefully.

1. a) **Down tube battery:** Take the charger provided out of its packaging and plug it in at the wall socket (230–240 V).

1. b) **Seat tube battery:** Take the charger provided and the docking station out of their packaging and plug the mains plug into a socket (230–240 V). Connect the charger to the docking station. The LED in the charger now lights up briefly in red and then permanently in green.



- To charge the battery safely, the charger must be placed on a suitable surface, which should be dry and non-flammable.
- **Seat tube battery:** The charger must stand on its four feet. This is essential to ensure that the hot air from the ventilation slots can dissipate.

2. a) **Down tube battery:** Connect the plug of the charger to the battery.
2. b) **Seat tube battery:** Put the battery in the holder of the docking station. The LED in the charger lights up in green.



SEAT TUBE BATTERY
Charging the battery

3. a) **Down tube battery:** Charging begins. If your charger has an LED, this lights up red. The battery is charged in five stages. When charging of one stage is in progress, the corresponding LED flashes. If this stage has been fully charged, the LED will light up permanently. Now the next LED will begin to flash. After all five LEDs have gone out, the battery is fully charged.
3. b) **Seat tube battery:** Charging begins. The LED of the charger lights up in green. The battery LEDs light up one by one to indicate the progress of charging. The battery is charged in five stages. When charging of one stage is in progress, the corresponding LED flashes. If this stage has been fully charged, the LED will light up permanently. Now the next LED will begin to flash. After all five LEDs have gone out, the battery is fully charged.



If your charger has an LED, it may be that this flashes red permanently. This indicates a charging fault. Take the battery out of the charger, then put it back in. The charger tests the battery and performs readjustments, if required. If the LED on the charger still flashes, take the charger and battery to your specialist cycle shop who will test the device and replace it, if required.

4. To save power, pull the charger plug out of the socket once the charging operation is complete.



- Damaged batteries must not be charged, and further use is not permitted.
- The battery may heat up during charging. A maximum temperature of 45°C may be reached. If the battery becomes any hotter than this, stop the charging process immediately.



- There is no memory effect, so you can top up your battery after every trip. Then you are always ready for the off.
- Ideally you should charge the battery at a temperature of between +10°C and +30°C. It takes longer to charge the battery at low temperatures, while the battery will not charge up at temperatures higher than +45°C. Ideally, you should charge and store the battery inside your house or in a warm garage when the outside temperature is low. In this case, you should only fit the battery onto your bike just before using it.

5.1.3 Installing the battery

1. a) **Down tube battery:** Insert the battery into the battery holder of the Pedelec from the front/above. At the same time, the key must be in the lock and must be turned anticlockwise.
1. b) **Seat tube battery:** Insert the battery into the holder of the Pedelec from the left by tilting it outwards at roughly 45°.



Installing the battery

2. Press the battery down into the holder until the locking mechanism engages. Now turn the key clockwise and remove it. The battery is now locked in place.



DOWN TUBE BATTERY



SEAT TUBE BATTERY

Locking the battery

3. Make sure the battery is firmly in place.

5.2 Battery information system

There is a display panel on the outer face of the battery which includes five LEDs and a battery key | push button. The LEDs light up as soon as you press the battery key | push button. The charge state and capacity of the battery is indicated by the number of LEDs that light up and the way in which they light up.



DOWN TUBE BATTERY
Battery key



SEAT TUBE BATTERY
Push button

5.2.1 Checking the charge state

a) **Down tube battery:** Press the battery key briefly. The LEDs light up and display the current battery charge state.

DISPLAY	BATTERY CHARGE STATE	
•••••	5 LEDs light up	100-80%
••••	4 LEDs light up	80-60%
•••	3 LEDs light up	60-40%
••	2 LEDs light up	40-20%
•	1 LED lights up	20-10%
◦	1 LED flashes	10-0%

b) **Seat tube battery:** Press the push button briefly. The LEDs light up and display the current battery charge state.

SEAT TUBE BATTERY DISPLAY	BATTERY CHARGE STATE	
•••••	5 LEDs light up	100-84%
••••	4 LEDs light up	83-68%
•••	3 LEDs light up	67-51%
••	2 LEDs light up	50-34%
•	1 LED lights up	33-17%
◦	1 LED flashes	16-0%
◦◦◦◦◦	5 LEDs flash quickly	0% or overloaded *
◦	1st LED flashes quickly	Charging fault **

* All 5 LEDs flash quickly: The battery is a) empty and is being switched off, or is b) overloaded.

- a) If the battery is overloaded, it will switch back on after a short idle period and can then be used normally.
- b) If the battery is empty, it will work again briefly following a short period of rejuvenation and will then switch back off. It must now be charged.

** The 1st LED flashes quickly: a charging fault.

If this occurs, put the battery in the docking station for a short period of time or insert the plug of the charger into the battery. The charger performs a readjustment. If the LED still flashes, take the battery to your specialist cycle shop.

5.2.2 Checking the capacity

a) **Down tube battery:** If you hold down the battery button for roughly five seconds, the LEDs show the current battery capacity. If the LED in the largest panel lights up, then the battery has a capacity of over 60%. If the capacity is below 60%, this is indicated via the smallest LED. Only one of the two LEDs can light up at any one time.

b) **Seat tube battery:** If you press the push button for five seconds, the LEDs show the current capacity of the battery.

