

GROUND POWER UNIT RECTIFIER EAR-600M

OPERATION AND MAINTENANCE MANUAL
EAR00.054.000.00RE



2025

Revision: R01

Dear Valued Customer,

Thank you for choosing ElectroAir. Your trust in our products means the world to us.

Our dedicated team has poured years of passion and hard work into perfecting our products, ensuring they deliver exceptional performance and reliability. By investing in ground power unit, you're not just purchasing a product – you're investing in a better, more sustainable future for all.

This unit is effectively classified as a zero-emission power supply, meaning it is safe for your budget and the environment. It is a safe and convenient solution designed to provide a dedicated power flow to fulfill the technical needs of the entire aircraft

We are committed to your satisfaction and success. We're here to support you every step of the way, from installation assistance to ongoing maintenance.

Visit our website, www.electroair.eu, to explore our products, learn more about our company, and discover our latest promotions and news.

Thank you again for choosing us.

ElectroAir

You are well connected!

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NOTICE

This document contains information about the EAR rectifier. These products were developed and manufactured by ElectroAir.

ElectroAir may have one or more patents or pending patent applications protecting the intellectual property of the products described in this document.

The information in this document is subject to change without notice and should not be construed as a commitment by the manufacturer. ElectroAir assumes no responsibility for any errors that may appear in this document. All photographs, images and drawings in this manual are for illustration purposes only and may not reflect the actual equipment supplied, without loss of quality and declared parameters. The manufacturer reserves the right to make changes in the design of the equipment in order to improve the performance and quality of the product.

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Neither ElectroAir nor its affiliates shall be liable to the purchaser of EAR rectifier or third parties for damages, losses, costs or expenses incurred by the purchaser or any third party as a result of: an accident, misuse or abuse of this product, or unauthorized modifications, repairs or alterations to this product, or failure to strictly follow the operating and maintenance instructions.

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DECLARATION OF CONFORMITY

CE DECLARATION OF CONFORMITY

Ground Power Unit	
Type:	EAR series
Model:	EAR-600M
Designation and Description:	The EAR series ground power unit is intended to power on-board electrical equipment and launch <i>(optional, in accordance with the contract configuration)</i> aircraft and helicopters with 28,5VDC 300A during their ground service and pre-flight preparation.

All ratings and characteristics are complying with the following directives:	
2014/35/EU	Low Voltage Directive (LVD)
2014/30/EU	Electromagnetic compatibility (EMC)
2006/42/EC	Machinery

Conformity is attained by complying with:	
EN 61558-2-6	Safety of transformers, reactors, power supply units and similar products for voltages up to 1100 V -- Part 2-6: Particular requirements and tests for safety isolating transformers and power supply units incorporating safety isolating transformers
EN 62040-1	Uninterruptible power systems (UPS) - Part 1: Safety requirements.
EN 61000-6-2	Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity standard for industrial environments
EN 61000-6-4	Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments
EN 1915-1	Aircraft ground support equipment - General requirements - Part 1: Basic safety requirements
EN 60204-1	Safety of machinery. Electrical equipment of machines. General requirements

03.02.2025
Date


Roman Fleitin, Technical Director

INTRODUCTION

The Manual contains technical characteristics and other data needed for the proper operation of the unit.
The Ground power unit (GPU, rectifier, unit, equipment) complies with all regulations and standards given in the Table below.

STANDARDS REGULATION

STANDARD	DESCRIPTION
IATA AVH 913	Technical requirements for airport ground service support equipment.
ISO 6858	Ground support electrical supplies - General requirements.
BS 2G 219	Specification for general requirements for ground support electrical supplies for aircraft.
MIL-M-704E	Aircraft electric power characteristics.
EN 50091-1	Uninterruptible power systems (UPS). General and safety requirements for UPS used in operator access areas.
EN 61158-2-6	Industrial communication networks - Fieldbus specifications - Part 2: Physical layer specification and service definition.
EN 61000-6-4	Electromagnetic compatibility (EMC). Generic standards. Immunity for industrial environments (EN 50081-2).
EN 61000-6-2	Electromagnetic compatibility (EMC). Generic standards. Immunity for industrial environments (EN 50082-2).
EMC 89/336/EEC	Directive of Electromagnetic compatibility.
IEC 60721	Classification of environmental conditions - Part 2-1: Environmental conditions appearing in nature - Temperature and humidity.
IEC 60529	Degrees of Protection Package provides various testing and classifications of degrees of protection for your equipment.
UL1012	The standard for Power Units Other Than Class 2
EN 55011	Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement.

SAFETY REGULATIONS

WARNING!

Prior to operating or servicing the equipment, this manual must be read and understood. Follow these instructions meticulously and retain this manual for future reference.

Untrained personnel are PROHIBITED from operating, cleaning, inspecting, maintaining, servicing, or tampering with this equipment.

Do not operate or work on this equipment unless you have read and understand the instructions and warnings in the Operation and Maintenance Manuals. Only trained, authorized and qualified to operate this type of equipment personnel should work on this equipment.

Failure to follow the instructions or heed the warnings could result in serious injury or death.

WARNING!

Installation, repair, maintenance and adjustment must only be carried out by qualified, certified and licensed personnel.

If installation, repairs, maintenance and adjustments are not carried out by qualified, certified and licensed personnel, the **warranty will not be valid.**

	GENERAL
	▪ The Ground Power Unit is engineered to ensure safety when used appropriately. ▪ The unit is designed to comply with industry-accepted safety rules and regulations. ▪ However, the onus of safety lies with the personnel operating the GPU. ▪ All safety precautions and warnings provided in this manual MUST be read and comprehended before operating the GPU. ▪ Non-compliance with the instructions, procedures, and safety precautions detailed in this manual may increase the risk of accidents and injuries. ▪ Before performing any procedure or operating technique, the user MUST ensure that it is safe. ▪ A competent person MUST read all relevant sections of this manual before using, servicing, or repairing the unit. ▪ DO NOT obstruct the airflow by covering the running unit. ▪ Never start the GPU unless it is safe to do so. ▪ Operating the GPU in a known unsafe condition is STRICTLY FORBIDDEN. ▪ Personnel must be instructed on the location of the emergency stop button before starting work. This button is ONLY for use in cases of emergency shutdown. ▪ Activating the EMERGENCY STOP BUTTON will result in an immediate FULL STOP of operations. Except for fan operation if the unit is charging or switched on. ▪ When storing or transporting for a long period of time, make sure that the emergency stop button is pressed
	ELECTRIC SHOCK
	To prevent electric shock, it is strongly recommended to be familiar with and implement the regulations provided below: ▪ Ensure that all protective guards and all covers are secured in place on the GPU to prevent contact with electrical components. ▪ The connection and disconnection with aircraft should ONLY be done when the power is switched off. ▪ Regular inspections of the output cables' insulation cover are MANDATORY - replace if necessary. ▪ ONLY qualified personnel are allowed to operate and maintain the GPU. ▪ It is forbidden to operate the GPU when the panel door is not locked. ▪ It is forbidden to perform cleaning, dusting and repair works while power is on. ▪ The power supply unit has connected rechargeable batteries. To prevent short circuits, take precautions when handling them. ▫ Make sure that the batteries are disconnected before performing any maintenance work on the unit. ▫ Avoid shorting the battery terminals to each other or to conductive parts of the structure. ▫ Use only insulated tools to prevent accidental contact with the battery terminals.
	MOVING PARTS
	▪ The unit contains a high-speed moving fan blades, ENSURE to shut down the GPU prior to opening the side covers for maintenance. ▪ All protective guards and covers on the GPU must be securely affixed to prevent contact with moving parts.
	PERSONAL PROTECTIVE EQUIPMENT
	▪ Wear protective clothing, gloves and personal protective equipment. ▪ Keep your hands clean and dry to avoid accidents and injuries. ▪ Do not wear loose, torn or bulky clothing around the machine that may catch on working controls and projections or into fans, pulleys and other moving parts causing personal injury. ▪ Do not operate the machine or any equipment attached to it while under the influence of alcohol, medication, or other drugs, or while fatigued. ▪ Do not wear radio or music headphones while operating the engine.

WARRANTY RESTRICTIONS

WARNING!

