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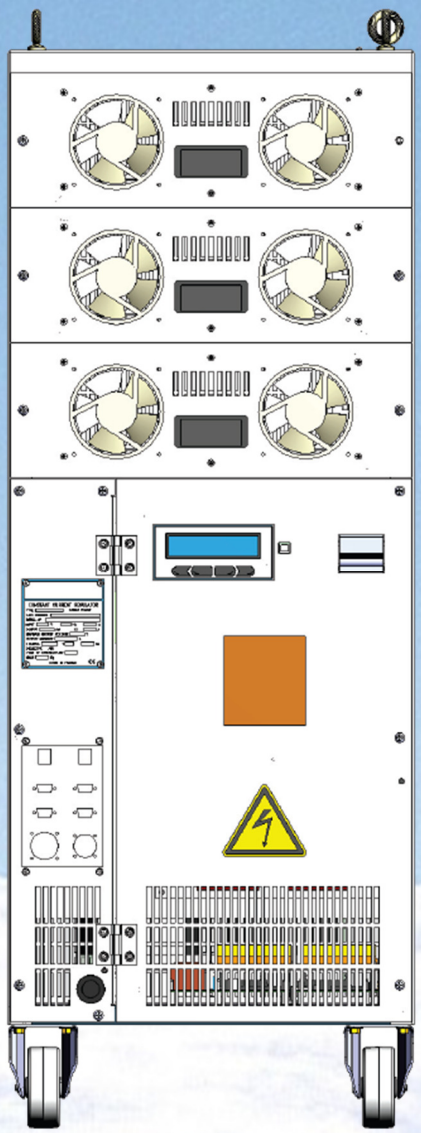
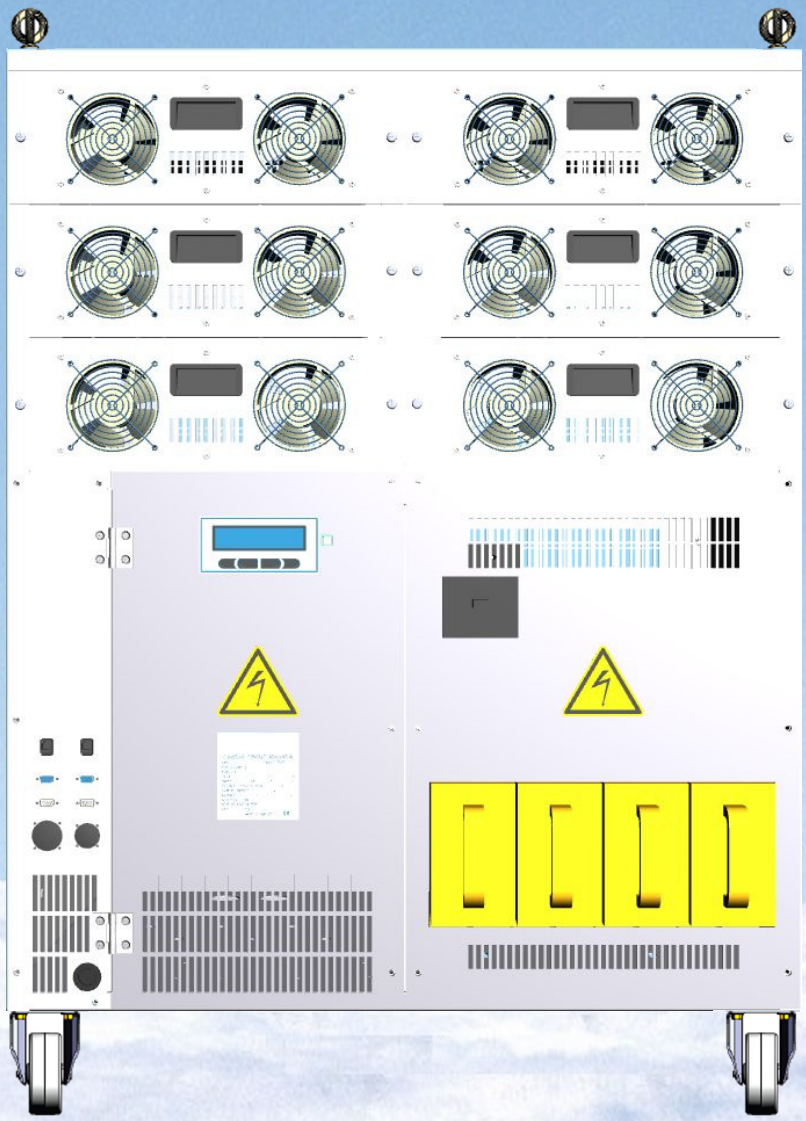
Installation & maintenance

DIAM4200 5-30kVA

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	11/11/2016
1.3		Add electrical dwg and spare parts 30kVA size		AL	AL	24/11/2016

WARRANTIES

Guarantee

AUGIER's products are guaranteed for one year from delivery date on the signed delivery note, and are guaranteed to be free from defects in materials used, design and manufacture.
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
- If these are repaired in AUGIER's factory;
- 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.

It is expressly agreed between the two parties that Buyer cannot avail himself of the beneficial dispositions contained in the guarantee without having first satisfied payment conditions laid down in contract

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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. Its remote control interface 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 OF 5-15KVA SIZE

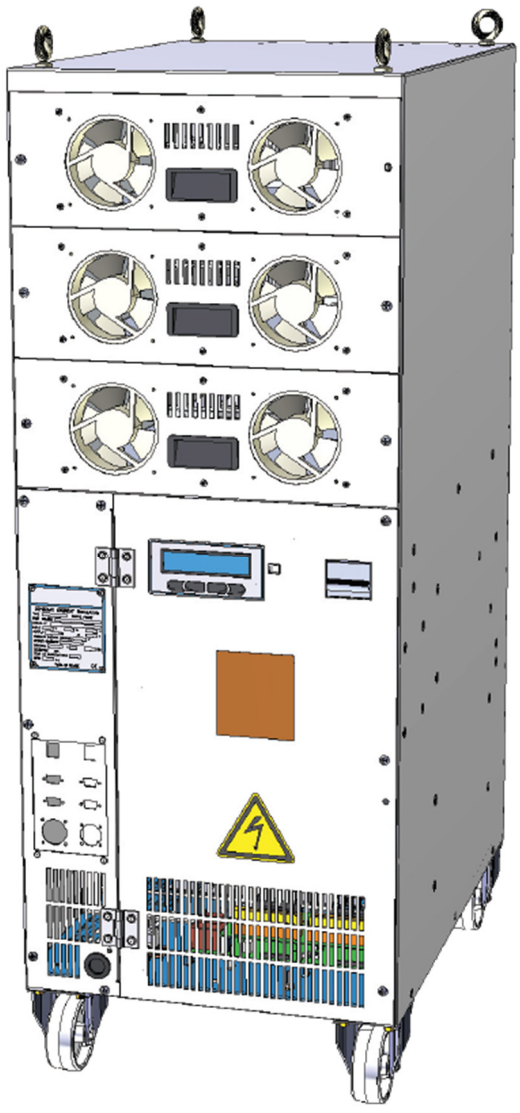
Each CCR is housed in a cabinet fitted with lifting rings.

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 DESCRIPTION OF 20-30KVA SIZE

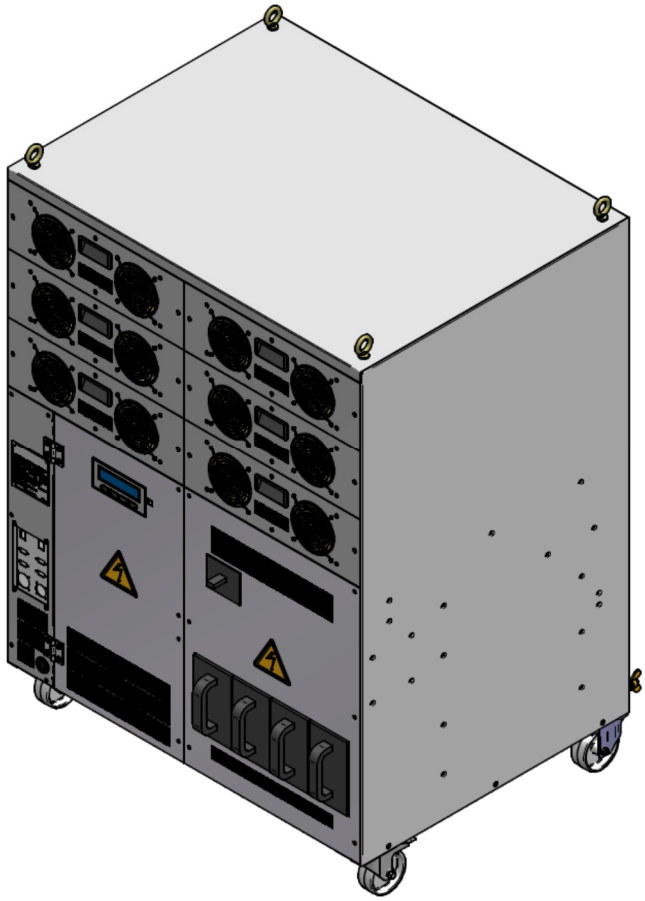
Each CCR is housed in a cabinet fitted with lifting rings.

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 four to six 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.2.3 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.

5 to 15kVA cabinet : 500mm Wide x 750mm Deep x 1380mm High

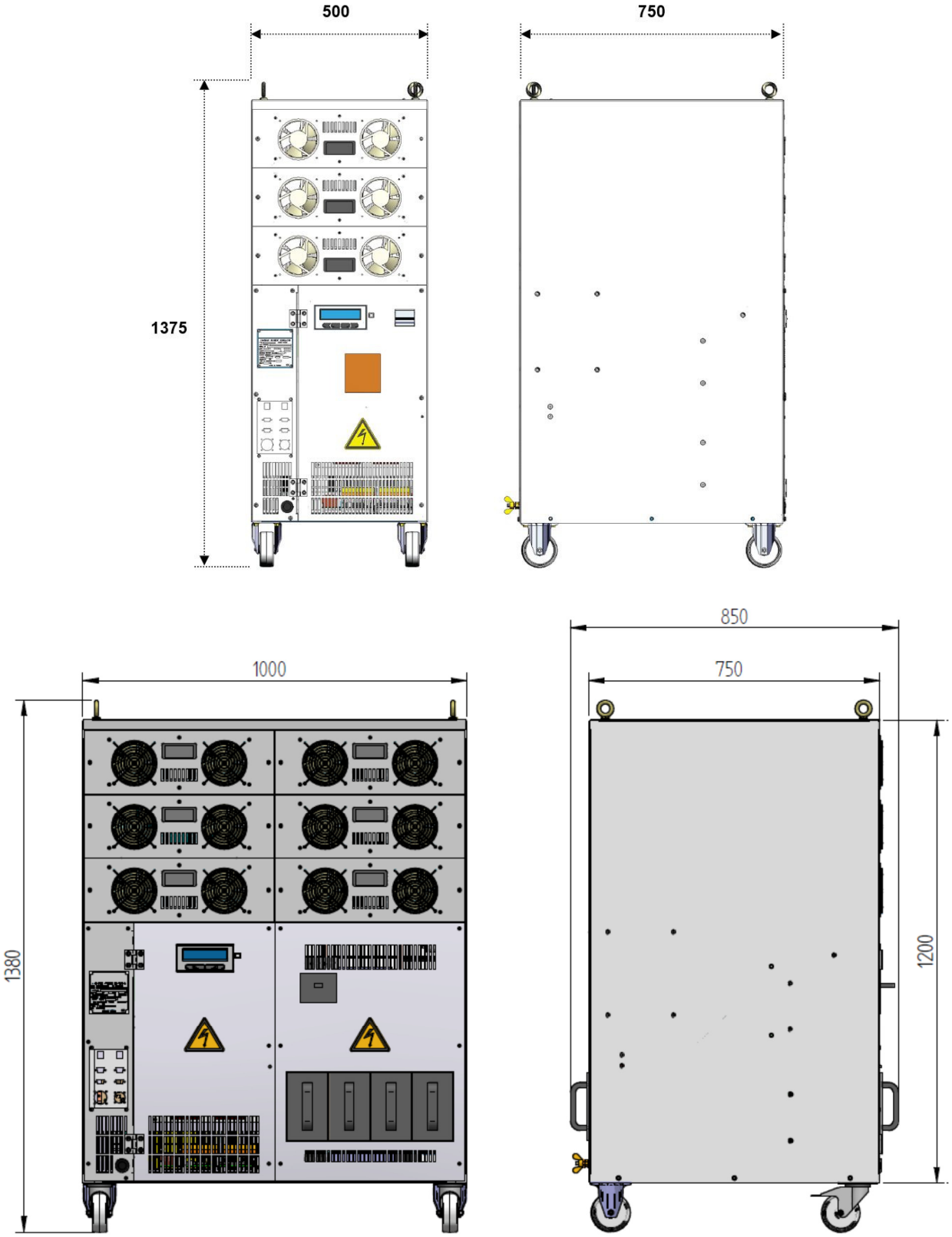
20 to 30kVA cabinet : 1.000mm Wide x 750mm Deep x 1380mm High

- Protection Index for the Casing: IP 21. (Contact us for other Protection Indices)
- Distances inter-axes (if casters option) :
    - 413 x 640 mm (5 to 15kVA cabinet)
    - 913 x 640 mm (20 to 30kVA cabinet)
- Usage: Ambient temperature between –20°C to +55°C (IEC type), with maximum relative humidity of 95%. Forced air cooling.

I.2.4 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.2.5 DIMENSIONS

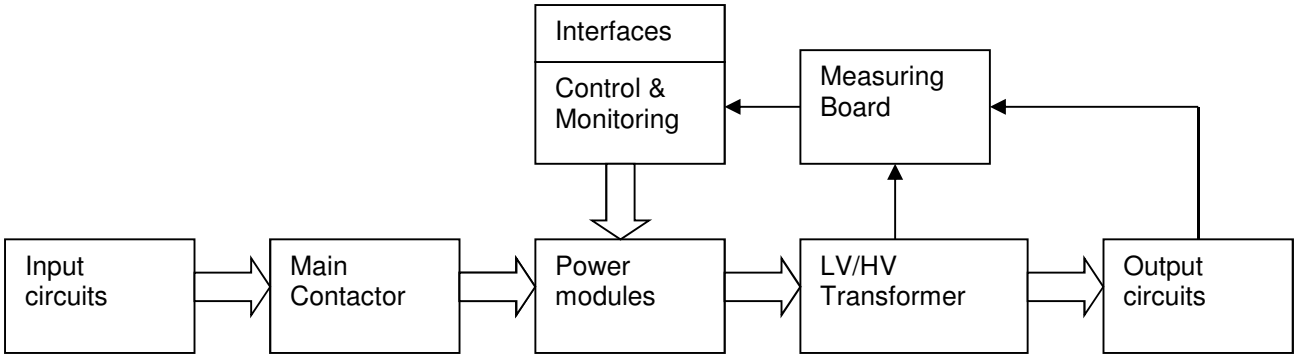


I.3 ELECTRICAL DESCRIPTION

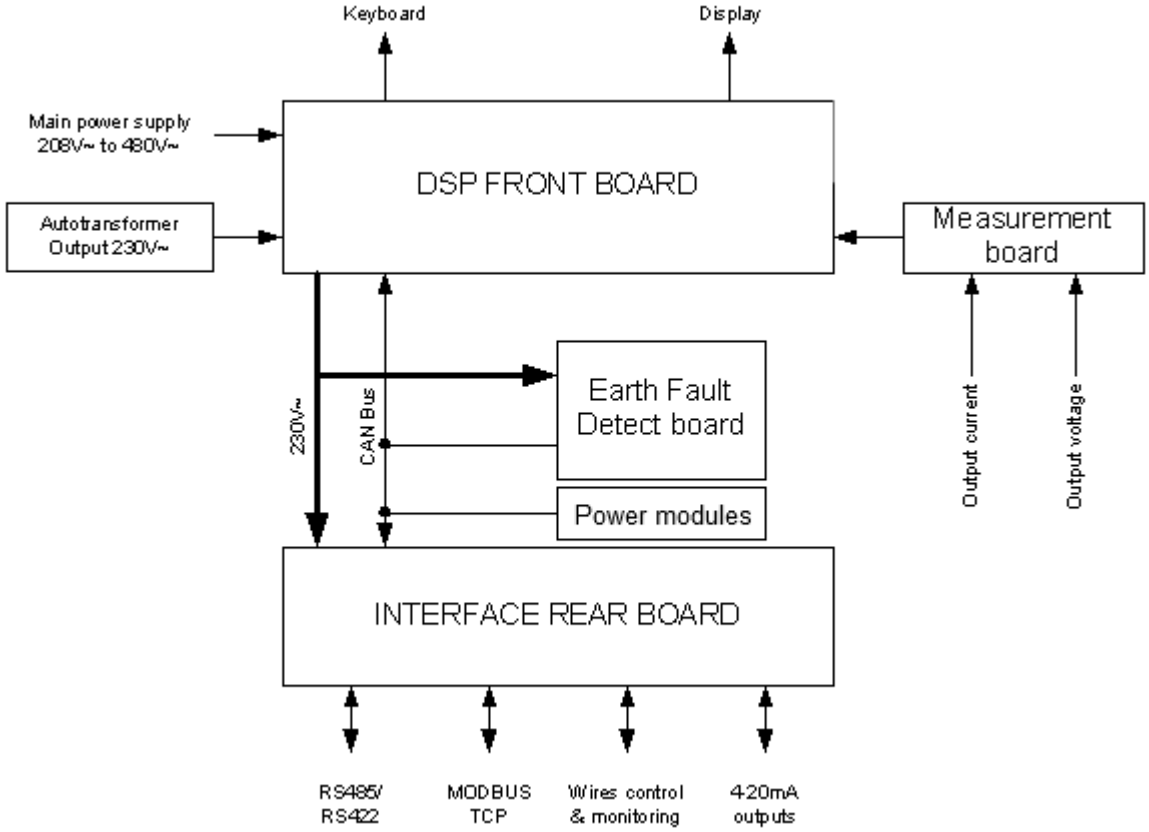
I.3.1 BLOCK DIAGRAMS

ⓘ 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:** 5, 7.5, 10, 15, 20, 25, 30 kVA

- **Power factor:**

  > 97% at nominal voltage and rated resistive load

- **Efficiency :** > 90% 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.

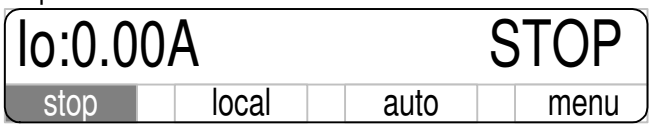
- **Lightning arrestors** :
  These regulators can be optionally provided with input and output lightning arrestors.

I.4 INSTRUCTIONS FOR USE

I.4.1 USER INTERFACE

Operating mode:

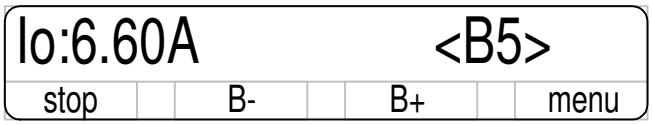
Stop mode :



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 :

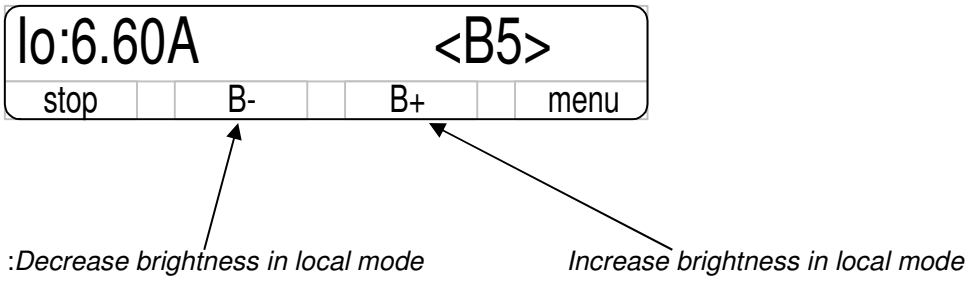


Access is given to B+ and B-, in order to increase / decrease the brightness.