SEAT TUBE BATTERY DISPLAY	CAPACITY	
•••••	5 LEDs light up	100-97%
••••	4 LEDs light up	96-80%
•••	3 LEDs light up	79-60%
••	2 LEDs light up	59-40%
•	1 LED lights up	39-20%
◦	1 LED flashes	< 20%



The range of the battery is less in winter due to the lower temperatures. Only move the battery (from the warm room where you store it) and fit it on your Pedelec just before you set off. This will help to prevent the effect of the low temperature on the range of the battery. ➔ Chapter 1.1 "General."

5.3 Battery management

The battery management monitors the temperature of your battery and warns you of incorrect use.



- › If an external short-circuit has been caused at the contacts or the charging socket, please consult your specialist cycle shop.
- › Never leave the battery unattended during charging. Disconnect the charger after use.

5.3.1 Sleep mode

The battery management switches the battery to sleep mode to prevent a so-called deep discharge. At the latest, the battery management activates the sleep mode after ten days without use. The system exits sleep mode when you connect the battery to the charger or press the battery key | push button on the battery.

5.4 Warranty and service life

Batteries are wear parts. Wear parts come with a two-year warranty.

If a fault occurs during this period, your specialist cycle shop will replace the battery. Normal ageing and battery wear do not constitute a fault.

The service life of the battery depends on different factors. The most important wear-relevant factors are:

- The **number of charges**

After 1,100 charging cycles, your battery will still have 60% of its initial capacity, providing it has been well looked after. This means 6.6 Ah in an 11 Ah battery and 7.2 Ah in a 15.5 Ah battery. A charging cycle is defined as the sum of the individual charges until the battery has been charged to full capacity once.

For example: You charge the battery with 5 Ah on the first day, 2 Ah on the second day and 4 Ah on the third day; the sum is 11 Ah. The battery has thereby completed one charge cycle.

According to the technical definition, the battery is exhausted when less than 60% of the initial capacity is available. If you can still ride the distances you require with the remaining battery capacity, you can of course continue using it. If the capacity is no longer sufficient, you can take your battery to a specialist cycle shop, which will dispose of your battery and sell you a new one.

- The **age** of the battery

A battery also ages during storage.

An 11 Ah battery with lithium-ion cells loses around 4–5% of its initial capacity each year. A 15 Ah battery with lithium-nickel-cobalt-aluminium-oxygen cells around 2–3%.

This means that even if you do not use your battery, its capacity reduces. With everyday use, you can expect the battery to age by approximately 3–5% per year as a result of ageing and charging processes.

Ensure that the battery does not become too hot. The rate at which the battery ages increases significantly at temperatures above 40°C. Direct sunlight can heat the battery considerably. Be sure not to leave the battery in a hot car, and always stand your Pedelec in the shade during breaks in cycle trips. If you cannot prevent exposure to heat, do not charge the battery until it has cooled down.

A fully charged battery ages at an even greater rate than a partially charged one at high temperatures.

- If you always ride with maximum motor output, your motor will always require a higher current. Higher currents cause the battery to age more quickly.

- You can also extend the service life of the battery by using the assistance selectively. Use a low assist level when riding. With lower discharge currents, you conserve your battery.



Make sure that the battery is fully charged before you ride your bike for the first time or if you have not used it for a while.

5.5 Storage

If you do not need your battery for a while, store it at a temperature of +10°C at 50–70% of its full charge capacity. If you do not use the battery for six months, you must recharge it.

5.6 Shipping



Never send your battery by post or courier! A battery is a hazardous article which can overheat and catch fire in certain conditions.

The preparation and shipping of a battery may only be carried out by trained personnel.

If you would like to return your battery for repair or replacement, please always arrange this via your specialist cycle shop. Specialist cycle shops can have the battery picked up free of charge and in compliance with dangerous goods legislation.

5.7 Disposal

Batteries must not be disposed of with domestic waste. Consumers are legally bound to dispose of used or damaged batteries at the locations designated for the purpose (battery collection point or specialist cycle shop).

6 Charger



If used incorrectly, the charger may be damaged or cause injury.

- Only use the charger in dry rooms.
- Only place the charger in a secure, stable position on a suitable surface.
- Do not cover the charger or place any objects on it, as otherwise it could overheat and catch fire.



- Do not use any other charger. Only charge your battery using the charger provided, or a charger approved by us.
- Read the type plates on the charger before using it for the first time.

You can charge your Pedelec Impulse 2.0 Ergo directly via a charging socket in the battery. The battery can remain on the Pedelec whilst the charging operation is in progress.



SEAT TUBE BATTERY
Charging the battery

Alternatively, you can take the battery out of its holder and charge it elsewhere. This is recommended if it is cold outside, in order to charge the battery in a warmer room. The battery can be charged at temperatures between 0°C and 45°C.



SEAT TUBE BATTERY
Battery in the docking station



If a charging fault occurs, the LED (where present) in the charger flashes red. In this case, the charging current is too high. Disconnect the battery from the charger and then connect it again. If the error message still appears, the battery and charger must be checked by a specialist cycle shop.

7 Control unit and display

The Pedelec Impulse 2.0 Ergo can be controlled via two elements: the control unit on the handlebar grip and the display in the middle of the handlebar.

7.1 Control unit



Press the  button to switch the system on and off. Buttons 2 to 4 have different functions depending on the menu item you have selected.

