

USER MANUAL  
neodrives Battery

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## 1. Introduction

### 1.1 Important instructions – please observe at all times.

Along with this operating manual, your Pedelec comes with additional documents. Please observe the specifications and instructions in these documents.

### 1.2 Proper use of the neodrive battery

The neodrive battery is used exclusively to power the neodrive drive system. No other components may be connected to it. Any other use requires the written authorisation of the manufacturer.

This operating manual only describes the use of the neodrive battery and corresponds to the state of the art at the time of print.

The manufacturer reserves the right to make changes resulting from further development of the mechanics, software or legal requirements.

The manufacturer regards uses including the following as misuse of the battery:

- Use of the battery that contravenes the instructions and recommendations in this operating manual.
- Exceeding the technical limits laid down in this operating manual.
- Technical changes to the battery.
- Changes to the software of the battery.
- Unauthorised attachments or use of the battery.

The manufacturer shall not be liable for any damage caused by improper use of the battery.



**Before using the device, carefully read all safety and hazard information contained in the individual chapters of this operating manual and all other enclosed documents.**

### 1.3 Signs and symbols

Important information for your safety are identified in this operating manual as follows:



Indicates tips and special information.



Warning against possible hazards to your health and indicates possible injury risks and/or hazards to the environment.



Indicates magnetic forces

Observe these indications at all times to avoid injury to people and damage to the product.

### 1.4 Permissible operating conditions / operating sites

The battery must only be used at ambient temperatures between -20 °C and +60 °C.

Also observe the information on permissible operating conditions in the Pedelec manufacturer's operating instructions. The manufacturer's restrictions on the permissible operating conditions must be observed.

Observe the safety and hazard information provided in the individual chapters of the operating manual.

### 1.5 Standard scope of delivery (neodrive components)

- Battery including 1 key pair
- Battery slide rail to fit the battery (already installed on the Pedelec)
- This operating manual

### 1.6 Technical data

Name:	BM18650Z3	ICR18650MG1
Battery type:	Lithium ion	Lithium ion
Rated capacity:	11.25 Ah	14.5 Ah
Rated voltage:	37 V	36.2 V
End-of-charge voltage	42.5 V	42 V
Total energy:	416 Wh	515 Wh
Maximum discharge current:	30 A	30 A
Ambient charging temperature:	0 °C to 40 °C	0 °C to 40 °C
Ambient operating temperature:	-20 °C to 60 °C	-20 °C to 60 °C
Number of cells:	50	50
Protection rating:	IP54	IP54
Weight:	about 3.5 kg	about 3.5 kg

We reserve the right to modify the design and technology of our products to incorporate the latest developments.

Please retain this operating manual for future reference.

This operating manual is also available to download from our website [www.neodrive.de](http://www.neodrive.de).

### 1.7 The key elements at a glance

#### Battery

Battery (housing)	1
Key	2
Charger socket / motor connection	3
On/off button	4
LED display	5