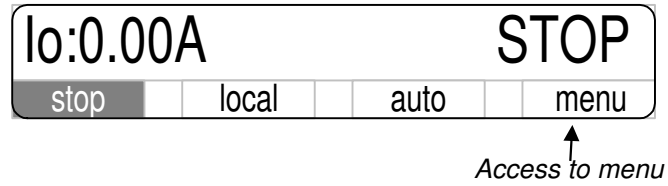
Remote control mode :

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

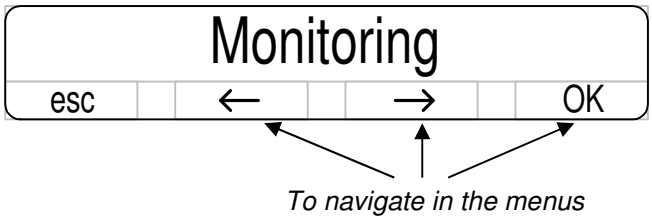
Brightness selection in local mode:



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 :

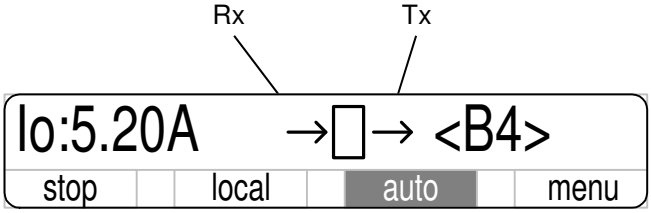
Cancel fault(s)

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) :

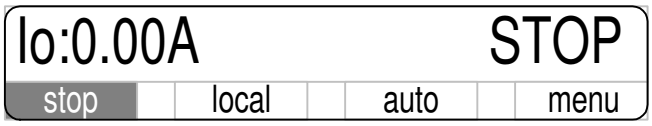
- upper line: information datas),
- lower line :key definition.

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

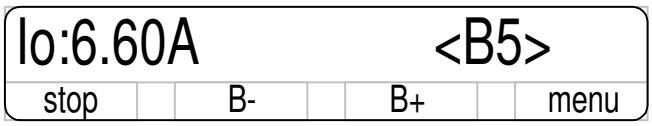
The device is controlled by mean of a 4 buttons keypad which allows to change the operating mode: “Stop” – Manual or “Local” mode – Remote or “Auto” control mode.

- **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.

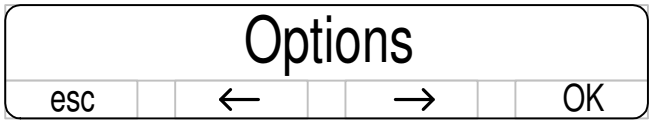
ⓘ See the JBUS table in the appendix b: jbus table, for more details.

I.5 OPERATION

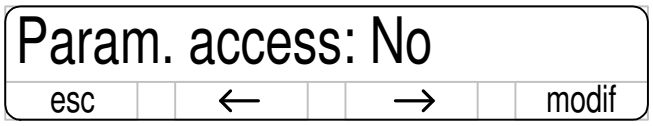
ⓘ **The "*Parameter Access"* function must be activated before changing parameters, in order to avoid unwanted changes.**

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

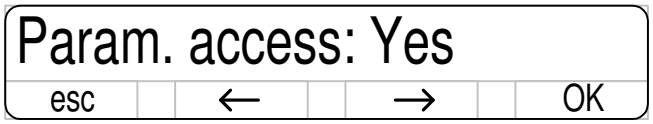
then scroll through the top-level menu items using the ◄— and —► keys. When the "*Options*" item is shown like:



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: *5-7.5-10-15-20-25-30*
- 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.5.2.1 Current 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.5.3.1 LV 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

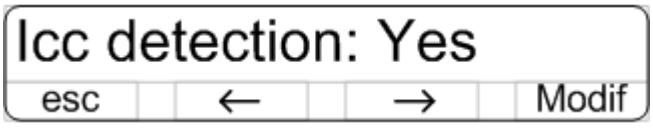
I.5.3.2 "Open circuit":

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).

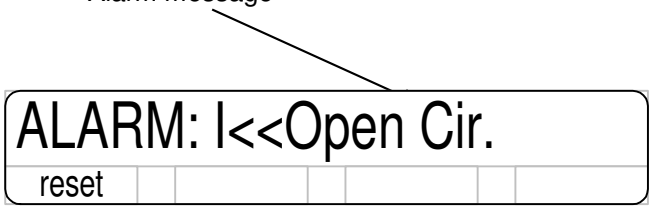
An Overcurrent fault can be automatically cancelled according to the value of the "*Restarts number*" parameter.
As each fault occurs, the number of faults is incremented. If the number of faults is greater than or equal to "*Restarts number*" in a period of less than 10s the fault is activated. The 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.6 SUB-ASSEMBLIES

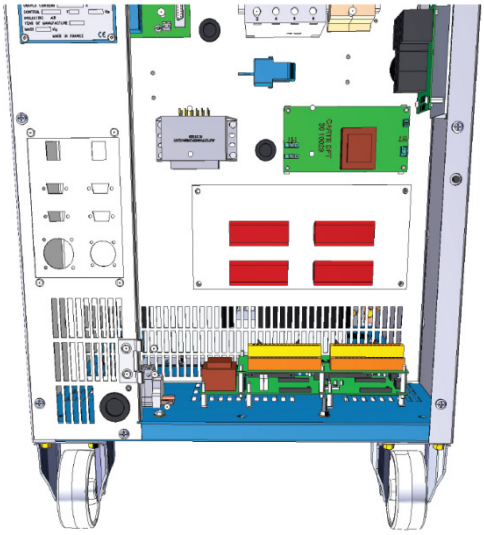
I.6.1 CUT OUT AND EARTHING PLATE (OPTION)

AUGIER'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 and earthing plate, using two jumpers which allows to carry out all maintenance and measurement operations, without unscrewing any load terminal or earth connection, and without requiring any special tools.

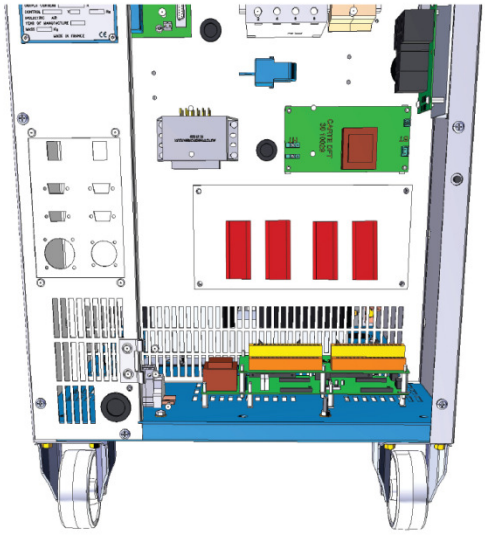
I.6.1.1 Normal position :

It is the operational position (jumpers In horizontal position).



I.6.1.2 Safety position:

By removing the two jumpers from the previous operating position as above, the CCR will be disconnected from the loop in a safe and clearly visible way. Then, placing the two jumpers in horizontal position, CCR's output and the two loop's terminals (still isolated) will be short-circuited and grounded.



ⓘ This is the **safe position**, allowing works to be carried out on the field : CCR is short-circuited to the earth, and separately from the loop, also short-circuited and earthed.

ⓘ WARNING : Although the CCR and the loop are earthed, the CCR can be switched ON : In that case, it regulates a constant current through the upper jumper.

I.6.1.3 Load measurements:

Removing the lower jumper, CCR will be still short-circuited and earthed, but loop's terminals will be let free, in order to allow to proceed at all insulation and continuity measurements, which can be carried out as well as any other testing or research operations concerning the load.

ⓘ This is the **measurement position** of the cut-out plate.

ⓘ WARNING : Although the CCR and the loop are isolated, the CCR can be switched ON : In the case where the two jumpers are removed, it should fail in "Open Circuit".

CAUTION:
In order to avoid damaging the pins of the jumpers, do not push or pull it asymmetrically from the sockets : They must be placed or withdrawn with the two hands, distributing efforts at each end so that its movement remains perpendicular to the plate, the body remaining parallel with the plate.

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 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.8.2 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.8.3 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.

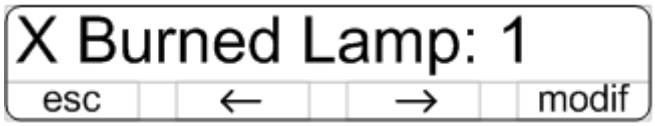
I.8.4 CASTERS

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

I.8.5 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*":

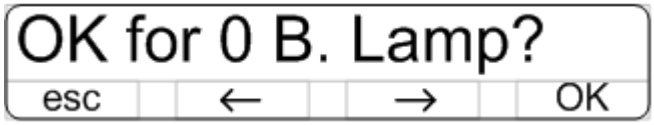


The X number must be set in function of the total number of lamps in the loop to realize the calibration (X can be set for 1 to 10 lamps).

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%).

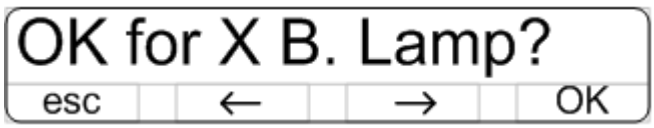
Initialisation can be carried out in two stages:

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.8.6 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.8.7 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.8.8 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.8.9 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

	230V Power Supply		400V Power Supply	
Power	**LV cable gauge**	**LV circuit breaker**	**LV cable gauge**	**LV circuit breaker**
20 kVA	50 mm²	NSX250F TM200D	25 mm²	NSX100F TM125D
25 kVA	70 mm²	NSX250F TM250D	35 mm²	NSX160F TM160D
30 kVA	95 mm²	NSX400F TM300D	35 mm²	NSX250F TM200D

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 0 in order to configure the remote control mode.

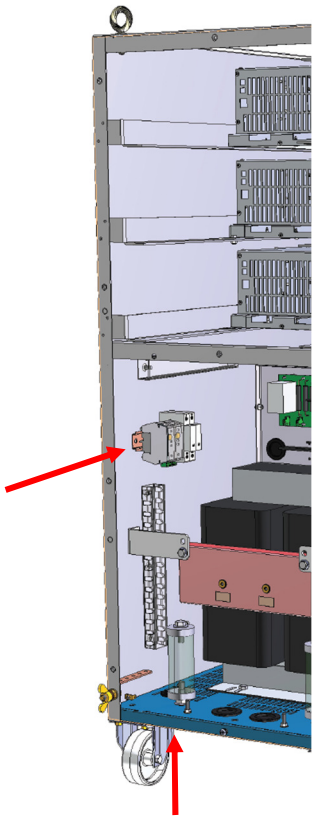
II.2 CONNECTIONS

II.2.1 POWER AND EARTH

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

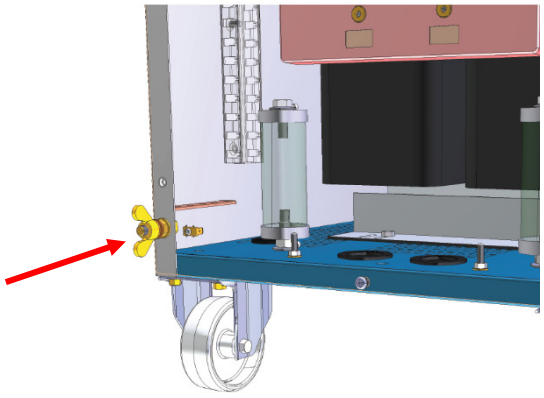
II.2.1.1 LV supply:

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).

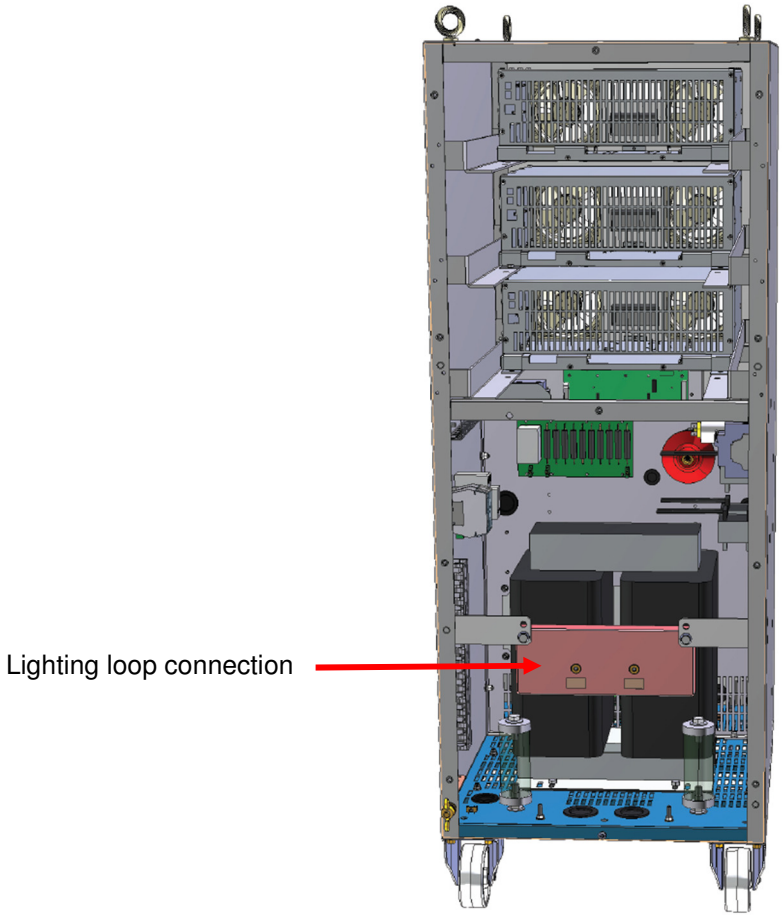
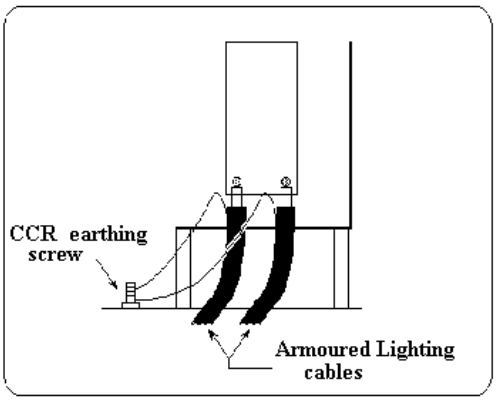
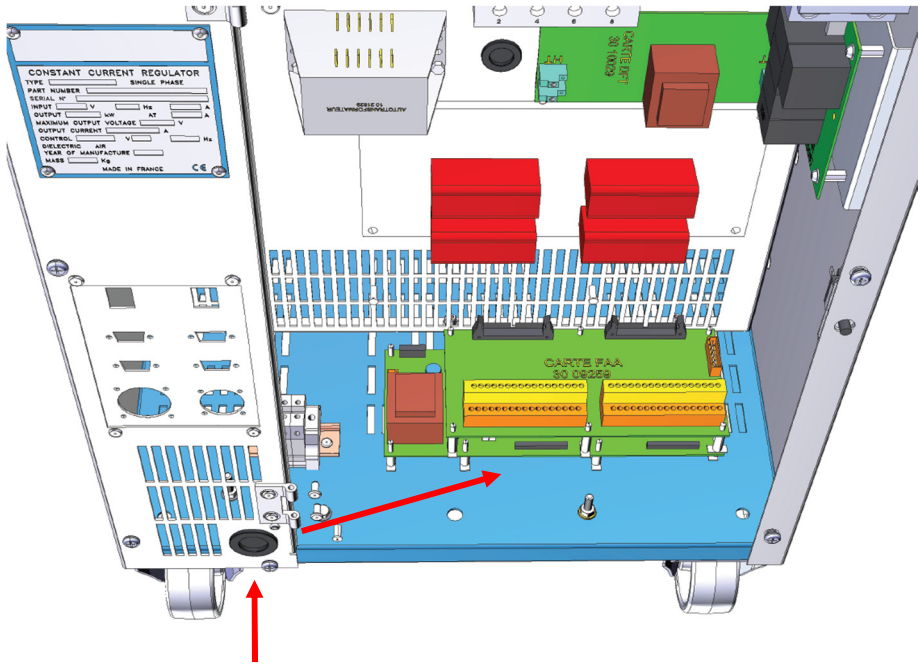


Diagram: load connection

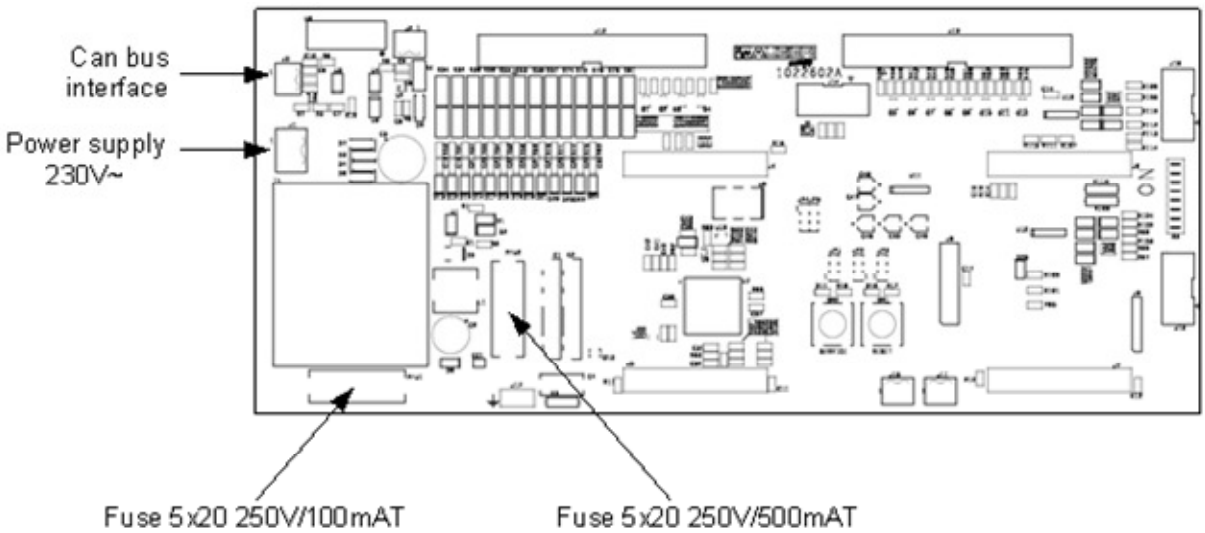


II.2.2 REMOTE CONTROL CONNECTIONS

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.

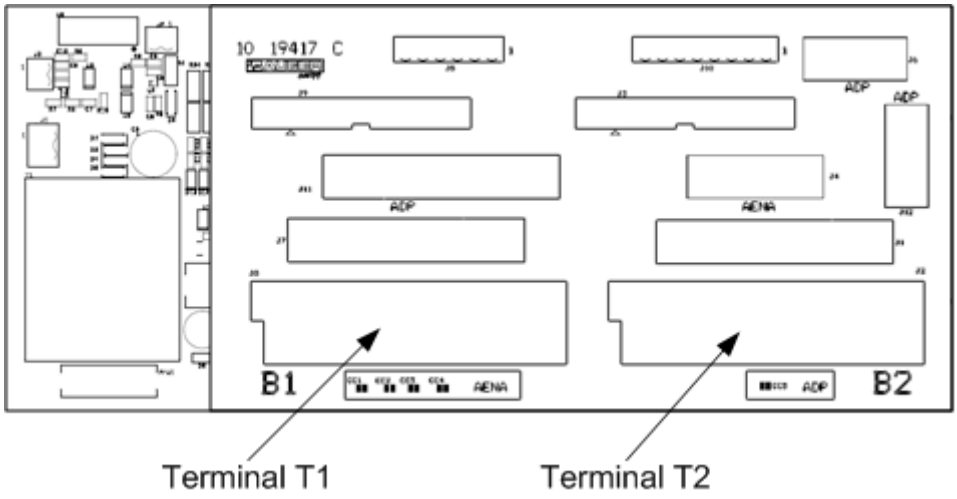


The control cables run from the front panel into the rubber grommet, and have to be connected to the interface board laid on the frame.



