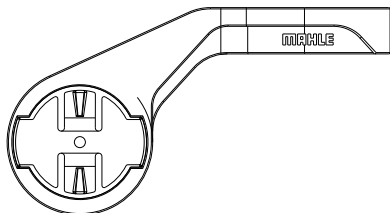


4.1.1. Pulsar ONE holders

There are two different optional holders to place the display in 4 different positions. It is also possible to use other GARMIN compatible device holders. To ensure a safe installation, please ensure you are using a compatible holder with your Pulsar ONE display:

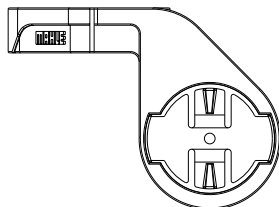
Pulsar ONE Sport holder

SKU: 330 100 000 01 000



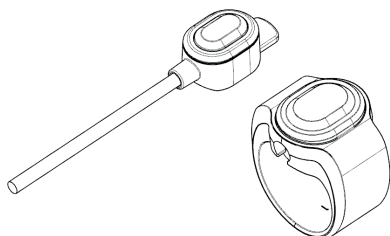
Pulsar ONE Urban holder

SKU: 330 100 000 02 000



4.2. e-Shifters

e-Shifters is a set of 2 small optional buttons connected to the Head Unit which allow to control the functions of the MAHLE SmartBike System directly from the handlebar (assist level, lights, etc.). The minimalist design allows them to be installed independently from the handlebar used (drop- or flat bar).



By pressing the e-Shifters, whether briefly or for longer, different commands are sent to the system. A maximum of 2 e-Shifters per eBike can be installed (left and right).

The e-Shifters give haptic feedback to the rider by vibrating (under patent) whenever the status of the system is changed to not draw the attention away from riding.

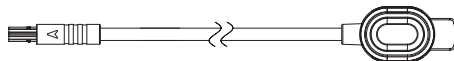
Using the e-Shifters can help to increase the safety while riding by avoiding removing the hand from the handlebar. Additionally, the vibration of e-Shifter buttons deliver additional information to the rider when the APP or the eBike system changes the status or reports an alert.

To upgrade e-Shifters to your X20 equipped bike, please get in touch with your local dealer to ensure a correct installation and connection to the X20 System. The following configurations are available:

e-Shifter 720

SKU: 350 100 000 00 200

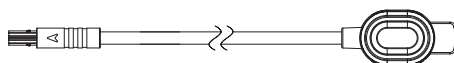
Giftbox + Y-Joint + 2 e-Shifters with 720mm length wire + 2 Silicon Bands + Manual



e-Shifter 970

SKU: 350 100 000 00 300

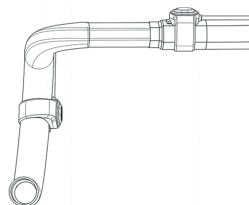
Giftbox + Y-Joint + 2 e-Shifter with 970mm length wire + 2 Silicon Bands + Manual



4.2.1. e-Shifters Installation

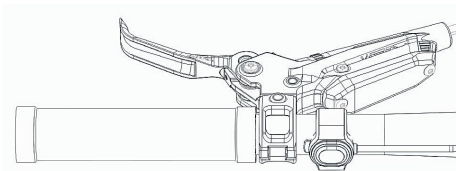
The e-Shifters allow to be installed in various ways and areas of the handlebars. The included e-Shifter rubber hoods can be used to install the e-Shifters in every possible area of the handlebar. Without the rubber hoods, the e-Shifters can be installed under the bar tape on drop bars.

Curved - Road and Gravel



The ergonomic design of e-Shifters and rubber hoods allows the installation in various areas of the handlebar.

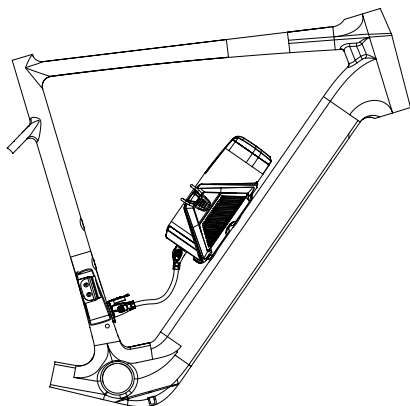
Flat – Mtb and Commuter



The ergonomic design of the e-Shifter and rubber hoods allows them to be placed in a perfect, easy to reach position.

4.3. e185 - Range Extender

The e185 Range Extender is our latest generation of external batteries and can always be added to the X20 System. The e185 is working as an independent battery supplying its power directly to the motor without any interference of the main battery. With the new My SmartBike APP, it is now possible to customize the power consumption of your eBike between the main and the external battery.



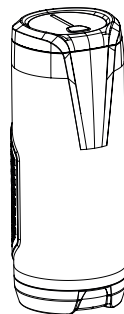
The Range Extender carries 171Wh in addition and allows you to increase your range drastically, while only adding 1.1Kg of extra weight to the system. This will upgrade your total capacity by 77% when added to the iX250 battery and 53% when added to the iX350 battery. The new designed holder for the e185 Range Extender follows the design, size and mounting points of a regular bottle cage and can therefore also be used to carry a regular bottle when the Range Extender is not used.