#### Motor

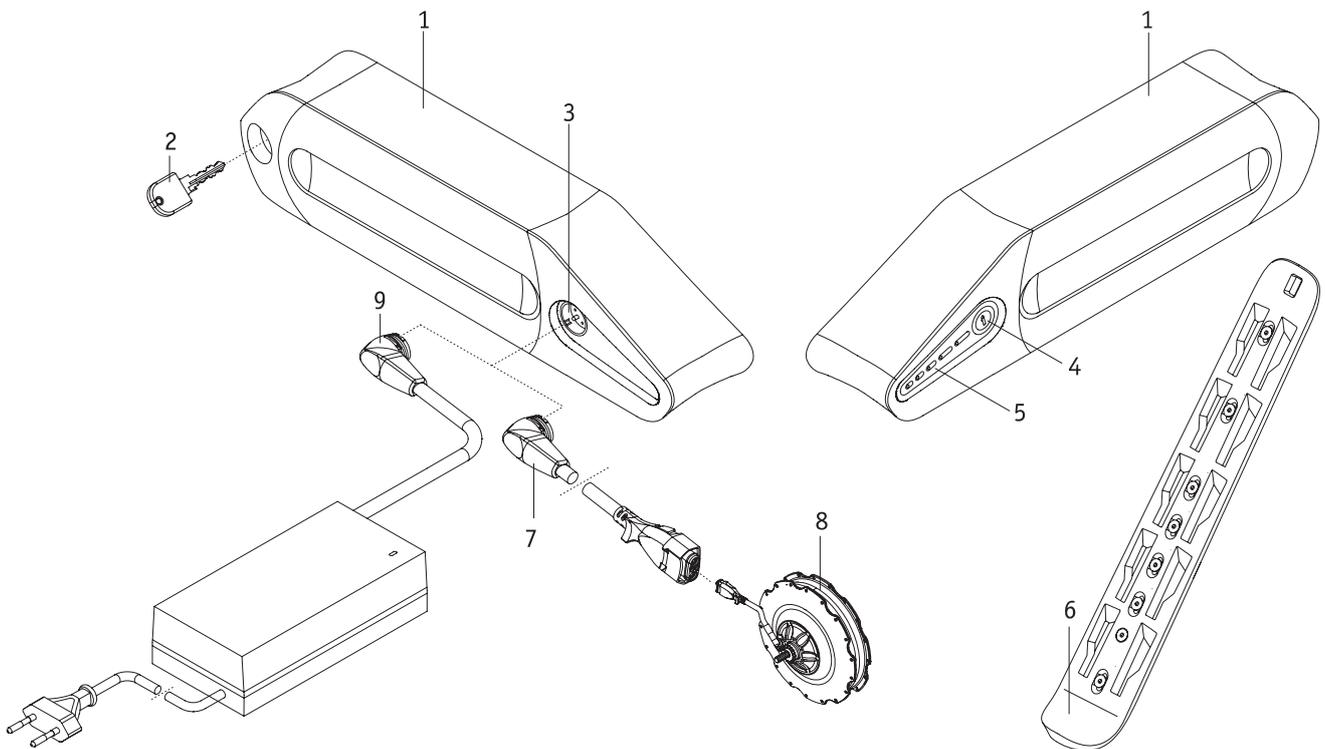
Motor cable connector	7
Motor	8

#### Charging device

Charging cable connector	9
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#### On the Pedelec

Battery slide rail	6
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## 2. Safety instructions and precautions



**Read and observe the following safety instructions and precautions before activating the battery and before starting the charging process. Failure to comply with the safety precautions and instructions may damage the product or result in electric shock, fire and/or serious injuries. The lithium-ion battery contains chemical substances, which may cause hazardous reactions if the safety instructions specified here are disregarded. The manufacturer accepts no liability for damage resulting from non-compliance with these instructions.**

### 2.1 Safety instructions and precautions on the use of the battery

- Before using for the first time, the battery should be fully charged.
- The battery must only be used at temperatures between -20 °C and 60 °C.
- The battery must not be exposed to heat (e.g. radiators) or fire. External heat exposure can lead to the battery exploding.
- In the (unlikely) event of the battery overheating or catching on fire, you must ensure that the battery does not come into contact with water or other liquids. The only suitable extinguishing agent that is recommended by the cell manufacturers is sand.
- Your Pedelec uses power in all operating modes. Therefore, if possible, charge the battery after every use.
- The battery must only be used to supply energy to the neodrives components. Any other use requires the written authorisation of the manufacturer.
- The battery must not be opened or taken apart. Improper opening or wilful destruction of the battery involves the danger of serious injury. In addition, opening the battery voids any warranty claim.
- Never connect the battery contacts in the socket [3] to metallic objects, or ensure that the contacts never come into contact with metallic objects (for example with metal filings).
- If the socket [3] is dirty, clean it with a clean and dry cloth.
- Never immerse the battery in water.
- The useful life of the battery depends, among other things, on its storage location. Consequently, never leave the battery (irrespective of whether the battery is installed in or has been removed from the Pedelec) in hot locations for prolonged periods. In particular, use the boot of a car parked in the sun only for transport rather than as a storage location.
- The battery must not be subjected to mechanical impact. If, for example, the Pedelec overturns and the battery thereby hits the ground, the battery must be checked by the manufacturer. Contact your specialist dealer in this regard. You must not continue to use a damaged battery.
- If damaged or defective, the battery must be singled out and checked. Please contact your specialist dealer and discuss with them the next steps with regard to return and repair.  
The defective/damaged battery must not be used again or opened.
- Always ensure that the battery is kept clean and dry.