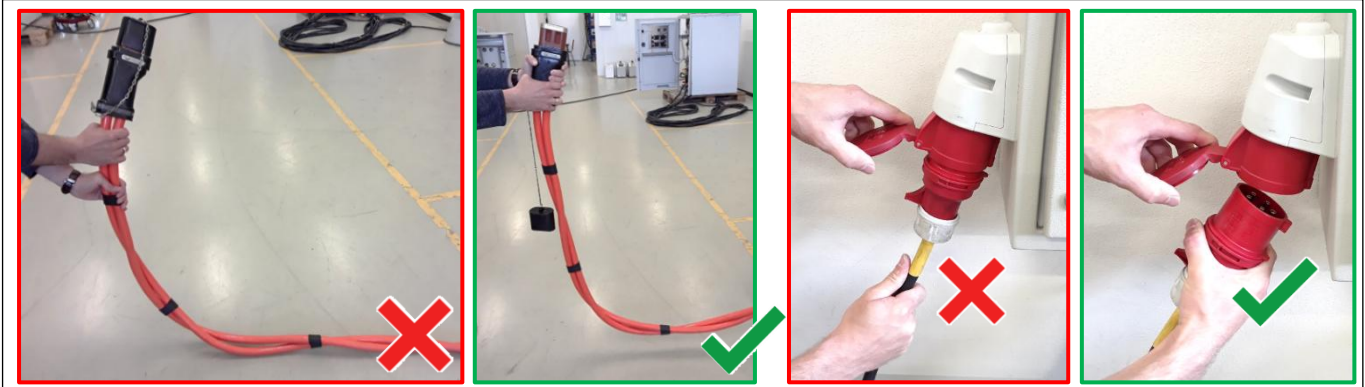
UNAUTHORISED ACCESS INSIDE OF THE ENCLOSURE OF THE UNIT, REMOVAL AND REPLACEMENT OF COMPONENTS WITHOUT PERMISSION FROM THE MANUFACTURER, **RESULTS IN A WARRANTY LOSS.**

THE WARRANTY DOES NOT COVER DAMAGE CAUSED BY IMPROPER USE OF THE EQUIPMENT.

ONLY ORIGINAL SPARE PARTS, ACCESSORIES OR CONSUMABLES FROM ELECTROAIR MUST BE USED TO SERVICE, REPAIR, MAINTAIN OR REPLACE CONSUMABLE MATERIALS OF ELECTROAIR PRODUCTS.

The warranty is voided if products are repaired, maintained, modified or altered using non-approved parts, spare parts, accessories or consumables from third-party manufacturers. In all such cases, repairs will be done at the customer's cost.

- Do not drag cables along the ground, concrete floor, or asphalt. This can damage the integrity of the cables, insulation, and aircraft connectors and reduce their operability or cause a malfunction
The warranty does not cover scratches and cracks caused by improper use.
- Avoid harsh bends, knots, and twists of the cables as these can damage the wires and insulation.
- Avoid running over the cables/plugs with vehicles or other objects. This will cause mechanical damage
- Improper connection and disconnection can damage the input and output cables and plugs. When connecting, and disconnecting industrial cables, you must hold them by the connector, not the cable, to avoid damage to the wires and insulation



WARNING!

Refusal to follow safety requirements makes the customer responsible for all expenses including travel expenses to perform repair and commission service by the manufacturing company

TRANSPORTATION, STORAGE AND PLACEMENT

TRANSPORTATION

- The transportation of equipment must be carried out in a secure cargo compartment, following safety regulations, and ensuring protection from precipitation, high humidity, and extreme temperatures.
- To protect the equipment from moisture and dust, it should be wrapped in a sealed film or placed in a container with a controlled environment.
- Ensure that the packed equipment is securely positioned and protected from impacts against the walls of the vehicle and nearby objects during transportation.
- To secure the equipment inside the container, straps should be used at all four corners.
- Use special packaging materials that protect the equipment from shocks, vibrations, and weather conditions. These may include cushioning inserts, boxes with fasteners, or containers.
- The equipment must be securely fastened in the transport vehicle to prevent shifting, damage, or falling. Use straps, fasteners, or special frames.
- The equipment should be placed on wooden pallets and loaded into the container or truck using a forklift capable of handling the load of this specific cargo.

- Take extra precautions during loading and unloading to avoid accidents and injuries.
- Comply with all relevant legal requirements and regulations when transporting equipment with any carrier.
- The transportation of cargo in enclosed vehicles must meet transport standards and not contradict the technical specifications of the equipment.
- After the transportation is completed, the equipment must be inspected again for any damage.

Environmental conditions must be within the following temperature range:

Max: +55°C, Min: -40°C.

Loading and Unloading

Before loading and unloading equipment, a thorough risk assessment should be carried out which considers every step of the job, including site risks and hazards, loading, transport, and unloading. This is particularly necessary in the case of an unfamiliar commodity or location and/or where there are unfavorable weather conditions.

Communication with site personnel is necessary to ensure the safety of drivers, workers on the site and the general public. If a specific risk or hazard that cannot be eliminated is identified, operations should not take place until control measures have been determined and implemented.

COMMON HAZARDS
▪ Toppling of improperly stacked or secured cargo; ▪ Breaking or failure of lashing and dunnage equipment; ▪ Unsafe access to and egress from the lorry or trailer bed; ▪ Falling off the loading platform. ▪ Sprains and strains from improper lifting or handling of cargo ▪ Crushing injuries caused by colliding with a forklift, truck, falls from loading docks, or falling stacked materials ▪ Bruises and cuts ▪ Spinal injuries from improper loading, unloading, falls or being crushed ▪ Head trauma from falling cargo
LOADING AND UNLOADING AREA
Designated loading/unloading areas should be sectioned off where required, a check should be done for overhead electric cables, the area should be cleared of debris, and any uneven surfaces should be identified. ▪ Loading and unloading areas should be well lit at all times ▪ Loading and unloading areas should be free from hazards ▪ Loading and unloading areas should be free of traffic
PARKING
Ensure vehicle is stopped, braked, and stabilized before loading/unloading ▪ Park on firm and level ground. ▪ Ensure parking brakes are fully engaged. ▪ Fully extend all stabilizers. ▪ Put on wheel chocks.
LOADING
▪ Don't overload the vehicle. ▪ Stack lighter loads on top of heavier loads. ▪ Spread the loads out evenly for balanced weight distribution. ▪ Secure and lash the loads properly. ▪ Ensure loads are secured and arranged properly before transport ▪ Ensure that the stacking arrangement is stable.
UNLOADING
▪ Ensure that the loads have not shifted during transportation before unloading. ▪ Ensure that all equipment used for unloading are in good working condition. ▪ Perform unloading on flat and firm ground.

EMPLOYER'S ROLE

- Provide the right vehicle for the job.
- Provide the necessary resources for the operation (e.g. lashing/securing devices, PPE).
- Ensure that risk assessments are conducted for all loading and unloading operations.
- Ensure that competent personnel are appointed to carry out the operation.
- Teach employees proper technique
- Give clear instructions to drivers for each operation.

EMPLOYEE'S ROLE

- Check that the vehicle and equipment are in good condition and able to perform the intended task (e.g. check lashings for damage before use).
- Follow all safe operating instructions and procedures.
- Ensure that the cargo is properly loaded on the vehicle.
- Carry out loading and unloading at designated areas (e.g. loading and unloading bay).
- Take necessary precautions to prevent the vehicle from moving during loading and unloading.
- Not leave the loading site without checking stowage and securing.
- Report any unsafe condition, loading/unloading issue, incident or near miss to your supervisor.

Tie-down lashing

During transportation, secure the unit with ratchet/tie-down straps through the designated points on the unit frame or by the pallet.

IMPORTANT

Check that the load is properly secured. Ensure that the cargo is properly positioned and secured on the pallet or platform.

Remember that safe load securing is crucial for preventing accidents, ensuring the well-being of everyone involved, and maintaining the integrity of the cargo.

If necessary, use wedges, wood slats or other blocking materials to prevent movement.

WARNING!

The manufacturer is not responsible for damage caused by ignoring the requirements

Forklift transportation**IMPORTANT**

Check the Load: Verify that the pallet load is the correct weight and not too large for the forklift. Never exceed the rated load capacity and maintain stability.

Look for loose objects or materials that could fall during transport.

Ensure that the load is firmly secured to the pallet.

Avoid sudden movements to maintain stability. To prevent the load from falling during transport, loading and unloading.

Assess Your Surroundings: Ensure people and obstacles are at a safe distance and not in your travel path.

The equipment is supplied on a wooden pallet. The equipment can be transported and installed by lifting the unit with a forklift truck to the intended installation location while it is still on the pallet and securely fastened to the pallet.

