

DIAM Series D5-3

three-phase system

AUGIER
energy

OCER
AirfieldTechnology

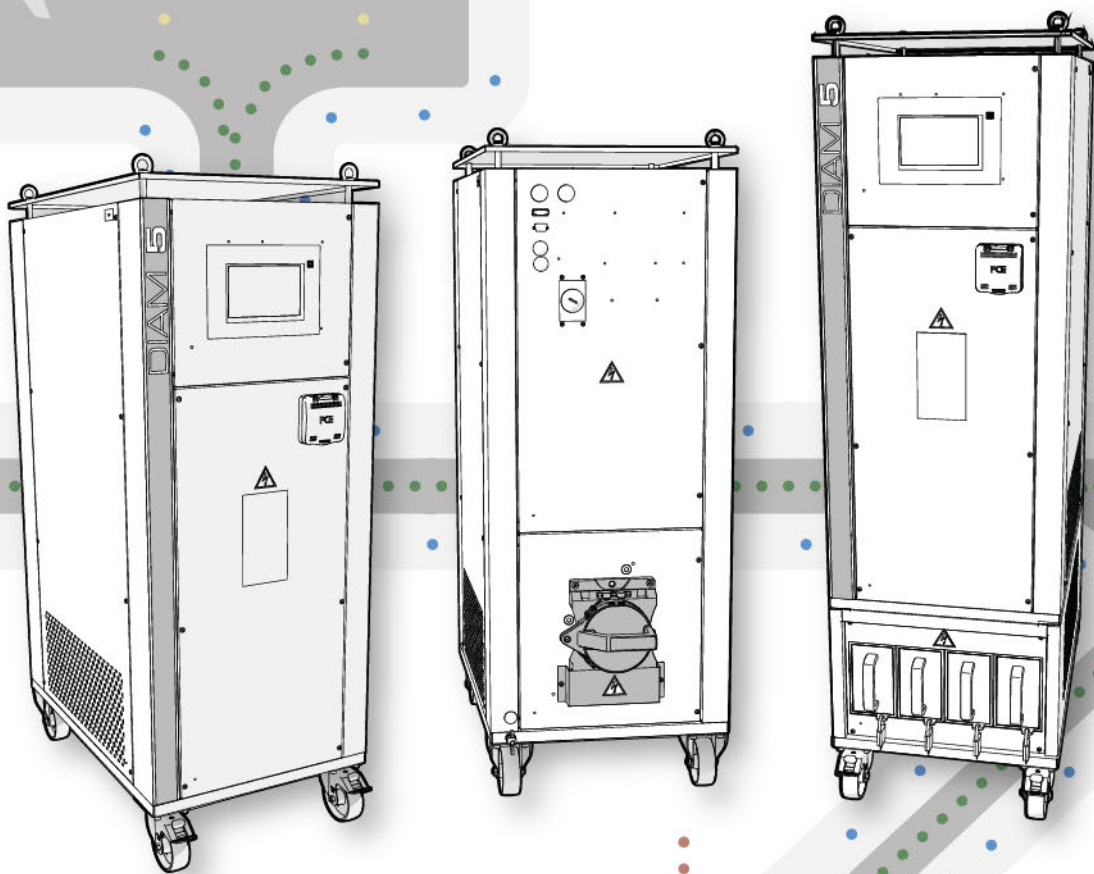
Use and Maintenance Manual

Original Instructions

DIAM 5

Advanced IGBT-Based Constant
Current Regulator for AGL Systems

High-performance CCR designed for
precise current regulation and optimized
system operation



UT-MT-1018_2.0_23-03-2026 (EN)

ocem



EN

[ocem.com](https://www.ocem.com)

Contact us

OCEM AT



+39 051 66 56 611



info@ocem.com

AUGIER



+33 4 920 86200



home@augier.com

Editions		
Revision	Date	Notes
1.0	01-06-2024	First publication
1.1	29-08-2025	Update of spare parts list
2.0	23-03-2026	Complete update

UT-MT-1018_2.0_23-03-2026 (EN) | These specifications may be subject to change.
© Copyright 2026 OCEM Airfield Technology (Italia) | All rights reserved.

OCEM Airfield Technology, and any other names/trademarks associated with OCEM Airfield Technology products mentioned or referred to in this document, are trademarks or registered trademarks of OCEM Airfield Technology. The rights of third parties to each registered trademark mentioned in this document belong to their respective owners.

The copyright of this manual belongs to OCEM Airfield Technology. The instructions, drawings, tables and other contents of this manual are of a confidential technical nature and may not be reproduced and/or disclosed, either in whole or in part, without specific authorisation from the Manufacturer. Reproduction of this manual is permitted for the sole purpose of making a back-up copy. OCEM Airfield Technology retains ownership of this manual in accordance with the law and prohibits its transfer to third parties and/or unauthorised reproduction.

1 GENERAL INFORMATION

1.1	Safety information	5
1.2	EC directive	5
1.3	Package Contents	6
1.4	Handbook Reference Guide	7
1.5	Safety Instructions	8
1.6	Safety Symbols	9
1.7	Definition of Operator	10
1.8	Limited Warranty	10
1.9	CE Marking	11
1.10	Confidentiality, industrial property rights	12
1.11	Disposal	12
1.12	Item Identification	12

2 DESCRIPTION OF THE DEVICE

2.1	General Characteristics	13
2.2	Operating principle	13
2.3	Reference standards	15
2.4	Current levels	16
2.5	Supply voltage	17
2.6	Nominal power	17
2.7	Wired remote control	17
2.8	Communication network	17
2.9	Protection systems	17
2.10	CUT-OUT output disconnecter	17
2.11	Product Code	18
2.12	Behaviour in case of fault	19
2.13	Wiring	20
2.14	ICS (Integrated Circuit Selector) module	21

3 INSTALLATION

3.1	Constant current regulator	27
3.2	Handling and positioning of the device	28
3.3	Preliminary checks	29
3.4	Connecting the power cables	31
3.5	Connection of the series circuit	32
3.6	Remote control configuration	34
3.7	External circuit selector interlock	35
3.8	Tests and checks	35

4 ADJUSTMENTS AND MAINTENANCE

4.1	Preliminary Operations	39
4.2	Selection of the operation mode	40
4.3	Navigation map	41
4.4	Local monitoring	46
4.5	Warning and alarm messages	51
4.6	Troubleshooting	54
4.7	Configuration access	57
4.8	Edit parameters	59
4.9	Software configuration utility	60
4.10	Scheduled Maintenance	61
3.1	Corrective Maintenance - Component Identification	64
3.2	CCR wiring diagram	67
3.3	ICS wiring diagram (optional)	69
3.4	Spare Parts	69

1 GENERAL INFORMATION

1.1 Safety information



HIGH VOLTAGE - RISK OF DEATH

This device is normally used in systems that use dangerous and lethal voltage levels.

Use the utmost care when operating and maintaining the equipment and the related circuits. Consult the applicable rules and regulations on safety and work precautions. Always refer to any applicable national, international, federal/ EU standards, such as (representative and non-exhaustive list):

- ILO Conventions no. 155, 148, 167 concerning the safety and health of workers, protection against occupational hazards, electrical safety during maintenance work;
- ISO 45001 about best practices to guarantee an adequate level as regards work safety;
- Standard and SARPs recommendations established by ICAO;
- (European Union) Directive 89/391/EEC on health and safety in the workplace;
- (European Union) EASA norms for the safety standards for civil aviation and the airport infrastructures
- (USA) OSHA 29 CFR regulations (Part 1910, Part 1926) concerning occupational hazards, to ensure the health and safety of workers;
- (Italy) Legislative Decree 81/08 Code on safety in the workplace;
- (Spain) AENA operational rules for maintenance operations in the airports.

Always operate in compliance with all relevant standards and regulations in force in the country in which the installation and operation of the device is carried out.

Installation and commissioning of the device may only be carried out by qualified personnel who are adequately trained on the features and use of the device.



Stay away from potentially active parts

Disconnect the energy sources before performing operations on the device. Allow adequate discharging time for any residual energy before accessing the device. Use a suitable measuring instrument to check for residual voltage before coming into contact with potentially active parts.



Access the internal parts of the device only in case of absolute necessity, such as maintenance or repairs.

Wait until the device is fully de-energized before opening it or removing the guards to carry out maintenance.



All personnel working on the device and its associated circuits must be qualified and trained in first aid and cardiopulmonary resuscitation (CPR) techniques.

1.2 EC directive

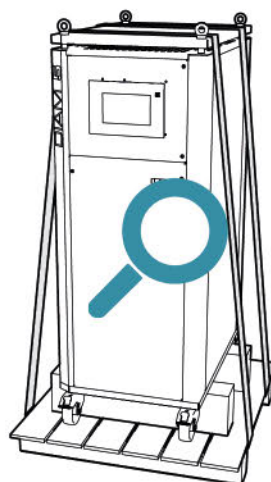
This device complies with the requirements of the EC Directives:

- 2014/30/EU with regard to electromagnetic compatibility
- 2014/35/EU with regard to low voltage devices



The information in this document is for information purposes only and cannot be considered a substitute for the declaration of conformity signed and issued by the Manufacturer or of the certificates accompanying the product.

1.3 Package Contents



The CCRs DIAM D5-3 of OCEM Airfield Technology are optimized static power supplies, for powering airport light signalling circuits by connecting light fixtures with isolation transformers to a series circuit.

The control of operating values is ensured by dual-stage power modules (rectifier and inverter), designed to keep the output current level constant, regardless of power supply or load fluctuations.

Thanks to their unique power architecture, the CCRs DIAM D5-3 of OCEM Airfield Technology introduce no distortion or degradation of the power factor, which remains that of the load. The harmonic content reflected on the supply network is therefore particularly low, over the entire output current range and for any load.

No adaptation to the load via sockets is necessary. The digital processing capability of the DSP processor allows it to be adapted to any type of load: LED fixtures, halogen fixtures, electronic converters or combined systems.

The CCRs DIAM D5-3 of OCEM Airfield Technology perform an automatic calibration that avoids any analogue adjustment during maintenance. A simple and intuitive HMI user interface allows clear display of alarm indications, of the CCR status and of all relevant parameters.

These appliances are specifically designed to power airport visual aids, in accordance with international regulations.

The device is designed in compliance with:

- IEC 61820-3-2 (CCR), 61821 (Maintenance);
- AENA (DIN/DNYM/PPT/002-05/13);
- ICAO Doc 9157 - Part 5: Aerodrome Design Manual - Part 5 - Electrical systems.



Immediately check for visible damage to the device and packaging. Carefully unpack the device and check for visible damage.



Store all the components in the original packaging until the time of installation. Take care not to damage sheet metal parts, cables and internal components.



The device described in this manual is designed to power series circuits intended for airport lighting of runways, taxiways and aircraft aprons.

1.4 Handbook Reference Guide

This document contains all information about the equipment and describes the procedures to be followed when installing the product and performing routine maintenance. This document is intended for all operators who have to work on the device.

This document in no way replaces applicable laws, rules or regulations, including ICAO standards.

Precautions in the manual are always preceded by a symbol as shown below:



It indicates warnings, notes, suggestions and other points to which to draw the reader's attention.



It indicates the operations that must be carried out or information to which particular attention must be paid in order to avoid possible risks.



It indicates particular risks associated with electricity. It lists operations that must be carried out or information to which particular attention must be paid in order to avoid possible risks.

These precautions protect the personal safety of those who work and/or are present in the buffer zone of the device and its supply circuits.

Failure to follow instructions (especially those preceded by danger, caution, warning) can result in serious injury or death.

1.5 Safety Instructions



READ THIS DOCUMENT CAREFULLY.

Improper use of the device or failure to follow all precautions listed will result in danger of death and serious injury to persons and damage to property.



DANGER OF ELECTRIC SHOCK, EXPLOSION OR ELECTRIC ARC

Read the enclosed documentation carefully before installing or starting to use the device. Do not install the device until all necessary construction work has been completed.



DO NOT OPERATE ON ENERGISED CIRCUITS

Do not carry out any operations on energised circuits.

Before any access, inspection or intervention on the device, make sure that the device is switched off by opening the main switch and removing power from the units (open the power switch at the beginning of the line or switch off the regulator).

Failure to observe all the precautions listed above will result in danger of death and serious injury to persons.

Always proceed with the utmost attention. The safe intervention procedures indicated aim to protect the operator against possible risks and to preserve the light fixture from any damage.



SAFE INTERVENTION ON THE REGULATOR

Proceed as follows:

- Switch off the constant current regulator by opening the main switch
- Open the protection switch upstream
- Modify the functional and protective wiring between the regulator and the series/grounding circuit cables to ensure the operator's safety during maintenance/testing. If the regulator is equipped with an optional cutout device, act on the controls and bring the device into maintenance mode

Carry out all the operations on the light fixture and complete the intervention. When finished, restore the operating condition:

- Restore the functional and protective wiring between the regulator and the series/grounding circuit cables. If the regulator is equipped with an optional cutout device, act on the controls and bring the device into operative mode
- Close the protection switch upstream
- Close the the main switch and restart the constant current regulator



RESIDUAL ENERGY

Always wait for the discharge time (at least 10 min) before operating on the equipment. Check the complete de-energization of the equipment before accessing the potentially active parts. Failure to observe all the precautions listed above will result in danger of death and serious injury to persons.



EARTH CONNECTION

The body/envelope of the device must be connected to the earth potential before the light fixture is commissioned.

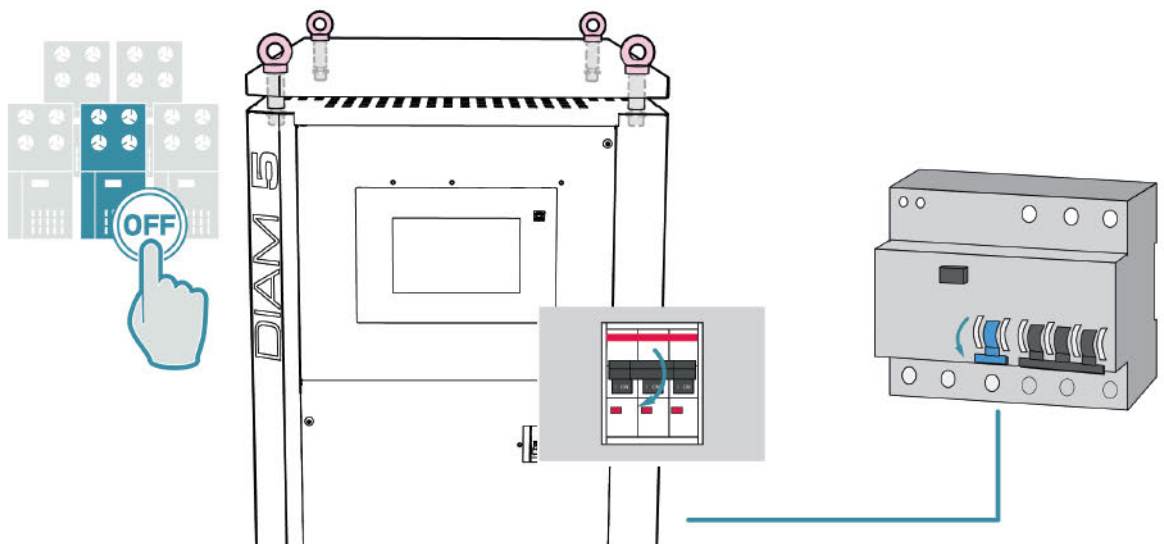
Check that the yellow-green protective conductor is connected to the terminal provided on the device.

In the case of an isolation transformer with a secondary connected to ground, it is advisable to connect the grounding of the light fixture at the point where the secondary of the isolation transformer is connected to ground.



IN CASE OF EQUIPMENT MALFUNCTION

Do not leave devices active if they show signs of deterioration or malfunction. Disconnect the power sources and proceed as soon as possible with the repair/replacement of the devices.



1.6 Safety Symbols

The symbols shown in the following table are used in the operation and maintenance manual and on the device. These symbols are used to indicate the existence of present or possible hazardous situations, to indicate prescriptions or prohibitions regarding situations that could pose a danger to the operator, or to indicate the behaviour to be adopted in order to minimise risk for the operator.

Hazard Signs		Prohibition and Obligation Signs	
	W001 General warning sign		P001 General prohibition sign
	W004 Warning, LASER beam		M001 General mandatory action
	W005 Warning, non-ionising radiation		M002 Refer to instruction manual
	W006 Warning, magnetic field		M005 Connect an earth terminal to the ground
	W012 Warning, electricity		M009 Wear protective gloves
	W017 Warning, hot surface		M015 Wear high-visibility clothing
	W027 Warning, optical radiation		M021 Disconnect energy sources

1.7 Definition of Operator

All work on the device and its internal parts must be carried out by experienced, adequately trained personnel who are aware of the risks involved in the use of electrical energy and the use of low and high voltage circuits.



Take all precautions in compliance with safety regulations for work performed on electrical systems and, in any case, for work performed using electrical systems or in areas adjacent to electrical systems and equipment

All operations on equipment and on its internal parts must be performed by professional staff, properly trained for Cardio Pulmonary Resuscitation (CPR) techniques.



Never work on the device unless at least one other operator is present who is adequately trained in CPR techniques.

Check that Operators do not carry out interventions outside their specific areas of expertise and responsibility. OCEM Airfield Technology declines any and all liability arising from incorrect operations carried out by personnel not trained in the use of the devices, or resulting from failure to comply with general safety standards.

1.8 Limited Warranty

OCEM Airfield Technology guarantees that all marketed DIAM D5-3 products are free of manufacturing defects at the time of shipment. This limited warranty shall be valid for the period stated in the sales agreement. THIS LIMITED WARRANTY IS IMMEDIATELY VOID IF THE PRODUCT IS USED FOR PURPOSES OTHER THAN THOSE FOR WHICH IT WAS MADE.

This limited warranty is provided by OCEM Airfield Technology to the original purchaser of DIAM DIAM D5-3 products as identified by the documents issued at the time of purchase. This limited warranty may be transferred to subsequent purchasers of the Product only on the condition that such Product is resold in NEW condition and complete with its original packaging.



Any modification and/or tampering with the product immediately invalidates the warranty. OCEM Airfield Technology cannot be held responsible for any damage to items or persons deriving from the failure to comply with instructions relating to installation, use and maintenance of the product, or with the environmental conditions for installation and storage specified by the Manufacturer or by applicable regulations regarding electrical devices and systems.

In case of potential defects and/or unusability of the delivered Goods, the applicable warranty - which excludes all other legal warranties and agreements - applies to defects in materials, design, and/or installation of the delivered Goods. The warranty provides, at the Supplier's discretion, for the repair or replacement, at the Supplier's expense, of any component that is faulty or malfunctioning from the outset, but does not extend to damage resulting from negligence or wear and tear.



For more details on warranty conditions, please refer to the document “General Terms and Conditions of Sale” updated to the latest version.
See online: <https://ocem.com/en/terms-conditions/>



The Supplier undertakes to repair or replace components as quickly as possible, it being understood that for so-called commercial components and more generally for components supplied by third-party manufacturers, only the terms of the respective original manufacturer's warranties will apply.

The Warranty excludes any liability on the part of the Supplier and does not apply to damage of any kind caused by: improper use by the Customer or the Customer's personnel; use of unsuitable materials, or incorrect or insufficient treatment; installation of equipment or spare parts not approved by the Supplier; installation and operation of the Goods received without following the directions and instructions provided by the Supplier's technical personnel; improper or excessive use, insufficient maintenance, and/or work not carried out in accordance with the instructions for use and maintenance; any other reason not attributable to the Supplier. The Customer must take charge, at its own expense and employing its own personnel, without involving the Supplier, of those repairs which in the opinion of the Supplier are deemed to comply with a moderate level of technical knowledge.

The Customer must, under penalty of forfeiture, communicate the claim concerning the defect or non-conformity to the Supplier **within 8 days from the discovery of the defect**, and must send a written request to activate warranty service. Warranty claims must be sent to:

OCEM Airfield Technology | via della Solidarietà, 2/1 | 40056 Valsamoggia BO (Italy)
info@ocem.com

The Customer shall bear the costs for travel and accommodation incurred by the Supplier's technical personnel who must complete any warranty-related work at the installation site.

The warranty excludes all other damages, including those resulting from economic loss and reduced production capacity; direct, indirect and consequential damages; and termination of the Contract.

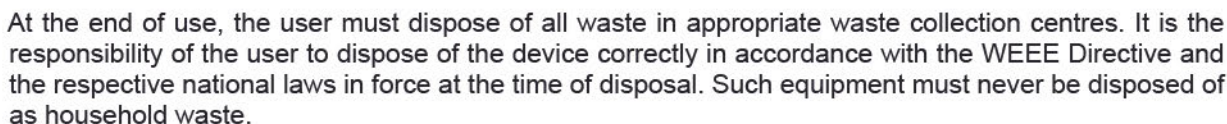
The Supplier shall in no way be liable for any other compensation or indemnity, including damage resulting from loss of or reduced production, loss of opportunity, loss of or reduced profit, loss of contracts, impossibility of use or partial use in general, as well as indirect and/or consequent damage.

CE

This equipment meets the requirements in relation to health and safety of the main EC directives, and in particular of the EMC Directive on electromagnetic compatibility (2014/30/EU) and of the LV Directive relating to electrical equipment designed for use within certain voltage limits (2014/35/EU).

The Customer is obliged to adopt the utmost confidentiality with regard to all information of a technical nature (including but not limited to diagrams, programmes, documentation, formulas, recipes, settings and correspondence) received from the Supplier or otherwise assimilated or acquired during the conclusion of the Contract of Sale.

1.11 Disposal



On each device there is an item nameplate, where the item code is given; on the nameplate there are further data: the model name, uses or utilisation, power supply characteristics, any trademarks and/or symbols attesting to the device's compliance with specific regulations or standards.



2 DESCRIPTION OF THE DEVICE

2.1 General Characteristics

The DIAM D5-3 constant current regulators are designed for the purpose of powering series circuits for light fixtures of airport areas: runways, taxiways and aircraft aprons.

The DIAM D5-3 constant current regulators (CCR) are optimized static power supplies, whose control is ensured by dual-stage power modules (rectifier and inverter), designed to keep the output current level constant, regardless of power supply or load fluctuations.



The DIAM D5-3 constant current regulators described in this manual have been designed to be installed on the levelled floor with adequate flatness and strength characteristics.

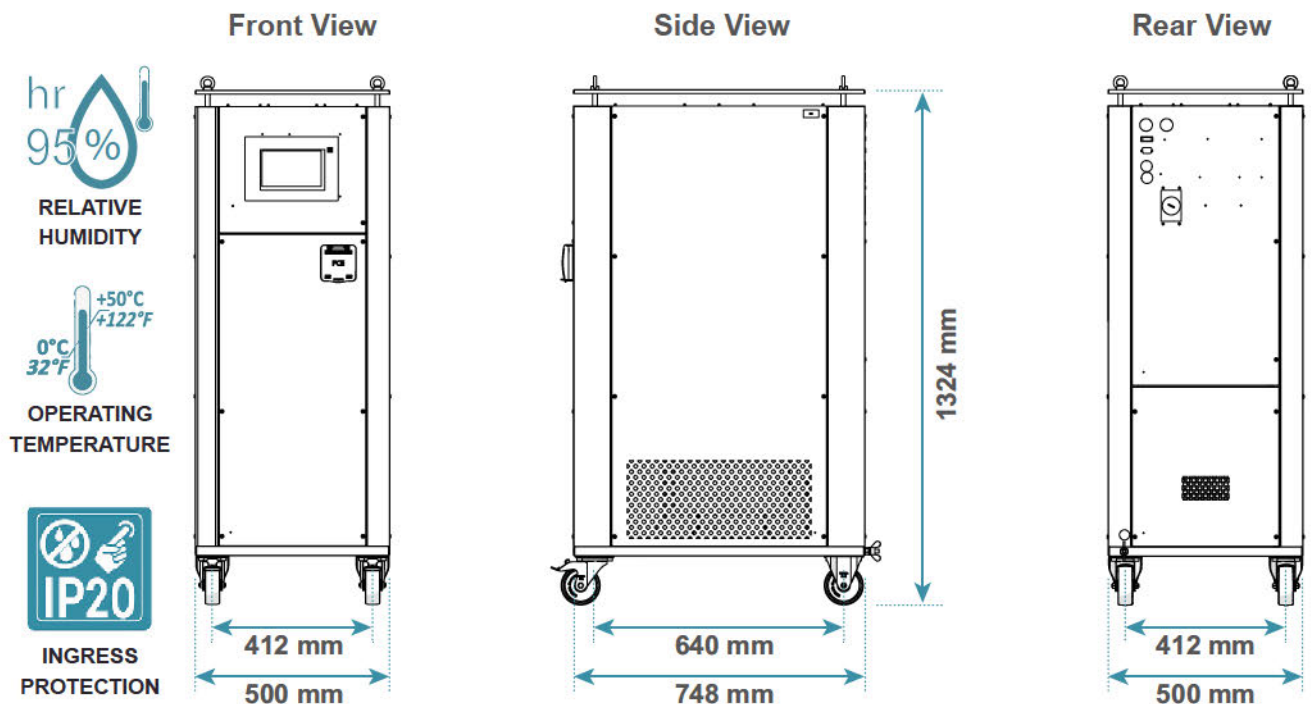
The normal installation condition is a fixed, stable and non-slip floor, free from protrusions, cavities or inclined surfaces, designed and constructed with characteristics suitable for the actual operating conditions.

The positioning of the unit must ensure easy access to complete the use and maintenance operations.

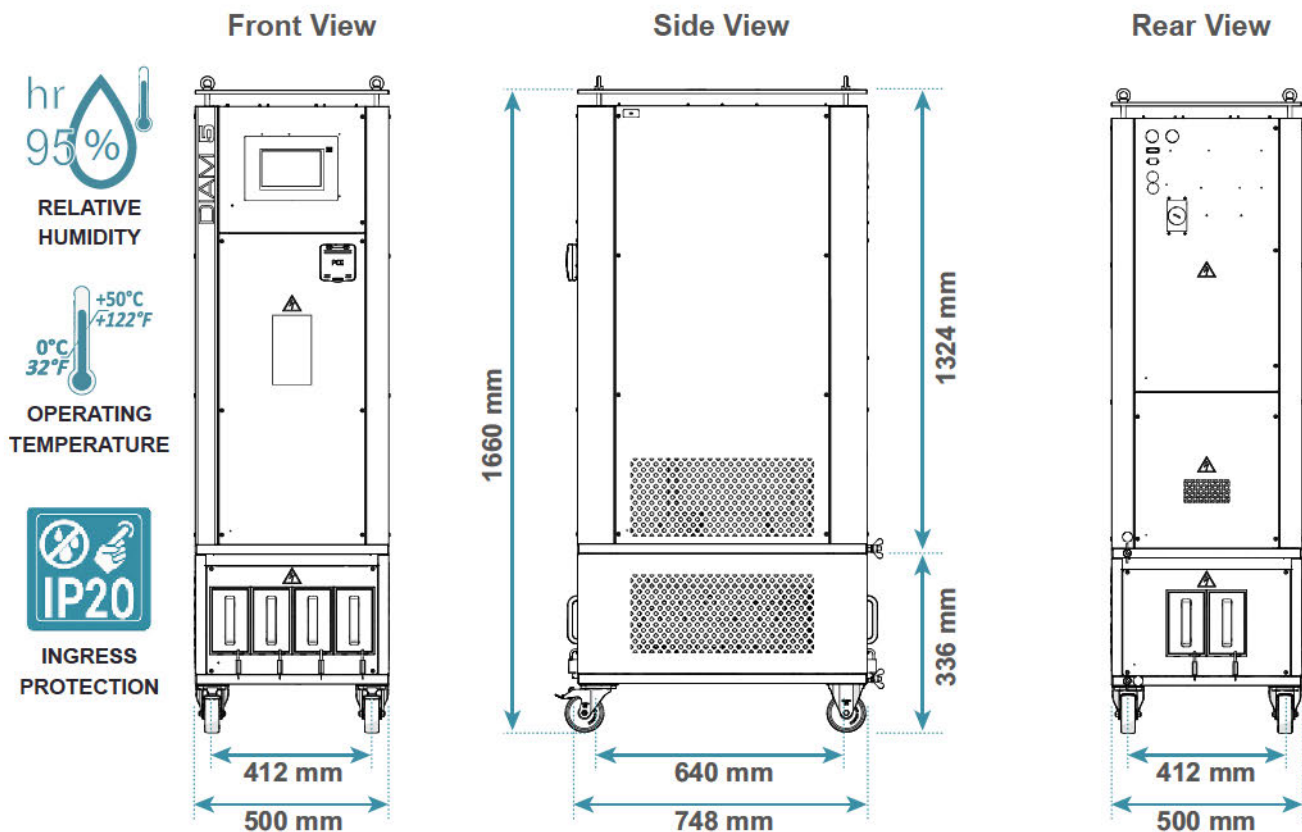


The supply circuits, with appropriate technical specifications, can be placed inside pipes, ducts or cable trays that comply with the applicable regulations in force. In the same conduit, without separations, no conductors referring to different services must be laid (this prohibition is extended to all connecting lines, even if the conductors operate at the same operating voltage).