### 2.2 Safety instructions and precautions on how to store the battery

- Protect the battery immediately upon separating from the battery charger or motor. Never allow any moisture or foreign particles (e.g. metal fragments, small nails, filings or other conductive metals) to get into the battery.
- Do not expose the battery to moisture of any kind during storage (water, rainwater, snow, etc.).
- Before storing it, charge the battery and check its charge status every 3 months.
- Store the battery in a cool and dry location where it is safe from damage and unauthorised access.
- To achieve the optimum battery service life, store the battery at a temperature from 18°C to 23°C and at a humidity of 0 to 80 per cent. The charge status under these conditions should be 70 per cent.
- Check the charge status of the battery every 3 months during storage and charge it to 70 per cent if necessary.

### 2.3 Safety instructions and precautions on the charging process

- Only charge the battery in a ventilated, dry and dust-free environment.
- Do not charge the battery in the presence or vicinity of flammable liquids or gases.
- Do not expose the battery to moisture of any kind during charging (water, rainwater, snow, etc.).
- Do not carry out the charging process in rooms where moisture may affect the battery.
- The battery must only be charged at temperatures between 0 °C and 40 °C. If you attempt to carry out a charging process outside of this temperature range, the battery mechanism automatically switches off the charging process.  
The battery reaches its maximum service life if it is charged at temperatures between 10 °C and 30 °C.
- Only use the designated charger to charge the battery. Your specialist dealer can provide the relevant information.
- Using an unsuitable battery charger can lead to malfunction and result in the battery having a limited service life. There is also a danger of fire and explosion.
- When the charging process is complete, disconnect the charger from the mains socket first before disconnecting it from the battery.
- Ensure adequate air circulation as soon as the battery is charged. In principle, only charge the battery under supervision.
- Damaged batteries must not be recharged or used any further.

- Damaged battery chargers (damage to the plug, housing, cable) must not be used.

#### 2.4 Safety information and precautions on how to transport and ship the battery

Lithium-ion cells are used in the neodrives battery. Transport and shipping of the battery are, therefore, subject to all applicable statutory requirements, which must be strictly observed. For instance, a defective battery must never be transported by plane.

If your battery is defective, take it personally to your specialist dealer as shipping lithium-ion batteries by post or other carriers is subject to strict rules and regulations. Once again, we recommend that you contact your specialist dealer.

As transport regulations may change annually, we strongly recommend that you consult your travel operator, airline or shipping line before you set out on your trip in order to learn about the current applicable regulations. A defective battery must not be taken on a plane or put in your luggage.

If your battery is fitted to the Pedelec when being transported, relaxed transport regulations apply in accordance with UN3171.



**Make sure you keep the packaging container of the battery in case you need to transport it.**



**Discuss transportation with your specialist dealer prior to shipping.**

#### 2.5 Safety information and precautions on the charger



**Before starting the charging process, read and follow all instructions and precautions enclosed with the charger and the following precautions and safety information.**

