LED Airport Lighting

DIAM4200 1 to 2.5 kVA

IGBT controlled Sinusoidal Single-phase Constant Current Regulator

COMPLIANCE STANDARDS

ICAO Aerodrome design manual, part5
CEI (61822)
FAA (AC150/5345-10 – L828/829)

APPLICATIONS

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.

CONSTITUTION

Control electronics of the DIAM4200 is characterized by an innovative architecture linked by an internal CAN network, built around an AC power chopper with electronic boards using a powerful DSP processor.

An USB front socket allows the connection of a portable computer for parameter setting, this setting being possible *without live voltage*.

Remote control interface supports all the series networks, with or without redundancy, as well as universal multiwire interfaces.

ADVANTAGES

- Perfect sinusoidal output current
- No degradation of the power factor (PF near 1)
- No fed back harmonics (THD near 0)
- No tapping : automatic adaptation to the load
- Space saving :
  - Stackable (up to three units)
  - CCR's can be joined side by side, without gap.
- Compatibility with all DIAM4XXX CCRs, same options and same control interfaces.
- Easy maintenance: low number of spare parts, robust and simple architecture minimizing internal wiring.
- Friendly easy to use and very complete software tool (compatible with all DIAM4XXX), with oscilloscopic capability and data back up.

DIAM4200: Technical characteristics

GENERAL PRESENTATION

Each DIAM4200 is delivered into a metal frame with lifting rings. It includes 3 distinct parts: an "electronic" compartment, a “low voltage” compartment and a "high voltage" compartment.

- The **Electronic part** includes an electronic board whose design uses last digital technologies; it is fixed at the front panel of the device. This front sheet supports the user interface delivering any useful information, and allowing all local or distant operations. Internal parts are accessible from the front or the top.
- The **Low voltage compartment** includes all components involved in supplying and controlling the device, as interface boards, fuses, terminals, the IGBT converter. It is located in the rear part, opening the back door.
- The **High voltage compartment** is located at the lower part of the device, and includes components connected to the lighting loop, as the power transformer, lightning arrestors and load terminals. It can be acceded opening the front panel of the CCR. A door contact switch-off the CCR when opening the compartment, in order to avoid contact hazard with high voltage electrical parts.

MECHANICAL FEATURES

- Protection : IP 21. (other on request)
- Dimensions (all voltages) :

H 750mm (1 CCR) 1290 mm (2 CCR) 1840 mm (3 CCR), Width 530 mm (max), Depth 730 mm

- Use : Normal temperature : -20°C to +55°C, humidity max. : 95%. (FAA style : -40°C to +55°C).
- Cooling : Natural air cooling.
- Accessibility: In order to open front and back doors. Distance min. between back and wall > 20 cm.

PROTECTIONS

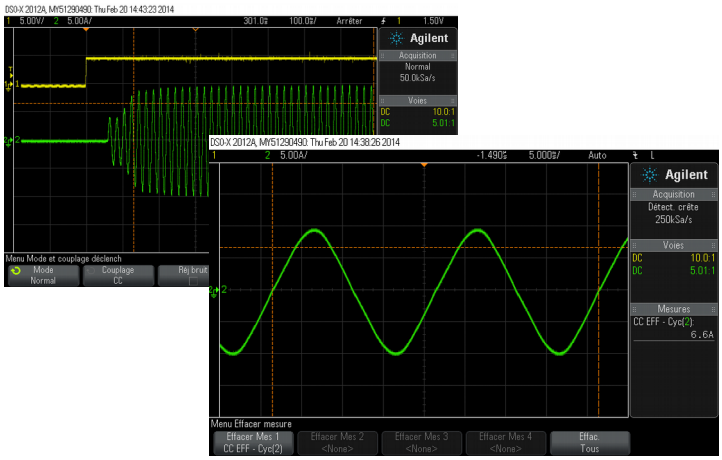
- Lightning arrestors on outputs or input (option)
- Input circuit breaker
- Overcurrent, Open circuit,
- Under/Over input voltage

USER INTERFACE

Made up of a flat polyester keypad on the front plate, it includes a wide display of 16 x 140 p. with screen saver , showing preferably on the upper line the installation state, warnings and parameters, and on the lower line the 4 keys definition, depending of the present menu. An USB front socket allows the connection of a lap-top computer, for parameters setting, also possible without live voltage.

ELECTRICAL FEATURES

- Supply: Single-phase 208 to 480 Vac 10% (IEC type) or –5/+10% (FAA type).
- Frequency : from 45 to 66Hz
- Output rated current : 6,6 A
- Max output power : 2.5 kVA
- Power factor : Not degraded ; on real lamps with transformers load: typically 0,97.
- Efficiency : > 90% at rated parameters.
- Output current accuracy : Better than ±1% under the following conditions : Power supply voltage: ± 10% (IEC) or –5/+10% (FAA) – Frequency from 45 to 66Hz, Load from 0 to 100%
- Remote control : Voltage, from 20V to 60V DC, or dry contacts, or serial single or double network (JBus, ETHERNET)
- Back indication: Static dry contacts (IEC type), or relay contacts (FAA), or serial network
- Black current : preferred value 1.5 or 1.8 A
- Output current waveform : Pure sinusoid.



