

Recommended contents for Operating manual

Just Drive Comfort control unit for pedelecs and e-scooters



Similar to the picture.

Series 4313


MARQUARDT

Store for future use!

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1 About this operating manual

This manual serves as a content recommendation for the overall system manual of an overall system and does not serve as an end customer operating manual.

1.1 Display modes

The following display modes are used to highlight special elements of the operating manual:

Safety instructions

Safety instructions in this manual are identified by symbols. The safety instructions are introduced by signal words which express the extent of the danger.



WARNING!

This combination of symbol and signal word indicates a potentially dangerous situation which, if not avoided, could result in death or serious injury.



CAUTION!

This combination of symbol and signal word indicates a potentially dangerous situation which, if not avoided, may result in minor or moderate injury.



NOTE!

This combination of symbol and signal word indicates a potentially dangerous situation which, if not avoided, may result in property damage and environmental damage.

Tips and recommendations



This symbol highlights useful tips and recommendations as well as information for efficient and trouble-free operation.

Other markings

The following markings are used in this manual to highlight instructions for action, results, lists, references and other elements:

Steps for action

Steps for action are displayed as a numbered list. The sequence of the steps must be observed. The system reactions to the respective operating action are marked by an arrow.

Example:

1. First operating action / step
 2. Second operating action / step
- Reaction of the system to the operating action enumerations

Enumerations

Enumerations without a mandatory sequence are displayed as a list with enumeration points.

Example:

- Point 1
- Point 2

1.2 Copyright protection

The contents of this manual are protected by copyright. Their use is permitted within the scope of using the device and creating a complete system operating manual. Any other use is not permitted without the written consent of the manufacturer.

1.3 Contact details

Address	Marquardt GmbH Schlossstraße 16 78604 Rietheim-Weilheim
Telephone	+49 7424 99-28301
E-Mail	support-emobility@marquardt.com
Internet	www.marquardt.com

2 Safety Instructions

- Read this operating manual and observe all safety instructions. Failure to follow the safety instructions can result in electric shock, fire and/or serious injury.
- Keep this operating manual in a safe place. This will enable you to read the information on various functions later, for example.
- The Comfort control unit is part of the pedelec's drive system. Read and follow the safety notes and instructions in all pedelec operating instructions, especially in the electric drive operating instructions. This is the only way to ensure safe use of the pedelec.
- Do not be distracted by the Comfort control unit display. If you do not concentrate exclusively on traffic, you run the risk of being involved in an accident. While driving, check the displayed elements, change the support level, activate the sliding aid and switch the light on or off. To change the settings, stop and enter the appropriate data.
- Do not open the Comfort control unit. The Comfort control unit may be damaged if it is opened and the warranty is void.
- Do not use the Comfort control unit as a handle. If you lift the pedelec by the Comfort control unit, you may irreparably damage the Comfort control unit.

- Do not place the bicycle upside down on the handlebars as this may damage the control unit, but use a suitable bicycle mounting stand approved for the total weight.



WARNING!

Configure the basic settings on the Comfort control unit before driving.
Unconcentrated driving endangers you and other road users.



Familiarize yourself with the functions of the pedelec and the Comfort control unit before starting your first ride.

Carry the operating manual with you on all trips. This means that you can also read up on less frequently used functions at any time.

3 Overview of Comfort control unit

Switch the pedelec on and off at the Comfort control unit. Use the two keys and the joystick to activate and control support from the electric motor or switch on the headlights.

The Comfort control unit's display shows the current driving speed. You can also see which support level is active, how long the power for the support motor will last, the charge level of the battery and whether the light is switched on. You can also view the trip kilometers, average speed and maximum speed for the current tour. The Comfort control unit also displays the total mileage of the pedelec and the maximum speed over the entire distance.

3.1 Technical data

Comfort control unit

Length x width x height	72.8 x 50.2 x 44.6 mm
Operating temperature	-10 °C to 45 °C
Storage temperature	-20 °C to 85 °C
Protection class	IP65 (HMI) dustproof, water spray proof
ESD model	Human Body Model (HBM)
USB interface	Micro USB Standard 2.0 Full Speed
USB charging function	USB Battery Charging Standard BC1.2 Max. 1.0 A
CAN Interface ISO 11898-5	High-speed CAN

4 Mounting the Comfort control unit



Check the fastening screws at regular intervals. Shocks, heat and cold may cause the screws to loosen.

