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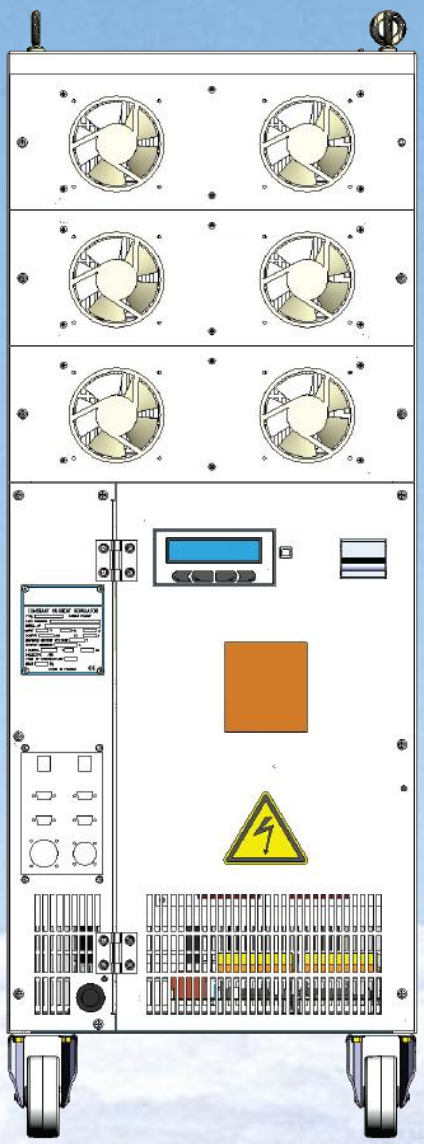
Installation & maintenance

DIAM4200 2,5-20kVA

Sinusoidal Single-phase Constant Current Regulator



Compliance with standards:
ICAO Aerodrom design manual, part 5
IEC 61822 et 61821
FAA (AC 150/5345-10F Spec.L828/L829)
AENA (PPT2 ed4(2004)

Document available at http://www.augier.com/doc/6021642.pdf

RECORD OF CHANGES

Rev.	*Pages*	*Description*	*From S/N*	*By*	*App.*	*Date*
1.0		First issue		PS	RG-ED	01/01/2015
1.1	70	Nomenclature corrections		RG	RG	19/05/2016
1.2		Corrections		RG	RG	07/07/2016
1.3	64	Fuse modification		ED	RG	04/11/2016
1.4	2	Warranty modification		RG	RG	15/05/2017
1.5		Add 20KVA power		ED	RG	17/11/2017
1.6		Diagrams and schematics update		RG	RG	20/02/2018
1.7	10, and 68	USB note, and High T° warning		RG	RG	08/03/2018
1.8		New logo		RG	RG	23/05/2018
1.9		Add 2,5KVA nominal power CCR Adding multi terminal inductance Remove the remote control and cut out pages Notice 6021732 : Remote control notice Notice 6021752 : Cut out notice		ED	RG	31/01/2019

WARRANTIES

Guarantee

AUGIER's goods has been manufactured and will perform in accordance with applicable specifications, and any defect in design, materials or workmanship which may occur during proper and normal use during a period of 1 year from date of installation or 2 years from date of shipment will be corrected by repair or replacement by the manufacturers f.o.b factory.

The guarantee covers repair, modification or replacement of parts or products recognised to be defective, in the shortest possible time, at AUGIER's cost, provided always that the goods have been properly handled and stored prior installation, properly installed and properly operated after installation.

Unless otherwise specifically laid down in contract, the guarantee does not cover:

- Costs of consignment to factory and re-consignment of defective goods to Buyer
- Travelling & sojourn expenses of AUGIER's personnel if goods have to be repaired on site; assembly and dismantling of any goods other than those recognised to be defective; expenses incurred for waiting times by AUGIER's personnel on site for reasons independent of their will;
- Unjustified travel expenses.

Guarantee shall not apply in the following cases:

- Defects in materials supplied by Buyer or from any designs imposed by them;
- Repairs or replacements due to normal wear and tear, or damages or accidents.
- Repairs or replacements due to damages or accidents resulting from negligence or lack of due care, inadequate supervision or maintenance, or erroneous use of the equipment or software;
- Any other causes for which AUGIER shall not be held responsible, e.g. resulting from an case of Force Majeure.
- When Buyer has replaced AUGIER's parts with other parts.

Buyer must inform AUGIER in writing and without delay of any defects in goods, giving all necessary information and detailed description of how equipment has been utilised, together with purchase date. Buyer undertakes not to have repairs carried out by third parties; any repairs carried out without AUGIER's express prior agreement shall invalidate the guarantee.

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This manual could contain technical or typographical errors. AUGIER reserves the right to make changes and revise this manual from time to time without obligation to notify any person or organisation of such changes or revision.
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No guarantee is made that the use of the products, equipment, processes or information to which this manual refers will not infringe any third party's patent or rights. Information given does not release the buyer from making their own tests.

SAFETY

Safety precautions

This equipment is normally used or connected to circuits that may employ dangerous and lethal voltages. Extreme caution should be exercised by operating or maintenance people when working on or with this equipment.
See IEC 61820 & 61821 standard (CCR type IEC), or FAA AC150/5340-26 advisory circular (CCR type FAA), concerning safety rules and precautions. While practical safety precautions have been incorporated in this equipment, the following rules must be strictly observed :

- **KEEP AWAY FROM LIVE CIRCUITS** :
  Operating and maintenance people must at all time observe all safety regulations. Do not change components nor perform maintenance inside equipment with power ON or the lighting loop energised.
- **RESUSCITATION** :
  Operating and maintenance personnel should familiarise and keep themselves trained with resuscitation techniques found in widely published manuals about first aid instructions.
- **ELECTROSTATIC DISCHARGE (ESD)** :
  Electronic sub-assemblies and boards should be touched only for unavoidable operation (replacement, for example). Before to operate, maintenance people must first of all eliminate unwanted electronic charges, discharging his own body while touching a conductive earthed object or part. Electronic boards and components as power semiconductors must be stored and carried an conductive packing.
- **DESTRUCTION** :
  In case of dismantling, scrapping or placing out of service, the user must follow all the required precautions for component, materials or equipment elimination, according the local rules.

EEC DIRECTIVES

CE

This equipment complies with the requirements of EC directives :

- 89/336/EEC, 92/31/EEC and 93/68/EEC with regard of Electromagnetic Compatibility
- 73/23/EEC with regard of Low Voltage Equipment

TABLE OF CONTENTS

ABBREVIATIONS

Abbreviation	Definition
A	Ampere
AC	Alternating Current
B	Brightness
CCR	Constant Current Regulator
DC	Direct Current
EFD	Earth Fault Detector
HV	High Voltage
IT	Injection Transformer
LFD	Lamp Fault Detector
LV	Low Voltage
OO	Out of order
V	Volt
VA	Volt-Ampere

I DESCRIPTION

I.1 OVERVIEW

DIAM4200 series CCRs are optimized static devices, controlled IGBT bridges, designed to maintain a constant, pre-displayed and adjustable output current independently of load or power supply fluctuations. These devices are specifically designed for visual aids supply, and particularly LED lights. They meet all international standards. Control electronics of the DIAM4200 is characterized by an innovating architecture built around an electronic board using a powerful DSP processor, associated with an internal CAN network connecting the various parts.

An USB front socket allows the connection of a portable computer for parameter setting, this setting being possible without live voltage. However, this link is not a hardened industrial link, such as the JBus, Ethernet or Interbus communication ports of the CCR: all precautions must be taken not to introduce electrostatic or electrical disturbances, which could disrupt the operation of the CCR, (using ESD protections).

The remote control interface of the CCR supports all the series networks, with or without redundancy, as well as universal multiwire interfaces. DIAM4200 series CCRs are low costs fully static devices controlled by high performance IGBT switches. They are designed to maintain a constant, pre-displayed and adjustable output current independently of the load and power supply fluctuations.

These devices are specifically designed for airfield lighting on runways, taxiways, aprons. They meet both national and international standards.

In order to do this, they use an adapted triggering and regulation mechanism that is not affected by external interference and does not emit measurable interference in the Aviation Band between 100 and 400 MHz.

The output current remains constant with an accuracy of 100mA for mains voltage fluctuations of –5/+10% (+/-10% for IEC type). At the rated load and the rated or higher voltage, accuracy of regulation is maintained for all load between 0 and 100%, and for up to 30% of transformers with open secondary.

Here are some of its advantages:

- **Sinusoidal wave shape:**
  Thanks to its original power architecture, the CCR does not introduce any distortion or degradation of the power-factor, which remains that of the load. The harmonic content rejected on the mains network is thus particularly low, for all the range of output current and for any load. In particular, no tapping or adaptation at load is necessary. The digital processing capability of the DSP processor allows to adapt its regulation to any type of load (such as for example : signs). Like all the DIAM4XXX series regulators, an automatic calibration avoids any analogical adjustments, during maintenance. In the same way, indications of alarm, state of the CCR and all useful parameters are clearly displayed, through a simple and friendly HMI*.

- **Maintenance optimization:**
  Its internal CAN* architecture has been designed to minimize the number and the variety of the spare parts, and to allow the best flexibility of possible modification of options. Software tools are proposed in order to carry out fast parameter settings or diagnoses, without removing any parts.

- **Standards:**
  - ICAO: Airport design manual, part 5
  - CENELEC: prENV 50231
  - FAA: AC150/5345-10 L828 & L829
  - AENA: PPT02-05/13 (2013)
  - IEC: 61822 (CCRs), 61821 (Maintenance)

I.2 MECHANICAL DESCRIPTION

I.2.1 DESCRIPTION

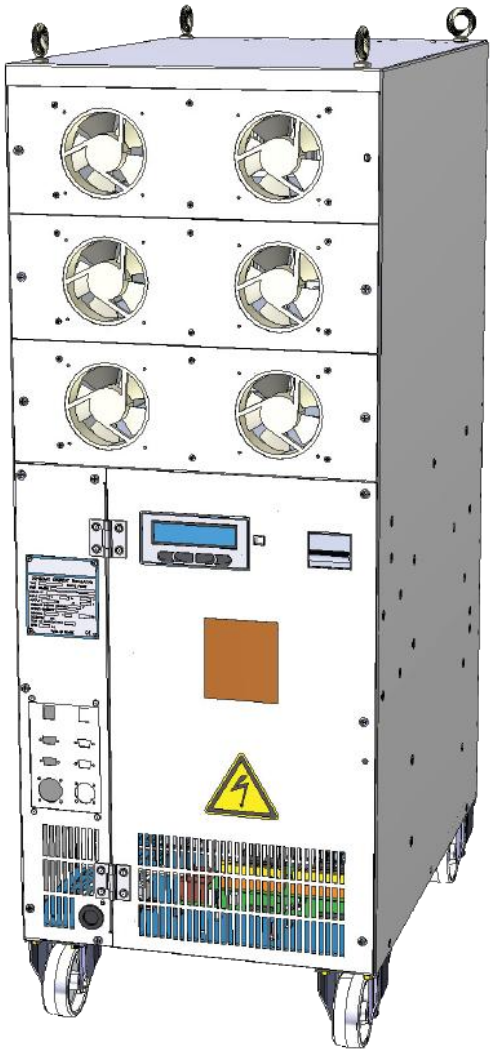
Each CCR is housed in a cabinet fitted with lifting rings.

The frame has three distinct parts: a low voltage converter stage, a low voltage compartment and a high voltage compartment.

- The **Low voltage converter stage** of the CCR consist of one to three power modules, situated in the upper section of the regulator.

- The **Low voltage unit** contains all the components connected to the power supply with, for example, the main switch, the LV protections, the electronics control motherboard, the LV fuses and connection terminals. It is located in the lower front part of the CCR.

- The **High voltage unit,** situated at the back of the CCR, contains all the components connected to the output loop such as the power transformer, the lightning arrestors, the CI-MALT (optional) and the HV part of the insulation fault detection unit. The load regulating plate and the load loop connections are accessible from the front of the device.



All these components are easily accessible from the front, the top or the back of the cabinet.

I.2.2 GENERAL MECHANICAL FEATURES

Regulators are contained in the same cabinet for all powers and input voltage. Taller cabinets could be available when inside additional equipment is requested by customer, as Circuit selector. Both cabinets are provided with hoisting eye rings, with or without casters, and can be located cuddled up to each other.