- Only use the designated charger to charge the battery. Your specialist dealer can provide the relevant information.
- Using an unsuitable battery charger can lead to malfunction and result in the battery having a limited service life. There is also a danger of fire and explosion.
- The charging process ends automatically as soon as the battery is fully charged. This avoids overcharging.
- When the charging process is complete, we recommend disconnecting the charger from the mains socket first before disconnecting it from the battery.
- Never use a charger that is not recommended by your specialist dealer.
- Do not expose the charger to moisture of any kind during charging (water, rain water, snow, etc.).
- Do not carry out the charging process in rooms where moisture may affect the charger.
- Be aware of condensation. If the charger is brought from a cold into a warm room, condensation may form. In this case, refrain from using the charger until all condensation has dissipated. Please note that this may take several hours.
- Never carry the charger by its power cable or the charger cable.
- Never tug at the power cable to disconnect the charger from the mains socket.
- Never subject cable and plug to any pressure. Overstretching or bending the cable, pinching a cable between a wall and a window frame or placing heavy objects on a cable or a plug may result in electric shock or fire.
- Lay the power cable and the attached charging cable so that nobody can step on it or trip over it and so both cables are protected against any other harmful effects or stress.
- Do not operate the charger if the power cable, the charging cable or the plugs attached to the cables are damaged. Damaged parts must be replaced immediately by the authorised specialist dealer.
- Do not use or disassemble the charger when it has received a hard blow or was dropped or damaged in another way. Take the damaged charger to a specialist dealer who has been authorised to perform repairs.
- The charger must not be used by children.
- Never attempt to disassemble or modify the charger.
- Do not cover the charger during the charging process or place any objects on top of the device.
- Never connect the terminals of the charging plug with any metal objects.
- Ensure that the plug is firmly inserted in the socket.
- Never touch plugs with wet hands.
- Do not use the plug of the charger and/or the mains plug if they are wet or dirty. Before inserting it, clean the plug using a dry cloth.

### 3. Starting up

#### 3.1 Information on the operating modes

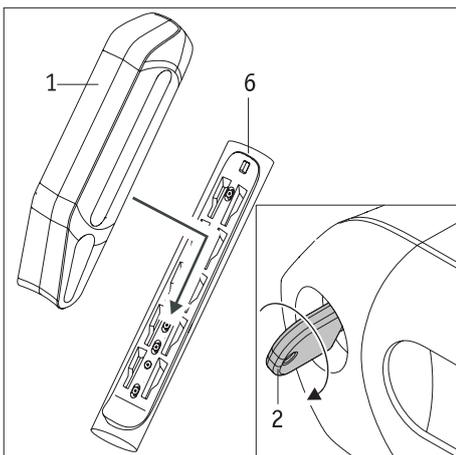
Essentially, the battery has two operating modes. It is either in "Active mode" or in "Deep Sleep mode".

In Active mode the battery consumes at least 5 mA per hour (consumption of the battery's own electronics).

To keep the battery's own consumption as low as possible, the battery automatically switches to the so-called Deep Sleep mode after 48 hours.

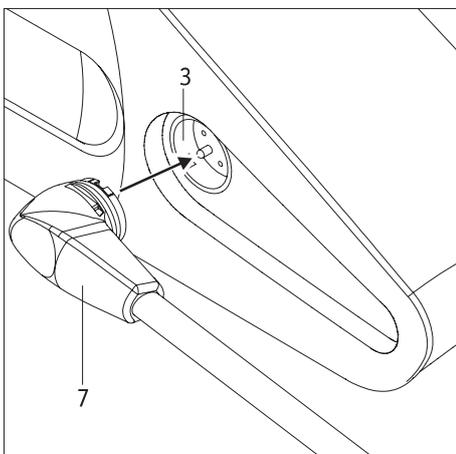
#### 3.2 Inserting the battery

- Place the battery [1] on the battery slide rail [6] mounted on the Pedelec.
- Push the battery [1], as shown in the diagram, up to the front edge of the battery slide rail [6].
- Lock the battery [1] by carefully turning the key [2] clockwise until it stops. The battery can no longer be removed from the battery slide rail.
- Remove the key [2] from the battery [1].

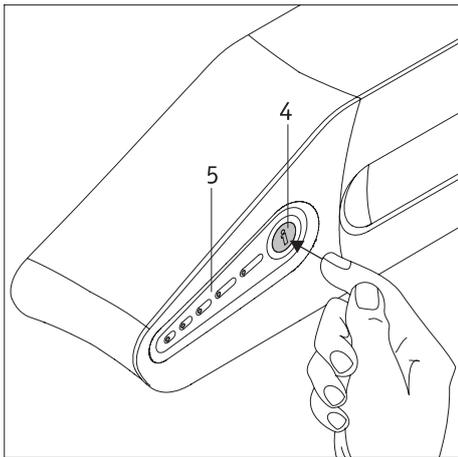


#### 3.3 Connecting the battery to the motor cable

- Insert the plug [7] of the cable coming from the motor into the socket [3] on the battery [1].
- The two parts are correctly aligned and interlocked automatically by means of a magnetic latch.