STORAGE

By following these general storage guidelines, you ensure the equipment remains protected, functional, and ready for use even after prolonged periods of storage.

- The equipment should be stored in a dry, well-ventilated area, where the temperature and humidity are controlled. Specific air, temperature, and humidity conditions can be found in the technical description table.

- For outdoor storage, ensure that it is placed in a secure location, protected from direct exposure to the elements such as rain, snow, or direct sunlight. Outdoor storage should adhere to the environmental limits outlined in the technical description. It is highly recommended to cover the equipment with a durable, weather-resistant material to protect it from environmental impacts such as rain, snow, dust, and ultraviolet (UV) radiation. A fitted cover or tarp that fully encloses the equipment is ideal, ensuring that no water or debris can enter or settle on the equipment. Proper anchoring of the cover is important to prevent it from being dislodged by wind.
- When storing the equipment indoors, it is recommended to remove the polyethylene cover from the equipment. This allows for proper ventilation and prevents moisture from being trapped, which could lead to condensation and potential damage to internal components. Ensure the storage space is free from environmental contaminants that may affect the equipment when uncovered.
- Do not store the equipment near highly flammable liquids, acids, or other corrosive substances that could pose a safety hazard or cause damage to the equipment's enclosure and internal components. Such substances may accelerate corrosion, degrade materials, or create dangerous chemical reactions, compromising both the safety and performance of the equipment.
- If the equipment is stored for an extended period (over 2 years), it is important to carry out preservation procedures to ensure that the equipment remains in optimal condition. This process may involve:
 - Inspecting and cleaning all external and accessible internal components.
 - Checking for signs of corrosion, dust buildup, or moisture ingress.
 - Ensuring that all electrical connections, seals, and moving parts remain intact and functional.
 - Applying appropriate protective coatings or lubricants if required, based on manufacturer recommendations.

IMPORTANT

Ensure that the emergency stop button is in the pressed position before storing the unit.

PLACEMENT

Accessibility for control and maintenance

- The equipment should be placed in a location that allows easy and unobstructed access to all critical components, including: control panel, input and output cables and connectors, and any other components that are essential for adjustment, maintenance, or repair.
Sufficient space should be left around the equipment to accommodate routine maintenance and emergency repairs.

Protection from environmental hazards

- The equipment should be placed in a position that minimizes its exposure to environmental hazards.
 - Water ingress must be prevented, as it could damage electrical components or lead to short circuits.
 - Falling debris or objects must be avoided to prevent damage to the equipment's roof or other structural elements.
 - The placement should also prevent physical damage during transport or handling operations. Ensure that there is enough space to move and maneuver machinery or vehicles without causing impact or strain on the equipment.

Additional protection

(if necessary)

- If the equipment is installed outdoors or in areas exposed to extreme weather, additional protective measures such as installing canopies, fences, or barricades may be required to protect it from harsh environmental conditions, including high winds, dust, direct sunlight, or extreme cold.

Distance from other equipment and walls

- The equipment must be positioned **at least 1500 mm (1.5 meters)** away from other equipment, walls, or obstructions. This clearance ensures proper ventilation and reduces the risk of overheating by allowing air to circulate freely around the equipment. It also facilitates safe and easy access for personnel during maintenance, reducing the risk of injury or damage from cramped conditions.
- In addition to the minimum distance from other equipment and walls, the placement should consider **safety clearances** for the movement of personnel and vehicles. This is particularly important in industrial settings where forklifts or cranes may be used near the equipment.
- Ensure that emergency exits, walkways, and fire suppression systems are not obstructed by the placement of the equipment.

VENTILATION - AIRFLOW DIRECTION

Ensure the placement allows for adequate airflow around the equipment to maintain optimal operating temperatures. Obstructions near air vents or cooling systems can lead to overheating and decreased performance. Avoid placing the equipment in areas where heat may accumulate, such as near heating ducts or enclosed spaces with poor air circulation.

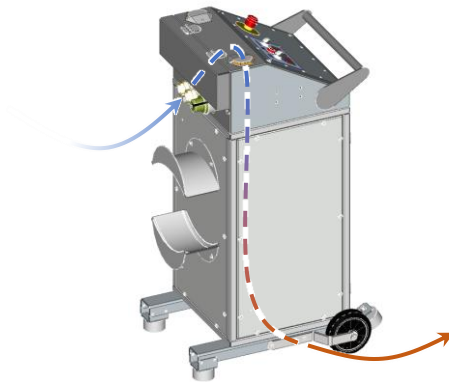
IMPORTANT

Do not cover the equipment while it is operating to ensure that air circulation is not obstructed.

WARNING!

Blocking the vents and not allowing air circulation can lead to overheating and damage to the equipment. In this case, the manufacturer's warranty may be void.

Airflow enters from the top, through the roof of the unit, ensuring that all key components inside are cooled. After the air passes through the system, it exits through the bottom openings or other specially designed outlets at the bottom of the unit.



WORK ZONE MOVEMENT

To move the unit within the work area, follow these steps:

- Gather and secure the cables in the designated holder for easier transportation.
- Standing in front of the unit, press down on the protrusion of the support leg with your foot and tilt the unit toward you until it stands solely on its wheels.
- Move the unit to the desired location within the work area.

GROUNDING

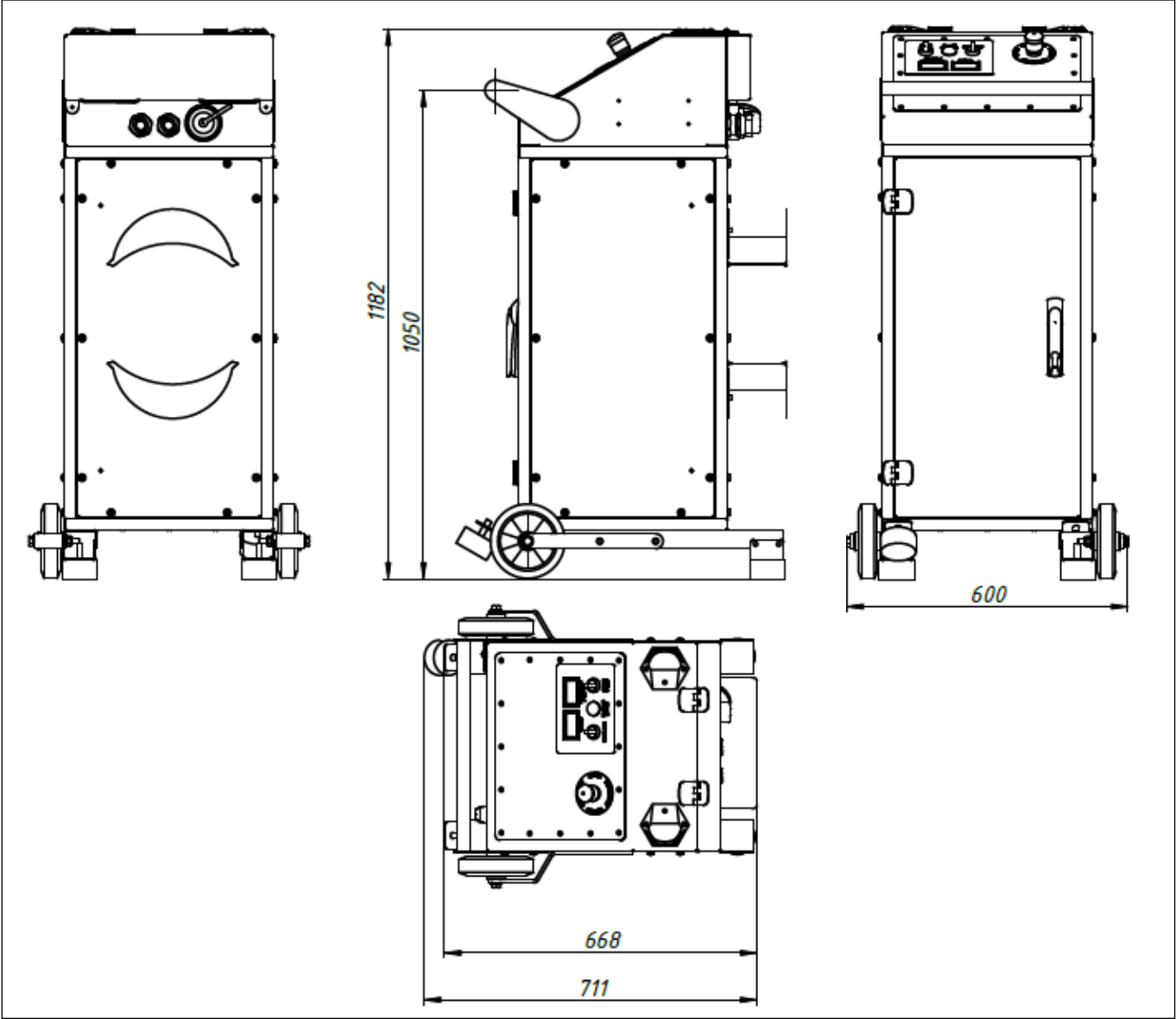
For personal safety and health reasons, the GPU must be grounded through the grounding cable.

