RELIANCE Power CSF

Constant Current Regulator

Ferroresonant, Air-Cooled

Shown with optional ACE3

Compliance with Standards

FAA: L-828/L-829 AC 150/5345-10 (Current Edition). ETL Certified.

ICAO: Aerodrome Design Manual Part 5, para. 3.2.1.4 to 3.2.1.6.

Military: UFC 3-535-01; NAVAIR 51-50AAA-2

Uses

FAA L-828/L-829 & ICAO
Provides three or five precision output levels to power series lighting circuits on airport runways and taxiways.

Features

- Advanced CCR architecture produces minimal EMI, high efficiency, and near unity power factor for AC 150/5345-10 test conditions. Exceeds FAA and military requirements for power factor and efficiency.
- Complies with the conducted power line emission limits test listed in Table 4 of AC 150/5345-10 and as specified in the Code of Federal Regulations (CFR) Title 47, Subpart B, Section 15.107b. Also complies with the radiated emission test listed in Table 5 of AC 150/5345-10 and as specified in the Code of Federal Regulations (CFR) Title 47, Subpart B, Section 15.109b.
- Optional integrated ACE3 unit with 7-inch LCD touchscreen display provides state-of-the-art remote control and L-829 monitoring capability. The new touchscreen design allows all measurements – output True-RMS current and voltage, VA, watts, lamps-out, and series circuit insulation resistance value – to be displayed simultaneously. A visual indication is also provided for FAA-monitored parameters, including open circuit, overcurrent, loss of input power, loss of input voltage, low VA (drop in load VA of 10%), Remote/Local status, and incorrect output current.
- Interlock switch cuts power when the door is opened.
- Available in two classes and styles:
  Class 1 = 6.6 A maximum output current
  Class 2 = 20 A maximum output current (15-30 kW only)
  Style 1 = 3 Brightness Steps (6.6 A output current only)
  Style 2 = 5 Brightness Steps
- If input power loss occurs, operation will resume within five seconds after restoration of input power.
- Number of Brightness Steps can be changed in the field (between 3 and 5 Steps).
- Field upgradable from L-828 to L-829 with touchscreen LCD ACE3 unit.
- Input and output lightning protection included.
- A ferroresonant CCR is preferred for airports that require low output harmonic content (EMI) or that have varying loads, such as Runway Guard Lights using incandescent (tungsten-halogen) lamps, L-849 REILs using xenon flash lamps, or Runway Status Lights (RWSL).
- For 20 A, 50 and 70 kW CCRs, refer to DS-3013.
- RELIANCE® Power CSF regulators can be stacked to minimize the floor space required in a vault. Standard 3/8"-16 x 3/4" hex head bolts are used to secure the regulators together. Regulators can only be stacked two high.

Theory of Operation

A ferroresonant transformer is used to supply constant current to the series circuit. Using a feedback current sensing transformer, the output is regulated to ensure that a constant current is delivered to the series field circuit per FAA regulations. The output is modulated by controlling the current flowing in the tank circuit of the ferroresonant transformer.

ACE3 Unit

The optional ACE3 unit provides L-829 monitoring and optional megging or CCR input monitoring capability.

- CCR input voltage
- CCR run-time by step
- CCR cycle count

Optional CCR input monitoring indicates the following:

- CCR input current
- CCR input volt-amps (VA)
- CCR input power (watts)
- CCR input power factor
- CCR % efficiency

The ACE3 unit is also a component of ADB SAFEGATE's distributed control and monitoring system. Each unit can be easily connected to an Airport Lighting Control & Monitoring System (ALCMS) by simply adding redundant communication wires. More information can be found on the ACE3 data sheet 3097.

RELIANCE Power CSF

Environmental Operating Conditions

Temperature:	-40 °C to +55 °C (-40 °F to +131 °F)
Humidity:	10 to 95%
Altitude:	0 to 6,600 ft (2,000 m)

CCR Kits

Various kits are available to customize CCRs for specific application requirements.

Current Sensing Relay Kit	**94A0343**
Provides a dedicated contact closure if CCR output current is present.	
Time Meter Kit[1]	**94A0263/1GH**
Provides CCR run-time information on L-828 CCRs.	
CCR Output Analog Voltmeter Kit[1]	**Part No.**
4 kW, 5 kW, 7.5 kW , 6.6 A; 20 kW, 20A 10-15 kW, 6.6 A; 30 kW, 20 A 20-30 kW, 6.6 A	94A0128/CSF 94A0129/CSF 94A0130/CSF
Time Meter & Output Analog Voltmeter Kit[1]	**Part No.**
7.5kW, 6.6A; 20kW, 20A	94A0128 & 94A0263/3GH
10-15kW, 6.6A; 30kW, 20A	94A0129 & 94A0263/3GH
20-30kW, 6.6A	94A0130 & 94A0263/3GH
Door Documentation Pocket Kit	**94A0654**
Provides a pocket for CCR documentation on the inside of the front door.	
Alternate Series Cutout Kit	**94A0341**
Kit is used to install an internal SCO Series Cutout (PN 1475.92.030). Kit is only available with Output Range options 3 or 5.	