II.2.2.1 IEC Multiwire remote control (IEC type CCRs only):

This board is used for all standards based on IEC standard (STNA...) or if the relays board type FAA is not needed.



II.2.2.1.1 Terminal block T1 (Inputs and brightness indication)

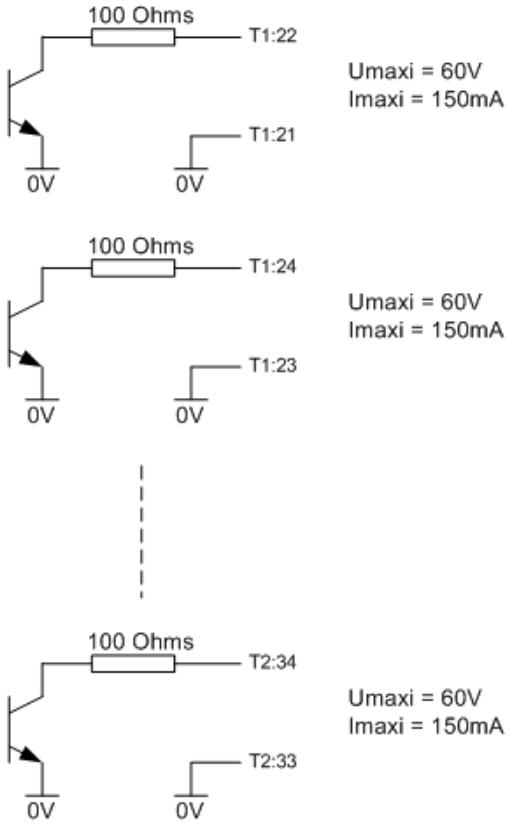
N°	Function	Type
1	B0 control	Input voltage or Contact with respect to C
2	B1 control	Input voltage or Contact with respect to C
3	B2 control	Input voltage or Contact with respect to C
4	B3 control	Input voltage or Contact with respect to C
5	B4 control	Input voltage or Contact with respect to C
6	B5 control	Input voltage or Contact with respect to C
7	B6 control	Input voltage or Contact with respect to C
8	B7 control	Input voltage or Contact with respect to C
9	“ON” control	Input voltage or Contact with respect to C
10	Aux1 control	Input voltage or Contact with respect to C
11	Aux2 control	Input voltage or Contact with respect to C
12	Aux3 control	Input voltage or Contact with respect to C
13	Aux4 control	Input voltage or Contact with respect to C
14	C	Common to Pin1 to Pin 13 inputs (note 2)
15	NOT USED	
16	NOT USED	
17	NOT USED	
18	NOT USED	
19	NOT USED	
20	NOT USED	
21-22	B0 return (On)	Open collector (note 3)
23-24	B1 return	Open collector (note 3)
25-26	B2 return	Open collector (note 3)
27-28	B3 return	Open collector (note 3)
29-30	B4 return	Open collector (note 3)
31-32	B5 return	Open collector (note 3)
33-34	B6 return	Open collector (note 3)

ⓘ The remote control **protection fuse** is marked as PFU2 on the interface board (5x20mm 250V/500mAT)

II.2.2.1.2 Terminal block T2 (other outputs)

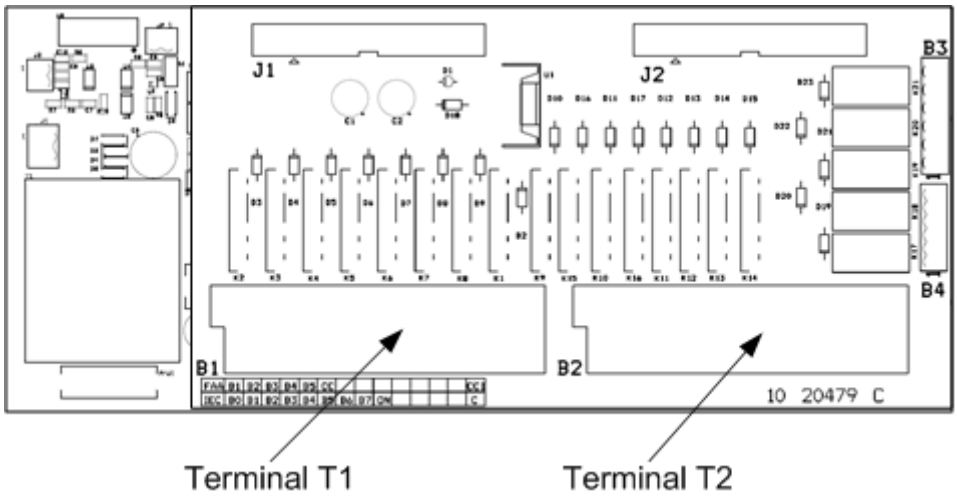
N°	Function	Type
1-2	B7 return	Open collector (note 3)
3-4	Local mode	Open collector (note 3)
5-6	Remote control mode	Open collector (note 3)
7-8	Voltage-current-flow	Open collector (note 3)
9-10	Current error	Open collector (note 3)
11-12	Open circuit	Open collector (note 3)
13-14	Overcurrent	Open collector (note 3)
15-16	Regulation error	Open collector (note 3)
17-18	Ground fault level 1	Open collector (note 3)
19-20	Ground fault level 2	Open collector (note 3)
21-22	Fault lamps level 1	Open collector (note 3)
23-24	Fault lamps level 2	Open collector (note 3)
25-26	Hour meter	Open collector (note 3)
27-28	Aux1 output (CIMALT)	Open collector (note 3)
29-30	Aux2 output (T°1)	Open collector (note 3)
31-32	Aux3 output (T°2)	Open collector (note 3)
33-34	Aux4 output (SV)	Open collector (note 3)
	Power measurement	(+) (-) 4-20mA

Note 1: Optional connector or terminal-bloc
Note 2: for configuring the remote control type, see Wiring remote control voltage configuration.
Note 3: Outputs circuit: pins T1:21, 23, 25, 27, 29, 31, 33 and pins T2:1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33 are connected to 0V (see schematic below)



II.2.2.2 SOURIAU multiwire remote control with 20 to 60Vdc control supply

This relay board is used for SOURIAU circulars connectors, 12 and 19 pins.



II.2.2.2.1 Control (20 to 60 Vdc only) :

Terminal	T.Bloc	Function	SOURIAU	Pin Type
1	T1	B1 control	12b/9	Input voltage with respect to C
2	T1	B2 control	12b/2	Input voltage with respect to C
3	T1	B3 control	12b/3	Input voltage with respect to C
4	T1	B4 control	12b/4	Input voltage with respect to C
5	T1	B5 control	12b/5	Input voltage with respect to C
6	T1	“ON” control	12b/7	Input voltage with respect to C
14	T1	C	12b/1	Common to Pin1 to Pin 13 inputs (Note 2)

Note 2: for configuring the remote control type, see Wiring remote control voltage configuration.

II.2.2.2.2 Monitoring (dry contacts):

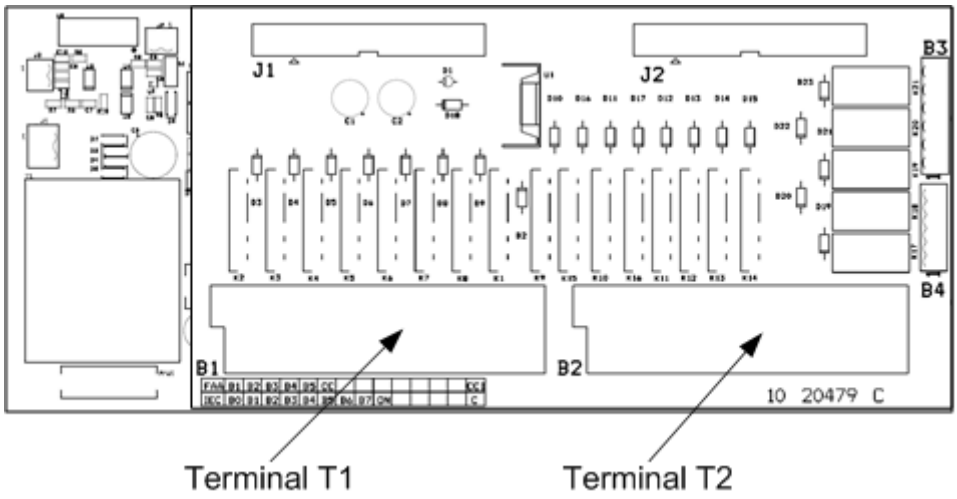
II.2.2.2.3

Terminal	T.Bloc	Function	SOURIAU	Pin Type
16-17	T1	B1 return	19b/1-2	Dry contact
18-19	T1	B2 return	19b/3-4	Dry contact
20-21	T1	B3 return	19b/5-6	Dry contact
22-23	T1	B4 return	19b/7-8	Dry contact
26	T1	Local	19b/12	Dry contact
27	T1	Common local/Remote	19b/11, 12b/6	Dry contact
28	T1	Remote	12b/10	Dry contact
29	T1	No power supply/no current	19b/18	Dry contact
30	T1	Common power supply/current	19b/17	Dry contact
31	T1	Power supply/current flow	19b/19	Dry contact
32-33	T1	Open circuit	19b/13-14	Dry contact
1-2	T2	Over current	19b/15-16	Dry contact
7-8	T2	Ground fault level 1	19b/9-10	Dry contact

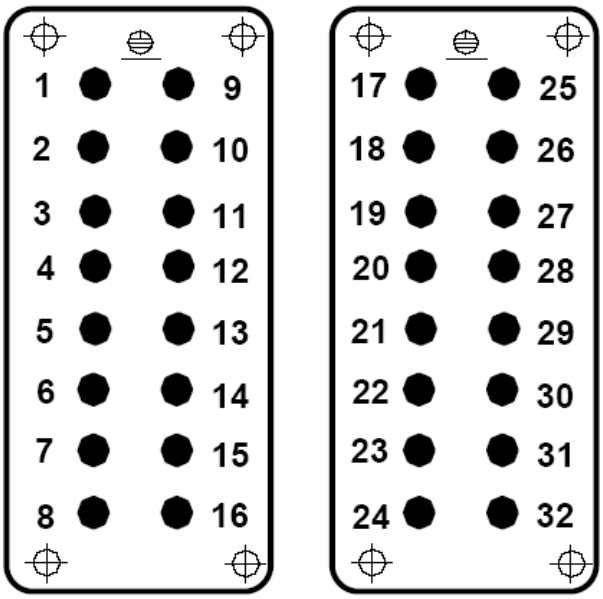
Contact Relays: 125VAC / 2A or 125VDC / 2A resistive load

II.2.2.3 AENA multiwire remote control with 20 to 60Vdc control supply

This relay board is used for AENA connectors:



AENA connectors:



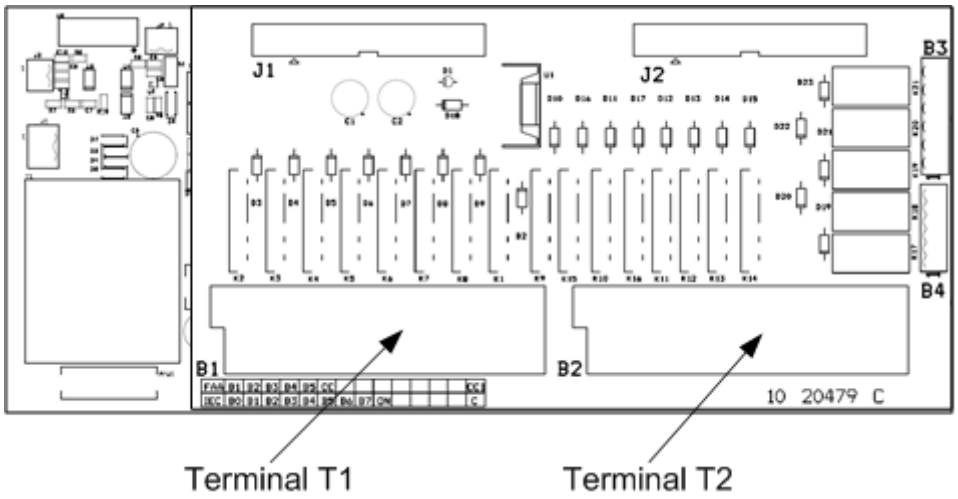
Control and monitoring connections (AENA 2004):

AENA PIN	DESCRIPTION	VOLTAGE	FUNCTION	T1-T2 PIN
1	Command step 1	+ 48V	Control	T1-1
2	Command step 2	+ 48V	Control	T1-2
3	Command step 3	+ 48V	Control	T1-3
4	Command step 4	+ 48V	Control	T1-4
5	Command step 5	+ 48V	Control	T1-5
6	ON / OFF	+ 48V	Control	T1-6
7	Acknowledge of signalling voltage	Configurable	Monitoring	COM
8	Signalling Common	Configurable	Monitoring	COM
9	Confirmed brightness step 1	Configurable	Monitoring	T1-17
10	Confirmed brightness step 2	Configurable	Monitoring	T1-19
11	Confirmed brightness step 3	Configurable	Monitoring	T1-21
12	Confirmed brightness step 4	Configurable	Monitoring	T1-23
13	Confirmed brightness step 5	Configurable	Monitoring	T1-25
14	Local / remote signalling	Configurable	Monitoring	T1-28
15	Free			
16	Signalling open circuit alarm	Configurable	Monitoring	T1-31
17	Common command	Configurable	Control	T1-14
18	Common signalling	Configurable	Monitoring	COM
19	Constant current regulator ON	Configurable	Monitoring	T1-34
20	Over current alarm	Configurable	Monitoring	T2-3
21	Burnout lamp warning	Configurable	Monitoring	T2-6
22	Constant current regulator out of range alarm	Configurable	Monitoring	T2-9
23	Burnout lamp alarm	Configurable	Monitoring	T2-12
24	Earth fault warning	Configurable	Monitoring	T2-15
25	Earth fault alarm	Configurable	Monitoring	T2-18
26	High temperature warning	Configurable	Monitoring	T2-21
27	High temperature alarm	Configurable	Monitoring	T2-24
28	Constant current regulator in remote mode	Configurable	Monitoring	T2-26
29	Short-circuit signalling	Configurable	Monitoring	T2-28
30	Free			
31	Power measurement “SMP” 4-20mA		Monitoring	J10-1
32	Power measurement “SMP” 4-20mA		Monitoring	J10-2

Note:

COM connected to T1-16, T1-18, T1-20, T1-22, T1-24, T1-27, T1-30, T1-33, T2-2, T2-5, T2-8, T2-11, T2-14, T2-17, T2-20, T2-23, T2-25, T2-27.

II.2.2.4 FAA Multiwire remote control with 20 to 60Vdc control supply



II.2.2.5 FAA Multiwire remote control with EXTERNAL 20 to 60Vdc control supply

When delivered, the CCR is configured in factory as :
- "External" power supply: see Wiring remote control voltage configuration.
- "ON order" : see Operating modes for multiwire (FAA & IEC) remote control :
- Default brightness B1 (2.8A)
- 1, 3 or 5 brightness, as ordered and indicated in the part number (see at the end appendix C: PART NUMBER IDENTIFICATION:)

The 34-pin terminal blocks making up the inputs and outputs for remote control are situated at the back of the CCR.

II.2.2.5.1 Inputs (20 to 60 Vdc only) :

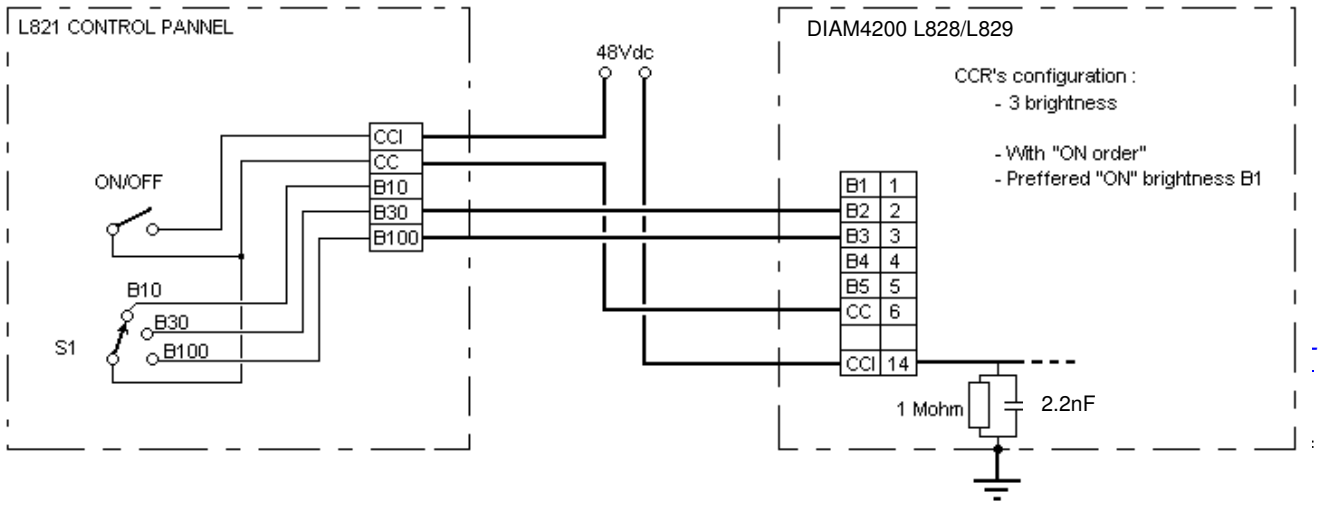
Terminal	T.Bloc	Function	FAA label	Pin Type
1	T1	B1 control	B1	Input voltage with respect to C
2	T1	B2 control	B2	Input voltage with respect to C
3	T1	B3 control	B3	Input voltage with respect to C
4	T1	B4 control	B4	Input voltage with respect to C
5	T1	B5 control	B5	Input voltage with respect to C
6	T1	"ON" control	CC	Input voltage with respect to C
7	T1	Circuit 1 control (*)		Input voltage with respect to C
8	T1	Circuit 2 control (*)		Input voltage with respect to C
9	T1	Circuit 3 control (*)		Input voltage with respect to C
10	T1	Circuit 4 control (*)		Input voltage with respect to C
11	T1	Circuit 5 control (*)		Input voltage with respect to C
12	T1	Aux 1 control (**)		Input voltage with respect to C
13	T1	Aux 2 control (**)		Input voltage with respect to C
14	T1	C	CCI	Common to Pin1 to Pin 13 inputs

Notes :
FAA Labels :
- CCI is the common of the external power supply (20 to 60Vdc) for all inputs (Pins 1 to 13).
- CC : when selected, the CCR goes to B1 (see Operating modes for multiwire (FAA & IEC) remote control :)
(*) If there is a built-in circuit selector under the CCR (2 to 5 ways)
(**) Not used : for special applications

ⓘ The remote control **protection fuse** is marked as PFU2 on the interface board (5x20mm 250V/500mAT)

II.2.2.6 Example of FAA wiring : EXTERNAL 48Vdc

- According AC150/5340-30, and only for control lines
- 3 Steps CCR
- Polarity : irrelevant (see Wiring remote control voltage configuration):



II.2.2.7.1 Inputs (contacts free of voltage only) :