BUILT-IN PROTECTIONS

The system provides comprehensive protection against various potential issues to ensure safe and reliable operation. Specifically, it includes safeguards:

- **Against external short-circuit current at the input**, which prevents damage to the system in case of a short-circuit event occurring at the input terminal.
- **Against external short-circuit current and output overload**, protecting the system from damage caused by excessive current draw or output load that exceeds the design capacity.

DIMENSIONS



TECHNICAL SPECIFICATION

Parameter	Value
General parameters	
Operating temperatures, °C	-20 to +55
Humidity, %	10-100
Noise level	<65dB(A)@1m
Warranty	24 months
Protection class	IP55
Dimensions, LxWxH, mm (mobile)	711x600x11182
Battery capacity	50Ah
Input parameters	
Input voltage, VAC	220-230, 1 phase, 3 wires (1P+N+PE)
Input frequency, Hz	50/60 ±5%
Inrush current	soft start
Output parameters	
Number of outputs	1
Current (continuously), A	≤ 300 (up to the discharge)
Rated output voltage, VDC	≤ 28.5
Output voltage stabilization accuracy, V	±0.5
Output voltage ripple factor, V	≤2
Coefficient of efficiency, %	97
Line drop compensation	automatic
Overload rating	Up to 1200 A – ≥ 2 sec
Protection	over/under voltage at input/output
	overload
	overheating
	short circuit at input/output
Documentation	
User Manual + Service Manual; Spare Parts Catalogue; Passport; Warranty Certificate	

GENERAL VIEW

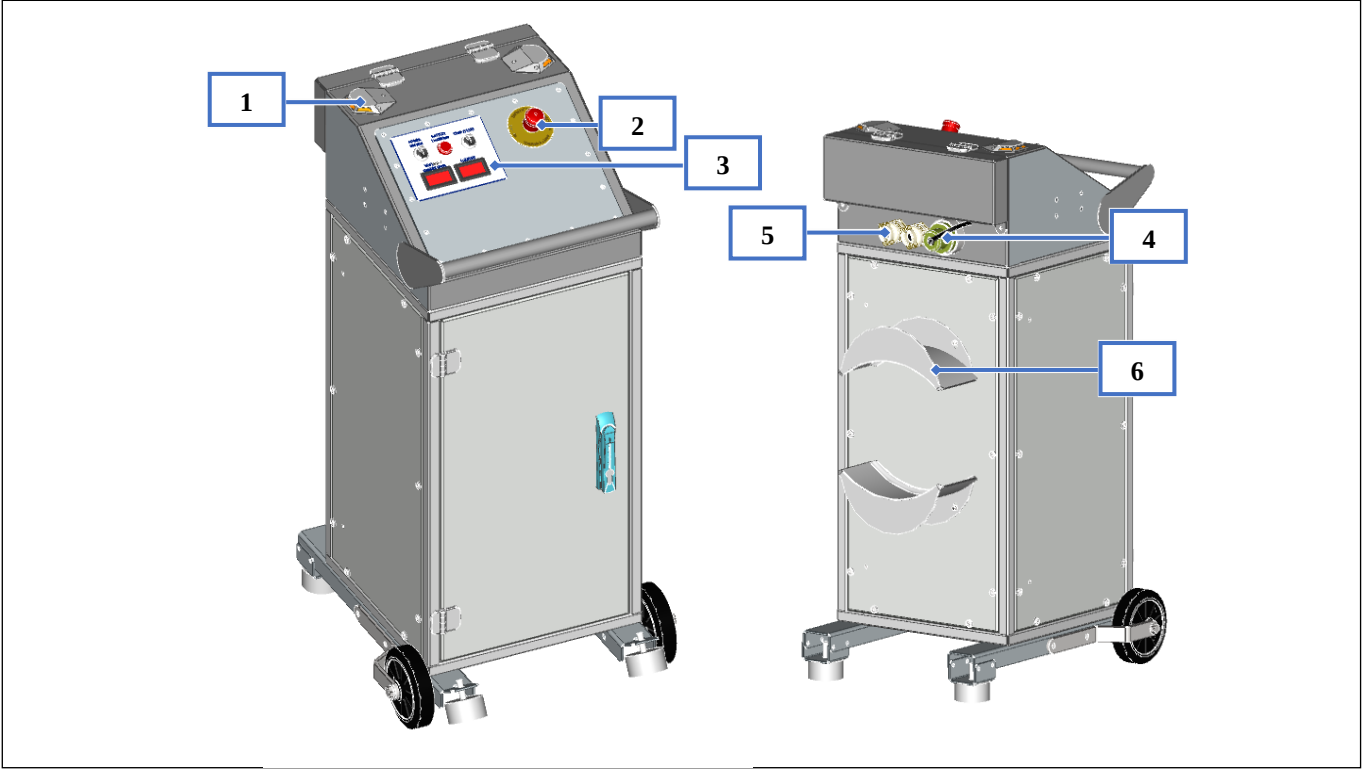
INTERNAL COMPONENTS



DESCRIPTION

1.	Primary fuses
2.	Circuit breakers QF1
3.	Power supply batteries

EXTERNAL COMPONENTS



DESCRIPTION

1.	Flashing beacons	The beacon light will flash, indicating that the unit is turned on.
2.	Emergency Stop button	
3.	Control panel	
4.	Power supply batteries charging plug	
5.	Cable glands	
6.	Cable holders	

DESCRIPTION

EMERGENCY STOP BUTTON



The **Emergency Stop button** is a safety mechanism that allows you to quickly stop the equipment when there is a risk of injury or the work process needs to be immediately stopped. It is designed to prevent harm or reduce existing hazards to people, machines or workers.

Do not use the emergency stop button as a daily OFF switch for equipment, unless it is necessary.

Pressing the mushroom head of the emergency stop button breaks the circuit of the mechanism and cuts off the power supply. Except for fan operation when the unit is charging or has been switched on.

After inspecting the Unit and eliminating the emergency, pull out the **Emergency Stop button**.

IMPORTANT

Before any start of the GPU operation make sure that the Emergency Stop button is pulled out, otherwise the unit will not start.

IMPORTANT

When storing or transporting for a long period of time, make sure that the emergency stop button is pressed

PRIMARY FUSE

If the device fails to power on, inspect the primary fuses. The Primary fuse is located behind the back panel of the unit. If a fuse blows due to an overload or a short circuit, it must be replaced with a new one.

POWER SUPPLY BATTERIES

The 5 power supply batteries are installed in the GPU

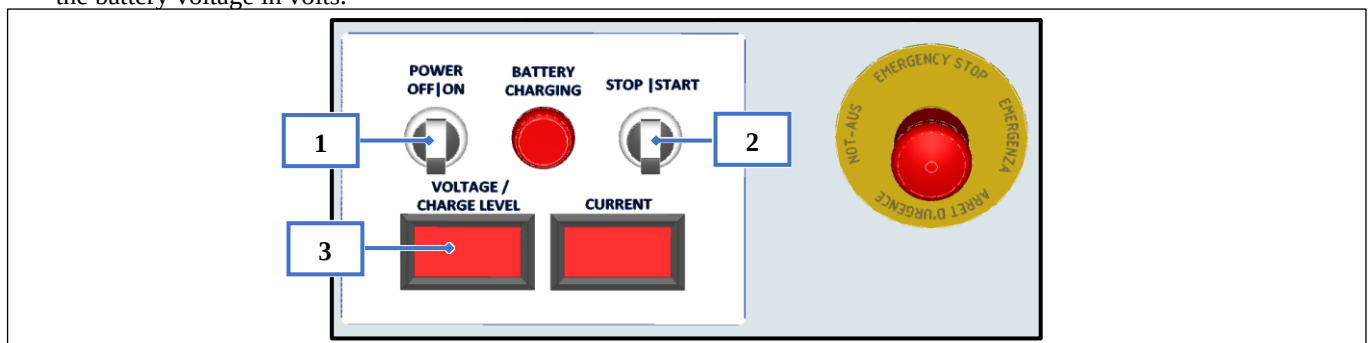
Battery charge status

IMPORTANT

Before each operation session, check the battery charge level of the power supply unit. The recommended voltage level before each session should be higher than 23.4V.