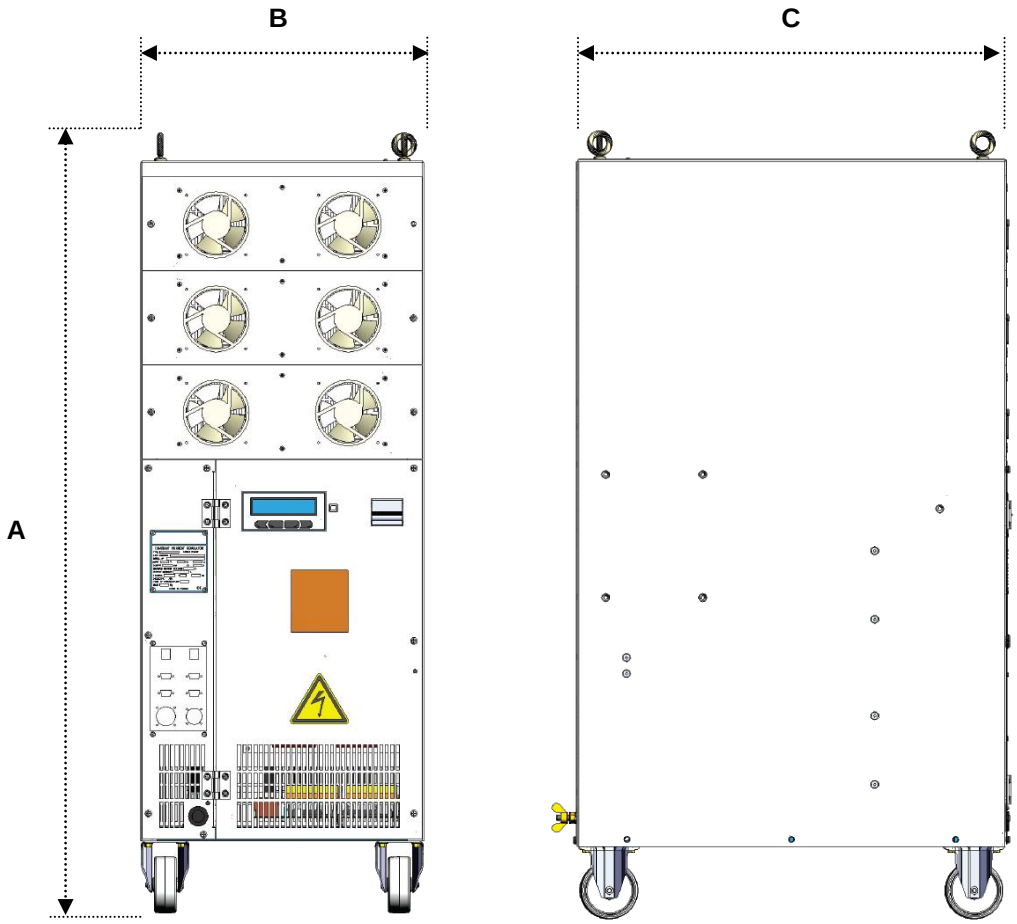
Standard cabinet :	2.5 to 15KVA:	500mm Wide x 750mm Deep x 1380mm High
	20KVA:	500mm Wide x 750mm Deep x 1575mm High

- Protection Index for the Casing: IP 21. (Contact us for other Protection Indices)
- Distances inter-axes (if casters option) : 413 x 640 mm
- Usage: Ambient temperature between –20°C to +55°C (IEC type), with maximum relative humidity of 95%. Forced air cooling.

I.2.3 STORAGE CONDITIONS

The components are designed to be stored in a dry, airy location, sheltered from rain, water discharges and chemical agents. We must be consulted if the components are to be stored outside, or in an ambient temperature out of the range -40°C/+55°C.

I.2.4 DIMENSIONS



	A (mm)	*B (mm)*	*C (mm)*
2.5 to 15 kVA	1375	500	750
20KVA	1575	500	750

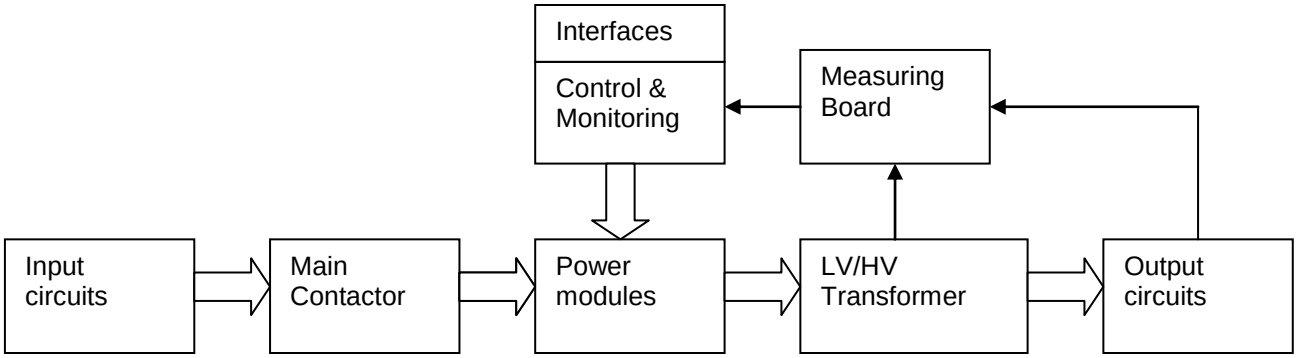
Load	*5kVA*	*7.5kVA*	*10kVA*	*15kVA*	*20kVA*
Weight	127 kg	185 kg	195 kg	215 kg	315 kg

I.3 ELECTRICAL DESCRIPTION

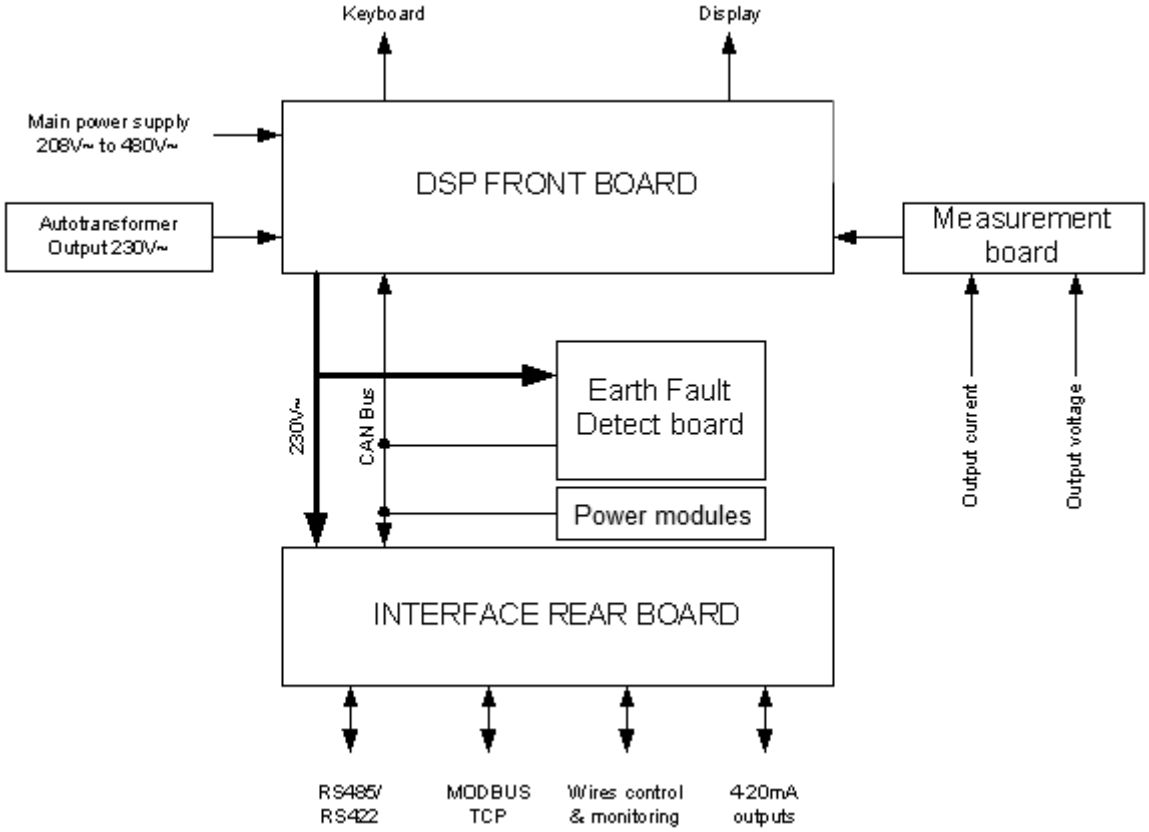
I.3.1 BLOCK DIAGRAMS

ⓘ See paragraph I.5 for the device operating description

I.3.1.1 Overview:



I.3.1.2 Electronics :



I.3.2 GENERAL CIRCUIT DIAGRAMS

ⓘ **See** APPENDIX A: DIAGRAMS

I.3.3 GENERAL ELECTRICAL FEATURES

- **Power supply voltage**:
  Single phase; 230Vac, 400Vac +10/-10%, 45 to 66 Hz

- **Maximum rated current**: 6.6 A (other values available).

- **Number of Brightness Levels:** maximum 8, adjustable.

- **Heating Brightness ("Black current"):**
  The CCR can produce "heating" level brightness at low current (1.8A preferred value), which is used to remove condensation from the interior of the lamp lenses without lighting up their bulb. The symbol for local setting is 'B0'.

- **Remote Control:** By voltage from 20V to 60V DC positive or negative, or dry contact, or 120Vac, serial network, TCP/IP network (MODBUS TCP).

- **Remote indication:**

  Relays, 120VAC , 2A max, 10µA min., and/or serial network

- **Output power:** 2.5, 5, 7.5, 10, 15, 20kVA

- **Power factor:**

  > 97% at nominal voltage and rated resistive load

- **Efficiency :** > 80% at nominal voltage and rated resistive load.

- **Output Current Regulation:**
  Better than ±100mA under the following conditions: Power supply voltage: ± 10% - Frequency: 45 to 66 Hz - Load: from 0 to 100%

- **Load adaptation**:
  The DIAM4200 CCR does not require load adaptation: the output voltage is purely sinusoidal at every load and current step.

- **Protection:**
  The electronic circuitry is protected against fluctuations by the use of a Hall effect sensor for measuring current. Electronic board manages all overcurrent, open circuit or mains under/over voltage.

- **LV Protection**:
  A set of high-power fuses (or optional circuit breaker), a set of fuses for the power supply to the auxiliaries, and "glass" fuses on the circuit boards provide LV protection.

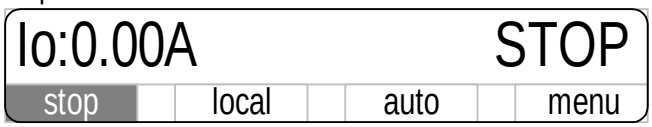
- **Lightning arrestors** :
  These regulators can be optionally provided with input and output lightning arrestors.

I.4 INSTRUCTIONS FOR USE

I.4.1 USER INTERFACE

Operating mode:

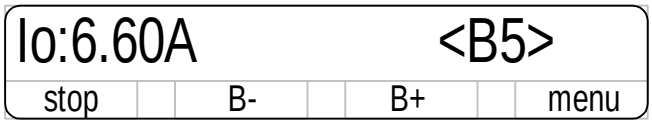
Stop mode :



Preferred information displayed: It can be changed by a long press on the “STOP” key, meanwhile the CCR is in Stop mode. The choice can be :

- Output current Io – Brightness state Bx (as seen in examples below and above)
- Output current Io – Output power Po
- Output current Io – Output voltage Uo

Local mode :

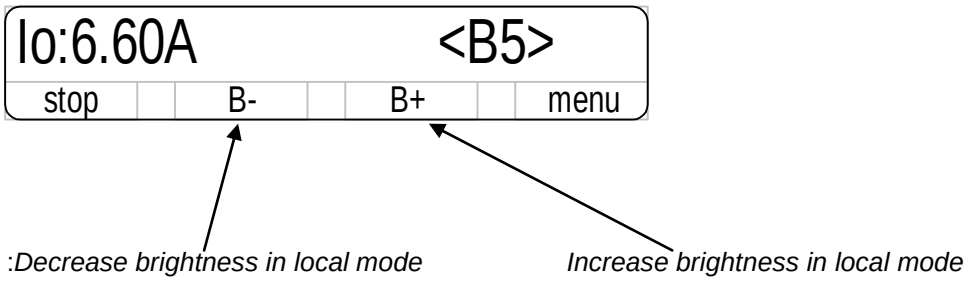


Access is given to B+ and B-, in order to increase / decrease the brightness.

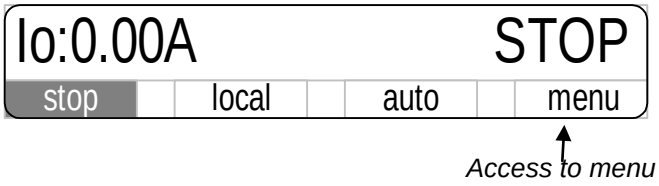
Remote control mode :

“Auto” is highlighted, in order to indicate the current state.

Brightness selection in local mode:



Menus:



Access to menu

To navigate in the menus

Alarms and Warnings:

Alarm (the CCR failed to supply the load); for example, the CCR is stopped by a loop open circuit :

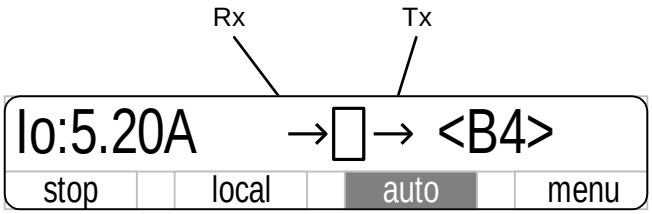
Cancel fault(s)

Warning (the CCR doesn't stop; warning is only indicative); for example the earth insulation fault level 1 is detected :

USB link:

An USB socket (type B) is located in front of the CCR, in order to connect a lap-top computer

Rx: indicator Data reception on USB connection
Tx: indicator Data transmission on USB connection



Alphanumeric display:

VFD Blue display (16 x 140 pts) :

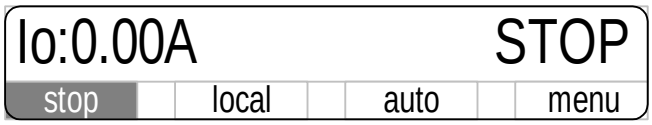
- upper line: information datas),
- lower line :key definition.

