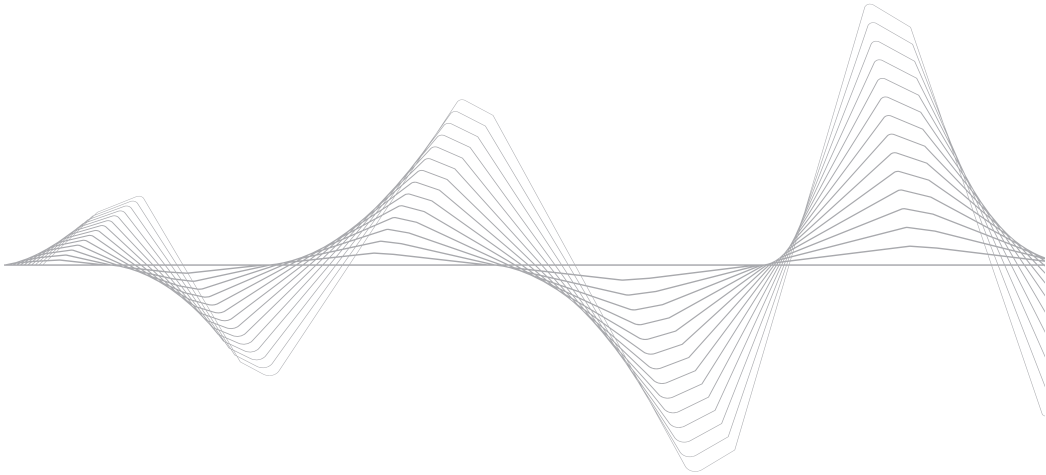
ROTAX®

INSTALLATION and OPERATION MANUAL ROTAX E10



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A BRP BRAND

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TABLE OF CONTENT

1. SCOPE OF DELIVERY

2. GENERAL INFORMATION

3. INTENDED USE AND TECHNICAL DATA

4. SAFETY INFORMATION

5. PRODUCT DESCRIPTION

6. MOUNTING

7. CHARGING

8. OPERATION

9. INSPECTION AND MAINTENANCE

10. STORAGE AND DISPOSAL

Preface

Congratulation for purchasing of ROTAX E10.
This electric kart Powertrain is specifically designed for racing applications.
Lifetime ease of use and parity to the next level are achieved by this Powertrain and will bring much joy to its user.

1. Scope of delivery

The ROTAX E10 includes following components:

- Drive unit
- Steering wheel module
- Kart status light (front LED White and rear LED Orange)
- Throttle unit
- Wiring harness
- DESS key Grey with terminal
- Quick start guide
- Battery user guide
- Other accessories

Following parts must be ordered separately, according to your specific demand:

- Battery (1 battery for Bambini, 2 batteries for Mini)
- Battery cooling cover with fan (one per battery)
- Battery charger
- AC cable for battery charger (EU/UK - Industrial, NA - Industrial)

2. General information

This installation and operation manual is issued to allow you to familiarize yourself with all the components and the function of the ROTAX Electric Powertrain E10.

This manual contains the necessary information for the installation, operation and maintenance of the ROTAX E10.

The safety information ensures safe handling during all work and operation on the ROTAX E10.

Before starting any work, the installation manual must be carefully read and understood by all target groups.

The illustrations are intended for better understanding and may differ from the version supplied.

2.1 Target groups

Target groups for this manual are the following categories:

- The end-user are racers with a racing license and additional training
- Distributors
- Maintenance Personnel, Mechanics
- Racing schools, race track owners

2.2 Further documents

Additional to this installation manual see the follow documentation in scope of delivery:

- Charger user manual
- Battery user manual

The further documents are a mandatory part of this installation manual. Before starting any work read all documents.

If you have any questions or concerns regarding any section of the manuals or documentation, please contact an authorized ROTAX karting distributor or one of his service centers/dealers https://locator.rotax-racing.com

Please use either the links or QR-codes to navigate to the Online version of the PRODUCT DOCUMENTATION to view and download all manuals and documents related to your engine: https://www.rotax-racing.com/manuals

3. Intended use

- ROTAX E10 is intended for use on kart race tracks complying with short track requirements according to CIK-FIA
- ROTAX E10 is intended for competitive racing purposes only. This includes races and training
- ROTAX E10 is intended to fit chassis with a wheelbase of 950 mm and 1010-1070 mm. Make sure that the chassis you are using is capable of mounting the ROTAX E10
- Only technically qualified personnel is authorized to mount the ROTAX E10
- Before use, the technical personnel must instruct the racer in the use of the kart
- Maintenance or replacing of components only permitted with genuine Rotax Spare Parts according to the Installation manual
- No driving at speeds that exceed the kart operator's capabilities or physical condition
- Only use approved protective equipment (helmet, racing suit, karting gloves and shoes) and other safety equipment for children in your country

NOTICE

Any other use is considered improper use.
BRP-ROTAX is not liable for any resulting damage to people, the environment or possible damage to property.

BRP-ROTAX reserves the right to remove, replace or discontinue any design specification, feature or other at any time and without obligation to notify you of such errors.

Do not open the covers of the motor, inverter or battery as this will invalidate the warranty and may cause injury.

3.1 Not intended use

- Modification of any component

3.2 Responsibilities of the operator and technical personnel

- Compliance with the intended use
- Check the suitability of the operators
- Ensure that only technical trained personnel may install the ROTAX E10
- Ensure that children are not allowed to work on the ROTAX E10, to remove the battery from the vehicle or charge the battery
- Check the compatibility of additional parts
- Observe regular maintenance intervals

3.3 Technical data

Features	Single battery	Dual battery
Max. power output (depending on key)	5 kW	10,5 kW
Boost function Single/Dual Batteries	more power for 5 s, every 45 s	
Mass	27,7 kg	40,5 kg
Degree of protection battery	IP67	
Degree of protection drive unit	IP66K	
Ambient temperature	5 °C to 35 °C / 41 °F to 95 °F	
Humidity	0…100 %	
Sea level altitude	to 2500 m	
Ambient temperature limits charging	5 °C to 40 °C / 32 °F to 104 °F	
Storage conditions	SoC of 30 % -20 °C to 25 °C / -4°F to 77 °F	

The safety installations of the mains-power supply shall be in accordance with the national laws.

Make sure that the socket is protected:

- For 230 V grid with 16 A fuse for fast charging and with 10 A for or normal charging
- For 110 V grid with 13 A fuse (fast charge not possible)

3.4 Conformity

ROTAX E10 was developed according to the state of the art at the time of market launch.

4. Safety information

The following safety information must be read carefully of all target groups.

Obey the safety instructions and operate with the ROTAX E10 accordingly.

⚠WARNING

Risk of injury due to improper use!

- Never open the components
- The tuning of the ROTAX 10 is prohibited
- Private use or working on electrical components is strictly prohibited
- Each user is responsible for ensuring safety at all times
- Observe the safety and operating instructions carefully
- Never drive under the influence of any drugs, alcohol or in a bad medical condition

⚠WARNING

Risk of injury due to improper charging!

- Use the charger only in a dry area and do not expose it to water or rain
- Use the charger in a well ventilated area
- Use only original ROTAX E10 Charger
- Charge the battery only in a dry area that's fitted with a working smoke detector without flammable materials near
- Do not place charger or battery near flammable materials
- Do not charge your battery unattended or overnight
- Disconnect the charger from the power supply after charging
- Disconnect the cable from charger to the battery after charging

⚠WARNING

Risk of electric shock!