Tighten all screws to the required torque.

The Comfort control unit can be mounted on the left or right handlebar side. The protruding page faces inwards. It is not above the handlebar grips. Position the control unit close to the handle. All keys must be easy to operate with your thumb.

1. Unscrew the hexagon socket screw with a hexagon socket SW 2.5 on the bracket of the control unit. Open the mounting bracket.
2. Position the control unit on the left-hand side of the handlebar.
3. Position the connecting cable in the control unit bracket. It must lie in the guide troughs on the inside of the bracket and be guided through a recess in the bracket to the connection.
4. Close the bracket. Pay attention to the connecting cable.

The connecting cable must not be crushed by the bracket.

5. Turn the hexagon socket screws on the bracket back in with a hexagon socket SW 2.5.
Do not tighten the screws yet.
 - Check the position of the Comfort control unit. Are all keys accessible with the thumb?
Is the advertisement clearly visible?
 6. Tighten the hexagon socket screw with the hexagon socket (min. torque 0.3 Nm, max. torque 0.5 Nm).
 7. Connect the purple plug of the control unit to the socket of the same color on the wiring harness. Ensure that the cut-outs in the plug and socket meet so as not to damage the connection
- The Comfort control unit is installed.

5 Operating and display elements

Use the keys on the Comfort control unit to regulate the functions of the pedelec system ergonomically. The hand can remain on the handlebar grip, while the thumb can operate the keys on the Comfort control unit. The displays on the control unit display provide information about the driving situation and the support aids.

5.1 Operating keys

The keys on the Comfort control unit are used to control the functions of the pedelec system.

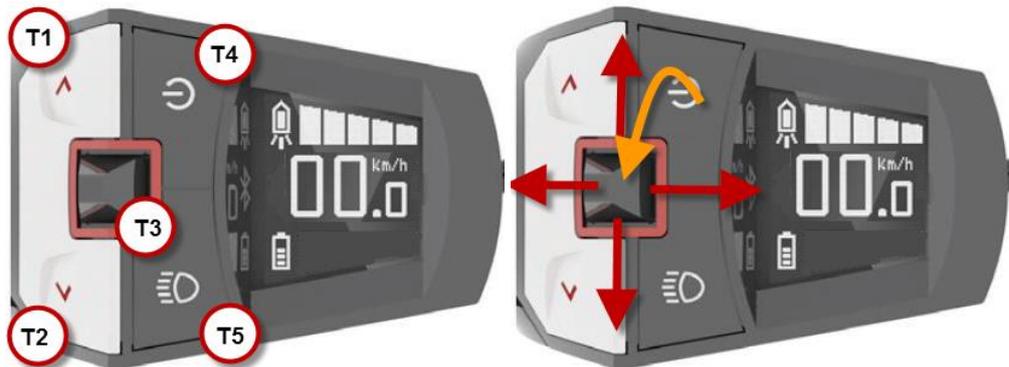


Fig. 1 Keys and joystick of the Comfort control unit (figure shows left-hand installation. The display and function of the keys are mirrored when mounted on the right-hand side). Shown amount of support levels and battery indicators may vary due to your system configuration.

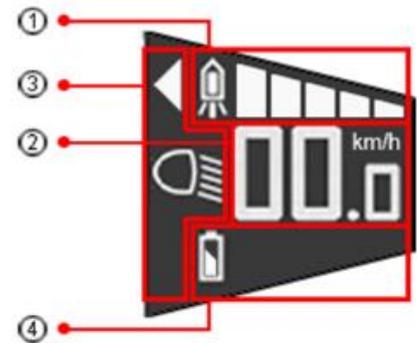
Key	Function
T1	Increase support level Hold > 3s: Switch on push mode until key is no longer held.
T2	Reduce support level
T3	Joystick:
↑	One page up. Switch to editing mode. One entry higher in editing mode.
←	Move to the next page to the left. In editing mode, exit the mode and confirm the value.
■	In edit mode, edit the highlighted value.
→	Switch to the next page to the right. In editing mode, exit the mode and confirm the value.
↓	Move one page down. Switch to editing mode. One entry higher in editing mode.
T4	Switch the Comfort control unit on and off.
T5	Short press: Switch on the light. Long press: Switch off the light. In automatic mode: The light is switched on or off depending on the ambient light. The light can always be switched on or off manually using this switch.

