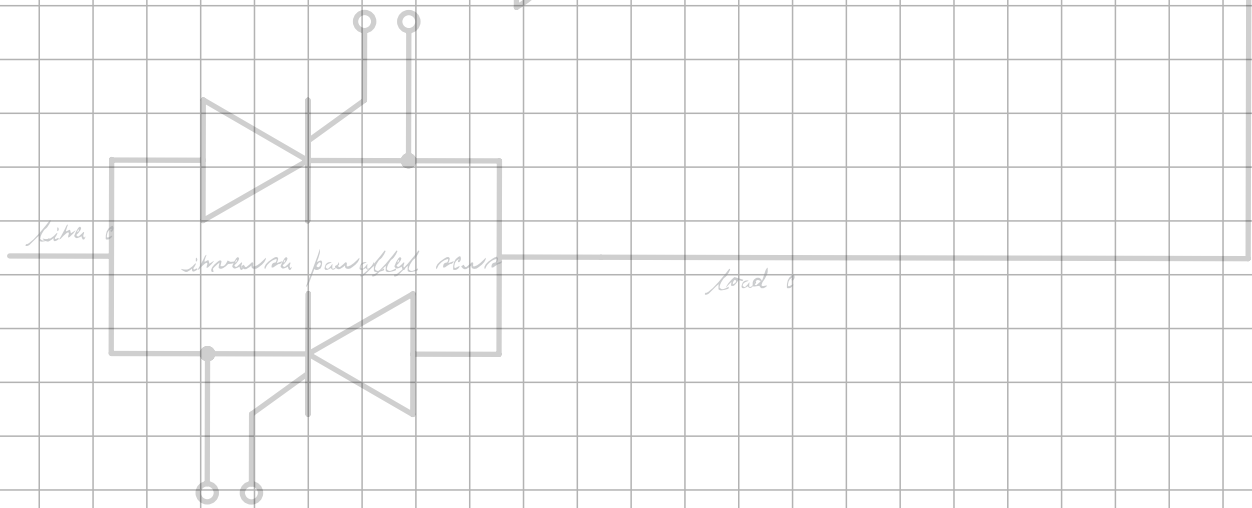


# COMPACT FUSION SCR POWER CONTROLLERS





## FEATURES

**Auto-Ranging Input Voltage**

24 - 600 VAC, 45 - 65 Hz

**AC Output**

10 - 160 Amps

**Internal Class-T Fusing**

Blown Fuse Indicator

**Analog Interface (Two Analog Inputs)**

Standard setpoint ranges: 0 - 5 Vdc, 4 - 20 mA  
Field Scalable 0 - 10 Vdc , 0 - 20 mA , or POT\*

**Optional Fieldbus Interface**

Modbus TCP (Ethernet)  
PROFINET  
Ethernet/IP

**Integrated or Remote Display**

Displays Setpoints, Line / Load Voltage, Load Current, Load Power, Alarms

**Control Features**

Digital Controller / Phase Lock Loop Timing  
Zero-Cross / Phase Angle / Burst Mode  
Soft Start  
Output Limits: Voltage, Current, Power (Phase Angle only)  
Missing Cycle Detection  
TRANS-GUARD™, SYNC-GUARD™

**Alarms**

Overtemp / Phase Loss / Over Current Trip / Shorted SCR\*\*  
Two form C relay outputs for alarms  
Optional Auxiliary I/O Card  
Up to two retransmit channels of voltage, current, or power

**Easy Setup via Plug-n-Play USB**

Load / Save Configurations  
Diagnostics with Chart and Log Operations

\* Other scaling options available via control panel software. Contact factory for information.  
\*\* User selectable. Feature may be disabled in case of nuisance shorted SCR warnings

## CERTIFICATIONS



## BRANCH-RATED FUSING: SAVE \$\$\$ - DON'T FUSE TWICE!

Compact FUSION utilizes integrated Class-T, Branch-rated fusing. It's fast enough to protect your SCR from dead shorts, reduces nuisance fuse-blowing, and meets UL 508A branch fusing requirements. Integrated fusing gives you fewer pieces to manage and lowers installation costs and footprint size.

## DESCRIPTION

The Compact FUSION series controller is a modular digital controller capable of single phase or three phase operation. The modular design allows up to four independent zones of control within one footprint-saving package.

Compact FUSION is nearly identical to its predecessor FUSION, (see sidebar) but with a narrower footprint, onboard branch-rated protection fusing (Class T), and a blown fuse indicator for each line. Optional pass through fusing allows a line to pass through the single phase controller to fuse the return leg of the load.



