



# Multi

ELECTRIC



## DIAM4000

### Single-phase Constant Current Regulator

#### COMPLIANCE STANDARDS

ICAO Aerodrome design manual, part 5

IEC (61822)

CENELEC (ENV 50231)

STNA (91068 rev.93)

FAA (AC150/5345-10E – L829)

AENA (PPT2 rev.5)

#### APPLICATIONS

DIAM4000 series CCRs are low-cost fully static devices controlled by two thyristors. They are designed to maintain a constant, pre-displayed and adjustable output current independently of load or power supply fluctuations. These devices are specifically designed for airfield lighting on runways, taxiways or aprons. They meet all international standards.

Electronics, using the latest digital technology, can be controlled and monitored by the mean of the most popular serial networks with or without redundancy, as well as the most simple universal multiwire interface.

#### ADVANTAGES

##### ➤ Flexibility of operation :

The large semigraphic alphanumeric display combined with a menu type keyboard allows the CCR to be configured without connecting a computer. Regulation is fully digital, which enables parameters to be simply adapted in case of particular load or special application. Auto-calibration eliminates the use of tedious setting, in case of long-time scheduled maintenance.

Emergency and warning messages are clearly displayed, as the current state of the CCR or all input or output electrical measurements.

##### ➤ Maintenance optimisation :

These regulators show a very simplified architecture both for electronics, LV part and HV power unit : It has been optimised to keep the number and variety of spare parts to a minimum, in order to facilitate maintenance. Software tools allow a fast fault diagnosis and test, without dismantling.

##### ➤ Purchase and life-cycle costs :

DIAM4000 series constant current regulators represents the best compromise on the market between high performances, maintenance services and the most reduced cost, thanks to an optimised design and a latest state-of-the-art digital electronic technology.



# DIAM4000 : Technical characteristics

## GENERAL PRESENTATION

Each DIAM4000 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, thyristors. It is located at rear in the upper part, and can be accessed dismantling the roof or the back panel.
- 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, load tapping and load terminals. It can be accessed 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 powers and voltages):  
H 1380 mm, W 500 mm, D 700 mm  
If ECB option (Loop Communication System type STB or SCB) : H 1580 mm, W 500 mm, D 700 mm
- Inter-axes (If casters option): 355 x 610 mm
- Use : Normal temperature : -20°C to +55°C, humidity max. : 95%. (FAA style : -40°C to +55°C).
- Natural air cooling.
- Accessibility: For opening the front and back panels. Distance min. between back and wall > 20 cm.

## PROTECTIONS

- Lightning arrestors on outputs or input (option)
- Input circuit breaker instead of fuse (option)
- Overcurrent, Open circuit, Under/Over 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 (Blue) the installation state, warnings and parameters, and on the lower line the 4 keys definition, depending of the present menu (Purple).

A 9-pins SubD socket located in front allows to connect a lap-top PC to the CCR (for diagnostic or maintenance).

## ELECTRICAL FEATURES

- Supply: Single-phase 208 to 480 Vac  $\pm 10\%$  (IEC type) or  $-5/+10\%$  (FAA type), 50/60 Hz  $\pm 5\%$
- Rated output current : 6.6 or 20 A
- Max. Rated power : 30 kW
- Power factor : FAA type : > 90% (2.5 to 10kW CCRs) or > 95% (15 to 30kW CCRs).  
IEC type : > 90% at nominal voltage and rated resistive load
- Efficiency : > 90% at rated parameters.
- Output current accuracy : Better than  $\pm 1\%$  under the following conditions : Power supply voltage:  $\pm 10\%$  (IEC) or  $-5/+10\%$  (FAA) - Frequency:  $\pm 5\%$ , and Load: from 0 to 100%
- Remote control : Voltage, from 20V to 60V DC, or dry contacts, or serial network.
- Back indication: Static dry contacts, 125Vac/70Vdc, 0.1A max, or serial network
- Black current : offered in standard (B0)



# DIAM4000 : 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 :



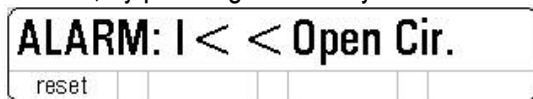
- "Remote control" mode (B4 level):



## 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 30 kVA
- Frequency, in Hz: 50 or 60
- Brightness number, 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 DIAM4000, 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

The output transformer is equipped with an epoxy plate including adjustment taps in order to adapt the rated output voltage of the CCR to the load. Moving 2 brass straps allows to make steps of 12.5%.



## CUT-OUT AND EARTHING PLATE

In option, the CCR can be equipped with an earthing cut-out plate using 2 jumpers which allows to make all maintenance and measurement operations on the loop, without unscrewing any load or earth connections :

- Normal position : When the two 3 pins jumpers are in that position, the CCR is supplying normally the loop.



- Safety position : When the two 3 pins jumpers are in that position, the loop is short-circuited and grounded, and the CCR is also short-circuited and grounded.



# Constant Current Regulator – DIAM4000

## ORDERING INFORMATION

The DIAM regulator is identified by a serialised ordering number which indicates its type and particularity. If needed, add all useful precision and options

Example : D40-IEC-1-5-50-15-400-B1-530 = DIAM4000 compliant to IEC, 6.6A, 5 brightness, 50Hz, 15kVA, 400Vac, with a multiwire interface and Jbus serial network, with lightning arrestors on output terminals, Circuit breaker, EFD and LFD :

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

<b>Series</b>	D40: DIAM 4000 series	
<b>Type</b>	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)	
<b>Class</b>	1: Class1 (output current 6.6A) 2: Class2 (output current 20A)	
<b>Style</b>	3: Style 1 (Class1 : 4.8A, 5.5A, 6.6A) 5: Style 2 (Class1 : 2.8A, 3.4A, 4.1A, 5.2A, 6.6A, or Class2 : 8.5A, 10.3A, 12.4A, 15.8A, 20A) X: Number of brightness, up to 8 (not counting B0 = "black" current) : Values of currents must be specified separately	
<b>Freq.</b>	50: 50Hz Mains frequency 60: 60Hz Mains frequency	
<b>Power</b>	01: 1 kVA Output Power 02: 2.5kVA Output Power 04: 4kVA Output Power 05: 5kVA Output Power 07: 7.5kVA Output Power	10: 10kVA Output Power 15: 15kVA Output Power 20: 20kVA Output Power 25: 25kVA Output Power 30: 30kVA Output Power
<b>Supply</b>	XXX: 208, 220, 230, 240, 277, 380, 400, 415 or 480 Vac -5% +10% (FAA) or +/-10% (IEC) Mains Voltage	
<b>Control</b>	0X : No multiwire interface AX : Internal 20 to 60 Vdc Remote control BX : External 20 to 60 Vdc Remote control HX : External 120 Vac Remote control (Only one letter must be selected)	X0 : No communication network X1 : 1 x JBus RS485 port X2 : 2 x Jbus RS485 ports X3 : 1 x Lonwork port X4 : 1 x Ethernet port X5 : 1 x Jbus and 1 x Ethernet ports (Only one figure must be selected)

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

<b>Regular Options</b>	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) XX4 : ECB included (Final number : add all needed weights)
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Other Options :

Please specify (AENA specs, FAA cut-out plug, Protection rating other than IP21, Circuit selector, etc.)



# Multi

## ELECTRIC

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