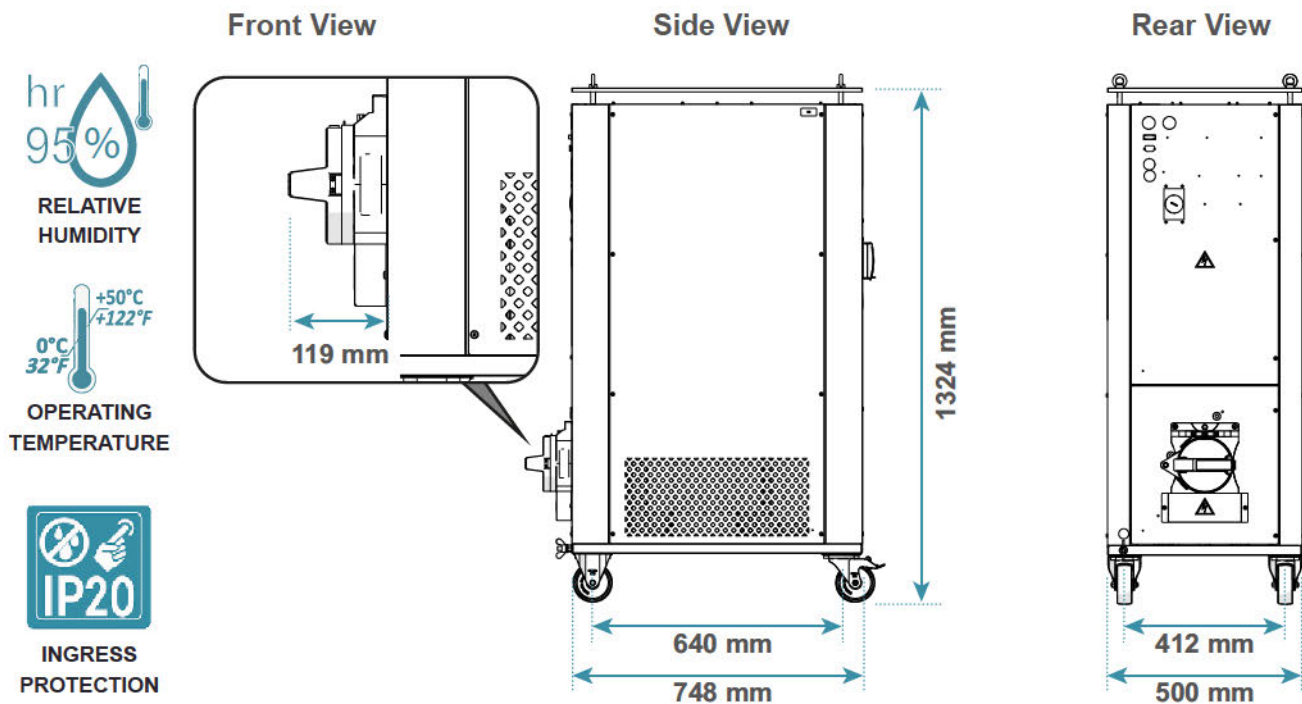
DIAM53 (no cut-out/SIMALT4 cut-out)



DIAM53 (SEB cut-out + ICS with SEB cut-out)



DIAM53 (SCC cut-out)



2.2 Operating principle

The control and management system of the device is programmed to manage the operation of the constant current regulator automatically. The unit also includes the possibility of advanced features, which can be activated by the user if required (Wig-Wag mode and 4-20 mA mode).

When a brightness level is selected, the system activates the main contactor and adjusts the bipolar transistors to supply the output series circuit with a current value in accordance with the set value.

The device continuously measures the loop current (via a Hall effect sensor), which is compared with the set value. The detected deviation is used to correct the operating parameters by means of a digital regulator.



The term **LOOP** refers to the series circuit installed in the field, for the supply of light fixtures.

The dischargers on the output line of the device (OD-Output Dischargers) protect it from any overvoltages present on the circuit.

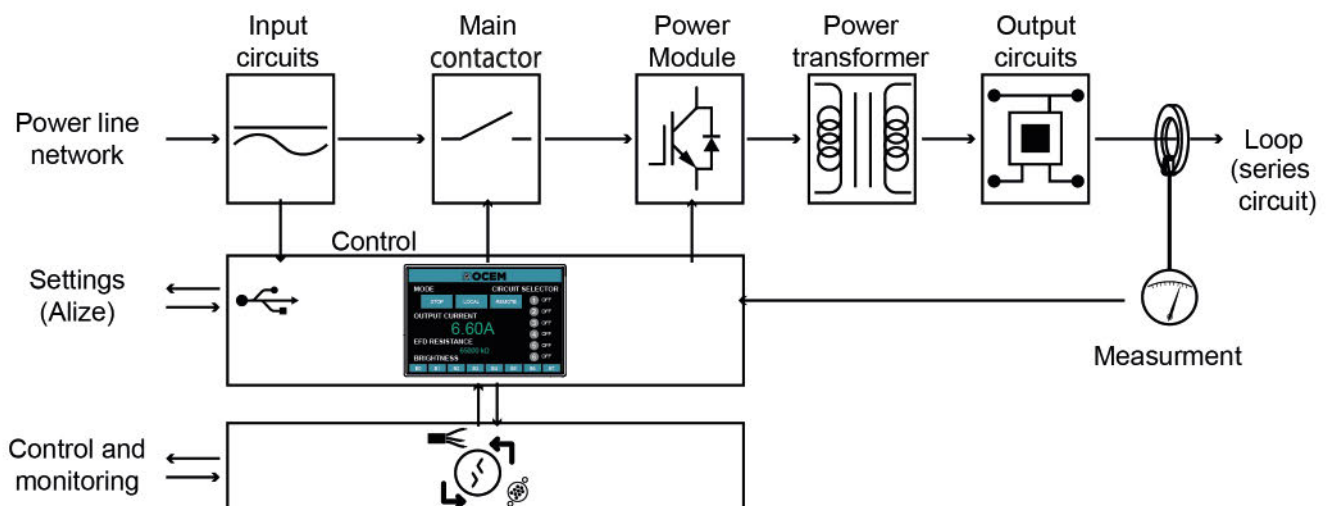
The burnt lamps detector (LFD) allows the detection of the presence of burnt lamps on the series circuit. If used, the LFD function must be properly configured and calibrated on the field.

Optional devices perform control and monitoring of the operating parameters, disconnection manoeuvres of the output circuit towards the load, and protection from incoming surges, simplifying the operation and functioning of the device:

- An insulation control system (EFD) allows the continuous analysis of the resistance value between the series circuit and the earth, triggering an alert when pre-alarm and alarm thresholds are exceeded.
- An output disconnection device (CUT-OUT) simplifies the maintenance on the HV side: units equipped with the disconnection device can be serviced without the need to disconnect the series circuit terminals and the earth connection.
- Input discharger (ID-M) system to protect against overvoltages on the power supply line of the device.

In addition to local control, the constant current regulator can also be controlled remotely through suitable connection interfaces. Supervision of the constant current regulator management system can be done through the integrated touchscreen display, or through the Alize software interface (using an external PC connected via USB cable to the regulator).

Using the optional integrated output circuit selector (ICS), it is possible to split the load and select which portion of the circuit to power.



2.3 Reference standards

The constant current regulators are manufactured in accordance with the following standards:

- IEC 61820-3-2 (CCR), 61821 (Maintenance);
- AENA (DIN/DNYM/PPT/002-05/13);
- ICAO Doc 9157 - Part 5: Aerodrome Design Manual - Part 5 - Electrical systems.

2.4 Current levels

The constant current regulators can be equipped with a number of steps varying from 1 to 8, each configurable in the range 1.8-6.6 A, to meet different end-user requirements.

According to IEC61820-3-2, the nominal output current range is:

- Style 1: from 4.8 to 6.6 A
- Style 2: from 2.8 to 6.6 A

The table provides the normalised CCR pre-settings. These settings can be modified according to the requirements of an airport.

The tolerance is ± 0.1 A for each adjustment within the nominal output current range.

Style	Current level	CCR
1	B3	6.6A
	B2	5.5A
	B1	4.8A
2	B5	6.6A
	B4	5.2A
	B3	4.1A
	B2	3.4A
	B1	2.8A



The regulator can deliver a low-current heating brightness level (preferably 1.8 A), used to remove condensate from inside the light fixtures without turning on the lamps. The symbol for the local setting is B0.

2.5 Supply voltage

The DIAM D5-3 constant current regulators can be supplied with different voltage levels, depending on the mains values.

The constant current regulators DIAM D5-3 are designed for three-phase power supply (3PH+GND) with rated supply voltage from the following values: 380 V (−5% / +10%), 400 V (±10%), 415 V (−10% / +5%), 50/60 Hz. Attention: the power supply voltage value chosen when ordering cannot be changed.

2.6 Nominal power

The constant current regulators can provide variable output power depending on the chosen configuration. The available sizes are: 2,5 kVA, 5,0 kVA, 7,5 kVA, 10,0 kVA, 15,0 kVA, 20,0 kVA.

The constant current regulators are air-cooled. Up to the maximum power of 10.0 kVA, ventilation is natural, while forced ventilation is provided for larger sizes (through internal fans). Attention: The nominal power value selected when ordering is final and cannot be changed later.

2.7 Wired remote control

The constant current regulators can be configured to be remotely controlled and monitored through dry contacts (relay 125 V_{AC}/2 A or 125 V_{DC}/2 A for resistive loads) and by an internal or external voltage (from 20 to 60 V_{DC}, positive or negative) or through a multipolar cable (input via cable gland and terminal block attestation or connection through connector 32 PIN optional).

2.8 Communication network

The constant current regulators can be equipped with different communication interfaces, depending on requirements. One or more RJ45 or D-Sub 9 pin (M/F) ports can be present on the rear panel to provide connectivity through the main standards:

- RS485: serial communication standard EIA.
- LonTalk: control protocol defined by the standard ISO/IEC 14908.1
- Ethernet: network technology for communication via LAN (Modbus/TCP).

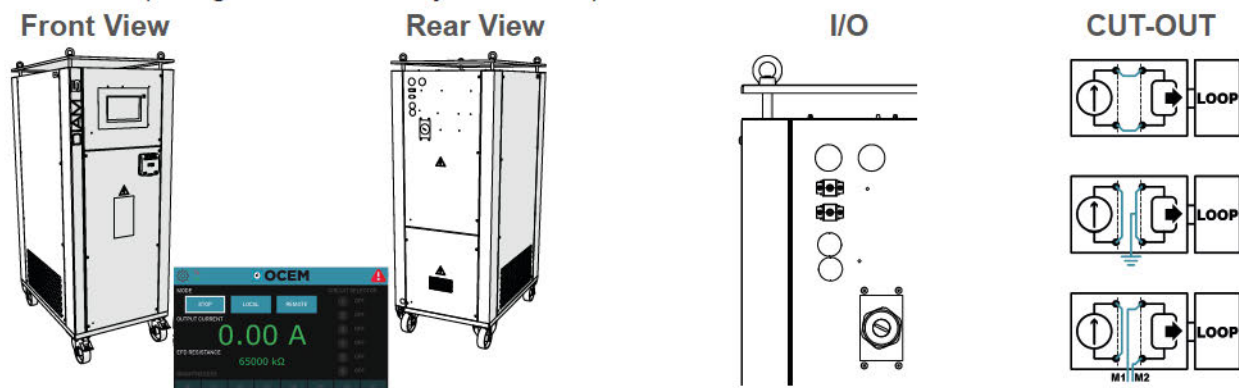
2.9 Protection systems

Depending on installation requirements, the constant current regulators can be equipped with optional protective devices in addition to the thermal-magnetic protection of the power supply provided as standard:

- ID-M overvoltage discharger with status monitoring on the input line.
- EFD earth fault detector of the series circuit.

2.10 CUT-OUT output disconnecter

The installation of an optional CUT-OUT disconnector is a useful tool for maintenance operations on the series circuit. The main function of the device is to connect the HV1 and HV2 poles of the series circuit easily to earth without the need for rewiring operations. Using the CUT-OUT disconnect it is also possible to perform a loop impedance measurement (through suitable auxiliary instruments).



2.11 Product Code

example: D5-3-IEC5-4005-066D-ICS4-Sxxx

Model:

3 = 3-phase supply (☐ ▲)

Reference regulations¹:

IEC = IEC (61820-3-2) (☐)

AEN = AENA (DIN/DNYM/PPT/002-05/13) (▲)

No. of steps (brightness - from 1.8 to 6.6 A):

from 1 = 1 no. of steps to 8 = 8 no. of steps

Three-phase supply voltage¹:

38 = 380 VAC -5% / +10%

40 = 400 VAC ±10%

41 = 415 VAC -10% / +5%

Nominal power:

02 = 2.5 kVA

05 = 5.0 kVA

07 = 7.5 kVA

10 = 10 kVA

15 = 15 kVA (con ventole)

20 = 20 kVA (con ventole)

Wired remote control¹:

0 = not present (☐)

E = Dry contacts IEC/AENA std (auxiliary internal supply VDC)(☐)

F = Dry contacts IEC/AENA std (auxiliary external supply VDC)(☐)

I = 32 Pins terminal (☐ ▲)

Communication network (default: 1):

1 = RS485 (x1)

2 = RS485 (x2)

3 = LonTalk (x1)

4 = Ethernet (x1)

5 = RS485 + Ethernet

6 = Ethernet (x2)

7 = RS485 + LonTalk

8 = LonTalk + Ethernet

Protection systems¹ (sum of the figures):

1 = Additional input discharger ID-M (with monitoring status) (☐)

2 = Standard equipment (☐):

- Integrated input discharger (standard)

- Thermal-magnetic circuit breaker CB (standard)

4 = Earth fault detector EFD (☐ ▲)

CUT-OUT output disconnector¹:

0 = None (☐)

A = Disconnector SIMALT4 (with jumper, 3 positions) (☐)

D = Disconnector SCC (with handle, 3 positions) (☐ ▲)

E = Disconnector SEB (removable handle and monitoring function) (☐)

Options²:

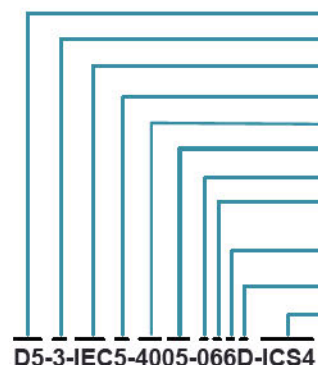
ICSx = Selector ICS with x outputs (from 2 to max. 6)

Special equipment³:

Sxxx = Specifications project identification code

¹ Always check the compatibility of the options with the selected reference standard;² Any additional codes identify the options integrated in the device (if no option is available, this field is absent);³ Any Sxxx code is assigned by the manufacturer to identify any design specifications implemented in the device (if no particular equipment is available, this field is absent).

In the example:



Code	Description
[D5 - -]	▶ Regulator model DIAM Series 5
[- - - 3]	▶ Three-phase Model
[IEC -]	▶ Compliant with standard IEC 61820-3-2
[- - - 5]	▶ 5 regulating steps (2.8 - 3.4 - 4.1 - 5.2 - 6.6 A)
[40 - -]	▶ 3-phase supply (without neutral), mains voltage 400 VAC ±10%
[- - 05]	▶ Nominal power 5.0 kVA
[0 - - -]	▶ Without wired remote control
[- 6 - -]	▶ Dual Ethernet communication network (2 ports)
[- - 6 -]	▶ (sum of the figures, 2 + 4) Provided with standard equipment: thermal-magnetic circuit breaker CB and integrated input dischargers (without monitoring status) + earth fault detector (EFD)
[- - - D]	▶ CUT-OUT disconnector SCC type with 3 positions handle
[ICS4]	▶ 4-way integrated circuit selector (for P/N and order code, refer to the catalogue UC-PU-0366)

Equipment included:

Tropicalisation of electronic cards and of magnetic components; Output dischargers; Operating hour counter; Burnt lamps detection; Swivel castors; Lifting rings

2.12 Behaviour in case of fault

If the unit detects a fault or an error, the control system applies corrections and informs the operator through a message on the display. The possible types of warning are:

- **WARNING:** the constant current regulator continues normal operation but alerts the operator if there is a problem (such as the EFD or LFD fault).
- **ALARM:** the constant current regulator is unable to continue normal operation and interrupts the current supply due to an internal fault (e.g. alarm of one of the overcurrent threshold levels) or an external fault (e.g. open circuit).



When a fault occurs, prompt action must be taken to identify the cause of the fault and eliminate the problem.

The system can only be reset by means of a manual reset (STOP key).

The unit preserves the memory of the messages detected during operation even in the absence of the supply voltage. When the unit is switched back on, proceed to resolve and restore all the messages in the memory.

2.12.1 Input voltage monitoring

The input voltage monitoring system analyses and evaluates whether the power supply value U_i allows the device to function properly. When the input voltage value goes out of the rated input voltage operating range U_{in} (-15% +20%) and remains outside the range for a certain period of time, the system interrupts the power supply and the unit goes into alarm.

In the case of overvoltages:

- $U_i > 120\% U_{in}$: if the voltage value rises above the pre-alarm threshold, the unit continues to operate for a maximum period of 60 seconds, after which the system shuts down and goes into alarm status.
- $U_i > 130\% U_{in}$: as soon as the value of the input voltage rises above the limit threshold, the system shuts down and goes into alarm status.

In the case of undervoltages:

- $U_i < 85\% U_{in}$: if the voltage value falls below the pre-alarm threshold, the unit continues to operate for a maximum period of 60 seconds, after which the system shuts down and goes into alarm status.
- $U_i < 75\% U_{in}$: as soon as the input voltage value falls below the limit threshold, the system shuts down and goes into alarm status.



If the error condition is temporary and the input voltage value returns within the operating range, the unit automatically resets.

If the unit shuts down and goes into alarm status, when the voltage values return to within a narrow range ($U_{in} \pm 10\%$) the unit restarts. The unit preserves the memory of the alarm message, which must be reset manually.

2.13 Wiring

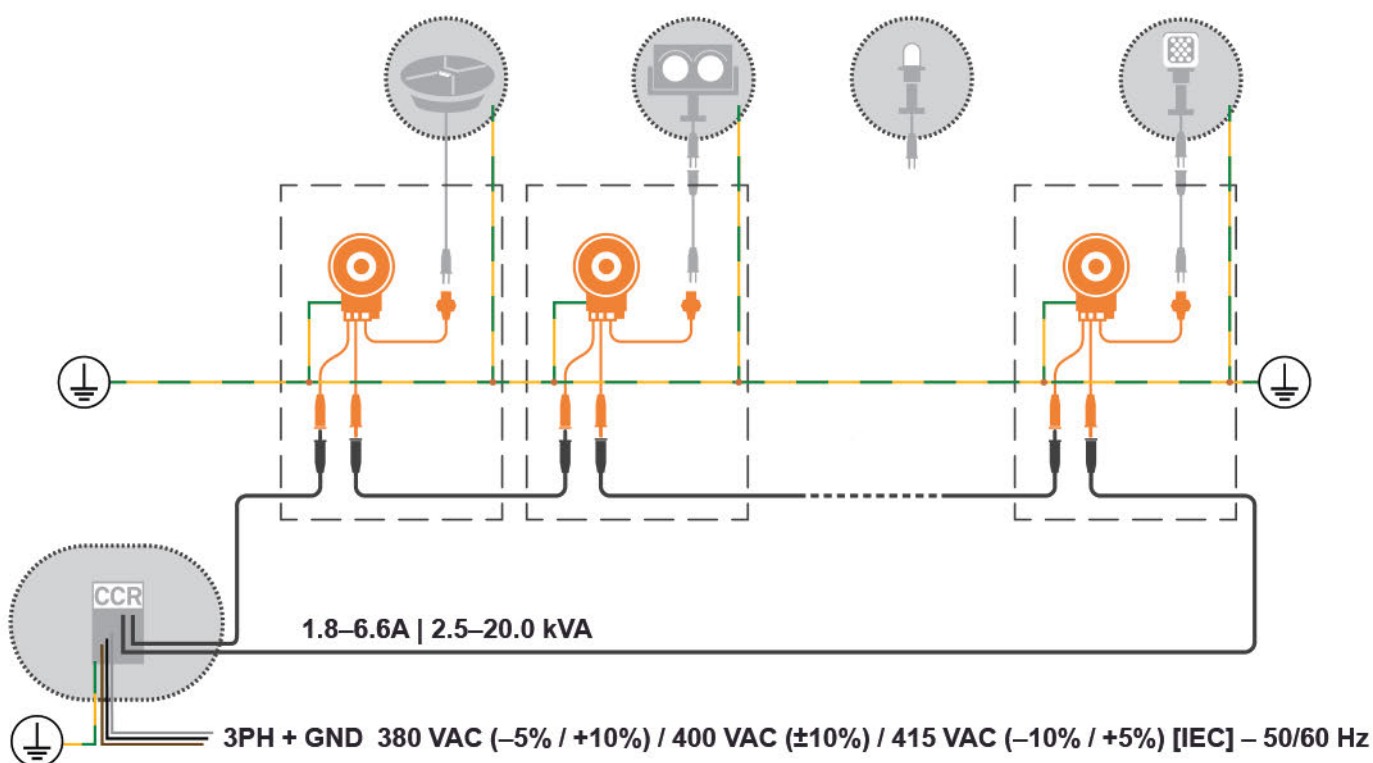
To wire the DIAM D5-3 system properly, use only cables compliant with the relevant technical specifications (IEC/EN 60228), specially designed for airport installations and safety-critical systems.



The cables necessary for the operation of the units are not included in the supply. It is the customer's responsibility to arrange appropriate certified equipment to connect the units.



Before connecting the device, check that the unit configuration is compatible with the actual system conditions.
Always check the supply voltage and the load installed on the series circuit.



2.14 ICS (Integrated Circuit Selector) module

This is an **optional module** that allows the DIAM 5 regulator to select and manage multiple circuits from a single device. It transforms the CCR regulator, normally dedicated to a single circuit, into a system that can power and manage multiple circuits, reducing the need for external selection panels.

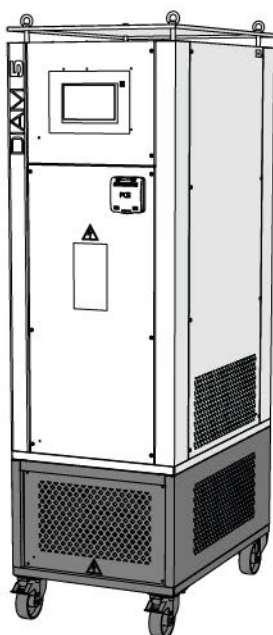
The ICS module allows you to select up to six circuits, alternately or simultaneously. The power relays and interlock, which prevent switching under load, are managed directly by the URCC electronics. The choice of the circuit can be made in local mode, via the CCR display, or in remote mode. In the latter case, two options are available: remote cable control or RS485 serial connection

The version described complies with ICAO requirements and IEC standards.

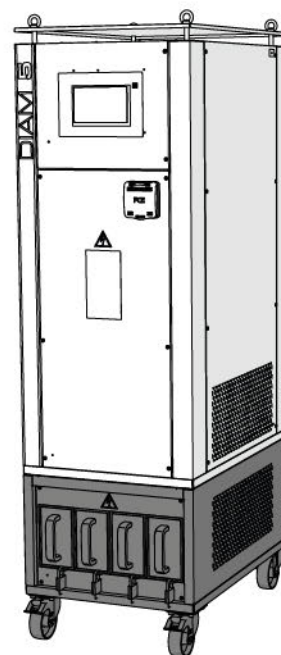
The customer can order a standard ICS module that does not provide disconnectors, or an ICS module with SEB-type disconnectors for each way.



If requested at the time of purchase, the DIAM 5 regulator is supplied already equipped with the ICS module.



ICS standard version
(does not provide disconnectors)



ICS with SEB type disconnectors
(removable handle and monitoring function)

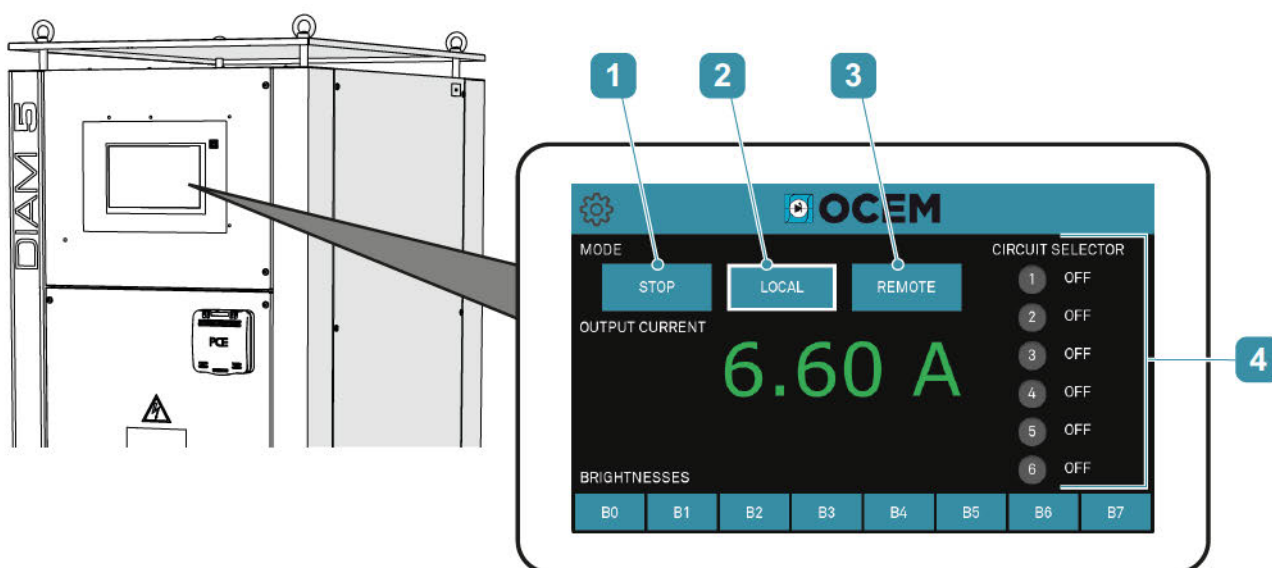
2-way up to max. 6-way

2.14.1 Technical specifications

- Number of circuits: up to 6 (IEC)
- Dielectric strength: complying with regulatory requirements and IEC standards
- Supply voltage: as constant current regulator
- Protection index: IP20
- Dimensions: height 300 mm, support surface as CCR
- Operating conditions: 0 to +50°C (CEI); humidity: 95%
- Accessibility: front, rear and side panels

2.14.2 Instructions for use

The ICS integrated selector is designed to provide 2 to 6 circuits alternately or simultaneously. The number of circuits must be set on the display.



1) STOP

- Press the STOP button to stop the power supply.
- When the device starts, the system is initialized and the device goes into stop mode: the regulator's control system is active, but the series circuit is disconnected.
- System reset is only possible with the system energized in STOP mode.
- Changing and updating the values is only possible with the system energized in STOP mode.

2) LOCAL

Local control mode, with a selector it is possible to enable the selected output circuits by pressing the buttons (4)

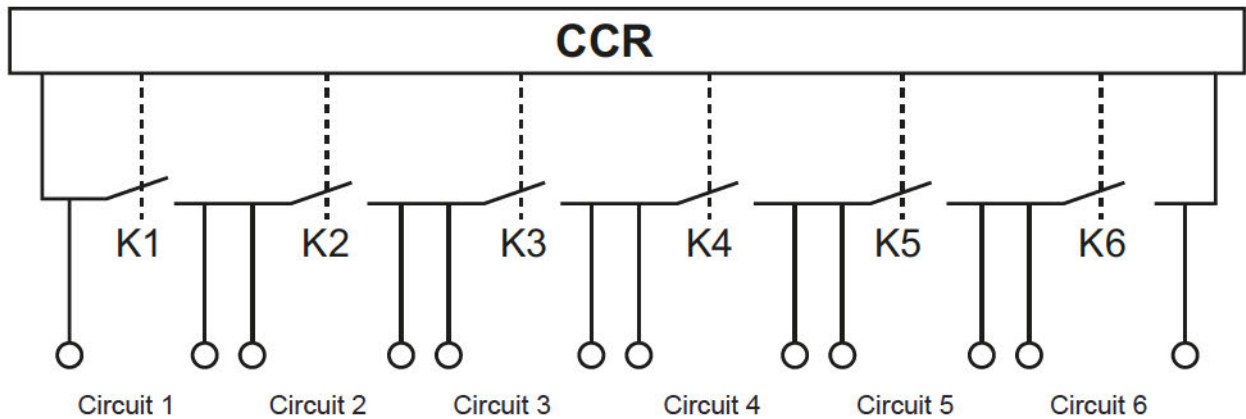
3) REMOTE

Remote control mode, with a selector it is possible to enable the selected output circuits by pressing the buttons (4)



To see the functions of the display, refer to the dedicated section "4.2 Selection of the operation mode".

- Circuit selector in alternate or simultaneous mode:

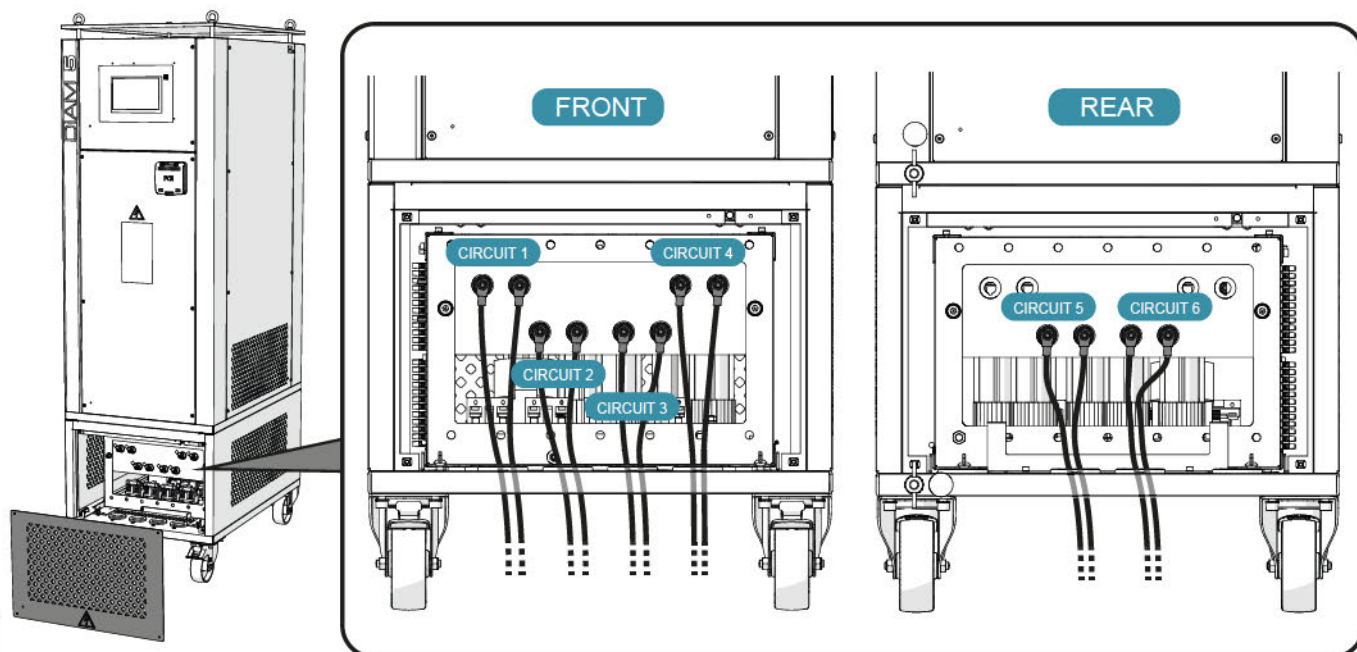


In simultaneous mode, the output current of the CCR may traverse one to six circuits simultaneously.
In alternate mode, the CCR output current can only traverse one circuit at a time (only one relay is open).