Loads can be controlled in phase-angle, zero-cross, or burst modes for operation of resistive or transformer connected loads. Output is controlled linearly with respect to command signal and can be set to the average or RMS value of the voltage or current, as well as true instantaneous power or external feedback.

Compact FUSION controllers are available in current ratings from 10 - 160 amps AC. Auto-ranging voltage circuitry enables mains supply voltage from 24-600 VAC, (45-65 Hz) eliminating the need for hardware jumpers or stocking multiple controllers for international voltages. A separate power source supplies the control electronics and maintains critical communications to your control system when the mains are absent.

An integrated display and on-board diagnostics make operation and trouble shooting simple. Limits, set-points, and alarm conditions can be easily viewed and customized. A plug-n-play USB interface and free FUSION Control Panel software for the PC further simplifies installing and configuring the controller to your application. OEMs, for example, can duplicate controller settings by simply loading a configuration file saved from a previous unit.

Parameters can be easily viewed and controlled through the onboard display. For additional convenience, the display can also be remotely mounted on an electrical enclosure door. (See "Utilizing Remote Control," below)

Setpoints can be controlled through the standard analog or optional Fieldbus interface. The factory-configured analog setpoint signal ranges are 0 - 5 Vdc and 4 - 20 mA, both of which are field scalable from 0 - 10 Vdc or 0 - 20 mA.

The Fieldbus interface options include Modbus TCP (Ethernet), PROFINET (Ethernet), or EtherNet/IP. These interface options can be used to communicate with a PLC or factory control system. For multi zone controllers consisting of 3 or 4 zones, a Fieldbus interface is required.

# THE VISION BEHIND COMPACT FUSION

In 2009, Control Concepts released FUSION: a single controller designed to meet customer requirements and built for use around the world. FUSION series controllers accommodate international supply voltages and meet global safety and environmental standards.

Compact FUSION is our latest controller built on this same vision. The slim design reduces total installed cost and further improves economic impact, and you can expect reliable performance backed by exceptional customer service.



# UTILIZING REMOTE CONTROL

A remote display kit is available from Control Concepts, Inc, allowing you to mount the display on the outside of an electrical enclosure and eliminating costly Amp meters, switches, and associated wiring and labor.

The display is rated IP 65 and UL type 1 and 12 to withstand water or dust in demanding factory conditions.

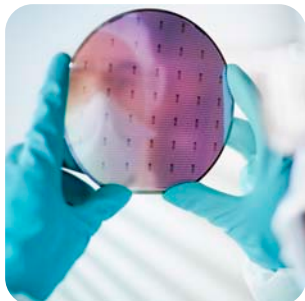
For a complete description and ordering information, see Page 6.



# APPLICATIONS

**Constant Resistive Loads**  
(Nickel Chromium)

**Variable Resistive Loads**  
Silicon Carbide  
Molybdenum Disilicide  
Graphite  
Tungsten Lamps



**Transformer Coupled Loads**

**Inductive**  
(Not Intended for Motor Applications)

**Gas Discharge**  
Ultra Violet



**Electron Beam**

**Crystal Growing and Processing**



# PERFORMANCE SPECIFICATIONS

POWER	
Line Voltage (auto ranging)	24 - 600 Vac (Nominal) +10% / -15% *
Line Frequency (auto switching)	45 - 65 Hz
Frame Current Ratings (Amps) Fusing (Amps)	1 Continuous RMS    10   25   50   80   100   125   160 Fused at                15   30   60   100   125   150   200
Current Rating- Peak Surge	20X continuous rating
Minimum Hold/Latch Current	1 A RMS
SCR Rating (PIV)	1600 V peak forward & reverse
Fusing	Internal; Branch-Rated Class T
Thermal	Integrated heat sink thermal sensor
Current Limit	20% – 105% of continuous rating of Frame Amp Rating
Current Trip	50% - 450% of continuous rating
Power Dissipation	1.3 Watt per amp of load current per phase
Control Power / Operates Internal Control Electronics	100 - 240 Vac 50/60 Hz

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

ENCLOSURE PROTECTIVE RATING	
International	IP 20
Removable Display	IP 65, UL Type 1 & 12

ENVIRONMENTAL	
Surrounding Air Operating Temperature	32°F [0°C] - 122°F [50°C]
Humidity	20% to 90% RH Non-Condensing
Rated Operating Altitude	Up to 6000 ft [1750m] at full rated current
Contaminates	ROHS Compliant CE Pollution Degree 2 (only non-conductive pollution occurs)
Storage Temperature	- 4 to 176°F [- 20 to 80°C]