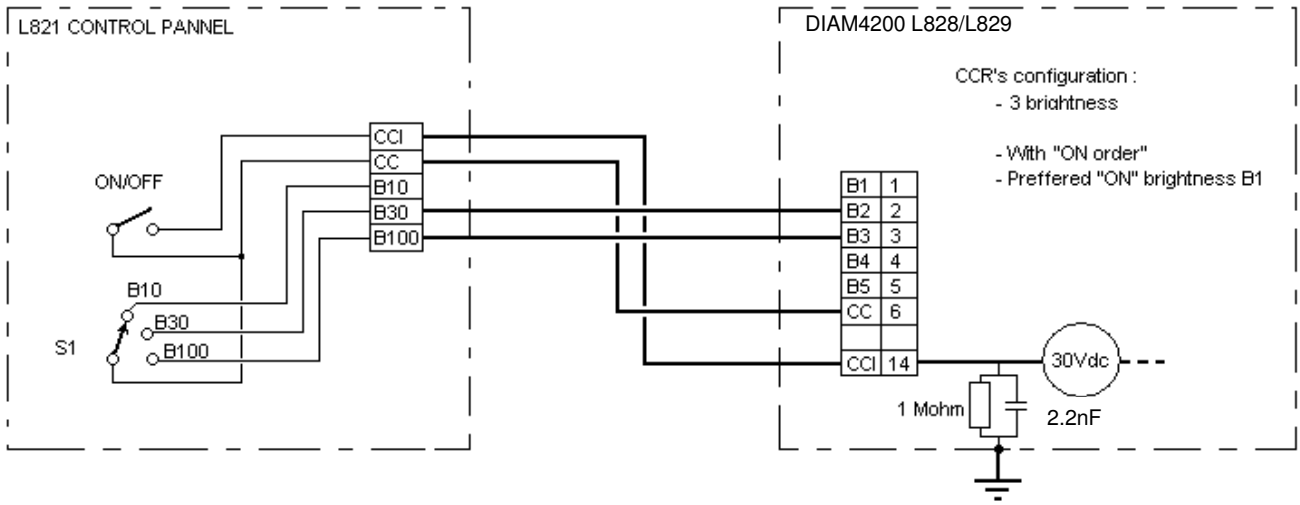
Terminal	T.Bloc	Function	FAA label	Pin Type
1	T1	B1 control	B1	Contact or short-circuit with C
2	T1	B2 control	B2	Contact or short-circuit with C
3	T1	B3 control	B3	Contact or short-circuit with C
4	T1	B4 control	B4	Contact or short-circuit with C
5	T1	B5 control	B5	Contact or short-circuit with C
6	T1	“ON” control	CC	Contact or short-circuit with C
7	T1	Circuit 1 control (*)		Contact or short-circuit with C
8	T1	Circuit 2 control (*)		Contact or short-circuit with C
9	T1	Circuit 3 control (*)		Contact or short-circuit with C
10	T1	Circuit 4 control (*)		Contact or short-circuit with C
11	T1	Circuit 5 control (*)		Contact or short-circuit with C
12	T1	Aux 1 control (**)		Contact or short-circuit with C
13	T1	Aux 2 control (**)		Contact or short-circuit with C
14	T1	C	CCI	Common to Pin1 to Pin 6 inputs

Notes :
FAA Labels :
- CCI : common of the internal power supply (30Vdc) : must be linked to an input for activation (Pins 1 to 13).
- “CC” : when selected, the CCR goes to B1 (see: Operating modes for multiwire (FAA & IEC) remote control :)

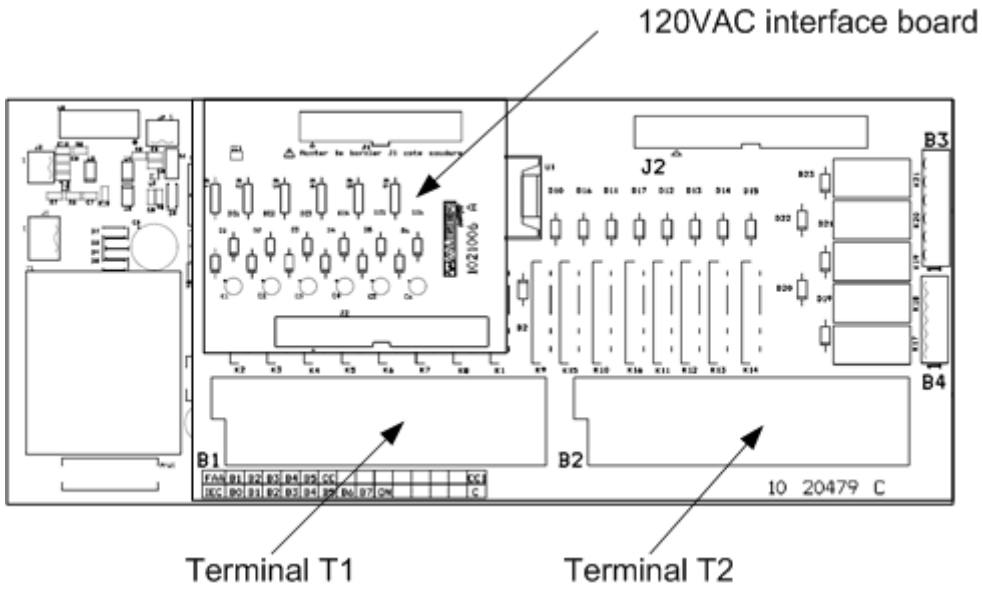
(*) If there is a built-in circuit selector under the CCR (2 to 5 ways)
(**) Not used : for special control

II.2.2.8 Example of FAA wiring : INTERNAL 20 to 60Vdc

- According AC150/5340-30, and only for control lines
- 3 Steps CCR



II.2.2.9 FAA Multiwire remote control with 120Vac control supply



II.2.2.10 FAA Multiwire remote control with EXTERNAL 120Vac control supply

When delivered, the CCR is configured in factory as :
- "External" power supply, see: Wiring remote control voltage configuration
- a small daughter board is plugged on J1 of the FAA remote control board
- "ON order" see: Operating modes for multiwire (FAA & IEC) remote control :
- Default brightness B1 (2.8A)
- 1, 3 or 5 brightness, as ordered and indicated in the part number (see at the end appendix C: PART NUMBER IDENTIFICATION

The 34-pin terminal blocks making up the inputs and outputs for remote control are situated at the back of the CCR.

II.2.2.10.1 Inputs (120Vac only) :

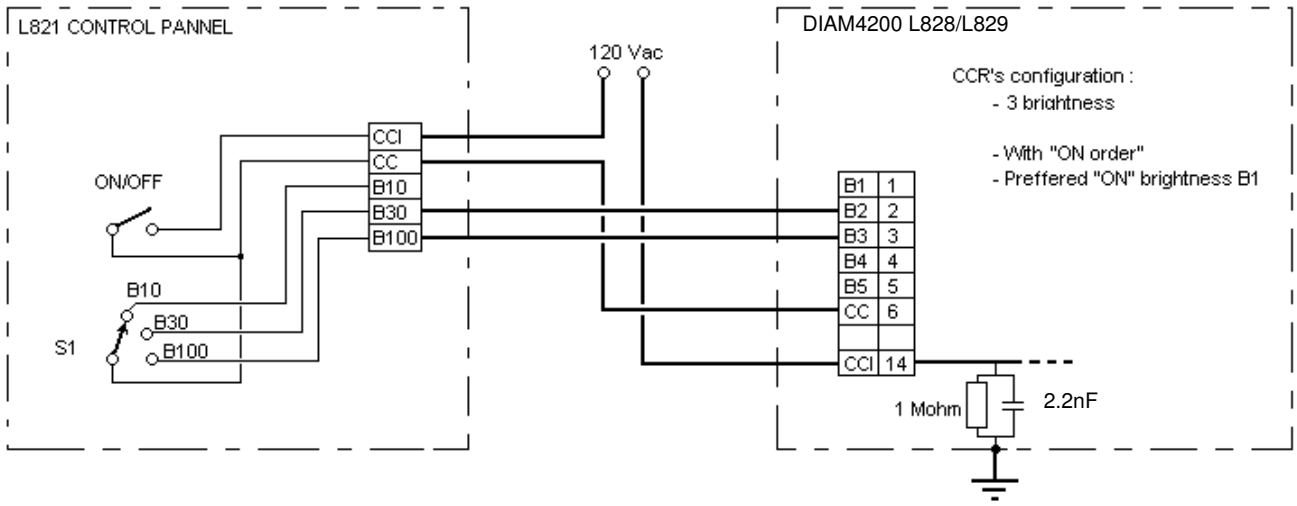
Terminal	T.Bloc	Function	FAA label	Pin Type
1	T1	B1 control	B1	Input voltage with respect to C
2	T1	B2 control	B2	Input voltage with respect to C
3	T1	B3 control	B3	Input voltage with respect to C
4	T1	B4 control	B4	Input voltage with respect to C
5	T1	B5 control	B5	Input voltage with respect to C
6	T1	"ON" control	CC	Input voltage with respect to C
7	T1	Not used (*)		
8	T1	Not used (*)		
9	T1	Not used (*)		
10	T1	Not used (*)		
11	T1	Not used (*)		
12	T1	Not used (*)		
13	T1	Not used (*)		
14	T1	C	CCI	Common to Pin1 to Pin 6 inputs

Notes :
FAA Labels :
- CCI is the common of the external power supply (120Vac) for all inputs (Pins 1 to 6).
- "CC" : when selected, the CCR goes to B1 (see: Operating modes for multiwire (FAA & IEC) remote control :)
(*) The "circuit selector" Option is not available with the 120 Vac option

ⓘ The remote control **protection fuse** is marked as PFU2 on the interface board (5x20mm 250V/500mAT)

II.2.2.11 Example of FAA wiring : EXTERNAL 120 Vac

- According AC150/5340-30, and only for control lines
- 3 Steps CCR
- Neutral : irrelevant
- Note than CCI is linked to earth through 1Mohm/2.2nF on the mother-board



II.2.2.12 FAA Multiwire remote control with INTERNAL 120Vac control supply

When delivered, the CCR is configured in factory as :
- "External" power supply, see: Wiring remote control voltage configuration
- a small daughter board is plugged on J1 of the FAA remote control board
- "ON order" see: Operating modes for multiwire (FAA & IEC) remote control :
- Default brightness B1 (2.8A)
- 1, 3 or 5 brightness, as ordered and indicated in the part number (see at the end appendix C: PART NUMBER IDENTIFICATION

The 34-pin terminal blocks making up the inputs and outputs for remote control are situated at the back of the CCR.

II.2.2.12.1 Inputs (contacts free of voltage only) :

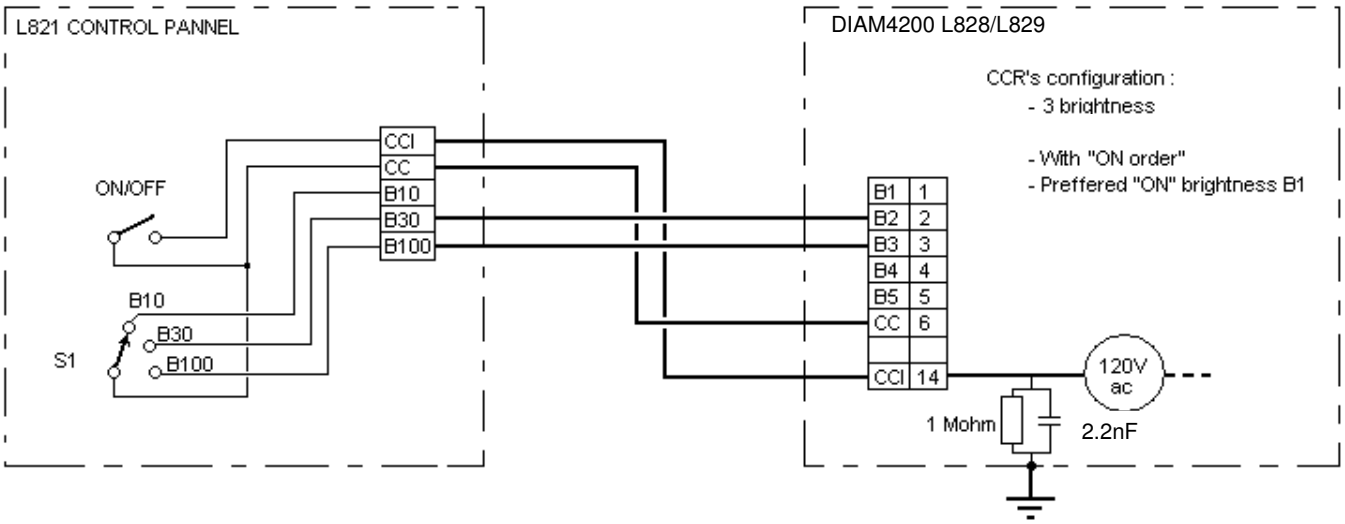
Terminal	T.Bloc	Function	FAA label	Pin Type
1	T1	B1 control	B1	Contact or short-circuit with C
2	T1	B2 control	B2	Contact or short-circuit with C
3	T1	B3 control	B3	Contact or short-circuit with C
4	T1	B4 control	B4	Contact or short-circuit with C
5	T1	B5 control	B5	Contact or short-circuit with C
6	T1	"ON" control	CC	Contact or short-circuit with C
7	T1	Not used (*)		
8	T1	Not used (*)		
9	T1	Not used (*)		
10	T1	Not used (*)		
11	T1	Not used (*)		
12	T1	Not used (*)		
13	T1	Not used (*)		
14	T1	C	CCI	Common to Pin1 to Pin 13 inputs

Notes :
FAA Labels :
- CCI : common of the internal power supply (120Vac) : must be linked to an input for activation (Pins 1 to 6).
- "CC" : when selected, the CCR goes to B1 (see: Operating modes for multiwire (FAA & IEC) remote control :)
(*) If there is a built-in circuit selector under the CCR (2 to 5 ways)
(**) Not used : for special control

ⓘ The remote control **protection fuse** is marked as PFU2 on the interface board (5x20mm 250V/500mAT)

II.2.2.13 Example of FAA wiring : INTERNAL 120Vac

- According AC150/5340-30, and only for control lines
- 3 Steps CCR
- The 120V source is isolated from mains.
- Note than CCI is linked to earth through 1Mohm/2.2nF on the mother-board



II.2.2.14 FAA Multiwire remote control outputs:

FAA TYPE (MONITORING)						
Terminal	Pin B1	Information feedback	Relay contact	CCR power		
				OFF	ON	
					Information feedback: NO	Information feedback: YES
T1	16	B1 return	COM			√
	17		NC			√
	18	B2 return	COM			√
	19		NC			√
	20	B3 return	COM			√
	21		NC			√
	22	B4 return	COM			√
	23		NC			√
	24	B5 return	COM			√
	25		NC			√
	26	Local mode return	NC	√		√
	27		COM	√	√	√
	28		NO		√	
	29	No power line / Loop current	NC	√		√
	30		COM	√	√	√
	31		NO		√	
	32	Open circuit alarm	NC	√		√
	33		COM	√	√	√
	34		NO		√	
T2	1	Over current alarm	NC	√		√
	2		COM	√	√	√
	3		NO		√	
	4	Regulation error alarm	NC	√		√
	5		COM	√	√	√
	6		NO		√	
	7	Earth fault Level 1 warning	NC	√		√
	8		COM	√	√	√
	9		NO		√	
	10	Earth fault Level 2 warning	NC	√		√
	11		COM	√	√	√
	12		NO		√	
	13	Burn lamp fault Level 1 warning	NC	√		√
	14		COM	√	√	√
	15		NO		√	
	16	Burn lamp fault Level 2 warning	NC	√		√
	17		COM	√	√	√
	18		NO		√	
	19	Power drop 10% or greater warning	NC	√		√
	20		COM	√	√	√
	21		NO		√	
	22	Load energized	NC	√	√	
	23		COM	√	√	√
	24		NO			√

Contact Relays: 125VAC / 2A or 125VDC / 2A resistive load

FAA TYPE (MONITORING)						
Terminal	Pin B1	Information feedback	Relay contact	CCR power		
				OFF	ON	
					Information feedback: NO	Information feedback: YES
T2	25	Circuit 1 energised	COM		√	
	26		NO		√	
	27	Circuit 2 energised	COM		√	
	28		NO		√	
	29	Circuit 3 energised	COM		√	
	30		NO		√	
	31	Circuit 4 energised	COM		√	
	32		NO		√	
	33	Circuit 5 energised	COM		√	
	34		NO		√	

Contact Relays: 125VAC / 0.3A or 30VDC / 1A resistive load

II.2.2.15 Wiring remote control voltage configuration

The DIAM CCR can be remotely controlled either by an external voltage (20 to 60 VDC positive or negative, or 120Vac), or by “free potential” contacts (internal power supply 30VDC from the CCR, or additional 120Vac source). This choice is made by the values at address 70 in the Jbus table.

CONTROL INPUTS CONFIGURATION									
Inputs configuration	**Fig**	**Jbus address**	**B7**	**B6**	**B5**	**B4**	**B3**	**B2**	**B1**	**B0**
External voltage +20V to +60V-- to control the inputs	1	70	X	**0**	X	X	X	X	**0**	**0**
External voltage -20V to -60V-- to control the inputs	2	70	X	**1**	X	X	X	X	**0**	**0**
Contacts to control the inputs. 24V-- internal voltage	3	70	X	**0**	X	X	X	X	**0**	**1**
FAA type only. External voltage 115V~ to control the inputs	4	70	X	**0**	X	**0**	X	X	**1**	**0**
FAA type only. Internal voltage 115V~ to control the inputs	5	70	X	**0**	X	**0**	X	X	**1**	**0**

Fig 1

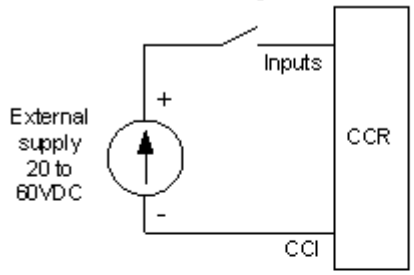


Fig 2

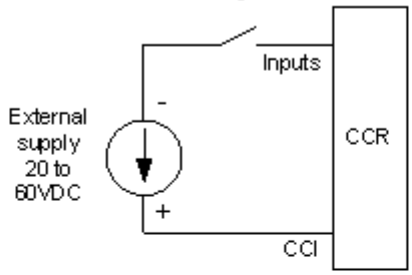


Fig 3

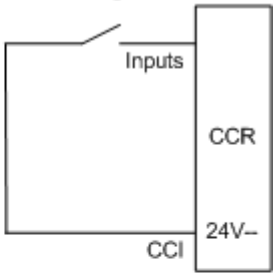


Fig 4

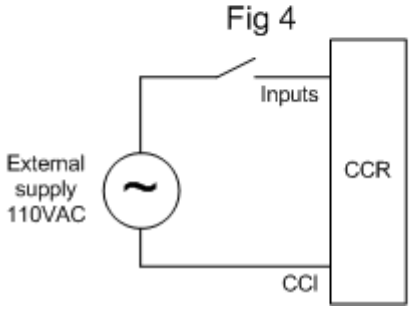
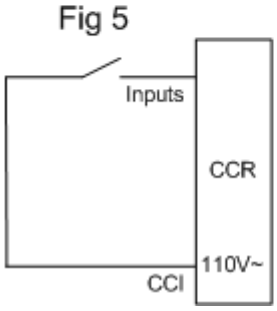


Fig 5



IMPORTANT NOTICE :

This control inputs configuration, as other configuration elements, are set in factory according the kind of remote control board and the type of control supply.