2.14.3 Connections of the series circuits:

Connection to the circuits - ICS selector without Cut-Out disconnectors

It is possible to access the HV terminals by disassembling the front and rear panels of the cabinet:



Cut the membranes of the cable glands located at the base of the ICS.

Pass the pairs of cables of series circuits 1, 2, 3 and 4 (front) and 5.6 (rear) through the membrane cable glands at the base of the frame.

The connection of each circuit must be made by means of a crimp terminal ($\varnothing 6$ mm) on the cable conductor.

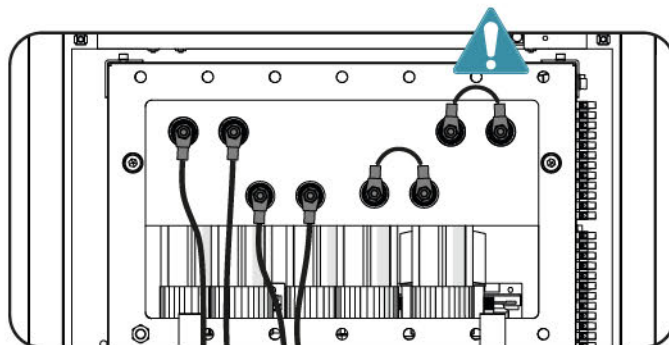
Connect any shielding of each cable (braided or taped) to the ground of the frame (using studs for M6 screws).



Take care to maintain a sufficient distance between the conductor and the shield (> 5 cm).

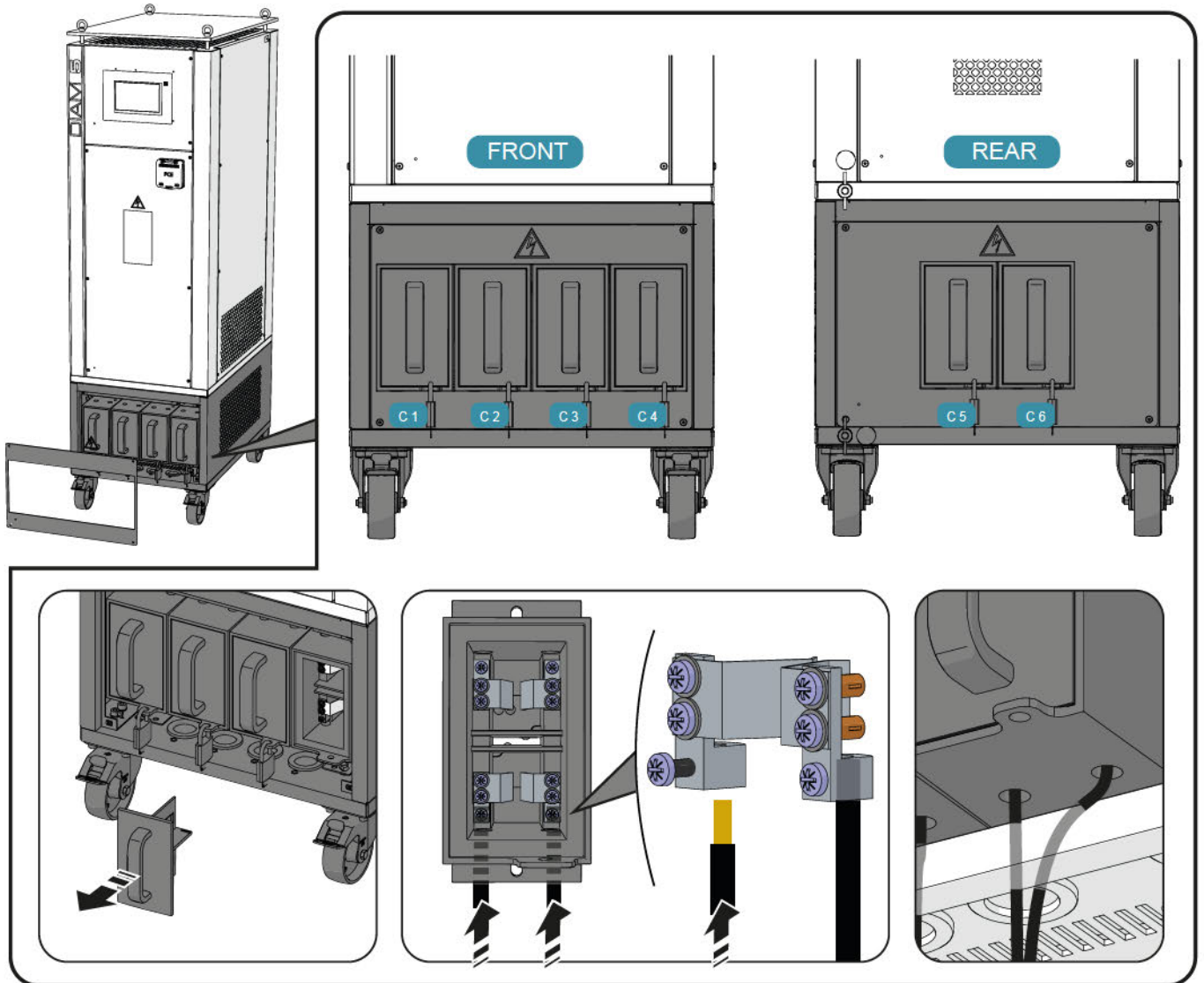


For safety reasons, if not all available outputs are used, a jumper must be connected.



Connection to the circuits - ICS selector with Cut-Out disconnectors

The HV terminals for each output are located at the base of the SEB cut-out disconnecter and are accessible only after removing the front and rear panels and then the removable handle.



Remove the "Cut out SEB" handles.

Cut the membranes of the cable glands located at the base of the ICS.

Pass the pairs of cables of circuits 1, 2, 3 and 4 (front) and 5.6 (rear) through the membrane cable glands at the base of the frame.

The connection of each circuit must be made on the bottom of the terminals inside each "Cut out SEB" disconnector. Connect any shielding of each cable (braided or taped) to the ground of the frame (8 mm diameter studs).



Take care to maintain a sufficient distance between the conductor and the shield (> 5 cm).

When finished, reinsert the handles into the base of the cut-out SEB disconnectors and reinstall the front and rear panels.

Specific product code for ICS module

example: C53-IEC6-20-1

Type of ICS: C53 = Fixed field for this type of module	↑
Number of circuits: from 2 to 6 circuits alternately or simultaneously	↑
CCR Power: 15 = up to 15 kVA 20 = 20 kVA	↑
Disconnecter option: 0 = No (without disconnector) 1 = Yes (with SEB type disconnector)	↑

3 INSTALLATION

3.1 Constant current regulator

The DIAM D5-3 constant current regulators, installed to power the series circuits, are able to supply current to the series circuit to provide the necessary brightness to the light fixtures installed on the circuit. The number of selectable brightness levels must be consistent with the intended functionality of the circuit design.

The features of series circuits must be compliant with the dispositions of competent bodies and with the regulations in force. The load actually supplied by the series circuit must not exceed the operating limits of the constant current regulator.



For the construction of the supply circuits and for the series circuits, refer to the requirements of the relevant Standards.

For the conformity of the light fixtures supplied by the constant current regulators through the series circuits, refer to the specific product certifications.



Do not connect the constant current regulator to circuits which have not previously undergone high-voltage insulation tests or to cables which show signs of damage or deformation.

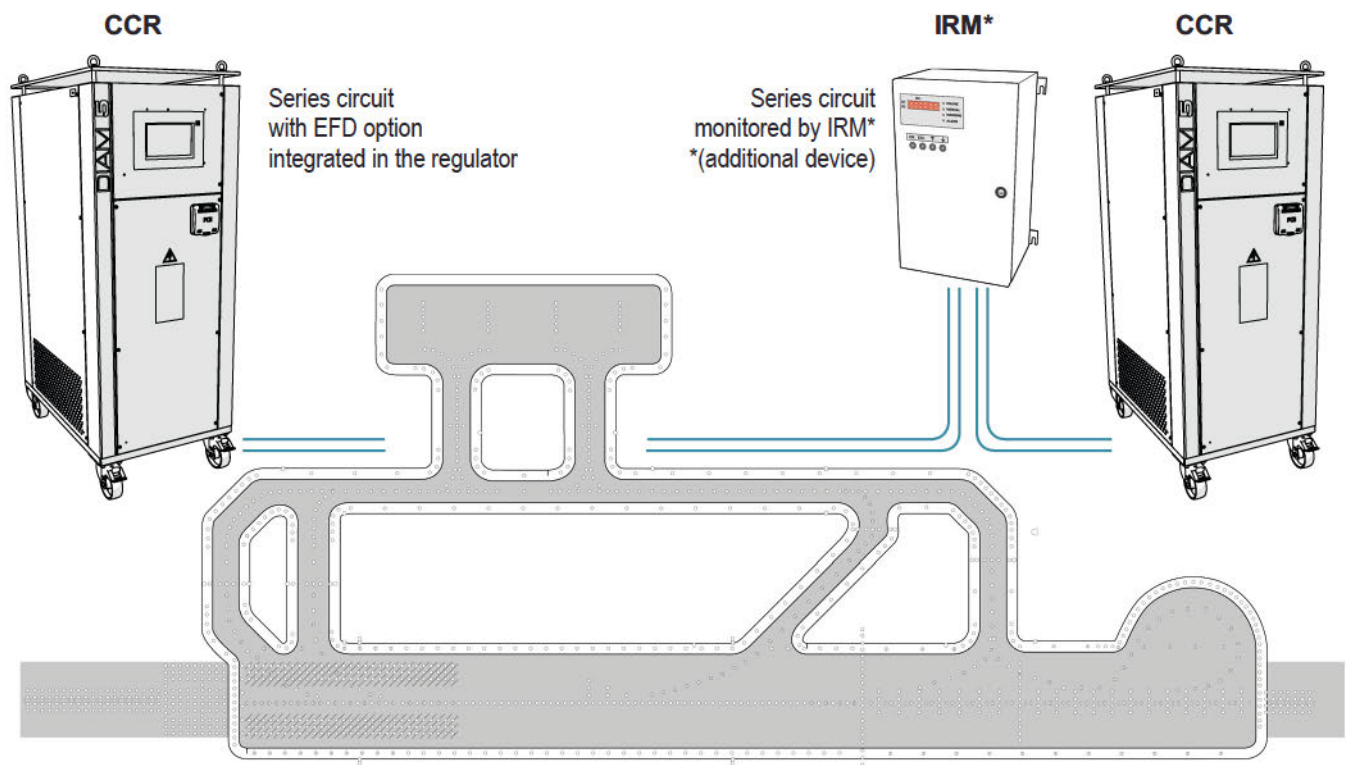
Before making connections, check that the series circuits and light fixtures are correctly configured and installed.



As an alternative to the earth fault detector integrated in the regulator (EFD option), optional devices are available for monitoring the series circuit (IRM), able to generate warning and alarm messages external to the regulator to be integrated in the mandatory reporting required for airport management and maintenance.

These devices are a useful accessory for fault management and for an easier identification of cabin problems.

For more information, contact sales support.



3.2 Handling and positioning of the device

To position the device correctly, take the following aspects into consideration: Access to the unit from the front side must be guaranteed to make operation and maintenance procedures easy.

- The constant current regulators must be arranged side by side.
- Maintain a free space of at least 20 cm at the rear side of the unit to ensure proper ventilation of the device.



Before proceeding with the operation, check the conditions of the device:

- check that the mechanical fixing of the components is steady;
- check that the internal connections are properly tightened;
- check that the internal equipotential connections are all well made.



Always use lifting equipment with suitable characteristics: before handling the load, check the weight indicated on the data plate of the load to be lifted and ensure that the centre of gravity is correctly positioned.

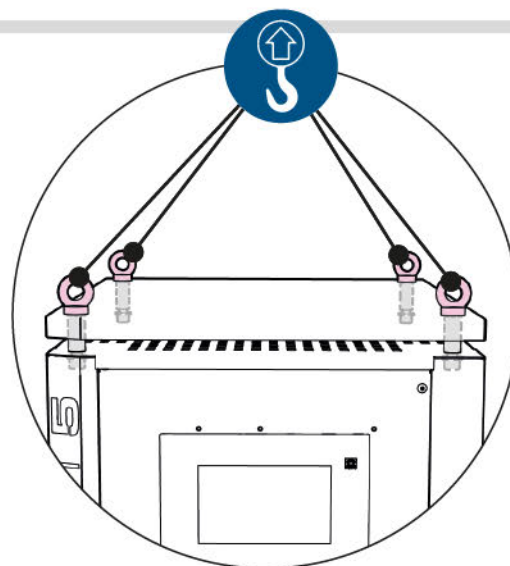
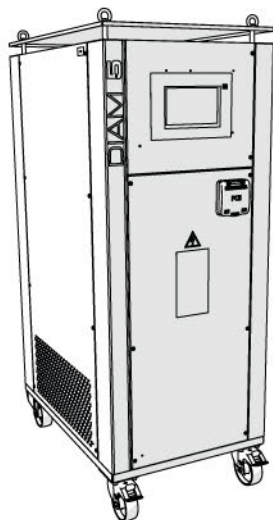
Do not attempt to lift the machine using anchor points other than those indicated.

1

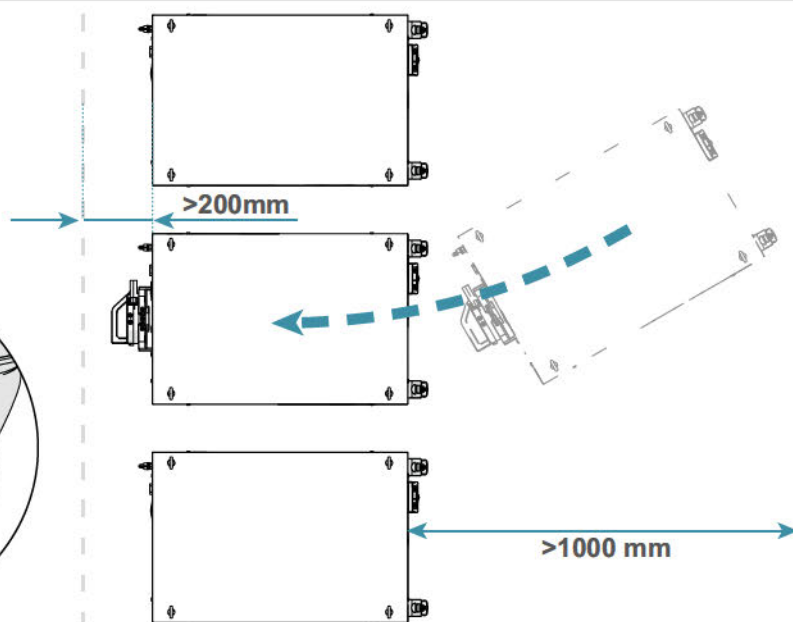
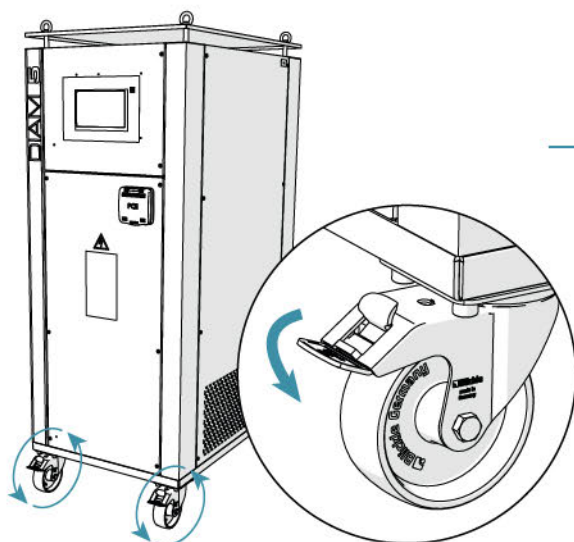
hr
95%
RELATIVE
HUMIDITY

+50°C
+122°F
0°C
32°F
OPERATING
TEMPERATURE

IP20
INGRESS
PROTECTION



2



3.3 Preliminary checks



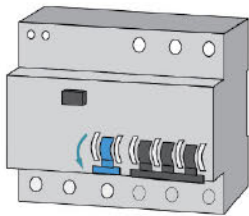
Keep the device in its original packaging until installation. Check the characteristics of the electrical system into which the device must be integrated before installing the constant current regulator.

- The power supply line must be suitably dimensioned and adequately protected.

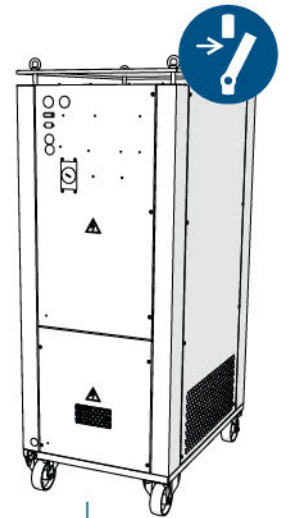
For each CCR, the protective device installed inside the panel is as follows:

1

upstream protection



D5-3 Power [kVA]	D5-3 Terminal block Three-phase input (max. cable cross-section)	D5-3 internal Automatic circuit breaker (CB)
2.5	10 mm ²	ABB: S203-C10 2CDS253001R0104 ord. S467803
5.0	10 mm ²	ABB: S203-C25 2CDS253001R0254 ord. S468206
7.5	10 mm ²	ABB: S203-C25 2CDS253001R0254 ord. S468206
10	16mm ²	ABB: S203-C25 2CDS253001R0254 ord. S468206
15	35 mm ²	ABB: S203-C50 2CDS253001R0504 ord. S551069
20	35 mm ²	ABB: S203-C50 2CDS253001R0504 ord. S551069

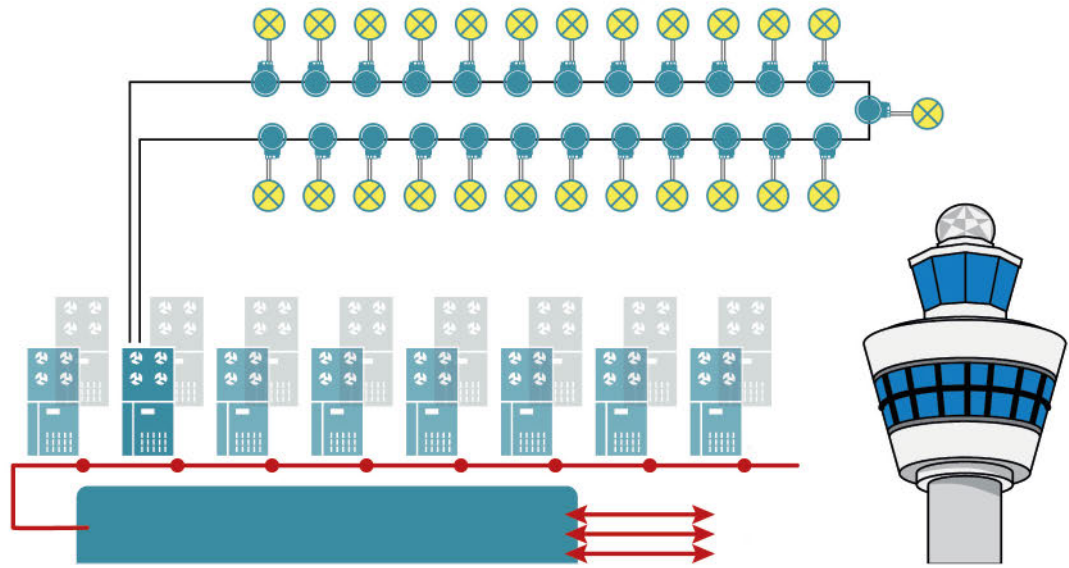


The coordination and, where required, the selectivity between the upstream protection device in the customer's panel and the protection device in the CCR must be verified by the customer's electrical designer, based on the actual characteristics of the system and the intervention curves/data provided by the manufacturer of the selected devices.

To define the upstream protective device correctly, the customer's electrical designer must take at least the following parameters into account:

- The nominal power and impedance of the upstream transformer;
- The assumed short-circuit current at the installation point;
- The type of power supply system and the earthing diagram;
- The cross-section, type and length of the cables between the transformer and the panel;
- The cross-section, type and length of the cables between the panel and the CCR;
- The method of laying and the environmental conditions of the cables;
- The characteristics of the protective device installed in the CCR.

2



- Use the device only in combination with series circuits that comply with the standards of the ICAO Aerodrome Design Manual Part 5.
- Do not use the device to power light fixtures that do not comply with international standards. Powering non-certified light fixtures could cause sudden shutdowns and lamp ignition problems.
- Check that the power installed on the series circuit is compatible with the specifications of the constant
- Perform the continuity check of the series circuit and evaluate the possible presence of burnt lamps in the installed fixtures.

3.4 Connecting the power cables



Access to the regulator for all activities (connecting the power supply, maintenance or troubleshooting) is restricted exclusively to qualified and specifically trained personnel.

For further information regarding the safety devices fitted, refer to the “Scheduled Maintenance” section.



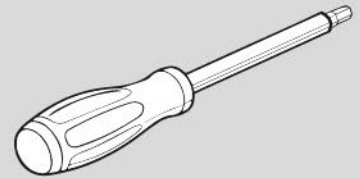
Before carrying out any work on the device, disconnect all power sources and affix appropriate signs to indicate work in progress on the equipment.

Wait for the discharge time (at least 10 minutes) and check with suitable instruments that there is no residual energy before accessing electrical equipment.



The regulator panels are secured using M5×35 TBEI UNI 7380 screws.

To remove them, we recommend using a 3 mm Allen key.



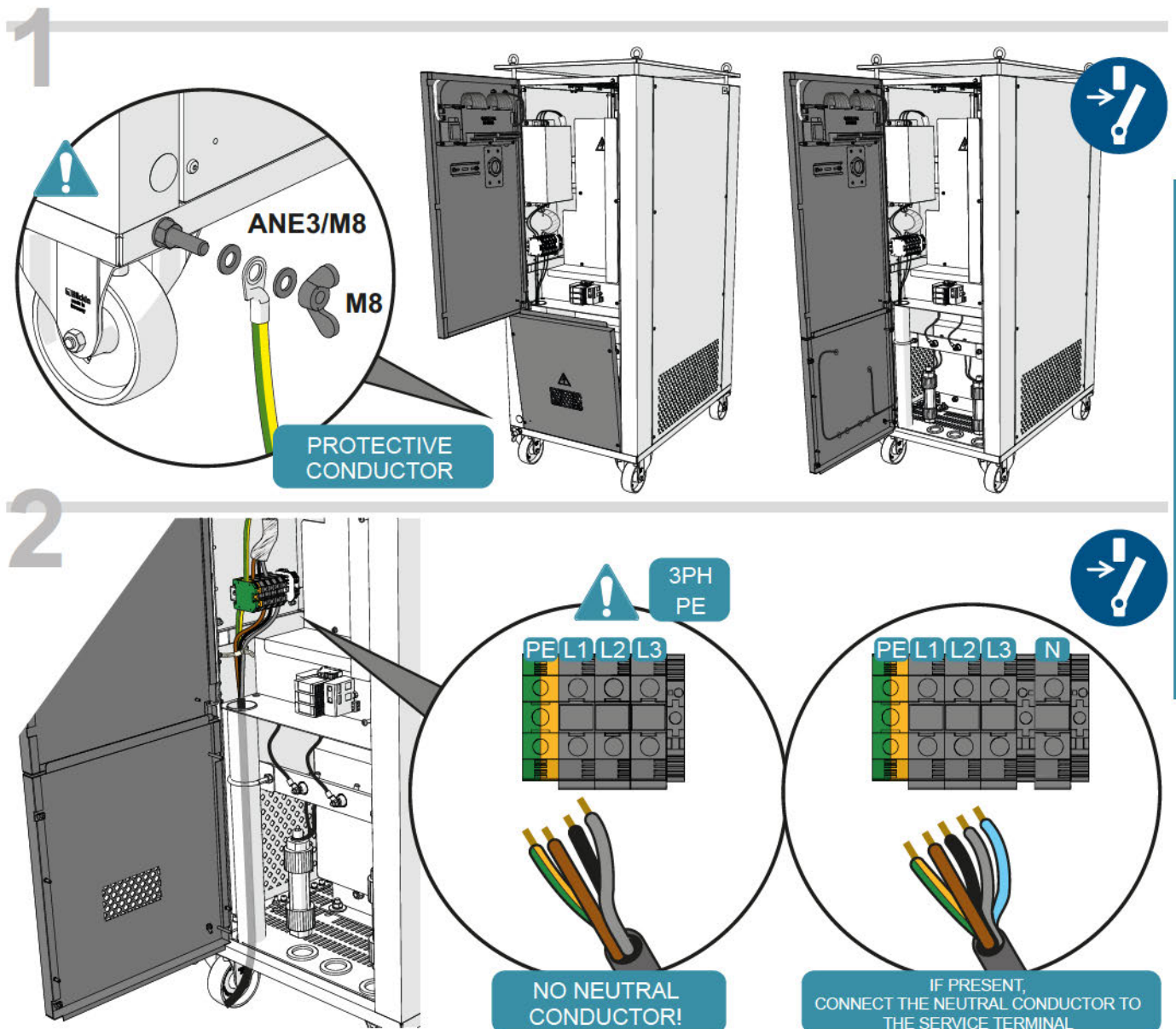
Connect the protective conductor to the grounding pin located at the rear. Prepare the connecting cable by firmly attaching a screw eye of suitable size to the cable.

Open the upper rear cover. Open the lower guard and, if provided, remove the lower panel to access the connection area. Insert the cable inside the cable gland, position the cable inside the cable duct and make the electrical connection.



Before making the connections, check that the characteristics of the line are compatible with the characteristics of the device.

If the power supply line is equipped with a neutral connector, connect it to the dedicated terminal.



3.5 Connection of the series circuit



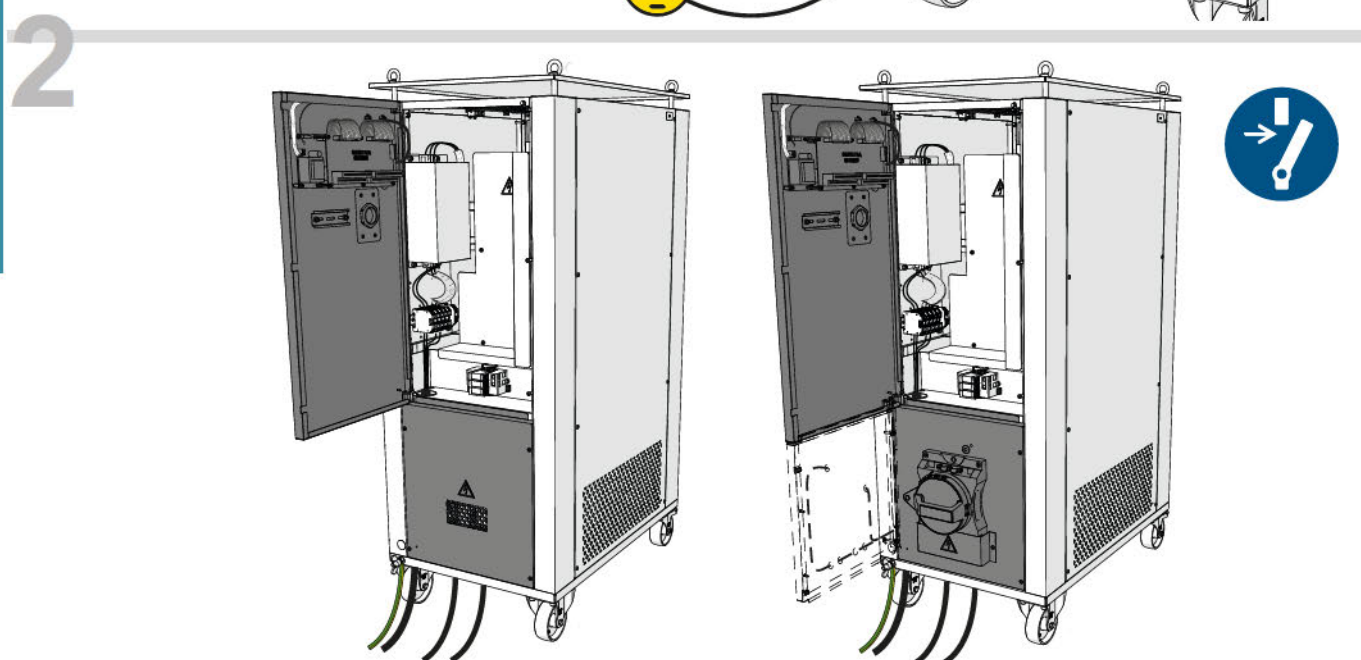
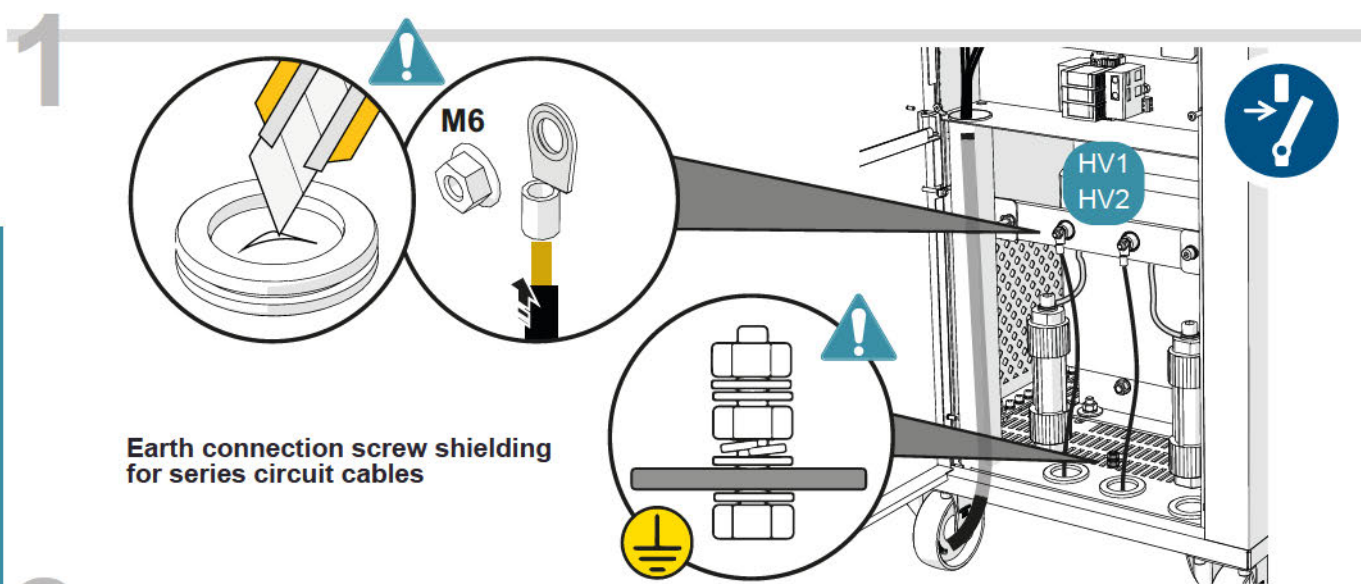
Before carrying out any work on the device, disconnect all power sources and affix appropriate signs to indicate work in progress on the equipment.
Wait for the discharge time (at least 10 minutes) and check with suitable instruments that there is no residual energy before accessing electrical equipment.

