



CONTROL CONCEPTS

FUSION SCR Power Controllers

Features

- **Auto Senses Line Voltage**
 - 24 - 600 VAC, 45 - 65 Hz
- **AC or DC Output**
 - AC Models: 50 - 1200 Amps
 - DC Models: 45 - 1400 Amps
- **Integrated or Remote Display**
 - Setpoints, Line / Load Voltage, Load Current, Load Power, Alarms
- **Easy Setup via Plug-n-Play USB** 
 - Load / Save Configurations
 - Diagnostics with Chart & Log Operations
- **Analog Interface**
 - Field Scalable 0 - 10 Vdc , 0 - 20 mA , or POT
- **Optional Modbus Digital Interface**
 - Ethernet or RS-485
- **Control Features**
 - Digital Controller / Phase Lock Loop Timing
 - Zero-Cross / Phase Angle / Burst Mode
 - Soft Start
 - Output Limits: Voltage, Current, Power
 - Missing Cycle Detection
 - TRANS-GUARD™, SYNC-GUARD™
- **Alarms: Overtemp / Shorted SCR / Over Current Trip / Phase Loss**
- **Optional Auxiliary I/O Card**



Description

The FUSION Series power controller is a modular digital power controller capable of single or three phase operation with either AC or DC loads. Loads can be controlled by either phase angle, zero-cross, or advanced zero cross for operation into transformers. The controller output is controlled linearly with respect to the command signal and can be the average or RMS value of the voltage, current, true power or external feedback.

FUSION Series power controllers are available in current ratings from 50 - 1200 amps AC or 45 - 1400 amps DC and auto sense input line voltages from 24 - 600 Vac with 45 - 65 Hz line frequency. This controller also features separate universal control power to operate the circuitry and fans.

Operation and troubleshooting is made simple through the use of an integrated display and on-board diagnostics which display load values, set-points, and alarm conditions. Furthermore, a plug-n-play USB interface and FUSION Control Panel software for the PC reduces the workload for installing and configuring the controller to your application.

Setpoints can be controlled by either a standard analog or an optional Modbus digital command interface. The factory configured analog setpoint signal ranges are 0 - 5 Vdc and 4 - 20 mA and are field scalable within from 0 - 10 Vdc or 0 - 20 mA. The digital interface is either Modbus RTU (RS-485) or TCP (Ethernet) and can be used to communicate with a PLC or factory control system.

A remote display kit is available to remote mount the display to the front panel of an electrical enclosure, allowing easy viewing, adjustment of parameters and reduce external gauges or monitor instruments.

Certifications



100kA
Short Circuit
Current Rating*

*On select models with
appropriate fusing



EN60947-4



Part 15 Subpart B
Class A Device



Applications

1. Constant Resistive Loads (Nickel Chromium)
2. Variable Resistive Loads
 - a. Silicon Carbide
 - b. Molybdenum Disilicide
 - c. Graphite
 - d. Lamps
3. Transformer Coupled Loads
4. Fast responding DC
5. Inductive (not intended for motor applications)
6. Gas Discharge
 - a. Ultra Violet
7. Electron Beam
8. Crystal Growing and Processing

Performance Specifications

Power	
Line Voltage (auto switching)	24 - 600 Vac (Nominal) +10% / -15%
Line Frequency (auto switching)	45 - 65 Hz
Frame Current Ratings I Continuous RMS for AC	1Ø or 3Ø AMP AC [50, 80, 100, 130, 160, 200, 240, 320, 400, 500, 650, 800, 1000, 1200]
I Continuous RMS for DC	1Ø AMP DC [45, 90, 145, 220, 360, 720, 1080] 3Ø AMP DC [60, 120, 195, 290, 490, 975, 1400]
Current Rating - Peak Surge	20X continuous rating
Minimum Hold/Latch Current	1 A RMS
SCR Rating (PIV)	1600 V peak forward & reverse
SCR Protection	200 Volt / μ Sec dv/dt protection 1400 V MOV peak voltage protection
Fusing	External compliant with UL, CE or Local Authority
Thermal	Integrated heatsink thermal sensor
Current Limit	20% - 105% of continuous rating of Frame Amp Rating
Current Trip	50% - 450% of continuous rating of Frame Amp Rating
Power Dissipation	1.3 Watt per amp of load current per phase
Control Power / Operate Internal Control	100 - 240 Vac 47-63 Hz (Auto switching)

Environmental	
Surrounding Air Operating Temperature	No derating up to 122°F [50°C] at rated current*
Humidity	20% to 90% RH Non-Condensing
Rated Operating Altitude	Up to 6000 ft [1750m] at rated current*
Contaminates	RoHS Compliant CE Pollution Degree 2
Storage Temperature	- 4 to 176°F [- 20 to 80°C]
*1200 Amp AC, 1080 & 1400 Amp DC Controllers are rated for 113°F [45°C] at sea level	

Reliability	
Mean Time Between Failure (MTBF)	Designed for 50,000 Hours

Isolation	
Signal to Line/Load	3750 Vac minimum
Line/Load to Ground	2500 Vac minimum
Signal to Ground	1500 Vac minimum
Line to Load	1400 Vac minimum
Network	1500 Vac minimum
USB	2500 Vac minimum
Signal to Processor	1500 Vac minimum
Remote Display	2500 Vac minimum