Screen saver : The brightness decreases automatically or turn off after one hour if the keyboard is not used. Turns on again instantly when a key is pressed. (Function user-definable)

I.4.2 CONTROL

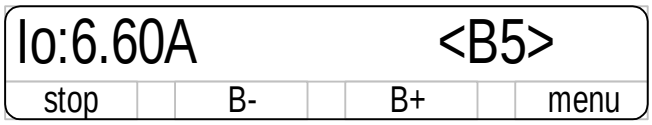
The device is controlled by mean of a 4 buttons keypad which allows to change the operating mode: “Stop” – Manual or “Local” mode – Remote or “Auto” control mode.

- **Stop mode:**



In that mode, “Stop” is highlighted. The CCR stops, whatever the current brightness orders (remote control or local selection).
Menus can then be accessed.

- **Local mode:**



In that mode appears brightness controls : The brightness is chosen by pressing buttons **B-** and **B+** (from B0 to B7 maximum, according to the number of brightness levels configured).

- **Remote control mode:**

In that mode, “Auto” is highlighted. Operation of the CCR is governed by remote control inputs on the CCR’s motherboard. If remote control commands overlap, priority is given to the first choice of brightness. The remote control is either of the multiwire type (20 to 60 DC positive or negative, or 120Vac), or the dry-contact type with internal power supply, and/or given by the mean of a serial network.

ⓘ See paragraph II.2.2 for configuring the remote control type.
ⓘ See paragraph I.5.2 for adjusting brightness values and protection levels.

I.4.3 LOCAL INFORMATION FEEDBACK

Alphanumeric display:

- The display shows the RMS current flowing in the loop and the selected brightness (preferably).

In the “**Monitoring”** menu, the following information are shown:

- Uo: RMS output voltage in Vrms
- Po: RMS output power in kVA
- Ui: Mains power supply voltage in Vrms
- Ii: Mains power current in Arms
- If option “EFD” exists: Insulation resistance of the loop with respect to earth in KOhms
- Load plate tap value from 0 to 100% (0 to 8/8 by increments of 1/8)
- If option “LFD” exists: Number of burnt lamps, and VA drop if FAA type
- The operating time (powered on and for each brightness) in Hours

Warning:

WARNING is an indicative message, which does not change regulation and supply function in connection with the load. (Except for mains warning)

If any warning have been detected, the following message(s) can be shown on the display:

- If option “EFD” exists:

  "No EFD" (interface EFD board not present or faulty)

  “No HV (500V) EFD” (no injection voltage : measurement of earth leakage cannot be done)

  “R Level EFD1” (A leakage has been detected, with a resistance value lower than the level 1).

  “R Level EFD2” (A leakage has been detected, with a resistance value lower than the level 2).

- If option “Burnt lamps” exists:

  “Level 1 Burnt lamps” (The current number of burnt lamps is greater than level 1)

  “Level 2 Burnt lamps” (The current number of burnt lamps is greater than level 2)

  “Power drop” (if FAA selected : the load was cut more than 10%, in VA)

- Mains power supply outside limits (Input voltage lower or greater than +/-10%)
- Regulation outside limits (as “error regulation” programmed values)
- "BAD Interface" message (control and monitoring board not present or faulty)

Fault:

ALARM represents a major fault of the CCR or due to an external event, which have stopped the CCR (in order to protect itself or the lighting loop).

In case of fault or damage, the display shows that the CCR stopped and one or more faults have been detected. The following message(s) are shown on the display:

- Overcurrent Level 1 (after a trial to restart, the CCR cannot contain the output current which had reach the 1st level as programmed)
- Overcurrent Level 2 (ditto, for 2nd level)
- Overcurrent Level 3 (ditto, for 3rd level)
- Peak Overcurrent (ditto, for a 4th level, not configurable)
- Open circuit (the CCR detected an output current lower and during a greater time than the programmed parameters)

In order to re-start (after having fixed the fault), cancel the ALARM pressing the RESET key.

I.4.4 REMOTE INFORMATION FEEDBACK

Dry contacts:

Information returned:

- Selected brightness
- Operating mode: Local/Remote control
- “Open Circuit” fault
- “Overcurrent” fault
- If option “EFD” appears: EFD Level 1 and 2 warnings
- If option “Burnt lamps” appears: Burnt lamps level 1 and 2 warnings
- If option “Burnt lamps” and FAA type: Power drop

ⓘ See the “Remote control terminal block” connection table in the appendix.

MODBUS TCP link or Insulated RS485 link:

A JBUS table is accessible via an ethernet interface, an insulated JBUS RS422/485 link or through the USB socket (type B) in front of the CCR.
The values in the table are used to control and monitor the device remotely.

ⓘ See the JBUS table in the **Erreur ! Source du renvoi introuvable.**, for more details.

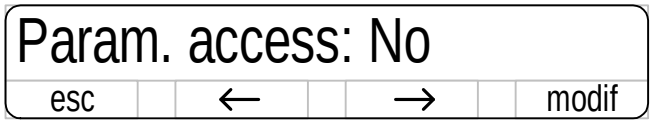
I.5 OPERATION

ⓘ **The "*Parameter Access*" function must be activated before changing parameters, in order to avoid unwanted changes.**

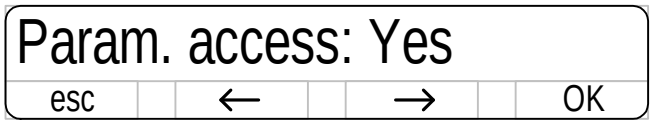
Pressing the **menu** touch, the display shows:

then scroll through the top-level menu items using the ◄ and ► keys. When the "*Options*" item is shown like:

press **OK** to go into the "*Options*" menu, then scroll through the items until the "*Param. access: NO"* item is displayed:



Press **modif** in order to modify the parameter. When the "*NO*" displayed blinks, it is possible to change the parameter : press **<** or **>** to in order to change "*NO*" to "*YES*" :



Save the modification by pressing **OK** .
Press **esc** twice to go back to the initial state.

ALL PARAMETERS ARE MODIFIED USING THE SAME PROCEDURE.

I.5.1 CONFIGURATION

The "*Configuration*" menu is used to define the basic parameters of the CCR (for example when replacing the main board):

- Rated mains voltage in Vrms: *220-230-240380-400-415*
- Rated power in kVA: *5-7.5-10-15-20*
- Number of brightness (Including B0): *from 1 to 8*

I.5.2 SETTING

The "*Setting"* menu is used to assign values of current to brightness levels B0 to B7.

- Minimum value = 1 Arms
- Maximum value = 6.8 Arms

I.5.2.1Current range:

The "Regulation Error" warning is triggered if the measured current is outside the ranges defined for each setting B0 to B7.
Each range is automatically calculated when a setting is changed (as described below) in the following way:

- Minimum value = Setting – 100mA
- Maximum value = Setting +100mA

Nevertheless it is possible to set two limits of the current range manually using the "*Current range*" menu.

I.5.3 PROTECTIONS

I.5.3.1LV power monitoring:

Mains voltage	Duration	CCR status
Ui < 75% of rated voltage	0s	CCR stops (Power supply Warning)
Ui > 130% of rated voltage	0s	CCR stops (Power supply warning)
Ui < 85% of rated voltage	60s	CCR stops (Power supply warning)
Ui > 120% of rated voltage	60s	CCR stops (Power supply warning)
90% < Ui < 110% of rated voltage	0s	CCR automatically restarts

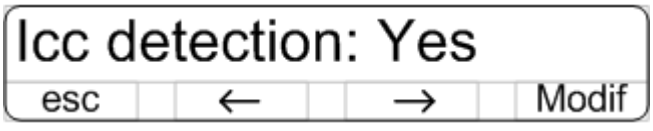
I.5.3.2"Open circuit":

Open Circuit Protection is activated if the output current goes below a defined value (*I level OC*) for a defined period (*Duration OC).* The CCR stops instantly, and the display shows the message "*Open Circuit*".

Setting *I level OC* and *Duration OC*:
Go into the menu "*Alarms and Warnings"* then "*Open Circuit*".

I.5.3.3"Capacitive current detection":

The standard IEC61822 Ed2 (7.5.1) note an "Open Circuit detection" with a capactive current highest than the open circuit level value (see above).This protection can be enabled or disabled in the menu *"Options"* and:



I.5.3.4 "Overcurrent":

Overcurrent protection is activated if the output current goes above a defined value for a defined period. There are three adjustable Overcurrent levels:

Setting current levels *I>> Level 1, I>> Level 2, I>> Level 3, Duration IL1, Duration IL 2, Duration IL 3 :*
Go into the menu "*Alarms and Warnings"* then "*Overcurrent*".

There is a fourth level, which is not adjustable : The fault "*Peak Overcurrent!*" occurs if the output current goes instantly above twice the nominal peak current (see IEC definition).

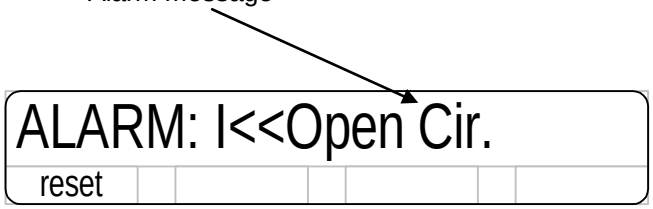
An Overcurrent fault can be automatically cancelled according to the value of the "*Restarts number*" parameter.
As each fault occurs, the number of faults is incremented. If the number of faults is greater than or equal to "*Restarts number*" in a period of less than 10s the fault is activated. The number of faults is reset to 0 after 10s without fault.
If the programmed number of restarts is reached without control of the current, the CCR stops instantly, and the display shows which level has been reached.

Setting the "*Restarts number*" parameter :
Go into the menu "*Alarms and Warnings"* then "*Overcurrent*".

I.5.3.5 Cancelling "Open circuit" and "Overcurrent" faults:

Faults are memorised during a mains power loss :

Alarm message



to cancel any faults, press **reset** , when CCR is energised in the stop mode.

I.5.4 AUTOMATIC OPERATION:

The operation of the device is programmed into the software. In local mode, the brightness selected from the keyboard is activated, in remote control mode the highest priority is given to multiwire remote control (control terminal block), then to the JBUS link or other present communication interface

When a brightness level is activated, the motherboard turns on the main contactor and controls the power modules in order to have an output current according to the desired setting.

It continually compares the loop current measurement coming from the measuring board (which uses a HALL effect sensor) and the requested setting, and then applies the error obtained to a digital regulator which synthesises power modules control signals.

Power modules control is therefore constantly adjusted so that the true RMS current in the loop corresponds to the required setting with an accuracy better than 100mA.

ⓘ See paragraph I.3.1 for block diagrams of the system.

I.7 ACCESSORIES

I.7.1 "ALIZE4100" SOFTWARE

The CCR is configured in factory but its parameters can be changed directly on the equipment without using any special accessories. The CCR can also be configured via a PC-type computer linked to the USB socket on the front of the device.

The free software, called "ALIZE4100", allows to :

- Configure the device and save or retrieve the parameters in a file.
- Download the CCR's software at http://www.augier.com/soft/ALIZE4100.exe
- Help maintenance people in fault diagnosis (Displaying internal voltages, state of inputs/outputs, etc).
- Test and monitor the CCR, allowing to send remote orders and to see its back indication.

I.8 OPTIONS

I.8.1 CUT OUT (OPTION)

AUGIER/OCEM's experience regarding CCRs has been used to simplify the HV compartment and maintenance operations to the maximum.

With that option, the CCR is equipped with an cut-out which allows to carry out all maintenance and measurement operations, without unscrewing any load terminal or earth connection, and without requiring any special tools.

ⓘ SEE NOTICE 6021752.

I.8.2 EARTH FAULT DETECTOR (EFD)

This option is used to measure the insulation of the load with respect to earth.

The insulation controller, or "earth fault detector" continually checks the electrical resistance between the loop and earth. It uses the principle of continuous current injection at 500V and its range of measurement is between 1 kΩ and 50 MΩ.

The insulation resistance value can be seen in the "*Monitoring*" menu
Two comparison levels (warning and alarm) are available. They are preferably set at 1MΩ and 100kΩ.

Setting the *Level EFD1 and Level EFD2* parameters:
Go into the menu "*Alarms and Warnings"* then "*Earth fault*".

Remote indication :

- Each level passed is indicated by a contact relay
- The insulation resistance value, levels and warnings are transferred to the Jbus table.

Note: this option can be used to diagnose lightning arrestor status. This possibility is fully explained during the CCR training course.

I.8.3 OUTPUT LIGHTNING ARRESTORS

This option consists of two lighting arrestors, which protect the CCR at each end of the loop. Current discharge is conducted through the CCR's main earth link, which must be of sufficient gauge.

If a particularly large current flow occurs (e.g. lightning strike directly on the loop cable), the lightning arrestor can short-circuit itself permanently, thus creating a "Earth fault". In this case, the two lightning arrestors must be replaced unconditionally.

ⓘ If the CCR is not fitted with an optional cutout device, it is mandatory to disconnect the lightning arretors in order to perform insulation measures.

I.8.4 INPUT LIGHTNING ARRESTORS

This option include two lighting arrestors on input mains, in order to protect the CCR. Current discharge is conducted through the CCR's main earth link, which must be of sufficient gauge.