5.2 Displays of the Comfort control unit

The displays of the Comfort control unit offer different information on different pages. The joystick moves sideways to switch between the pages. Some of the pages offer additional pages that are controlled by vertical movements of the joystick.

The main page provides the following information:

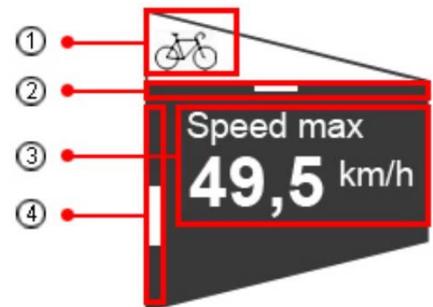
- 1 Indication of the current support.
- 2 Speed
- 3 Status display for
Triangle symbol: Sliding aid active.
Lighting: Symbols show the status.
- 4 Battery charge status.



Shown amount of support levels and battery indicators may vary due to your system configuration.

The other pages are designed according to the following pattern:

- 1 Symbol for the page.
- 2 Horizontal navigation position.
- 3 Page content.
- 4 Vertical navigation position: Refers to further pages and shows the current position.



Driver Performance



Fig. 2 Comfort Page Driver performance

Shows the current power output by the user to drive the pedelec in watts. This value is transmitted by the motor to the control unit.

Remaining range



Fig. 3 Comfort Page Remaining range

Indicates the remaining range of the pedelec. The remaining range is determined by the control unit itself using information from the system. The remaining range changes depending on the driving style and takes into account long and short-term experience values. This offers significantly higher reliability during daily journeys with a constant driving profile. Short-term changes to the driving profile are also included in the range calculation

Tour Distance



Fig. 4 Comfort Page Tour Distance

Displays the distance travelled since the value was last reset.

This page contains additional pages.

Tour Distance / Average Speed



Fig. 5 Comfort page Tour average speed

- Medium speed.

Displays the average speed of the current route.

Tour Distance / Maximum Speed



Fig. 6 Comfort page Tour-Max. Speed

- Maximum speed.
Displays the highest speed of the current route.

Tour Distance / Reset



Fig. 7 Comfort page Tour-Reset

- Reset - Move the joystick (T3) down to activate the RESET function (change the color of the menu item from black to white).
- By briefly pressing the joystick, the tour values are reset to "0".
The values for the distance, average speed and maximum speed of the current tour are deleted and set to "0".

Total Distance



Fig. 8 Comfort Page Total Distance

Displays the total distance covered by the pedelec.
Another page belongs to this display.

Total distance / maximum speed



Fig. 9 Comfort Page Max. Speed.

Shows the highest speed on the total distance covered by the pedelec.

Automatic light (setting menu)



Fig. 10 Comfort page Automatic light

Activate the automatic mode for the headlight here. The light is then switched on or off depending on the ambient brightness.

If the automatic mode is switched on, the headlight symbol is displayed with an "A" on the main page.

The light can be switched on or off at any time using the T5 key.

Language (Settings menu)

If you want to change the language of the operating element, this can be done in the settings menu. If you select the Language menu option with the joystick, the selection page for the available languages opens.

Now select the desired language and confirm the selection by activating the respective checkbox.

The language is changed without a restart. There may be a short waiting time during which the operating element does not react for a short time.

By pressing the joystick to the left for right installation or by pressing the joystick to the right for left installation, you return to the settings menu.

Installation position (Settings menu)

If you want to change the installation position of the operating element, this can also be done in the settings menu. If you select the menu item Installation position with the joystick, the corresponding selection page opens.

Now select the desired installation side and confirm the selection by activating the respective checkbox.

Changing the installation position is associated with an automatic restart of the operating element. Subsequently, you are back on the main page of the operating element.