- The charger may only be used if the mains supply has an RCD and protective earth
- Visually check the cable for damage before use. Damaged cables must be replaced immediately by authorized personnel
- Switch off the power supply before handling the electric kart
- Perform the grounding in accordance with national regulations by authorized personnel
- Switch off the charger and disconnect the charging cable from batteries before handling the electric kart

⚠WARNING

Risk of injury due to heavy parts!

- Use personal protective equipment for the installation works
- Only technical personnel shall work on the components

⚠WARNING

Slip hazard due to wet surface!

- The surfaces can get slippery when wet. Racers shall ensure safe entry / exit

⚠WARNING

Risk of injury to rotating parts!

- Before working on the ROTAX E10, batteries shall be disconnected
- Don’t wear loose clothing, a scarf or a tie. The long hair must be knot when working on the ROTAX E10

⚠WARNING

Risk of injury due to parts not tightened correctly!

- Observe the specified tightening torque
- Incorrectly tightened parts can result in functional impairment and can be hazardous (loose, flying parts)

⚠WARNING

Risk of injury due to improper use of the battery!

- Use only original Rotax batteries for the ROTAX E10
- Use the battery only in conjunction with the original ROTAX E10
- For your own safety, do not repair defective or old batteries
- Never open the batteries
- Protect battery against heat, fire and being submerged in water
- Do not store or operate the battery near hot or flammable objects
- When the battery is not used keep away from small metal objects that can make connection from one connector pin to another
- Avoid mechanical loads and exposure to high temperature

⚠WARNING

If the batteries catch fire or start smoking:

- Ensure area is well ventilated
- Ensure that people are evacuated from the danger zone
- If applicable, stop operation of the kart
- Cover the batteries with a bag of fire extinguishing granulate for lithium batteries
- Cool down the batteries with water and suitable fire extinguisher
- If possible, move kart to an open easy-accessible area
- Put the E10 in a fire-proof container and wait until the batteries are not smoking anymore
- Start fighting the fire with sand and plenty of water
- Alert the fire brigade
- Consult a doctor if you notice any side effects. The fumes may irritate the respiratory system

⚠WARNING

Risk of fire!
Flammable material must be stored or placed at an adequate distance from all sources of ignition, direct sunlight, spotlights, and heating devices to assure that the material cannot be ignited or catch fire by either source potentially emitting heat.

⚠CAUTION

Risk of injury due to sharp edges!

- Wear gloves during installation work
- Prevent the sharp edges at cable laying

NOTICE

In case of transport:

- Interrupt the charger
- Disconnect the cables from the batteries
- Ensure the electric kart is securely fastened

NOTICE

If a battery is defective or no longer in use, the customer should contact the local dealer or sales point to make sure these batteries can be recycled / disposed free of charge for the end-customer.

4.1 Protecting clothes for drivers

Make sure drivers comply with the following mandatory requirements prior to getting into the kart:

- Full-face helmet in the correct size for the driver's head, approved according to national regulation, with strap to secure under the chin, and visor
- Mid-length and long hair must be secured under the helmet and the balaclava

- Closed clothing (no flowing skirts, dresses, coat or equivalent)
- Closed shoes with short lacing
- Jumpsuit / overalls with close cuffs on wrist and ankle
- Kart gloves, neck protector, rib protector

4.2 Preparation for emergency procedures

It is recommended that the kart operator has well documented procedures and trained staff for the following cases of emergency. The points mentioned below are a recommendation without the claim of completeness. It is mandatory to have safety measures and equipment available in case of fire.

NOTICE

The kart operator must ensure that his procedures comply with local laws and regulations.

5. Product description

ROTAX E10 is a Powertrain kit for an electric kart.

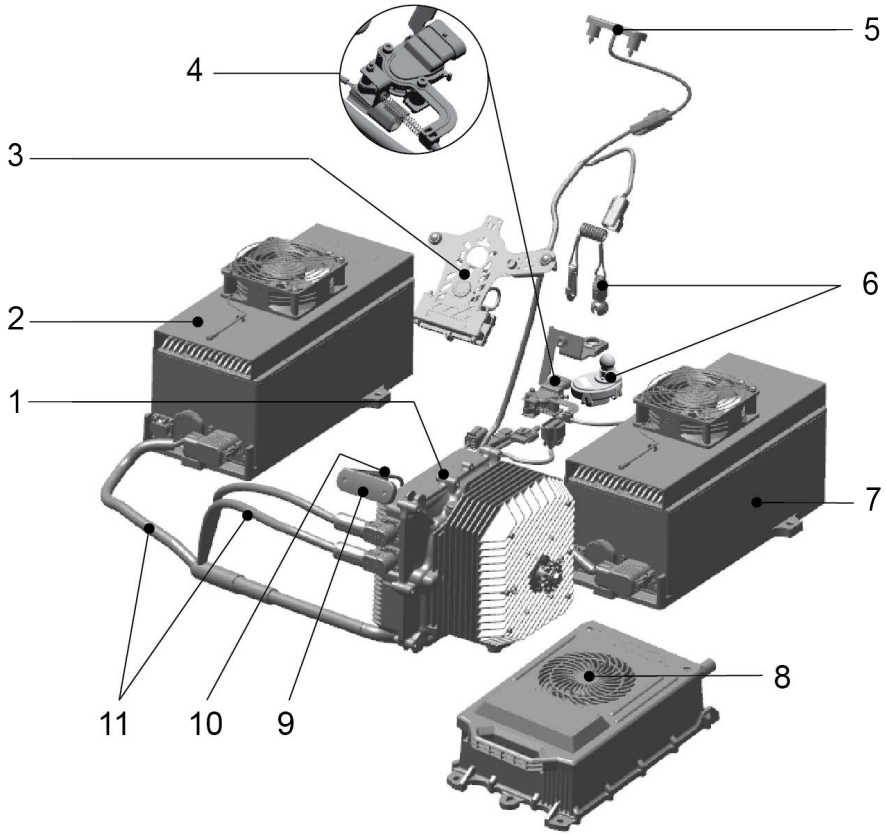
Type	E10 Bambini	E10 Mini
Ages	6-9	9-12
Battery	one	two

If only one battery is fitted the output power is reduced.

DC-DC Converter inside the 48 V battery provides the energy for the 12 V electrical system.

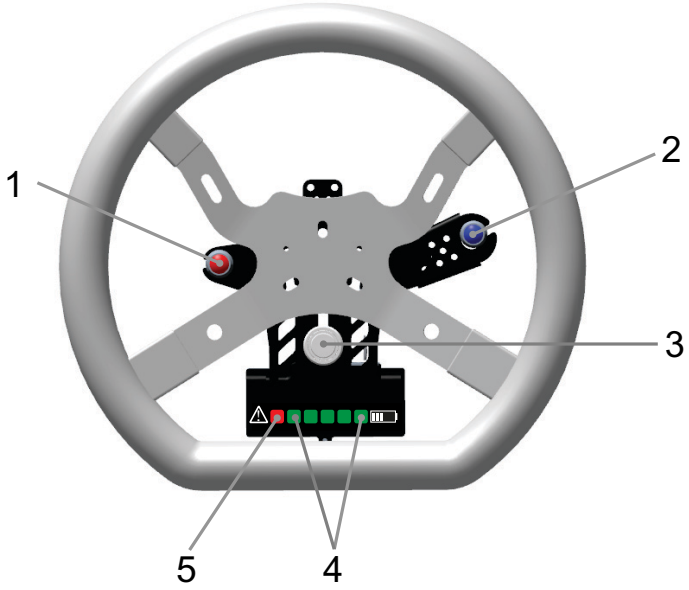
5.1 Product view

The following picture shows the components of the ROTAX E10 without chassis.