Prepare the series circuit cables for connection and connect the terminal to the conductor.
Insert the cable inside the cable gland, the membrane of which has already been cut, and make the electrical connection. The two cables in the series circuit must be terminated using Ø6 eye terminals, crimped onto the terminals.



Before making the connections, check that the characteristics of the line are compatible with the characteristics of the device.

Close the rear panel taking care to not damage the cables, and close the upper rear cover.



3.6 Remote control configuration

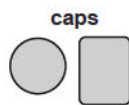
The connection for remote control varies depending on the configuration of the device. The connections are available on the back of the unit.

Connect the prepared cables to the respective doors of the device.



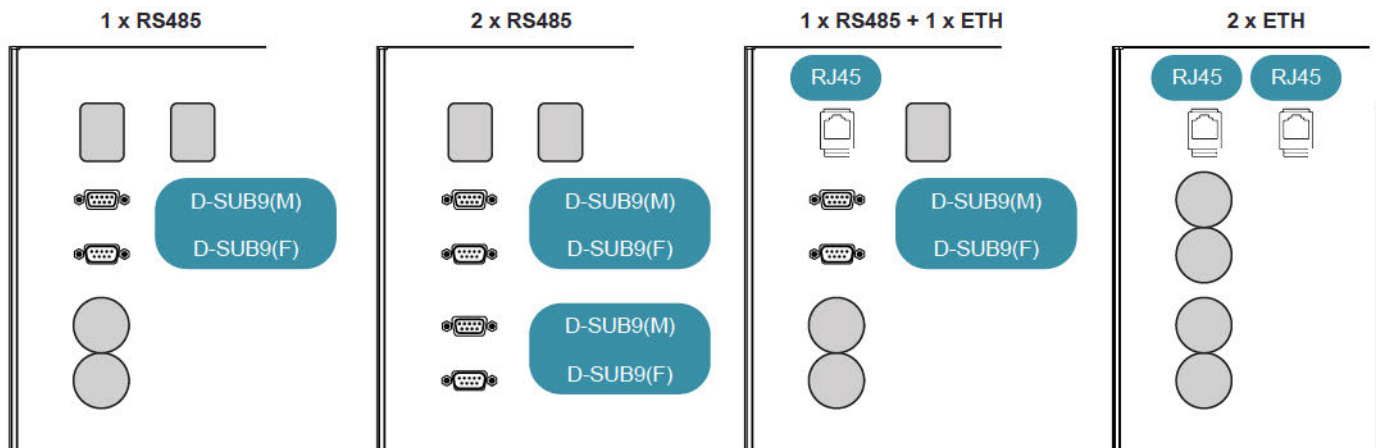
The units can be equipped with 1 or 2 serial communication interfaces. The basic configuration includes one RS485 serial port.

1



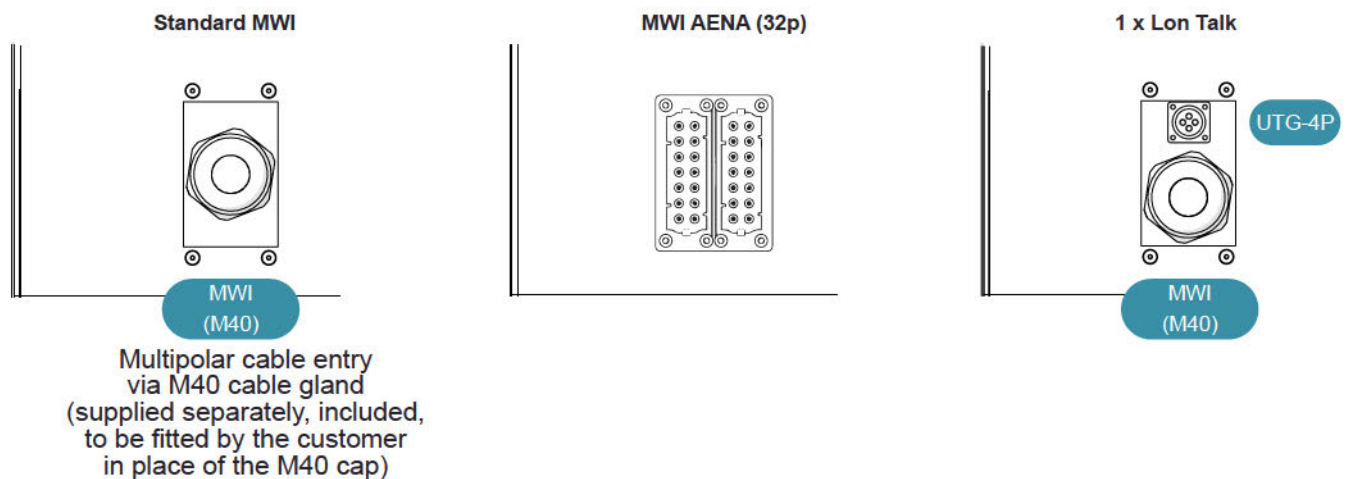
UPPER ZONE:

Communication network



LOWER ZONE:

Wired control MWI (+ Lon)



3.7 External circuit selector interlock



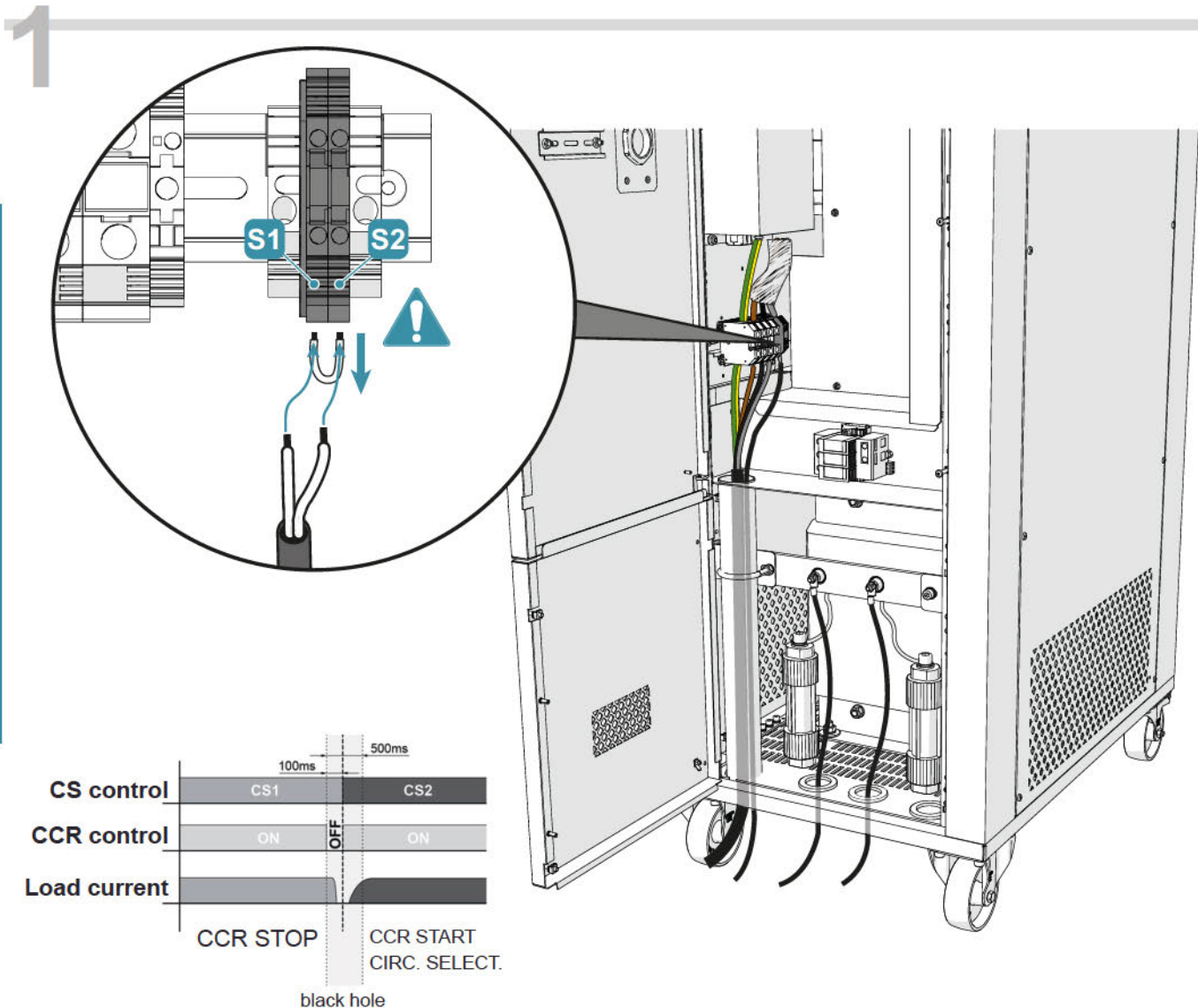
The unit is supplied already wired to operate without an external circuit selector. To operate, the two terminals S1 and S2 are short-circuited (removable jumper). To operate in combination with an external selector, it is necessary for the unit to stop the supply at least 100 ms before the circuit changeover occurs in order to prevent transitory overcurrents from drastically reducing the life of the powered lamps. The unit must also stop the supply when the selector guards are open.

To drive the unit correctly, connect the interlock cables from the external selector to the prepared terminals S1 and S2. Before connecting the cables, remove the jumper (required for operation without an external selector).

Open the front panel and identify the terminals S1 and S2.

Remove the jumper and make the connection to the cable coming from the external circuit selector.

Close the front panel.



3.8 Tests and checks



At the end of the installation (before commissioning) and whenever necessary, carry out tests and functional checks.
Always follow the safety instructions so as not to create dangerous situations for persons or property.

3.8.1 Short-circuit test



Do not perform this test if there is any doubt about the correct operation of the unit, or if there is a fault or breakage.

- Act on the main switch and switch off the unit.
- De-energise the power supply and wait for the discharging time.
- Open the rear cover and completely disconnect the series circuit.
- Short-circuit the HV1 and HV2 terminals of the unit



If the unit is equipped with a CUT-OUT device, it is possible to short-circuit the terminals without acting on the wiring by configuring the jumpers or the handle in the test position (for more information, see document ES-MT-0113 that accompanies the CUT-OUT device).

- Energise the supply line of the unit.
- Turn on the main switch and activate the unit.



The unit activates and the output current value is shown on the display.

- Activate the LOCAL mode.
- Operate the control panel and gradually increase the intensity levels.



The maximum brightness level at which to test the unit should be fixed at 6.6A.

- Operate the control panel and gradually decrease the intensity levels.
- Press the OFF key and switch off the unit.
- Act on the main switch and switch off the unit.
- De-energise the power supply and wait for the discharging time.
- Open the rear panel and remove the short-circuit between the terminals HV1 and HV2 of the unit.
- Connect the series circuit and close the panel.
- Energise the supply line of the unit.
- Act on the main switch and switch on the unit.



If any problems occur during the test (e.g. tripping of protections, presence of overcurrents,...) stop the test immediately.
Then check the connections: earth connections, electronic board connections,...).
Check the status of the power module indicators and display messages before restarting the device.

3.8.2 Open-circuit test



Do not perform this test if there is any doubt about the correct operation of the unit, or if there is a fault or breakage.

- Act on the main switch and switch off the unit.
- De-energise the power supply and wait for the discharging time.
- Open the rear cover and completely disconnect the series circuit.



If the unit is equipped with a SIMALT4 or SEB device, it is possible to disconnect the series circuit without acting on the wiring by removing the CCR jumpers (for more information, see document ES-MT-0113 that accompanies the CUT-OUT device).

- Energise the supply line of the unit.
- Act on the main switch and switch on the unit.



The unit starts and stops within 1.0s after the start of the supply.
The constant current regulator inhibited the supply (STOP mode). The display shows the message:
ALARM: I<<Open Cir.

- Act on the main switch and switch off the unit.
- De-energise the power supply and wait for the discharging time.
- Open the rear cover and connect the series circuit.



If the unit is equipped with a SIMALT4 or SEB device, it is possible to reconnect the series circuit without acting on the wiring by inserting the CCR jumpers in the horizontal/service position (for more information, see document ES-MT-0113 that accompanies the CUT-OUT device).

- Energise the supply line of the unit.
- Act on the main switch and switch on the unit.

Page intentionally left blank

4 ADJUSTMENTS AND MAINTENANCE



Access to the regulator for all activities (connecting the power supply, maintenance or troubleshooting) is restricted exclusively to qualified and specifically trained personnel.



After completing the installation, check that all the fixed guards are closed. Only now is it possible to close the upstream cut-out to supply the device.

4.1 Preliminary Operations

Act on the local cut-out (thermal-magnetic circuit breaker CB - standard), by rotating it in ON position.

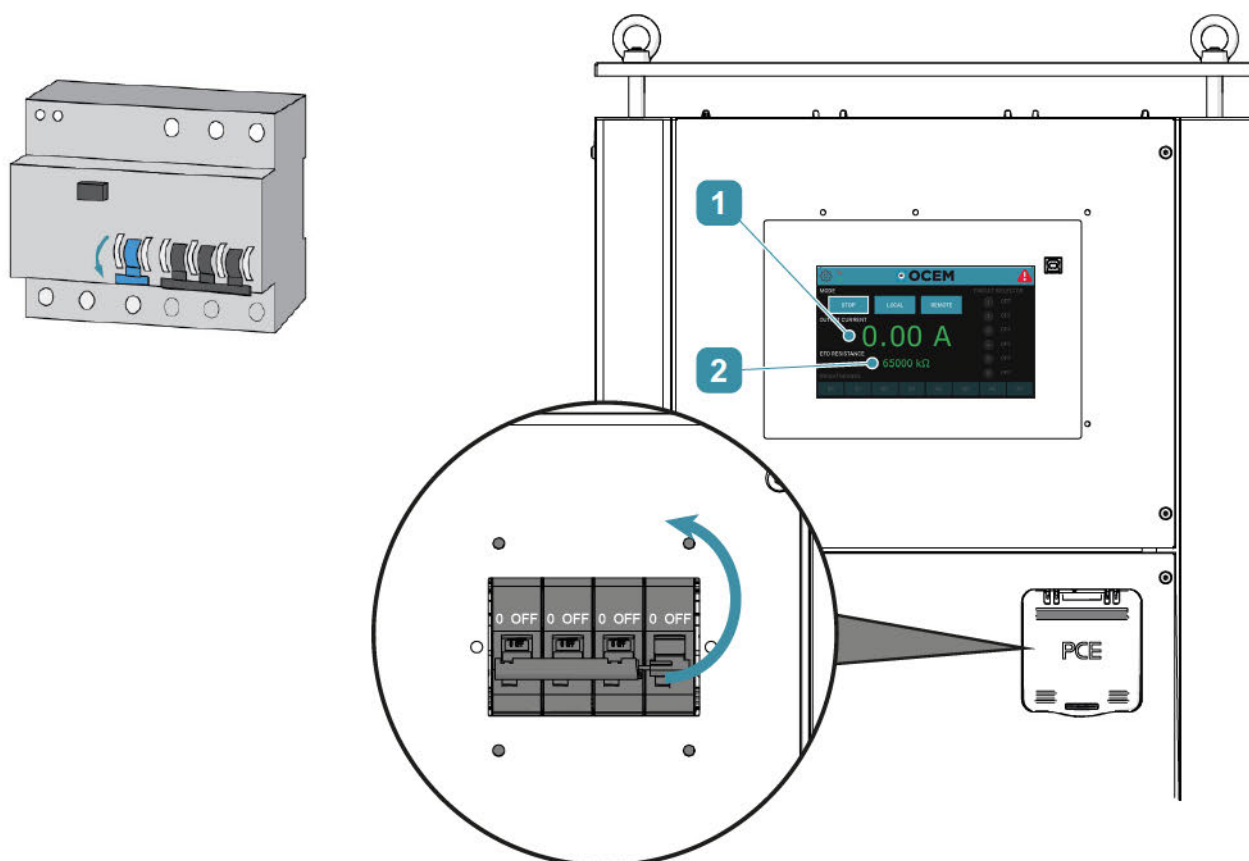
Now the device is **ONLINE** (constant current regulator powered) the display switches on, the system is initialized and the device goes into **STOP** mode: the regulator control system is active, but the series circuit is disconnected.



When the device is **ONLINE** the display always shows the output current in A (1). If the EFD option is present, during operation, the display always shows the output current in A (1) and the earth fault resistance in k Ω (2).



The device is provided already configured with the default values. All parameters can be freely customised according to the customer's needs



4.2 Selection of the operation mode



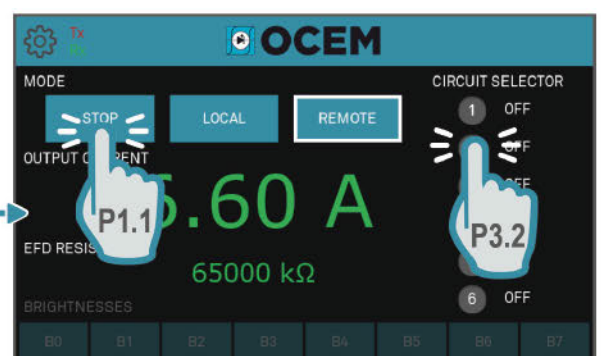
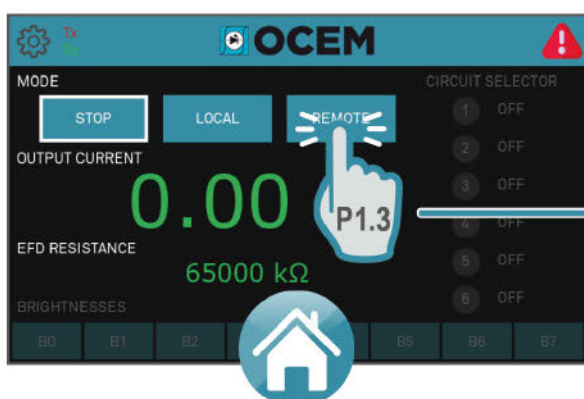
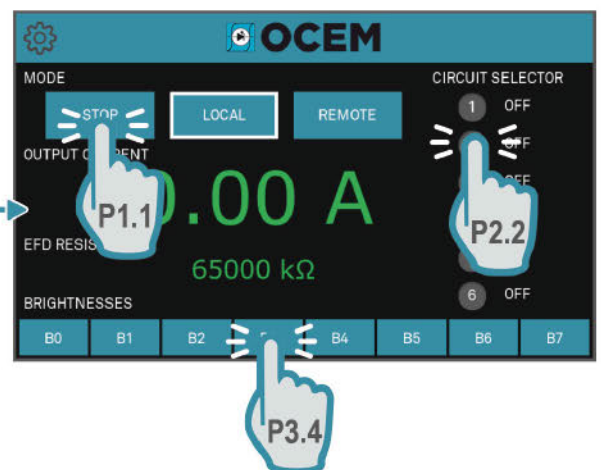
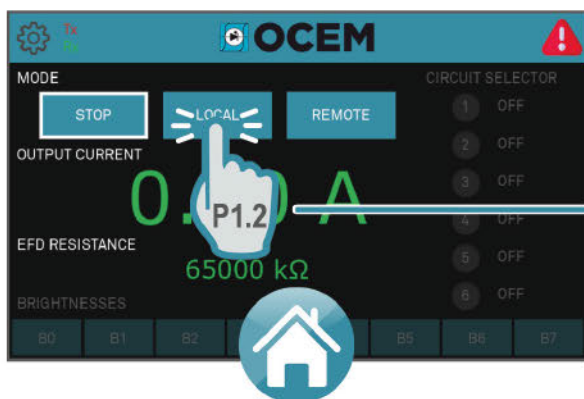
The unit is supplied with a pre-set of parameters in accordance with the machine configuration. For normal use, no reconfiguration is necessary during installation operations.

Starting from the STOP mode, the constant current regulator can power the series circuit by operating in different modes:

- LOCAL mode (1): press the LOCAL button (P1.2) to select the local control mode. If the unit is equipped with an ICS circuit, it is possible to enable the selected output circuits by pressing the (P2.x) buttons. The display shows the current operating parameters (output current and earth fault resistance, if the EFD option has been provided) and the operator can manually select a different level by pressing the (P3.x) buttons as needed.
- REMOTE mode: press the AUTO button (P1.3) to select the remote control mode. The display shows the current operating parameters (output current and earth fault resistance if the EFD option has been provided).
- STOP mode: press the STOP button (P1.1) to stop the current supply.



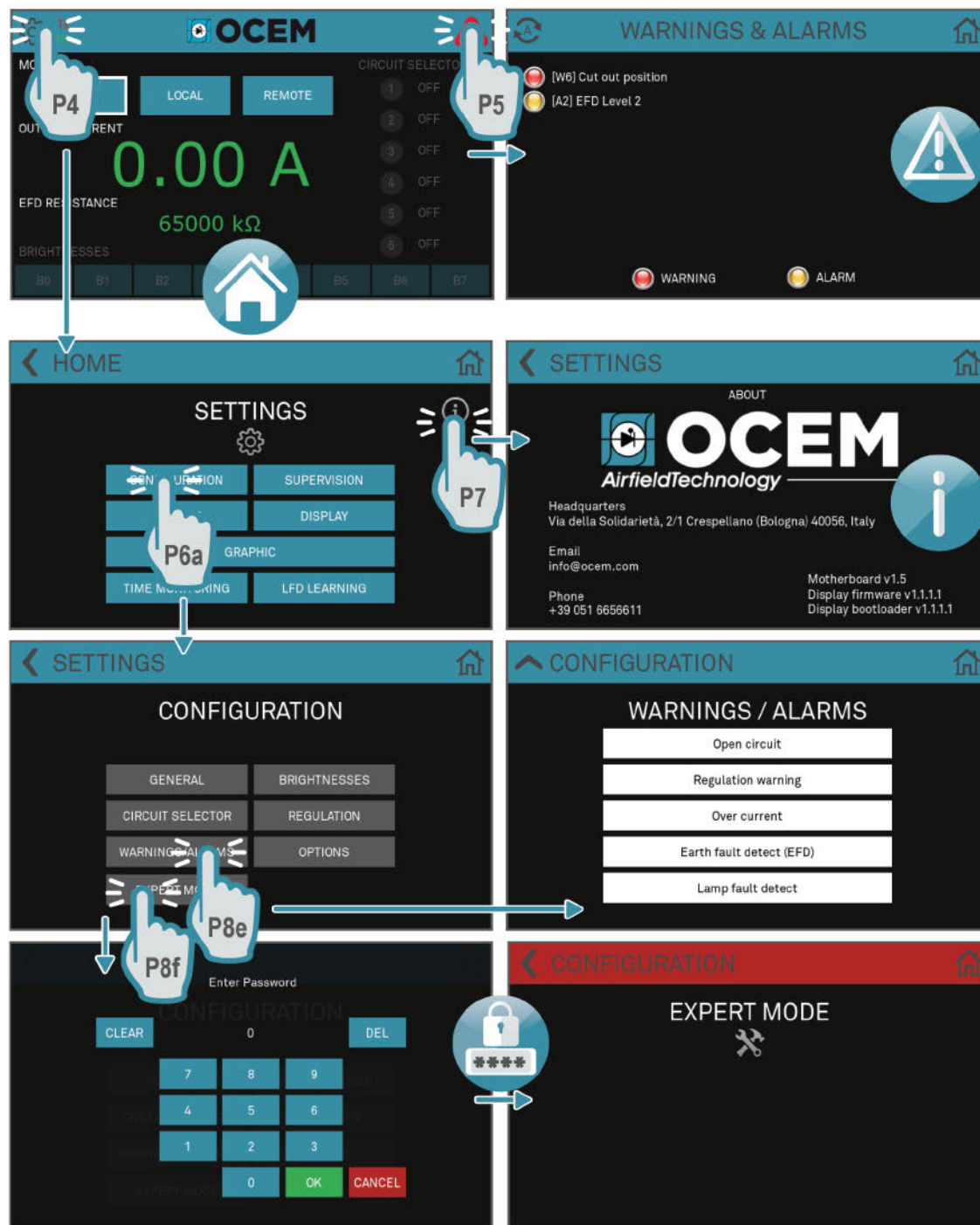
The multi-wired connection has a higher priority than Ethernet and serial connectivity. Changing operative parameters is only allowed when the constant current regulator is in STOP mode.



4.3 Navigation map



When the device is **ONLINE** the display always shows the output current in **A**.
If the **EFD** option is present, during operation, the display always shows the output current in **A** and the earth fault resistance in **kΩ**.



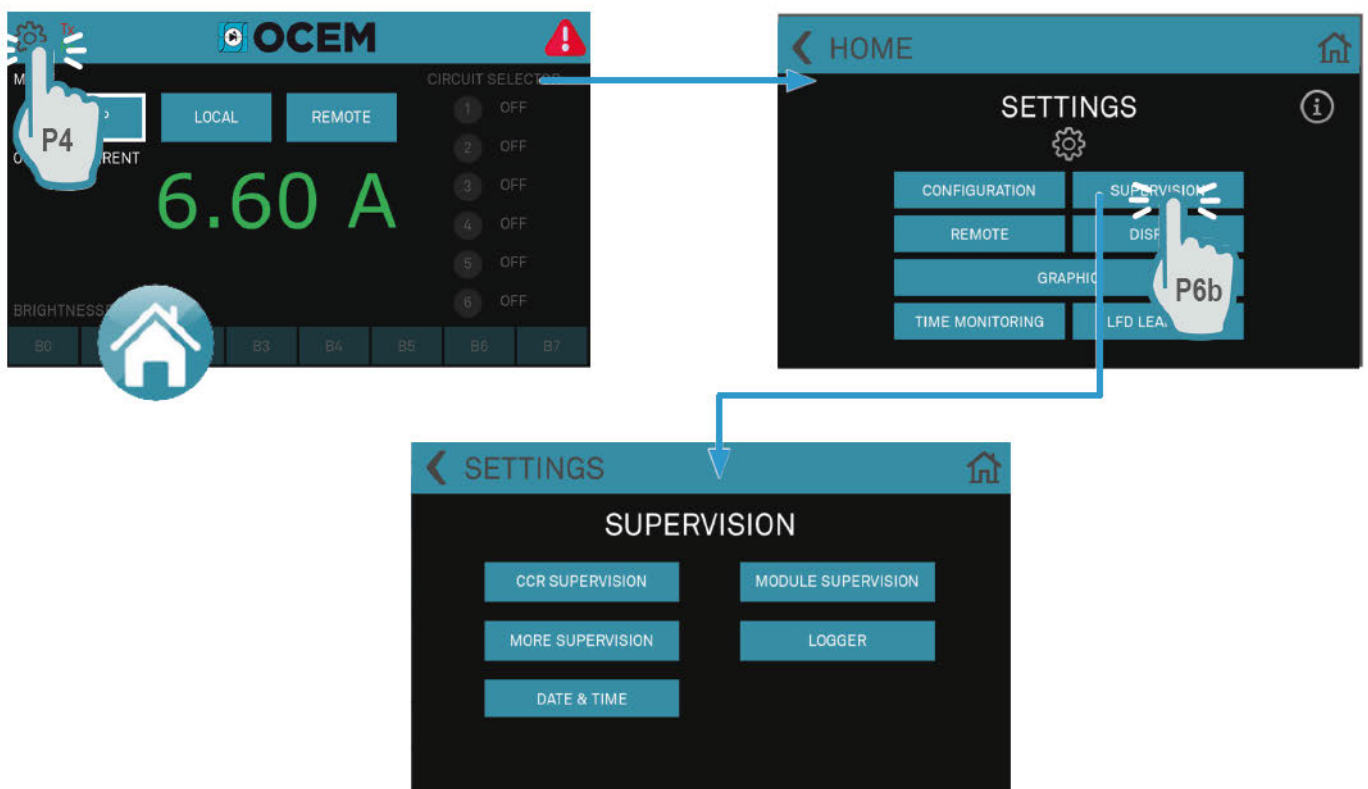
EXPERT MODE is intended for advanced operations and must only be used under the supervision of OCEM personnel.

4.4 Local monitoring

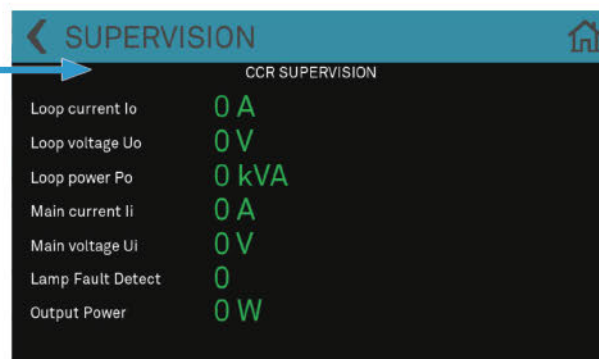
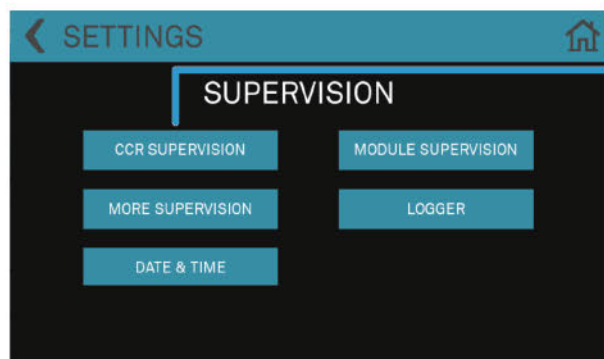
From the main page it is always possible to read in real time the output current values (expressed in A) and earth fault resistance (expressed in k Ω , if the EFD option has been provided).