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

\* Contact factory for other options

# MODEL NUMBER IDENTIFICATION

CF -   -  -     -  -     -

**Type of Controller**  
 ZC - Zero Cross  
 PA - Phase Angle

**Number of Legs of Control**  
 1 - 1 Leg  
 2 - 2 Leg (ZC only)  
 3 - 3 Leg

**Module Amperage Selections**

	Single Phase						Three Phase			
	# of Zones	1 Zone	1 Zone	2 Zones	2 Zones	3 Zones	4 Zones	1 Zone 2 Leg	1 Zone 2 Leg	1 Zone 3 Leg
Lines Fused	L1	L1, L2	L1, L2	L1, L2, L3, L4	L1, L2, L3	L1, L2, L3, L4	L1, L2	L1, L2, L3	L1, L2, L3	
Current Size	10 Amps	1000	1F00	1100	1F1F	1110	1111	1100	1F10	1110
	25 Amps	2000	2F00	2200	2F2F	2220	2222	2200	2F20	2220
	50 Amps	3000	3F00	3300	3F3F	3330	3333	3300	3F30	3330
	80 Amps	4000	4F00	4400	4F4F	4440	4444	4400	4F40	4440
	100 Amps	5000	5F00	5500	5F5F	5550	5555	5500	5F50	5550
	125 Amps	6000	6F00	6600	6F6F	6660	6666	6600	6F60	6660
	160 Amps	7000	7F00	7700	7F7F	7770	7777	7700	7F70	7770

**NOTE:** F = Pass-Through Fuse  
 Multi-Zone Note: When combining current sizes, the first two and last two numbers must be identical. (Examples: 3311, 6655) Higher numbers precede lower numbers.

**Factory Industrial Communications\***  
 0 - None  
 I - Ethernet/IP  
 E - Modbus TCP (Ethernet)  
 N - PROFINET  
*Discontinued*  
 S - Modbus RTU (RS-485)  
 P - PROFIBUS  
 D - DeviceNet

\*This is in addition to USB, which comes standard on all controllers.

**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  
 XXXX - Custom configuration data such as load configurations, firing modes, feedback, limits, setpoints ramp rates, etc., assigned by factory.

**Option Card**  
 0000 - No option card  
 1000 - Auxiliary I/O expansion card [Details found in Installation & Maintenance Manual]

Model Number	Controller Description
CF - PA - 1 - 7000 - 0 - 0000 - 1000	Single Phase, Phase Angle, 160 Amps, Aux I/O Card
CF - PA - 1 - 3330 - E - 0000 - 0000	(3x) Single Phase, Phase Angle, 50 Amps, Modbus TCP
CF - ZC - 2 - 3311 - 0 - 0000 - 0000	(2x) Three Phase, Two Leg, Zero Cross, 50 Amps in Zone 1, 10 Amps in Zone 2
CF - PA - 1 - 7F5F - 0 - 0000 - 0000	(2x) Single Phase, Phase Angle, 160 Amps with Pass-Through Fusing, 100 Amps with Pass-Through Fusing

**Custom configurations are available.** Contact factory with special requirements and for availability. This may require a "-SP

# DIMENSIONS

DIMENSIONS ARE IN INCHES [mm], LISTED HEIGHT x WIDTH x DEPTH	
14.03 [356.5] x 5.96 [151.4] x 9.57 [243.0]	14.03 [356.5] x 9.61 [244.1] x 9.57 [243.0]
Single Phase	(2x) Single Phase with Pass Through
Single Phase with Pass Through	(3x) Single Phase
(2x) Single Phase	(4x) Single Phase
Three Phase Two Leg	3 Phase Two Leg with Pass Through
	Three Phase Three Leg