For an airplane engine start session, the battery voltage should be at maximum charge.

- Pull out the Emergency Stop button if pressed.
- Turn **POWER switch (1)** to the “ON” position. The **VOLTAGE / CHARGE LEVEL display (3)** will show the battery charge in percent. (P000 - P100 where the numbers indicate the charge percentage)
- Turn the **STOP/START switch (2)** to the “ON” position, then the **VOLTAGE / CHARGE LEVEL display (3)** will show the battery voltage in volts.



NOTICE

State of charge battery:

When fully charged, the display will show the following values:

- charged and **plugged in to the mains** - **28.5V**.
- charged and **disconnected from the mains** - **24.5-25V**.

Low charge – 22.4V (< P10) It is not recommended to use the device when the battery level is low. Charge the device for further operation.

Completely discharged – 21.4V (< P0 – P2) It is prohibited to use the device when the battery is completely discharged. This can lead to deep discharge, potential battery damage, and a significant reduction in battery life.

Charging power supply batteries

The battery charging cable is located on the back of the unit.

- To charge the unit, connect it to the mains via the power supply battery charging cable. Turning on the unit is not required for charging. The green battery indicator lights up when the unit is charging and turns off when not charging.
- Charge the unit minimum 10 min.
- Disconnect the battery charging cable from the mains.
- Check charge level on VOLTAGE display.

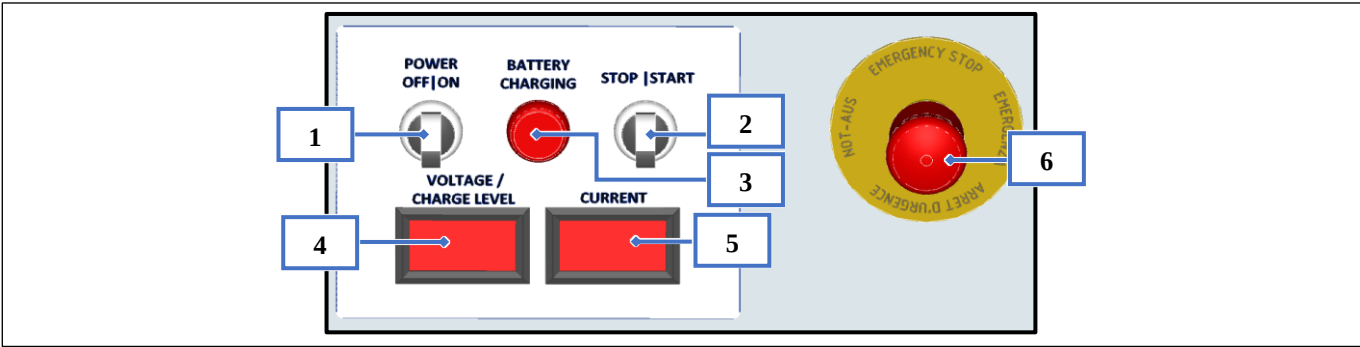
NOTICE

Battery charging stops when the unit is running (connected to an aircraft or other load and the START/STOP switch is in the START position).

The charging cable has Retractable Cord Mechanism, which is responsible for storing the cord while the unit is not charging. Upon completion of charging:

- Disconnect the plug from the power socket.
- Cover the plug with the built-in cap.
- Tug the cable multiple times to engage the rewind mechanism.
- Maintain control of the cord during the rewinding process to prevent tangling or other potential damage within the cord storage area.

CONTROL PANEL



DESCRIPTION

1.	POWER OFF / ON switch	On/off switch for the unit.
2.	STOP / START switch	DC output power switch.
3.	BATTERY CHARGING	Indicates that the batteries are charging.
4.	VOLTAGE / CHARGE LEVEL	Display for monitoring the DC channel voltage and batteries voltage/charge level.
5.	CURRENT	DC channel current indication.
6.	EMERGENCY STOP BUTTON	When fully charged, the display will show the following values: charged and plugged in to the mains - 28.5V. charged and disconnected from the mains - 24.5-25V. Low charge – 22.4V (< P10) Completely discharged – 21.4V (< P0-P2)

PREPARATION FOR OPERATION

WARNING!

To prevent electric shock, it is strongly recommended to be familiar and implement the regulations provided below.

Failure to comply with the rules of operation specified in this Manual may lead to a warranty loss.

- Only qualified and properly trained person is allowed to operate and maintain the unit.
- It is necessary to check the proper operation of the GPU. If any fault was found, immediately disconnect the unit. Further operation is possible only after the elimination of fault status.
- It is forbidden to perform cleaning, dusting and repair works while the power is on.
- It is forbidden to operate the GPU when the panel door is not locked.
- Before connecting/disconnecting any internal and external electronic components or interconnecting wiring between electronic equipment, always ensure that power is off and wait for at least 5 minutes before any connections and disconnections are made. Failure to follow safety rules could result in damage to equipment or personal injuries.
- Maintenance of the power circuit components inside of the GPU is allowed only after the specified time. Make sure there is no voltage on the capacitors' outputs.
- In case if GPU is operated in high humidity indoor or outdoor, it is necessary to be extra careful.
- Only a qualified and properly trained person is allowed to disassemble components of the unit.
- Exploitation, technical service and troubleshooting of the unit should meet the requirements of "Safety and maintenance regulations of consumes".
- **Wear protective clothing, gloves and personal protective equipment.**

FIRST USE OR AFTER LONG PERIODS OF INACTIVITY

NOTICE

When choosing the length of the cable, the voltage drop must be taken into account. Incorrect cable length can lead to malfunctions and trip the protection system.

- Check all fastenings are tight and fixed.
- Check fast contacts; control system blocks; drivers and rectifier modules connections.
- Check grounding. Check the reliability of the PE protective conductor.

IMPORTANT

Before any start of the GPU operation make sure that the **Emergency Stop button is pulled out** and the main **Circuit Breaker QF1 in its ON position**, otherwise the unit will not start.

OPERATION MANUAL

START AND STOP

Start:

- Before start of the GPU operation make sure that the **Emergency Stop button is pulled out** and the **main Circuit Breaker QF1 in its ON position**, otherwise the unit will not start.

NOTICE

If the emergency stop button was pressed - find out the reason why it was triggered and make sure that the unit is in working condition. To restore the unit from the emergency mode, follow the steps in section "EMERGENCY STOP BUTTON".

- Turn the **POWER** switch to the **ON** position.
- The beacon will start flashing.
- Plug the output cable into the power-consuming device (load, aircraft, etc.).

Turn the **STOP / START** switch to the **ON** position Monitor output parameters by display messages.

- Check the battery charge level using the charge level indicator.
When fully charged, the display will show the following values:
 - charged and **plugged in to the mains - 28.5V.**
 - charged and **disconnected from the mains - 24.5-25V.**
- Low charge – 22.4V (< P10)**

IMPORTANT

It is not recommended to use the device when the battery level is low. Charge the device for further operation.

Completely discharged – 21.4V (< P0-P2)

WARNING!

It is prohibited to use the device when the battery is completely discharged. This can lead to deep discharge, potential battery damage, and a significant reduction in battery life.

If the **current load is less than 150 A**, 4 batteries are operating and the display shows - **24.5-25 V.**

If the **current load exceeds 150 A**, the 5th battery is activated and the display will show - **28.5 V.**

When the unit is **connected to the mains**, the 4 batteries and the power supply are operating and the display shows also - **28.5V.**

Stop:

- To Stop, turn the **STOP / START** switch to the **OFF** position.
- Disconnect the output cable.

switch to the **OFF** position.

WARNING!

It is forbidden to disconnect the cables if the GPU is still running!