Imperial (Settings menu)

If you want to change the used unit of the operating element, this can be done in the setting menu. If you use the joystick to select the Imperial menu item and activate the checkbox, all data will be converted from km to miles.

The change does not require a restart and takes effect immediately.

Bluetooth



Fig. 11 Comfort page Bluetooth

Displays Bluetooth connection options.

- OFF: Bluetooth is turned off.
- Smartphone: Connecting to a telephone

This is how you change the current selection:

1. Move the joystick forward or backward.
→ A new value is highlighted.
2. A vertical movement of the joystick marks another option.
3. Press the joystick to activate the selected option.
→ The change is applied immediately.

Please contact your system manufacturer for a smartphone app compatible with your system.

Move the joystick left/right to the next page.

6 Operating

6.1 Switching on and off

Switching on the Comfort control unit

- Press the T4 key for less than 2 seconds.
- The display shows the home screen, then changes to the Main screen.

Switching off the Comfort control unit

- Press and hold (>2s) the T4 key.
- The display goes out.

6.2 Operation

6.2.1 Headlight

Press the T5 key to switch the light on or off. If the automatic light function is activated, the light is switched on or off according to the ambient light.

The main page shows the current status of the running light with the following symbols:

Symbol Headlight

- Headlight off

 Headlight on

 Automatic mode on - Headlight off

 Automatic mode Headlight on

Switch on the headlight

- Briefly press the T5 key.
- The headlight is switched on.
- The headlight symbol shows the normal light status.

Switching off the headlight

- Press and hold (>2 sec) the T5 key.
- The headlight is switched off.
- The headlight symbol shows the current status.

Automatic mode Switching the headlights on and off

You activate the automatic mode for the headlight on the "Automatic light" page.

The automatic mode switches the headlight on or off according to the ambient light.

In automatic mode, you can switch the headlight on or off at any time with the T5 key.

6.2.2 Setting support

The electric motor of your pedelec supports your pedaling power. Several support levels are available. You can also drive without motor assistance.

- You set the support levels on the Comfort control unit (T4 / T2).
- The current support level indicates Comfort with a scale.
- The selected level is immediately effective.

You can see the active level from the bright segments of the support display on the main page of the Comfort control unit.

Level	Description
None	Normal cycling conditions. Motor inactive.
ECO	Efficient support for maximum battery range
TOUR	Consistent support for long distances with large battery range
SPORT	Powerful support for sporty driving, on mountainous roads and in city traffic with normal battery range
BOOST	Powerful support for sporty driving on steep and mountainous tracks with low battery range

Enable support

- The display shows no support level.
- 1. Press the T4 key on the Comfort control unit.
 - The electric motor supports the drive.
 - The first segment is shown in the support display.

Increasing support

- 1. Press the T4 key. You switch to the next higher level.
 - The electric motor provides more support to the drive.
 - Further segments are displayed in the support display.

Reducing support

- 1. Press the T2 key.
 - The electric motor is less supportive.
 - In the support display, the number of segments displayed decreases.

Driving without assistance

- 1. Press the T2 key until no segment of the support display is visible.
 - You are driving without motor support.

6.2.3 Sliding aid

The sliding aid is available for starting or pushing the wheel. The drive of the pedelec supports the movement of the wheel. The sliding aid can be activated up to a speed of < 6 km/h.

You use the sliding aid when sliding the wheel, when starting off or when assisted starting on a hill. If you push the wheel, you move beside the wheel. Use the sliding aid as a starting aid when sitting on the bike.

In both cases, the activated sliding aid moves the pedelec.



WARNING!

The sliding aid moves the pedelec.

Grasp the handlebar grips and be ready to apply the brakes.

When sitting on the bike, do not press the pedals. Your power and the sliding aid could accelerate the pedelec very strongly. The second pedal also moves and can injure you when you climb up!

Do not use the sliding aid for slow driving.

Switch on the sliding aid:

- Press and hold the T1 key.
- The sliding aid is active and moves the wheel.
- The triangle symbol for the sliding aid is displayed on the main page of the display.

Switch off the sliding aid:

- Release the T4 key.
- The sliding aid is switched off.
- The triangle symbol is no longer displayed on the main page of the display.