4.3.1. Range Extender Pack Components

The Range Extender e185 pack includes:

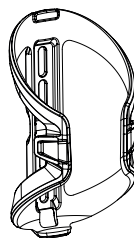
Battery Pack e185
SKU: 41010400000000

- Weight: 1.100 grs.
- Waterproofness IP67
- Capacity: 171Wh

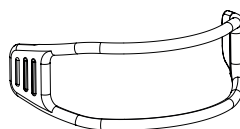


Holder
SKU: 24010414300000

- Compatible with standard water bottles
- 4 x 15mm slotted holes (64mm standard distance)
- Weight: 46 grs.



Rubber (to lock the holder)
SKU: 24010414301000



4.3.2. Range Extender Wires

Due to different frame designs the Range Extender is sold without connection wires. Two versions of the connection wire are available, which allow two different installation positions for each cable. When purchasing the connection cable, please consult your bike manufacturer to ensure that you choose the correct cable so it does not interfere with your cranks while pedaling.

Connector AD RA2 30°

SKU: 24010411000000

- Total length: 193 mm ($\pm$ 7mm)
- Diameter: 6,5 mm
- Wire length: 100 mm ($\pm$ 5mm)
- Weight: 33 grs.
- Waterproofness IP67



Connector DE RA2 90°

SKU: 240 104 110 01 000

- Total length: 193 mm ($\pm$ 7mm)
- Diameter: 6,5 mm
- Wire length: 110 mm ($\pm$ 5 mm)
- Weight: 35 grs.
- Waterproofness IP67



5. Application and Services

The MAHLE My SmartBike application allows you to connect your smart device to your X20 System. The My SmartBike application will not only display all critical ride data and let you track and record your activities, it also lets you customize the assist levels to your own expectations.

MAHLE will continue to add new features and functions to the system, to ensure your bike will always be fully compatible with new software applications and added smart solution added in the future.

Your X20 System is compatible with the full family of MAHLE SmartBike Systems APPs that provide the following features:

- My SmartBike iOS version for iPhones
- My SmartBike for Android phones
- www.my-smartbike.com Browser applications

To diagnose the system in a professional workshop environment we also offer a dealer-only application:

- Smarbike Lab (iOS and Android)

↕ NOTICE

To ensure your X20 System is always up-to-date, we highly recommend downloading the My SmartBike APP and regularly connecting your system to your smart device. Doing so will ensure your bike will always feature the newest updates.

5.1. My-SmartBike phone APP

The MAHLE My SmartBike APP is compatible with smart devices using iOS or Android systems. The APP lets you track and record your activities. With the available features, your smart device becomes your all-in-one smart bike display when placed on the handlebar.

⚠ CAUTION

For your own safety, we do not recommend using your smart device while riding if it is not firmly connected to your handlebar.

Use the following links to download the APPs



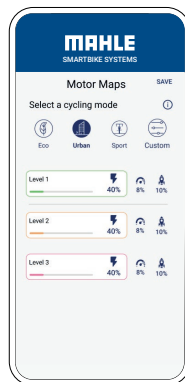
5.1.1. Smartphone APP. Main Functions

If you connect your eBike to the MAHLE My SmartBike APP you will benefit from the following features:

- Motor performance definition. Control the power, acceleration and reactivity of each assist level.
- Record and track your activities and automatically synchronize with STRAVA. You can always also view your completed activities online.
- Use your smartphone as your main display to see your main parameters such as batteries status, hearth rate, range, etc.
- Automatic assist level control.
- Get access to extra information and tutorials.
- Keep track of the status of your eBike.
- Keep your system updated.
- Localize your eBike (last position connected to your smart device).
- Additional features will be added in the future.

5.1.2. Smartphone APP. Motor settings

The X20 System includes 3 PRESET modes. Each preset mode is a full system setup of which will modify the peak power, acceleration, and reactivity of each assist level (1 to 3).



The system also features a CUSTOM mode. The CUSTOM mode will allow you to customize each of the assist levels (1 to 3) by adjusting peak power, acceleration, and reactivity.

PEAK-System The system also features a CUSTOM mode. The CUSTOM mode will allow you to customize each of the assist levels (1 to 3) by adjusting peak power, acceleration, and reactiveness.

- **Power:**

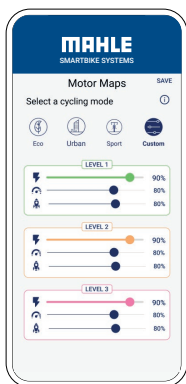
Peak power defines the maximum power the motor can provide for a short period of time (Watts).

- **Acceleration:**

Acceleration defines the time it takes to reach the full level of assistance you selected. Less % will result in a smoother change while more % will make it change faster.