**Before inserting the plug [7] in the socket [3], ensure that both parts are clean and there are no metallic particles on them. If you detect such particles, use a dry and clean cloth to remove them.**



### 3.4 Switching on the battery

If the battery has been used within 48 hours it does not need to be switched on. The Pedelec is ready for use and can be switched on via the sMMI and used.

If the battery is first being activated now, or if it has not been used for more than 48 hours (Deep Sleep mode), it needs to be switched on.

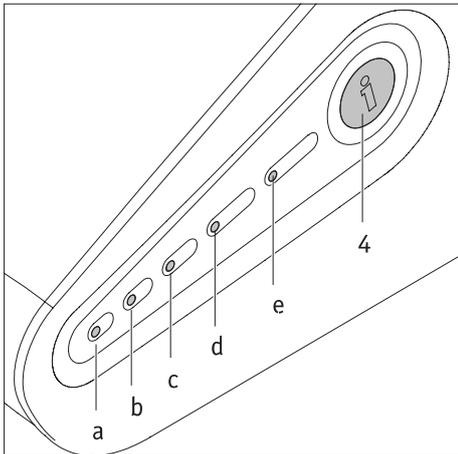
- Tap button [4].
- All the LEDs [5] flash three times to show it is switched on.
- Your Pedelec is now ready for use and can be switched on via the sMMI and used.



**If the motor cable is not yet connected to the battery, the battery will still be in Active mode when switched on.**



**If the battery cannot be switched on, the cell voltage may be too low. In this case connect the charger and then press the on/off button [4]. The battery will be charged for a minute.**



### 3.5 Battery capacity indicator

You can check the battery capacity at any time using the LED display.

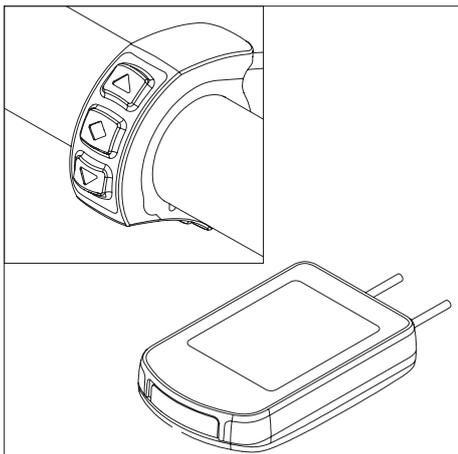
If the battery has not been used for more than 48 hours:

- Tap button [4].
- The battery is switched on, all LEDs (a–e) flash three times.
- Tap button [4] again.
- Now the LEDs indicate the capacity of the battery as shown in the following table.

If the battery has been used in the past 48 hours:

- Tap button [4].
- Now the LEDs indicate the capacity of the battery as shown in the following table.

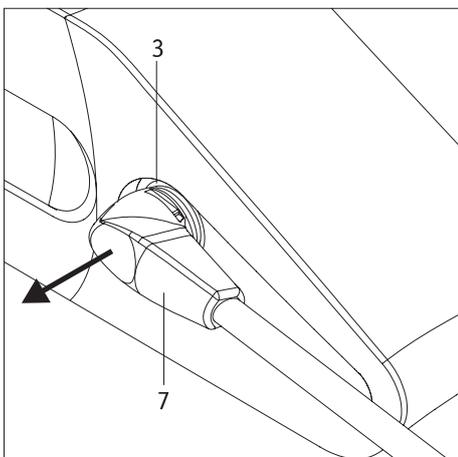
LED is lit	LED flashes	Capacity
-	a	- 19 %
a	-	20 - 39 %
a, b	-	40 - 59 %
a, b, c	-	60 - 79 %
a, b, c, d	-	80 - 99 %
a, b, c, d, e	-	100 %



#### 4. Detaching the battery

##### 4.1 Switching off the battery

The battery is switched off using the sMMI controller (see the sMMI and motor operating manual). This puts the battery initially in Active mode for 48 hours. This means that, within this period, the sMMI can be reactivated at any time without having to first switch on the battery. The power required for this is minimal.