See the part number wrote on the identification plate to know the type of remote control delivered *(end appendix C: PART NUMBER IDENTIFICATION*
at the end of the manual)

II.2.2.16 Operating modes for multiwire (FAA & IEC) remote control

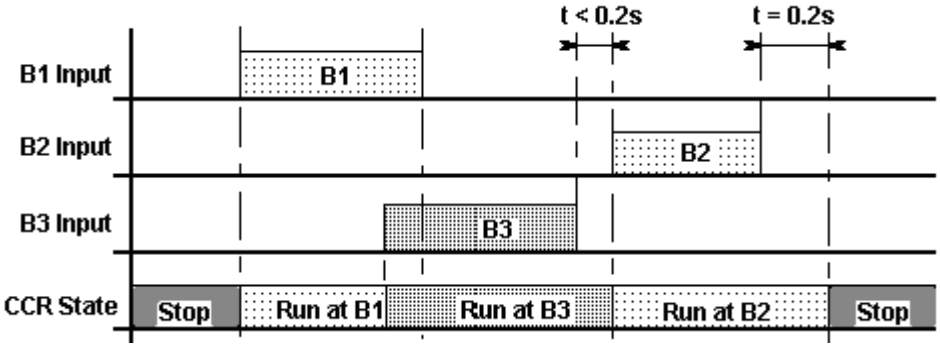
The device can be controlled in two ways:
- "*Without ON order",* with direct command of brightness levels. (preferred configuration)
- "*With ON order*" and brightness selection

The choice is made by setting a parameter in the jbus table using ALIZE4100 software.

ON ORDER CONFIGURATION									
Inputs configuration	**Jbus address**	**B7**	**B6**	**B5**	**B4**	**B3**	**B2**	**B1**	**B0**
Without ON ORDER	**69**	X	X	X	X	X	X	X	**0**
With ON ORDER (B0 Brightness)	**69**	X	X	X	X	X	X	**0**	**1**
With ON ORDER (B1 Brightness)	**69**	X	X	X	X	X	X	**1**	**1**

Without ON order:

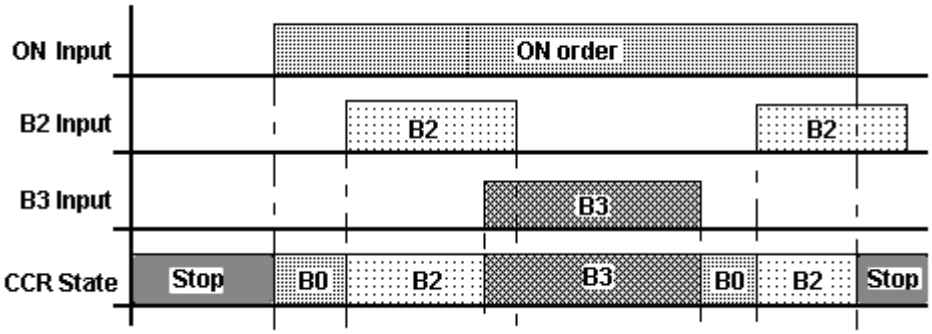
Activating input B0, B1,… B7 causes the device to start up at the selected brightness. The CCR stops 0.2s after any order has stopped.



With ON order:

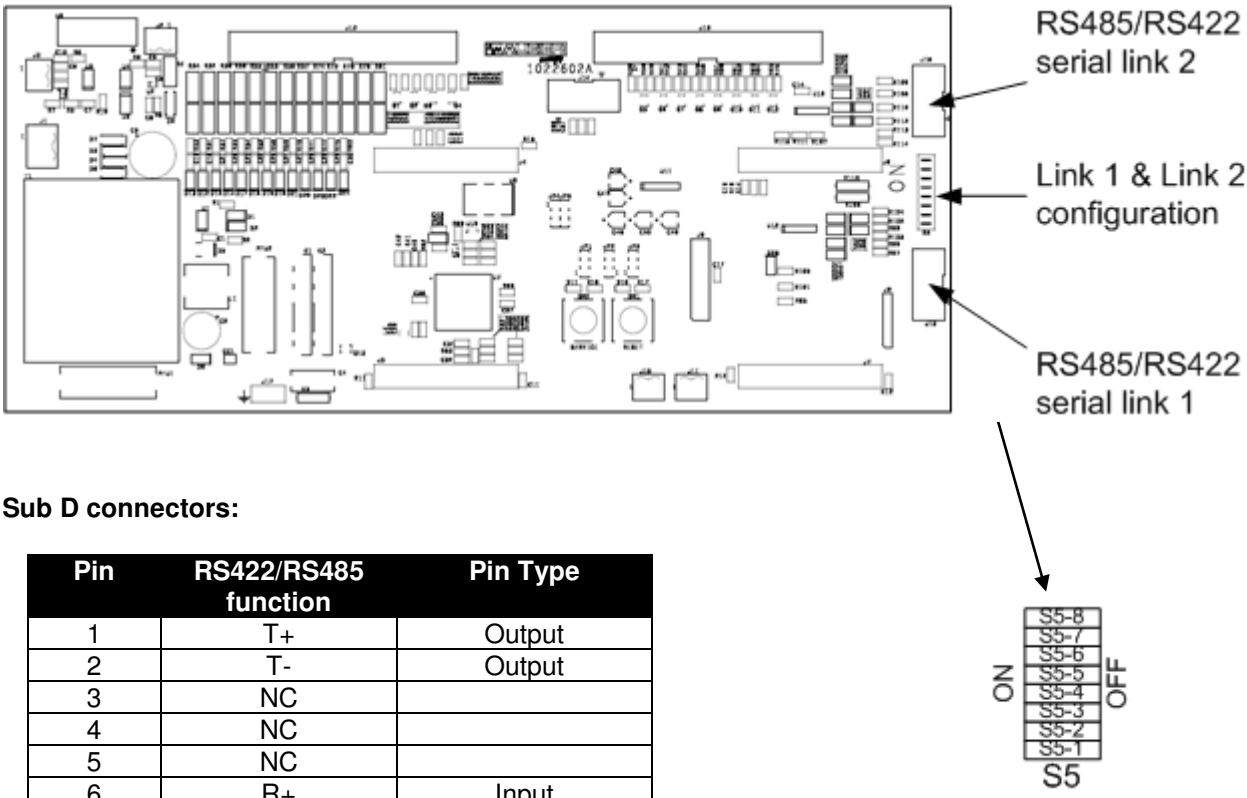
Activation of the "ON" input causes the CCR to start up at the preferred brightness defined (B0 or B1), if no brightness level has been selected.

Brightness level is changed by adding the desired brightness input.
The CCR stops when the "On" order is stopped whatever the states of the brightness inputs.
The choice of B0 or B1 is configurable using the ALIZE4100 software. (B0 is the default value)



II.2.2.17 RS485/RS422 Serial Link (Option):

Each serial link is equipped with two SubD 9-pin (1 female and 1 male sockets).
The links are electrically insulated from all the other circuits:



Sub D connectors:

Pin	RS422/RS485 function	Pin Type
1	T+	Output
2	T-	Output
3	NC	
4	NC	
5	NC	
6	R+	Input
7	R-	Input
8	NC	
9	NC	

RS422/RS485 network polarity and termination

Link number	Function	Dip switch
1	Termination impedance	S5-1
		S5-2
	Polarising resistors	S5-3
		S5-4
2	Termination impedance	S5-5
		S5-6
	Polarising resistors	S5-7
		S5-8

Polarising resistors.
Set the two switches to “ON” to activate the two polarising resistors on lines R- and R+. (value = 2200 ohms)

Generally, these switches are set to ON for the CCR on the end of the line. For all other CCRs linked on the same bus, leave them set to OFF.

Termination impedance.
- Set the two switches to “ON” to insert a 120 ohm resistance in the Jbus line.
- This impedance must *compulsorily* be inserted in the last CCR in the line, and *only* in this one.

N.B.: do not forget to connect similar impedance on the input line of the *master device* (robot or micro-computer), if this is placed at the end of the line and does not carry one.

Serial link parameters:

The asynchronous serial links are defined as follows:

Preferred parameters : 9600 baud, 8 data bits, 1 stop bits, no parity.
JBUS protocol with Id=1 at delivery.

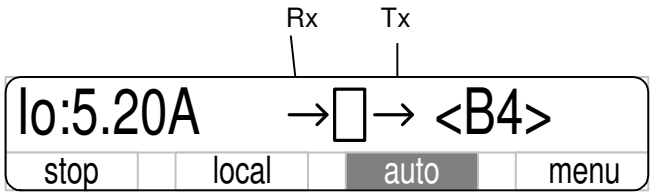
It is possible to change the speed and the ID in the "*Serial Link"* menu:

- Speed: **2400-4800-9600-19200** Baud
- ID: **1 to 249**

These changes are active after a device reset (mains disconnection).

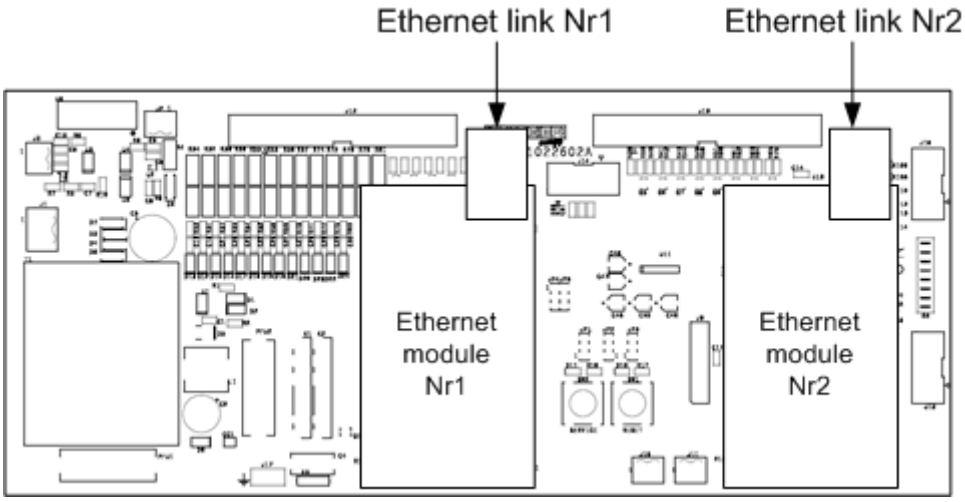
The 2 serial links access to the same jbus table with the same priority (the last order is the one taken).

Communication (for the link 1 or 2) is shown on the display, by mean of 2 arrows Rx & Tx :



ⓘ The JBUS table is defined in appendix b: jbus table

II.2.2.18 Ethernet link (Option):



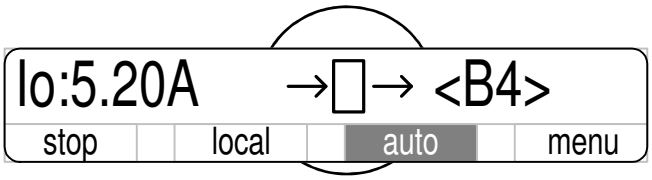
DIAM4100 CCR can be equipped with one or two Ethernet interfaces. The used protocol is **MODBUS TCP** (port 502).
Supplied functions are : function 3 (number of words <= 100), function 6.and function 16 (number of words =1) Slave ID = 1.

IP parameters:

Ethernet interface number	Default mask and address	Maximum number of sockets (clients)
1	Mask: 255.255.255.0 Address: 192.168.100.160	2
2	Mask: 255.255.255.0 Address: 192.168.100.161	2

The IP mask (4 bytes) and the IP adress (4 bytes) are configurable in the following menu:

Communication is shown on the display, by mean of 2 arrows in & out :



Connection of the network is made at the rear of the CCR (RJ45 8 pins)

II.2.2.19 Remote fail safe mode:

A « remote fail safe mode » can be set on the CCR. This mode is used to set a default brightness if the serial communication or the wire control fail.

- If the option « remote fail safe mode » is set, in case of loss of communication (timeout configurable in the jbus table) or cut out of the wire remote link, the CCR drive a default brightness (configurable in the jbus table).
- If this option is set; a permanent wire link must be applied on an wire input to avoid the CCR start in default brightness when the normal wire control is “off”.

Remote control board	Interface board reference	Permanent wire control
IEC board (without relay)	30 08928	B1 - 10
FAA board (with relays)	30 09259	B1 - 12

Adress 69, bit 5	Remote fail safe
0	No
1	Yes

Value at adress	Description	Default value	Value
140	Timeout	250 (=5s)	0 to 65535 (*20ms)
141	Default brightness	3	0 to 7, (0 = stop, X = Brightness X)

II.2.2.20 Remote priority:

The CCR can be controled by 3 inputs :

- Wires control
- COM 1 input (RS422 or RS485 or MODBUS TCP)
- COM 2 input (RS422 or RS485 or MODBUS TCP)

Standard priority:

- The wires remote control has the highest priority. The COM 1 or COM2 control is applied when there is no wire order (“stop” wire order).
- The two COM 1 and COM2 have the same priority, the last order from COM 1 or COM 2 is applied.

Reverse priority :

- The COM 1 or COM 2 control link has the highest priority. If the CCR don’t answer request for a timout period, the wire remote control the CCR. The timeout delay is setting at the adress 226 in the jbus table.
- The two COM 1 and COM2 have the same priority, the last order from COM 1 or COM 2 is applied.

Remote priority setting :

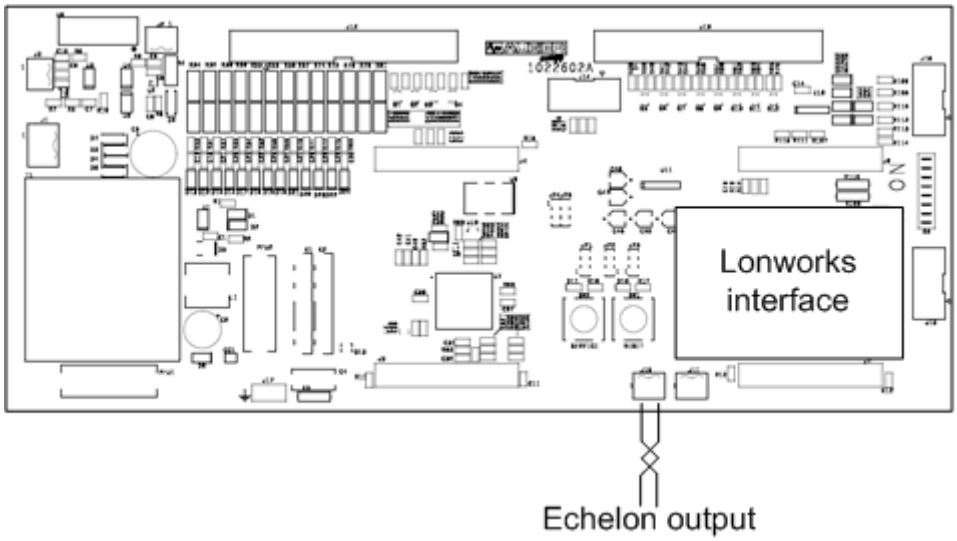
Adress 69, bit 3	Remote priority
0	Standard (wire control), default value
1	Reverse priority (COM1 ou COM2)

Timeout :

Value at adress	Description	Default value	Value
140	Timeout	250 (5s)	0 to 65535 (*20ms)

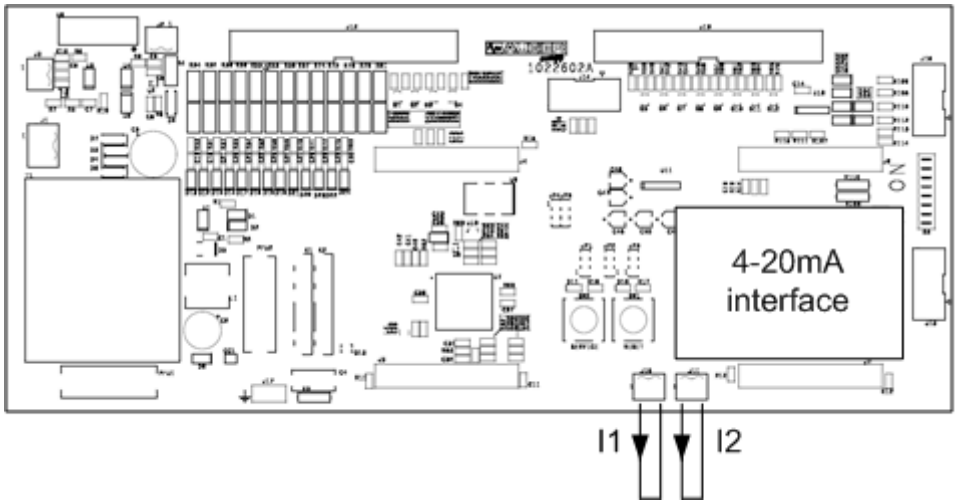
ⓘ The reverse priority can be choose for interface board firmware version from :V6

II.2.2.21 Lonworks link (Option):



The lonworks interface use an FT10 module.

II.2.2.22 4-20mA outputs (Option)



II.2.3 4-20MA LOOP CURRENT :

The CCR can be delivered with two independent 4-20mA current loops with the following features :

- The two outputs are isolated (500V~).
- The load to be connected must be less than 200 Ohms.
- I1 is connected to J10 (pin 1 = +, pin2 = -), I2 is connected on J11 (pin 1 = +, pin2 = -)

4-20mA outputs configuration									
4-20mA output	**Jbus address**	**B7**	**B6**	**B5**	**B4**	**B3**	**B2**	**B1**	**B0**
I1 ➔ loop current, I2 ➔ loop power	**69**	X	X	X	0	X	X	X	X
I1 ➔ loop insulation, I2 not used	**69**	X	X	X	1	X	X	X	X

II.2.3.1 4-20mA current loop for output current and power measurements :

- First output (J10):
  I1 = 4 mA + (Io /10A) * 16 mA.

  Example: for Io = 6.6 Arms, I1 = 4 mA + (6.6/10) * 16 mA = 14.56 mA

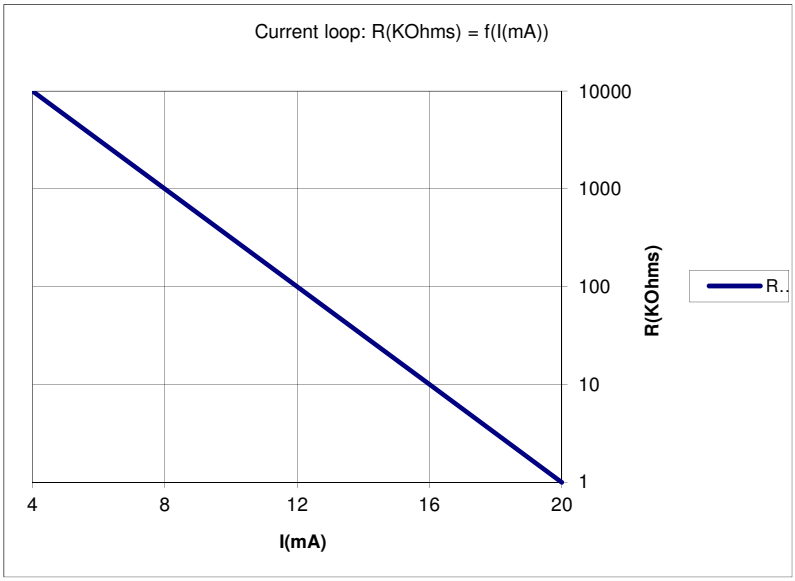
- Second output:
  I2 = 4 mA + (Output Power/Nominal Power) * 16 mA.

  Example: For 15 kVA nominal power and 9.6 kVA in the loop (64% of the nominal power),
  I2 = 4 mA + (9.6/15) * 16 mA = 14.24 mA

II.2.3.2 4-20mA loop current (ground insulation):

- First output:
  If R(Ω) earth >= 10MΩ , I1 = 4mA
  If R(Ω) earth <= 1KΩ , I1 = 20mA

  Between 1KΩ and 10MΩ, the loop current follows the ground value, according the curve



- Second output: not used

II.2.4 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.