1. Drive unit
2. Primary battery with cooling cover
3. Steering wheel module
4. Acceleration pedal sensor
5. Front LED White with vibration damper
6. DESS key Grey with terminal
7. Secondary battery (optional)
8. Battery charger (optional)
9. Rear LED Orange
10. Rear LED bracket
11. Wiring harness

5.2 Steering wheel module view



1. Reverse button
2. Boost button
3. Start/Stop button
4. Battery SoC LED (x5)
5. MIL – malfunction indicator light

5.3 LED indication

The LED show a certain state of the kart.

Boost button	Flashing – Boost recharge	Continuously ON – Boost ready	OFF – Boost active
Start/stop button	Flashing slow – Drive Mode Direction: Reverse	Continuously ON – Drive Mode Direction: Forward	OFF – Drive Mode disabled
	Flashing fast – Drive Mode Neutral		
***MIL (malfunction indicator light)**	Flashing slow – Primary battery fault	Continuously RED – inverter fault	
	Flashing fast – Secondary battery fault		

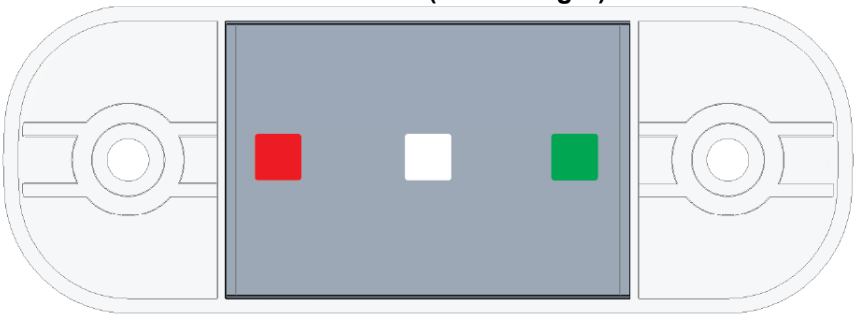
***MIL**

While the inverter is in the state “Fault”, the inverter turns the MIL LED on.

If the error indicator lights up in red:

- Check the DESS key is fitted correctly
- After 60 seconds switch on the kart again

RESS LED (left and right)



RED	GREEN
Continuously RED ON – Failure	Continuously GREEN ON – Ready to drive
RED FLASHING, GREEN OFF – Critical battery failure	

If the error has occurred, take the following steps:

- step out of the kart → disconnect the charger from the grid (if applicable) → move the kart to an open easy accessible area if possible → See Chapter 4 “Safety information” on page 8

If front LED White and rear LED Orange are illuminated – Ready-to-drive		
Flashing short ON, long OFF	Charging	50 ms on, 2000 ms off
Flashing fast	Battery almost empty	250 ms on, 250 ms off
Constant ON	Drive Mode	ON
Flashing slow	Standby Mode	1000 ms on, 1000 ms off

5.4 SoC LED

In Drive Mode the SoC LED show the following State of Charge SoC.

SoC	SoC LED1	SoC LED2	SoC LED3	SoC LED4	SoC LED5
80 % – 100 %	ON	ON	ON	ON	ON
60 % – 80 %	ON	ON	ON	ON	OFF
40 % – 60 %	ON	ON	ON	OFF	OFF
20% – 40 %	ON	ON	OFF	OFF	OFF
5% – 20 %	ON	OFF	OFF	OFF	OFF
<5%	FLASHING	OFF	OFF	OFF	OFF

In charging mode the SoC LED show the following State of Charge SoC.

SoC	LED Status				
	SoC LED1	SoC LED2	SoC LED3	SoC LED4	SoC LED5
> 95 %	ON	ON	ON	ON	ON
80 % – 95 %	ON	ON	ON	ON	FLASHING
60 % – 80 %	ON	ON	ON	FLASHING	OFF
40 % – 60 %	ON	ON	FLASHING	OFF	OFF
20 % – 40 %	ON	FLASHING	OFF	OFF	OFF
0 % – 20 %	FLASHING	OFF	OFF	OFF	OFF

5.5 Setting the light brightness

To ensure the driver is not disturbed by bright LED in low-light conditions and to maintain adequate visibility in direct sunlight, the LED brightness can be adjusted across three levels.

Only the LED on the steering wheel are affected by this brightness adjustment setting. The brightness can be varied between the minimum and maximum levels.

To adjust the brightness:

- turn on the kart
- press the boost button for 5 seconds and keep it pressed while adjusting the brightness
- use the reverse button to adjust the brightness of the LED in 10 stages
- release the boost button again

During adjustment, all LED remain permanently on to indicate the current brightness setting.

5.6 DESS key Grey

The DESS key ensures a safe shutdown function in an emergency. Removing the key immediately triggers the battery to cut off the power supply. This stops the power flow to the drive unit and other components and bringing the kart to a standstill.

The DESS key is paired to the DESS key terminal, therefore the DESS keys of different karts must not be exchanged!

The ROTAX E10 is supplied with the standard DESS key Grey, which enables two standard performance settings.

DESS key Grey standard settings:

- DESS key for Bambini – primary battery only
- DESS key for Mini – primary battery + secondary battery

5.7 Drive unit

The drive unit combines the inverter and motor. The inverter controls the power of the kart and is the main component controlling the operation of the kart.
The drive unit consists of a motor and inverter. The motor drives the rear axle and provides mechanical power.

5.8 Battery cooling cover with fan

The cooling fan starts cooling the batteries as soon as the internal battery temperature exceeds a temperature of 25°C during charging.

⚠CAUTION Do not remove the protective grille of the battery cooling fan on either of both sides.

5.9 Battery

The battery system consists either of just one battery (primary battery, fitted on the left side) or also a second battery (fitted on the right side). Every battery can be fitted as primary or secondary battery. In case only one battery is used, the battery must be installed on the left side of the vehicle which is further called primary battery.

A DC-DC Converter inside the 48 V battery provides the energy for the 12 V electrical system.

5.10 Main additional components

The kart manufacturer has to select the following parts to complete the vehicle. The following parts will not be delivered by Rotax:

- Chassis incl. accessories (types 950 and 1010-1070 mm)
- Steering wheel
- Brackets for batteries and drive unit
- Driver seat
- Rear sprocket and chain (type 219)

Rear sprockets and chains are also available at the Rotax karting network.

6. Mounting

⚠CAUTION

Risk of injury due to sharp edges or functional impairment!

- Wear gloves during installation work
- Prevent sharp edges at wire routing

Observe the tightening torques of each component.