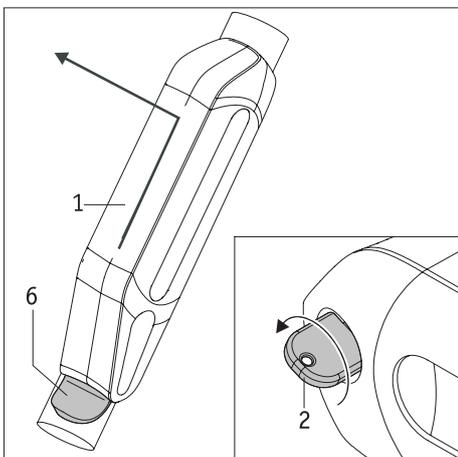


##### 4.2 Disconnecting the cable

- Disconnect the Pedelec on the sMMI.
- Then remove the plug of the motor cable [7] from of the socket [3].



Ensure that the plug of the motor cable [7] does not come into contact with any metallic particles when being set down (risk of contamination).

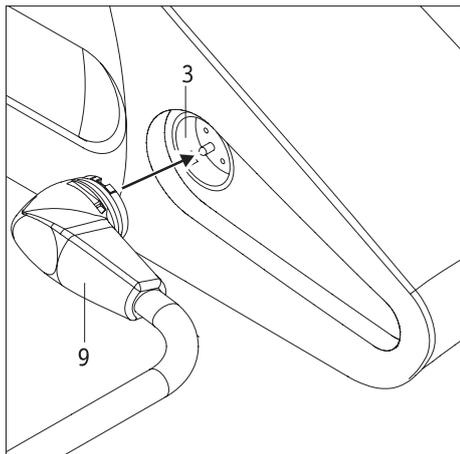


##### 4.3 Removing the battery

- Insert the key [2] in the lock on the battery [1].
- Carefully turn the key [2] anticlockwise until it stops. The lock is now released, the key can no longer be removed from the battery.
- Pull the battery [1] upwards about 2 cm along the slide rail [6] and then remove it completely.
- Store the battery in a clean place.



Ensure that the socket [3] does not come into contact with any metallic particles when setting down the battery (risk of contamination).



**5. Charging the battery**

Fully charge the battery before its first use. The battery capacity upon delivery is generally 30%. The battery can be charged at any capacity without adversely impacting its service life. The battery achieves its maximum service life when it is charged at an ambient temperature of between 10 °C and 30 °C

**5.1 Connecting the battery charger**

The battery [1] does not need to be removed from the Pedelec for charging, it can stay where it is. Only the motor cable plug [9] needs to be removed (see section 4.2). Then, proceed as before.

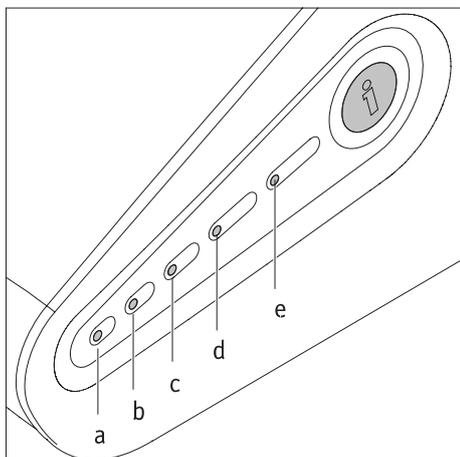
- Insert the plug [9] of the battery charger into the socket [3] on the battery.
- The two parts are correctly aligned and interlocked automatically by means of a magnetic latch.
- Carry out the charging process according to the specifications in the charger operating manual. In addition, follow the instructions on the charging process given in section 2.3.



**Before inserting the plug [6] in the socket [3], ensure that both parts are clean and there are no metallic particles on them. If you detect such particles, use a dry and clean cloth to remove them.**

**5.2 Charging process**

When charging the battery follow the instructions of the charger operating manual. Also observe the safety information and precautions provided in sections 2.3 and 2.5.