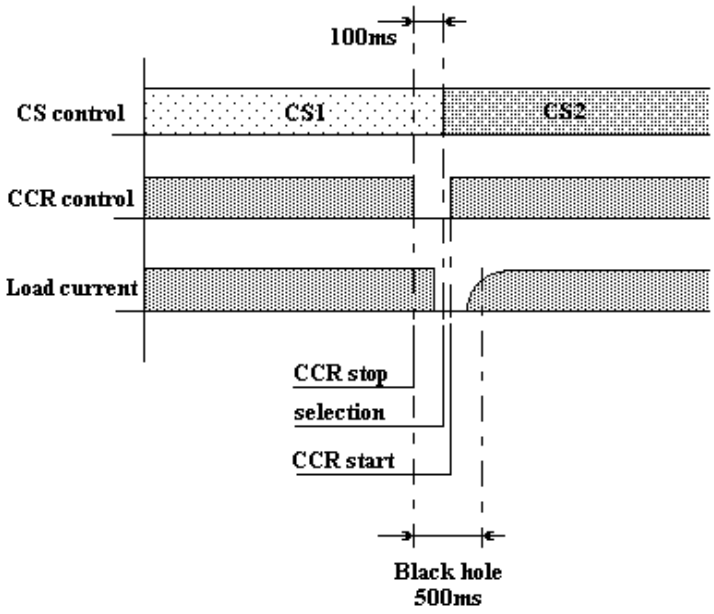
Corresponding cables must be placed in the same duct (at left) than power supply cables

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 :



II.3 ADJUSTING THE CCR

II.3.1 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.3.1.1 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.3.1.2 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.3.1.3 Value of “Open Circuit” protection level:

See paragraph I.5.3.2

II.3.1.4 Value of “Overcurrent” protection levels:

See paragraph I.5.3.4

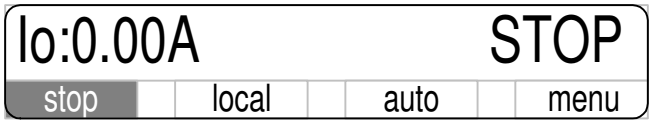
III COMMISSIONING

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

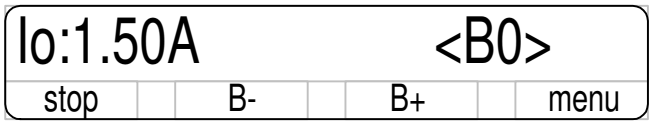
III.1 PROCEDURE

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.4.2

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

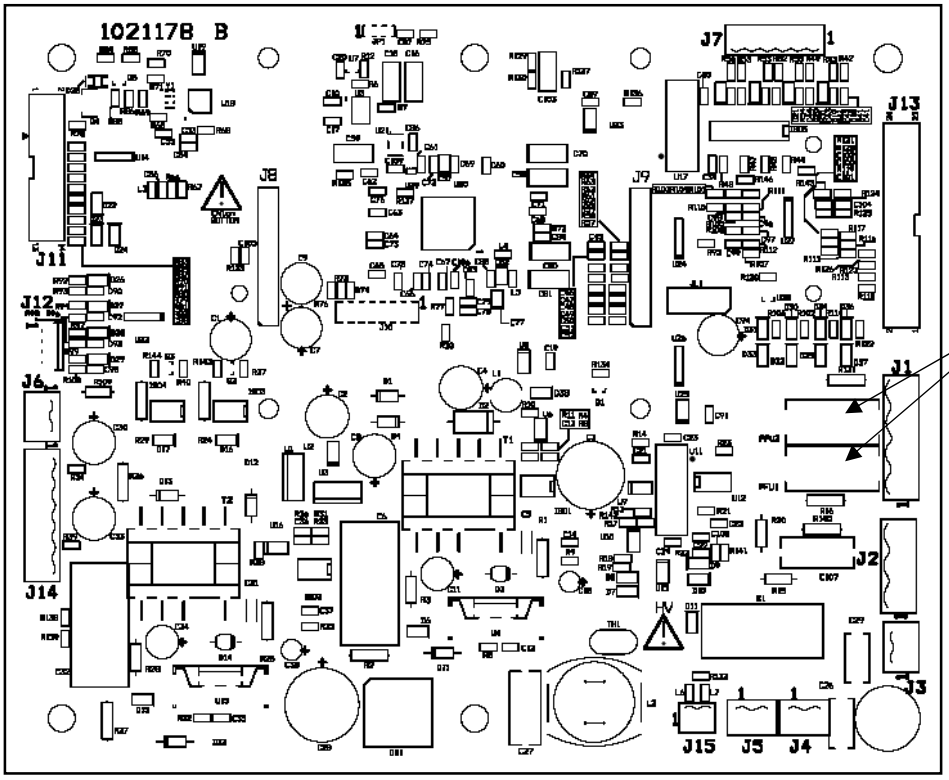
The frequency with which these operations are carried out will depend on the usage of the CCR:

- 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

Motherboard fuses



IV.4.1 FAULT DIAGNOSIS

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

IV.4.1.1 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.4.1.2 "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.4.1.3 "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.4.1.4 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).

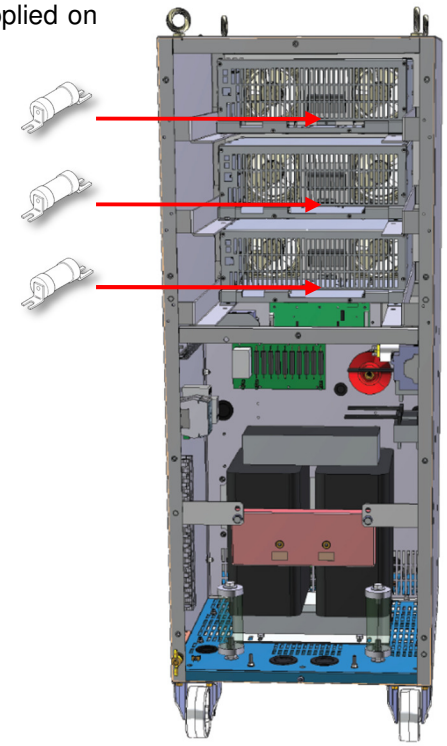
ⓘ **BEWARE: Risk of electrical shock.** This operation should be handled by qualified personnel only.

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.

ⓘ Make 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.4.2 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.
«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

	Désignations	Tensions	REFERENCES								
			1 kVA	2,5 kVA	5 kVA	7,5 kVA	10 kVA	15 kVA	20 kVA	25 kVA	30 kVA
	Disjoncteur DJ	220/240V	IC60N 6A C 10.25249	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	NSX 160 F TM160D 10.16660	
		380/415V	IC60N 4A C 10.25248	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
	Contacteur KM	220/240V	AF9 4000 10.27053		AF16 4000 10.27054	A45 4000 10.17574		A50 4000 10.17576	A75 4000 10.17578		AF190 30-11-13
		380/415V	AF9 4000 10.27053		AF16 4000 10.27054		AF26 4000 10.27055	A45 4000 10.17574		A50 4000 10.17576	A75 4000 10.17578
	Circuit RC2	220/240V	Incorporé dans la référence du contacteur			RC5-2/250 10.17583					Incorporé dans le contacteur
		380/415V	Incorporé dans la référence du contacteur					RC5-2/250 10.17583			
	Fusibles F1 et F2	220/240V									
		380/415V							10x38 1A aM		
	Fusibles F3 à F8	220/240V					14x51 32A gG 10.05894				
		380/415V					14x51 20A gG 10.07058				
	Contact de porte SQ1				10.08192						
	Transformateur principal T1	220V	A définir	A définir	A définir	A définir	A définir	A définir	A définir	A définir	A définir
		230V	10.26723	10.24847	10.26712	10.26725	10.26714	10.26716	10.27443	10.27444	10.27445
		240V	A définir	A définir	A définir	A définir	A définir	A définir	A définir	A définir	A définir
		380V	A définir	A définir	A définir	A définir	A définir	A définir	A définir	A définir	A définir
		400V	10.26724	10.26711	10.26713	10.26726	10.26715	10.26717	10.27446	10.27447	10.27448
		415V	A définir	A définir	A définir	A définir	A définir	A définir	A définir	A définir	A définir
	Autoransformateur d'alimentation T2	220V	A définir	10.26448	10.21529	10.21529	10.21529	10.21529	10.21529	10.21529	10.21529
		230V									
		240/415V	A définir	10.26448	10.21529	10.21529	10.21529	10.21529	10.21529	10.21529	10.21529
	transformateur d'alimentation T3	220/240V									
		380/415V							44254		
	Alimentation AL					10.27217					
	Condensateur C2					10.20841					
	Condensateur C3								10.20841		
Module de puissance 5kVA	Ventilateur 12V				30.12254						
	Carte puissance	220/240V			30.12209						
		380/415V			30.12236						
	Carte commande				30.12223						
	Fusible FU	220/240V			Fus 550V 14x55 32A 10.26615						
		380/415V			Fus 550V 14x55 20A 10.26761						
	Module complet	220/240V			30.12210						
		380/415V			30.12310						
*	Parafoudres BT PFI		DS41-400 10.19975								
*	Parafoudres HT PF1, PF2		CEA3 10.17854					CEA6 10.17855		CEA9 10.17856	
*	Cavalier sectionneur		10.25705		30.07967						
*	Carte platine MDT		30.11451								
*	Carte I.DFT		30.10029								
	Carte Mère		30.10026								
	Carte Puissance		30.11637								
	Carte Fille		30.11412								
	Carte Mesure		30.08004								
	Carte Interface		30.10028								
	Carte EMC	220/240V	30.10087								
		380/415V	30.10068								
	Carte borniers TC-TS	IEC	30.08928								
		FAA	30.09259								
	Afficheur		30.12449								
	Clavier 4 touches		10.20483								
	Câbles plats		Liaisons: cartes Mère / TC-TS => 30.10352 + cartes Mère / Mesure => 30.08947								

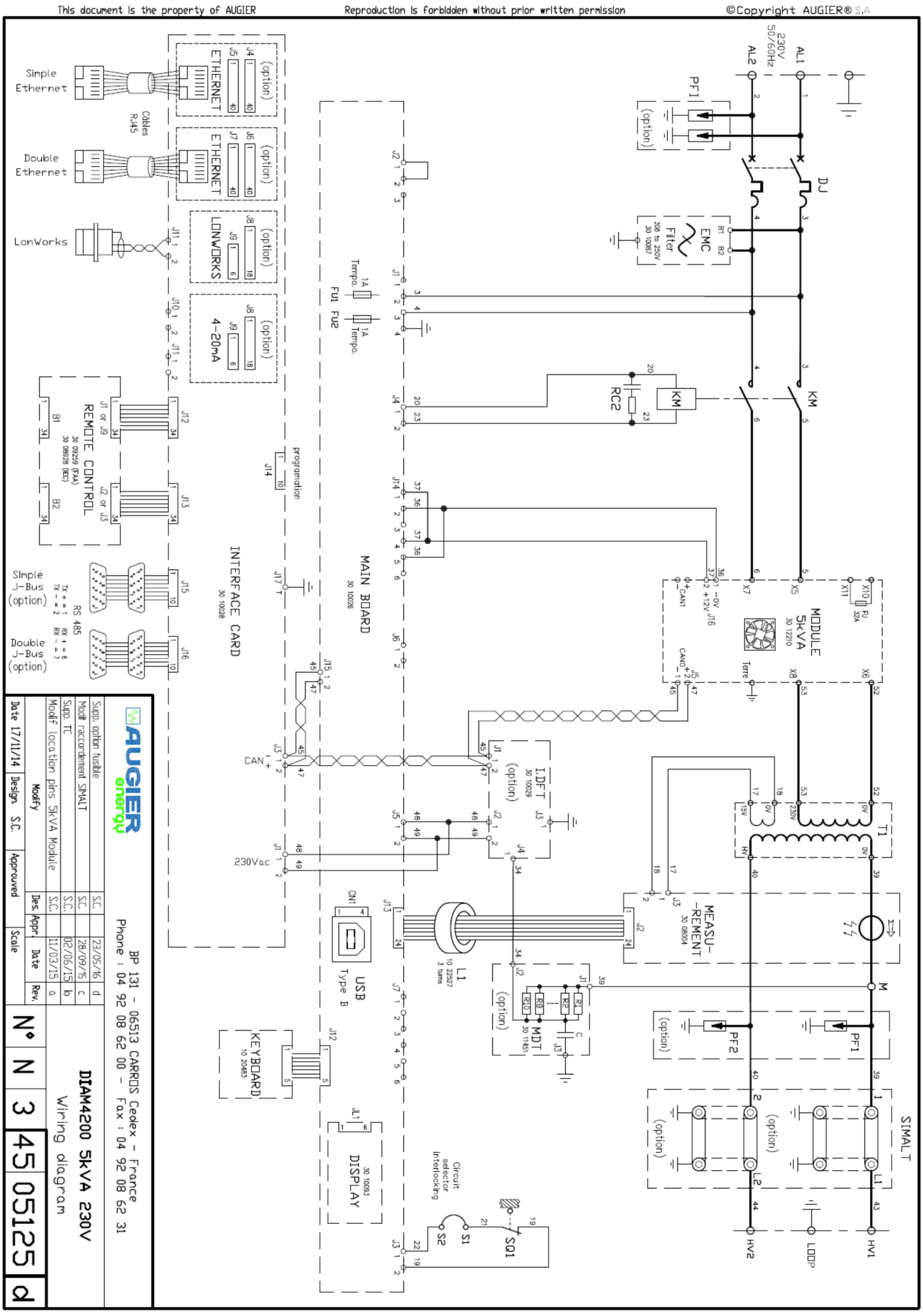
* Materiel en option

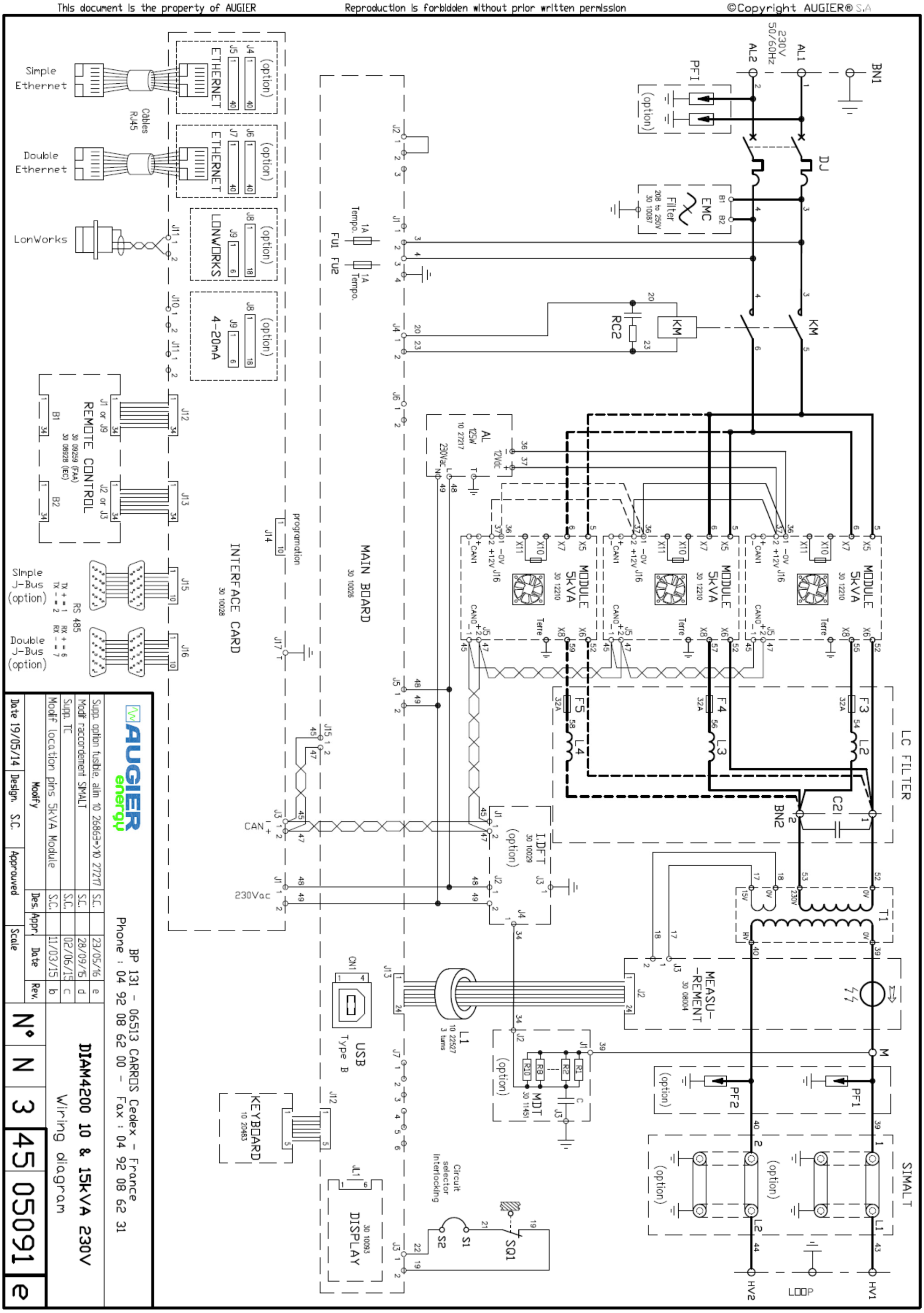
HISTORIQUE DES MODIFICATIONS

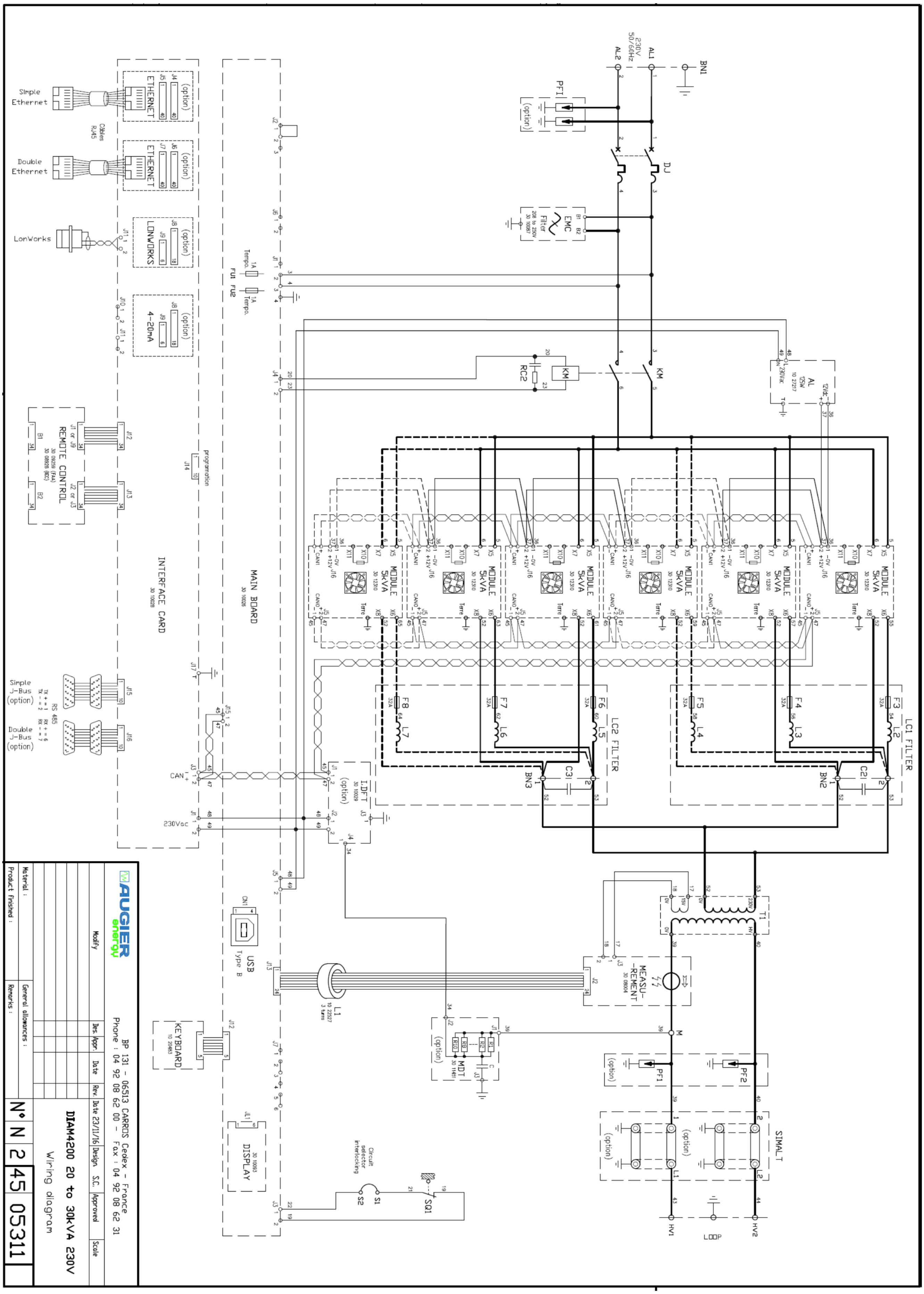
C	24/11/2016	Ajout 20, 25 et 30kVA	S.C.	O.E.
B	08/05/2016	Intensités disjoncteurs 5 à 15kVA (RG) et référence afficheur	S.C.	O.E.
A	19/05/2015	Mise à jour de l'ensemble des références	O.E.	E.D.
Révision	Date	Description	Rédacteur	Approbateur