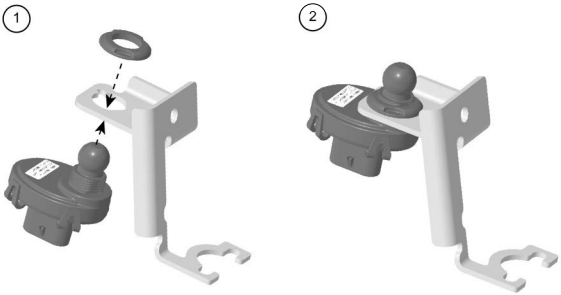
Use and fit a chain cover that completely covers the chain drive including front and rear sprocket.
The chain cover is in the scope of delivery of the chassis manufacturer.

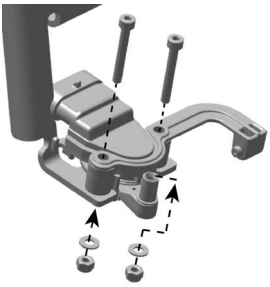
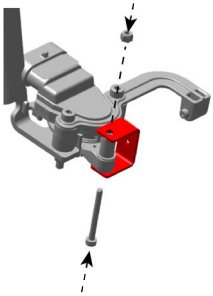
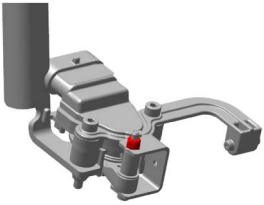
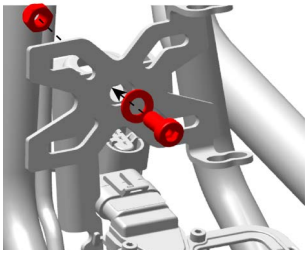
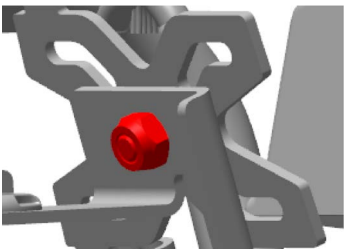
NOTE: If screws were not provided by Rotax make sure that the minimum screw-in depth is at least: 1xD for Steel and 2xD for Aluminum. D = Thread Diameter

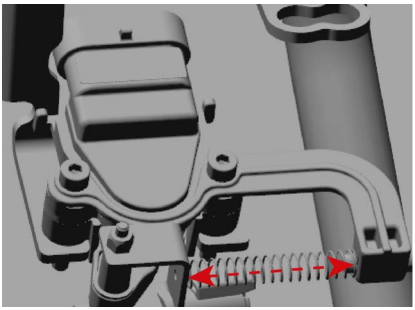
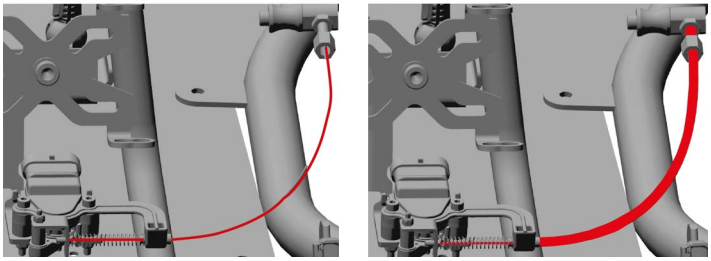
NOTE: Use the following tools

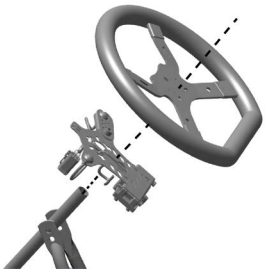
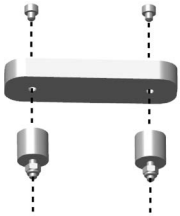
Wrench 5.5 - 7 - 13 - 16 mm	Allen key 2.5 - 3 - 4 - 6 mm	Others
		Wire cutters Pliers

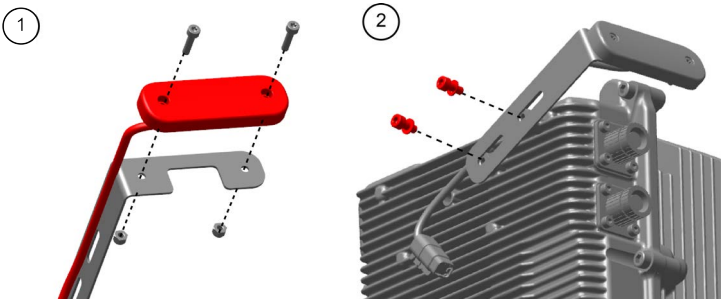
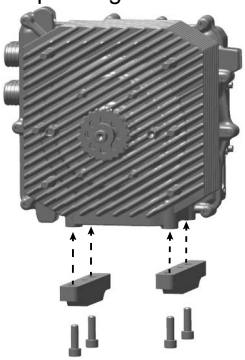
Mounting instructions recommended by ROTAX

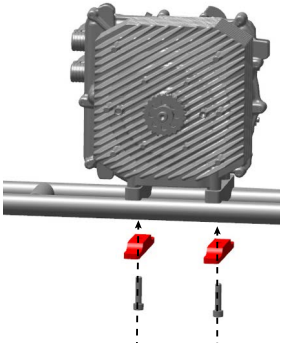
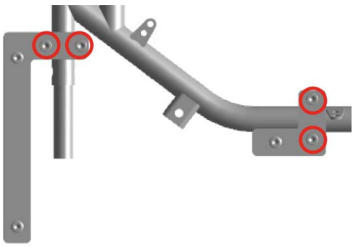
Step	Procedure
1.	**Mount DESS key Grey** - Insert the DESS key terminal into the plate from below - Fasten with the nut from above to 2.5 Nm ① ②  NOTE: The wristband on the DESS key has to be attached to one of the two brackets for the Nassau panel. NOTE: For tightening the DESS Key terminal plastic nut, you can use pliers or download and print the specific tool provided on our website for download.

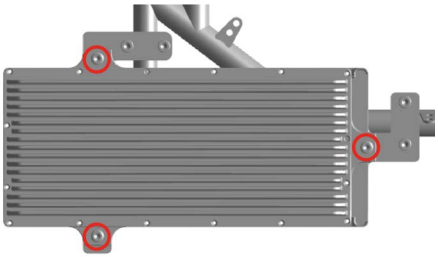
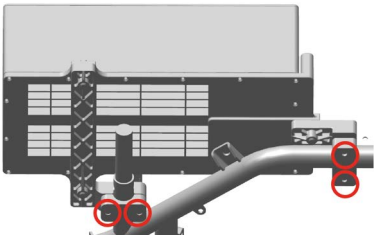
2.	- Place the acceleration pedal position sensor on the plate at the bottom - Mount the bowden cable bracket - Place the washers (x2) - Fit the nuts (x2) from below and fix with 2 screws M4x30 to 2.3 Nm - Use 3 mm Allen key and 7 mm wrench 
3.	- Place the plate for the bowden cable - Mount it from below with the screw M3x30 NOTE: The plate for the bowden cable must turn freely - Screw the nut on from above to 1.3 Nm - Use 2,5 mm Allen key and 5,5 mm wrench 1  2 
4.	- Mount the unit on the frame and tighten the screw M8x16 to 20 Nm - Use 6 mm Allen key and 13 mm wrench 1 2  

5.	- Insert the spring between the plate and the bowden cable bracket 
6.	- Route the bowden cable through the cable bracket and spring - Cut the bowden cable sleeve in the appropriate length. Make sure that the cross-section is round. NOTE: Use a specific bowden cable sleeve cutter or angle grinder to cut the bowden cable sleeve in order not to squeeze the opening. - Slide the bowden cable sleeve over the cable and route the bowden cable through the bowden cable holder of the chassis (1) (2)  NOTE: Lubricate the bowden cable with a dedicated bowden cable lubricant agent.
7.	Mount the bowden cable to the acceleration pedal sensor and make sure that there is slack when the acceleration pedal is in position neutral. **NOTE: If the acceleration pedal position sensor is not in position "zero", the kart will not allow to go into Drive Mode.**

8.	- Fit the steering wheel module between the steering wheel and steering column with screws 
9.	- Mount the kart status light front with vibration dampers on the TOP of the Nassau panel and fasten them with 2 Allen screws M4x10 mm to 3 Nm - Use 3 mm Allen key and 7 mm wrench  NOTE: The kart status light must be visible from every position.