MAINTENANCE

Maintenance during the warranty period

If your equipment remains within the warranty period, it is essential that all maintenance and servicing be carried out by **ElectroAir**. This requirement ensures that the equipment's warranty coverage remains valid and protects you from unexpected repair costs associated with potential manufacturing defects or malfunctions. Please be advised that failure to have your equipment serviced by **ElectroAir** during this period may result in the warranty being voided. Only certified technicians at **ElectroAir** or experts trained by **ElectroAir** possess the specific knowledge and authorized parts needed to meet warranty requirements, ensuring that your equipment receives proper care without risking coverage loss.

After warranty period

We highly recommend that, once the warranty period has concluded, you continue to schedule regular maintenance with **ElectroAir**. By doing so, you help preserve the device's optimal performance and extend its overall service life. Regular maintenance conducted by **ElectroAir**'s trained professionals can prevent potential issues before they arise, maximize efficiency, and maintain the integrity of your equipment over time.

MAINTENANCE PREPARATION

- Only certified and trained personnel are qualified to operate and maintain the GPU.
- All maintenance works of the unit should be performed only when the power is off.
- The service procedure includes checking the electrical circuit and structural components.
- The GPU technical condition should be inspected indoors.

WARNING!

Installation, repair, maintenance and adjustment must only be carried out by qualified, certified and licensed personnel.

If installation, repairs, maintenance and adjustments are not carried out by qualified, certified and licensed personnel, the **warranty will not be valid.**

IMPORTANT

- **When carrying out repair or service work, maintenance records must be kept in the maintenance logbook (which can be found in the product's passport)**
- **A scheduled inspection is mandatory. The customer is obliged to provide the manufacturer with a full maintenance report in the case of a malfunction.**

In the absence of proper care or total lack of maintenance, the manufacturer may void the warranty.

WARNING!

THE CLIENT IS OBLIGED TO COMPLY WITH SAFETY AND SERVICE REQUIREMENTS. FAILURE TO COMPLY WITH THESE REQUIREMENTS WILL RESULT IN THE LOSS OF THE WARRANTY.

MAINTENANCE INTERVAL SCHEDULE**Every 3 months:**

- Carry out a visual inspection of the enclosure checking bolting and fastening of side and back panels. Tighten bolts if necessary.
- Clean the filters. Change filtering material if necessary.
- Visually check the operation of the fans and, if necessary, clean the dust between the fan blades, with compressed air.
- Carry out a visual inspection of the mounting panel:
 - If you find detached fasteners such as bolts or nuts - identify their original position and reattach them
 - If rust appears, you need to clean the area and remove the rust and then paint
 - Check terminal connections, tighten screws if loose.

Every 6 months:

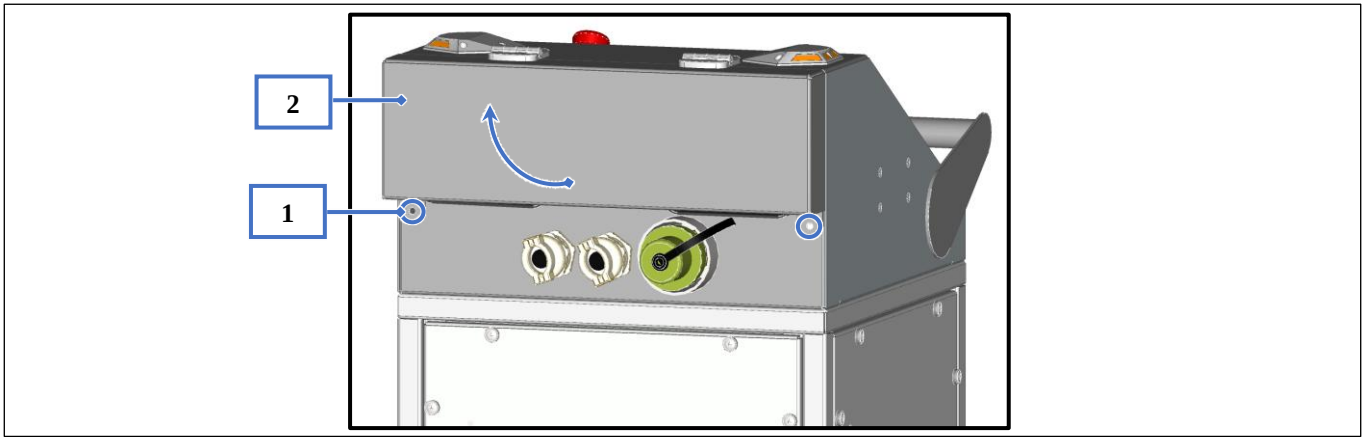
- Check the reliability of grounding cables of the enclosure. Tighten bolts/screws if loose.
- Check the reliability of the power output cable's connection. Tighten bolts/screws if loose.
- Visually check the power blocks and power cable fasteners. If necessary, tighten the fasteners.
- Check fuses for signs of oxidization. Replace fuses if oxidized.
- **Test the ground power unit using a load bank to verify that the output current and voltage comply with the values specified in the technical specification.**

Every year:

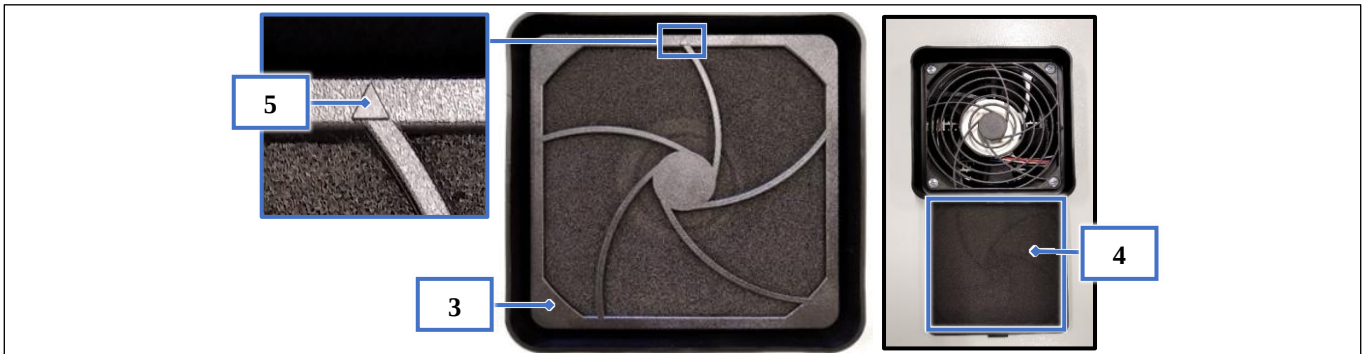
- Carry out visual inspection of the fans.

FANS AND AIR FILTERS

- Ensure the Ground Power Unit (GPU) is completely disconnected from the mains and the power indicator is off before proceeding.
- Unscrew the **fixing screws (1)** securing the **fan protection panel (2)** at the rear of the unit.
- Lift the **fan protection panel (2)** to access internal components.



- After raising the **fan protection panel (2)**,
- Open the **frame cover (3)** containing the **air filter material (4)**.
 - To open, **pull the edge marked with an arrow (5)**. If no arrow is present, lift the **upper edge of the cover** at the same location.
- Air Filter Maintenance:
 - Remove the **air filter (4)** for **cleaning or replacement**.
Clean the **air filter (4)** using a **vacuum cleaner, damp cloth, and a suitable cleaning agent** to remove accumulated dust.



- Fan Cleaning:
 - Use compressed air or a damp cloth with a non-aggressive cleaning agent to remove dust from the fans.

WARNING!

Do not use corrosive, abrasive, or flammable cleaning agents on the fans.
The manufacturer assumes no responsibility for damage resulting from improper maintenance or failure to follow safety precautions.

BATTERIES

Regularly check the battery's condition:

- **Inspect the external condition:** Check the battery case for cracks, leaks, or corrosion on the terminals. If the case is damaged or there is corrosion on the terminals, it could indicate a problem.
- **Measure the voltage:** To check the battery's condition, you can measure its voltage using a voltmeter. A healthy battery typically has a voltage of:
Power supply batteries (5pcs) – 6V ± 0.3V each

Cleaning the terminals and contacts:

- If there is corrosion on the battery terminals (usually white deposits), it should be carefully cleaned. You can use a special brush. After cleaning the terminals, dry them and, if necessary, apply a special grease to prevent further corrosion.

Maintaining the charge state:

Recharging: If the battery is not used for an extended period, it should be periodically recharged to prevent deep discharge. Use an appropriate charger, following the manufacturer's recommendations.

NOTICE

It is recommended that a specialized tool, such as a **battery tester**, is used to ascertain the condition of the battery.