**5.3 LED displays during the charging process**

The following table shows the LED display [5] of the battery during charging.

LED is lit	LED flashes	Battery capacity
-	a	about 0–19 %
a	b	about 20–39 %
a, b	c	about 40–59 %
a, b, c	d	about 60–79 %
a, b, c, d	e	about 80–99 %
a, b, c, d, e	-	End of charging reached, battery charged to 100 %



**If an error occurs during the charging process, all LEDs will light up. Check if all criteria (e.g. ambient temperature, properly connected charging plug, etc.) for the charging process have been met in accordance with this operating manual and the operating manual that is included with the charger.**



**Do not leave the charger connected to the mains socket any longer than necessary. When the charging process is complete, disconnect the charger from the mains socket first before disconnecting it from the battery.**

Continued on the next page



Before using the device, always check the charge status of the battery. The battery should be fully charged prior to use in order to provide motorised support at all times.



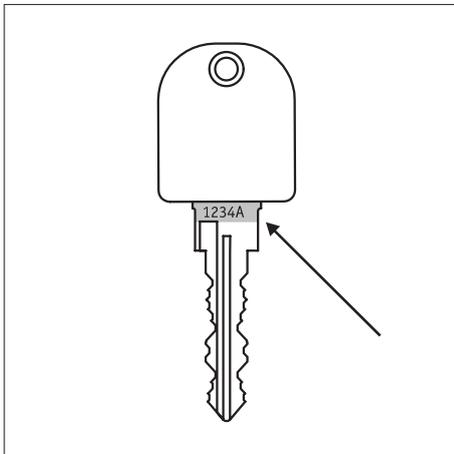
The battery may only be charged in a dry room at temperatures between 0° and 40° degrees centigrade.



Please observe the instructions in the operating manual enclosed with the charger.



Observe the safety information and precautions regarding the battery provided in sections 2.1 to 2.5 of this operating manual.



### 6. Keys

The battery is supplied with two keys for locking in the battery slide rail. Your specialist dealer should note the identifier engraved on the key in the supplied Pedelec documentation so that these can be reordered if required.

Please therefore check whether the key identifier is entered in the documentation. If this is not the case, please enter it.

Keys can only be reordered by the specialist dealer from AXA (as of November 2013).

### 7. Cleaning the battery

When cleaning the device, never use cleaning benzene, thinner, acetone or similar agents. Instead, use only conventional household cleaning agents and disinfectants (isopropyl alcohol).

- The plug of the charging cable on the battery charger [9], the plug of the motor cable [7] and the charger socket [3] on the battery may only be cleaned using a dry cloth.
- The battery must never be sprayed with a steam cleaner or similar device.

## 8. Disposal



Electrical and electronic equipment need to be disposed of separately to general household waste at specific state-provided locations. The correct disposal and separate collection of used appliances serves to prevent potential damage to health and the environment. It is a requirement for the re-utilisation and recycling of used electrical and electronic equipment.

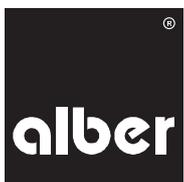
Detailed information on the disposal of your used equipment can be obtained from your local authority, your waste disposal service, the specialist dealer from which you purchased the product, or your sales contact. This information only applies to equipment which is installed and sold in the countries of the European Union and which is subject to the European directive 2002/96/EC. In countries outside of the European Union, deviating conditions apply to the disposal of electrical and electronic waste.

## 9. Liability

The manufacturer is not liable in any instance if

- the battery has been /is incorrectly handled.
- the battery has been /is commissioned in contravention to the instructions in this operating manual.
- the battery has been /is operated with insufficient battery charge.
- the battery has been /is repaired or otherwise modified by a person not authorised to carry out such work.
- the battery has been /is used contrary to the intended use.

Manufacturer of the battery:  
Batterien-Montage-Zentrum GmbH  
Am Sportplatz 28 - 30  
63791 Karlstein am Main  
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Fax: +49 6188 9956 - 900  
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Stand: 10.10.2013

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