Through the navigation menu (P4) of the functions it is possible to read the real-time values of the main quantities measured by the system (P6b):

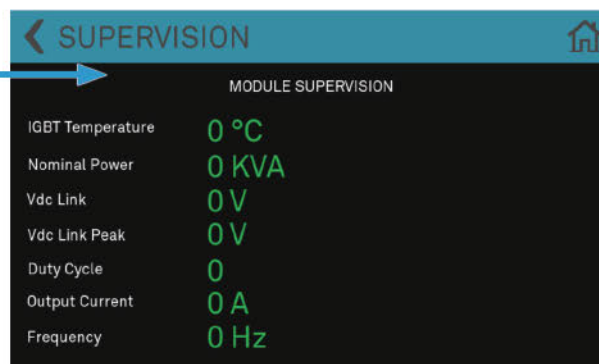
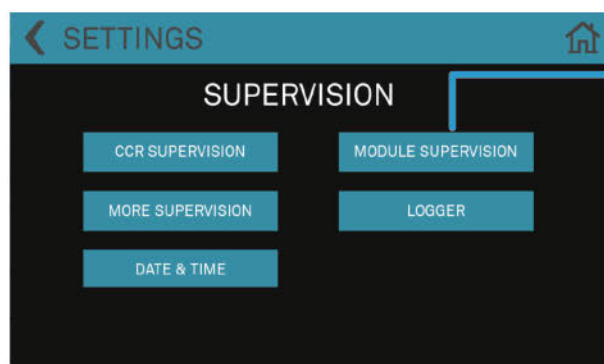
- Output current/loop Io (expressed in A)
- Output voltage/loop Uo (expressed in V)
- Output power/loop Po (expressed in kVA)
- Input current Ii (expressed in A)
- Input voltage Ui (expressed in V)
- Injection voltage of the detector earth fault (expressed in V)
- Input Power (expressed in W)
- Input Power Factor (capacitive/inductive)
- Earth fault resistance (expressed in k Ω , if the EFD option has been provided)
- TI opened (expressed in percentage value)
- Phase angle (expressed in percentage value)
- Output power (expressed in W)
- Output power factor (capacitive/inductive)



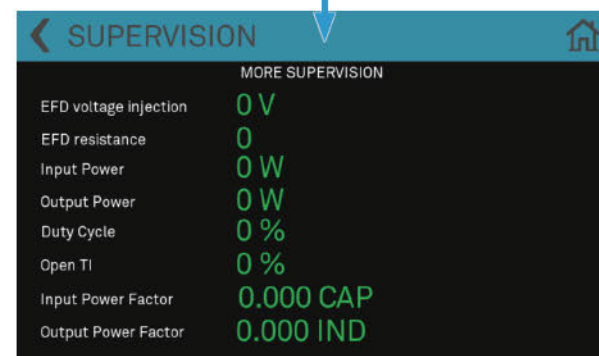
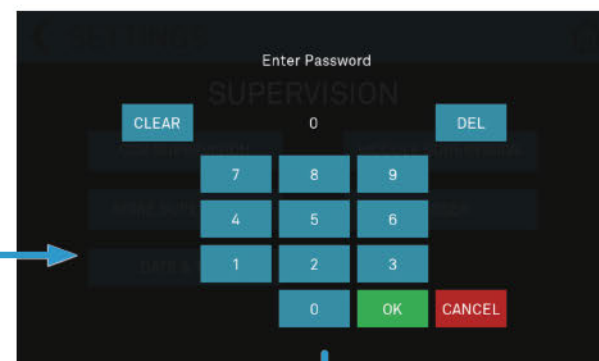
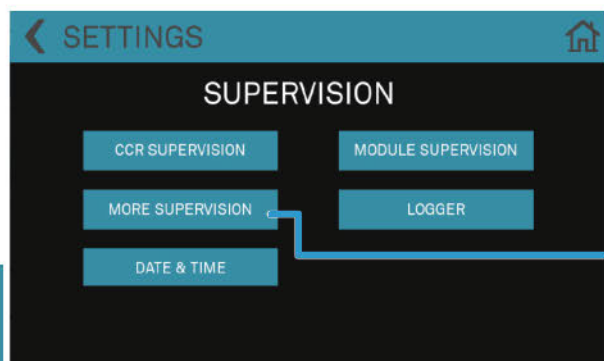
CCR SUPERVISION



MODULE SUPERVISION



MORE SUPERVISION



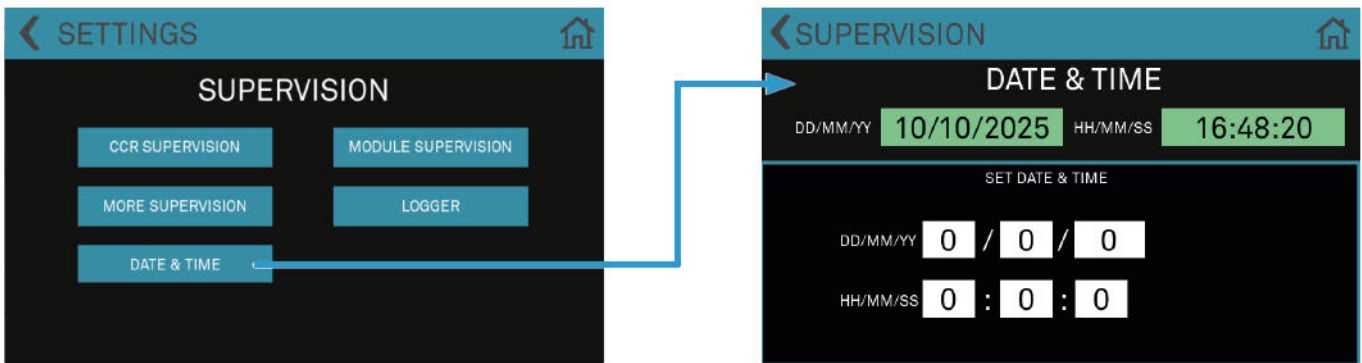
Also within the "SUPERVISION" screen it is possible to access the last 54 events and Warnings in chronological order (displayed on 5 pages).

LOGGER

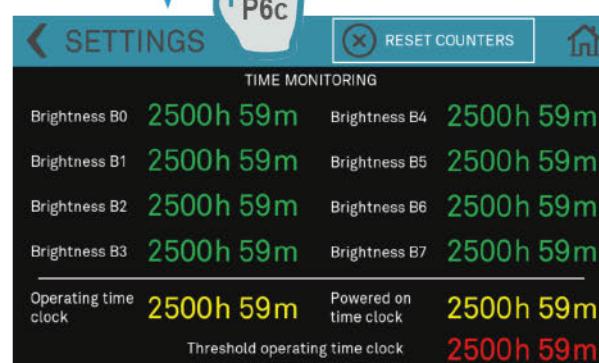
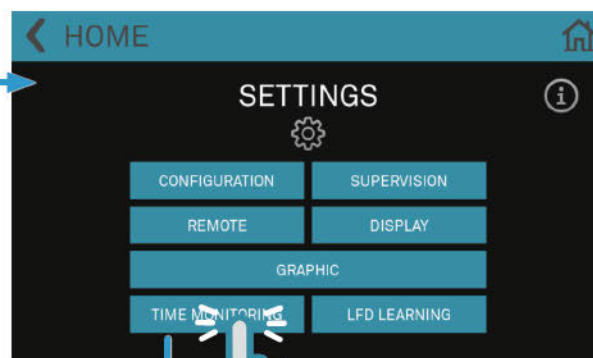
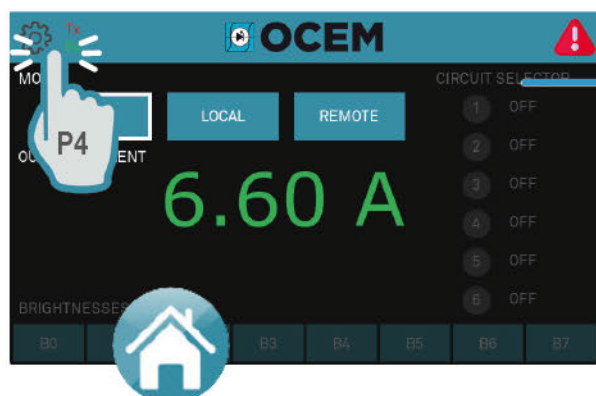


It is also possible to manage the internal clock of the system (date and time), which is essential for various operational and diagnostic functions.

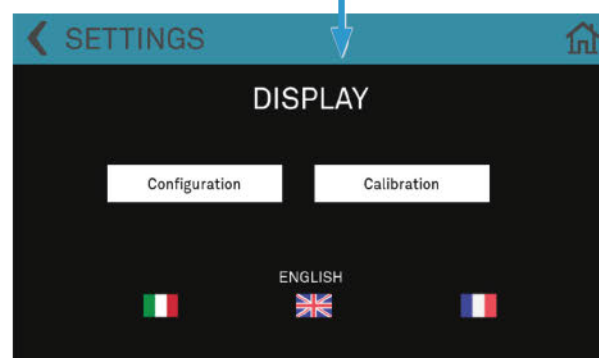
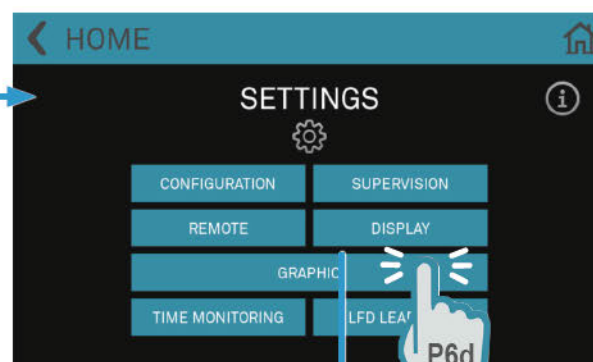
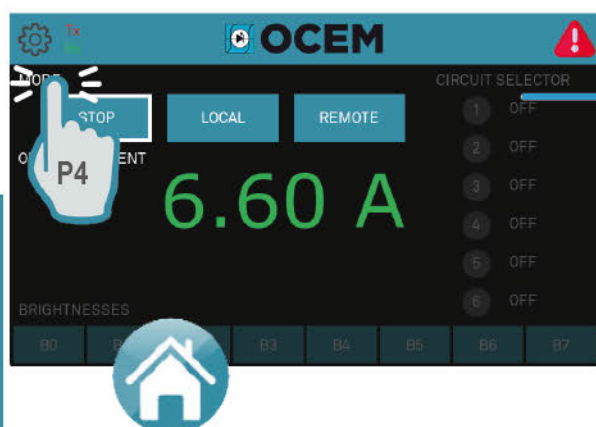
DATE & TIME



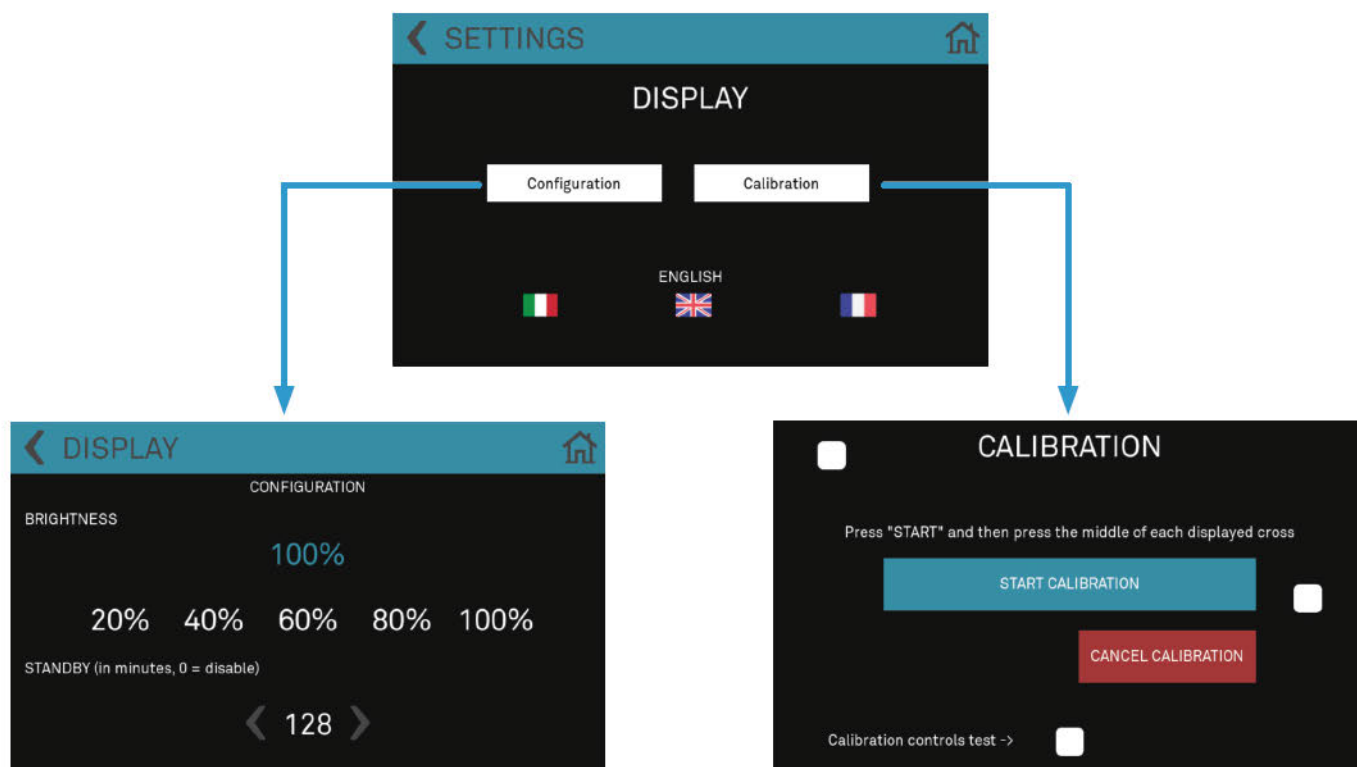
Through the navigation menu (P4) of the functions it is possible to read the real-time values of the operation of the system (P6c) both overall and for each expected brightness level (expressed in hours).



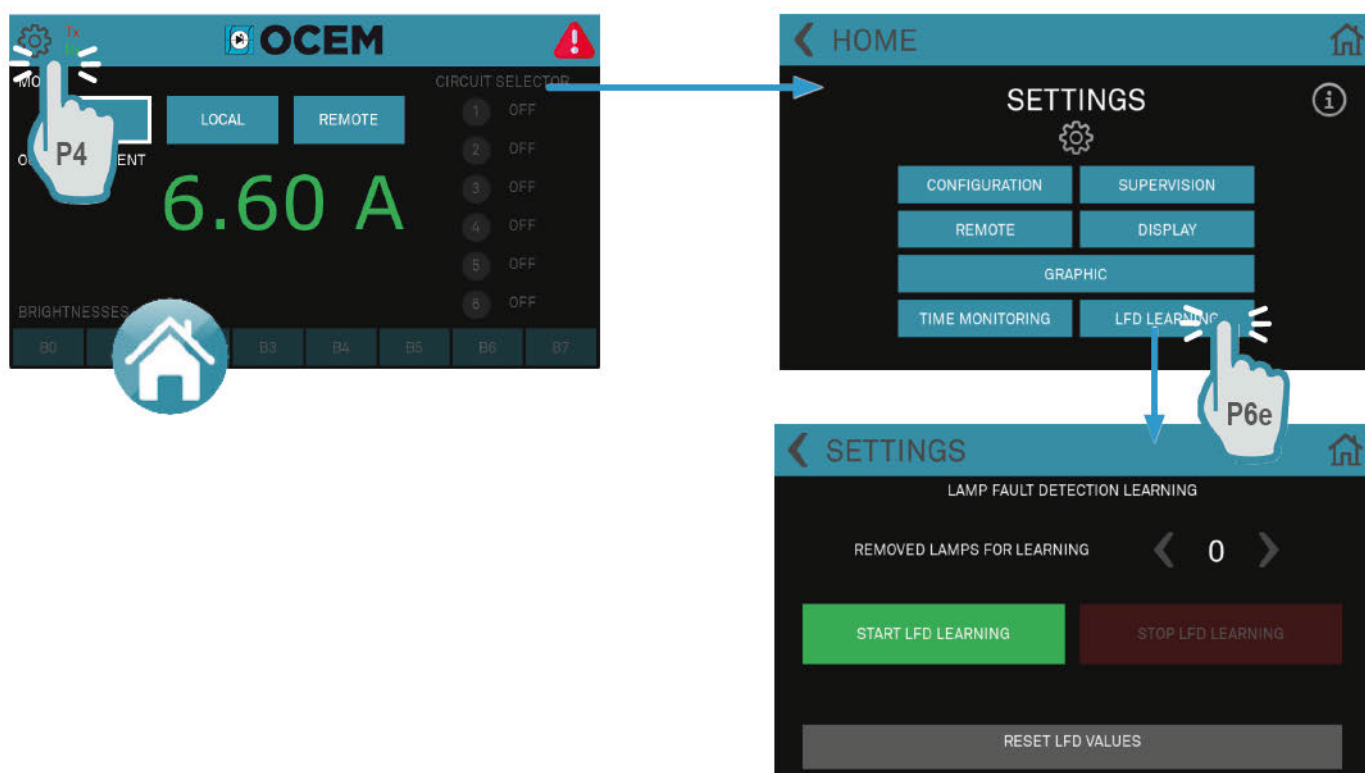
Through the navigation menu (P4) of the functions it is possible to act on the display settings (P6d), to change the languages (IT - EN - FR).



It is possible to configure the brightness of the screen and the off time of the display, and it is also possible to perform screen calibration.

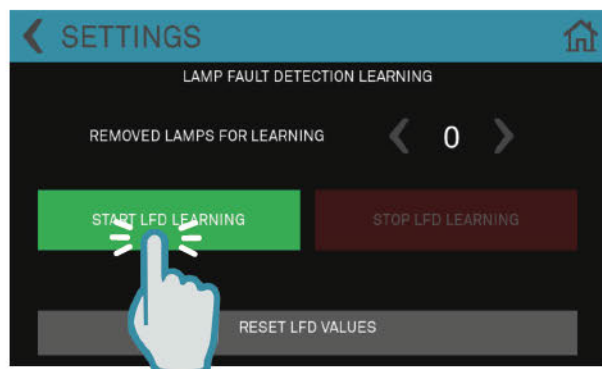


Using the function navigation menu (P4), you can calibrate the CCR with respect to the series circuit (LFD LEARNING) in order to monitor the circuit and detect any burnt lamps.

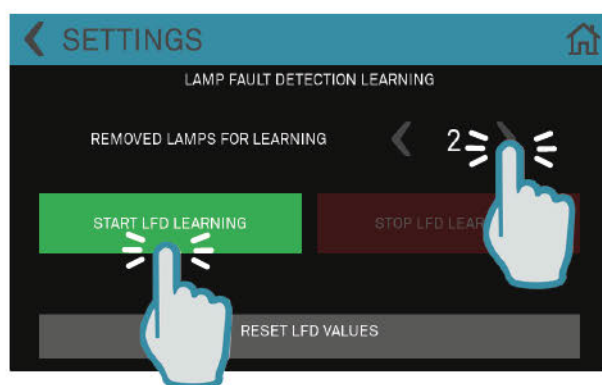


The LFD LEARNING function stores the current status of the circuit. If the circuit is modified (addition/replacement of transformers, load variation, changes to configuration parameters), the learned value is no longer valid. In these cases, it is necessary to reinitialize the calibration procedure, that is, to redo the "learning" to update the internal reference parameters.

Before performing calibration it is necessary to check that all the lamps are installed and working.
When learning it is important that the value of the lamp faults is 0.



Press START LFD LEARNING and wait for the system to measure the absorbed current after which press STOP LFD LEARNING to save the detected value.



To simulate the fault condition, the procedure requires manually disconnecting a number X of lamps from the circuit. Set on the display: REMOVED LAMPS FOR LEARNING the corresponding value in the field (e.g. 2). Start the procedure by pressing START LFD LEARNING to allow the system to characterise the series circuit with the lamps disconnected. At the end of the measurement, press STOP LFD LEARNING to save the detected value and complete the calibration phase.

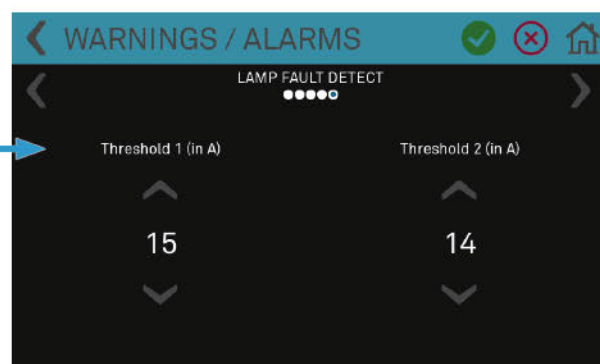
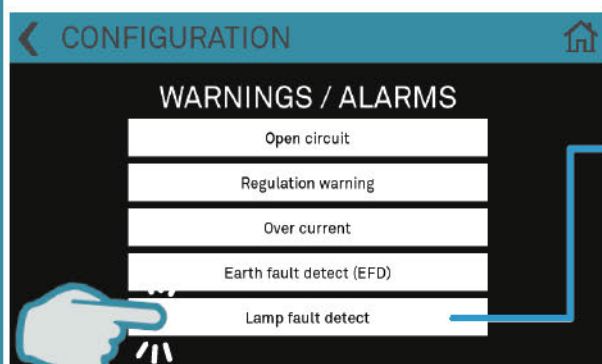


Pressing RESET LFD VALUES deletes the values previously stored by the system.

At the end, the LFD LEARNING algorithm is operational, ready to evaluate the status of the lights in real time and detect any faults.

Within the CONFIGURATION ► WARNINGS / ALARMS ► lamp fault detect screen, you can set Threshold 1 (warning) and Threshold 2 (critical alarm). **These thresholds should be set after calibration.**

If the value drops below Threshold 1, LFD Level 1 (warning) is activated.
If the value drops below Threshold 2, LFD Level 2 (critical alarm) is activated.



The unit is supplied with a pre-set of parameters in accordance with the machine configuration. Below is the parameter diagram (P6f).



Please check the actual configuration of the device.
Some parameters may not be available, if the relevant option is not present on the device.



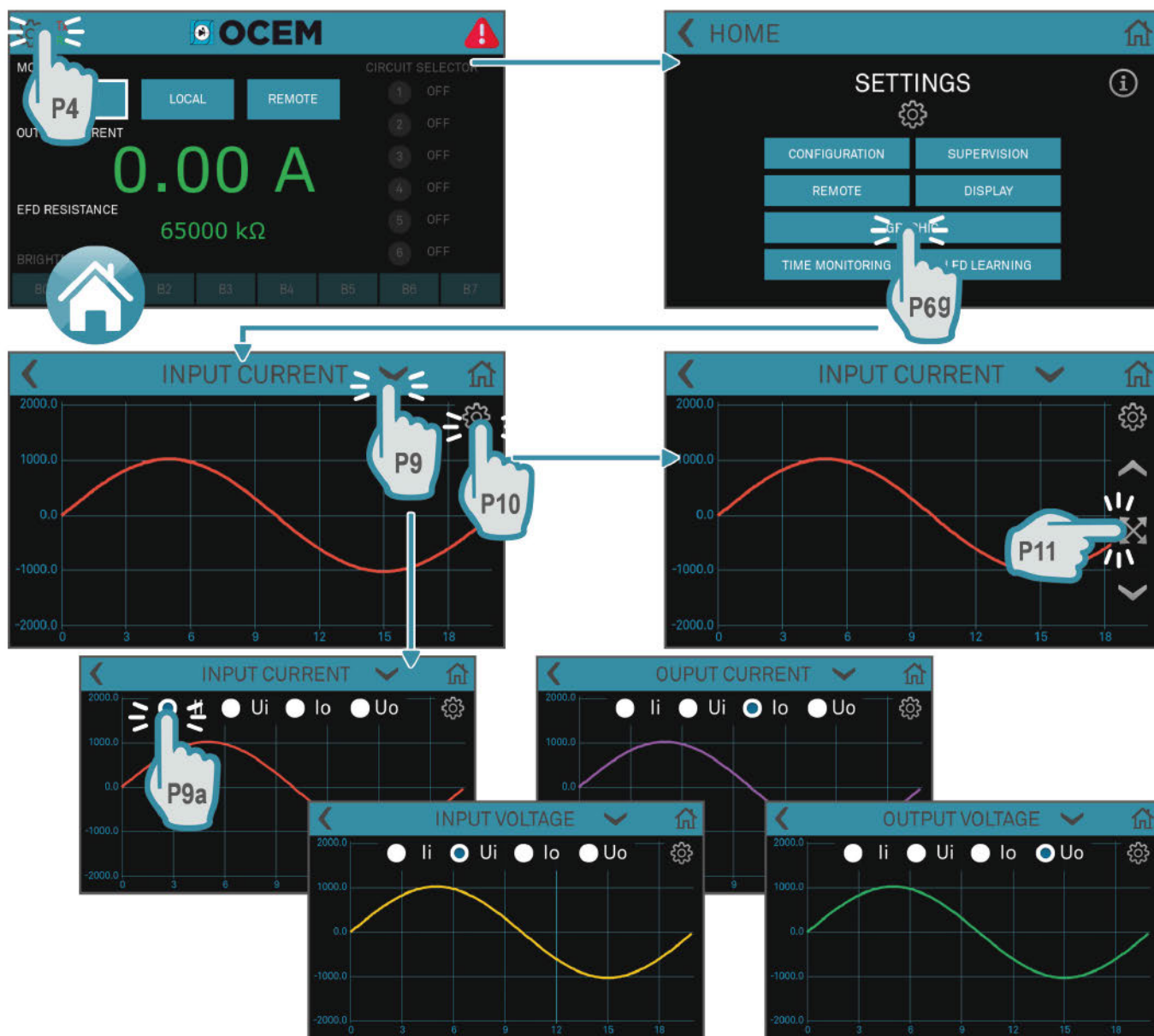
Through the navigation menu (P4) of the functions it is possible to consult the graphs (P6g) of the progress of the main quantities measured by the system:

- I_i : input current (expressed in A)
- U_i : input voltage (expressed in V)
- I_o : output current/loop (expressed in A)
- U_o : output voltage/loop (expressed in V)



To optimise the view, you can act on the setting button (P10) and increase or decrease the scale of the measured quantities. It is possible at any time to restore the initial view of the graph by pressing the corresponding button (P11).

To select the graph to be displayed, click on the drop-down menu (P9) and select the quantity of interest.



4.5 Warning and alarm messages



During operation, the display always shows the presence of warning or alarm messages. If there are active errors, an icon appears in the top bar of the interface.

When active error messages are reported, by acting on the button (P5) it is possible to access the message register.

A coloured icon identifies the type of message:

- **YELLOW LED:** warning message. This is an abnormal error/fault situation that does not prevent the device from functioning, but requires attention as soon as possible.
- **RED LED:** alarm message. This is an abnormal error/fault situation that does prevent the device from functioning. When there are active alarms, immediate action must be taken to restore correct operation of the regulator.

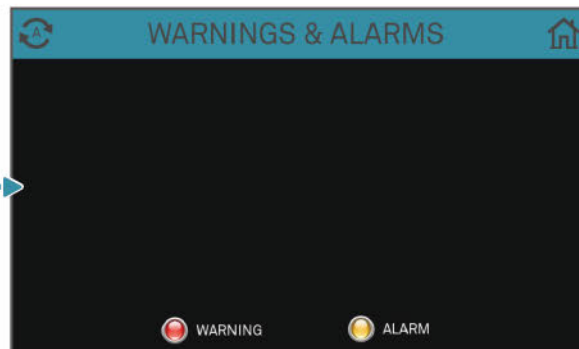
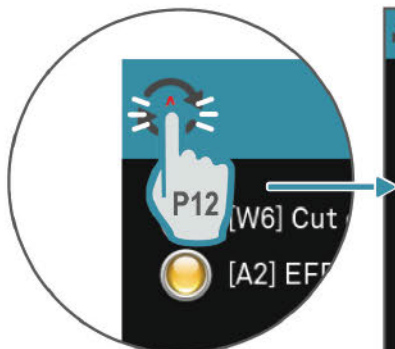
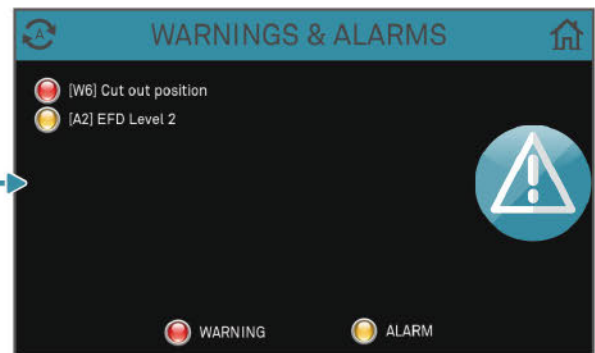
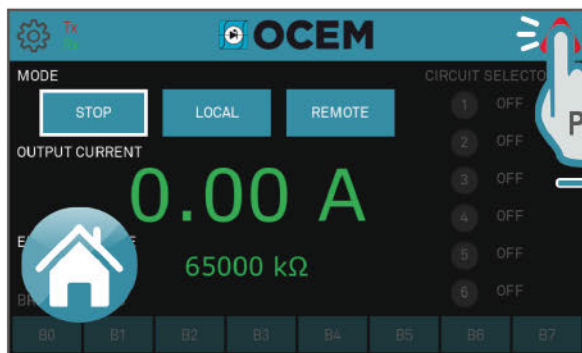
A code (given in square brackets) enables the error message to be identified precisely. Next to the identification code there is always a short message explaining the fault detected, which can provide preliminary indications for a quick solution to the problem.