10.	**Mount the kart status light rear** - Mount the LED on the bracket with 2 Allen screws M4x10 to 3 Nm Use 3 mm Allen key and 7 mm wrench - Mount the bracket on the drive unit with 2 Allen screws M5x12 with washers to 6 Nm. Use 4 mm Allen key  NOTE: The kart status light must be visible from every position all around the kart.
11.	- Install the upper part of the brackets to the drive unit with 4 screws - Use the appropriate tool depending of the screw type  NOTE: Brackets and screws are the scope of delivery from the chassis manufacturer.

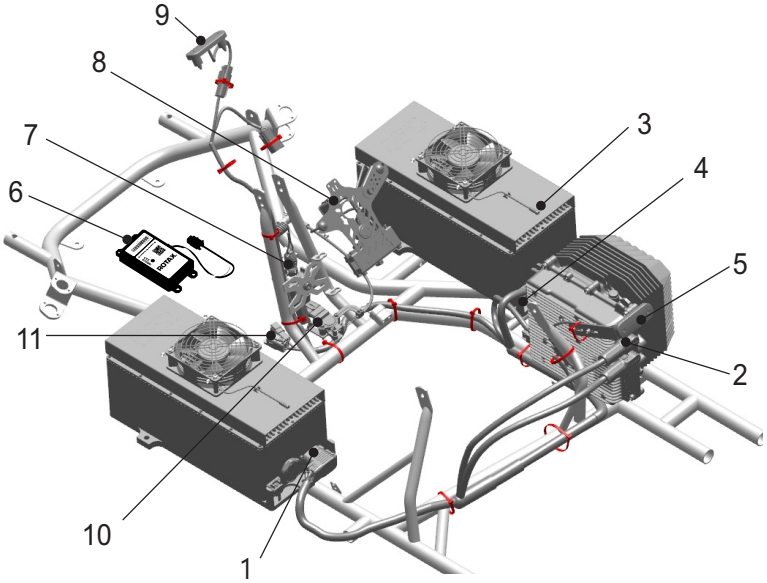
12.	- Place the drive unit onto the chassis and pre-install the bottom part ot the brackets. Put the drive unit toward to the rear axle as far as possible - Do not tighten the drive unit so that it can still move on the chassis 
13.	**Steps for mounting the chain:** - Make sure that the rear sprocket and the front sprocket align to each other, use a ruler to check it In case of misalignment, move the rear sprocket - Place the chain around the rear sprocket - Fit the chain on the front sprocket - Move the motor forwards to tension the chain - Set the correct chain tension. Use the stopper to set the drive unit to the correct position - Fasten the chain tensioner using the counter nut - Tighten the screws for the drive unit brackets NOTE: Observe the tightening torque recommended by the chassis manufacturer.
14.	**Fix lightly the battery bracket with 2 appropriate screws**  NOTE: Brackets and screws are the scope of delivery from the chassis manufacturer.

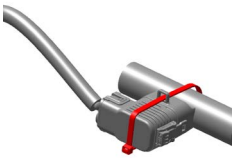
15.	- Place the battery on the battery bracket and tighten them with 3 screws - Use the appropriate tool depending of the screw type  NOTE: Observe the tightening torque recommended by the chassis manufacturer.
16.	**Fasten the battery bracket firmly**  In case of maintenance: 1. Loosen the battery screws. 2. Replace the battery. 3. Tighten the battery screws. NOTE: Observe the tightening torque recommended by the chassis manufacturer

6.1 Connect wiring harnesses

CAUTION

- Observe the following wiring sequence
- Acceleration pedal cable routing must not be routed via the brake pedal
- Do not lay the wiring harness over sharp edges
- Avoid chafe marks
- Do not pinch cable



Step	
1.	Primary battery
2.	Drive unit DC +/-
3.	Secondary Battery (optional) NOTE: If the secondary battery is not install, make sure to cover the battery connector of the wiring harness with the foreseen cover and fix the connector with cover to the chassis. 
4.	Drive unit signal connector
5.	Kart status light rear

6.	DESS key terminal
7.	Steering wheel module
8.	Kart status light front
9.	Acceleration pedal sensor
10.	ROTAX TRAX (optional)
11.	12 V connector for ROTAX TRAX

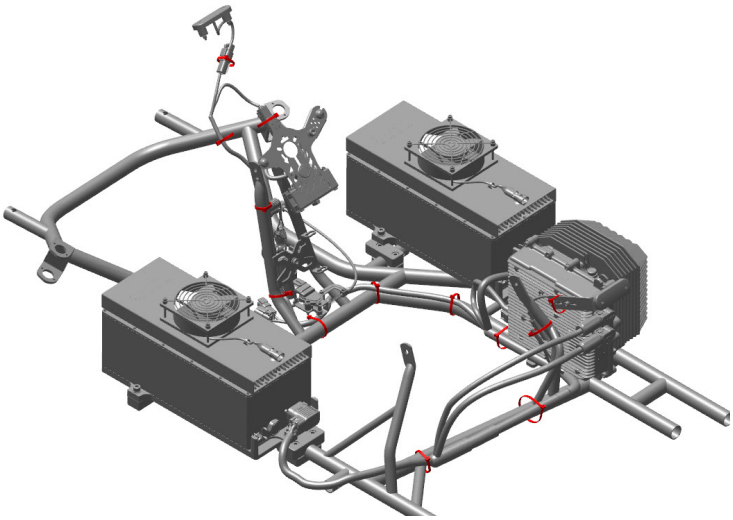
There is a diagnostic plug on the wiring harness. This must always be covered with the cap included.

If the bowden cable is relocated, the acceleration pedal sensor must remain in the “zero” position.

6.2 Fastening the cable harnesses

Fix the wiring harness on the chassis with cable ties (13 pieces).

Note the red markings in the picture to fix the cable harness correctly with cable ties.



6.3 Functionality check

→ Switch on: Attach the DESS key Grey

→ Press the START/STOP Button for more than 1 s →
START/STOP Button and all LED illuminates → Kart energized

→ Press REVERSE & BOOST Button for 3 s → Kart in Drive Mode

NOTE: The accelerator pedal must not be pressed!

→ Press REVERSE & BOOST Button for 3 s simultaneously → Exit Drive Mode

→ Switch off: Remove DESS key or press for 3 s the START/STOP Button

7. Charging

For the charging it is necessary to have an AC-power source with following specifications depending on the charging mode.