- **Reactiveness to applied torque:**

Reactiveness defines the effort you need to apply to reach the designated power outlet. Less % will result in more effort while more % will make it easier to reach the selected power outlet.

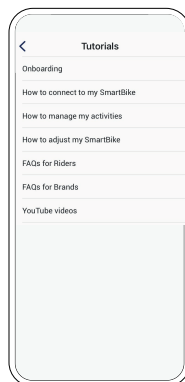


If you need support connecting your device to your eBike, please use the tutorials provided in the APP.



NOTICE

Open the APP and click on SETTINGS. Once you choose SETTINGS go to TUTORIALS



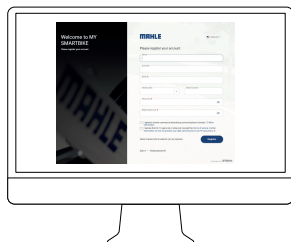
5.2. My Smartbike Web APP

You can also view all your eBike details online through your web browser (on any smart device or computer). The Web APP is designed to give you more details about your activities and a higher level of trackability about your general usage of the system. To access the website please go to www.my-smartbike.com

5.1.3. Smartphone APP Account creation

To enjoy all functions of the My SmartBike APP, please ensure you create your personal account:

1. Access www.my-smartbike.com/user/login through your web browser and create a user account.
2. Download the My SmartBike APP to your smart device and create a user account directly on your device.



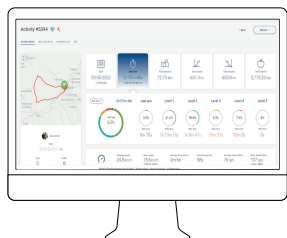
Sign up here

5.2.1. Web APP. Main Functions

The following features are available through the web application:

- Timeline of all your activities
- Complete overview of all your achievement
- Detailed visualization of your general usage including the use of the different assist levels
- Locate your eBike (last position connected to your smart device)
- Status of your eBike (Serial number, errors, reports, trouble shooting, components, ...)
- Full trackability of your activities incl. map overview and power mapping
- Segmentation of your ride by elevation, speed, slope, altitude, HR or assist level used or power consumed
- Access to all public activities
- Synchronization with STRAVA
- Share your tracks on Social Media
- Documentation of your system
- Support

Once you have created your personal account, open the MAHLE My SmartBike APP, switch your eBike on and simply follow the process of the APP to connect your device and eBike by Bluetooth.



5.2.2. Web APP. Account creation

Use the same username and password as you are using for the smart device applications to access the web application.

6. Servicing

All components of the X20 System are fully replaceable. Please be aware that some parts can only be changed or handled by an authorized MAHLE service partner or dealer.

Components such as the rear wheel can be changed or replaced by the end user directly. To ensure that you will not injure yourself or damage the components please follow some basic guidelines.



WARNING

If servicing is required, please remember at all times that this can only be performed by a professional mechanic. eBike components include electronic components and connections that need to be installed correctly. Misuse of batteries or other components may cause serious injuries or damage to the components.

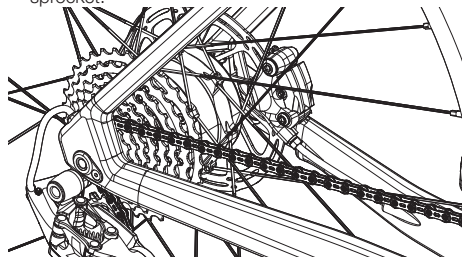
6.1. Rear wheel removal and installation

Should you need to remove the rear wheel for servicing or replacement, please read the following paragraph carefully.

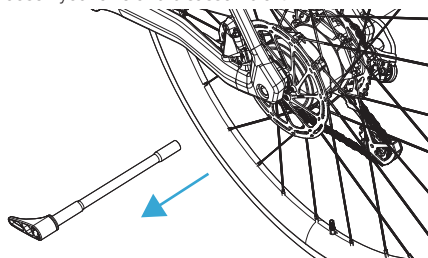
The rear wheel includes the X20 Drive which does not have direct wire connection. It features an automatic connection which needs to be taken care of when installing or removing the rear wheel. Please follow the steps below.

6.1.1. Rear wheel removal

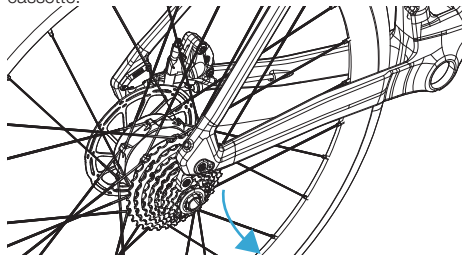
1. If you run a single speed setup, please continue with step 3.
2. If you run a cassette, downshift to the smallest sprocket.



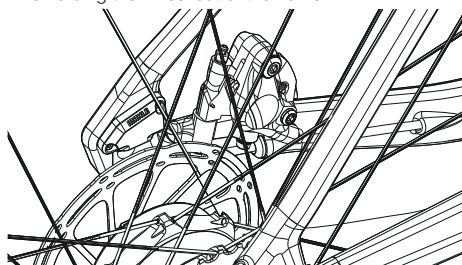
3. Loosen your axle and disassemble it.