6.3 USB port

The Comfort control unit has a Micro USB AB plug. The USB plug is located in the tip of the device above the handlebar and is protected against dirt and moisture by a rubber cap. A connected USB device is supplied with max. 1 A charging current.

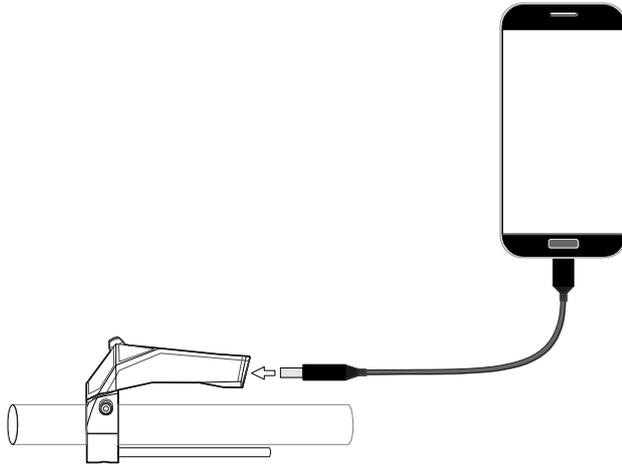


Fig. 12 USB port



NOTE!

No liability is accepted for damage to the mobile phone caused by the connection to the Comfort control unit.

Connecting the USB Device

1. Open the rubber protection cap of the USB port.
 2. Connect the USB device to the USB port - direct connection or with a suitable USB cable. A so-called OTG USB cable must be used to charge a device. The direction of connection must be observed.
- The new connection is displayed on the connected device.

Removing the USB device



NOTE!

Please observe the instructions for disconnecting the USB connection in the operating manual of the connected device.

1. Disconnect the USB device or the connecting cable from the USB port on the Comfort control unit.
2. Close the USB port with the rubber cap.



NOTE!

The Comfort control unit is only protected against water and dirt when the rubber protection is closed.



NOTE!

To prevent damage to the USB port of the control unit, it is recommended that the USB cable is also securely attached to the handlebars.

7 Error codes

The Comfort control unit displays error codes for the entire pedelec system. The error codes represent errors detected by the system. The following table shows the meaning of the error codes. Please observe the recommended reaction to the error codes.



WARNING!

Note the error codes!

Error codes can indicate serious errors in the pedelec system. These errors prevent safe operation of the pedelec. Accidents with personal injury and damage to the pedelec may occur.

Stop using the pedelec. Inform yourself about the meaning of the error code and observe the solution approach.

If the meaning of the error code is unclear, stop the drive and turn off the wheel. Contact the manufacturer, the dealer or your garage for information on the next steps.

Error codes provided by the drive system:

Error code	Description	Solution approach
10	The battery voltage is too low	Charge the battery pack with the battery charger.
11	The battery voltage is too high	Switch the system completely off and on again using the T4 key on the control unit. If the problem persists, contact your e-bike dealer.
12	The battery is almost completely discharged	Charge the battery pack with the battery charger.
20	Electrical measurements are erroneous	Switch the system completely off and on again using the LED key (28) on the battery pack (26). If the problem persists, contact your e-bike dealer.
21	Thermocouple defective	
23	Thermocouple defective	
24	The internal voltage is beyond the operating range	Charge the battery pack with the battery charger.
25	Error in the motor current measurement	Switch the system completely off and on again using the T4 key on the control unit. If the problem persists, contact your e-bike dealer.
26	A software reset has been performed	
31	Shortcut in light circuit	Check cable harness.
40/41	Detection of overcurrent in the motor	Reduce the load on the motor by pedaling less or reducing the support level.