7.1.1 Switching on/off

Press the  button on the control unit to switch the Impulse system on. After a few seconds, the welcome screen appears, followed by the start menu. From there you can carry out further settings ➔ Chapter 1.1 “General”.



After switching on, the system is always in the same display mode as when you last switched it off.

To switch your Pedelec off, press the  button on the control unit in the start menu.

7.1.2 Pushing assistance

The pushing assistance moves the Pedelec slowly (at a maximum speed of 6 km/h) without you having to turn the pedals, e.g. if you are manoeuvring in a tight space or are pushing your Pedelec out of a basement garage.

To activate the pushing assistance, press the  button for three seconds.



The pushing assistance is not suitable for use as starting assistance.

7.1.3 buttons

- You can specify the power-assist level via the  buttons.
- Each time you press one of these two buttons, the power assist changes by one level. If you press the  button once, the level of assistance increases by one level. If you press the  button once, the assistance becomes weaker by one level.

7.2 Display



- 1 Speed
- 2 Power-assist mode
- 3 Battery charge state
- 4 Remaining range
- 5 Information area

The display in the middle of the handlebar is divided into five different display fields.

- At the top on the left is your current **1** speed.
- To the right of the current speed is a display showing the selected **2** power-assist mode ➔ *Chapter 7.2.1.*
- At the top on the right is the **3** battery symbol which tells you the current battery charge state of your Pedelec ➔ *Chapter 7.2.2.*
- Below this the remaining **4** range is displayed ➔ *Chapter 7.2.3.*
- Along the bottom section of the display is a long **5** **information area** that can be used to call up the following information:



You can switch between the various displays in the information area by pressing the **⊕/⊖** button in the main menu.

- How much of its potential output the motor is currently delivering.
- The costs incurred in the course of the current trip and during the entire service life.
- The savings achieved in both euros and CO₂ in comparison with the same journey by car.
- Total number of kilometres covered.
- Kilometres covered during the day and overall.

- Journey time during the current trip and the top speed reached on this trip.
- Average speed during the current trip and the total distance covered.

7.2.1 Assistance indicator

The display shows you how much assistance the motor is currently providing.

DISPLAY	ASSISTANCE
<ul style="list-style-type: none"> ERGO POWER SPORT ECO 	The level of assistance depends on your heart rate.
<ul style="list-style-type: none"> ERGO POWER SPORT ECO 	This means the assistance is working hard.
<ul style="list-style-type: none"> ERGO POWER SPORT ECO 	This means the assistance is working at medium output.
<ul style="list-style-type: none"> ERGO POWER SPORT ECO 	This means the assistance is working at low output.
<ul style="list-style-type: none"> ERGO POWER SPORT ECO 	No assistance. Battery indicator is still lit.

Use the **⊕/⊖** buttons to switch between the individual power-assist modes.

7.2.2 Battery charge state indicator

The battery charge state indicator is located at the top right of the display. Using a battery symbol divided into seven segments, it shows the charge remaining in the battery. The lower the charge state of the battery, the fewer segments are displayed.

DISPLAY	BATTERY CHARGE STATE
	100-85.5%
	85.5-71.5%
	71.5-57.5%
	57.5-42.4%
	42.5-28.5%
	28.5-14.5%

If the battery charge state falls below a minimum level, the motor assistance switches off. Then the entire display fades and goes off, too.



If you do not use your Pedelec for ten minutes, the system switches off automatically. If you then want to ride using the assistance, you will have to switch it back on via the control unit.

7.2.3 Remaining range indicator

Below and to the right of the battery charge state indicator, the distance in km over which you can still travel with power assist is displayed. This is the remaining range indicator.



If the riding conditions change, for example, when you come to a hill after a long, flat stretch, the value displayed can also change at short notice. Please consider this factor when planning your trips. You are probably familiar with this effect from the remaining range indicator of your car. The remaining range de-

pends on the current battery charge state and the assist mode which has been set (ERGO, POWER, SPORT or ECO).

7.2.4 Units

Press and hold the  button for three seconds to switch between kmh (speed)/ km (remaining range indicator) and mph/mi.

7.3 Programming and settings

After switching on the Impulse system, you can switch from the main menu to the menu sub-items, by pressing the  button for three seconds.

This takes you to the menu sub-items:

- Drive data → Chapter 1.2.1
- Delete trip data → Chapter 7.3.2
- Delete overall data → Chapter 7.3.3
- Device settings → Chapter 7.3.4
- Personalize → Chapter 7.3.5
- Target cost → Chapter 7.3.6
- ERGO settings → Chapter 7.3.7
- Back

You can select the menu sub-items using the / buttons on the control unit. Confirm your selection by pressing the  button. The respective contents are then displayed for you. To return to the main menu display from the menu sub-items, you must select “Back” and confirm by pressing the  button. You can also return to the main menu by pressing and holding the  button for three seconds.

7.3.1 Drive data

The following data are displayed in the menu sub-item “Drive data”:

- Trip (in km)
- Trip time (in 00:00:00)
- Trip max (in km/h)
- Trip Ø (in km/h) = Trip average
- Trip cost (in €)
- Tour (in km)
- Tour Ø (in km/h) = Tour average
- Tour cost (in €)
- Overall (in km)
- Overall savings (in €)
- Tot. sav. CO2 (in kg)
- Back

Select the desired item using the ⊕/⊖ buttons. The selected item is highlighted in bold. Confirm your selection by tapping the Ⓢ button. This takes you back to the menu sub-items.