4. Slide the wheel out of the frame. Ensure you give room to the wheel by pressing the rear derailleur away from the cassette.



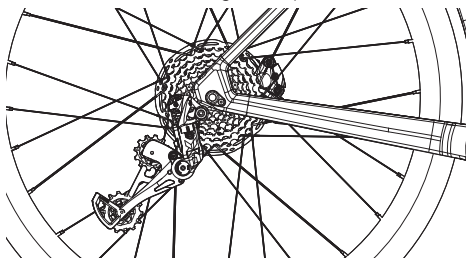
5. Ensure to not damage the frame with the disc rotor when sliding the wheel out of the frame



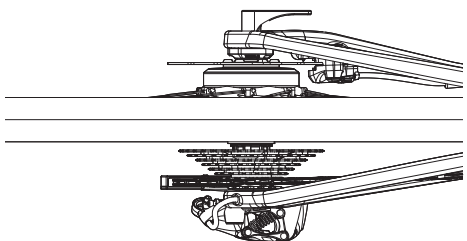
6.1.2. Rear wheel installation

To install the rear wheel, please follow the steps below:

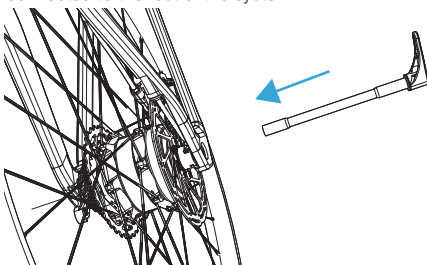
1. Ensure the upper chain is lying on the cassette, while the lower part of the chain is running underneath the cassette and is not blocking the dropouts.



2. Ensure that both the disc rotor and the brake caliper are perfectly aligned to avoid any damage to the frame or brake caliper.



3. Carefully slide the rear wheel into the dropouts. Please ensure that the motor connector is facing upwards and is aligned with the dropout. Once the wheel sits smoothly in the dropouts, guide the axle through the motor and tighten it to the frame manufacturers recommendations. Once the axle is tight, the motor is automatically connected to the rest of the system.



WARNING

Always ensure that both, the motor and the frame side of the automatic connector are clean before installing the rear wheel. Check the connector before installing the rear wheel – all pins should be straight. Should you need support installing your rear wheel, please reach out to your local dealer.

6.2. Other Services

Your X20 System does require regular servicing and some components are suspect to wear. To always ensure your eBike is working as intended please ensure regular service. If any of the components needs to be replaced, please get in touch with your local dealer for further support.

6.2.1. Freewheel and bottom bracket service

The X20 System does feature a fully replaceable freewheel and bottom bracket which both require regular servicing.

For both freewheel and bottom bracket installation, there are guidelines that explain the process step by step in detail.

Any kind of replacement or service needs to be performed by a professional mechanic. Always ensure that no wires or connectors are damaged in the process of installing or removing system components. Before you perform any kind of replacement, please read the recommendations of both MAHLE and the bike manufacturer, including all additional information about bicycle maintenance and care. Pay special attention to the guidelines of the bottom bracket removal and installation.

6.2.2. Battery, Motor, Head Unit Service

Should a new battery be required, please be aware that the replacement can only be performed by a professional mechanic. We therefore recommend getting in touch with your dealer prior to the replacement. Additional steps such as the activation of the battery may occur for various components which can only be performed by an authorized MAHLE service partner.

Please be aware that MAHLE only warrants the X20 Drive Unit which is the rear hub of your eBike wheel. Should you face any issues with your spokes or rim or other parts of your rear wheel, please get in touch with your bike manufacturer directly.



NOTICE

MAHLE SmartBike Systems components require a specific software activation. Pay special attention when replacing the BB, the Drive Unit, the battery or Head Unit. In any case, replacements must only be performed by professional mechanics.

6.2.3. Replacing Automatic Dropout Connection

If the motor connector is damaged a replacement is possible. Please get in touch with your local dealer if a replacement is required.

6.3. Warranty

Warranty terms and periods are based in our end user final policy and into the end user warranty regulation and laws of each region. Please get in touch with your dealer should you have any problem with the system. MAHLE has a global distribution and service network for the regions where the sale of the X20 System is authorized.

6.4. FAQs

I was long time without using My SmartBike and it doesn't switch ON when I press the button

If you were more than 60 days without using your eBike it can automatically enter in sleep mode. To wake up just connect your charger. Even battery can goes to ultra-sleep mode, in that situation you will need to keep connected at least one hour.

Is it possible to change the inner battery?

Changing the battery also requires an additional process that only a dealer with the proper tools can carry out. It is possible to change the inner batteries but only through the official network.

Is it possible to install a MAHLE display on your SmartBike?

The X20 Systems supports ANT+ LEV profile; therefore using the Pulsar ONE as a display grants full compatibility with your X20.

Is the bike compatible with other displays?