Refer to the product documentation for further information and to be able to plan the necessary operations to solve the problem quickly.

If it is not possible to eliminate the problem and thus restore the full operation of the device, contact the **Manufacturer's Technical Service**: always provide all the device identification data and the error codes active at the time of the fault to allow the precise identification of the problem.

After eliminating the causes of failure, reset the system by pressing the button (P12): wait for the operations to be completed and verify that the register is empty. If errors persist, contact the Manufacturer's Technical Service.



In the event of a [W] WARNING, the CCR continues to supply current to the series circuit, and the possible messages are:

- [W0] No EFD: the EFD board is either missing or faulty (if the "EFD" option is enabled).
- [W1] EFD level1: Earth fault, with a resistance value below level 1 (if the "EFD" option is enabled).
- [W2] EFD level 2: Earth fault, with a resistance value below level 2 (if the "EFD" option is enabled).
- [W3] LFD level 1: Level 1: burnt lamps. The number of burnt lamps detected exceeds Level 1 (if the LFD option is enabled).
- [W4] LFD level 2: Level 2: burnt lamps. The number of burnt lamps detected exceeds Level 2 (if the LFD option is enabled).
- [W5] BAD Supply: supply voltage outside the range $\pm 10\%$.
- [W6] Regulation error: The value of the current delivered is outside the minimum or maximum limits for the selected step (B0...B7).
- [W7] BAD Interface: No communication with the interface board.
- [W8] BAD Frequency: Power supply frequency out of range.
- [W10] Power Drop: a drop in load power of more than 10%.
- [W12] Temperature level 1: the regulator internal temperature is higher than the value set for the threshold level 1 (only version AENA).
- [W16] Module Warning: a general warning regarding the power module, usually accompanied by another detailed message about the module.

In the event of an [A] ALARM warning, the CCR stops supplying power and an operator must intervene to reset the system; the possible messages are:

- [A0] I >>Level 1, overcurrent alarm: the output current (RMS) has exceeded Level 1 (6.75A for 2.5 seconds)
- [A1] I >>Level 2, overcurrent alarm: the output current (RMS) has exceeded Level 2 (6.93A for 1 second).
- [A2] I >>Level 3, overcurrent alarm: the output current (RMS) has exceeded Level 3 (8.23A for 0.2 seconds).
- [A3] I >> Peak Value: as in [A2], the output current (PEAK) has exceeded level 3.
- [A4] I <<Open Circuit: Output current below the set level for > 0.9 seconds.
- [A5] Temperature Level 2: the regulator internal temperature is higher than the value set for the threshold level 2 (only version AENA).
- [A6] Cut-out position: Cut-out handle removed or set to "measurement" position.
- [A7] Module Alarm: A general warning regarding the power module, usually accompanied by another detailed message about the module.
- [A8] Main Contactor Error: the contactor KM has not executed the command; there may be a wiring issue or a fault.
- [A9] Vdc Low: the capacitors on the F408 have not been fully precharged within the specified time.

4.6 Troubleshooting



Before proceeding to delete the message, identify the causes of the fault and eliminate the problem.

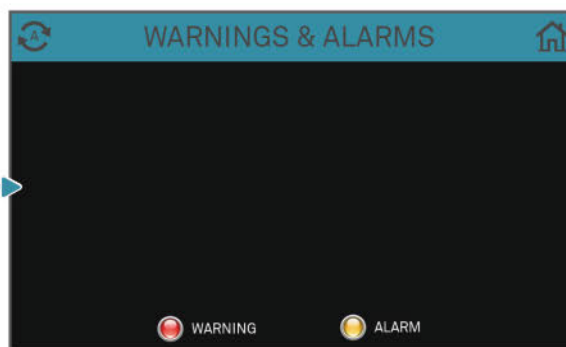
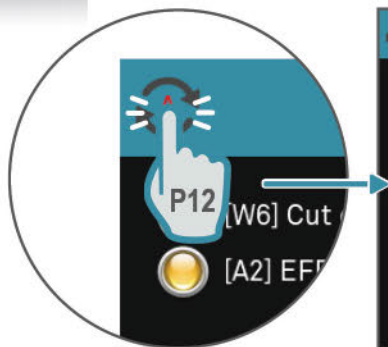
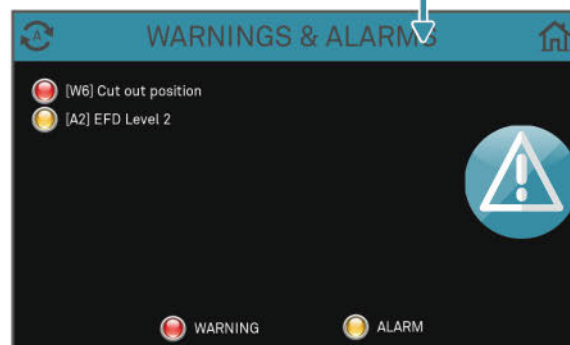
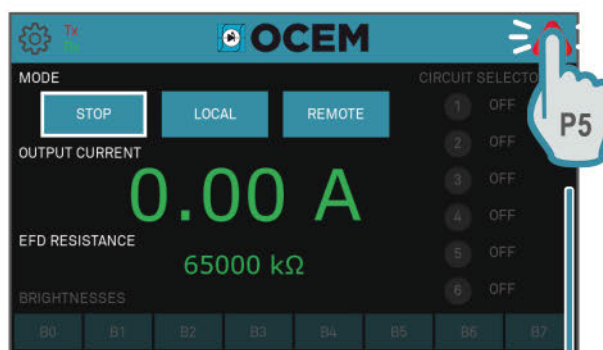
Check the general status of the device. If necessary, consult the manual to identify the problem and possible causes of failure.

Eliminate the problem and press the RESET button (P12) to restore the system.



System reset is only possible with the system energized in STOP mode.

The unit preserves the memory of the messages detected during operation even in the absence of the supply voltage. When the unit is switched back on, proceed to resolve and restore all the messages in the memory.



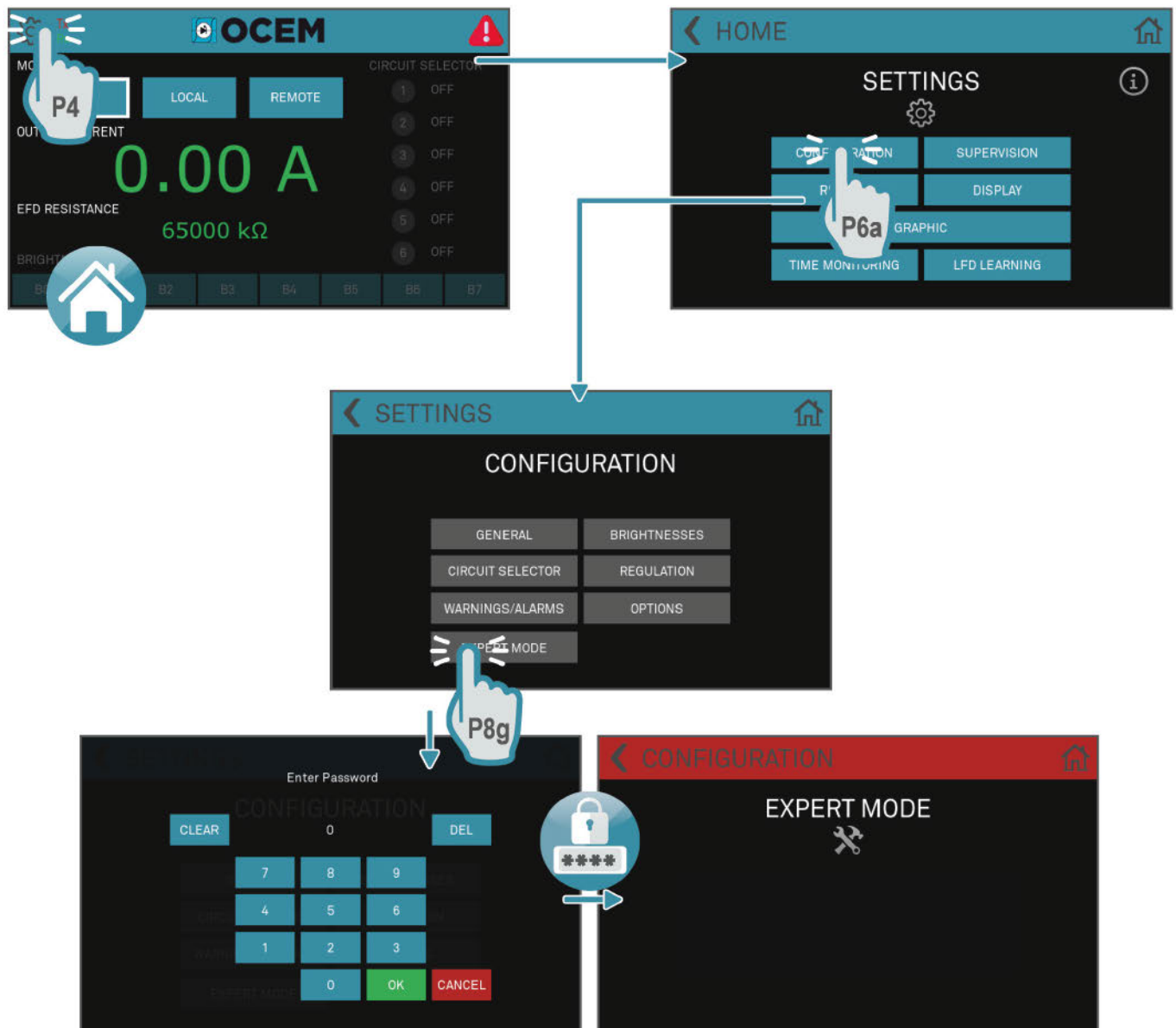
4.7 Configuration access



Changing and updating the values is only possible with the system energized in **STOP** mode. Access to some parameters is restricted to authorised users only. The correct management of the credentials is the sole responsibility of the customer, who must provide any access to advanced features only to suitably trained and specifically authorised operators.

To access the configuration parameters, click on the button (P6a) and select the group of parameters to be edited:

- generals: system general parameters (P4.5a);
- brilliances: system brilliance management parameters (P4.5b);
- circuit selector: circuit selector management parameters, if present (P4.5c);
- adjustment: regulator operating parameters (P4.5d);
- warnings/alarms: levels/message activation thresholds (P4.5e);
- options: configuration parameters of the options installed at system (P4.5f);
- expert mode: advanced system parameters, with limited access (P4.5g).



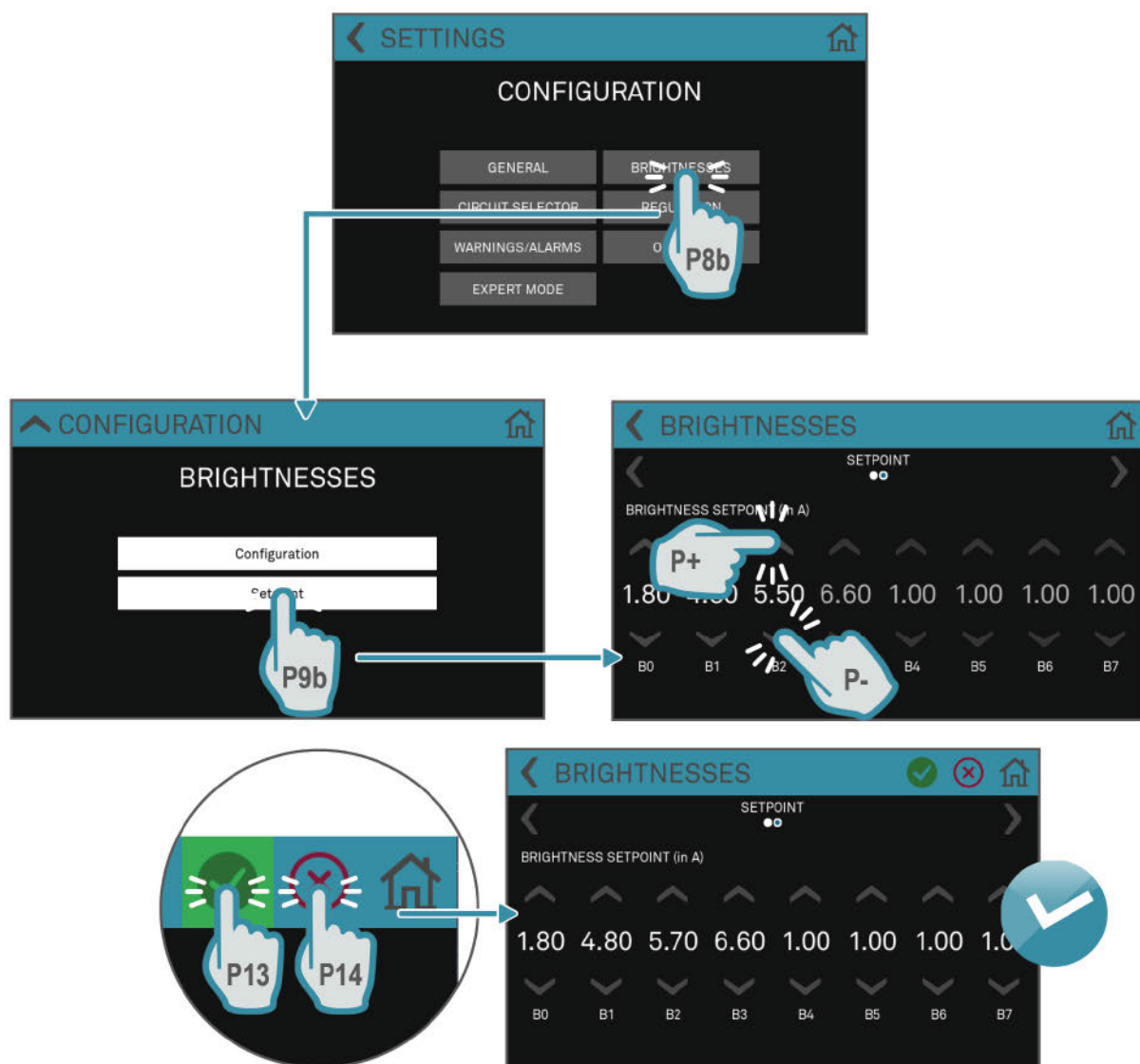
4.8 Edit parameters



The unit is supplied with a pre-set of parameters in accordance with the machine configuration. For normal use, no reconfiguration is necessary during installation operations. Changing the parameters is only possible with the system energised in STOP mode.

To modify the parameters:

- access the configuration page;
- press the navigation buttons (P8x) and (P9x) and select the desired function;
- press the option buttons (P+) or (P-) and select the desired value for the parameter to be updated (when the parameter is changed, the buttons to proceed appear in the top bar);
- press the confirmation button (P13) to update the configuration or press the reset button (P14) to cancel the entry and exit the page.



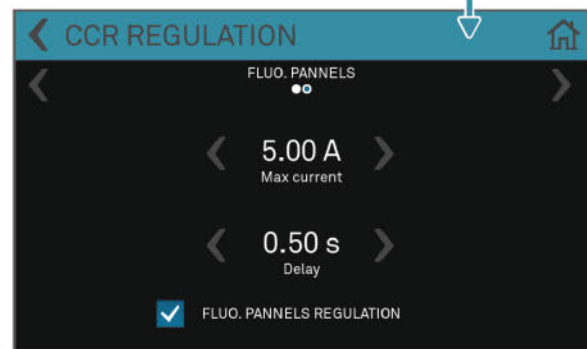
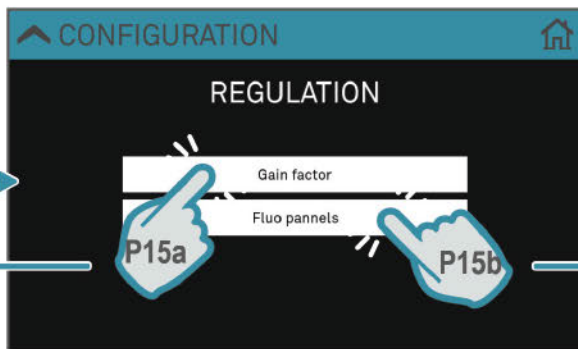
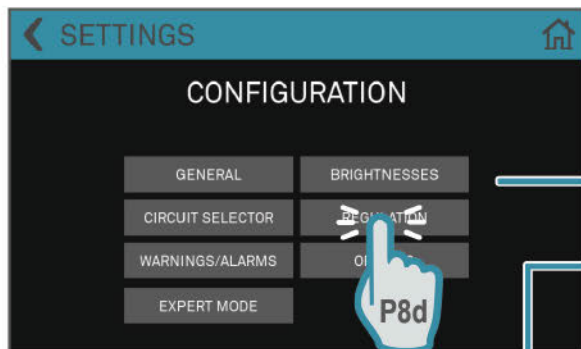
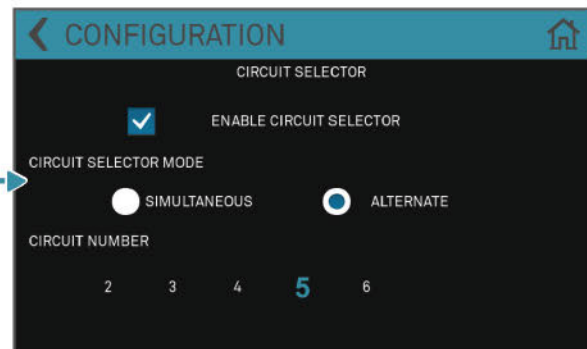
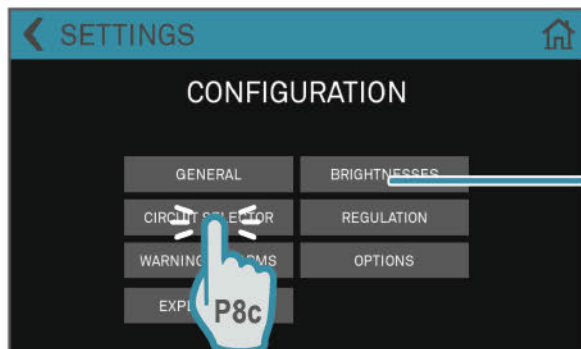
Changing parameters may require updates of derived parameters. In the example, changing the current level B2 requires enabling the relative level of brightness.

4.8.1 Configuration parameter diagram

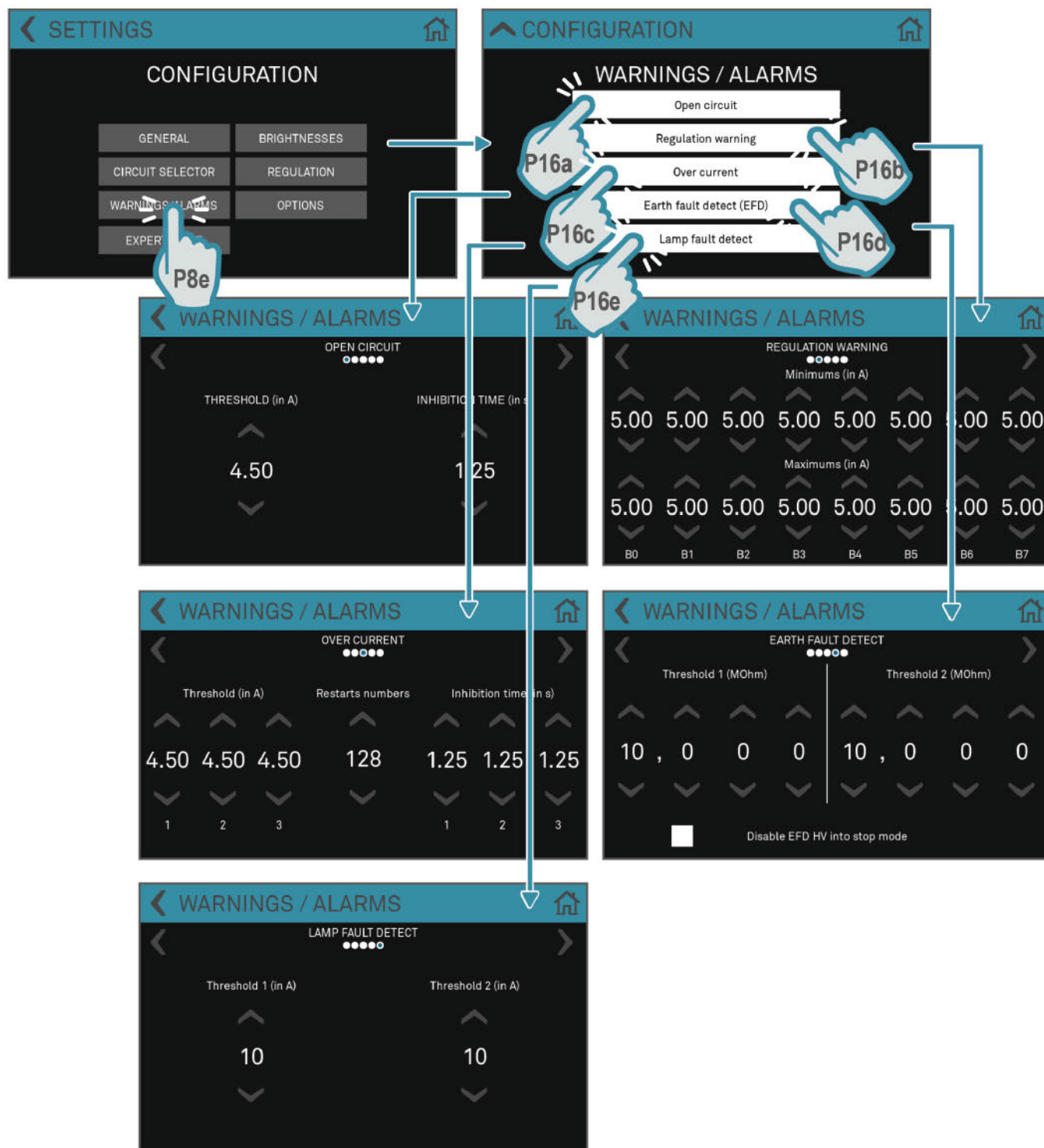
The unit is supplied with a pre-set of parameters in accordance with the machine configuration. Below is the parameter diagram.



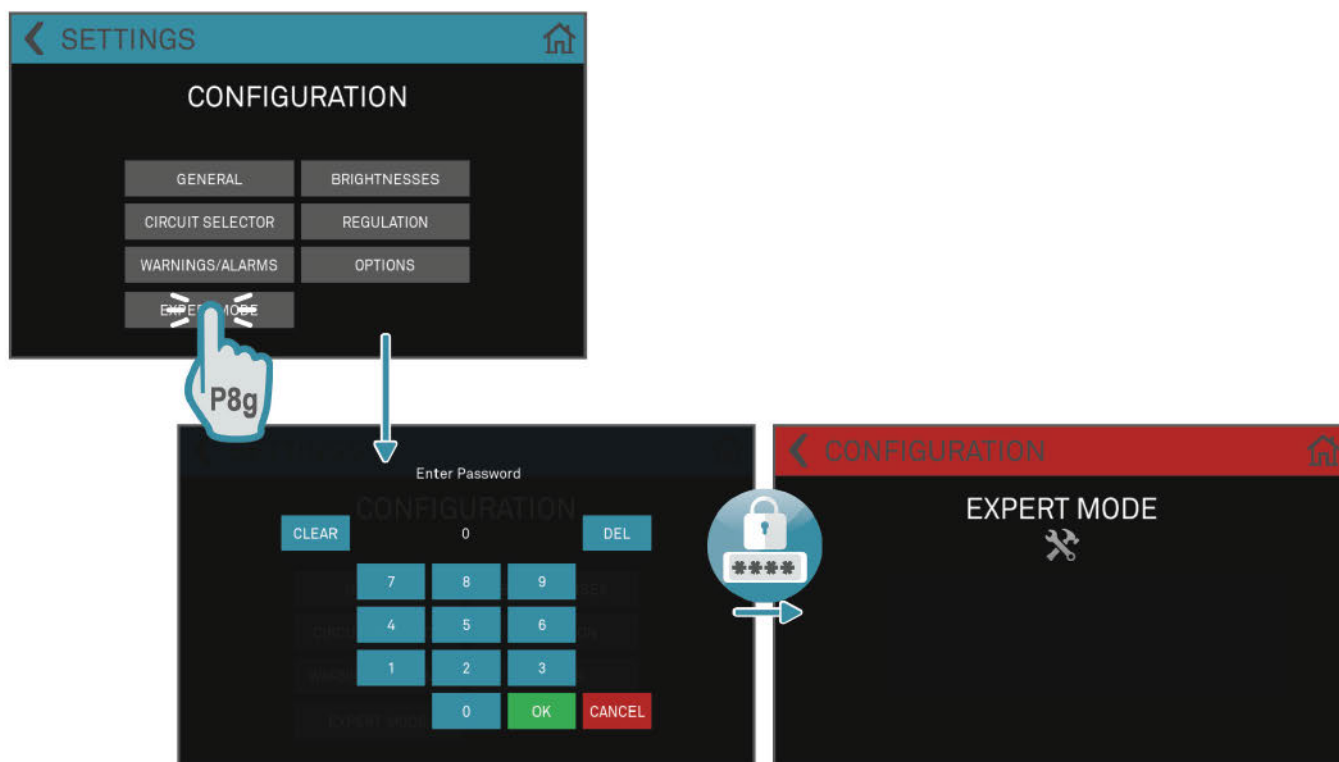
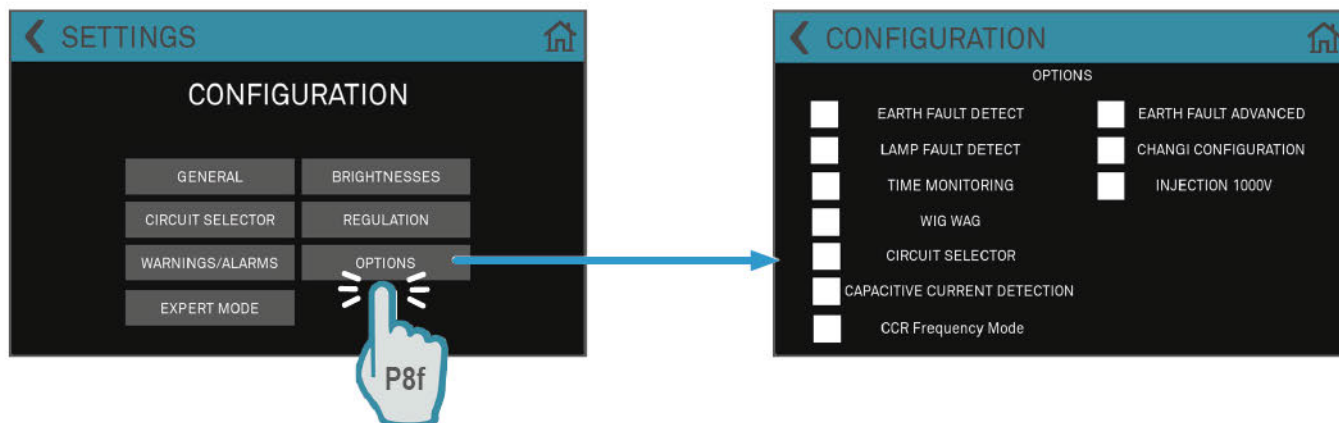
Please check the actual configuration of the device.
Some parameters may not be available, if the relevant option is not present on the device.



Please check the actual configuration of the device.
Some parameters may not be available, if the relevant option is not present on the device.



Please check the actual configuration of the device.
Some parameters may not be available, if the relevant option is not present on the device.



Please check the actual configuration of the device.
Some parameters may not be available, if the relevant option is not present on the device.

4.9 Software configuration utility

In order to make the features of the device more usable, it is possible to connect to the constant current regulator control system using the USB port (located on the front of the device) using the cable supplied, connected to a PC with the ALIZE 4100 software installed.



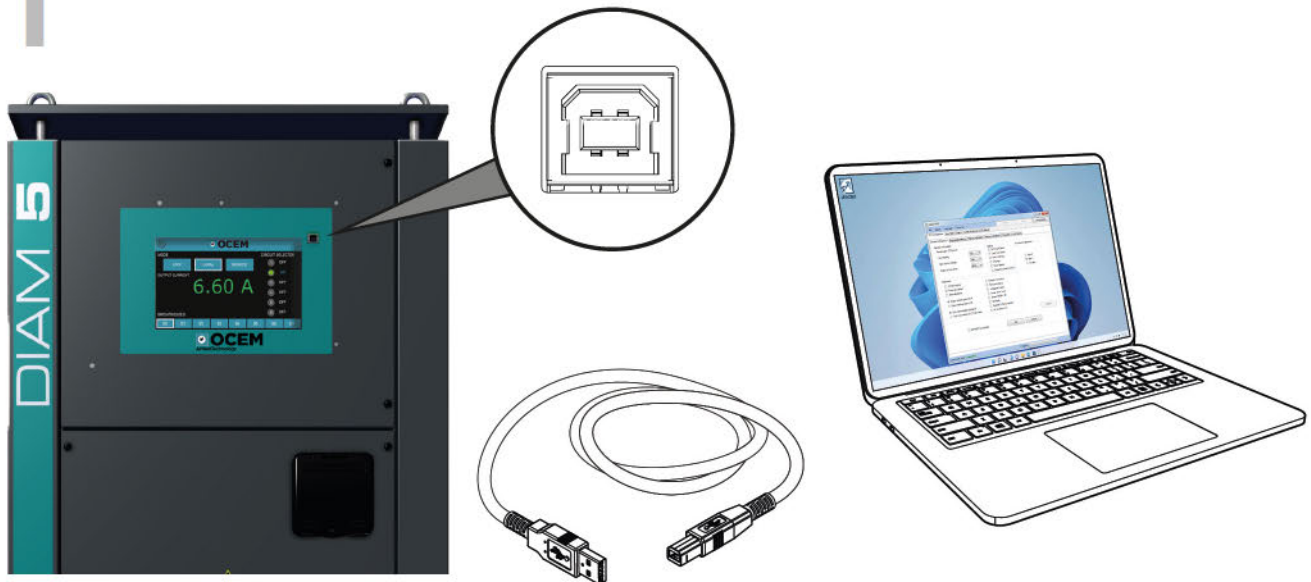
The ALIZE 4100 software (available for download from the link on the manufacturer's website: https://ocem.com/ALIZE4100_1_11_10_0.exe) Before installing the software, read and accept the licence conditions and check that the system meets the minimum requirements.