Date: 18/06/14	Rédacteur: S.C.	Approbateur:	Echelle: N° N 3 55 01755 C

v APPENDIX A: DIAGRAMS



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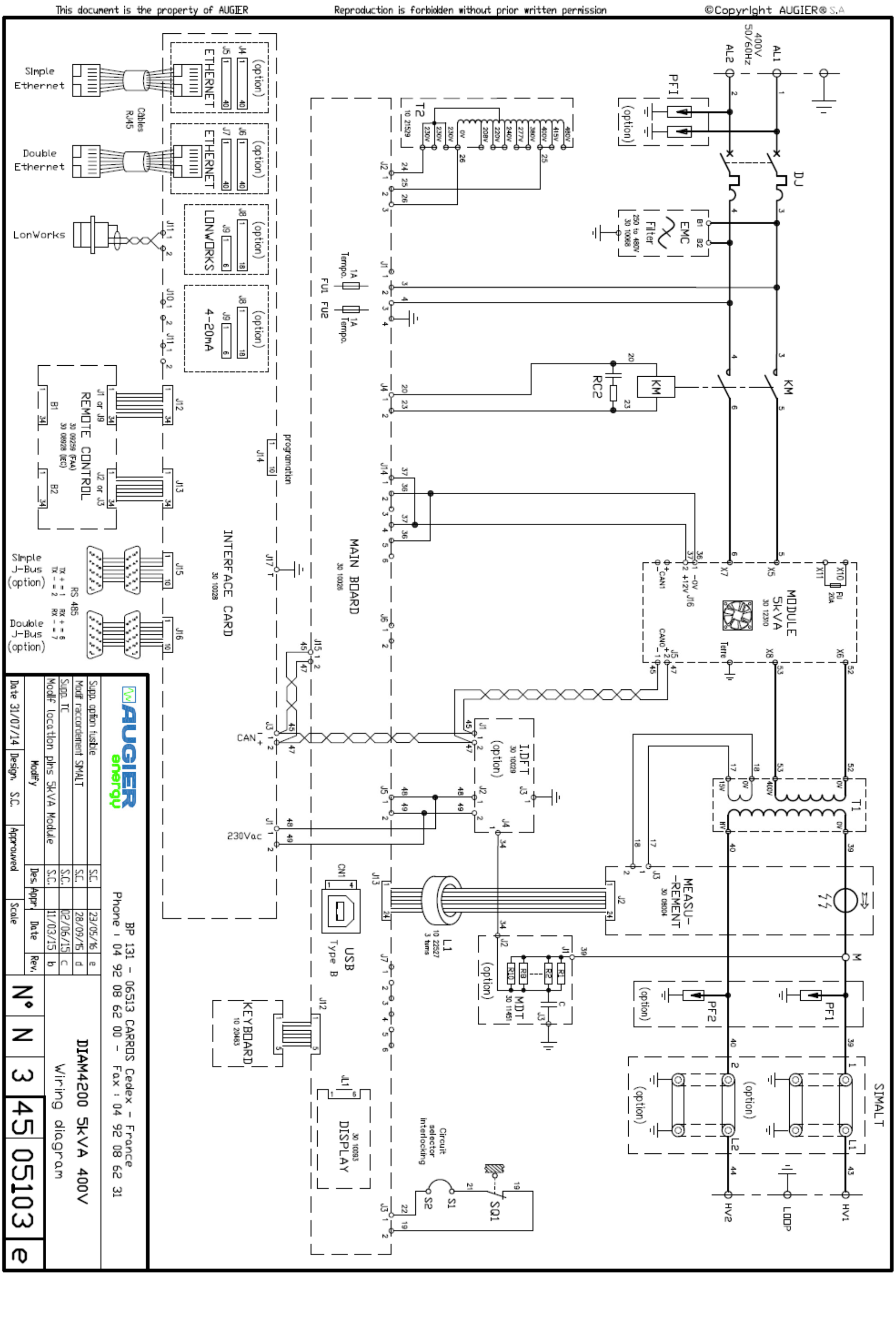
DIAM4200 20 to 30kVA 230V
Wiring diagram
N° N 2 45 05311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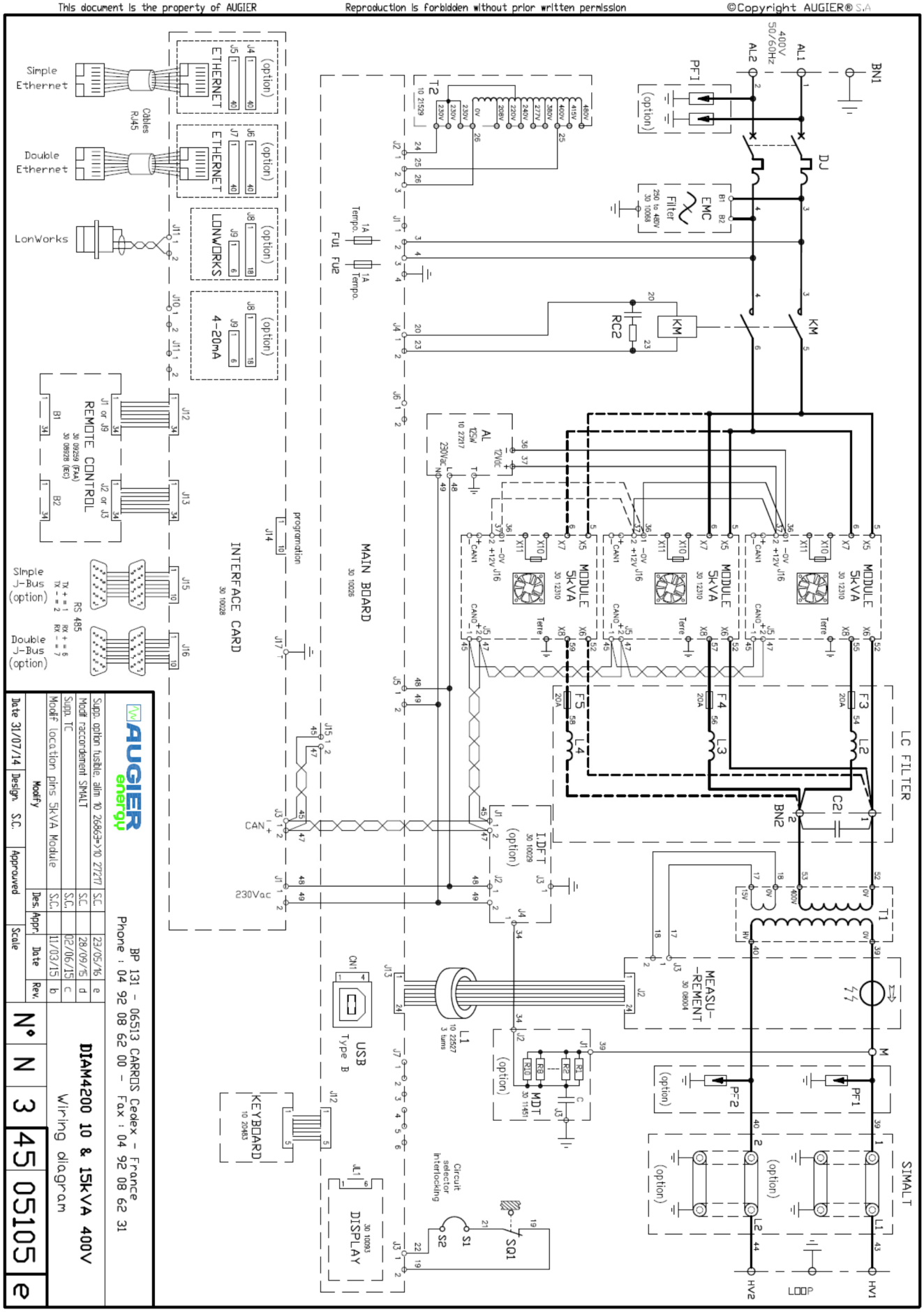
DIAM4200 5kVA 400V
Wiring diagram
N° N 3 45 05103 e
MAIN BOARD
INTERFACE CARD
MODULE 5kVA
MEASU-REMENT
REMOTE CONTROL
KEYBOARD
DISPLAY
USB Type B
SIMALT
I.DFT
MDT
T1
T2
EMC Filter
400V 50/60Hz
AL1
AL2
HV1
HV2
LOOP
Simple Ethernet
Double Ethernet
LonWorks
Simple J-Bus (option)
Double J-Bus (option)
CAN
230Vac



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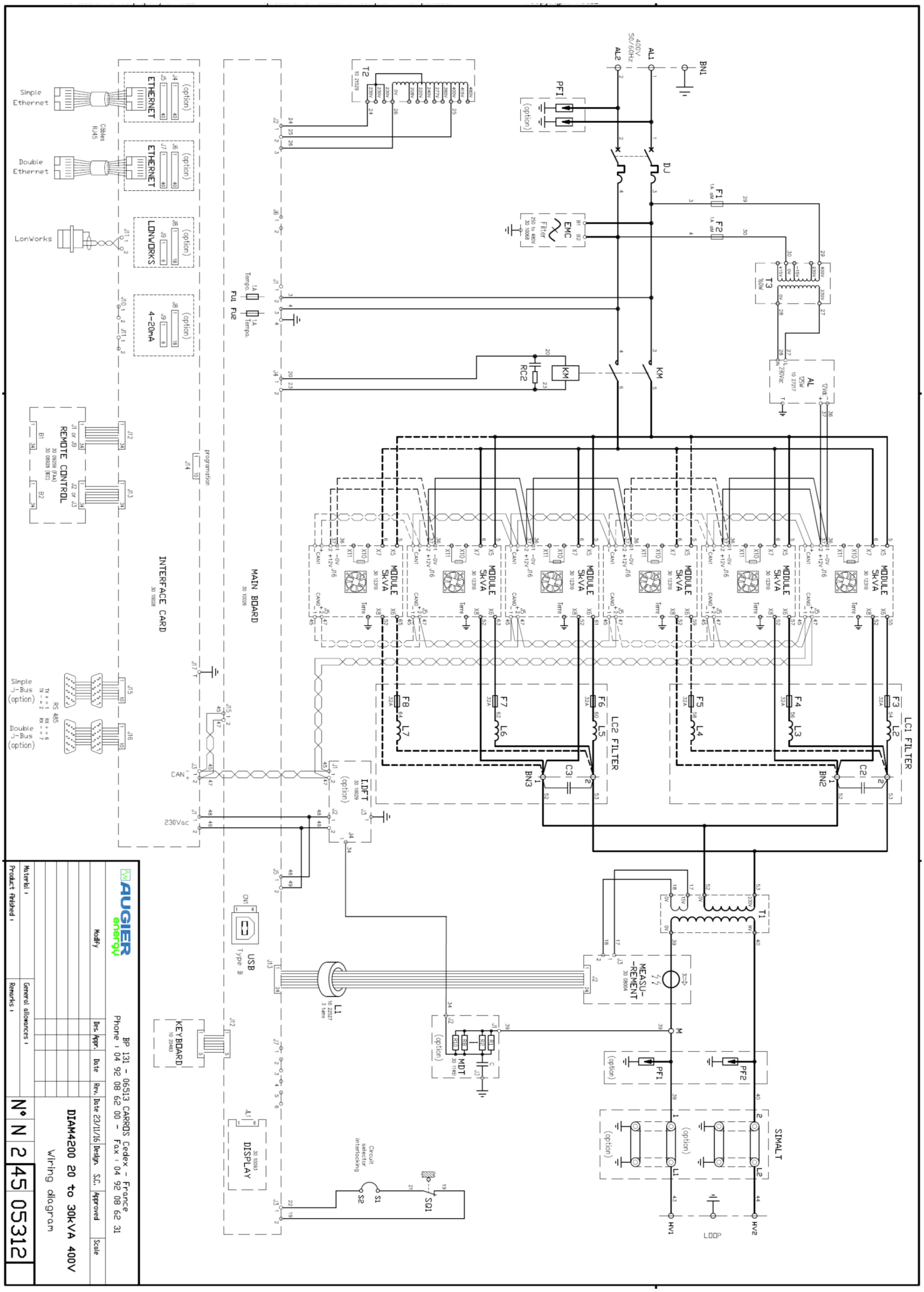
Rev.	Date	Modify	Des. Appr	Scale
e	23/05/16	Supp. option fusible, alim 10 26863=10 27217	S.C.	
d	28/09/15	Modif raccordement SIMALT	S.C.	
c	02/06/15	Supp. TC	S.C.	
b	11/03/15	Modif location pins 5kVA Module	S.C.	
			Approuved	
		Date 31/07/14	Design. S.C.	

N° N 3 45 05105 e

DIAM4200 10 & 15kVA 400V

Wiring diagram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Phone : 04 92 08 62 00 - Fax : 04 92 08 62 31
DIAM4200 20 to 30kVA 400V
Wiring diagram
N° N 2 45 05312

VI APPENDIX B: JBUS TABLE

VI.1 STANDARD JBUS TABLE

Adr.	R/W	Mode	Memory	Label	Detail	Bit clear	Bit set	Default Value	Comments
0	R		Ram	Warnings	Bit0	Stop	Start	0	Main switch status
					Bit1	OK	Pb power line	0	Power supply over range
					Bit2	OK	Pb EFD	0	Level 1 or Level 2 or EFD board defect
					Bit3	OK	Pb current	0	Open circuit or Over current or Regulation error
					Bit4	OK	Pb regul	0	Regulation error
					Bit5	OK	Pb open circuit	0	Open circuit
					Bit6	OK	Pb Overcurrent	0	Over current
					Bit7	Local or Stop	Remote control		Bit 7:8, 0:0 = Local , 0:1 = Stop, 1:0 = Remote
					Bit8	Local or Remote	Stop mode		
					Bit9	OK	EFD level 1 warning	0	Earth fault detect (OPTION)
					Bit10	OK	EFD level 2 warning	0	Earth fault detect (OPTION)
					Bit11	OK	LFD level 1 warning	0	Lamp fault detect (OPTION)
					Bit12	OK	LFD level 2 warning	0	Lamp fault detect (OPTION)
					Bit13	OK	Internal failure	0	CCR internal problem
1	R		Ram	Brightness back indication					0 : Stop 1 : Brightness B1 2 : Brightness B2 3 : Brightness B3 4 : Brightness B4 5 : Brightness B5 6 : Brightness B6 7 : Brightness B7 8 : Brightness B0 (Heat)
2	R		Ram	Io loop current					*10mA
3	R		Ram	U injection EFD				500	*V
4	R		Ram	Uo loop voltage					*V
5									
6	R		Ram	Mains voltage Ui					*V
7	R		Ram	Mains current Ii					*A (OPTION)
8	R		Ram	Output power Po					*VA
9									
10	R		Ram	EFD Resistance					*KOhms (1..65000)
11	R		Ram	Number of burnt lamps					
12	R		Ram	Open load ratio measurement					*%

Adr.	R/W	Mode	Memory	Label	Detail	Bit clear	Bit set	Default Value	Comments
13	R		Ram	Heat sink temperature					Only for DIAM4200
14	R			EFD board status	Bit0		Communication error		
					Bit1		Internal error		
15	R			Interface board status	Bit0		Communication error		
					Bit1		Internal error		
16	R		Eeprom	Status flags	Bit0	No EFD HV (500V--)	EFD HV (500V--)		EFD Option
					Bit1	No Uaux	Uaux present		Auxiliary voltage
					Bit2	Maintenance	Loop		CIMALT position
					Bit3	No power drop	10% or greater Power drop		Power drop
					Bit4	No time overlap	Time overlap		Time management (OPTION)
17	R		Eeprom	Mother board firmware version					1 to 255
18	R		Eeprom	Mother board firmware correction					0 to 255
19	R			EFD board firmware version					1 to 255
20	R			Interface board firmware version					1 to 255
21	R		Ram	Phase shift U I					0 to 500
22	R/W		Eeprom	Load plate					*1/8
23	R/W	Sup	Eeprom	Rated mains voltage				230	*V 208V, 220V, 230V, 240V, 380V, 400V ,415V ,480V
24	R/W	Sup	Eeprom	Rated power				5000	*VA, 1kVA, 2.5kVA, 4kVA, 5kVA, 7.5kVA, 10kVA, 15kVA, 20kVA, 25kVA, 30kVA
25	R/W	Sup	Eeprom	Serial link ID				1	1 to 249
26	R/W	Sup	Eeprom	Serial link speed				9600	In Baud 2400, 4800, 9600, 19200
27	R		Eeprom	USB link speed				3840	*10 Baud 960, 1920, 3840, 5760, 11520
28	R		Eeprom	USB link Id				1	1 to 15
29	R/W	Sup	Eeprom	B0 setting				150	*10mA
30	R/W	Sup	Eeprom	B1 setting				280	*10mA
31	R/W	Sup	Eeprom	B2 setting				340	*10mA
32	R/W	Sup	Eeprom	B3 setting				410	*10mA
33	R/W	Sup	Eeprom	B4 setting				520	*10mA
34	R/W	Sup	Eeprom	B5 setting				660	*10mA
35	R/W	Sup	Eeprom	B6 setting				660	*10mA
36	R/W	Sup	Eeprom	B7 setting				660	*10mA
37	R/W	Sup	Eeprom	Nb of Brightness				6	1 to 8