CCR Kit Notes

[1] Used only with Monitoring Option 0. When a n L-829 is ordered, Time Meter and Output Voltage monitoring is integrated into the functionality of the ACE3.

Ordering Code

CSF XX XX - X X XX

Amperage
66 = 6.6 A output
20 = 20 A output

Size
02 = 2.5 kW, 6.6 A only
04 = 4 kW, 6.6 A only
05 = 5 kW, 6.6 A only
07 = 7.5 kW, 6.6 A only
10 = 10 kW, 6.6 A only
15 = 15 kW
20 = 20 kW
25 = 25 kW
30 = 30 kW

Output Range
3 = 3-step without Series Cutout (6.6 A only)[1]
4 = 3-step with Series Cutout (6.6 A only)[1, 2]
5 = 5-step without Series Cutout
6 = 5-step with Series Cutout [2]

Input Voltage
1 = 208, 60 Hz
2 = 240, 60 Hz
3 = 480, 60 Hz
4 = 347, 60 Hz
5 = 220, 60 Hz
6 = 400, 50 Hz[3]
8 = 220, 50 Hz[3]
9 = 230, 50 Hz[3]
A = 240, 50 Hz[3]
B = 380, 60 Hz
C = 380, 50 Hz[3]
D = 600, 60 Hz[3]

Monitoring and Additional Options (See Application Notes)
00 = L-828
33 = L-829 Monitoring; w/out input monitoring (ACE3)
53 = L-829 Monitoring with IRMS; w/out input monitoring (ACE3)
73 = L-829 Monitoring; with input monitoring (ACE3)[4]
83 = L-829 Monitoring with IRMS; with input monitoring (ACE3)[4]
3A = L-829 Monitoring; w/out input monitoring (ACE2)
5A = L-829 Monitoring with IRMS; w/out input monitoring (ACE2)
3G = L-829 Monitoring; with input monitoring (ACE2)
5G = L-829 Monitoring with IRMS; with input monitoring (ACE2)

Notes
[1] 3-step, 20 A is not standard FAA operation, but ADB SAFEGATE can offer a non-ETL Certified 3-step, 20 A CCR. Please contact Sales for more details.
[2] Not ETL Certified with 20, 25, or 30 kW CCR.
[3] Not ETL Certified.
[4] ACE3 includes input voltage monitoring. If input current and input power monitoring is needed, then select option 73 or 83.

Application Notes

Monitoring Option	Description	Application
00	None	Standard L-828 supplied with analog ammeter
3X	L-829 Monitoring (ACE)	Includes FAA L-829 monitoring equipment (ACE2 and ACE3). Following options are for ACE2 only: • If application is for connection to ADB SAFEGATE L-890 ALCMS: Add a "/A" to end of Ordering Code. The ACE unit will then be programmed to provide monitoring data via redundant communication links. • If application is for a stand-alone L-829 CCR: Ordering Code is not changed. The ACE unit is programmed to deactivate a dry contact closure if a fault is present. The fault alarm can then be connected to any external monitoring system.
5X	L-829 Monitoring (ACE) and IRMS	Includes FAA L-829 and IRMS equipment (ACE2 and ACE3). Following options are for ACE2 only: • If application is for connection to ADB SAFEGATE L-890 ALCMS: Add a "/A" to end of Ordering Code. The ACE unit will then be programmed to provide monitoring data via redundant communication links. • If application is for a stand-alone L-829 CCR with Insulation Resistance Monitoring: Ordering Code is not changed. The ACE unit is programmed to deactivate a dry contact closure if a fault is present. The fault alarm can then be connected to any external monitoring system.
73	L-829 Monitoring (ACE3) with Input Monitoring	Includes FAA L-829 monitoring equipment (ACE3 only). ACE3 includes input voltage monitoring. Contact the sales department for input current monitoring availability.
83	L-829 Monitoring (ACE3) with Input Monitoring and IRMS	Includes FAA L-829 monitoring equipment. This option adds an IRMS (ACE3 only). ACE3 includes input voltage monitoring. Contact the sales department for input current monitoring availability.

Weights and Dimensions

CCR Size	CCR Weight lb (kg)	Shipping Weight lb (kg)
2.5 kW [1]	277 (125.65)	311 (141.07)
4 kW	443 (200.94)	483 (219.09)
5 kW [1]	505 (229.06)	545 (247.21)
7.5 kW	597 (270.79)	631 (286.22)
10 kW	663 (300.73)	703 (318.88)
15 kW [1]	755 (342.46)	795 (360.61)
20 kW	1048 (475.36)	1088 (493.51)
25 kW [1]	1201 (544.76)	1241 (562.91)
30 kW	1355 (614.62)	1395 (632.76)
CCR Size	**H × W × D - inches**	**H × W × D - mm**
All	40 × 31.5 × 31.5 in	1,016 × 800 × 800 mm

Notes

[1] Estimated Weight

Electrical Supply

Power Input:	50/60 Hz, single-phase, available in multiple voltages
Power Factor:	0.99 or more for 2.5 to 30 kW
Efficiency:	90% minimum for 2.5 to 25 kW 92% minimum for 30 kW
Remote Control:	120 VAC, 50/60 Hz (Internal or External) or +48 VDC, ±10% (External)