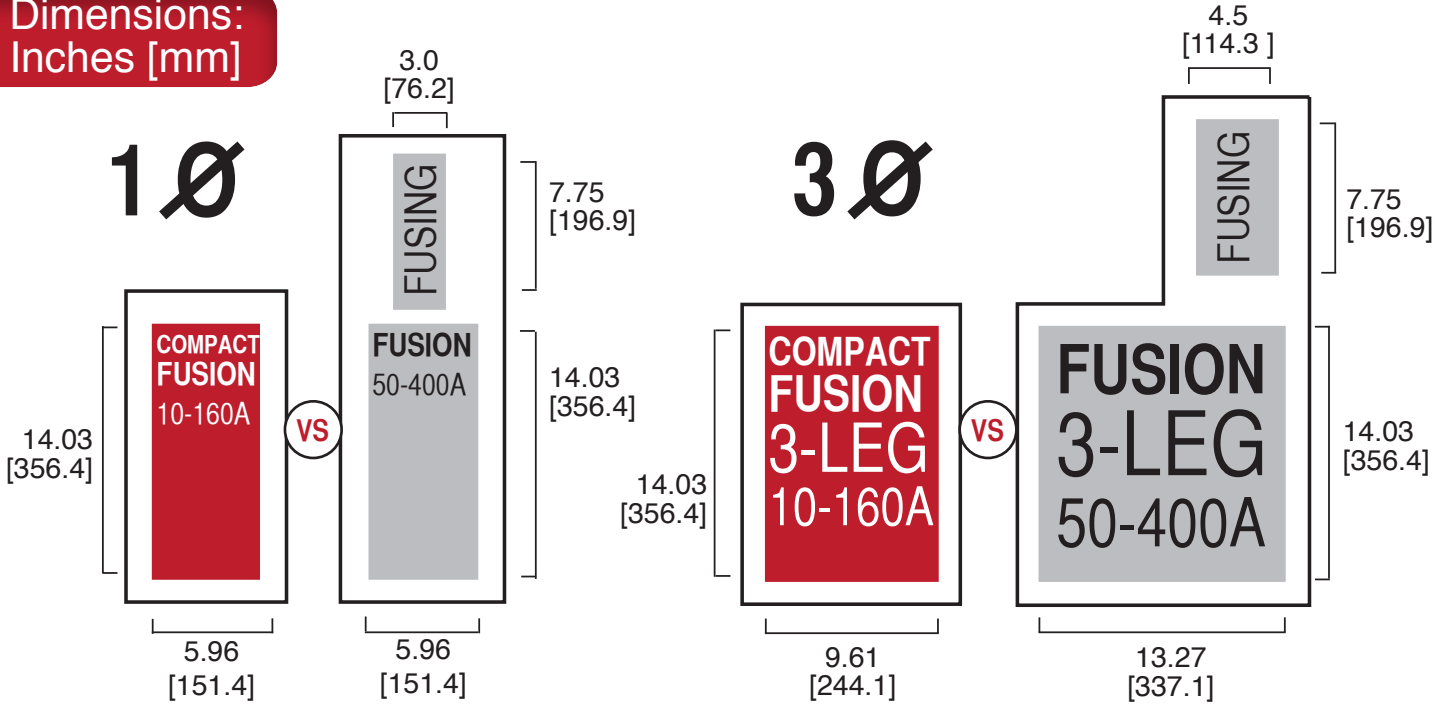
See Manual for panel layout.

# HOW COMPACT IS THE FOOTPRINT?

Internal fusing reduces power control-related panel space requirements significantly. Three-phase models are also built almost four inches slimmer than their equivalents in the original Fusion series.

Compare panel space requirements between Compact Fusion and the original Fusion model to see how slimmer dimensions translate into big savings.

## Dimensions: Inches [mm]



## ACCESSORIES

### AUXILIARY I/O CARD

#### Retransmit

- 2 Analog output channels
- Scalable 0-10V dc or 0-20mA with up to 15 Vdc compliance voltage
- Each channel may be assigned either the RMS or AVG value of the load voltage, load current, or true instantaneous 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)

### FIELD BUS INTERFACE

MODBUS TCP (Ethernet), DeviceNet, or EtherNet/IP, or PROFINET. Simplify your cabling, eliminate A/D conversion error, and gain access to monitor information. In the model number, use:

- I for EtherNet/IP
- E for Modbus TCP (Ethernet)
- P for PROFIBUS

### REMOTE DISPLAY

- Controller display is mountable in a 1/4 DIN cutout
- UL-type 1 & 12 ratings, IP65
- Outside Dimensions: 4.156 [105.6] x 4.156 [105.6]
- Display Mounting Kit includes: Gasket, display retainer with screws, shielded cable, ferrite, and empty replacement display with CCI logo
- Sizes: 25 ft [7.62m] (CCI P/N: SMAFUSION-RD25)  
5 ft [1.52m] (CCI P/N: SMAFUSION-RD5)

### USB CABLE

- 15 ft [4.92m] USB Cable (CCI P/N: 0058004-0000-15)

## CONTACT/ORDERING INFORMATION

TEL: (952) 474-6200 | (800) 765-2799  
FAX: (952) 474-6070 | [www.ccipower.com](http://www.ccipower.com)  
8077 Century Blvd, Chanhassen, MN 55317, USA