WARNING

Risk of injury due to fire!

- The charger must only be used in combination with a RCCB (Residual Current operated Circuit-Breaker) installed in the electrical infrastructure of the facility
- Ensure that an automatic fire alarm system is installed
- During the charging process, fans must be installed on top of the battery and connected to the charger to cool the battery
- Left the battery not unattended while charging
- Local laws and regulations must be observed

WARNING

Risk of injury due to improper charging!

- Use the charger only in a dry area and do not expose it to water or rain
- Use the charger in a well ventilated area
- Use only original ROTAX E10 Charger
- Charge the battery only in a dry area that's fitted with a working smoke detector without flammable materials near
- Do not place charger or battery near flammable materials
- Do not charge your battery unattended or overnight
- Disconnect the charger from the power supply after charging
- Disconnect the cable from charger to the battery after charging

NOTICE

Charge level

For storage and transport use the storage charge function.

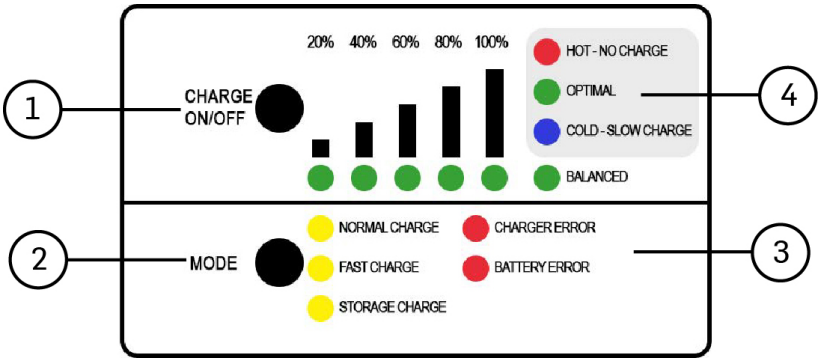
The charger can be ordered separately.

The operator can charge one battery or both battery packs, depending on configuration.

The charging can only be performed in dry environment via the mains power supply.

Electrical INPUT of the charger (standard version)	
110-120 VAC, 50/60Hz, 13 A (reduced charging power)	
230-240 VAC, 50/60Hz, 15 A	
Electrical output	48 V, 12 V
Ambient temperature limits charging	5 °C to 40 °C

7.1 Charger interface



1. ON/OFF BUTTON	Starts and stops the charging process.
2. MODE BUTTON	Used to switch in between charging modes.
3. CHARGING STATUS	The indication lights in the charging status section provide information about the charging mode and display possible errors.
4. BATTERY STATUS	The indication lights in the battery status section provide information about state of charge (SoC) and temperature of the batteries.

Before charging, it is important to check which power output the power source you are using is capable of and choose the charging mode corresponding.

7.2 Requirements for the power supply network

NOTICE

Before charging, check that the mains supply is sufficient for the load. Otherwise you must not charge. Product damage and injuries can be the consequences.

Make sure that the socket is protected:

- For 230-240 VAC grid with 16 A fuse for fast charging
- For 230-240 VAC grid with 13 A for normal charging
- 2,5 mm^2 Roll out drum cable
- For 110-120 VAC grid with 13 A fuse (reduced charging power)

The size of the circuit breaker must be larger than the current consumption of the charger - if this is not the case, the slow charging mode must be used.

7.3 Charging process

⚠CAUTION

Avoid damage to the product and persons!

- Before starting the charging process, make sure that all plugs are connected correctly
- Do not carry out any mechanical work on the vehicle during the charging process and never disconnect any plugs. The charger must first be switched off and disconnected from the batteries

There are 2 different charging types:

- Charging for driving (100%)
- Charging for storage (30%)

Charge mode	Start the kart and make sure the vehicle is active.
	Install the cooling cover on top of the battery and connect the cooling cover to the charger.
	Connect the charging cable to the primary battery.
	Connect the charger to the power socket.
	Select the charging mode and press the ON/OFF button to start the charging process. NORMAL CHARGE || FAST CHARGE || STORAGE CHARGE → press CHARGE ON/OFF button. Changing the charging mode is only possible if the charging is not active.
	The charging is active if the cooling fan of the charger is spinning and the charge mode indication light is flashing.
	To stop the charging process, press the ON/OFF button.

	The charger will stop automatically by itself if the charge process is completed.
	NORMAL CHARGE || FAST CHARGE The charging process is completed if all SoC LED are permanently ON and the fan of the charger itself stopped spinning.  NOTE: See Chapter 5.4 “SoC LED” on page 17
	STORAGE CHARGE In storage charge the first and second LED will be on (30%SoC) When the charging process is finished the charger turns automatically off. 
	Disconnect the charger from the main socket.
	Disconnect charging cable from the charging port of the battery. Insert the protective rubber plug of the battery charging socket. NOTE: At high ambient temperatures it is recommended to keep the battery cooling cover(s) with fan installed and activated as long as possible to achieve the lowest possible battery (batteries) temperature.

For charging outside of the kart they are special cables and accessories available.

7.4 Charging Procedure outside of the vehicle

The batteries can be charged, when they are not installed in the kart. For this there are some adapters necessary, otherwise the battery will not communicate with the charger.

Single Charger Adapter → for charging one individual battery

Multi Charger Adapter → for charging two batteries at the same time

7.4.1 Single charging:

1. Connect the Single charger adapter with the battery
2. Plug in the charging cable from the charger into the battery
3. Install the cooling cover on the battery and connect to the charger
4. Plug in the main power cable of the charger to the power outlet
5. Choose the charging mode you want to use, by pressing the mode button
6. Start the charging process by pressing ON/OFF button
7. The charging is active if the cooling fan of the charger is spinning and the charge mode indication light is flashing.
8. To stop the charging process, press the ON/OFF button.
9. The charger will stop automatically by itself if the charge process is completed.
10. Unplug the charger from the power outlet
11. Disconnect the battery from the charger
12. Disconnect the single charging adapter from the battery

7.4.2 Multi charging

1. Connect the Multi Charger Adapter with both battery
2. Plug in the charging cable from the charger into one of the batteries
3. Install the cooling covers on the batteries and connect to the charger
4. Plug in the main power cable of the charger to the power outlet
5. Choose the charging mode you want to use, by pressing the mode button
6. Start the charging process by pressing ON/OFF button
7. The charging is active if the cooling fan of the charger is spinning and the charge mode indication light is flashing.
8. To stop the charging process, press the ON/OFF button.
9. The charger will stop automatically by itself if the charge process is completed.
10. Unplug the charger from the power outlet
11. Disconnect the battery from the charger
12. Disconnect the Multi Battery Charging Harness from the batteries

8. Operation

NOTICE

Check the following points, before each use of the kart.
Otherwise the vehicle may not be operated.

Safety check before operating

- Carry out a visual check before each use
- Check the battery for heat and deformation
- Check the wiring harness for damage
- Check that all components are mounted correctly and tightened securely
- Inspect the kart for any possible damage after the kart suffered a crash
- Replace defective or worn parts immediately with genuine ROTAX spare parts by technical personnel
- Check the brake system for proper function

8.1 Kart start up

ON → Connect the DESS key to the terminal

STANDBY → press START/STOP BUTTON for 1 sec.