Other compatible displays can be found here: <https://www.thisisant.com/directory/>

Is it possible to install or retrofit the eBike e-Shifters?

Commercial Answer. Technically it can be done; but wiring routing on some OEM integrations might become tricky from end user point of view.

By how much does the Range Extender increase my range?

Range Extender e185 offers you an additional 171Wh. As well as with the inner batteries, the increase depends on the way you use your eBike. What we can say is that it increases the range of the eBike with iX350 batteries by 50% and the eBike with iX250 batteries by 75%. (from 30 km to 70 km).

Is it possible to upgrade the eBike from the iX250 to iX350 battery?

Check with your dealer. Change batteries will change the specifications of your eBike. Anyway, iX250 and iX350 have different sizes but share same fitting points. Any battery replacing also requires the activation of the new battery by the dealer.

In case of malfunction what do I have to do?

A malfunction shall be shown as an error or warning on the Head Unit. Please, connect the My SmartBike APP from MAHLE to check the code number that identifies the malfunction and share with an authorized Dealer or Customer Service.

Is it possible to repair the battery?

The battery is considered a dangerous good. Therefore, MAHLE recommends that the battery should only be handled by MAHLE specialists and replaced with a new one in the official dealer network.

Is it possible to update the system?

Sure. It is possible. Use the micro-USB port included in the Active Charger. Review the specific section of this manual for that.

Why is the Head Unit flashing when the battery is close to being drained?

The Head Unit LED bar will light up in the color of the engaged assist level and show the actual state of your battery charge. When battery charge goes below 10%, the Head Unit LED bar starts flashing to warn you about this status, when charge goes below 5%, flashing becomes faster to warn about an eventual ordered shutdown of the system at any time.

The X20 System is too aggressive or not powerful enough, how can I reduce or increase the power?

Sure. X20 System includes the capability to adjust the power, acceleration, and reactivity. For a proper adjustment, install the My-SmartBike APP, pair your eBike and go to Motor Settings. Custom setup gives to you the opportunity to set up your own power definition.

What is the range with the iX250 and iX350 batteries?

Range depends on your weight and cargo carried, elevation of terrain, wheel size, assist used, motor setup defined, speed and type of battery installed. As reference we can use this table:

Inner Battery	Range in Km	
	Minimum	Maximum
iX250	40	100
iX350	60	140

Remember that you can always add the External Range e185 extender that will close to double your iX250 inner battery.

How long does it take to charge the inner battery?

It is possible to get 80% of SOC after the first 2 hours of charging. The last part of the charge will take more time depending on the inner battery version installed. Maximum charging time is around 4 hours. Five minutes after reaching the max SOC the eBike is automatically switched OFF.

My display or Head Unit Control shows an error, what do I have to do?

A malfunction shall be shown as an error or warning on the Head Unit. Please connect the My SmartBike APP from MAHLE to check the code number that identifies the malfunction and share it with an authorized Dealer or Customer Service.

Your Head Unit Control flashes orange.

X20 functionality is limited and therefore the Head Unit shows you a warning. A malfunction will be shown as an error or warning on the Head Unit. Please, connect the My SmartBike APP from MAHLE to check the code number that identifies the malfunction and share it with an authorized Dealer or Customer Service.

My Head Unit Control flashes red

X20 functionality is compromised and therefore the Head Unit shows you an error. A malfunction will be shown as an error or warning on the Head Unit. Please connect the My SmartBike APP from MAHLE to check the code number that identifies the malfunction and share with an authorized Dealer or Customer Service.

Can I use a third-party charger?

No. The Active Charger is a device that establishes a digital communication with the batteries. If you do use NON-MAHLE original equipment, you run the risk of destroying components and voiding the warranty terms.

Is it possible to use third-party Range Extenders?

No. The Range Extender is a device that establishes a digital communication with the batteries. If you do use NON-MAHLE original equipment, you run the risk of destroying components and voiding the warranty terms.

What is the consequence of tampering with the eBike system?

Tampering will cause a direct security and safety issue that will affect the normal operation mode designed, running a high risk of suffering personal injuries and losing the normal warranty terms. Only use MAHLE official components to avoid that.

6.5. Error Codes

This is a short list of the potential error codes that might occur in the Head Unit. For further information, get in touch with your local dealer or the MAHLE technical service:

 -> Flashing Red (ERROR)

 -> Flashing Orange (WARNING)

Code	Head Unit	Description / Action
22		MOTOR_ERROR Check the connections. If there is no recovery go to your dealer.
30		OVER_CURRENT_PROTECTION Restart the system. If there is no recovery go to the dealer.
32		COMM_HMI_ECU_ERROR Error in the HMI – ECU Communication. Check the connections. Needs to go to assistance 0 to assist again. If there is no recovery, go to your dealer.
33		NO_SPEED_SENSOR_INFO Speed Sensor error. If there is no recovery, go to your dealer.
43		TORQUE_FAULT Torque sensor error. Review the connections. If there is no recovery, go to your dealer.
44		LOW_VOLTAGE_PROTECTION Battery voltage too low. Charge the battery.
45		OVER_VOLTAGE_PROTECTION Battery voltage too high. Discharge the battery.
46		HALL_SENSORS_FAULT Motor sensor error. If there is no recovery, go to your dealer.
47		ECU_OVER_TEMPERATURE_PROTECTION Motor controller temperature too high. Let the system cool down.
49		BATTERY_CURRENT_ERROR Battery current too high, reduce the assistance. If there is no recovery, go to your dealer.
50		BMS_COMMUNICATION_FAULT Error in the BMS – ECU Communication. If there is no recovery, go to your dealer.

