

FCL Series of Air-cooled Programmable

Why Choose the FCL Series?

AMREL's Integrated Fuel Cell Load "FCL" Series is the ideal all-in-one solution that packages a booster supply for true "0-volt at high-current" operations. The FCL also has an embedded FRA for impedance measurement/EIS, and a full featured high-speed dynamic dc load in an ultra-compact 3U (5.25") air-cooled package. AMREL's FCL offers the industry's highest current rating of 200Adc, as well as custom-tailored voltage, current and power ratings.

Markets and Applications:

- Fuel Cells
 - Single Cell and Short Stack Fuel Cell Characterization, Break-in and Testing Applications
 - Gstat Impedance Measurement (EIS & AC Modulation)
 - Polarization Curve Data Capture (CV & CC Control)
 - Durability
 - Lifetime Tests
 - Performance/Design Characterization



FCL SELECTOR GUIDE

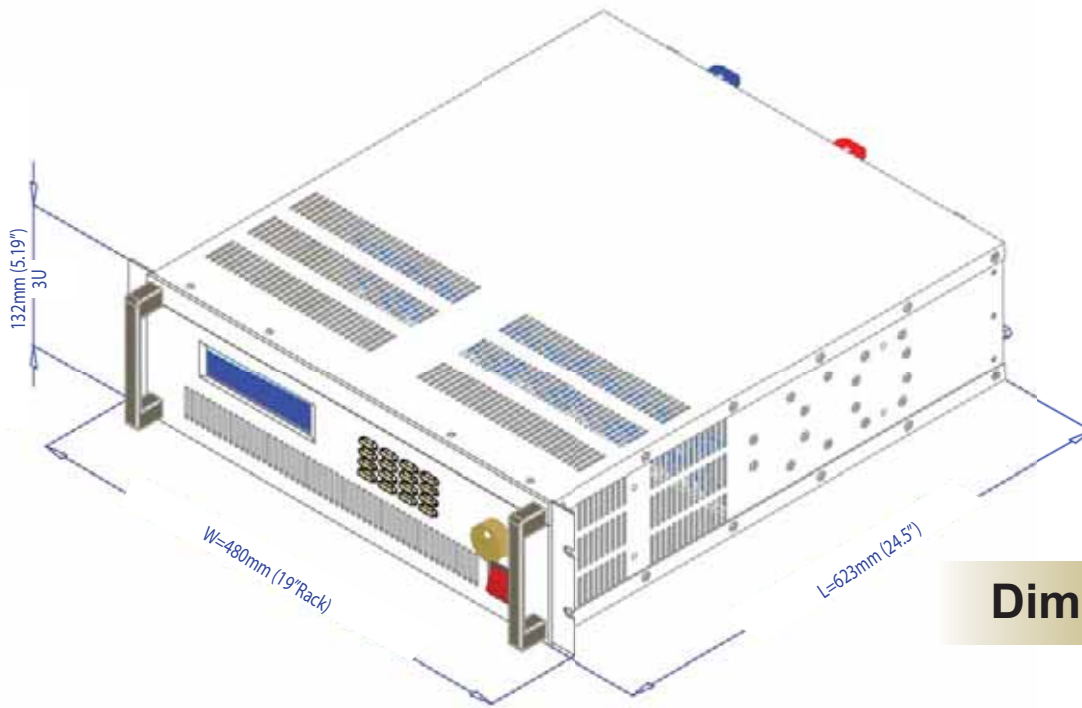
FCL XXX - YY - ZZZ - OPTION
 XXX - POWER | YY - VOLTAGE | ZZZ - CURRENT

L=Low Frequency Option

Series	Model #	Power (W)	Voltage (Vdc)	Current (Adc)	V _{MIN} at I _{MAX}	Size (Height, Depth)
FCL	FCL200-10-100	200W	10	100	0Vdc	(5.25", 19.5")
FCL	FCL200-20-100	200W	20	100	0Vdc	(5.25", 19.5")
FCL	FCL200-30-100	200W	30	100	0Vdc	(5.25", 19.5")
FCL	FCL400-10-100	400W	10	100	0Vdc	(5.25", 19.5")
FCL	FCL400-20-100	400W	20	100	0Vdc	(5.25", 19.5")
FCL	FCL400-30-100	400W	30	100	0Vdc	(5.25", 19.5")
FCL	FCL400-10-150	400W	10	150	0Vdc	(5.25", 19.5")
FCL	FCL400-20-150	400W	20	150	0Vdc	(5.25", 19.5")
FCL	FCL400-30-150	400W	30	150	0Vdc	(5.25", 19.5")
FCL	FCL800-10-100	800W	10	100	0Vdc	(5.25", 19.5")
FCL	FCL800-20-100	800W	20	100	0Vdc	(5.25", 19.5")
FCL	FCL800-30-100	800W	30	100	0Vdc	(5.25", 19.5")
FCL	FCL800-10-200	800W	10	200	0Vdc	(5.25", 19.5")
FCL	FCL800-20-200	800W	20	200	0Vdc	(5.25", 19.5")
FCL	FCL800-30-200	800W	30	200	0Vdc	(5.25", 19.5")
FCL	FCL1.5K-10-100	1.5kW	10	100	0Vdc	(5.25", 19.5")
FCL	FCL1.5K-20-100	1.5kW	20	100	0Vdc	(5.25", 19.5")
FCL	FCL1.5K-30-100	1.5kW	30	100	0Vdc	(5.25", 19.5")
FCL	FCL1.5K-10-200	1.5kW	10	200	0Vdc	(5.25", 19.5")
FCL	FCL1.5K-20-200	1.5kW	20	200	0Vdc	(5.25", 19.5")
FCL	FCL1.5K-30-200	1.5kW	30	200	0Vdc	(5.25", 19.5")
Custom-tailored Ranges Available		Voltage Range:10Vdc ~ 800Vdc Rating Current Range:1Adc ~ 200Adc Rating Power Range:60W ~ 800W Rating		EFU-L = Field Upgradeable Ethernet & USB Available		