7.3.2 Delete trip data

Under the menu sub-item “Delete trip data”, you can delete the kilometres indicated for the current day trip. The following question appears on the display: “Confirm delete?”, and below it “Yes” or “No”. Select one of these using the ⊕/⊖ button. Your selection is highlighted in bold. Confirm your selection by tapping the Ⓢ button. This takes you back to the menu sub-items.

7.3.3 Delete overall data

Under the menu sub-item “Delete overall data”, you can delete the total kilometres covered. The following question appears on the display: “Confirm delete?”, and below it “Yes” or “No”. Select one of these using the ⊕/⊖ button. Your selection is highlighted in bold. Confirm your selection by tapping the Ⓢ button. This takes you back to the menu sub-items.

7.3.4 Device settings

Under the menu sub-item “Device settings”, you can select the following items by pressing the ⊕/⊖ button:

- Display ➡ Chapter 7.3.4.1
- Drive ➡ Chapter 7.3.4.2
- Miscellaneous ➡ Chapter 7.3.4.3
- Back

Confirm your selection by tapping the Ⓢ button.

7.3.4.1 Display

Choose from the following using the ⊕/⊖ button:

- Contrast
- Brightness
- Language
- Unit
- Back

Confirm your selection by tapping the Ⓢ button.

Contrast: You can select the following values using the ⊕/⊖ button:

Very low contrast	-35%
	-30%
	-25%
	-20%
	-15%
	-10%
	-5%
Average	Standard
	5%
	10%
	15%
Very high contrast	20%

The change in contrast is implemented immediately. Tapping the Ⓢ button confirms your selection and then takes you back to the menu sub-item display.

Brightness: You can select the following values using the ⊕/⊖ button:

Very bright	-50%
	45%
	40%
	35%
	30%
Average	Standard
	5%
	10%
	15%
Very dull	20%

The change in brightness is implemented immediately. Pressing the Ⓢ button confirms your selection and then takes you back to the menu sub-item display.

Language: You can choose to have the information shown on the display in the following languages:

- Deutsch
- English
- Francais
- Nederlands
- Espanol
- Italiano
- Suomi
- Dansk

Select a language using the \oplus/\ominus buttons. Tapping the SET button confirms your selection and takes you back to the menu sub-item display.

Unit: Under the item “Unit”, you can choose whether the distance travelled and speed are displayed in kilometres (km) or miles (mi). Use the \oplus/\ominus buttons to choose between kilometres (km) or miles (mph). Tapping the SET button confirms your selection and then takes you back to the menu sub-item display.

7.3.4.2 Drive

Choose from the following using the \oplus/\ominus button:

- Wheel circumference
- Shift Sensor
- Climb Assist
- Back

Confirm your selection by tapping the SET button. This takes you back to the menu sub-item display.

Wheel circumference: You can set the “wheel circumference” to any value between **1540 mm** and **2330 mm** by pressing the \oplus/\ominus buttons on the control unit. Tapping the SET button confirms your selection and then takes you back to the menu sub-item display.



A change to the setting becomes necessary, for example, when you have the tyres on your Pedelec exchanged for some of a different size. In order to display the correct data, the new wheel circumference must be entered.

Shift Sensor: Choose from the following values using the \oplus/\ominus button:

OFF	50 ms	100 ms	150 ms	200 ms	250 ms	300 ms
-----	-------	--------	--------	--------	--------	--------

Confirm your selection by tapping the SET button.



The Shift Sensor recognises gear shifting and imperceptibly interrupts the power assist for fractions of a second. This enables you to move more smoothly and considerably faster through the gears. The higher the value you set, the longer the assistance is interrupted for, and the more time there is for shifting gears.

Climb Assist: Choose from the following values using the \oplus/\ominus button:

1	2	3	4	5	6	7
---	---	---	---	---	---	---

Confirm your selection using the SET button.



You can influence the response time of the power sensor with the Climb Assist. The lower the value you set, the less responsive the system becomes. The higher the value you set, the more dynamic the system becomes, but beware a yo-yo effect.

7.3.4.3 Miscellaneous

Choose from the following using the \oplus/\ominus button:

- Factory settings
- Software
- Back

Confirm your selection by tapping the SET button.

Factory settings: The following question appears: “Restore factory settings?”. Select “Yes” if you wish to reset the system to its original settings. Select “No” if you wish to retain all the settings you have made. Confirm your selection by tapping the SET button.

Software: This takes you to the items:

- Version
- Update
- Back

Make a selection using the \oplus/\ominus button, then confirm and go to that item by tapping the SET button.

- Version: Here the current software version of the motor is displayed.
- Update: Here you can bring the software up to date. Your specialist cycle shop will perform a software update.

7.3.5 Personalize

Choose from the following using the \oplus/\ominus button:

- Name
- SET-Favourites
- Back

Confirm your selection by tapping the SET button.

Name: Under the sub-item “Name”, you can enter a name or other text with a maximum of 21 characters which will be displayed when the display is turned on and off. Navigate using the \oplus/\ominus button and select the desired character. Tap the SET button briefly. Create your text from the following characters:



Display capital letters



The use of spaces is not possible, so underscores must be used in their place.