- | | | |
|----|---|---|
| 51 |  | COMMUNICATION_FAULT_LOST_FRAME-JOB_1
Warning, communication problem. If there is no recovery, go to your dealer. |
| 52 |  | DRIVER_ERROR_VG_UNDERVOLTAGE
Motor controller voltage too low, charge the battery. If there is no recovery, go to your dealer. |
| 53 |  | DRIVER_ERROR_OVERTEMPERATURE
Motor controller temperature too high. Cool down the system. |
| 54 |  | DRIVER_ERROR_OVERCURRENT
Motor controller current too high, reduce the assistance. If there is no recovery, go to your dealer. |
| 55 |  | DRIVER_ERROR_VDD_UNDERVOLTAGE
Motor controller voltage too low, charge the battery. If there is no recovery, go to your dealer. |
| 56 |  | CADENCE_INVALID
Cadence sensor error. If there is no recovery, go to your dealer. |
| 57 |  | SPEED_PLAUSABILITY
Speed sensor error. If there is no recovery, go to your dealer. |
| 59 |  | SPEEDS_PLAUSABILITY
Speed sensor error. If there is no recovery, go to your dealer. |
| 61 |  | HARD_MOTOR_BLOCK
Motor error. If there is no recovery, go to your dealer. |
| 62 |  | EXCEED_TICK_SHIFT
Motor controller FW error. Re-start the eBike. If there is no recovery, go to your dealer. |
| 67 |  | CAN_UVS_DLC
Communication problem. Restart the system and review connections. If there is no recovery, go to your dealer. |
| 69 |  | PHASE_ZEROING_ERROR
Power system error. If there is no recovery, go to your dealer. |
| 70 |  | DU_UNDER_TEMP
Motor under temperature. Please go to a warmer place. |
- | | | |
|----|---|---|
| 71 |  | DU_OVER_TEMP
Motor over temperature. Please go to a cooler place. |
| 72 |  | DU_SNS_UNDER_TEMP
Motor sensors under temperature. Please go to a warmer place. |
| 73 |  | DU_SNS_OVER_TEMP
Motor sensors over temperature. Please go to a cooler place. |
| 74 |  | GEARSET_OVERSPEED
Motor over speed. Please reduce the speed of the eBike. If there is no recovery, go to your dealer. |
| 77 |  | UNBALANCE_PHASE_CURRENT
Power system error. If there is no recovery, go to your dealer. |
| 79 |  | CAN_OFF_LONG
Communication error. If there is no recovery, go to your dealer. |
| 80 |  | POWER_STAGE_ERROR
Power system error. If there is no recovery, go to your dealer. |
| 84 |  | ANALOG_INPUT_ERROR
Motor controller sensors error. If there is no recovery go to your dealer. |
| 85 |  | MC_UNDER_TEMP
Motor controller under temperature. Please go to a warmer place. |
| 86 |  | MC_LIB_ERROR
Motor controller internal error. Re-start the system. If there is no recovery go to your dealer. |
| 87 |  | TCS_POWER_SUPPLY_ERROR
Torque and cadence sensors power supply error. Re-start the eBike. If there is no recovery, go to your dealer. |
| 88 |  | MOTOR_CONNECTION_ERROR
Motor error. Restart the eBike. If it doesn't reset, contact your dealer |

HMI Errors

Code	Head Unit	Description / Action
129		DEMO MODE HMI demo mode. Assistance goes to 0. If there is no recovery, go to your dealer.
130		HMI_CONFIGURATION_FAIL HMI configuration fail. Assistance goes to 0. If there is no recovery, go to your dealer.
132		CAN_TX_ERROR HMI Communication error. If there is no recovery, go to your dealer.
133		CAN_RX_BMS HMI – BMS communication error. Assistance goes to 0. If there is no recovery, go to your dealer.
134		CAN_RX_ECU HMI – ECU communication error. Assistance goes to 0. If there is no recovery, go to your dealer.
136		MAIN_BUTTON_DIAGNOSIS Main button error. Assistance goes to 0. If there is no recovery, go to your dealer.
137		LEFT_BUTTON_DIAGNOSIS e-Shift left button error. Assistance goes to 0. If there is no recovery, go to your dealer.
138		RIGHT_BUTTON_DIAGNOSIS e-Shift right button error. Assistance goes to 0. If there is no recovery, go to your dealer.
139		NOT_CALIBRATED HMI not calibrated. Assistance goes to 0. If there is no recovery, go to your dealer.
140		LIMITED_FUNCTIONALITY_IMU HMI limited functionality. Assistance goes to 0. If there is no recovery, go to your dealer.
144		ALS_LIMITED ALS limited functionality. If there is no recovery, go to your dealer.
145		LIMITED_FUNCTIONALITY_LED LEDs limited functionality. If there is no recovery, go to the dealer.
160		ANTITHIEF_ACTIVE Antitheft mode active.