DRIVE Mode → press REVERSE & BOOST BUTTON for 3 sec.

**From DRIVE Mode to STANDBY →
press REVERSE & BOOST BUTTON for 1 sec.**

**OFF → Remove DESS Key or
press START/STOP BUTTON for 3 sec.**

Drive mode is deactivated after 30 seconds of inactivity.

At standing start:
To avoid deactivation of the Drive Mode due to inactivity keep the BOOST BUTTON pressed while the vehicle is stationary.

8.2 Kart operation

Standby	Connect DESS key to the terminal → Press the Start/Stop button for 1 sec. → The kart is active and will respond to user inputs on the steering wheel module.
Drive Mode	Press Reverse & Boost button for 3 sec. → Front LED White and Rear LED Orange are illuminated → The kart is ready to drive. The kart responds to user input on the steering wheel module and on the acceleration pedal.
Charging Mode	See Chapter 7 "Charging" on page 30.
Reverse Mode	Stop the kart → Press and hold the Reverse button → Press the accelerator pedal to move reverse. To stop reverse driving → Release the accelerator pedal and Reverse button.
Boost Mode	Press the Boost button shortly → The kart has more power for 5 sec. Every 45 sec. is the Boost function available. If the Boost button flashes → the Boost function is recharging. If Boost function is available again → Boost button is illuminated.
Switch off	Press the Start/Stop button for 3 sec. Or remove the DESS key → The kart doesn't respond to any inputs and is deactivated.

9. Inspection and maintenance

The drive unit and batteries are maintenance-free.

If you have any questions or problems, please contact the local ROTAX karting distributor or one of their service centers/dealers.

WARNING Never open the batteries, the drive unit and other components! The drive unit must not be tuned!

NOTICE Keep the drive unit clean and avoid contact with aggressive substances and fuels, e.g. gasoline.
Take care when cleaning the drive unit.
Do not immerse any components, including the drive unit, in water or clean them with pressurized water.
The use of XPS care products is recommended.

Inspect prior use:

- Check that the accelerator pedal moves freely and most importantly returns to its initial position automatically
- Inspect and lubricate the chain regularly
- Check all components for proper fixation after each maintenance
- Inspect the harness and connectors for damage prior driving or charging

WARNING If the wire harness is visibly damaged, the kart must no longer be used and the wire harness must be replaced.

9.1 General safety and functional inspection

Before each use, the overall functionality and operational safety of the vehicle must be verified.

A brake function test shall be carried out to ensure that the braking system operates effectively and consistently.

The mechanical connection between the brake pedal and the master cylinder must be inspected for secure mounting, correct alignment, and unrestricted movement.

The bowden cable must be checked for free movement without any sticking or resistance.
The bowden cable should be cleaned after every race day and lubricated if necessary to protect against corrosion.

Ensure the throttle pedal is correctly adjusted to allow the full travel range and to return reliably to the idle position when released.

Any irregularities, damage, or signs of wear affecting safety or performance must be rectified before the vehicle is operated.

All functional inspections related to the scope of the chassis manufacturer must be performed according to the instructions provided by the chassis manufacturer.

9.2 Maintenance schedule

Part	Action	Interval	Type	Notes
Battery	Visual inspection for damage, swelling, or corrosion	Every use	Visual	Check housing, cables, connectors
Tires	Check pressure and wear	Every use	Visual / Adjust	Maintain recommended pressure range
Brakes	Check brake system for any leaks	Every use	Mechanical test	Press the brake pedal all the way and hold, brake pedal must not extend the endpoint over time
Brake pedal	Check connecting rod between brake cylinder and pedal including all screws	Every use	Visual / Functional	Check if all screws are tight and backup cable are installed correctly
Drive Unit	Check for abnormal noise or temperature	Every use	Visual / Functional	If overheating or noise, stop operation
Acceleration pedal sensor & bowden cable	Check function and ease of movement Clean, lubricate after every race day	Every use	Functional / Adjust	Ensure smooth signal response and smooth operation
Chain & sprockets	Clean, lubricate, inspect for wear	Every 2 hours of use	Clean / Inspect	Replace if teeth are sharp or chain is stretched
Motor mount bolts	Torque check	According to the chassis manufacturer	Tighten	Use chassis manufacturers torque specs
Brake components & brake fluid	Check wear of brake components according to the manufacturer	According to the chassis manufacturer	Visual	Replace components if faulty or worn
Brake lines	Check for leaks or damage	According to the chassis manufacturer	Visual	Replace if any fluid signs visible

Part	Action	Interval	Type	Notes
Steering bolts & nuts	Torque check	Every use	Tighten	Check before each drive
Chassis bolts (especially drive-train area)	Check torque	Every day of use	Tighten / Inspect	Focus on motor and battery mount
Battery and Drive Unit Connectors	Check if connectors are installed and locked properly	Every use	Visual	Ensure no oxidation or looseness Contact the Rotax service center
Wiring Harness	Check insulation and connection security	Every use	Visual / Fixed	Look for wear or heat marks
Steering system (tie rods, column, bearings)	Check for play or damage	Every use	Visual / Tighten / Replace	Ensure smooth and centered steering

9.3 B.U.D.S. diagnostic service

The ROTAX karting distributors will be able to provide additional services by means of the BUDS diagnostic tool (e.g. pairing of DESS key with the DESS key terminal, scrutineering of ROTAX E10 motor/inverter to confirm compliance with RMC technical regulations).

9.4 E10 MIL malfunction indicator LED

If there is more than one fault, only the error with the highest hierarchy is displayed via the steering wheel module.
Fault no. 1 is the lowest in the hierarchy.

Before looking up the indicated fault in the following chart, notice the MIL pattern below.

ON	The MIL indicates the component where the fault is present, a Continuous illuminated MIL shows that the fault is present in the drive unit
Flashing	If the MIL is flashing long ON - short OFF - long ON The fault is present in the primary battery, left side of the vehicle
Flashing	If the MIL is flashing short ON - long OFF - short ON The fault is present in the secondary battery, right side of the vehicle

9.5 Trouble shooting

Part	Fault name	Fault description	Action	MIL	SoC LED1	SoC LED2	SoC LED3	SoC LED4	SoC LED5
Battery Primary/Secondary	Temp Out Of Range	Temperature too low or too high for operation	Let the vehicle cool off or warm up for some time and check if cooling fins of the batteries are blocked	Flashing					
Battery Primary/Secondary	Unbalanced	Battery SoC of primary and secondary not equal enough for operation	Connect charger to the batteries and charge to 100% If fault is still present, check the wiring harnesses and connectors and charge the batteries individually	Continuous ON					
Battery Primary/Secondary	Overtemperature	An Overtemperature event caused an shutoff of the battery	Restart the vehicle	Flashing					
Battery Primary/Secondary	ISO Error	Isolation error or Short/ Open at the output	Check the wiring harness, check for water or damage of the wiring harness or connectors	Flashing					
Battery Primary/Secondary	CAN Com Error	Isolation error or Short/ Open at the output	Check the wiring harness, check for water or damage of the wiring harness or connectors	Flashing					