Display lower case letters

SET-Favourites: Navigate using the \oplus/\ominus buttons. Deselect or confirm the selection of the following items by tapping the SET button:

- Trip max/ \emptyset = Trip max/ave.
- Tour km/ \emptyset = Trip km/ave.
- Cadence/Assistance

- Power cost
- Total saving
- Total km
- Back

7.3.6 Target cost

Via the menu sub-item “Target cost”, you can access the sub-items:

- Fuel price
- Fuel consumption \emptyset
- Fuel type
- Power cost
- Back

You can select the sub-items using the \oplus/\ominus buttons. Pressing the SET button takes you to the respective sub-item. Select “Back” and confirm with the SET button to return to the menu sub-item display.



The fuel price, average consumption and fuel type need to be entered to enable calculation of the money and CO₂ saved in comparison with the use of a car. This is displayed in the main menu of the information area under “Overall savings” \rightarrow Chapter 7.2.

Fuel price: Under the sub-item “Fuel price”, you can specify the price of petrol or diesel in euros and cents. You can set this to a value in euros between 0 and 9 euros and a value in cents between 0 and 99 cents by using the \ominus buttons on the control unit to move in 1-euro and 1-cent steps respectively. Once you have confirmed both values by pressing the SET button, this takes you back to the menu sub-item display.

Fuel consumption \emptyset : You can enter the average fuel consumption for driving a car in half-litre steps from 0 to 20 litres. Navigate using the \oplus/\ominus buttons. Pressing the SET button confirms your selection and then takes you back to the menu sub-item display.

Fuel type: Under the sub-item “Fuel type”, you can choose “Petrol” or “Diesel” by pressing the \oplus/\ominus buttons. Pressing the SET button confirms your selection and then takes you back to the menu sub-item display.

Power cost: Under the sub-item “Power cost”, you can specify the price of electricity from 0 to 99 cents (ct) using the \oplus/\ominus buttons on the control unit to move in 1-cent

steps. Pressing the  button confirms your selection and then takes you back to the menu sub-item display.

7.3.7 ERGO settings

Via the menu sub-item “ERGO settings”, you can access the sub-items:

- Target heart rate
- Warning heart rate
- Back

You can select the sub-items using the / buttons on the control unit. Pressing the  button takes you to the respective sub-item. By selecting the sub-item “Back” and pressing the  button to confirm, you are taken to the menu sub-item display once more.

7.3.7.1 Target heart rate

Under the sub-item “Target heart rate”, you can set your optimal target heart rate. This can be set to a value of between 40 and 240 by pressing the two / buttons on the control unit. Pressing the  button confirms your selection and then takes you back to the menu sub-item display.



Observe the following points to determine your optimal target heart rate:

- › If necessary, you should undergo a sports-medical exercise test on a bicycle ergometer in order to determine your performance level and physical condition.
- › If no data from sports-medical tests is available, you should use the following table as a guide:

AGE	TARGET HEART RATE	AGE	TARGET HEART RATE
20	125	55	110
25	123	60	107
30	121	65	105
35	119	70	103
40	116	75	100
45	114	80	98
50	112	85	96

Heart rates differ from person to person. Variations occur as a result of illness (such as functional disorders of the thyroid gland), for example, or the intake of bradycardia- or tachycardia-inducing medication (such as digitalis, calcium antagonists or beta blockers).

7.3.7.2 Warning heart rate

Under the sub-item “Warning heart rate”, you can set your optimal warning heart rate. You can set this to a value of between “Target heart rate + 5” and “Target heart rate + 20” by using the two / buttons on the control unit. Pressing the  button confirms your selection and then takes you back to the menu sub-item display.

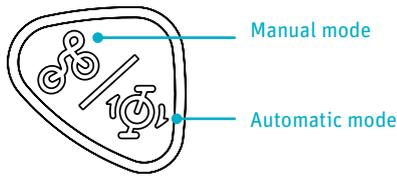


With a target heart rate in the range of the basic endurance, a warning heart rate of 10 beats (target heart rate + 10) is recommended. This means: If the target heart rate is exceeded by 10 beats, an acoustic warning signal sounds immediately, which repeats every six seconds. If the target heart rate is exceeded by 15 beats, two acoustic warning signals sound, which repeat every five seconds. If the target heart rate is exceeded by a minimum of 20 beats, three acoustic warning signals sound, which repeat every four seconds.

8 NuVinci Harmony gears

As soon as you operate the twist-grip shifter or start riding, the NuVinci Harmony gears switch on.

Now decide whether you prefer manual or automatic operation of the NuVinci Harmony gears. Press the mode button to switch to the desired mode.



Mode buttons



We recommend the automatic mode for riding in the ERGO power-assist mode. Because as soon as you start to ride in manual mode, you have to shift gear manually to ensure that you do not exceed your target heart rate.

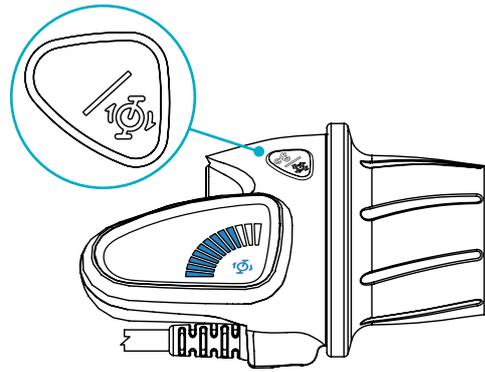
8.1 Automatic mode

Set the desired pedalling cadence using the twist-grip shifter.