Battery replacement

- Unscrew the **mounting bolts (1)** securing the **rear panel (2)** of the unit.
- Remove the **rear enclosure panel (2)** to access internal components.
- Battery disconnection:
 - Loosen and remove the **two securing nuts (3)** from the battery terminals.

IMPORTANT

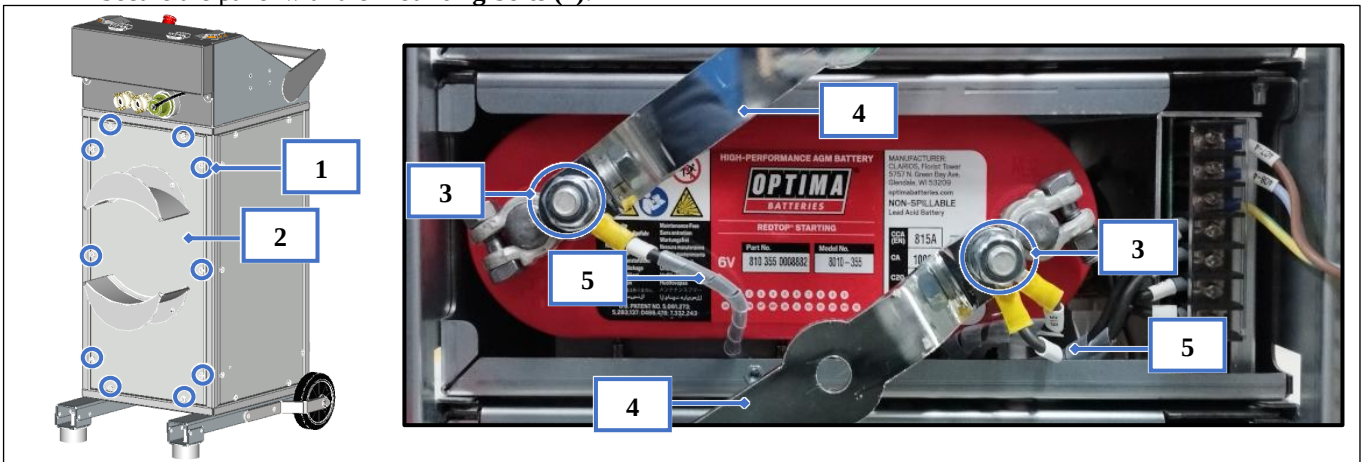
Disconnect the negative (-) terminal first to eliminate the risk of a short circuit.

- Carefully detach the **electrical busbars (4)** from both terminals.
- Disconnect the **wiring connections (5)** while noting the connection sequence for reassembly.

WARNING!

Ensure that cables do not come into contact with metallic components of the unit to prevent the risk of a short circuit.

- Battery replacement:
 - Remove the **depleted battery** from its mounting position.
 - Install the **new battery**, ensuring proper **phase alignment** and polarity.
- Reassembly:
 - Reconnect the **wiring connections (5)** in the previously documented order.
 - Reattach the **electrical busbars (4)** to the terminals and securely fasten them using the **nuts (3)**.
 - Reinstall the **rear enclosure panel (2)**.
 - Secure the panel with the **mounting bolts (1)**.



REPAIR AND PARTS REPLACEMENT

ROUTINE REPAIR**WARNING!**

If your equipment is still within the warranty period, it is imperative that the servicing is performed by ElectroAir in order to maintain the warranty. Please note that failure to do so may result in the warranty being voided.

NOTICE

We recommend that following the expiry of the warranty period, your device should continue to be serviced on a regular basis by ElectroAir in order to maintain optimal performance and extend its service life.

- Unauthorized access inside of functional blocks of the equipment may result in a loss of warranty.
- Replacement of defective parts, modules, blocks boards, etc. from the repair set is carried out by the manufacturer in terms of maintenance.
- After the expiration of the warranty period, the repair of the equipment can be agreed upon with the manufacturer's terms of maintenance.
- **For annual technical maintenance of the GPU, it is recommended to involve the Electroair manufacturer specialists.**

IMPORTANT

When carrying out repair or service work, maintenance records must be kept in the "Maintenance And Repair" table which can be found in the passport of equipment.

A scheduled inspection is mandatory. The customer is obliged to provide the manufacturer with a full maintenance report in the case of a malfunction.

In the absence of proper care or total lack of maintenance, the manufacturer may void the warranty.

WARNING!

THE CLIENT IS OBLIGED TO COMPLY WITH SAFETY AND SERVICE REQUIREMENTS. FAILURE TO COMPLY WITH THESE REQUIREMENTS **WILL RESULT IN THE LOSS OF THE WARRANTY.**

CONSUMABLE COMPONENTS**WARNING!**

ONLY ORIGINAL SPARE PARTS, ACCESSORIES OR CONSUMABLES FROM THE ELECTROAIR MUST BE USED TO SERVICE, REPAIR, MAINTAIN OR REPLACE CONSUMABLE MATERIALS OF ELECTROAIR PRODUCTS.

The warranty is voided if products are repaired, maintained, modified or altered using non-approved parts, spare parts, accessories or consumables from third-party manufacturers. In all such cases, repairs will be done at the customer's cost.

- Repair and parts replacement during the warranty period:
 - Equipment parts replacement, except fan filters and input/output cables (if any), is provided by the manufacturer.
 - However, unauthorized access inside of blocks, modules of the equipment, etc. for restoration or repair without the permission of the manufacturer may lead to the loss of the warranty.
- Repair and parts replacement after the warranty period:
 - Except for input/output cables and fan filters (if any), the change of replaceable parts and faulty electronic components can be provided at the client's request.
 - The manufacturer can only replace modules, blocks and PCBs that have been ordered for the equipment.
- Registration of parts replacement is provided in the equipment Passport.

Consumable components list

#	Description	Lifetime/years	EA-code	Qty
1.	Fan filter	1	4410	2
2.	Power supply batteries, 6V		25948	5

NOTICE

The consumption rate of spare parts is determined by a combination of operational factors, with the most significant influence coming from environmental conditions and equipment usage frequency.

UTILIZATION

- Follow the safety rules, while disassembling the GPU according to enterprise-consumer safety requirements.
- During disposal, it is necessary to fulfill the following operations:
 - Determine the unusable state of the GPU or its components.
 - Disassemble parts.
 - Separate removable parts and components by groups:
 - metal components
 - electronic components and boards
 - wiring
 - plastic
 - rubber
 - batteries
- Determine if these components can be used for repair. Contact the manufacturer for replacement and usability advice.
- Determine the need and conditions for the disposal of the remaining components. Send the remaining components for recycling.

BATTERIES

- Batteries must be disposed of in accordance with local environmental regulations and requirements.
- Do NOT discard in regular trash (household or industrial). Deliver to certified e-waste recyclers.
 - Lithium batteries MUST be discharged to $\leq 30\%$ (to reduce fire risk).
 - The battery terminals should be insulated (e.g. with tape) to prevent accidental short circuits.
 - Make sure that the battery case is not damaged and has no electrolyte leaks. In case of contact with electrolyte, immediately rinse the affected area with plenty of water and seek medical attention if necessary.
- Never incinerate batteries (toxic fumes/explosion risk).
- No landfill dumping (heavy metals contaminate soil/water).
- Do not disassemble (electrolyte exposure risk).

WARNING!	
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Failure to comply with the established rules of disposal may result in fines and administrative liability in accordance with the region's legislation.
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TESTING GPU WITH A LOAD BANK

(Optional)

EAL-28

Load bank EAL-28 is intended for **GPU output DC channel** maintenance, testing and functional testing. The unit can be used to check cable plugs after their replacement or repair.

EAL-28 has two constant types of loads – 300A and 750A and step change load from 1600A to 0A and 2500A to 0A

1

2

3

4

5

6

DESCRIPTION	
1.	Aircraft plug socket
2.	Indicator
3.	Display
4.	Meter test jacks
5.	USB
6.	External power supply connector

Please refer to the EAL-28 User Manual provided together with EAL-28 to learn safety regulations, preparational and operational instructions. **Never let untrained personnel operate, maintain or repair the load bank.**

- Before connecting the unit, make sure that the GPU is off.
- Input power of the Load Bank is 28.5VDC. Connect the GPU and the unit with a power cable equipped with an aircraft plug. Supply 28,5V to the load bank. The Main screen will appear.
- For continuous load at 300A or 750A:**
 - On the main screen push **300**. The GPU will get a load of 300A.
 - The continuous load will hold for 30 minutes. To interrupt the load push **STOP**.
- For automatic mode (5 steps drop from 1600A and 2500A)**
 - On the main screen push **1600** or **2500**.
 - Loads will be set to 1600A or 2500A and drop down to 0 by 5 steps during 35 seconds.
- To interrupt the load push **STOP**. The display will return to the main screen.
- To cool the Load Bank down after an operation, keep it idle (connected to the GPU) for at least 1,5 minutes.
- Stop the output channel of the GPU. Disconnect the power cable from the Load Bank.