Part	Fault name	Fault description	Action	MIL	SoC LED1	SoC LED2	SoC LED3	SoC LED4	SoC LED5
Battery Primary/Secondary	General fault	Other internal battery error that doesn't allow operation of the system	General Trouble shooting steps	Flashing					
Drive Unit	Overtemperature	Temperature of the drive unit too high	Let the vehicle cool off for some time/ check if the cooling fins of the drive unit are blocked or covered by something blocking airflow	Continuous ON					
Drive Unit	CAN Com Error	CAN Communication error	Check the wiring harness, check for water or damage of the wiring harness or connectors	Continuous ON					
Drive Unit	12 V Supply	Faulty 12 V Supply: Undervoltage / Overvoltage	Check wiring harness and connections	Continuous ON					
Drive Unit	48 V Supply	Faulty 48V Supply: Undervoltage / Overvoltage	Check wiring harness and connections	Continuous ON					

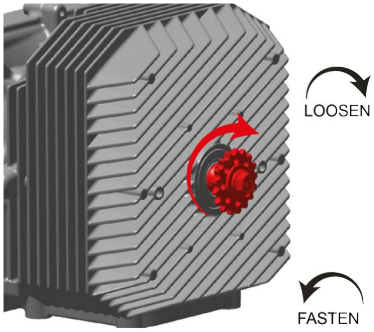
Part	Fault name	Fault description	Action	MIL	SoC LED1	SoC LED2	SoC LED3	SoC LED4	SoC LED5
Drive Unit	Acceleration pedal position sensor out of range	Acceleration Pedal incompatible voltage readings faulty wiring, faulty voltage supply, faulty throttle	Check the connection to the acceleration pedal sensor	Continuous ON					
Drive Unit	General Fault	Other internal inverter error that doesn't allow operation of the system	General Trouble shooting steps	Continuous ON					
Drive Unit	Drive Change Condition	State that doesn't allow change of virtual gear: speed too high / throttle not released	Make sure not to apply throttle when changing between modes Check if the throttle bowden cable is adjusted correctly	Continuous ON					
Drive Unit	DESS Key Error	DESS key not paired with the DESS key Terminal	Check if the correct DESS Key was used Connect the paired DESS key	Continuous ON					

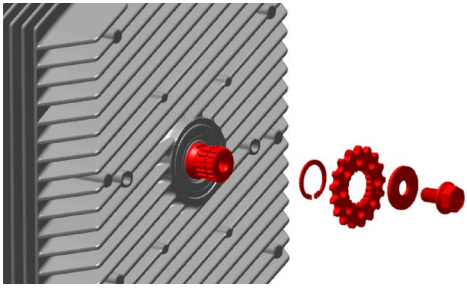
	If the fault is unknown, perform the following steps
Drive Unit Failure MIL  Continuous ON	1. Switch off the vehicle, wait for 1 minute and switch on again 2. If step 1, was not successful: - disconnect connections between Drive Unit and both batteries - wait 1 minute - connect everything again - try again to operate the vehicle
Primary Battery Failure MIL  Flashing long ON- short OFF- long ON	1. Switch off the vehicle, wait for 1 minute and switch on again 2. If step 1, was not successful: - disconnect connections between Drive Unit and both batteries - wait 1 minute - connect everything again and try again to operate the vehicle 3. Swap batteries from left to right, and check if the flashing pattern of the MIL changes to identify the battery with the error 4. Charge both batteries individually and check for errors afterwards (Single charge adapter or in the primary position in the vehicle)
Secondary Battery Failure MIL  Flashing short ON- long OFF- short ON	1. Switch off the vehicle, wait for 1 minute and switch on again 2. If step 1, was not successful: - disconnect connections between Drive Unit and both batteries - wait 1 minute - connect all again - try again to operate the vehicle 3. Disconnect the secondary battery, restart the kart and check if the battery error is still indicated by the display 4. Charge both batteries individually and check for errors afterwards (Single charge adapter or in the primary position in the vehicle)

9.6 Gear change

NOTE: For the mounting use the following tools:

- 16 mm open-end spanner for the shaft
- 13 mm torque wrench for the screw

Step	Procedure
1.	Turn off the vehicle and disconnect the power from the drive unit.
2.	Loosen the drive unit chassis mounts and chain tensioner. Remove the chain guard.
3.	Slide the drive unit back to loosen the chain and take it off from the sprockets.
4.	Loosen the left hand thread hex screw clockwise using the spanner and torque wrench. Therefore prevent the motor shaft from turning by holding it with the spanner. And use the torque wrench to turn the hex screw clockwise. 
5.	Remove the screw, sprocket and washer from the motor shaft.
6.	Make sure the motor shaft is cleaned and free from any debris or grease before installing the new components.
7.	Replace the new sprocket with a new washer in the correct order. Mount the sprocket with the marking ROTAX facing outwards.

8.	It is recommend to use a new screw every time you change the sprocket. Tighten the new screw counter clockwise using a torque wrench to 25 Nm. 
9.	Mounting the chain: • Make sure that the rear sprocket and the front sprocket align to each other, use a ruler to check it. In case of misalignment, move the rear sprocket • Place the chain around the rear sprocket • Fit the chain on the front sprocket • Move the motor forwards to tension the chain • Set the correct chain tension. Use the stopper to set the drive unit to the correct position • Fasten the chain tensioner using the counter nut • Tighten the screws for the drive unit brackets
10.	Mount the chain guard.

10. Storage and disposal

The ROTAX E10 may only be stored in dry rooms and away from any flammable substances. Make sure to store the batteries and all components at a constant ambient temperature of 0-25°C.

High temperature could harm the battery cells.

NOTICE

The battery must be stored with a State of Charge of 30% +/- 5%.

Charge the batteries during storage using the storage charge function of the charger every 6 months.

Dispose of components in accordance with the applicable regulations of the country of sale.

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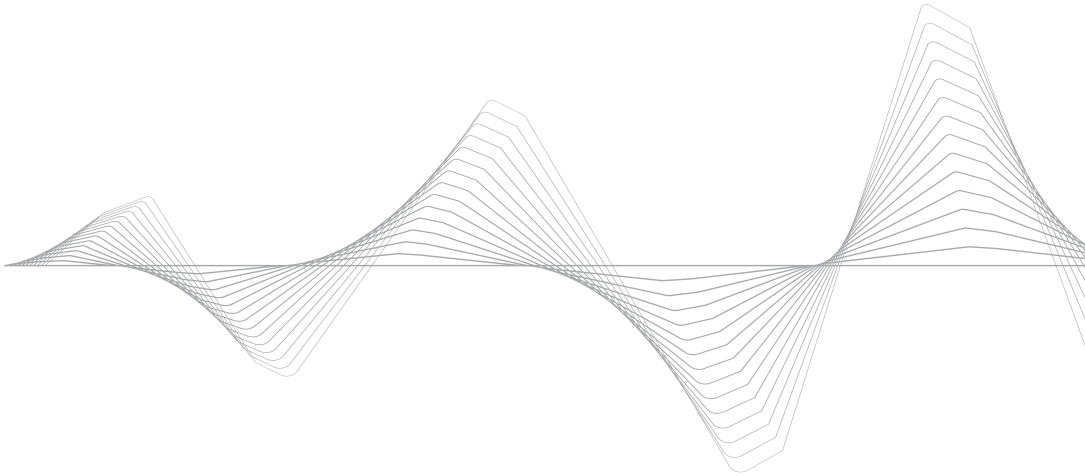

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