The pedalling cadence is the number of crank revolutions within a specific period of time when riding.

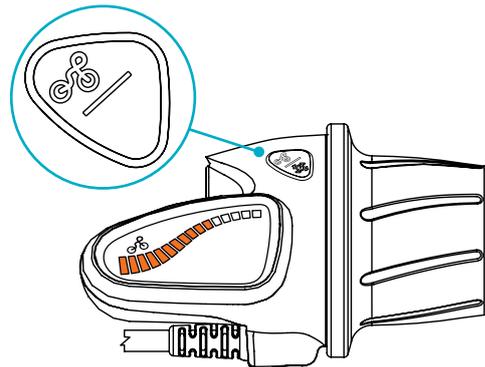
You can choose between 12 different pedalling cadences. The further forward you move the twist-grip shifter, the faster the pedalling cadence becomes. The number of boxes lit up in blue increases. The further back you move the twist-grip shifter, the slower the pedalling cadence becomes. The number of boxes lit up in blue decreases. The blue LEDs indicate the exact setting. Once you have found your ideal pedalling cadence, you can ride without even having to change gear once. The automatic mode adapts the gear ratio to the rider's preferred pedalling cadence.



Automatic selection of the pedalling cadence

8.2 Manual mode

Set the desired pedalling cadence using the twist-grip shifter. You can choose between 12 different pedalling cadences. The further forward you move the twist-grip shifter, the faster the pedalling cadence becomes. The number of boxes lit up in orange increases. The further back you move the twist-grip shifter, the slower the pedalling cadence becomes. The number of boxes lit up in orange decreases. The orange LEDs indicate the exact setting.



Manual selection of the pedalling cadence



You cannot shift through the entire gear ratio range of the NuVinci Harmony gears when the bike is stationary. If you shift between gear ratios with a large differential when the bike is stationary, the Harmony system will wait for the pedals or the bike to move.

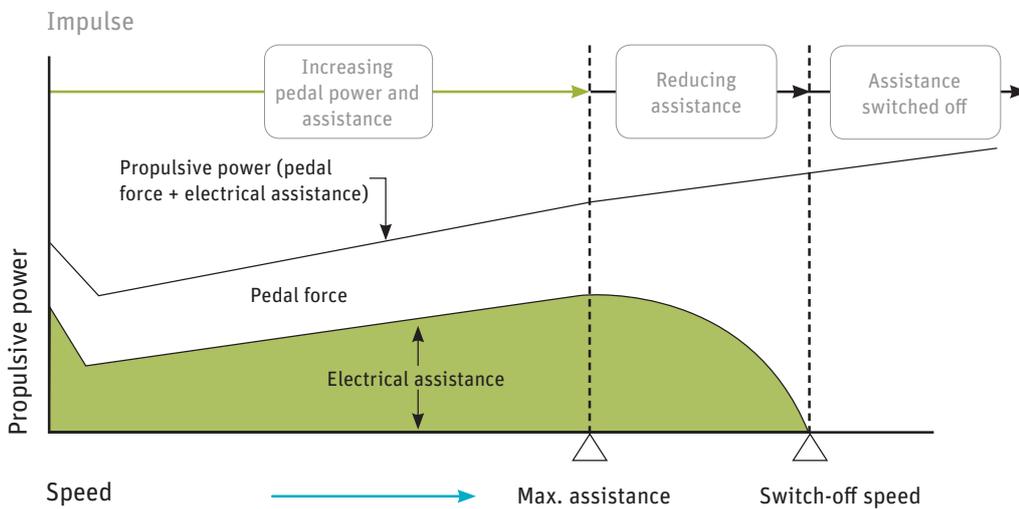
9 The motor

9.1 Operation

If you switch on the assistance and start pedalling, the motor starts as soon as the rear wheel is turning.

The level of thrust delivered by the motor depends on three factors:

- **Your own pedalling effort.**
The motor adapts to the force you apply. If you pedal harder, e.g. uphill or when setting off, the power sensor detects this and delivers more power than if you were only pedalling gently. The assistance increases proportionally if you pedal harder. The higher the assist level you set, the more pronounced this assistance characteristic becomes.



Ratio of pedal force to electrical assistance

- **The level of assistance you have selected.**
In the highest assist level (POWER), the motor assists you with the highest output and therefore also uses the most energy. With the *SPORT* assist level, the motor produces slightly less power. If you have selected *ECO*, you receive the least amount of assistance but have the battery's maximum range at your disposal.
- **How fast you ride.**
When you set off on your Pedelec, the assistance increases as you build up speed until it reaches its maximum, just before the highest assisted speed is achieved. Then it reduces automatically and switches off at roughly 25 km/h, irrespective of the gear you are in. Depending on the power-assist mode you are riding in, the transition between riding with and without power assist may seem more or less abrupt.

9.2 Range

The distance you can travel using the power assist with the battery fully charged depends on several factors:

- **Selected assist level**
If you want to cover a large distance with power assist, select the smaller gears, i.e. the ones that are easier to pedal. Also select a low assist level (*ECO*).
- **How you ride**
If you are riding in gears that are harder to pedal and select a high assist level, the motor will produce plenty of power to help you along. However, just as with driving a car at high speed, this leads to higher consumption. You will therefore have to recharge the battery sooner. You can conserve battery power by pedalling with even force throughout the complete revolution of the pedals.