The active part of the protector can be replaced, in case of failure or short circuit due to particularly high energy overvoltage.

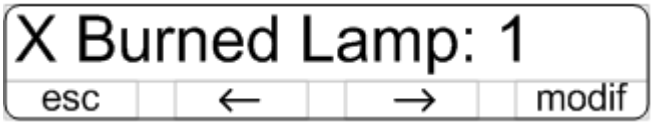
I.8.5 CASTERS

CCRs can be delivered with or without chassis casters, preferably uni-directional (other models on request)

I.8.6 BURNT LAMPS DETECTION:

This option determines the number of burnt lamps in the output load.
This is carried out by measuring the load Voltage versus Current phase shift.
Internal parameters of the data collection system must be re-initialised each time the loop is modified (addition of transformers, replacement of transformers by more powerful ones, etc) or if any settings have been changed (load adjustment, for example).

To increase the accuracy of the measurement, it is necessary to perform the calibration with **0** lamp burned (1st stage) and **minimum 3%** of lamps burned (2nd stage).
Before perform the calibration, it is necessary to set the following parameter in the menu "*Calibration*":

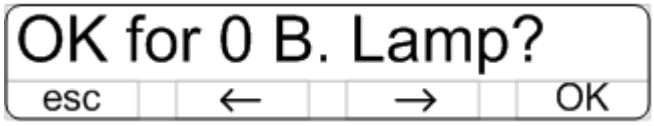


The X number must be set in function of the total number of lamps in the loop to realize the calibration (X can be set for 1 to 10 lamps).

Example: if the load loop is about 20 lamps, set the X parameter to 1 (1/20 = 5% > 3%).
Example: If the load loop is about 200 lamps, set the X parameter to 6 lamps. (6/200 = 3%).

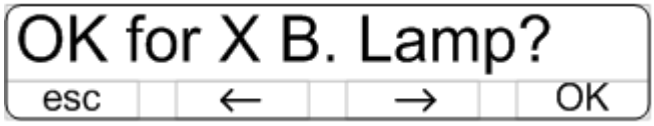
Initialisation can be carried out in two stages:

1. The loop should be connected up to the CCR with **no** burnt lamp (all lamps are working).
   Go into the "*Calibration"* menu then:



Press **OK** to start initialisation.
The message " *Wait please..."* blinks, meaning that data collection is in progress.
When the message stops flashing, data collection has been completed.

2. The loop should be connected up to the CCR with **X** lamp disconnected:
   Go into the "*Calibration"* menu then



Press **OK** to start initialisation.
The message " *Wait please..."* flashes meaning that data collection is in progress.
When the message stops flashing, data collection has been completed.

The number of fault lamps can be seen in the "*Monitoring"* menu

Two comparison levels (warnings level 1 & 2) are available. They are preferably fixed at 5 and 10.

Setting *Level LFD1 and Level LFD2* parameters:
Go into the menu "*Alarms and Warnings"* then "*Burnt Lamps Fault*".

Remote back indication:

- Each level reached is indicated by a dry contact output
- The number of fault lamps, levels and warnings are transferred to the Jbus table.

To reset the stored values (for 0 and X lamp burned) during learning. Go in the menu "Calibration" then:

When press 'OK', learning is resetting and to determine the number of burnt lamps in the output load, it is necessary to realize a new learning calibration (for 0 and X lamp burned).

I.8.7 TIME METERS:

This option performs time measurement for :

- Running time for each brightness,
- Total working time
- CCR is powered ON
- Elapsed time : The total running time is compared to an internal value (set preferably to 1000H). When reached, back indication is sent by a dry contact output, and information set in the Jbus table.

I.8.8 BUZZER

The CCR can be provided with a sound alarm: when fault occurs, the buzzer will sound. To stop the noise, it is mandatory to acknowledge the fault (by pressing RESET).

I.8.9 WIG WAG

The CCR can operate in wig wag mode (LAHSO applications), activating the option flag in the "*Option"* menu.

In the menu "*Wig Wag*", it is possible to modify the "*WigWag tcycle*" and the "*WigWag ton*".

I.8.10 OTHER OPTIONS

CCRs can also be equipped with the following options:

- Circuits selector (consult Augier)
- Interbus-S, Lonwork or other bus for monitoring and control.
- 20 A output current – In this case, parameters in the Jbus file, or from ALIZE4000 software, are seen as standard (max. Current = 6.6A).
- External pluggable cut-out, 3 positions

The following option can be designed after consultation :

- IP protection > 21
- Various supply voltage
- Various output current. For that case, parameters in the Jbus file, are seen as standard (max. read current = 6.6A).

II INSTALLATION

II.1 PREPARATION

II.1.1 EQUIPMENT RECEPTION

II.1.1.1 Equipment delivered:

The following are delivered with the CCR:

- The “Installation and Maintenance” instructions manual for the device
- A leaflet detailing possible added (non regular) options
- Factory test report for the device

II.1.1.2 Checking the equipment:

When the device is received, check that the frame and its components (in particular the electronic and LV units) are in good mechanical condition with no distortion or signs of impact.

Check also that the power transformer shows no signs of being transported in a wrong position and that its protective packaging is not damaged.

II.1.2 DEVICE LOCATION

In deciding the permanent operating location for the device, the following points must be kept in mind:

- An easy access must be kept to the front panel with no obstruction preventing the panel being opened.
- CCRs can be placed side-by-side
- Leave a gap of at least 20cm at the back of the device to allow sufficient ventilation
- Environmental conditions must be such that the temperature does not go outside the range -40°C to +55°C and that relative humidity does not exceed a maximum of 95%.
- The location must be compatible with the “IP21” protection index of the CCR.

II.1.3 CHECKING THE INSTALLATION

In checking the suitability of the electrical installation in which the CCR is to be integrated, the following points must be observed:

II.1.3.1 Single phase power supply:

This must be compatible with the electrical characteristics of the device as shown on the rating plate and factory test report.

The rated mains voltage is recorded in the software on the motherboard and is required for calculations.

The configured rated voltage can be seen in the "*Configuration*" menu, and written on the identification plate, on the front panel.

ⓘ See paragraph I.3.3 for the electrical characteristics of DIAM CCRs.

II.1.3.2 LV Protection:

The switchboard of the sub-station containing the regulators will have to include individual and lockable isolating devices, allowing the visible consignment of each regulator.

When these devices are associated to LV protection, that LV protection for each CCR must be proportioned according to the power of the CCR, the rated voltage and the type of protection already present on the CCR.

The following tables are given for information only, for cable lengths between fuse boxes and CCRs of less than 30m (Circuit breaker examples : MG references)

	230V Power Supply		400V Power Supply	
Power	**LV cable gauge**	**LV circuit breaker**	**LV cable gauge**	**LV circuit breaker**
5 kVA	10 mm²	IC60N 50A C	6 mm²	IC60N 25A C
7,5 kVA	16 mm²	IC60N 63A D	10 mm²	IC60N 40A C
10 kVA	16 mm²	C120N 100A D	10 mm²	IC60N 50A C
15 kVA	25 mm²	C120N 125A D	16 mm²	C120N 100A D
20 kVA	50 mm²	CVS250B 200A	16 mm²	C120N 100A D

II.1.3.3 Lighting loop:

Check that the installed power corresponds to the power of the CCR, check the continuity of the loop and the number of lamps blown.

The rated output power is recorded in the software on the motherboard and is required for calculations.

The configured rated power can be seen in the "*Configuration*" menu

II.1.3.4 Management by remote control:

Check the remote control mode: dry contact/external voltage/serial network. For external voltage mode (multiwire interface), check that the remote control voltage is compatible with the electrical characteristics of the CCRs.

ⓘ See paragraph I.3.3 for the electrical characteristics of the DIAM CCRs.

ⓘ See paragraph II.1.3.4 in order to configure the remote control mode.

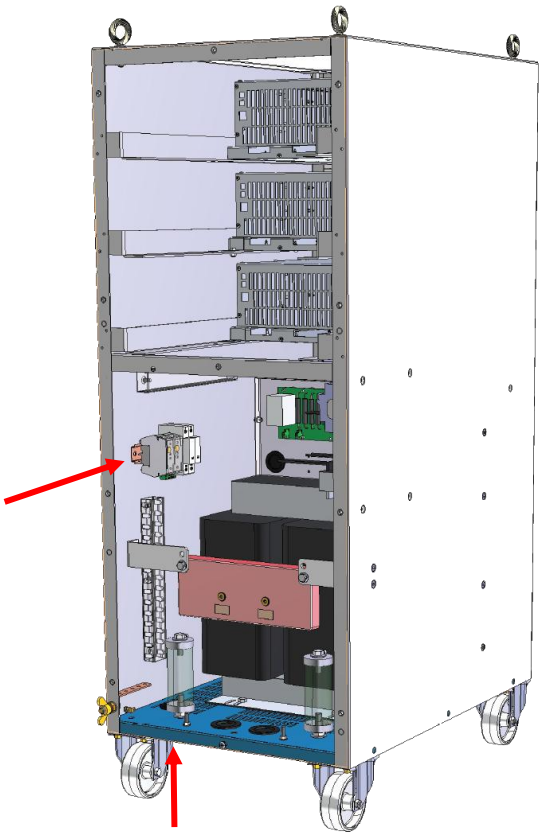
II.2 CONNECTIONS

II.2.1 POWER AND EARTH

ⓘ **N.B.:** before making any connections, make sure the installation is turned OFF.

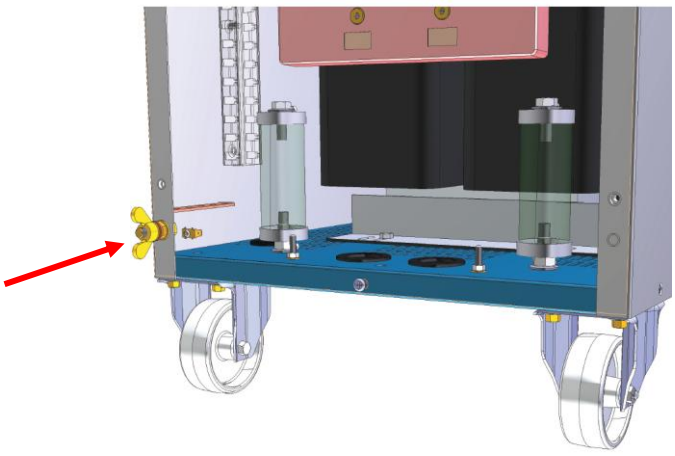
II.2.1.1 LV supply:

Connection to the mains is made at the back of the CCR, by the two cage terminals provided: the two power cables run from beneath the frame in the left duct, and have to be connected to the power supply block in the left upper part of the LV unit. Leave a loop in the power cable near the terminal to allow it to be opened.



II.2.1.2 Earthing

The Main Earth circuit must be connected to the earthing stud situated in the lower part of the frame at left (external or internal connection, at rear)



II.2.1.3 Lighting loop:

Connection is made at the back, the cables arriving through the base, from beneath the device:

- Connect the two load cables to the “HV1” and “HV2” terminals on the load plate (or on the Cut out plate, if the option is present) by crimping the lugs (φ 8mm) onto the core of the cable (or onto the two terminals of the FAA isolating switch if this option installed).

WARNING :
For all brass screws and bolts of that load plate ,
A TIGHTENING TORQUE RANGING BETWEEN 6.5 and 7 Nm MUST BE RESPECTED

- Connect the cable screens (strap or braided) to the CCR ground after having crimped a lug (φ 6mm).