Enclosure Protective Rating	
International	IP 20
Removable Display	IP 65, UL Type 1 & 12

Model Number Identification

FUSION - - - - - - - - SP

FUSION Series _____

Type of Controller _____

- ZC - Zero Cross
- PA - Phase Angle
- DC - Direct Current

Number of Legs of Control _____

- 1 - 1 Leg
- 2 - 2 Leg (ZC only)
- 3 - 3 Leg

Module Amperage Selections _____

	1Ø AC OR 3Ø AC	1Ø DC	3Ø DC
1	50A	45A	60A
2	80A	-	-
3	100A	90A	120A
4	130A	-	-
5	160A	145A	195A
6	200A	-	-
7	240A	220A	290A
8	320A	-	-
9	400A	360A	490A

	1Ø AC OR 3Ø AC	1Ø DC	3Ø DC
A	500A	-	-
B	650A	-	-
C	800A	720A	975A
D	1000A	-	-
E	1200A	1080A	1400A

Optional Communications _____

- 0 - None
- S - Modbus RTU (RS-485)
- E - Modbus TCP (Ethernet)

Configuration Data (supplied by Control Concepts, Inc.) _____

- Includes configuration data such as load configurations, firing modes, feedback, limits, setpoints, ramp rates, etc.
- 0000 - Standard
- 0001 - 3 Phase Controller with a Inside Delta Load
- 0002 - 3 Phase Controller with a 4 Wire Wye Load

Option Card Configuration Data _____

- 1 - The 1 signifies a series 1 option card, the pertains to the configuration data of the card and will be supplied by Control Concepts, Inc.

Short Circuit Current Rating (SCCR) _____

- NS - Only present when 100KA SCCR does not apply
- All models 500A and up contain the -NS and have a 5KA SCCR rating

Special Products (supplied by Control Concepts, Inc.) _____

- Contact factory with questions.

Notes: Zeros signify unselected options

- Module possibilities based on previous selections and number of zones

Examples of Controllers:

FUSION - ZC - 2 - 1100 - 0 - 0000 - 1000

- Three phase two Leg Control, Zero Cross, 50 Amps,
- Aux I/O Card with a standard configuration

FUSION - DC - 3 - EEE0 - 0 - 0000 - 0000 - NS

- Three Phase Full Wave Bridge, 1400 Amps DC
- Controller will have a Short Circuit Current Rating of 5KA

FUSION - PA - 1 - A000 - E - 0000 - 0000 - NS

- Single Leg Control, Phase Angle, 500 Amps, Modbus TCP (Ethernet)
- Controller will have a Short Circuit Current Rating of 5KA

Overall Dimension

	45 - 495 Amp	500 - 1400 Amp
Single Phase AC	14.03 [356.5] x 5.96 [151.4] x 9.57 [243.0]	20.49 [520.3] x 9.22 [134.1] x 11.21 [284.7]
Single Phase DC	14.03 [356.5] x 12.87 [326.9] x 9.57 [243.0]	20.49 [520.3] x 20.02 [508.5] x 11.21 [284.7]
Three Phase 2 Leg	14.03 [356.5] x 9.61 [244.1] x 9.57 [243.0]	20.49 [520.3] x 16.12 [409.5] x 11.21 [284.7]
Three Phase 3 Leg	14.03 [356.5] x 13.27 [337.1] x 9.57 [243.0]	20.49 [520.3] x 23.03 [585.0] x 11.21 [284.7]
Three Phase DC	14.03 [356.5] x 20.18 [512.6] x 9.57 [243.0]	20.49 [520.3] x 33.83 [859.3] x 11.21 [284.7]
Dimensions are: inches [mm] in the form Height x Width x Depth		
See Manual for detailed dimensional layout		

AUX I/O Card (Optional)

Retransmit	2 Analog output channels Scalable 0 - 10Vdc or 0 - 20mA with 15 Vdc compliance output Selectable retransmit functions include the RMS or AVG value of the load voltage or load current and load power
Digital I/O	2 Digital inputs TTL compatible, pull up to 5V through a 10KΩ resistor 2 Digital outputs Relay driver transistor based Open collector that sinks up to 48 Vdc at 150 mA
Custom option cards available, please contact factory for custom applications.	



Accessories

Modbus Digital Interface

Modbus RTU (RS-485) or Modbus TCP (Ethernet)
Simplify your cabling and eliminate A/D conversion error.
Gain access to all monitor information.

In the model number use: S for Modbus RTU (RS-485)
 E for Modbus TCP (Ethernet) available Q4, 2009



Modbus Developers kit (CCI P/N: SMAFUSION-MDK)

Modbus converter, splitter and terminating plug. This will allow for controllers to be "Daisy Chained" together.

Remote Display

Display is remote mountable in a 1/4 DIN hole.
UL Type 1 & 12 ratings
Outside dimensions: 4.156 [105.6] x 4.156 [105.6]
Display mounting kit (CCI P/N: SMAFUSION-RD25)
Gasket, custom mounting brackets with screws,
25 ft [7.62m] shielded cable, circuit board retainer



USB Interface

USB Cable (CCI PN: 0058004-0000-15)
15 ft [4.92m] USB cable



Fuses and Other Accessories

A wide range of fuses and fuse blocks are available.
Contact factory for fuse sizing and any other accessory needs.



Ordering Information



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