- **Ambient temperature**
If it is colder, you will travel a shorter distance with the same battery charge. To maximise the distance you can travel, keep the battery in a heated room so that it is at room temperature when you fit it on your Pedelec.

When the motor is in use, the battery generates enough heat to not lose too much of its power at low ambient temperatures. The battery cells can operate at temperatures of -15°C to +60°C.

- **Technical condition of your Pedelec**
Make sure the tyre pressure is correct. If you ride your bike with too little air in the tyres, this can significantly increase the rolling resistance, especially on smooth surfaces, e.g. tarmac. If the ground is uneven, as on a country path or gravel track, a somewhat reduced tyre pressure can lead

to less rolling resistance. At the same time, the risk of a puncture increases. Please consult your specialist cycle shop about this. The distance you can travel also decreases if the brakes are rubbing.

- **Battery capacity**

The current battery capacity ➡ *Chapter 5.2.2*
“Checking the capacity.”

- **Topography**

You pedal harder when riding uphill. This is detected by the power sensor which then allows the motor to work harder.

Under ideal conditions, the range may reach 130 km with the 11 Ah battery, 180 km with the 15 Ah battery and 205 km with the 17 Ah battery. These ranges have been achieved under the conditions listed below.

IMPULSE BATTERY	11 AH	15 AH	17 AH
Range	130 km	180 km	205 km
Temperature	10-15°C	10-15°C	10-15°C
Wind speed	Windless	Windless	Windless
Average speed	22 km/h	22 km/h	22 km/h
Assist level	ECO	ECO	ECO
Gross weight	105-110 kg	105-110 kg	105-110 kg

9.3 Riding your Pedelec efficiently

You can monitor and influence the cost of your journeys with the Pedelec yourself. You can reduce your consumption and therefore costs by following the tips for increasing the range.

The operating costs for power assist with an 11 Ah battery are calculated as follows:

- A new battery costs roughly 599 euros.
- Throughout the total service life of a battery, you can cover roughly 80 kilometres with one charge cycle.
- You can charge the battery roughly 1,100 times.
- 1,100 charging cycles x 80 km = 88,000 km.
- 599 euros: 88,000 km = 0.68 cents / km.
- You use roughly 0.565 kWh to fully charge the battery. Assuming a unit price of 20 cents / kWh, it costs you 11.3 cents to fully charge the battery.
- It costs you 0.14 cents to cover the average range of 80 km.

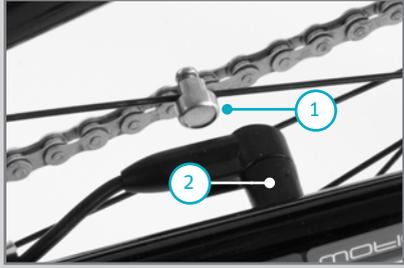
- This means the cost of consumption and the battery is a maximum of 0.82 cents / km.

This sample calculation is based on German energy prices. The operating costs may therefore be different in locations where other energy prices apply.

9.4 Warranty and service life

The Impulse centre motor is a durable maintenance-free drive. It is a wear part with a two-year warranty. As their power outputs are higher, wear parts such as the drive and brakes are subject to higher loads than they would be on a normal bike, causing increased wear.

10 Troubleshooting

TEXT	CAUSE	REMEDY
Battery heats up to above 45°C during charging.	High ambient temperatures	Stop the charging process and allow the battery to cool down. Then charge the battery in a cooler environment. If the problem still occurs, contact your specialist cycle shop; the battery may need to be replaced.
	Damaged battery	Damaged batteries must neither be charged nor used in any way. Contact your specialist cycle shop; the battery may need to be replaced.
Battery will not charge.	Ambient temperature is too high or too low	You can charge the battery at temperatures between 0°C and 45°C.
Battery is damaged.	Accident or fall with your Pedelec, or the battery has been dropped.	A damaged battery must neither be charged nor used in any way. Contact your specialist cycle shop; the battery may need to be replaced.
Range of the battery seems low.	Capacity of the battery cells depends on the temperature.	Protect the battery from heat by standing your Pedelec in the shade, for example.
“Speed sensor signal missing”	Spoke magnet has slipped out of position	Make sure the spoke magnet has not slipped. It should be as close as possible to the sensor on the chain stay (max. 5 mm clearance).
		
		<p>1 Spoke magnet 2 Sensor on chain stay</p>
	Speed sensor defective	Consult your specialist cycle shop.
	Cable connection defective	Consult your specialist cycle shop.
“Battery communication error”	No connection between motor and battery	Connect the battery to the charger. Use a different battery.
		Consult your specialist cycle shop.
Charging of your 17 Ah battery ends before completion.	You have run the battery down to empty	Pull the mains plug out of the charger and then plug it in again. Now the battery should charge fully. If the problem persists, please contact your specialist cycle shop.
The LED in the charger (where present) is flashing red.	In this case, the charging current is too high	Disconnect the battery from the charger and then connect it again. If the error message still appears, contact your specialist cycle shop to check the battery and charger.
“Motor temperature is too high”	The motor has overheated. For example, after riding up a long, steep incline in a high gear.	Allow the motor to cool down before resuming your journey.