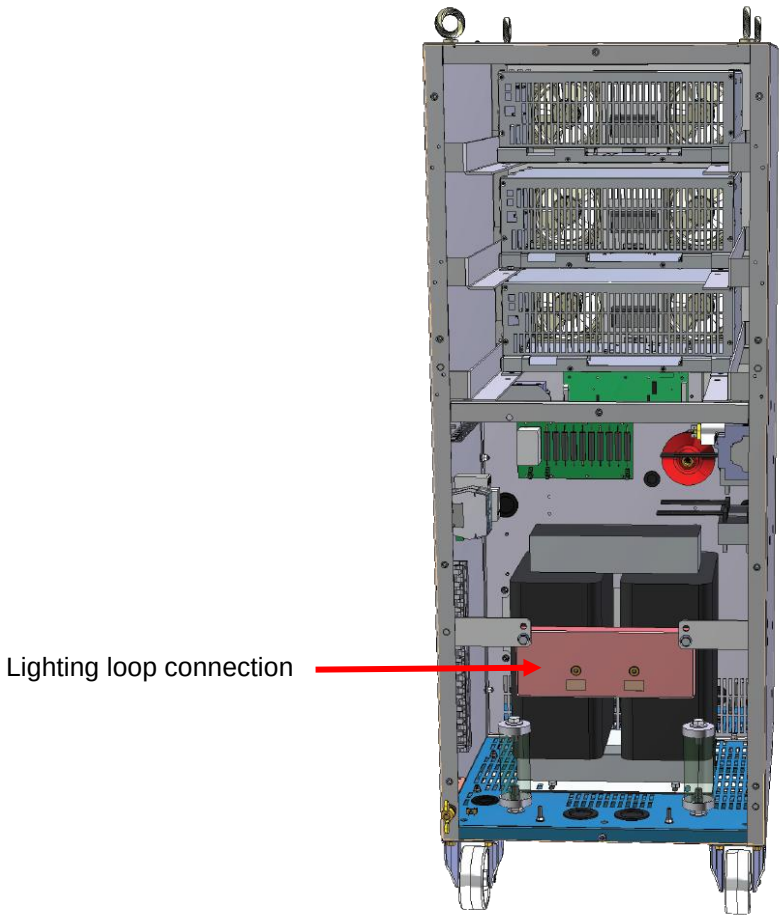
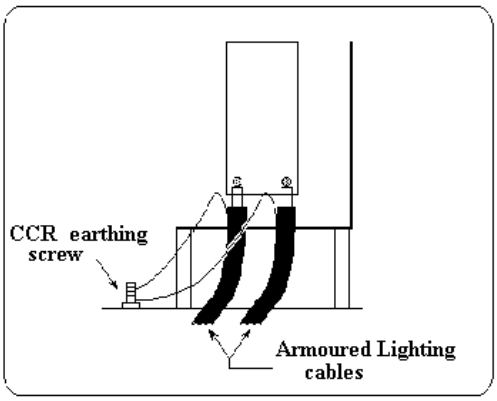
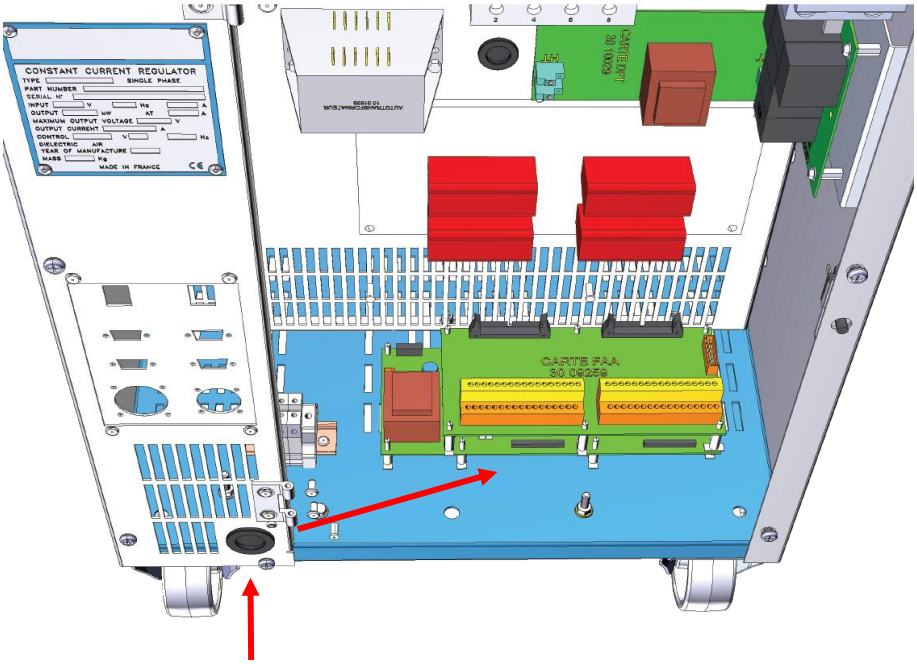


Diagram: load connection



II.2.2 REMOTE CONTROL CONNECTIONS

Connections to the control system is made at the front of the CCR, on terminal bloc provided on the interface board (FAA or IEC type). If the cable is screened, connect the shield only on 1 side, to the frame or at controller's ground terminal.



The control cables run from the front panel into the rubber grommet, and have to be connected to the interface board laid on the frame.

ⓘ FOR ALL REMOTE INFORMATION, SEE NOTICE 6021732.

II.2.3 CIRCUIT SELECTOR:

External CS :

The DIAM CCR has two electrical interlock terminals, **terminal S1 and S2** , located near the two power supply terminals, which must be connected to the door contact and circuit selector interlock.

When the CCR is used with a circuit selector, it must be stopped about 100ms before the circuit is selected. This is automatically done by the selector itself (Augier) by connecting terminals S1 & S2 to the selector interlock mechanism, or by remote control.

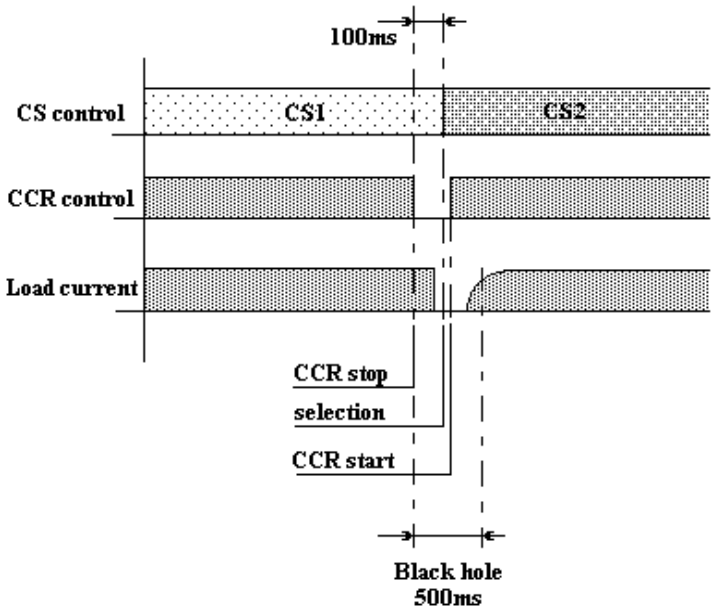
Corresponding cables must be placed in the same duct (at left) than power supply cables

Operation without selectors:
The two terminals S1 & S2 must be short-circuited, (Strap wired at delivery) in order to work without CS contact.

Operation with selectors:
The good practice, to select or un-select a way, is to do it at null current. Thus, no overcurrent can appear and lamps remain protected. At the contrary, an instantaneous short circuit (total or partial) of the load will create an instantaneous overcurrent proportional to the load reduction, during the regulation time. These repeated overcurrents cause a reduction of the lifespan of lamps. So, when used with a circuit selector, the regulator must be stopped 100ms approximately before changing a circuit.
That can be carried out by the selector itself (Augier selector) by cabling terminals S1 and S2 with interlock terminals of the selector, or by the monitoring system.

While S1/S2 are connected, the CCR shall be stopped if the selector box is opened, giving access to the H V load connections.

Chronogram of operation :



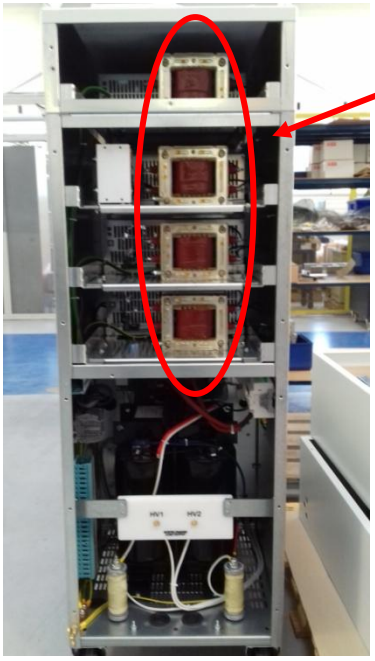
Integrated CS :

With this option, Interlocking and timming operations as described above are directly performed by the CCR's firmware.

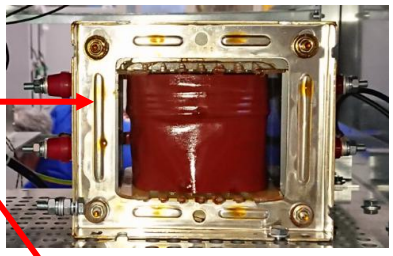
II.3 ADJUSTING THE CCR

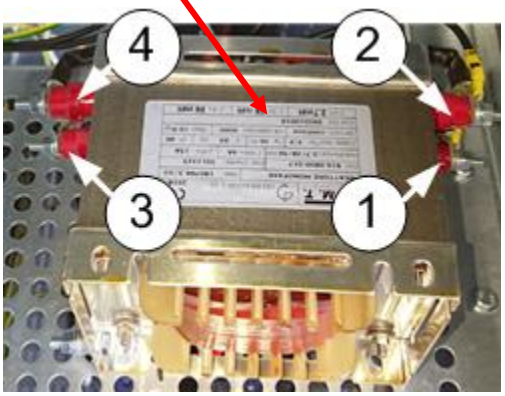
II.3.1 MULTI TERMINAL INDUCTANCE

Inductance are in the CCR to filter the input current. Position in the CCR.
One inductance per 5KVA module.



Multi terminal inductance

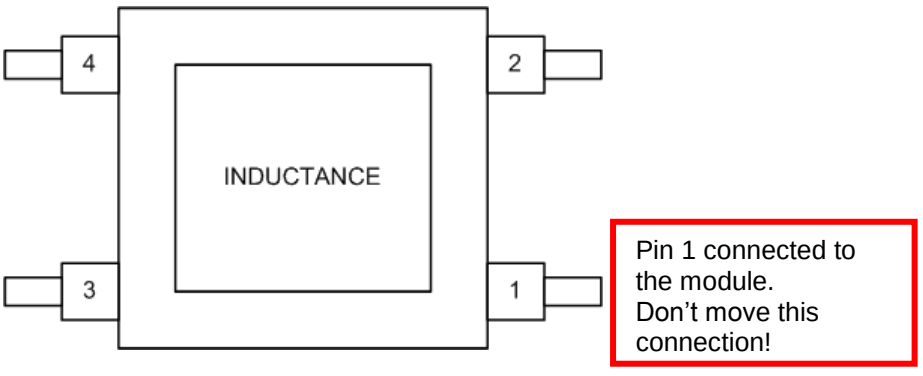




The inductance has 3 values available (L0, L1 and L2). L0 (the lower value) is selected by default. Depending of the loop load, the output current can be unstable.
It can be necessary to increase the inductance value.
It is possible to select L1 or L2 inductance moving the cable connection according to the following drawing:

ⓘ Keep the wire connected to pin 1 in place, move the wire on pin 2, 3 or 4.

⚠ **All inductances in the CCR must be connected on the same tapping to balance current in all modules.**



Inductance value	LOW VALUE (defaultvalue)	MEDIUM VALUE	HIGH VALUE
Connections	1 & 2	1 & 3	1 & 4

II.3.2 PARAMETER MODIFICATION

Preferably, and according to the CCR, the parameters are **pre-set in the factory as ordered**, so it is not necessary to reconfigure them during device installation and commissioning.

II.3.2.1 Preferred configuration values:

The preferred configuration (if no precision on orders, or in case of new mother board) is as follow :

- Setting

I B0 = 1.50 A
I B1 = 2.80 A
I B2 = 3.40 A
I B3 = 4.10 A
I B4 = 5.20 A
I B5 = 6.60 A

Brightness number = 6
Maxi current = Setting value + 100mA
Mini current = Setting value - 100mA

- Protection

Earth fault level 1 = 1MΩ (if option present)
Earth fault level 2 = 100KΩ (if option present)

Restarts number = 1

Over-current level 1 = 6.80 A (+ 3%)
Disable time = 2.50 s

Over-current level 2 = 6.93 A (+ 5%)
Disable time = 1s

Over-current level 3 = 8.25A (+ 25%)
Disable time = 200 ms

Open circuit current = 1.00A
Disable time = 600 ms

- Burnt lamps

Burnt lamps level 1 = 5 (if option present)
Burnt lamps level 2 = 10 (if option present)

Calibration cancelled.

- Wig wag

Cycle time = 2.5s
On time = 1.7s

- USB link

Slave Id = 1
Baud Rate = 38400

- Jbus RS485 link

Slave Id = 1
Baud Rate = 9600

II.3.2.2 Brightness values:

See paragraph I.5.2

ⓘ If the CCR does not supply the desired current, either it is in overload or the load contains transformers with open secondaries (missing or burnt lamps)

II.3.2.3 Value of “Open Circuit” protection level:

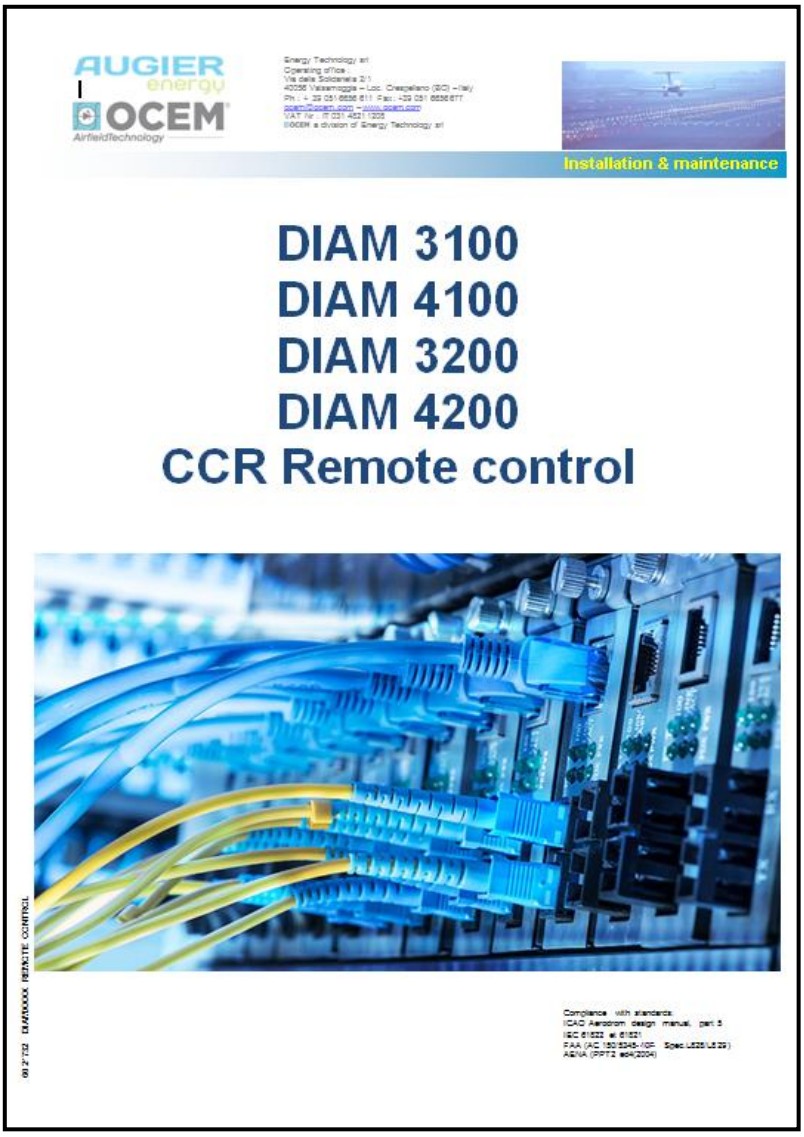
See paragraph I.5.3.2

II.3.2.4 Value of “Overcurrent” protection levels:

See paragraph I.5.3.4

II.4 REMOTE CONTROL

ⓘ FOR ALL REMOTE INFORMATION, SEE NOTICE 6021732.