The software interface allows faster access to the device's parameters, enabling the unit to be programmed quickly and accurately. The configuration file can be exported and stored for future reuse.

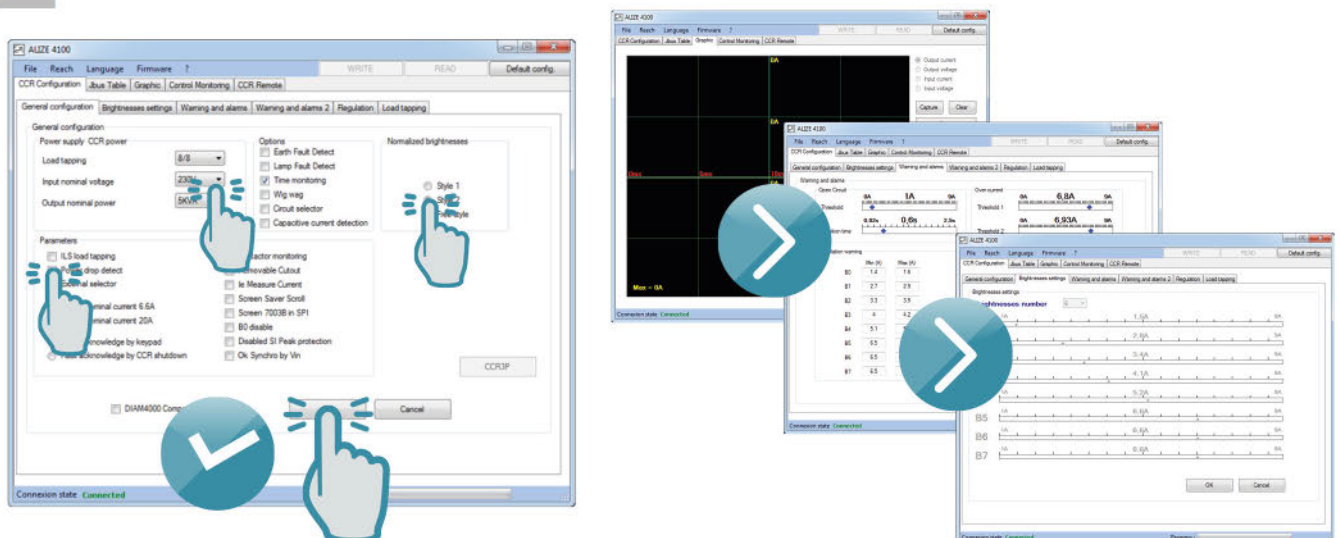
Through the software interface it is possible to view the main operating parameters, even in a graphic environment.

For further details, please refer to the software guide.

1



2



4.10 Scheduled Maintenance

The CAN architecture between the electronic boards contained in the DIAM D5-3 CCR controller of OCEM Airfield Technology is designed to minimise the number and variety of spare parts and to allow wide configurability of the options. OCEM Airfield Technology offers software tools to perform quick parameter settings or diagnostics, without having to remove any parts.



Access to the regulator for all activities (connecting the power supply, maintenance or troubleshooting) is restricted exclusively to qualified and specifically trained personnel.



Before carrying out any work on the device, disconnect all power sources and affix appropriate signs to indicate work in progress on the equipment.

Wait for the discharge time (at least 10 minutes) first and check with suitable instruments that there is no residual energy before accessing electrical equipment.



If present, use the CUT-OUT disconnecter to secure the device during maintenance operations. For further information, see the relevant technical documentation.

In accordance with the suggestions contained in the document ICAO Airport Service Manual - Part 9: Airport Maintenance Practices, DIAM D5-3 devices must be regularly maintained.

In order to ensure the proper functioning and the maximum duration of the operating lifetime of the device all the checks and periodical audits must be carried out and, if necessary, the necessary corrective procedures must be activated to restore and ensure operative safety levels foreseen by the standards.



Do not leave in operation devices that have not been properly maintained or light fixtures that show signs of damage or failure.

Access to the regulator is permitted only after:

- Disconnecting/opening the circuit breaker on the regulator;
- Disconnecting/opening the relevant upstream switch on the distribution panel;
- Waiting at least 10 minutes to allow any residual internal energy to dissipate completely.

Furthermore, to provide greater protection for the operator and to prevent unauthorised actions whilst the regulator is energised, specific safety measures have been implemented, including:

- 4 door microswitches on the regulator, 2 door microswitches on the ICS (when provided);
- 2 polycarbonate partition panels (one at the front and one at the rear).

Specifically:

i) Safety microswitch (door microswitch) on the D5-3: access to the regulator is protected by door microswitches, positioned to detect the removal of:

1. The two side panels;
2. The front door;
3. The rear door.



If the fixing screws of a panel or door were to be inadvertently removed while the regulator is energised, the relevant microswitch will be triggered when the panel or door is removed, causing the BLC coil to activate and the consequent tripping of the CB thermal-magnetic circuit breaker.

In these conditions, the components upstream from the CB (the lower terminals of the CB, filter FL1, and input terminal block X1) remain live; it is therefore necessary to restore the previously mentioned safe condition as soon as possible by tripping or opening the relevant upstream circuit breaker on the distribution panel.



The lower front and rear panels of the D5-3 are not monitored by door microswitches but are mechanically linked to the respective upper doors, meaning they cannot be removed until the upper doors have been opened.

- ii) Safety microswitch (door microswitch) on the ICS: access to the ICS selector is protected by door microswitches, positioned to detect the removal of the two front and rear panels.



If the fixing screws on an ICS panel were to be inadvertently removed while the regulator is energised, the relevant microswitch will be triggered when the panel is removed, causing the Main Board to shut down and the regulator to enter STOP mode; however, dangerous voltage will still be present on the internal components of the regulator and the ICS selector!

You must return to the safe condition described above as soon as possible by disengaging/opening the circuit breaker on the regulator and the corresponding upstream switch on the distribution panel.

Any maintenance work carried out on the devices must be recorded in the maintenance logbook.

3.10.1 Maintenance after the first month

After the first month of use, carry out the following checks:

- Status of the connections and tightening of the clamps of the power terminals: input line (LV+GND), fuse holders and contactors;
- Status of the connections and tightening of the power terminals: output line (HV1, HV2);
- Correct tightening of all internal terminal blocks.

3.10.2 Annual maintenance

At least once every 12 months of use, carry out the following activities:

- Remove dust accumulated on the lower surface of each unit;
- Remove dust accumulated on the electronic boards;
- Check the status of the connections and of tightening of the main connections (LV, HV, GND);
- Check the operation of the unit in LOCAL mode and in REMOTE mode.

3.10.3 Three-year maintenance

At least once every 36 months of use, carry out an overall check of the condition of the unit. Carry out a visual inspection and perform the following activities:

- Check the proper tightening of all internal terminal blocks;
- Measurement and check of current values: use suitable equipment with adequate measurement and accuracy specifications. If there are discrepancies between the actual values and those shown on the screen, recalibrate the unit. For more information, contact technical support.

3.1 Corrective Maintenance - Component Identification



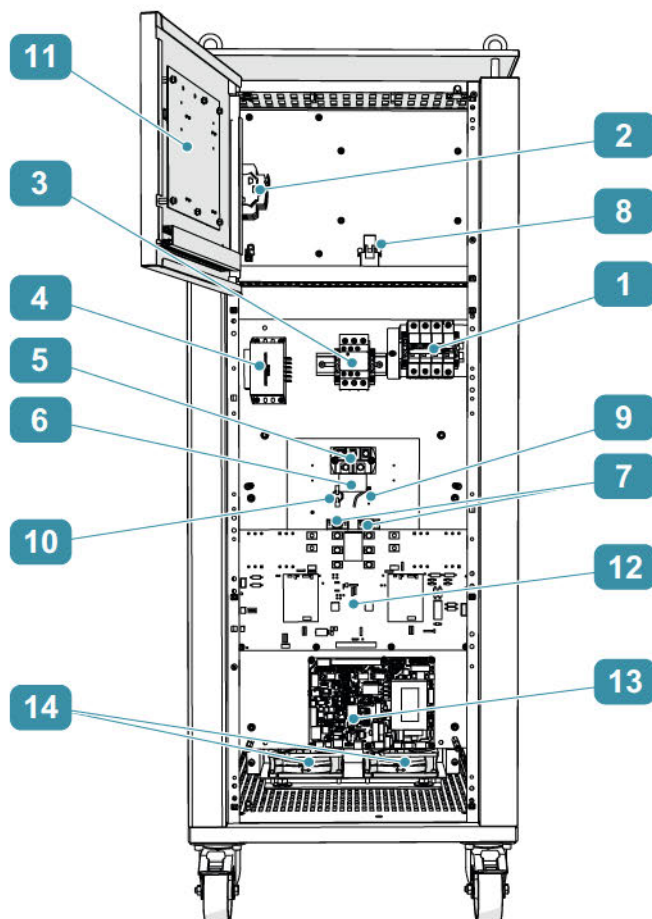
Before carrying out any work on the device, disconnect all power sources and affix appropriate signs to indicate work in progress on the equipment.

Wait for the discharge time (at least 10 minutes) first and check with suitable instruments that there is no residual energy before accessing electrical equipment.

When necessary, perform corrective maintenance procedures to repair/replace the main electrical/electronic components of the unit:

- Parts accessible from the front side

- 1) main circuit breaker (CB)
- 2) three-pole fuse holder and auxiliary fuses (FH1+ F1/F2/F3)
- 3) main contactor (KM)
- 4) auxiliary autotransformer (T2)
- 5) three-phase rectifier bridge (D)
- 6) capacitor for rectifier bridge (Cd)
- 7) IGBT power module (Q1, Q2)
- 8) current transformer (TC)
- 9) thermistor (NTC1)
- 10) thermo-switch (TSW1)
- 11) main electronic board (MAIN) and related protection fuses (FU1 and FU2) with TFT display
- 12) power electronic board (F409 complete with 2 F413 driver boards)
- 13) electronic control board (F440) and related fuses (FU1, FU2, FU3 and FU4)
- 14) electric fan (EV1, EV2) - only for versions with rated power 15 kVA and 20 kVA



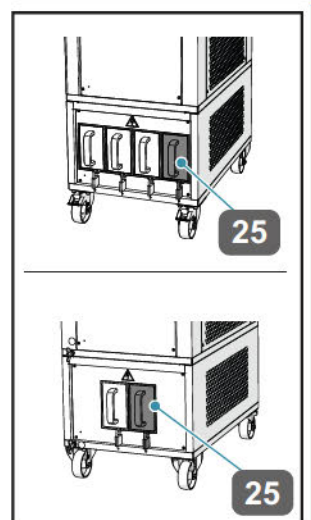
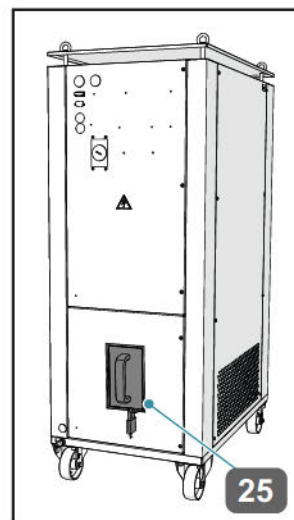
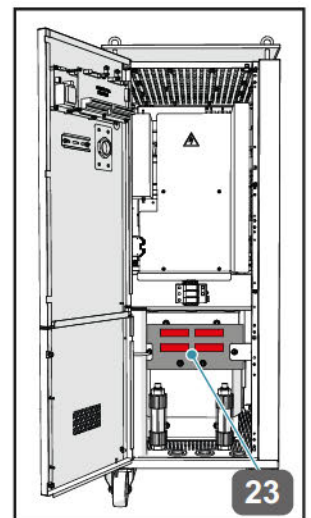
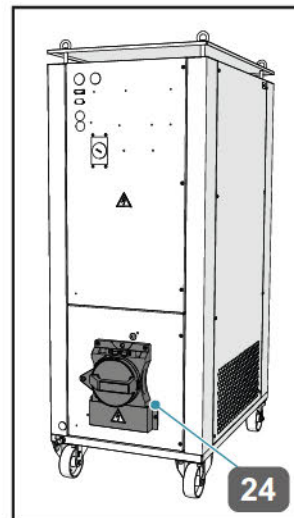
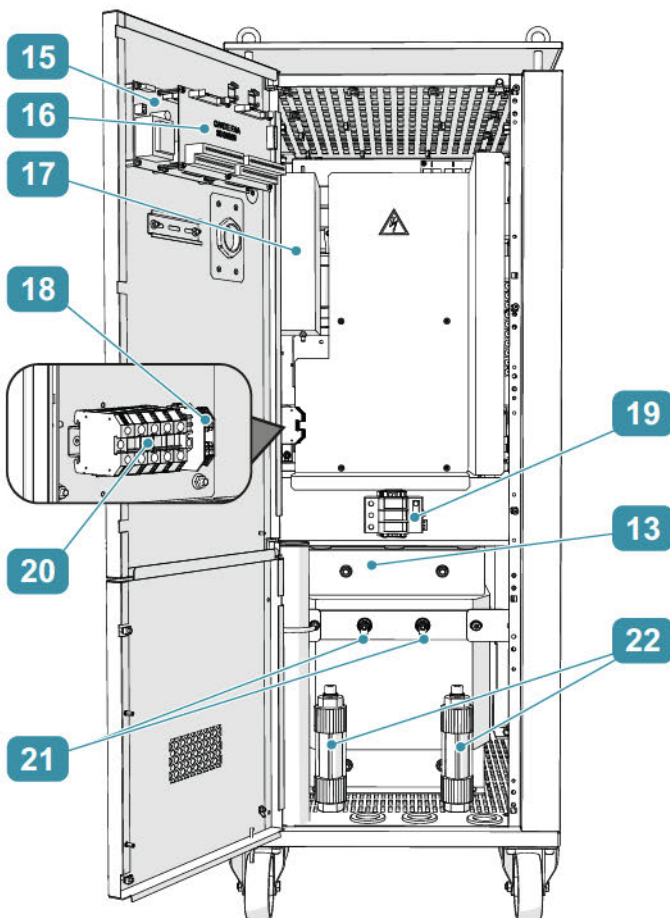
● Parts accessible from the rear side

- 15) electronic interface board (INTERFACE)
- 16) expansion electronic board for multi-wire remote control (MWI REMOTE)
- 17) EMC filter (FL1)
- 18) interlock terminals (S1-S2)
- 19) input discharger ID-M (Input Discharger with Monitoring) - optional
- 20) main power supply terminal block (X1)
- 21) series circuit connection (HV1, HV2)
- 22) series circuit dischargers (OD1, OD2)



The device could be equipped with a cut-out disconnecter switch (optional) of a different type, with specific positioning depending on the device configuration (for more information see document ES-MT-0113).

- 23) SIMALT4 cutout device with integrated HV1-HV2 connection points for the series circuit cables
- 24) SCC cutout device
- 25) SEB cutout device



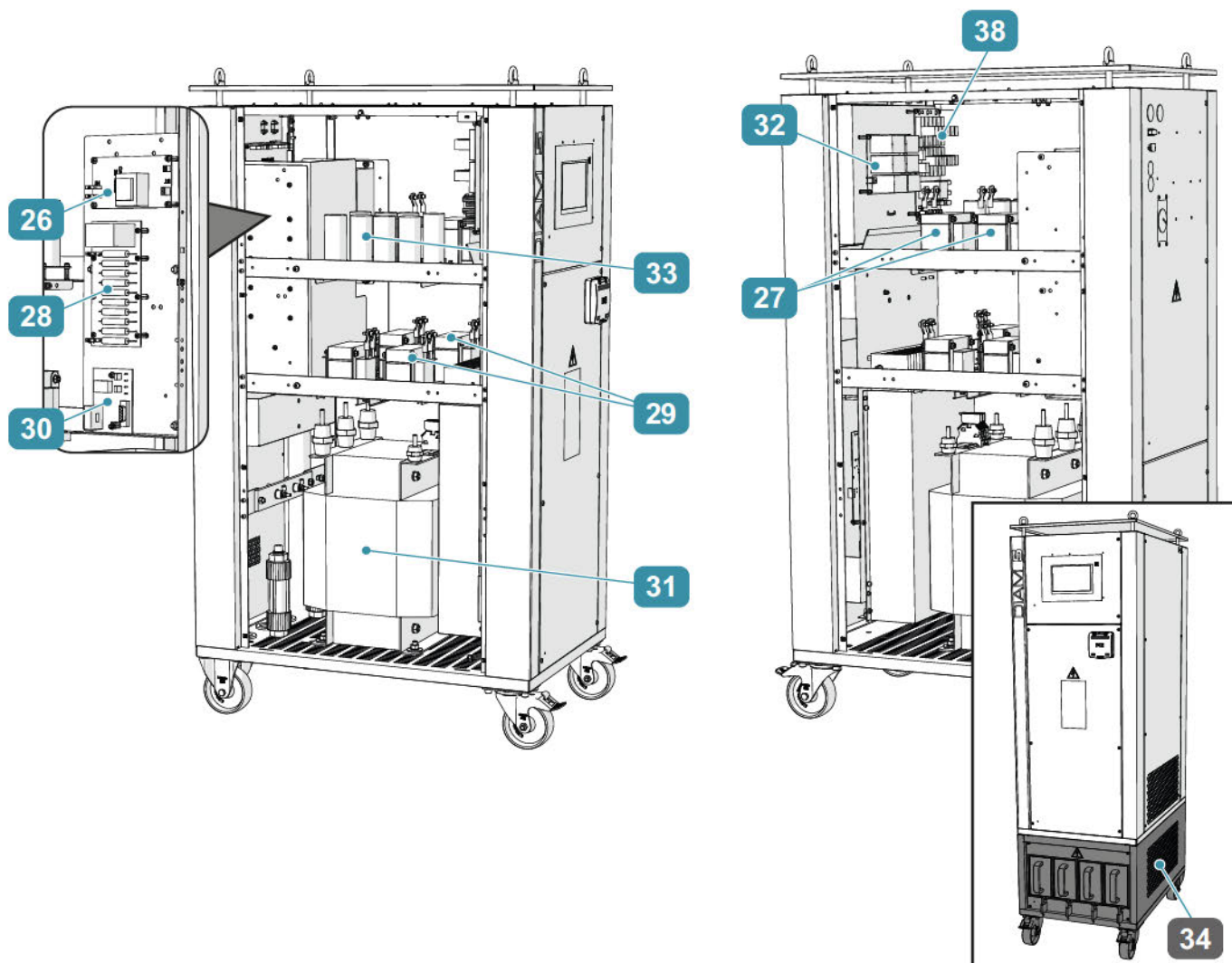
- Parts accessible only by removing fixed side guards

- 26) electronic board for earth fault detecting device (EFD CAN) - optional
- 27) DC inductors for LC filter (L1A, L1B)
- 28) electronic board for earth fault detecting device (EFD INJ) - optional
- 29) output filter inductances (L3A, L3B)
- 30) current measurement electronic board (MEAs)
- 31) power transformer (T1)
- 32) output filter (F426)
- 33) LC filter capacitor board LC (F408-1, F408-2)
- 38) Precharge Board F407

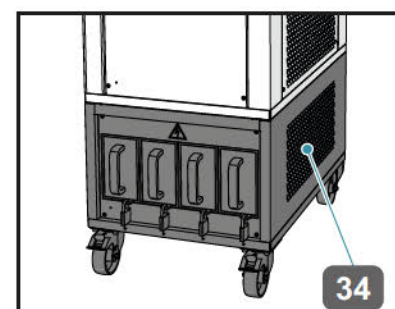
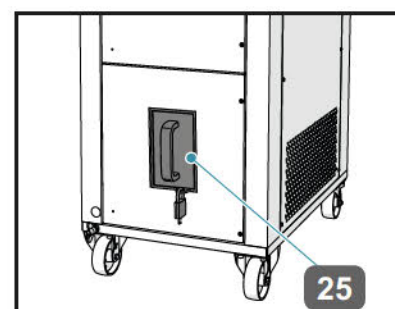
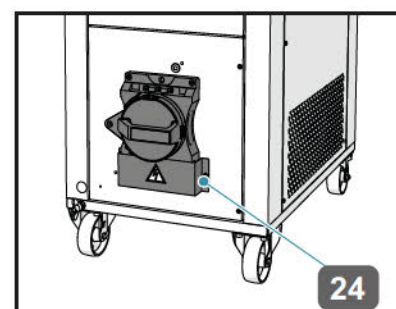
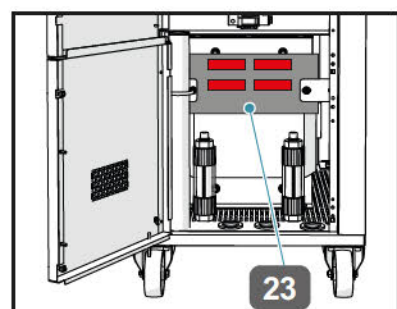
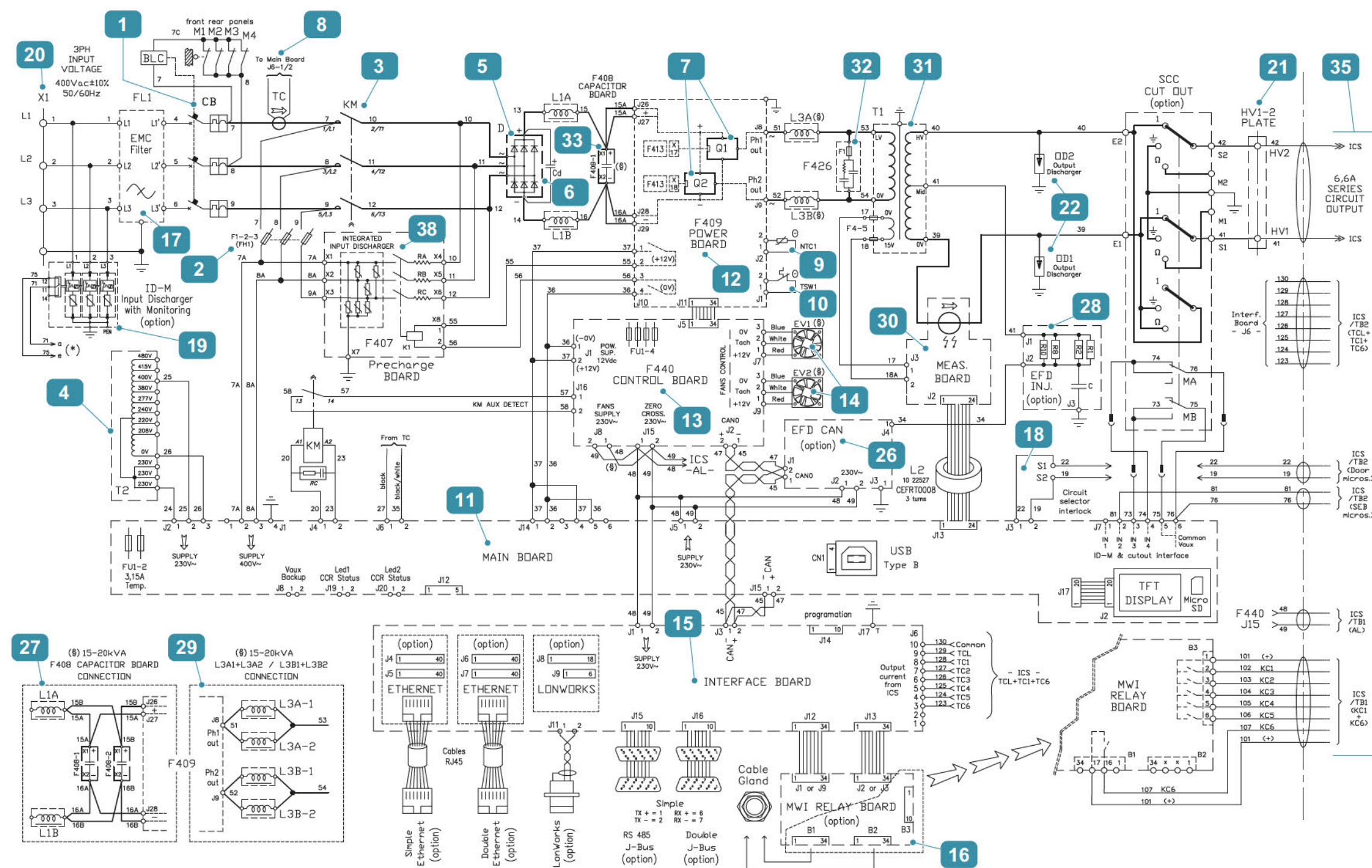


The device could be equipped with an ICS Integrated Circuit Selector (optional - for more information see document ES-DP-0007).

- 34) integrated circuit selector (ICS) with Cut-out SEB disconnectors



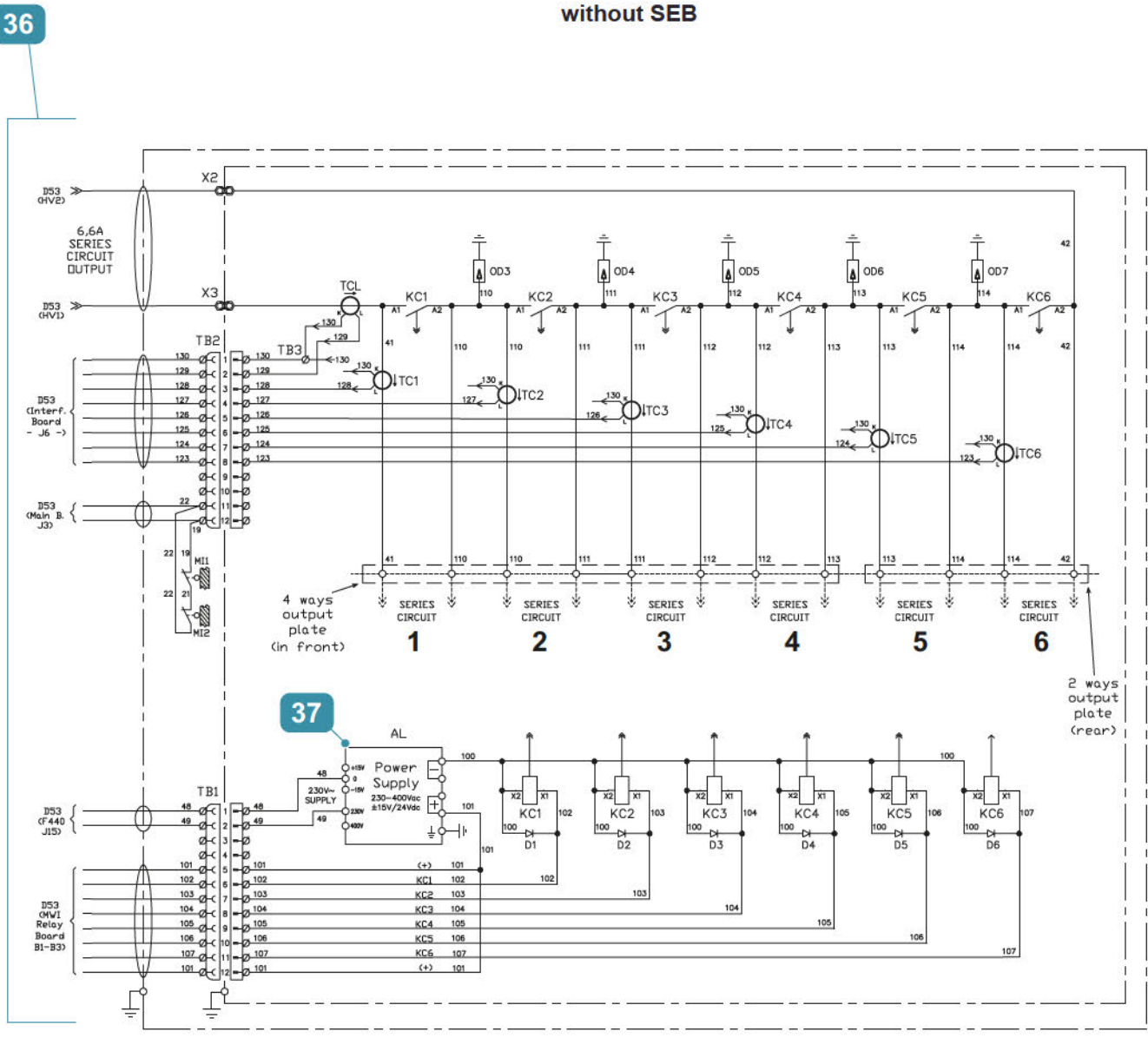
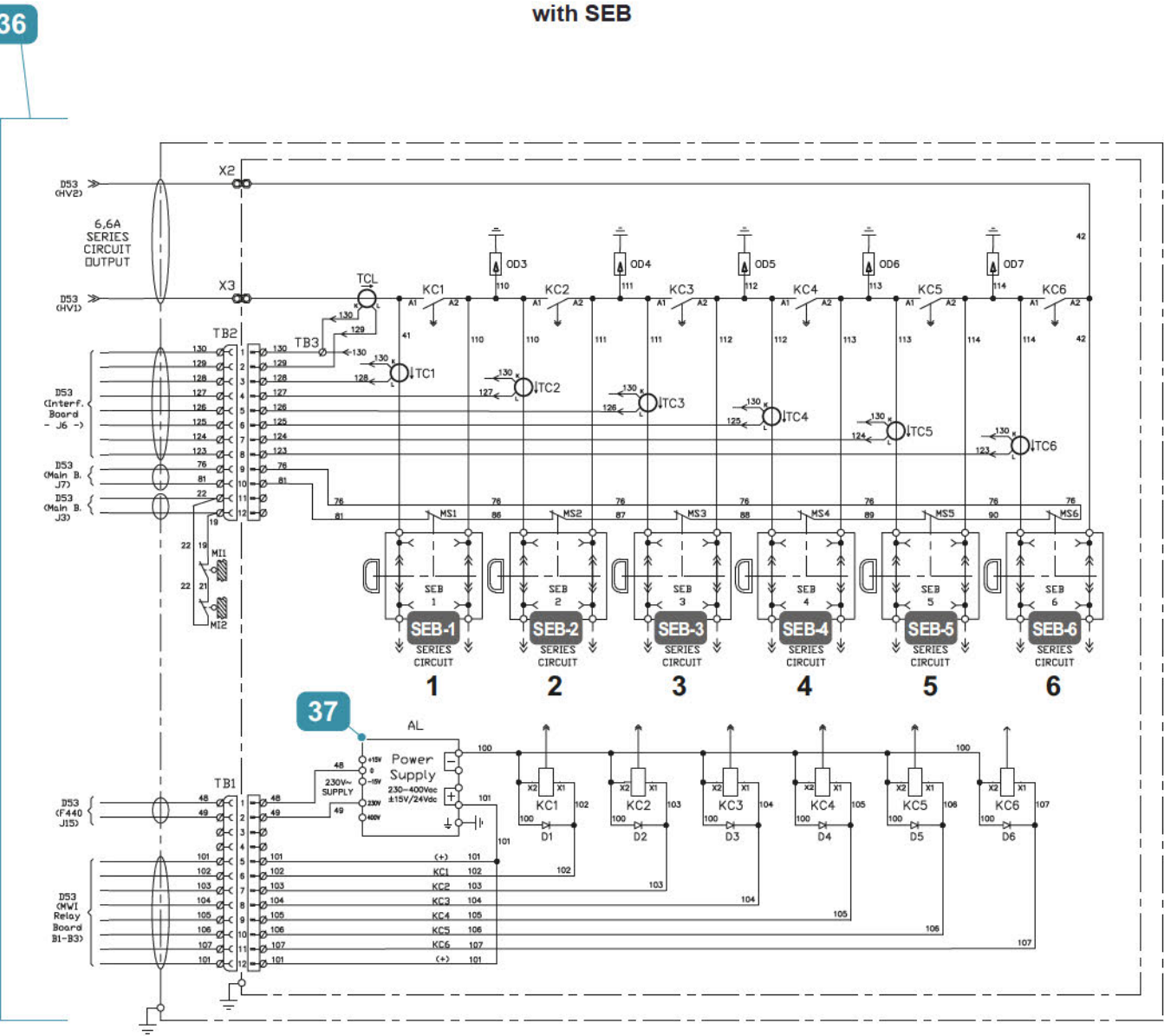
3.2 CCR wiring diagram