Adr.	R/W	Mode	Memory	Label	Detail	Bit clear	Bit set	Default Value	Comments
38	R/W	Sup	Eeprom	R Level EFD1				1000	*KΩ(10KΩ to 10MΩ)
39	R/W	Sup	Eeprom	R Level EFD2				100	*KΩ(10KΩ to 10MΩ)
40	R/W	Sup	Eeprom	Level 1 Overcurrent				680	*10mA (0 to 9Arms)
41	R/W	Sup	Eeprom	Level 2 Overcurrent				693	*10mA (0 to 9Arms)
42	R/W	Sup	Eeprom	Level 3 Overcurrent				825	*10mA (0 to 9Arms)
43	R/W	Sup	Eeprom	No of restarts				3	0 to 255
44	R/W	Sup	Eeprom	Open circuit level				100	*10mA (0 to 9Arms)
45	R/W	Sup	Eeprom	Open circuit time delay				60	*10ms (20ms to 2.5s)
46	R/W	Sup	Eeprom	Overcurrent level 1 time delay				250	*10ms (20ms to 2.5s)
47	R/W	Sup	Eeprom	Overcurrent level 2 time delay				100	*10ms (20ms to 2.5s)
48	R/W	Sup	Eeprom	Overcurrent level 3 time delay				20	*10ms (20ms to 2.5s)
49	R/W	Sup	Eeprom	Level B0 maxi				IB0+0.1A	*10mA (1 to 6.8Arms)
50	R/W	Sup	Eeprom	Level B0 mini				IB0-0.1A	*10mA (1 to 6.8Arms)
51	R/W	Sup	Eeprom	Level B1 maxi				IB1+0.1A	*10mA (1 to 6.8Arms)
52	R/W	Sup	Eeprom	Level B1 mini				IB1-0.1A	*10mA (1 to 6.8Arms)
53	R/W	Sup	Eeprom	Level B2 maxi				IB2+0.1A	*10mA (1 to 6.8Arms)
54	R/W	Sup	Eeprom	Level B2 mini				IB2-0.1A	*10mA (1 to 6.8Arms)
55	R/W	Sup	Eeprom	Level B3 maxi				IB3+0.1A	*10mA (1 to 6.8Arms)
56	R/W	Sup	Eeprom	Level B3 mini				IB3-0.1A	*10mA (1 to 6.8Arms)
57	R/W	Sup	Eeprom	Level B4 maxi				IB4+0.1A	*10mA (1 to 6.8Arms)
58	R/W	Sup	Eeprom	Level B4 mini				IB4-0.1A	*10mA (1 to 6.8Arms)
59	R/W	Sup	Eeprom	Level B5 maxi				IB5+0.1A	*10mA (1 to 6.8Arms)
60	R/W	Sup	Eeprom	Level B5 mini				IB5-0.1A	*10mA (1 to 6.8Arms)
61	R/W	Sup	Eeprom	Level B6 maxi				IB6+0.1A	*10mA (1 to 6.8Arms)
62	R/W	Sup	Eeprom	Level B6 mini				IB6-0.1A	*10mA (1 to 6.8Arms)
63	R/W	Sup	Eeprom	Level B7 maxi				IB7+0.1A	*10mA (1 to 6.8Arms)
64	R/W	Sup	Eeprom	Level B7 mini				IB7-0.1A	*10mA (1 to 6.8Arms)
65	R/W	Sup	Eeprom	Language				0	0 : French, 1 : English 2: Spanish
66	R/W	Sup	Eeprom	Wig-Wag cycle time				25	*100ms (1s to 25s)
67	R/W	Sup	Eeprom	Wig-Wag time				17	*100ms (1s to 25s)
68	R/W	Sup	Eeprom	Display brightness				8	1..8

Adr.	R/W	Mode	Memory	Label	Detail	Bit clear	Bit set	Default Value	Comments
69	R/W	Sup	Eeprom	Parameters 1	Bit0	Without “ON” order	With “ON” order	0	Run Order “ON”
					Bit1	Run to B0	Run to B1	0	Default brightness
					Bit2	Live Voltage	Current flow in the loop	0	
					Bit3	Standard remote priority	Reverse remote priority	0	
					Bit4	Loop current+power	Ground insulation	0	4-20mA loop current outputs
					Bit5	No remote fail safe	Remote fail safe	0	Option
					Bit6	Ciruit selector: Alternate	Circuit selector: Simultaneous	0	Option circuits selector
					Bit7	No Fluo pannel regul.	Fluo pannel regulation	0	Fluo pannel regulation
					Bit8	EFD HV always present	EFD HV if loop current	0	EFD High Voltage supply (500V--)
					Bit9	No Ii measurement	Ii meausrement	1	
70	R/W		Eeprom	Interface board control	Bit0	External Uaux supply	Internal Uaux supply	0	U control voltage type Ext/Int
					Bit1	24V-- Uaux supply	120V~ Uaux supply	0	U control voltage 24V--/120V~
					Bit2	Simple Jbus link	Double Jbus link	0	If Jbus option
					Bit3	No Lonworks link	Lonworks link	0	Option
					Bit4	FAA type	IEC type	0	Standard type
					Bit5	Simple TCP/IP link	Double TCP/IP link	0	If TCP/IP option
					Bit6	Wire common -	Wire common +	0	Wire control polarization
71	R/W	Cal	Eeprom	Calibrating current				660	*10mA (1 to 6.8Arms)
72	R/W	Cal	Eeprom	Io equalizer				1000	800 to 1200
73	R/W	Cal	Eeprom	Uo equalizer				1000	500 to 2000
74	R/W	Cal	Eeprom	Ui equalizer				1000	500 to 2000
75	R/W	Cal	Eeprom	Ii equalizer				1000	500 to 2000
76	R		Eeprom	Operating time clock					H2, H1 see note 1
77	R		Eeprom	Operating time clock					H0, M, see note 1
78	R		Eeprom	Powered-on time clock					H2, H1, see note 1
79	R		Eeprom	Powered-on time clock					H0, M, see note 1
80	R		Eeprom	Brightness B0 time clock					H2, H1, see note 1
81	R		Eeprom	Brightness B0 time clock					H0, M, see note 1
82	R		Eeprom	Brightness B1 time clock					H2, H1 see note 1
83	R		Eeprom	Brightness B1 time clock					H0, M see note 1
84	R		Eeprom	Brightness B2 time clock					H2, H1 see note 1
85	R		Eeprom	Brightness B2 time clock					H0, M see note 1

Adr.	R/W	Mode	Memory	Label	Detail	Bit clear	Bit set	Default Value	Comments
86	R		Eeprom	Brightness B3 time clock					H2, H1 see note 1
87	R		Eeprom	Brightness B3 time clock					H0, M see note 1
88	R		Eeprom	Brightness B4 time clock					H2, H1 see note 1
89	R		Eeprom	Brightness B4 time clock					H0, M see note 1
90	R		Eeprom	Brightness B5 time clock					H2, H1 see note 1
91	R		Eeprom	Brightness B5 time clock					H0, M see note 1
92	R		Eeprom	Brightness B6 time clock					H2, H1 see note 1
93	R		Eeprom	Brightness B6 time clock					H0, M see note 1
94	R		Eeprom	Brightness B7 time clock					H2, H1 see note 1
95	R		Eeprom	Brightness B7 time clock					H0, M see note 1
96	R/W	Sup	Eeprom	Operating time clock level				39	H2, H1 see note 1 (10000 Hours)
97	R/W	Sup	Eeprom	Operating time clock level				4096	H0, M see note 1 (10000 Hours)
98	R/W	Sup	Eeprom	Level 1 of no of burnt lamps				5	1 to 20
99	R/W	Sup	Eeprom	Level 2 of no of burnt lamps				10	1 to 20
100	R/W		Eeprom	BRIGHTNESS CCR CONTROL					0 : Stop 1 : Brightness B1 2 : Brightness B2 3 : Brightness B3 4 : Brightness B4 5 : Brightness B5 6 : Brightness B6 7 : Brightness B7 8 : Brightness B0 (Heat)
101	R		Ram	EFD injection control					EFD board control (OPTION)
102	R/W	Cal	Eeprom	CCR control in remote mode					
103	R/W	Cal	Eeprom	Selector control in remote mode					
104	R/W	Sup	Eeprom	Options	Bit0	-	-		
					Bit1	-	EFD Opt.		
					Bit2	-	Fault lamps Opt.		
					Bit3		Option Time mon.		
					Bit4		Opt.4-20mA		
					Bit5		Opt. Wig Wag		
					Bit6		Opt. circuit selector		
					Bit7		Opt. TCP/IP		
					Bit8		Opt. Jbus RS485/RS422		
					Bit9		Opt. ICc detection		
105	R/W	Cal	Eeprom	Initialisation parameter					

Adr.	R/W	Mode	Memory	Label	Detail	Bit clear	Bit set	Default Value	Comments
106	R/W	Sup	Eeprom	Memory 0 lamps B0					0 to 1000
107	R/W	Sup	Eeprom	Memory 0 lamps B1					0 to 1000
108	R/W	Sup	Eeprom	Memory 0 lamps B2					0 to 1000
109	R/W	Sup	Eeprom	Memory 0 lamps B3					0 to 1000
110	R/W	Sup	Eeprom	Memory 0 lamps B4					0 to 1000
111	R/W	Sup	Eeprom	Memory 0 lamps B5					0 to 1000
112	R/W	Sup	Eeprom	Memory 0 lamps B6					0 to 1000
113	R/W	Sup	Eeprom	Memory 0 lamps B7					0 to 1000
114	R/W	Sup	Eeprom	Memory X lamps B0					0 to 1000
115	R/W	Sup	Eeprom	Memory X lamps B1					0 to 1000
116	R/W	Sup	Eeprom	Memory X lamps B2					0 to 1000
117	R/W	Sup	Eeprom	Memory X lamps B3					0 to 1000
118	R/W	Sup	Eeprom	Memory X lamps B4					0 to 1000
119	R/W	Sup	Eeprom	Memory X lamps B5					0 to 1000
120	R/W	Sup	Eeprom	Memory X lamps B6					0 to 1000
121	R/W	Sup	Eeprom	Memory X lamps B7					0 to 1000
122	R/W	Sup	Ram	Password					0 to 9999
123	R	Cal		Signal reading pointer					
124	R		Ram	Interface board inputs status	Bit0	Off	On		IN1
					Bit1	Off	On		IN2
					Bit2	Off	On		IN3
					Bit3	Off	On		IN4
					Bit4	Off	On		IN5
					Bit5	Off	On		IN6
					Bit6	Off	On		IN7
					Bit7	Off	On		IN8
					Bit8	Off	On		IN9
					Bit9	Off	On		IN10
					Bit10	Off	On		IN11
					Bit11	Off	On		IN12
					Bit12	Off	On		IN13
					Bit13	External Uaux supply	Internal Uaux supply		U control voltage type Ext/Int
					Bit14	24V-- Uaux supply	120V~ Uaux supply		U control voltage 24V--/120V~
					Bit15	Common -	Common +		Wire control polarization

Adr.	R/W	Mode	Memory	Label	Detail	Bit clear	Bit set	Default Value	Comments
125	R		Ram	Interface board relays status 1	Bit0	Off	On		OUT_K17
					Bit1	Off	On		OUT_K18
					Bit2	Off	On		OUT_K19
					Bit3	Off	On		OUT_K20
					Bit4	Off	On		OUT_K21
					Bit5	Off	On		OUT_K22
					Bit6	Off	On		OUT_K23
					Bit7	Off	On		OUT_K24
					Bit8	Off	On		
					Bit9	Off	On		
					Bit10	Off	On		
					Bit11	Off	On		
					Bit12	Off	On		
					Bit13	Off	On		
					Bit14	Off	On		
					Bit15	Off	On		
126	R		Ram	Interface board relays status 2	Bit0	Off	On		OUT_K1
					Bit1	Off	On		OUT_K2
					Bit2	Off	On		OUT_K3
					Bit3	Off	On		OUT_K4
					Bit4	Off	On		OUT_K5
					Bit5	Off	On		OUT_K6
					Bit6	Off	On		OUT_K7
					Bit7	Off	On		OUT_K8
					Bit8	Off	On		OUT_K9
					Bit9	Off	On		OUT_K10
					Bit10	Off	On		OUT_K11
					Bit11	Off	On		OUT_K12
					Bit12	Off	On		OUT_K13
					Bit13	Off	On		OUT_K14
					Bit14	Off	On		OUT_K15
					Bit15	Off	On		OUT_K16

Adr.	R/W	Mode	Memory	Label	Detail	Bit clear	Bit set	Default Value	Comments
127	R		Ram	Input auxiliary inputs	Bit0	Off	On		AUX1
					Bit1	Off	On		AUX2
					Bit2	Off	On		AUX3
					Bit3	Off	On		AUX4
128	R			Phase angle					0 to 100
129	R/W		Eeprom	IP Mask module 1 (bytes 0&1)				255.255	65535 (0 to 65535)
130	R/W		Eeprom	IP Mask module 1 (bytes 2&3)				255.0	65280 (0 to 65535)
131	R/W		Eeprom	IP Adress module 1 (bytes 0&1)				192.168	(49320) (0 to 65535)
132	R/W		Eeprom	IP Adress module 1 (bytes 2&3)				100.160	(25760) (0 to 65535)
133	R/W		Eeprom	IP Mask module 2 (bytes 0&1)				255.255	65535 (0 to 65535)
134	R/W		Eeprom	IP Mask module 2 (bytes 2&3)				255.0	65280 (0 to 65535)
135	R/W		Eeprom	IP Adress module 2 (bytes 0&1)				192.168	(49320) (0 to 65535)
136	R/W		Eeprom	IP Adress module 2 (bytes 2&3)				100.161	(25761) (0 to 65535)
137	R/W	Sup	Eeprom	Regulation gain (start)				100	1 to 200
138	R/W	Sup	Eeprom	Delai Regulation gain (run)				100	*20ms (0 to 65535)
139	R/W	Sup	Eeprom	Regulation gain (run)				130	1 to 200
140	R/W	Sup	Eeprom	Remote fail safe mode: Time out				250	x20ms, 5 to 65535 (100ms to 20min)
141	R/W	Sup	Eeprom	Remote fail safe mode: Default brightness				3	0:Stop 1:Brightness B1 2:Brightness B2 3:Brightness B3 4:Brightness B4 5:Brightness B5 6:Brightness B6 7:Brightness B7 8:Brightness B0
142	R/W	Sup	Eeprom	Fluo pannel option (time)				25	*20ms (0 to 65535)
143	R/W	Sup	Eeprom	Fluo pannel option (current)				500	*10mA (100 to 660)
144	R/W	Sup	Eeprom	Memory power B0					
145	R/W	Sup	Eeprom	Memory power B1					
146	R/W	Sup	Eeprom	Memory power B2					
147	R/W	Sup	Eeprom	Memory power B3					
148	R/W	Sup	Eeprom	Memory power B4					
149	R/W	Sup	Eeprom	Memory power B5					
150	R/W	Sup	Eeprom	Memory power B6					
151	R/W	Sup	Eeprom	Memory power B7					
152	R			Phase shift Capacitive current					0 to 100%
153.. 189									

Adr.	R/W	Mode	Memory	Label	Detail	Bit clear	Bit set	Default Value	Comments
190	R	Ram		Word 1 switch over					
191									
192	R	Ram		Word 2 switch over					
193									
194	R/W	Sup		Soft download					85 in decimal
195	R		Ram	Mother board number					
196	R/W	Sup	Eeprom	Main menu display number				0	0: Output current, Brightness 1: Output current, Output voltage 2: Output current, Output power 3: Selector position (if option present)
197	R/W	Sup	Eeprom	Circuit selector: Circuits qty				5	1 to 5 (OPTION)
198	R/W	Sup	Eeprom	Circuit selector: Circuit in local mode				0	0 to 5 in alternate mode, 0 to 31 in simultaneous mode (OPTION)
199	R/W		Eeprom	Circuit selector: Circuit in remote mode				0	0 to 5 in alternate mode, 0 to 31 in simultaneous mode (OPTION)
200.. 230									
231	R/W	Sup	Eeprom	Parameters 2	Bit0	Photo MOS TCTS board	Relay TCTS board	1	for FAA standard
					Bit1	ILS load plate	No ILS load plate	1	
					Bit2	No power drop measure	Power drop measure	1	for FAA standard
					Bit3	6.6A nominal	20A nominal	0	
					Bit4	Reset by switch	Reset by power up	0	
					Bit5	No external selector	External selector	0	Lonworks Selector
					Bit6		AENA2004	0	transformer temp protection
232.. 248									
249	R		Ram	Lonworks interface flags					
250.. 511									

Note1 : The 4 bytes are coded: H2-H1-H0-M (H2,H1,H0 to compute the hours and M for minutes)
Example: Reading operating time:
Contents of address @106: 0x0102 in Hexadecimal, and of address @108 : 0x0324 in hexadecimal
The time is interpreted as: 0x010203 hours and 0x24 minutes (66051 Hours and 36 minutes)

R: Read, W :Write
Mode “Sup”: Write access via ID 250
Mode “Cal”: Words used for calibrating the device (DO NOT USE)

VII APPENDIX C: ORDERING CODE

DIAM4200 PART NUMBER IDENTIFICATION

The DIAM4200 regulator is identified by a serial ordering number which indicates its type and particularity. If needed, add all useful precision and options.
Example : D42-IEC-1-5-50-15-400-B21-530 = DIAM4200 compliant to IEC, 6.6A, 5 brightness, 50Hz, 15kVA, 400Vac, with a multiwire interface (dry contacts) ,Jbus serial network, lightning arrestors on output terminals, Circuit breaker, EFD and LFD

D	4	2	-	I	E	C	-	1	-	5	-	5	0	-	1	5	-	4	0	0	-	B	2	1	-	5	3	0

Serie	D42: DIAM 4200			
Type	IEC: IEC type 828: L-828 FAA Type (Options as described in L828 advisory are included) 829: L-829 FAA Type (Options as described in L829 advisory are included) AXX : AENA compliance (A29 = AENA PPT2-1995; A04 = AENA PPT2/04/04-2004; A05 = AENA PPT2/05/2013)			
Class	1: Class1 (output current 6.6A)			
Style	3: Style 1 (Class1 : 4.8A, 5.5A, 6.6A) 5: Style 2 (Class1 : 2.8A, 3.4A, 4.1A, 5.2A, 6.6A) A : 5 brightness, AENA values X: Number of brightness, up to 8 (not counting B0 = "black" current) : Values of currents must be specified separately			
Freq.	50: 50 Hz 60: 60Hz			
Output power	01: 1kVA 02: 2.5kVA 04: 4kVA	05: 5kVA 07: 7.5kVA 10: 10kVA	15: 15kVA 20: 20kVA 25: 25kVA	30: 30kVA
Supply	XXX: Input voltage :For power up to 2,5KVA: 220, 230, 240, 380, 400, 415 Vrms For power from 5kVA to 30KVA: 230, 400 Vrms			
Control	0X : No multiwire interface AX : INTERNAL source Remote control BX : EXTERNAL 20 to 60 Vdc Rem. Control CX : AENA terminal block DX : Cylindrical sockets (SOURIAU) GX : INTERNAL 120Vac remote control HX : EXTERNAL 120Vac remote control (Only one letter must be selected)	00X : No multiwire interface A1X or B1X : NEGATIVE common monitoring (IEC interface board) A2X or B2X: free common monitoring (FAA interface board, dry contacts) C2X D2X G2X H2X (Only one figure must be selected)	XX0 : No communication network XX1 : 1 x JBus RS485 port XX2 : 2 x Jbus RS485 ports XX3 : 1 x Lonwork port XX4 : 1 x Ethernet port XX5 : 1 x Jbus and 1 x Ethernet ports XX6 : 2 x Ethernet ports XX7 : 1 x Lonwork port + 1 x JBus RS485 port (Only one figure must be selected)	
Regular Options	0XX : No extra protection options, 1XX : Lightning arrestors (outputs) 2XX : Lightning arrestors (inputs) 4XX : Circuit Breaker (see Note 1) (Final number : add all needed weights)	X0X : No extra monitoring options, X1X : Earth Fault Detector (EFD) X2X : Lamp Failure Detector (LFD) X4X : Time meters (each brightness) (Final number : add all needed weights)	XX0 : No extra options XX1 : Cut-out / earthing jumpers XX2 : Casters (unidirectional) XX4: ECB option included (Final number : add all needed weights)	

Other Options : ICSx (Integrated Circuit selector x-ways)
Or specify : (FAA cut-out, IP other than IP21...)

Note 1 : Circuit breaker **is not optional** and always included in D42 CCR family, whatever the choice 4 (compatibility of the part number with other CCR family)

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