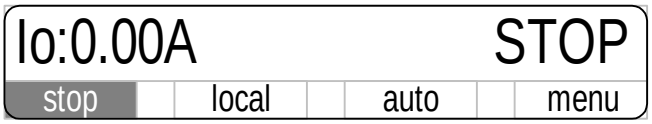
III COMMISSIONING

After that all installation operations defined in the previous section have been completed, the DIAM4200 CCR can be commissioned.

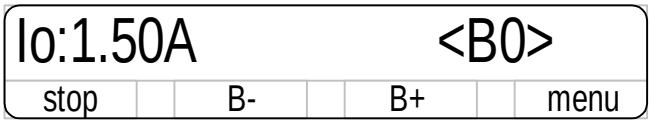
III.1 PROCEDURE

1. Close the fuse box master switches, or the main circuit breaker
2. Be sure that the jumpers of the Cut-out plate (if option) are in “normal” position
3. Close the front panel of the DIAM4200
4. Connect the installation to the power

ⓘ The display lights up:



5. Press **local** button, the display seems to:



ⓘ The CCR starts up and the output current is displayed on the front panel.

6. Progressively increase the brightness levels using the selection buttons while systematically checking the current value shown by the numeric display, maximum brightness being fixed at 6.6A.
7. Decrease the brightness levels again, then stop the CCR by pressing **stop** button

ⓘ If the CCR does not supply the desired current, see paragraph IV.4.4

8. Check operation of the CCR in remote control mode. (Press **auto** button)

III.2 TESTS

III.2.1 SHORT-CIRCUIT TESTS

ⓘ **DO NOT** carry out this test if there is any doubt about the operation of the CCR, or if there is a fault or breakdown.

1. Switch off the CCR from the power.
2. Completely disconnect the lighting loop. (or use the “security" position of the Cut-out plate, **without disconnection**)
3. Short circuit terminals “HV1” and “HV2” on the load plate, (or use the “security" position of the Cut-out plate, as above)
4. Connect the CCR to the power.
5. Put the CCR in “Local” mode.

ⓘ The CCR starts up and the output current is displayed on the front panel.

6. Progressively increase the brightness levels using the selection buttons while systematically checking the current value shown by the numeric display, maximum brightness being fixed at 6.6A.
7. Decrease the brightness levels again then stop the CCR.
8. Disconnect from the power, connect the Lighting loop (or replace the jumpers of the Cut-out option).

ⓘ If there is any problem (e.g. tripping out, Overcurrent), do not repeat the tests: check the connections again (ground, circuit board terminals, etc) and check the state of the power modules indicators and messages on the display.

III.2.2 OVERLOAD TESTS

The overload test is not applicable on DIAM4200 CCR because of the lack of a load adaptation plate.

III.2.3 OPEN-CIRCUIT TEST

Physically disconnect the loop (or remove jumpers of the Cut-out option) and start the CCR: the device should stop after about 0.3s (running time) with the fault indication.

IV MAINTENANCE

IV.1 FORMALISATION

To follow maintenance procedures correctly, the following points must be observed:

- Create a maintenance file containing the headings “Date”, “Time”, “Maintenance Engineer”, “CCR reference”, “Problem definition”, “Solution applied”, and “Time spent”
- The spare parts monitoring sheet (with their control numbers) should be completed if necessary.
- An overall maintenance operation book or folder for each maintenance post will be kept up to date with these sheets. It will gather together, in particular, all the device test reports and references to the initial states of the devices.
- A regular examination of these different documents will allow the status of the system to be monitored, facilitate management of spare part batches and improve, if necessary, maintenance procedures.

IV.2 PROCEDURE FOR INTERVENTION

Before any intervention on a regulator :

- Carry out the isolation of the CCR by consigning its power supply. The isolating device shall be locked and located.
- Check on the CCR the absence of supply voltage.
- Proceed to grounding and short-circuiting the parts normally under voltage, in order to discharge the residual capacitors.

Before any intervention on the load loop of load or on a HV part of a regulator :

- Achieve the consignment as considered previously
- Short-circuit and ground the HV loop or HV terminals, by using the devices present on the CCR (Option cut-out switch with jumpers, rotary or of FAA type), or using external cables, in order to discharge the residual capacitors.

IV.3 PREVENTIVE

IV.3.1 FIRST MONTHS

In the first months of use, check the tightness of terminals and connections, particularly for HV or LV power circuits :

- Input terminals, fuse-holders or circuit breaker, contactor
- Output terminals, brass straps on the load plate, all screwed connections at the back of the load plate.

IV.3.2 ANNUAL PROCEDURE

- Remove dust from the bottoms of the casings to avoid accumulation, which could prevent proper cooling.
- Remove dust from the electronic circuit boards and LV rack elements.
- Check the tightness of power connections (Lighting loop, Power, Earth)
- Check operative functions, in local and remote control.

IV.3.3 EVERY THREE YEARS

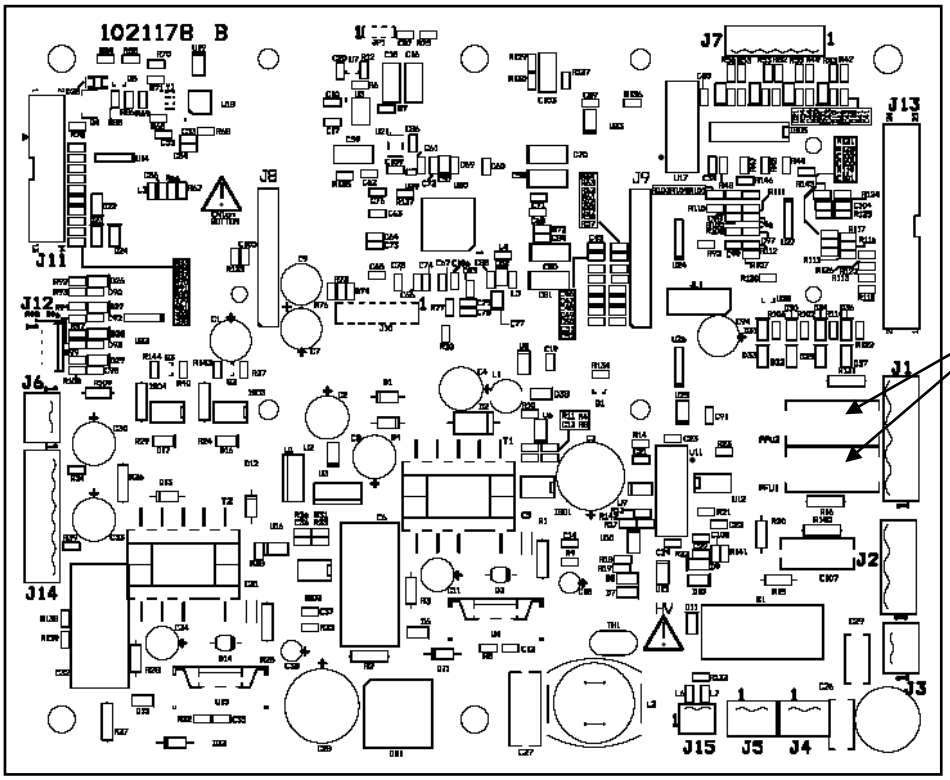
The frequency with which these operations are carried out will depend on the usage of the CCR:

- Start by a general visual inspection
- Check internal connections (tightness of screws and terminals),
- Check the correct correspondence between: current setting, displayed value, measured value (use an insulated true RMS ammeter and clamp of sufficient accuracy)

  In case of discordance, a calibration of the CCR can be carried out.

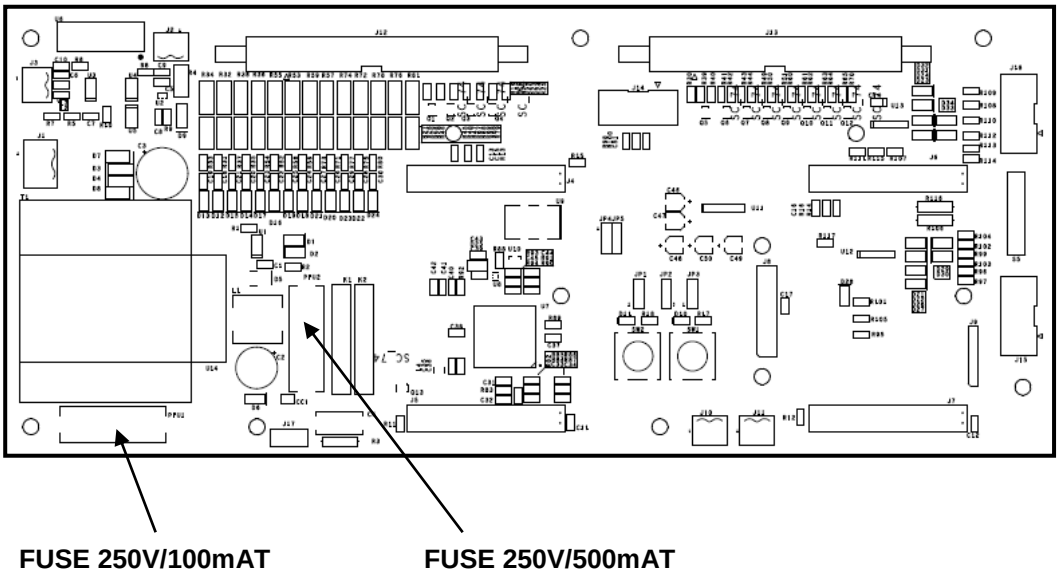
IV.4 CORRECTIVE

IV.4.1 FUSES ON MOTHER BOARD



FUSE REFERENCE: 5x20 3.15A Time lag (CODE: 10 27584)

IV.4.2 FUSES ON INTERFACE BOARD



IV.4.3 FAULT DIAGNOSIS

ⓘ See paragraph I.5.3 for a description of the following protections.

IV.4.3.1 LV power fault:

Symptom	Fault	Action
The CCR has stopped The message: "*ALARM : Bad supply*" is displayed	LV power fault	Check the voltage level of the LV power supply Check parameter settings in the "*Configuration*" menu

IV.4.3.2 "Open Circuit" fault:

Symptom	Fault	Action
The CCR has stopped The message: "*ALARM: I << Open Cir*." is displayed	Lighting loop open	Measure the continuity of the loop (on the transformer primaries and secondary's)
	Output current < 1.0A for more than 500 ms	Measure the output current value
		Large load increase on the loop caused by circuit switching
	Measuring board to motherboard link faulty	Check state of the ribbon cable between measuring board and motherboard
	Protection detection level setting on motherboard	Check setting of the level in the menu "*Alarms and warnings*" then "*Open circuit*"

IV.4.3.3 "Overcurrent" fault:

Symptom	Fault	Action
The CCR has stopped The message: "*ALARM : I >> Level 1, 2 or 3"* or "*ALARM : I >> Peak value*" is displayed	Output current > programmed level	Large load decrease on the loop caused by circuit switching
	Overload combined with load decrease by switching	Check the number of ITs open due to missing or fault lamps
	Levels too low	Check levels in the menu "*Alarms and Warnings"* then "*Overcurrent*".

IV.4.3.4 Module power fuse fault:

Follow the next procedure in order to replace the power fuse of any regulator power module. The fuse is located at the rear of the regulator, mounted on dedicated terminals of the power module(s).

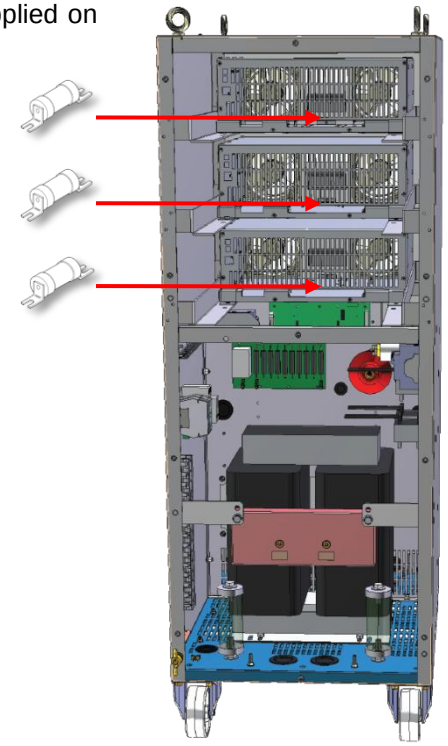
ⓘ **BEWARE: Risk of electrical shock.** This operation should be handled by qualified personnel only.