<p>“Please move the pedals” permanently shown on display.</p>	<p>Backpedal brake switch defective</p>	<p>Backpedal briefly and then pedal forwards again to trigger the system check. If there is still no assistance being delivered, please consult your specialist cycle shop.</p>
<p>“Please put on chest belt” permanently shown on display</p>	<p>The chest belt is too loose</p>	<ul style="list-style-type: none"> • Tighten the chest belt.
	<p>The battery of the chest belt is empty</p>	<ul style="list-style-type: none"> • Change the battery. To do so, unscrew the battery cover on the reverse of the chest belt using a coin and exchange the battery beneath the cover for an appropriate replacement battery ensuring that the polarity is not reversed.
	<p>There is no layer of moisture between the skin and the electrodes.</p>	<ul style="list-style-type: none"> • Moisten the chest belt with electrode gel or water before putting it on.
	<p>The chest belt is dirty</p>	<ul style="list-style-type: none"> • Clean the chest belt with lukewarm water and a mild soap solution.
<p>“Determine heart rate ...” permanently shown on display</p>	<p>Electromagnetic disturbance (high-voltage power lines, traffic lights, MP3 players, overhead cables, mobile phones, other training devices)</p>	<ul style="list-style-type: none"> • Stay away from possible sources of disturbance. • First switch the Impulse ERGO Pedelec off, and then on again.
<p>The pedalling cadence no longer adjusts itself correctly</p>	<p>Extraneous radiation or battery was not connected for an extended period of time</p>	<p>Ride slowly and hold down the mode button on the NuVinci Harmony gears for between five and seven seconds.</p>
<p>The system switches off</p>	<p>Battery has been run empty</p>	<p>Wait five minutes. During this period, the battery will have recovered and you can switch the system back on again. The display functions once more. From now on, please only ride in the mode “no assistance/stand by”. At this point you can also operate the gears once more. In this way, you can ride for another hour until the battery finally switches off. Note: The battery switches off as soon as you begin to ride using the power-assist mode once more.</p>

11 Cleaning



- › Remove the battery before you clean your Pedelec.
- › Do not use benzine, thinner, acetone or similar agents in the cleaning procedures under any circumstances. Also avoid using abrasive or harsh cleaners.
- › Only use household cleaners and disinfectants (isopropyl alcohol) or water. You can obtain suitable cleaning products and additional information from your specialist cycle shop. We recommend you clean your Pedelec with a damp cloth, a sponge or a brush.

11.1 Battery

Make sure that water does not enter the battery when cleaning. Although the electrical components are sealed, it is not advisable to clean your bike with a hose or high-pressure cleaner, as it could cause damage. When wiping down the battery, be careful not to touch and connect the contacts on the underside. This could cause the battery to switch off.

11.2 Motor

Dirt should be removed from the motor of your Pedelec regularly, ideally using a dry brush or a damp (not wet) cloth. Do not use running water such as a hose pipe or even a high-pressure cleaner.

The ingress of water can damage the motor, so ensure that no fluids or moisture enter the motor at any time during cleaning.

Do not clean the motor when it is warm, e.g. immediately after a trip. Wait until it has cooled down. Otherwise, the motor may be damaged.

If you remove the motor, e.g. for cleaning purposes, never hold or carry it by the cables, as there is a risk that they will break.

If you remove the motor from the frame of your Pedelec, check the plug from the motor and battery cable socket for dirt. If necessary, clean carefully with a dry cloth before reconnecting.

11.3 Display

The housing of the display must only be cleaned with a damp (not wet) cloth.

11.4 Control unit

The control unit can be cleaned with a damp cloth if necessary.

11.5 Charger



Always unplug the charger from the wall socket before cleaning to avoid a short-circuit and physical injury.

Make sure that water does not enter the charger when cleaning.

12 Technical data

MOTOR				
Brushless electric motor with gear unit and freewheel				
Output	250 W rated output			
Gross weight of electric drive, battery, control unit	Freewheel motor		Backpedal brake motor	
	11 Ah	15 Ah	12 Ah	17 Ah
	6.65 kg	6.75 kg	6.75 kg	6.75 / 6.85 kg
Control	via torque sensor and rotational speed sensor in motor and speed sensor (on rear wheel)			

IMPULSE LI-ION DOWN TUBE BATTERY		
Voltage	36 V	36 V
Capacity	11 Ah	17 Ah
Energy content	396 Wh	612 Wh
Weight	2.9 kg	2.9 kg
Charging time	3 hours	4.5 hours
Cell	2.25 Ah	3.4 Ah

IMPULSE LI-ION SEAT TUBE BATTERY				
Voltage	36 V	36 V	36 V	36 V
Capacity	11 Ah	12 Ah	15 Ah	17 Ah
Energy content	396 Wh	418 Wh	540 Wh	612 Wh
Weight	2.85 kg	2.5 kg	2.95 kg	2.95 kg
Charging time	4 hours	4 hours	5 hours	6 hours
Cell	2.25 Ah	2.9 Ah	3.1 Ah	3.4 Ah



It is generally permitted for children to be carried in bike trailers on Pedelects. Observe the maximum permitted gross weight of the bike ➔ *Chapter 30 "Technical data"* of the General User Manual (CD).

**We hope you thoroughly enjoy using your new Pedelec
with Impulse 2.0 drive.**

Copyright © Derby Cycle Werke GmbH / Raleigh Univega GmbH

*Reproduction, in whole or in part, is not permitted without the consent
of Derby Cycle Werke GmbH / Raleigh Univega GmbH.
Subject to misprints, errors and technical modifications.*