(*) connections made only if the option is installed

(§) EV1, EV2, J7-J8-J9 (F440), F408-2, double L3A-L3B are only mounted on 15 and 20 kVA models

3.3 ICS wiring diagram (optional)



36) connections to CCR
37) power supply

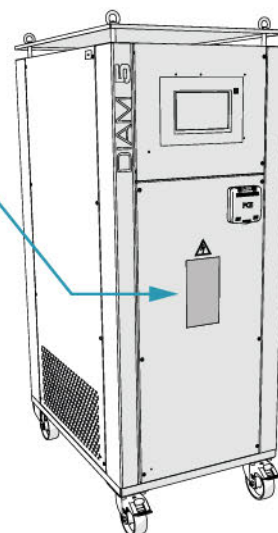
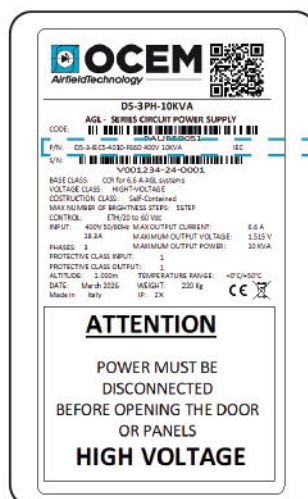
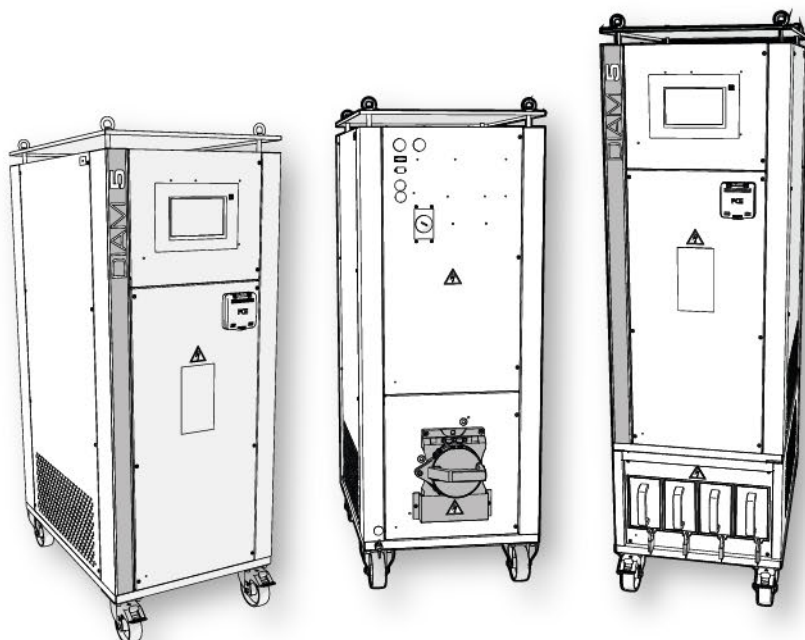
ICS with SEB type disconnecter with 2 up to max. 6 ways.

3.4 Spare Parts



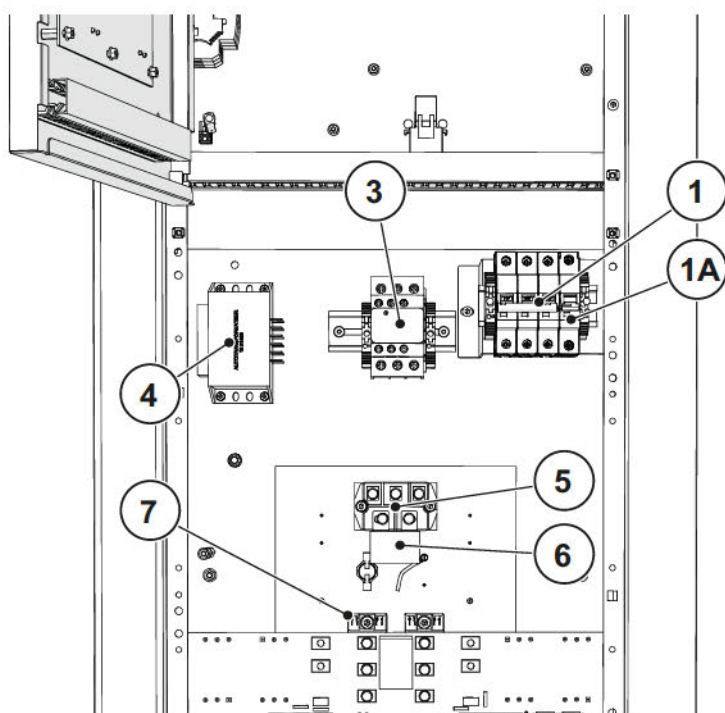
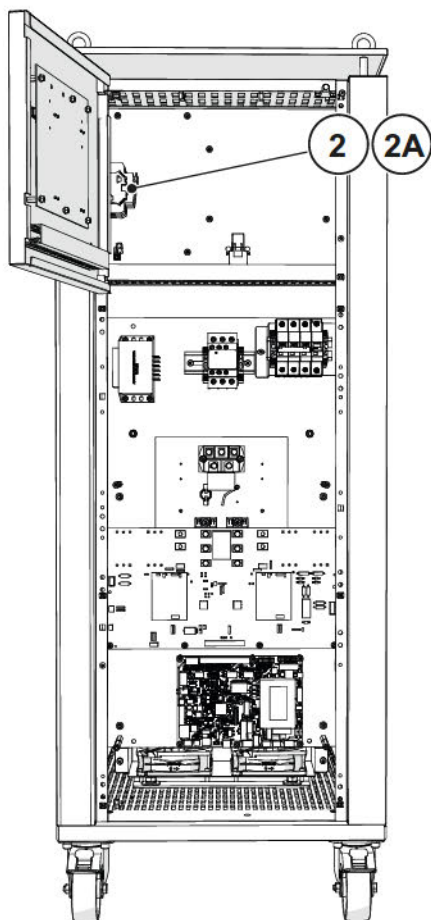
Always check the version of the device you have and any options/accessories present.

	Constant current regulator DIAM D5-3
A	Front segregation
B	Rear segregation
C	Internal segregation

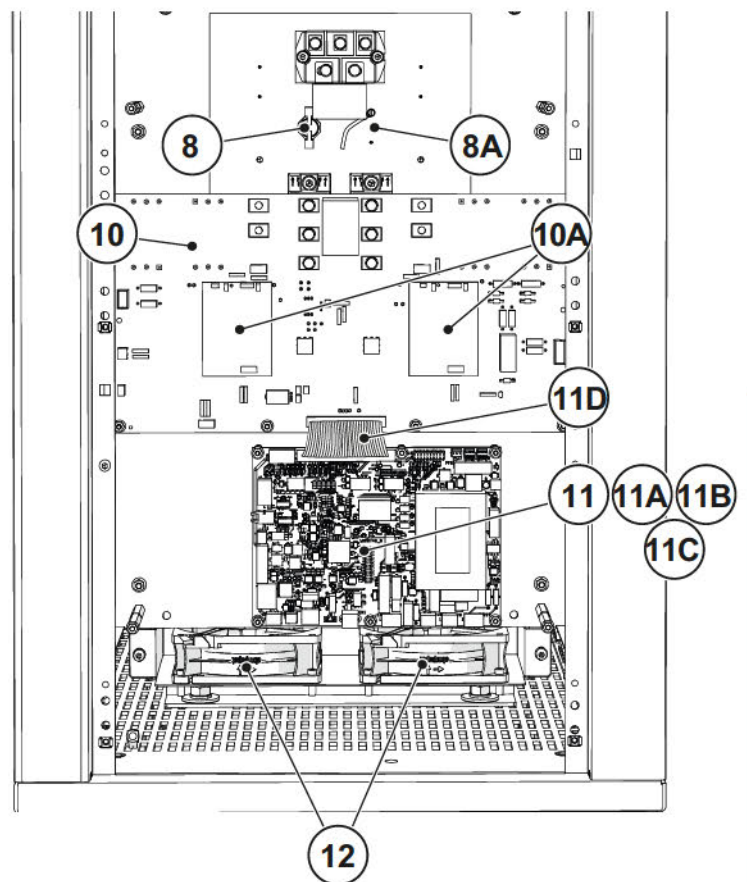
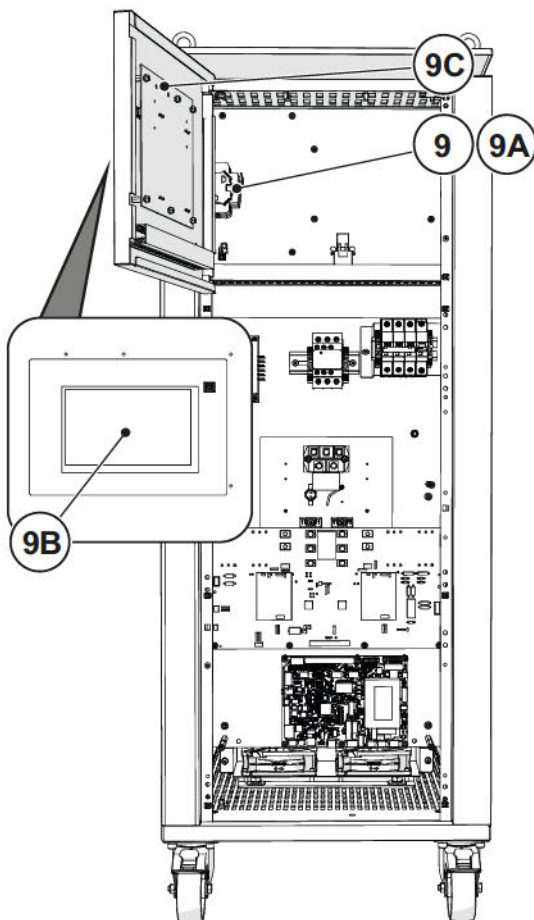


3.4.1 Front segregation

Pos.	Description	Product Code	Code Item
1	Main circuit breaker CB	3 - - 02 - -	RIOCC0006
		3 - - 05 - -	RIOCC0007
		3 - - 07 - -	
		3 - - 10 - -	
		3 - - 15 - -	RIOCC0008
		3 - - 20 - -	
1A	Current injection coil BLC	always valid (D53)	RIOCC0085
2	Three-pole auxiliary fuse holder (FH1)	always valid (D53)	RIOCC0051
2A	Fuses 10.3x38 4A aM (F1, F2, F3)	always valid (D53)	RIOCC0050
3	Main contactor (KM)	3 - - 02 - -	RIOCC0009
		3 - - 05 - -	
		3 - - 07 - -	
		3 - - 10 - -	RIOCC0010
		3 - - 15 - -	RIOCC0011
		3 - - 20 - -	
4	Auxiliary autotransformer (T2)	always valid (D51/D52/D53)	717.6100
5	3-phase rectifier bridge (D)	always valid (D53)	RIOCC0013
6	Condenser for rectifier bridge (Cd)	always valid (D53)	RIOCC0014
7	IGBT driver cable (F409-F413)	always valid (D53)	RIOCC0081

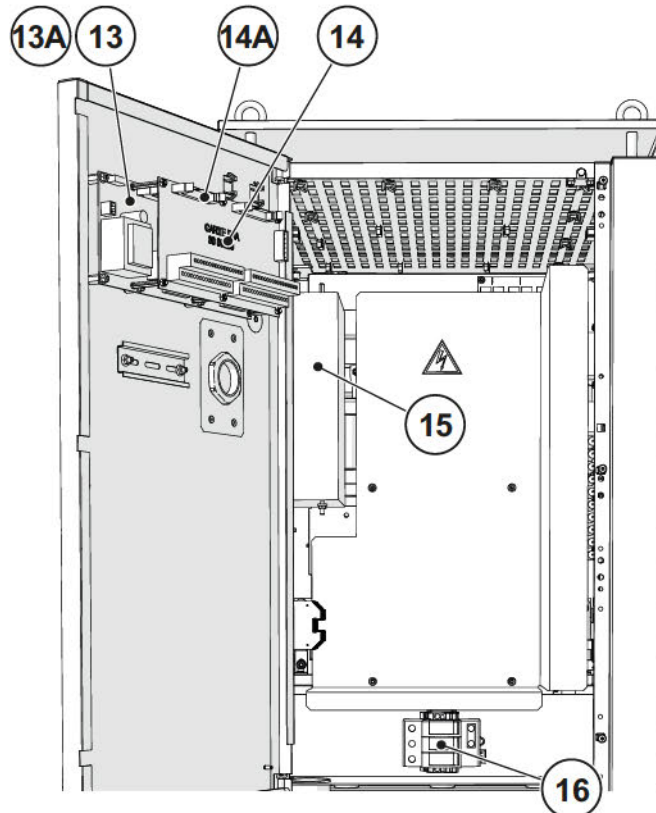
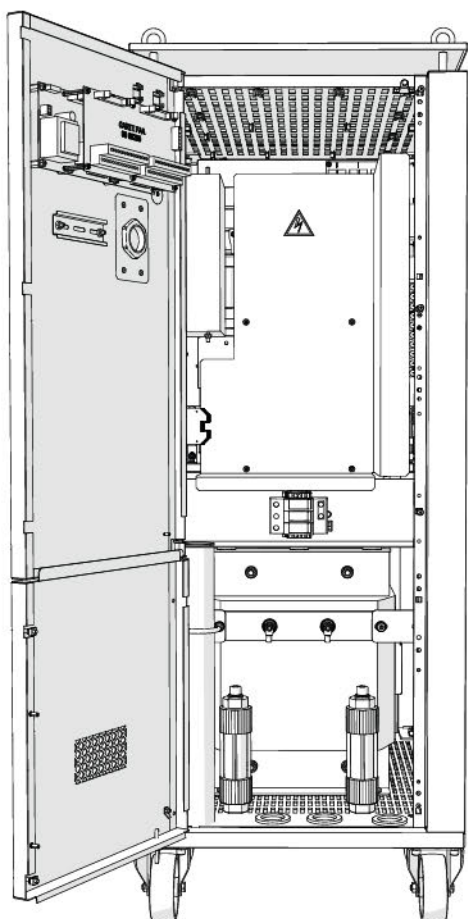


8	Thermo-switch (TSW1)	always valid (D51/D52/D53)	RIOCC0030
8A	Thermistor (NTC1)	always valid (D51/D52/D53)	RIOCC0029
9	Main electronic board (MAIN)	always valid (D51/D52/D53)	RIOCC0054
9A	Protective fuses (FU1 and FU2)	always valid (D51/D52/D53)	RIOCC0055
9B	Display TFT	always valid (D51/D52/D53)	RIOCC0056
9C	20p flat cable between Main board and Display board	always valid (D51/D52/D53)	RIOCC0080
10	Power electronic board (F409)	3 - - 02 - -	RIOCC0022
		3 - - 05 - -	RIOCC0023
		3 - - 07 - -	RIOCC0024
		3 - - 10 - -	RIOCC0025
		3 - - 15 - -	RIOCC0026
		3 - - 20 - -	RIOCC0027
10A	Driver electronic board (F413)	always valid (D51/D52/D53)	RIOCC0028
11	Control electronic board (F440)	always valid (D53)	RIOCC0075
11A	Protective fuses (FU1)	always valid (D53)	RIOCC0058
11B	Protective fuses (FU2 and FU4)	always valid (D53)	RIOCC0059
11C	Protective fuses (FU3)	always valid (D53)	RIOCC0055
11D	34p flat cable between F409 board and F440 board	always valid (D51/D52/D53)	RIOCC0079
12	Electrical fan (EV1, EV2)	3 - - 15 - -	RIOCC0060
		3 - - 20 - -	

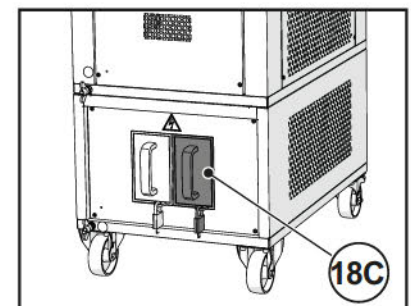
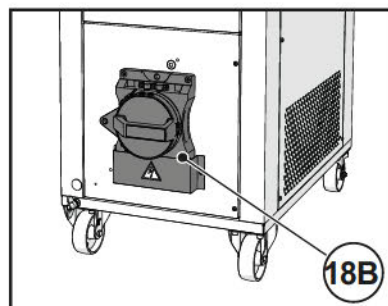
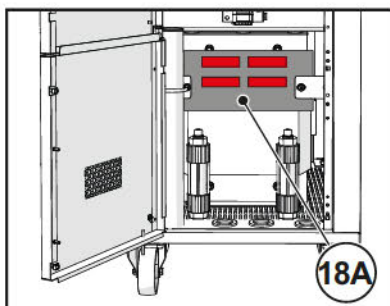
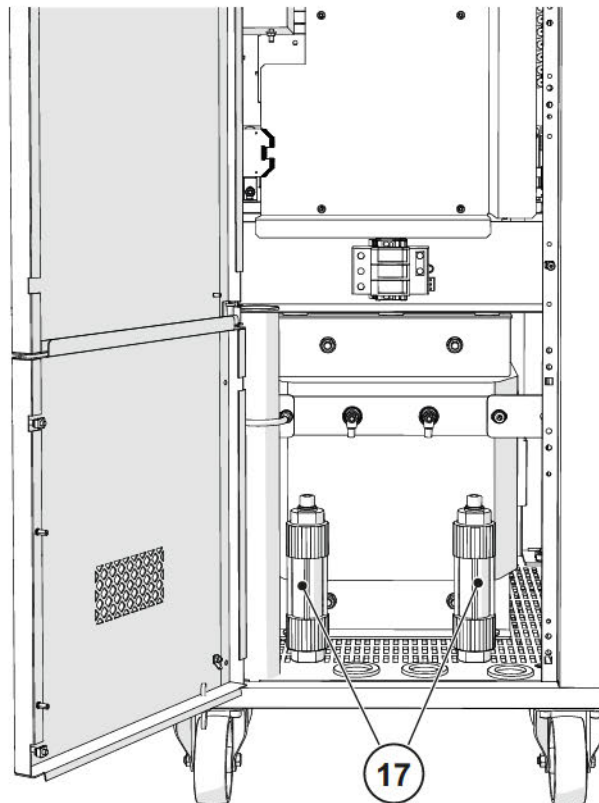


3.4.2 Rear segregation

Pos.	Description	Product Code	Code Item
13	Interface board (INTERFACE) 1xRS485	- - - 1 -	717.6123
	Interface board (INTERFACE) 1xETH	- - - 4 -	RIOCC0061
	Interface board (INTERFACE) 2xETH	- - - 6 -	RIOCC0062
	Interface board (INTERFACE) 1xLONW	- - - 3 -	RIOCC0063
	Interface board (INTERFACE) 1xLONW + 1xETH	- - - 8 -	RIOCC0064
13A	Interface expansion board (1x4-20mA)	-AEN - - 1 -	RIOCC0070
14	Expansion board for multi-wire interface (MWI)	- - -E -	RIAU00040
		- - -F -	
		- - -I -	
14A	34p flat cable between MWI board and Interface board	always valid (D51/D52/D53)	RIOCC0082
15	EMC filter (FL1)	3- - 02 - -	RIOCC0001
		3- - 05 - -	RIOCC0002
		3- - 07 - -	RIOCC0003
		3- - 10 - -	RIOCC0004
		3- - 15 - -	RIOCC0005
16	Input discharger ID-M (Input Discharger with Monitoring)	3- - 20 - -	RIOCC0005
		always valid (D53)	RIOCC0065

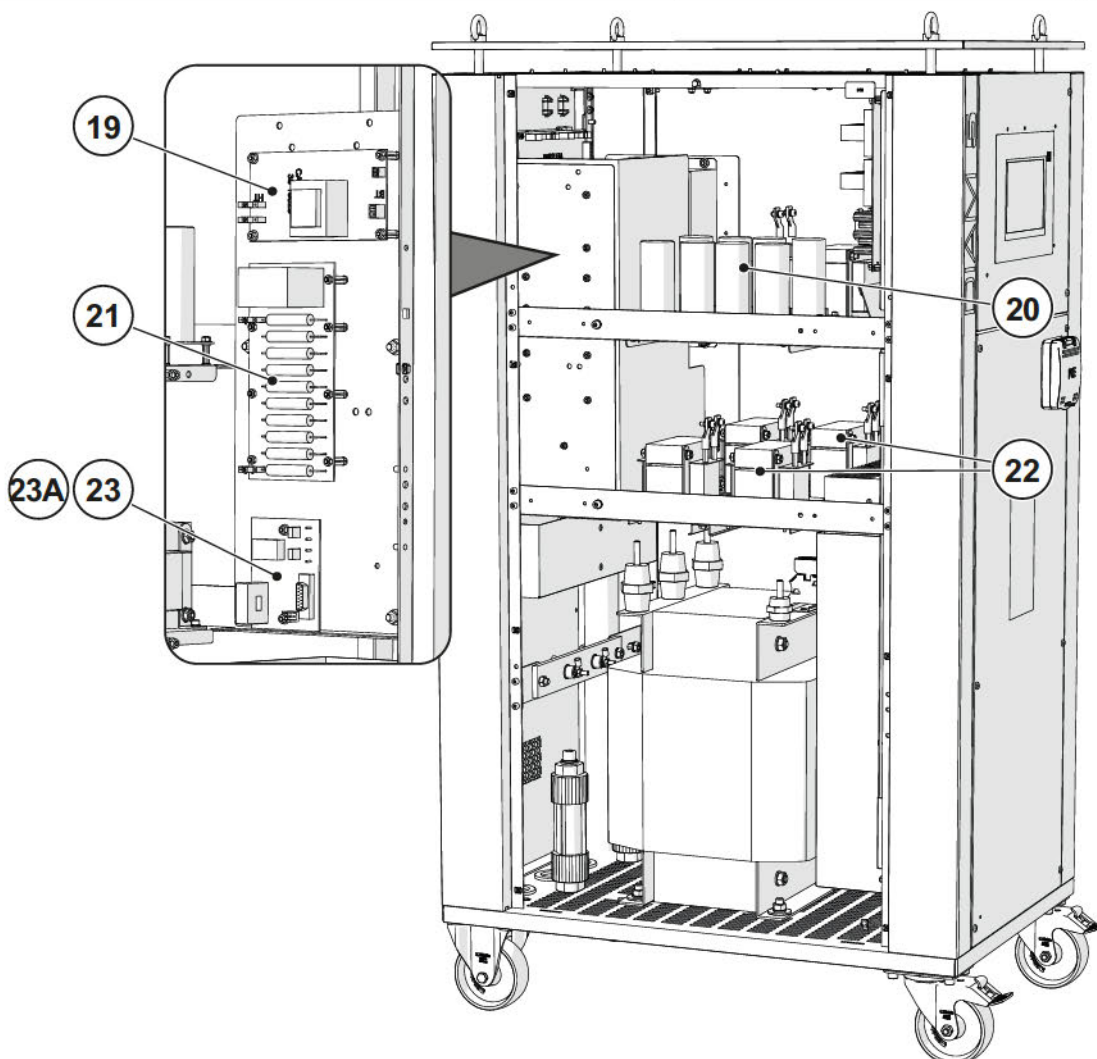


Pos.	Description	Product Code	Code Item
17	Series circuit dischargers (OD1-OD2)	3 - - 02 - - -	RIOCC0046
		3 - - 05 - - -	
		3 - - 07 - - -	
		3 - - 10 - - -	
		3 - - 15 - - -	
		3 - - 20 - - -	RIOCC0047
18A	SIMALT4 cutout device	- - - A -	RIOCC0066
18B	SCC cutout device	- - - C -	RIOCC0067
18C	SEB cutout device (red handle)	- - - D -	RIOCC0068
	SEB cutout device (green handle)		RIOCC0069
	SEB cutout device (microswitch)		RIAU00067

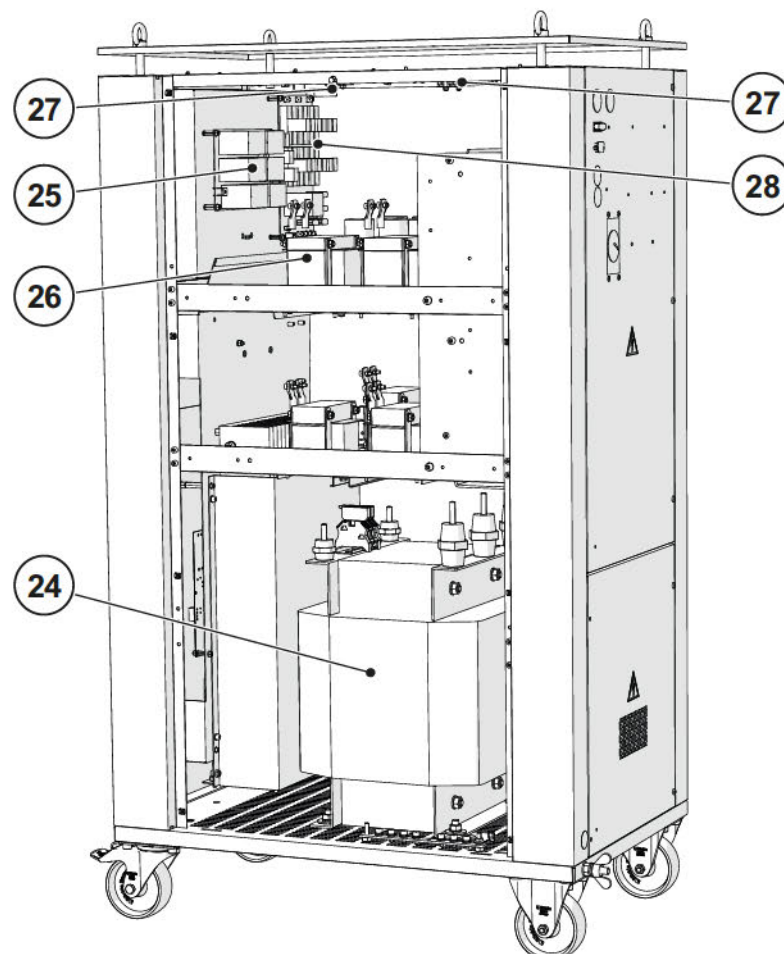


3.4.3 Rear segregation

Pos.	Description	Product Code	Code Item
19	Electronic board for earth fault detecting device (EFD CAN)	always valid (D51/D52/D53)	717.6110
20	Filter condenser board LC (F408-1) 1x	3- - - 02 - -	RIOCC0021
		3- - - 05 - -	
		3- - - 07 - -	
		3- - - 10 - -	
20	Filter condenser board LC (F408-1, F408-2) 2x	3- - - 15 - -	
		3- - - 20 - -	
21	Electronic board for earth fault detecting device (EFD INJ)	always valid (D51/D52/D53)	717.6111
22	Inductances output filter (L3A, L3B)	3- - - 02 - -	RIOCC0031
		3- - - 05 - -	RIOCC0032
		3- - - 07 - -	RIOCC0033
		3- - - 10 - -	RIOCC0034
		3- - - 15 - -	RIOCC0035
		3- - - 20 - -	RIOCC0036
23	Measures electronic board (MEAS)	always valid (D51/D52/D53)	717.6122
23A	24p flat cable between MEAS board and MAIN board	always valid (D51/D52/D53)	RIOCC0078



Pos.	Description	Product Code	Code Item
24	Power transformer (T1)	3- - 02 - -	RIOCC0040
		3- - 05 - -	RIOCC0041
		3- - 07 - -	RIOCC0042
		3- - 10 - -	RIOCC0043
		3- - 15 - -	RIOCC0044
		3- - 20 - -	RIOCC0045
25	Output filter (F426)	3- - 02 - -	RIOCC0037
		3- - 05 - -	
		3- - 07 - -	RIOCC0038
		3- - 10 - -	
		3- - 15 - -	RIOCC0039
26	Inductances DC for filter LC (L1A, L1B)	3- - 20 - -	
		3- - 02 - -	RIOCC0015
		3- - 05 - -	RIOCC0016
		3- - 07 - -	RIOCC0017
		3- - 10 - -	RIOCC0018
		3- - 15 - -	RIOCC0019
27	Door Microswitch M1-M2-M3-M4) + (MI1-MI2 à ICS)	3- - 20 - -	RIOCC0020
		always valid (D53)	RIOCC0048
28	Precharge Board F407	2.5-10kVA	RIOCC0052
		15-20kVA	RIOCC0053



Contact us

OCEM AT



+39 051 66 56 611



info@ocem.com

AUGIER



+33 4 920 86200



home@augier.com