Battery Errors

Code	Head Unit	Description / Action
167		LOW_VOLTAGE_PACK Battery level too low for correct motor operation. The user is recommended to change the battery quickly. Assistance goes to 0.
168		LOW_VOLTAGE_CELL Battery level too low for correct motor operation. The user is recommended to change the battery quickly. Assistance goes to 0.
169		DERRATING_ACTIVE_CHARGING High charging temperature. Please place the battery in a cold environment for charge. To prevent damage to the battery, the charging speed has been slowed down.
170		DERRATING_ACTIVE_DISCHARGING High battery temperature. To ensure safety, the engine power will be reduced. Please deactivate the electric assistance or take a break while the battery temperature is decreasing.
171		IMBALANCE_LIGHT_PACK Imbalance between cells. The capacity of the battery may be limited. Perform a full charge of the battery as soon as possible.
172		USB_OVERLOAD_OR_SHORTCIRCUIT An overcurrent or short-circuit has occurred in the USB charger line. The bike can work properly except for the USB line. If there is no recovery, go to your dealer to check the conditions of the battery and auxiliary wiring.
173		LIGHTS_OVERLOAD_OR_SHORTCIRCUIT An overcurrent or short-circuit has occurred in the lights line. Check the condition of the bike lights and the wiring to the battery. If there is no recovery, go to your dealer.
174		BACKUP_OVERLOAD_OR_SHORTCIRCUIT An overcurrent or short circuit has occurred in the lights line. Check the condition of the bike lights and wiring to the battery. If there is no recovery, go to your dealer. Bike can work properly except for the lights (Power OFF).
180		CHARGE_OVERCURRENT An overcurrent occurred during the charging process. Check that the charger is in good condition. If the problem persists, go to your dealer.
181		DISCHARGE_OVERCURRENT Battery has suffered an overcurrent. This may be due to the motor demanding more peak power than the battery can deliver. Assistance level goes to 0. Reduce the assistance level and check the wiring. If the problem persists, go to your dealer.

182		SHORTCIRCUIT Critical error of the BMS. If the problem persists, go to your dealer.
183		OPEN_CELL_WIRE Failure in the internal wiring of the battery. Assistance level goes to 0. If the problem persists, go to you dealer.
184		IMBALANCE_SEVERAL_CELL Severe imbalance between cells. Assistance level goes to 0. Please perform a full charge of the battery as soon as possible.
185		PACK_OVERTEMPERATURE High battery temperature. The battery cells are suffering severe degradation from high temperature. Assistance level goes to 0. Please go to a cooler place.
186		PACK_UNDERTEMPERATURE Low battery temperature. The battery cells are suffering and degradation from low temperature. Assistance level goes to 0. Please go to a warmer place for better cell life.
187		PACK_OVERTEMPERATURE_CHARGING The temperature is too high to charge the battery. Assistance goes to 0. Please goes to a cooler place for better cell life.
188		PACK_UNDERTEMPERATURE_CHARGING The temperature is too low to charge the battery. Assistance goes to 0. Please go to warmer place for better cell life.
189		OVERVOLTAGE_PROTECTION_PACK Battery pack voltage is more than the max allowed. Please stop the charging process and try to discharge it.
190		UNDERVOLTAGE_PROTECTION_PACK Battery pack voltage is less than the minimum allowed. Assistance level goes 0. It is recommended to charge the battery as soon as possible.
191		OVERVOLTAGE_PROTECTION_CELL Cell voltage is more than the max allowed. Please stop the charging process and try to discharge it.
192		UNERVOLTAGE_PROTECTION_CELL Battery pack voltage is higher than the maximum allowed. Assistance level goes to 0. It is recommended to charge the battery as soon as possible.
193		FET_OVERTEMPERATURE BMS MOSFET temperature failure. If the problem persists, go to your dealer.
194		HMI_1_OVERLOAD_OR_SHORTCIRCUIT There is an overcurrent fault on the HMI 1 line. Assistance goes to 0 and power OFF. Disconnect HMI 1 and connect the remote to HMI 2 line.

195		HMI_2_OVERLOAD_OR_SHORTCIRCUIT There is an overcurrent fault on the HMI 2 line. Assistance goes to 0 and power OFF. Disconnect HMI 2 and connect the remote to HMI 1 line.
196		MCON_OVERLOAD_OR_SHORTCIRCUIT There is an overcurrent fault on the MCON line. Assistance level goes to zero. If the problem persists, go to your dealer.
197		FATAL_SOFTWARE_ERROR Critical error of the BMS. Assistance goes to 0. If the problem persists, go to your dealer.
198		CAN_COMMUNICATION_ERROR There are security errors in the BMS communications. Assistance level goes to 0. Avoid using NON MAHLE original equipment.
200		CRITICAL_ERROR Critical communication in the BMS. Assistance goes to 0. If the problem persists, go to your dealer.
201		REVERSE_CURRENT Reverse current error. Please check that the motor is not breaking the eBike. If the problem persists, go to your dealer.