Fuse reference:

Power module version	Specification	AUGIER reference
5kVA 230V	FUS. 550V 13.8x54.5MM/BS88 32A NITD	10 26615
5kVA 400V	FUS. 550V 13.8x54.5MM/BS88 20A NITD	10 26761

1. Switch OFF the main power supply of the regulator, as well as the circuit breaker on the front panel of the regulator.

ⓘ Be sure that no electrical power supply can be provided to the regulator from the installation. Security rules of electrical consignment should be applied on the power supply.



2. Wait 1 minute for all internal stored energy to be discharged

3. Unscrew the regulator rear panel (hex screws and earth ribbon)

4. Locate the power fuses at the rear of each power module

5. Measure the absence of voltage on all fuse terminals

6. Unscrew the fuse fixing screws with a hex 3mm key

7. Replace the fuse and screw the hex nuts with dedicated washers. The tightening force applied on the hex nuts should be 0.5N.m

8. Reconnect the earth ribbon and screw the regulator back panel

IV.4.4 OTHER FAULTS

Symptom	Fault	Action
Output current insufficient The message *"Warning: Regulation error"* is displayed	Large number of ITs open	Check the number of ITs open due to missing or fault lamps
	CCR power insufficient	Check that the installed power is not greater than the power of the CCR
Display remains off when CCR is connected to the power	CCR LV protection faulty	Check LV fuses
	Motherboard protection faulty	Check state of fuses F1 and F2 on the motherboard (T1A)
	Motherboard faulty	Check motherboard with "Diagnostic" function of ALIZE software
CCR does not work in remote control mode	Remote control protection fuse faulty	Check fuse F1 (T100mA) and F2 (T500mA) on the interface board.
	Wrong configuration of remote control type	Check configuration of remote control type
	Insufficient remote control voltage	Check remote control voltage (from 20 to 60VDC? Or 120Vac)
Some brightness levels do not work in remote control mode The master switch does not close for a brightness command which causes a fault	Faulty link	Check the wiring for the remote control links
	Faulty link	Check the wiring for the remote control links
	Command photoMOS defective	Check photoMOS operation with "Diagnostic" function of ALIZE software
	Power supply fault	Check state of fuse F3 on the motherboard (T315mA)
LV power protection fuses trip during a brightness command	Faulty power module	Check the error messages on display and ALIZE control software
The switch does not close	Power supply fault	Check state of fuse F4 on the motherboard (T315mA)
"WARNING : EFD level 1" *"WARNING : EFD level 2"*	None from the CCR point of view. Light intensity may be impacted.	Check primary cables status as well as primary connectors. Check warning thresholds.
"WARNING : No EFD"	No isolation measurement .	Check EFD board connexions. Replace EFD board.
"WARNING : LFD level 1" *"WARNING : LFD level 2"*	Possible output regulated current instability. Possible loss of CAT conditions.	Replace burnt lamps. Check warning thresholds. Perform function learning again.

Symptom	Fault	Action
"WARNING : Meas. lamps"	No output voltage measurement. Inconsistent measure.	Check wire position in current sensor for proper current direction, using ALIZE4100 ("graphic" display, all curves must be phased) Perform "lamp burnt" learning again.
"ALARM : BAD Interface"	No remote control	Check remote control board connexions. Replace remote control board. Check mother board.
"WARNING : BAD Freq."	CCR stops for internal protection.	Check supply network. Frequency out of range or asymmetrical wave shape.
"WARNING : TC-TS board"	No multiwire remote control	Replace relay remote control board.
"WARNING : Power Drop"	None for the CCR More than 10% output power losses.	FAA : informative warning
"WARNING : Temp. level 1" *"FAULT : Temp. level 2"*	Main transformer overheat.	AENA: Check environmental conditions.
"WARNING : Module x"	The ambient temperature where the Module x is working is near the limit. However the CCR doesn't stop	Ensure proper ventilation of the CCR. Check that the ventilation holes are not blocked by dust, or fans have failed.
"FAULT : Module x"	The ambient temperature where the Module x was working reached the limit. CCR stop and doesn't start	Check that the ventilation holes are not blocked by dust, or fans have failed. Wait for cooling before restarting.
«ALARM : BAD SUPPLY»	CCR stops or does not start	Check supply network voltage, CCR nominal voltage setting (see "configuration" menu) or input voltage measurement (see "Supervision" menu). Refer to chapter I.5.3.1
«ALARM : POWER MODULE»	CCR stops or does not start	Check the error messages displayed on ALIZE software
«FAULT : POWER MODULE»	CCR stops or does not start	Check the error messages displayed on ALIZE software

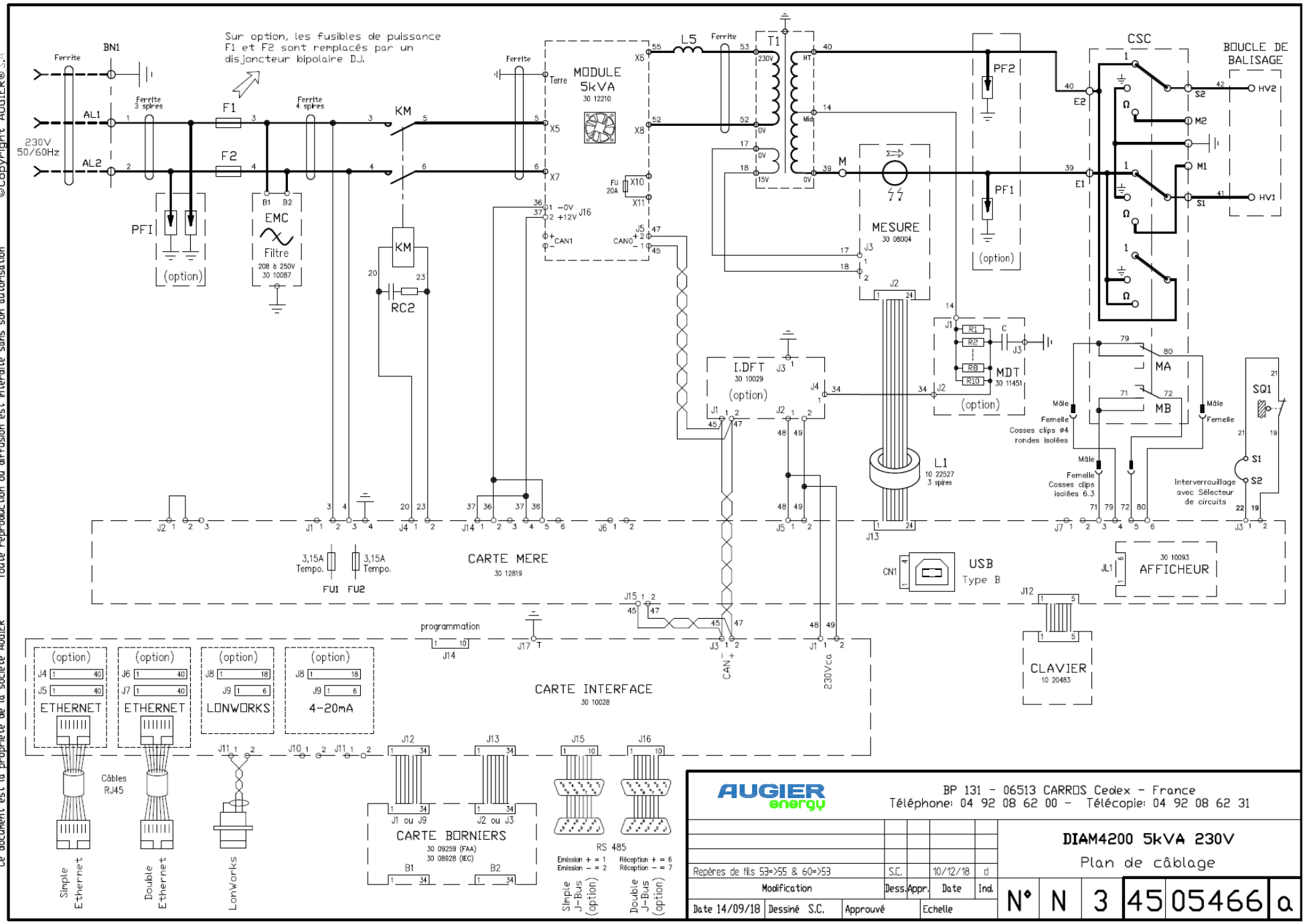
IV.5 SPARE PARTS LIST

Designation	Input volatge	STACKABLE CABINET		STANDARD CABINET							
		1 kVA	2,5 kVA	2,5 kVA	5 kVA	7,5 kVA	10 kVA	15 kVA	20 kVA	25 kVA	30 kVA
Breaker DJ	220/240V	IC60N 6A C 10.25249	IC60N 16A C 10.25251	IC60N 16A C 10.25251	IC60N 32A C 10.25254	IC60N 40A C 10.26780	IC60N 63A C 10.25256	C120N 80A C 10.22503	C120N 125A C 10.27676	NSX 160 F TM160D 10.16660	
	380/415V	IC60N 4A C 10.25248	IC60N 10A C 10.25250	IC60N 10A C 10.25250	IC60N 16A C 10.25251	IC60N 25A C 10.25253	IC60N 32A C 10.25254	IC60N 50A C 10.25255	IC60N 63A C 10.25256	C120N 80A C 10.22503	C120N 100A C 10.22504
Input Fuses	220/240V	10x38 6A gG 10.08770	10x38 16A gG 10.05891	10x38 16A gG 10.05891	14x51 32A gG 10.05894	14x51 40A gG 10.05895	22x58 63A gG 10.17587	22x58 80A gG 10.08776	22x58 125A gG 10.17589	Taille : 0 160A gG 10.17590	
	380/415V	10x38 4A gG 10.05767	10x38 10A gG 10.05768	10x38 10A gG 10.05768	10x38 16A gG 10.05891	10x38 25A gG 10.17586	14x51 32A gG 10.05894	14x51 50A gG 10.05896	22x58 63A gG 10.17587	22x58 80A gG 10.08776	22x58 100A gG 10.17588
Contactor KM	220/240V	AF9 4000 10.27053		AF16 4000 10.27054	AF16 4000 10.27054	AF40 4000 10.27877		AF52 4000 10.27915	AF80 4000 10.27916		AF190 30-11-13
	380/415V	AF9 4000 10.27053		AF16 4000 10.27054	AF16 4000 10.27054		AF26 4000 10.27055	AF40 4000 10.27877		AF52 4000 10.27915	AF80 4000 10.27916
Fuses FU1 et FU2	220/415V	5x20 1A time lag 10.22638		5x20 3,15A Temporisé 10.27584							
Fuses F3 à F8	220/240V			14x51 32A gG 10.05894							
	380/415V			14x51 20A gG 10.07058							
Door contact SQ1				10.08192							
Main transformer T1	230V	10.26723	10.24847	10.24847	10.26712	10.26725	10.26714	10.26716	10.27443	10.27444	10.27445
	400V			10 26711	10.26713	10.26726	10.26715	10.26717	10.27446	10.27447	10.27448
Auxiliary Autotransformer T2	220V	To be define	10.26448	10.21529							
	230V										
	240/415V	To be define	10.26448	10.21529							
Auxiliary Autotransformer T3	220/240V										
	380/415V					10.21529					

Designation	Input volatge	STACKABLE CABINET		STANDARD CABINET							
		1 kVA	2,5 kVA	2,5 kVA	5 kVA	7,5 kVA	10 kVA	15 kVA	20 kVA	25 kVA	30 kVA
Inductance	220/240V	To be define	30.13191	30.13192							
	380/415V	To be define	30.13191	30.13325							
Power supply AL						30.13190					
Capacitor C2						10.20841					
Capacitor C3										10.20841	
Fan 12V				30.12254							
Fuse FU	220/240V			Fus 550V 14x55 32A 10.26615							
	380/415V			Fus 550V 14x55 20A 10.26761							
Module 5KVA	220/240V			30.12210							
	380/415V			30.12310							
LV lightning arrestor PFI		DS41-400 10.19975									
HV lightning arrestor PF1, PF2		CEA3 10.17854						CEA6 10.17855		CEA9 10.17856	
Cut out		SEE NOTICE 6021752									
Earth injection board MDT		30.11451									
EFD board		30.10029									
Mother board		30.10026		30.12819							

Designation	Input volatge	STACKABLE CABINET		STANDARD CABINET							
		1 kVA	2,5 kVA	2,5 kVA	5 kVA	7,5 kVA	10 kVA	15 kVA	20 kVA	25 kVA	30 kVA
Power board		30.11637									
Daughter board		30.11412									
Measurement board		30.08004									
Remote control		SEE NOTICE 6021732									
EMI board	220/240V	30.10087									
	380/415V	30.10068									
Display		30.12449									
Keyboard		10.20483									
Câbles plats		Mother board / Mesurement board => 30.08947									

v APPENDIX A: DIAGRAMS



AUGIER energy
BP 131 - 06513 CARROS Cedex - France
Téléphone: 04 92 08 62 00 - Télécopie: 04 92 08 62 31