Key Features and Benefits:

- **Embedded FRA** (Frequency Response Analyzer) Without the Hassles of External Cables
- **Built-in Booster Power Supply** to Test Down to 0Vdc at Full Operating Current
- **Fully Integrated** 200W, 400W, 800W and 1.5kW Air-cooled Electronic eLoad
- **Impedance Measurement Software** Without the Costs of Purchasing Additional Software
- **CC/CV/CR/CP Operating Modes** to Meet Demanding Application Specific Requirements
- **Dynamic Operation Up to 20kHz** Provides Accurate Impedance Measurements
- **Dynamic Profile Loading Via Voltage and Current Sweeps** for Polarization Curves, Durability/Lifetime Tests, Simulate Real-world Applications and Other Dynamic Test Requirements
- **LabVIEW & LabWindows Drivers, Virtual Panel & SCPI Commands** for Simple ATE Integration
- **The One-box Solution** for Testing Electrical Specs, Validating Performance Targets and Evaluating the Impedance Losses for Fuel Cells
- **Widest Model Selection**-10Vdc/20Vdc/30Vdc FCL Rated at 100 or 200Amps and Custom-tailored Models Available



Dimensions

FCL SPECIFICATIONS

CV MODE SPECIFICATIONS		CC MODE SPECIFICATIONS	
CVL RANGE	0 ~ 10% of Vmax	CCL RANGE	0 ~ 10% of Imax
CVM RANGE	0 ~ 50% of Vmax	CCM RANGE	0 ~ 50% of Imax
CVH RANGE	0 ~ 100% of Vmax	CCH RANGE	0 ~ 100% of Imax
ACCURACY	0.05% of Value ± 0.1% of Rating	ACCURACY	0.05% of Value ± 0.1% of Rating
RESOLUTION	1/16000 of Rated Voltage	RESOLUTION	1/16000 of Rated Voltage
TRANSIENT TIME (SLOW)	0.150 ~ 153.6 (ms)	TRANSIENT TIME (SLOW)	0.150 ~ 153.6 (ms)
TRANSIENT TIME (FAST)	0.150 ~ 15.36 (ms)	TRANSIENT TIME (FAST)	0.015 ~ 15.36 (ms)
CR and CP MODE SPECIFICATIONS		PROTECTION	
Please reference website datasheet for details		OVER POWER PROTECTION	110% * Pmax
		OVER VOLTAGE PROTECTION	105% * Vmax
		OVER CURRENT PROTECTION	110% * Imax
		OVER TEMPERATURE PROTECTION	90°C ± 5°C
		REVERSE MAXIMUM CURRENT	110% of Imax
		REMOTE INHIBIT (RI)	Short
		FAULT INDICATOR	SPDT Relay
		Other Programmable Protections: OPP, OVP, OCP, UVL & Anti-Oscillation	
GENERAL SPECIFICATIONS		DIELECTRIC STRENGTH	
REMOTE INTERFACES	RS-232, GPIB & USB/ETHERNET	PRIMARY CIRCUIT TO CHASSIS	1500Vac for 1 Minute
ANALOG PROGRAMMING	0 ~ 10Vdc	PRIMARY CIRCUIT TO LOAD TERMINAL	1500Vac for 1 Minute
ACCURACY	Mode Accuracy ± 0.1% of Rating	LOAD TERMINAL TO CHASSIS	1500Vdc for 1 Minute
VMON ACCURACY	0.10% of RDG ± 0.1% of Rating		
IMON ACCURACY	0.10% of RDG ± 0.1% of Rating		
FREQUENCY RANGE	0.1Hz ~ 20kHz		
ACCURACY	0.10%		
AC INPUT	95-240Vac / 48 ~ 62Hz		
OPERATING TEMPERATURE	5°C ~ 40°C		
DIMENSIONS	19.5" (L) x 17" (W) x 5.25" (H)		