Range Extender (RE)

Code	Head Unit	Description / Action
208		LOW_BATTERY_CELL RE battery level too low for correct motor operation. It is recommended to charge the RE quickly. Assistance goes to 0.
209		LOW_BATTERY_PACK RE battery level too low for correct motor operation. It is recommended to charge the RE quickly. Assistance goes to 0.
210		DERRATING_ACTIVE_CHARGING High charging temperature. Please place RE in cool environment for charging. To avoid damage to the RE charging speed has been slowed down.
211		DERATING_ACTIVE_DISCHARGING High RE temperature. The RE cells are suffering from high temperature. To ensure safety, the motor power will be reduced. Please switch off the RE or decrease assist level to recover operation temperature.
212		IMBALANCE_LIGHT_PACK Imbalance between RE cells. The capacity of the range extender may be limited. Please perform a full charge of the RD as soon as possible.
221		CHARGE_OVERCURRENT An overcurrent occurred while charging process. Assistance goes to 0. Please check that the charger and range extender are in good condition. If error persist replaces the hardware.

222  **DISCHARGE_OVERCURRENT**
The RE has suffered an overcurrent. They may be due motor has demanded more power than the RE can deliver. Assistance goes to 0. Check the status of wiring or decrease assist level.

223  **SHORTCIRCUIT**
Critical error of the RD. If the problem persists, go to your dealer.

224  **OPEN_CELL_WIRE**
Failure in the internal wiring of the RE. Assistance level goes to 0. If the problem persists, go to your dealer.

225  **IMBALANCE_SEVERAL_CELLS**
Imbalance between RE cells. The capacity of the RE may be limited. Perform a full charge of the battery as soon as possible.

226  **PACK_OVERTEMPERATURE**
The temperature of the RE is too high. Assistance goes to 0. Please cold down the RE for better cell life.

227  **PACK_UNDERTEMPERATURE**
The temperature of the RE is too low. Assistance goes to 0. The RD cells are suffering a degradation from low temperature. Please warm the RE for better cell life.

228  **PACK_OVERTEMPERATURE_CHARGING**
The temperature is too high to charge the RE. Please go to a cooler place to charge.

229  **PACK_UNDERTEMPERATURE_CHARGING**
The temperature is too low to charge the RE. Please go to a warmer place to charge.

230  **OVERVOLTAGE_PROTECTION_PACK**
RE pack voltage is more than the max allowed. Please stop charging the RE and try to discharge it.

231  **UNDERVOLTAGE_PROTECTION_PACK**
RE pack voltage is less than the minimum allowed. It is recommended to charge the battery as soon as possible.

232  **OVERVOLTAGE_PROTECTION_PACK**
Cell voltage of the RE is more than the max allowed. Please stop the charging process and try to discharge it.

233  **UNERVOLTAGE_PROTECTION_CELL**
RE pack voltage is higher than the maximum allowed. It is recommended to charge the battery as soon as possible.

234  **FET_OVERTEMPERATURE**
RE BMS MOSFET temperature failure. If the problem persists, go to your dealer with the RE.

238  **FATAL_SOFTWARE_ERROR**
Critical error of the RE. Assistance goes to 0. If the problem persists, replace the RE.

239  **CAN_COMMUNICATION_ERROR**
There are security errors in the RE communications. Assistance goes to 0. Avoid using NON MAHLE original accessories.

240 **POWER_OFF**

241  **BMS_COMM_ERROR**
Internal error in the communication of internal components of the BMS. Assistance level goes to 0. If the problem persists, replace the battery.

242  **REVERSE_CURRENT**
Reverse current error. Assistance goes to 0. Check the motor is not breaking the eBike. If the problem persists, go to your dealer.

Charger

Code	Head Unit	Description / Action
248		CHARGER_OVERTEMPERATURE Charger overtemperature. Please go to a cooler place to lower the temperature of the charger.
249		CHARGER_SHORTCIRCUIT Charger power error. Review the wiring. Unplug and plug again the charger. If the problem persists, please go to your dealer.
250		CHARGER_OVERVOLTAGE Charger overvoltage. Unplug and plug again the charger. If the problem persists, go to your dealer.
251		CHARGER_OVERCURRENT Charger overcurrent. Unplug and plug again the charger. If the problem persists, please go to your dealer.
252		CHARGER_TIMEOUT Charger communication error. Unplug and plug again the charger. If the problem persists, go to your dealer.
253		CHARGER_CAN_COMMUNICATION Charger communication error. Review the connectors. Unplug and plug the charger. If the problem persists, please go to your dealer.

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