DIAM4200 : Display and Menus

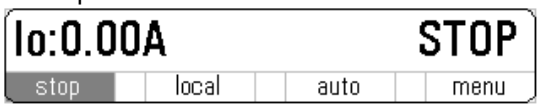
DISPLAY FUNCTIONALITY

The display shows 2 lines of text allowing to monitor many parameters, values and warnings. The lower line sets the definition of the keypad. The preferred information displayed can be changed in "STOP" mode, and can be chosen (long press on STOP) among :

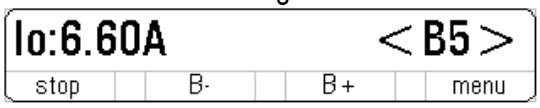
- "Output current Io" – "brightness state Bx"
- "Output current Io" – "Output power Po"
- "Output current Io" – "Output voltage Uo"

DISPLAY EXAMPLES AND KEYS DEFINITION :

- "Stop" mode:



- "Local" mode : (B5 level). Press B+ or B- to increase decrease the brightness:

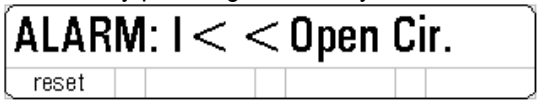


- "Remote control" mode (B4 level):

ALARMS AND WARNINGS

All *alarms* (the CCR failed to supply the loop) and *warnings* (only indicative, without incidence on the loop) are clearly displayed.

- Example :"Open circuit" alarm : In order to restart, first the fault shall be fixed and then the alarm cancelled, by pressing "reset" key.



- Example : Earth Fault warning; in order to see what is the exact resistance value of the leakage (from 0 to 10 Mohms), go in the "monitoring" menu

MONITORING

Parameters can be seen scrolling through the top-level menu items using the ← and → keys:

CONFIGURATION MENU

The "*Configuration*" menu allows to set all basic parameters of the CCR to the processor (in case of mother board replacement, for example) :

- Rated input voltage, from 208 to 480 Vac
- Rated power, in kVA, from 1 to 2.5 kVA
- Brightness steps, from 1 to 8.
- Type : FAA or IEC

OPTION MENU

The "*Option*" menu allows the following definitions:

- Parameter access: *No*

A change from *No* to *Yes* allows to change all parameters of the DIAM4200, in order to avoid wrong operations.

- Scrolling items, all optional features of the CCR can be shown.

SETTING MENU

The "*Setting*" menu is used to assign all values of current and/or delays to brightness levels, current range (min. & max.), over current, open circuit fault detection, etc.
All these parameters are preferably set according the current standard, but can be individually changed.

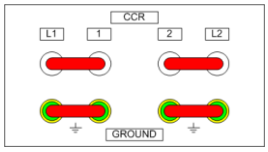
LOAD ADAPTATION

Not needed

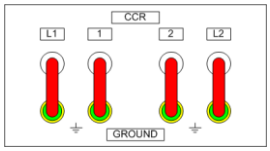
CUT-OUT AND EARTHING PLATE

In option, the CCR can be equipped with an earthing cut-out plate using 4 jumpers which allows to make all maintenance and measurement operations on the loop, without unscrewing any load or earth connections:

- Normal position : When the jumpers are in that position, the CCR supplies normally the load.



- Safety position : When the jumpers are in that position, load and CCR are short-circuited and grounded, and the CCR is disconnected from the load.



Notes :

DSP :	Digital Signal Processor
CAN :	Controller Area Network
USB :	Universal Serial Bus
LED :	Light Emitting Device
IGBT :	Insulated Gate Bipolar Transistor
HMI :	Human-Machine Interface

DIAM4200 CCR from 1 to 2.5 kVA : Ordering Code

ORDERING INFORMATION

The DIAM4200 IGBT's sinusoidal 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-1-5-50-02-400-B21-530 = DIAM4200 compliant to IEC, 6.6A, 5 brightness, 50Hz, 2.5kVA, 400Vac, with a multiwire interface and Jbus serial network, with lightning arrestors on output terminals, Circuit breaker, EFD and LFD :

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

Series	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
Class	1: Class1 (output current 6.6A)
Style	3: Style 1 (Classe1 : 4.8A, 5.5A, 6.6A) 5: Style 2 (Classe1 : 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: 50Hz 60: 60Hz
Output power	01: 1kVA 02: 2.5kVA
Supply	XXX: Tension d'entrée : 208, 220, 230, 240, 277, 380, 400, 415 or 480 Vca -5% +10% (FAA) ou +/-10% (CEI)

Control	0XX : No multiwire interface	00X : No multiwire interface	XX0 : No communication network
	AXX : INTERNAL source Remote control	A1X or B1X : NEGATIVE common monitoring (IEC interface board)	XX1 : 1 x JBus RS485 port
	BXX : EXTERNAL 20 to 60 Vdc Rem. Control	A2X or B2X: free common monitoring (FAA interface board, dry contacts)	XX2 : 2 x Jbus RS485 ports
	CXX : AENA terminal block	C2X	XX3 : 1 x Lonwork port
	DXX : Cylindrical sockets (SOURIAU)	D2X	XX4 : 1 x Ethernet port
	GXX : INTERNAL 120Vac remote control	G2X	XX5 : 1 x Jbus and 1 x Ethernet ports
	HXX : EXTERNAL 120Vac remote control	H2X	XX6 : 2 x Ethernet ports
	(Only one letter must be selected)	(Only one figure must be selected)	(Only one figure must be selected)

(If FAA type CCR, options as described in according advisory are included):

Regular Options	0XX : No extra protection options, 1XX : Lightning arrestors (outputs) 2XX : Lightning arrestors (inputs) 4XX : Circuit Breaker (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) (Final number : add all needed weights)

Other Options : Complementaries codes to add : BI (2 omni-directional caster with lock), CSx (Circuit selector x-ways)
Or specify : (FAA cut-out, IP other than IP21...)

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