Error code	Description	Solution approach
42	Fault in the engine rotation	Switch the system completely off and on again using the T4 key on the control unit. If the problem persists, contact your e-bike dealer.
43	Short-circuit in the motor	
44	Overheating of the motor	
45	The software has corrected an error when turning the motor	Switch the system completely off and on again using the T4 key on the control unit. If the problem persists, contact your e-bike dealer.
46	No motor movement detected although a current > 2 A was measured	
60	Interruption of data exchange on the CAN-BUS	Check the cables and plug connections of all components of the e-Bike system.
70	Force on the pedal is not within the valid range	Switch the system completely off and on again using the T4 key on the control unit. If the problem persists, contact your e-bike dealer.
71	Pedal rotation is not detected	
72	Force on the pedal is not detected	
73	Connection to pedal force sensor is faulty	
74	Errors were detected in the data	
75	Cadence sensing not plausible	Switch the system completely off and on again using the T4 key on the control unit. If the problem persists, contact your e-bike dealer.
76	Brake signal missing or not plausible	Switch the system completely off and on again using the T4 key on the control unit. If the problem persists, contact your e-bike dealer.
80	Erroneous motor parameter	Switch the system completely off and on again using the T4 key on the control unit. If the problem persists, contact your e-bike dealer.
81	Speed signal is not detected	Make sure that the spoke magnet is correctly positioned opposite the speed sensor.
82	The program has been manipulated	Switch the system completely off and on again using the T4 key on the control unit. If the problem persists, contact your e-bike dealer.
83	Error in the program flow	
84	Erroneous motor parameter	
85	No communication to throttle switch	No throttleswitch-support until error fixed.
86	Wrong values from throttle switch	No throttleswitch-support until error fixed.
87	Sticking throttle switch	No throttleswitch-support until error fixed.

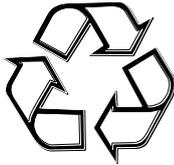
Error code	Description	Solution approach
90	Software program flow error detected	Switch the system completely off and on again using the T4 key on the control unit. If the problem persists, contact your e-bike dealer.
91	TorqueSensor send erroneous data	Switch the system completely off and on again using the T4 key on the control unit. If the problem persists, contact your e-bike dealer.
92	TorqueSensor send erroneous data	
93	TorqueSensor send erroneous data	
94	Overcurrent detected	
95	Break light test failed	Break light current too high. Check breaklight function and specification.

Error codes provided by the display:

CAN error	Source	Erroneous system message	Possible error solution
1	Drive	E_BIKESPEED_m	Check wiring and sensor
2	Drive	E_CADENCE_rpm	
3	Drive	E_HUMAN_POWER_mW	Check wiring and restart system
4	Drive	E_SUGGESTED_GEAR	
5	Drive	E_REMAINING_DISTANCE_km	
6	Drive	E_TOTAL_DISTANCE_m	Check wiring and restart system
7	Drive	E_MOTOR_RPM	
8	Drive	E_MOTOR_VOLTAGE_mV	
9	Drive	E_MOTOR_CURRENT_mA	
10	Drive	E_MOTOR_TORQUE_Nm	
11	Drive	E_MOTOR_TEMPERATURE_K	Check wiring and restart system
12	Drive	E_MOTOR_POWER_W	Check wiring and restart system
13	Battery	E_BATTERY_REMAINING_CAPACITY_mWh	Check wiring and battery
14	Battery	E_BATTERY_ABSOLUTE_CAPACITY_mWh	
15	Battery	E_BATTERY_STATE_OF_CHARGE_PERCENT	Check wiring and battery
16	Battery	E_BATTERY_STATE_OF_HEALTH_PERCENT	
17	Battery	E_BATTERY_TIME_TO_EMPTY_min	
18	Battery	E_BATTERY_VOLTAGE_mV	Check wiring and battery
19	Battery	E_BATTERY_CURRENT_mA	Check wiring and battery
20	Battery	E_BATTERY_CURRENT_AVG_mA	
21	Battery	E_BATTERY_TEMPERATURE_K	
22	Battery	E_BATTERY_POWER_W	

These errors are caused by erroneous communication on the part of the battery or drive. Errors marked with an asterisk * have a direct influence on the correct functioning of the control unit and result, for example, in an incorrect residual range calculation or speed display.

8 Disposal



In accordance with the European Directive 2012/19/EU, electrical appliances that are no longer serviceable must be collected separately, and in accordance with the European Directive 2006/66/EC, defective or used batteries must be collected separately and reused in an environmentally friendly manner.

Old machines, replacement parts and packaging are made of recyclable materials. The owner is obliged to dispose of these properly and in an environmentally friendly manner in accordance with the statutory regulations.

All plastic injection molded parts are marked with a recycling symbol.

RoHS Directive (2011/65/EU)