CONTACT AND SUPPORT INFORMATION

CONTACTS

Address: Kapteni tee 1, 75322 Soodevahe, Rae vald, Estonia

General contact: +372 6518020, electroair@electroair.eu

Support contact: +372 5555 8880, support@electroair.eu <https://electroair.eu/web/support/>

CLAIM PROCESSING

The main objectives of claims processing are

- To reduce the time the customer spends on the claim.
- To reduce the customer's operating costs.
- To avoid failure situations in the future.

The manufacturer does its best to avoid risks at every stage of product delivery and operation.

Depending on the final location of the equipment, a contact person should be assigned to handle customer claims. It could be the manufacturer's staff, an agent, or a partner employee.

Customer support is available 24/7 (if technical support is contractually agreed).

The contact person receiving a claim through any channel should have at least the following information

- S/N of equipment.
- Failure description.
- Contact information for the customer's technical person.

The manufacturer's contact person should provide brief instructions to the customer and forward the information to the appropriate person (if technical support is contracted).

Further steps may include, but are not limited to, the following

- Consultation with the customer by the contact person through a convenient channel.
- Sending written recommendations to the customer.
- Sending of spare parts for local repair by the partner or customer.
- Visit of the manufacturer's representative to the site.

All of the above can be done on a paid basis or under warranty, depending on the contract.

Each claim must be registered in the internal information system and investigated by the Quality Manager. The Quality Manager makes a recommendation for improvement of production or delivery processes or other areas of the manufacturer's activity.

In case of claims from non-customer sides (local authorities, state institutions or others) regarding ecological issues, the responsible person shall investigate the situation in detail and make an appropriate decision. In this case, independent experts may be involved in the matter.

DOCUMENT REVISION INFORMATION

The version control table provides historical data about each update in a document.

REVISION	DATE (dd.mm.yyyy)	AMENDMENT
R00	14.03.2025	Initial release
R01	31.03.2025	Updated paragraphs: “POWER SUPPLY BATTERIES” “START AND STOP” “CONTROL PANEL” “UTILIZATION”

SPARE PARTS CATALOGUE

EAR00.054.000.00PE_R02



#	Position	Stock nr.	Description	Qty	
1	QF1	26,640	Residual circuit breaker; C16; 30mA	1.000	pcs
2	KM1, KM2	26,724	Modular relay; 230VAC, 50/60Hz, 20A	2.000	pcs
3	KM3, KM4	11,150	Contact; 1P; 400A; 250VAC; 1NO	2.000	pcs
4	UG1	17,219	Power Supply; 24VDC; 133A; D	1.000	pcs
5	UG2	18,132	Power Supply; 24VDC; 10A; W	1.000	pcs
6	UG3	33,972	Converter DC-DC; 15V; 1A; 15W	1.000	pcs
7	XS3	17,220	Connector Housing; 16P; DF11 Series; plug; 2 mm	1.000	pcs
8	XS3	3,554	DF11-22SCA - Contact, DF11 Series, Socket, Crimp, 22 AWG, Gold Plated Contacts	16.000	pcs
9	M1, M2	29,095	Fan 230VAC; Power 4.4W; 119x119x38mm	2.000	pcs
10	K1, K2, K3, K6, K7	3,536	Power Relay; 24VDC; 5A; 4P	5.000	pcs
11	K1, K2, K3, K6, K7	9,526	Relay socket; 14 pole; 12A; 250V	5.000	pcs
12	K1, K2, K3, K6, K7	314	Clip for relay; 2P; Hold Down LY/MY DIN Rail Sockets	10.000	pcs
13	D1, D2, D3, D6, D7	2,459	Diode; 1000VDC; 1A; 5.1mm	1.000	pcs
14	K4	11,143	Timer; 0.6sec to 100h; TE19M; 230V; 50Hz	1.000	pcs
15	K5	19,535	Relay Module TERMSERIES 1NO DC; 5V; 100mA; Screw Terminal	1.000	pcs
16	TA1	12,768	Current Sensor; 2000A; Split Core Hall Current Sensor CYHCT-KV	1.000	pcs
17	XS4	16,009	Pluggable Terminal Block; 4P; 5.08 mm; plug	1.000	pcs
18	A1	25,491	Interrupter for warning lights for tail lifts; 12/24VDC	1.000	pcs
19	HL3, HL4	23,641	Flashing panel; Yellow; 12/24VDC; 7W	2.000	pcs
20	SB1, SB2, SB3, HL1, HL2	73	Fixing Adapter; Contact Block; Front Fixing; RMQ Titan; 30x40 mm	5.000	pcs
21	SB1	69	Contact element; 1NC; 22 mm; Front Mounting	1.000	pcs
22	SB1	62	Emergency stop pushbutton; 22.5 mm; 35 mm Pushbutton; Push-Pull; Non-illuminated; Red	1.000	pcs
23	SB1	61	Label; Emergency switching off; yellow; 4 languages; DE; EN; ES; PT	1.000	pcs
24	SB2, SB3	66	Contact element; 1NO; 22 mm; Front Mounting	3.000	pcs
25	SB2, SB3	12,123	Modular Selector; 22.5 mm; Knob, Momentary; Illuminated; Bezel Silver; Button White; IP66; NEMA 4X	2.000	pcs
26	SB2, SB3, HL2	76	Legend Plate; No Insert Plate; Round, Black; 30x50mm	3.000	pcs
27	HL1	79	LED element; 15mA; 12...30VAC/DC; 22.5mm; White	1.000	pcs
28	HL2	63	LED element; 15mA; 12...30VAC/DC; 22.5mm; Green	1.000	pcs
29	PV1	24,449	Voltmeter DC LED4	1.000	pcs
30	PA1	23,784	Ammeter DC; 24VDC	1.000	pcs
31	FU1, FU2	587	Fuse; 6.3A; 250V; 5x20mm	2.000	pcs
32	FU3	11,483	Fuse; 3.15A; 250V; 5x20mm	1.000	pcs
33	FH1, FH2, FH3	2,969	Fuse holder; 5x20mm; 4 Pos; DIN Rail	3.000	pcs
34	FH1, FH2, FH3	704	Terminal Block Partition; 4.2x54.0x32.5mm; Separating Plates; FEM8S; End Section; SNA Series	1.000	pcs
35	X1, X2, X3, X4, X5	17,820	Terminal Block; grey; 2P; DIN Rail; 0.2-4mm ²	38.000	pcs
36	X1, X2, X3, X4, X5	6,372	End plate for DIN rail terminal blocks; type WKFN 2.5/35	5.000	pcs
37	X1, X2, X3, X4, X5	8,066	Marking strips; 1 to 10; 5mm; 9705A/5/10	5.000	pcs
38	X4	8,067	Marking strips; 11 to 20; 5mm; 9705A/5/10	1.000	pcs
39	X1, X2, X3, X5	8,065	Cross connector jumper bar; 10P; 2.5mm ² ; 5mm wide; IVB WKF 2.5- 10	2.000	pcs
40	X1, X2, X3, X5	17,138	Partition; Grey; For Din Rail Terminal Blocks; TWFN 2.5 D2/2/35	2.000	pcs
41	GU10, GU11, GU12, GU13, GU14	20,270	Power supply: switched-mode; for building in, modular; 300W; 40A	5.000	pcs
42	VD10, VD11, VD12, VD13, VD14	22,807	Diode module SEMIPACK 1 1200 V	5.000	pcs
43	F10	29,543	Fuse; 500A; 32VDC; 68.58x19.05x9.90mm	2.000	pcs
44	VD2	53	Stud diode; 200A; 1200VDC; SD6	1.000	pcs
45	GB1-GB5	25,948	Battery; 6V; 50AH; 815V; SAE - Type A	5.000	pcs
46	VD1	15,068	Diode Module; 280A; 400VDC	1.000	pcs