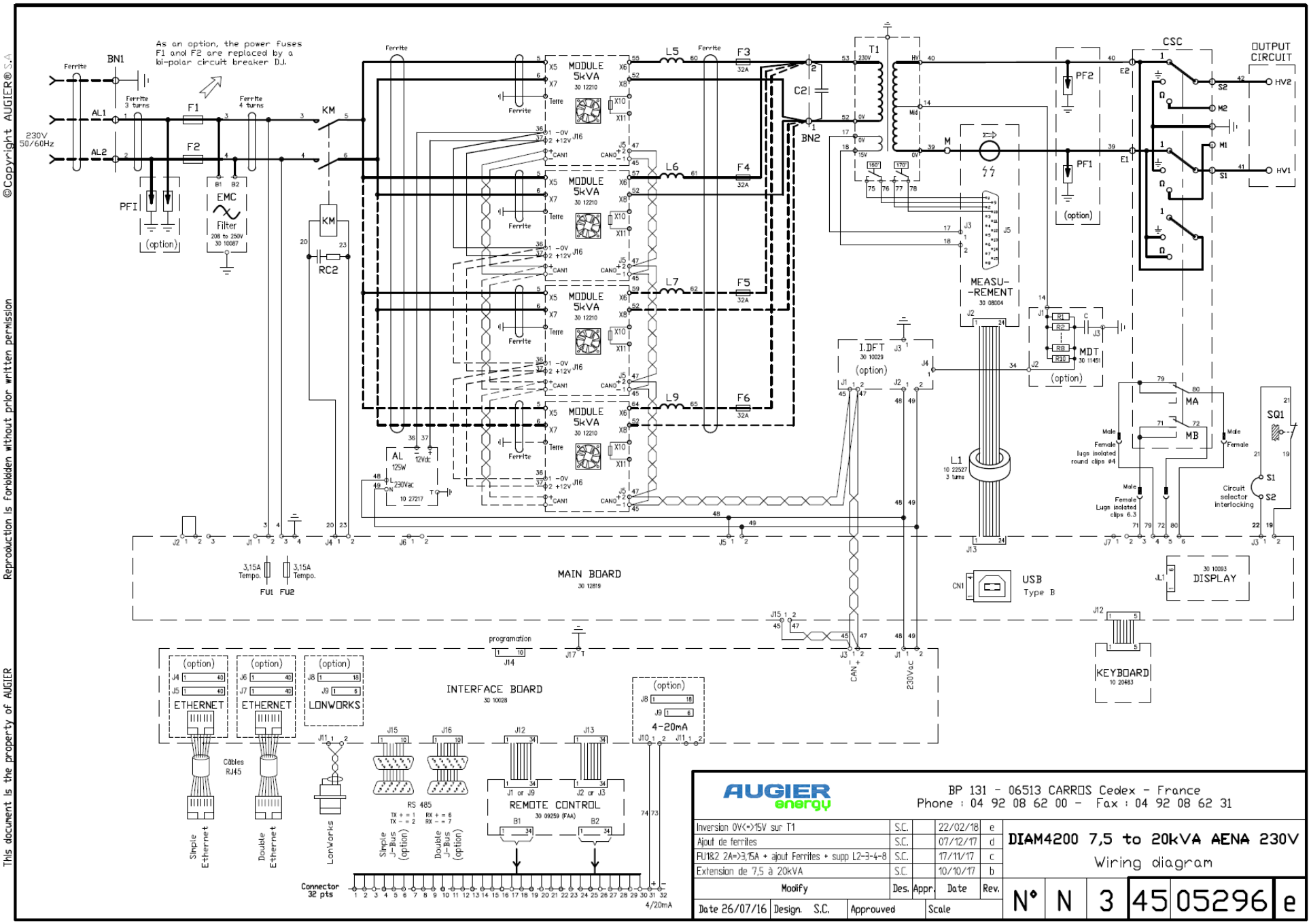
Repères de fils 53=>55 & 60=>53	S.C.		10/12/18	d
Modification	Dess.	Appr.	Date	Ind.

Date 14/09/18 | Dessiné S.C. | Approuvé | Echelle

DIAM4200 5kVA 230V

Plan de câblage

N° N 3 45 05466 a



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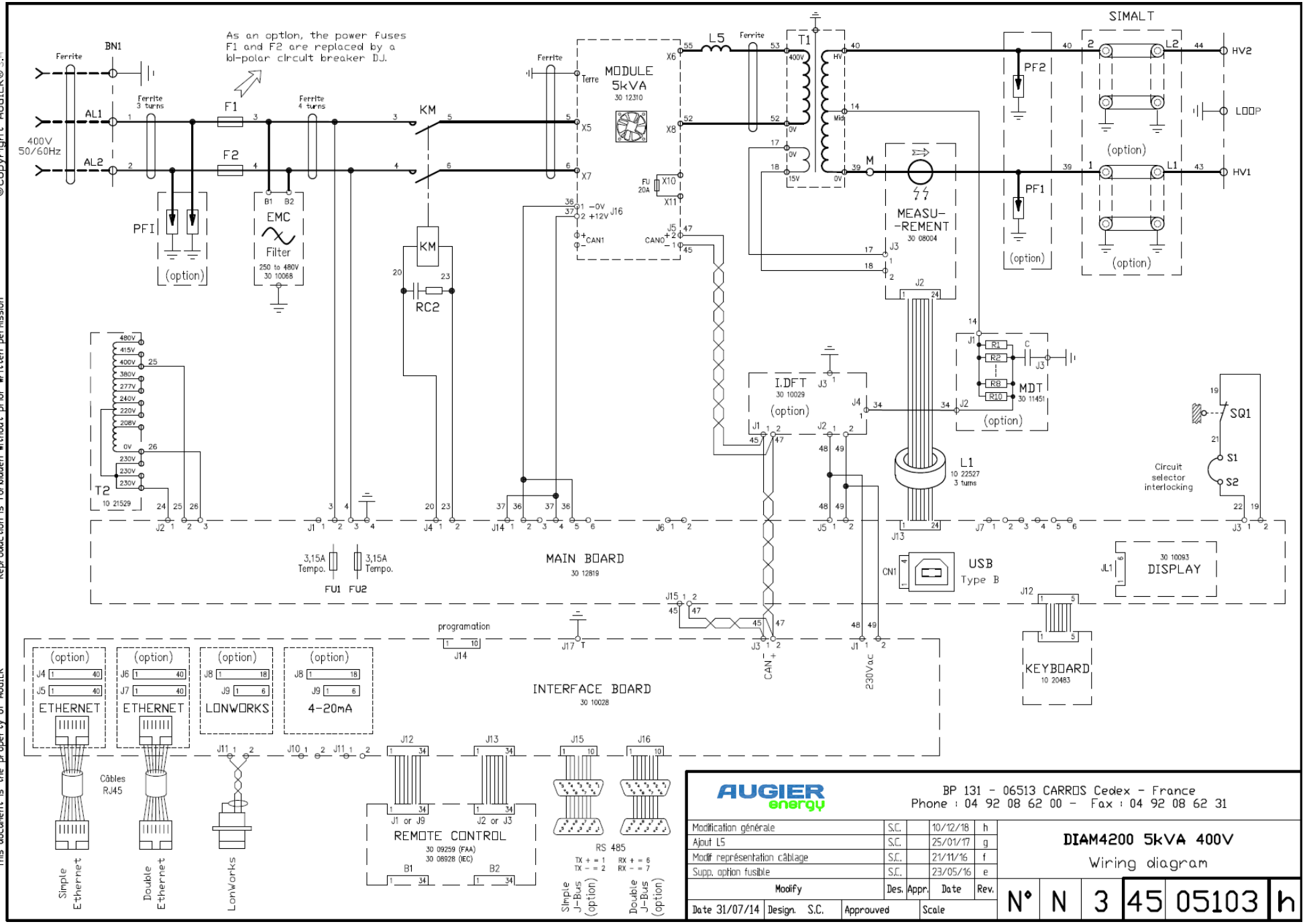
Inversion 0V<=>15V sur T1	S.C.		22/02/18	e
Ajout de ferrites	S.C.		07/12/17	d
FU1&2 2A=>3,15A + ajout Ferrites + supp L2-3-4-8	S.C.		17/11/17	c
Extension de 7,5 à 20kVA	S.C.		10/10/17	b
Modify	Des.	Appr.	Date	Rev.

Date 26/07/16 | Design. S.C. | Approuved | Scale

DIAM4200 7,5 to 20kVA AENA 230V
Wiring diagram

N° N 3 45 05296 e



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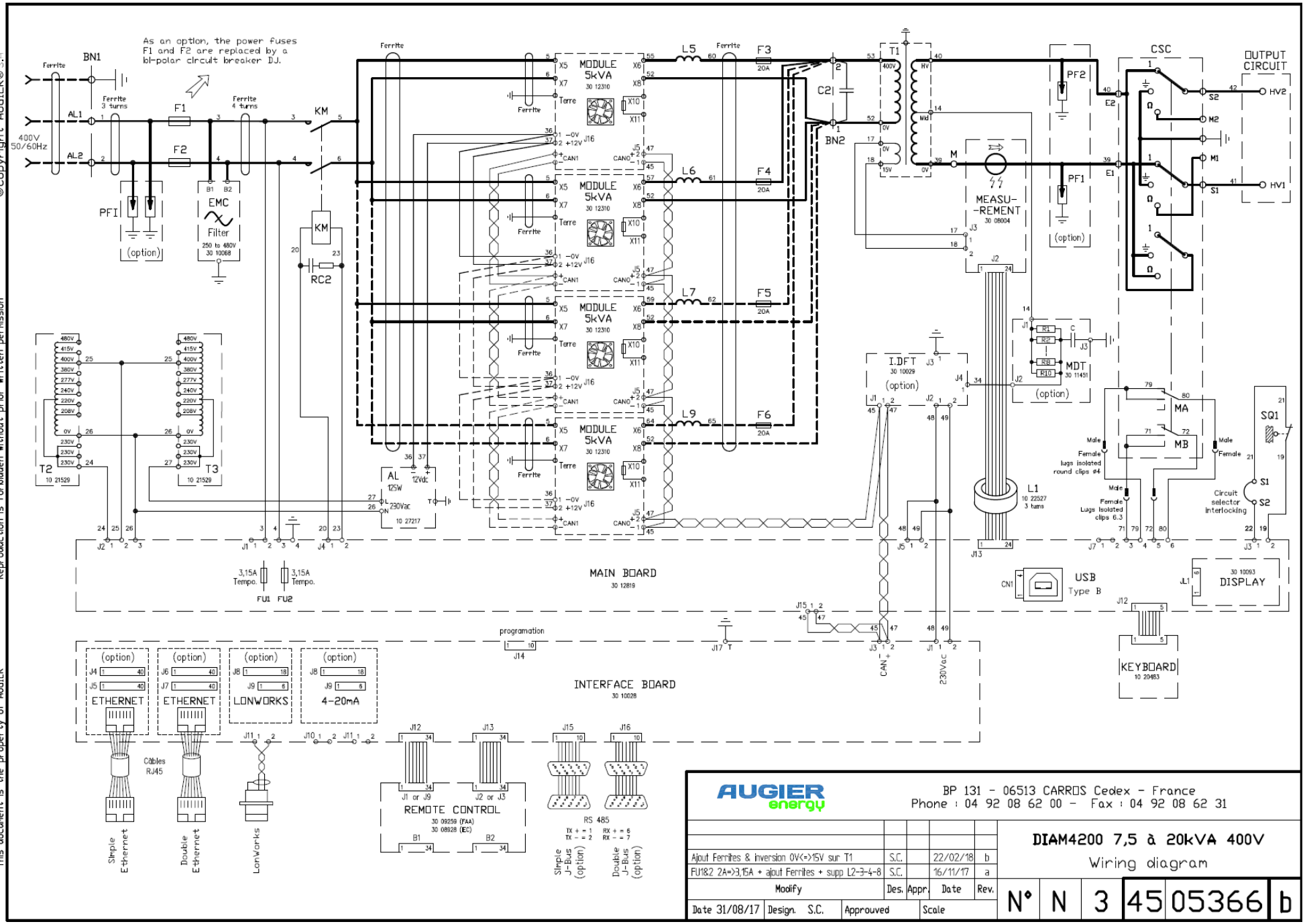
Modification				
Modification générale	S.C.		10/12/18	h
Ajout L5	S.C.		25/01/17	g
Modif représentation câblage	S.C.		21/11/16	f
Supp. option fusible	S.C.		23/05/16	e
Modify	Des.	Appr.	Date	Rev.
Date 31/07/14	Design. S.C.	Approved	Scale	

DIAM4200 5kVA 400V
Wiring diagram

N° N 3 45 05103 h



AUGIER energy
BP 131 - 06513 CARROS Cedex - France
Phone : 04 92 08 62 00 - Fax : 04 92 08 62 31

Modify	Des.	Appr.	Date	Rev.
Ajout Ferrites & inversion 0V<=>15V sur T1	S.C.		22/02/18	b
FU1&2 2A=>3,15A + ajout Ferrites + supp L2-3-4-8	S.C.		16/11/17	a

DIAM4200 7,5 à 20kVA 400V
Wiring diagram

Date 31/08/17	Design. S.C.	Approuved	Scale	N° N 3 45 05366 b

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