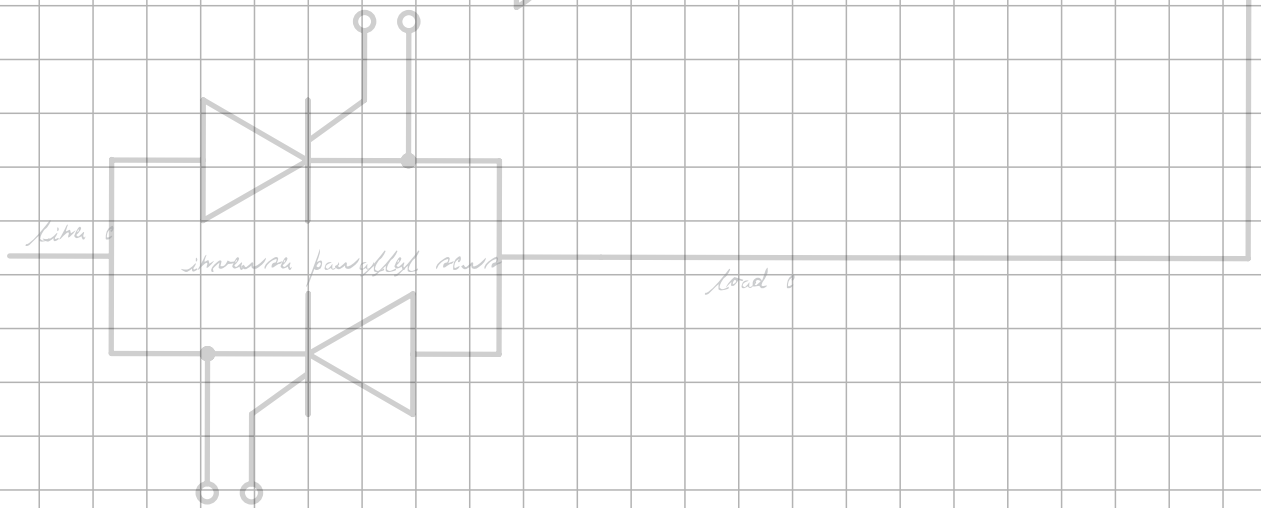


# COMPACT FUSION SCR POWER CONTROLLERS





# 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)  
Modbus RTU (RS-485)  
ODVA-Certified DeviceNet™  
PROFINET  
PROFIBUS  
Ethernet/IP

**Integrated or Remote Display**

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

\* 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

**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

# 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 RTU (RS-485), Modbus TCP (Ethernet), DeviceNet™, PROFINET (Ethernet), PROFIBUS, 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

| <b>POWER</b>  |   |
|---|---|
| Line Voltage (auto ranging)                           | 24 - 600 Vac (Nominal) +10% / -15% *  |
| Line Frequency (auto switching)                       | 45 - 65 Hz  |
| Frame Current Ratings (Amps)<br>Fusing (Amps)         | 1 Continuous RMS    10   25   50   80   100   125   160<br>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  |

| <b>RELIABILITY</b>               |                           |
|----------------------------------|---------------------------|
| Mean Time Between Failure (MTBF) | Designed for 50,000 Hours |

| <b>ENCLOSURE PROTECTIVE RATING</b> |                       |
|------------------------------------|-----------------------|
| International                      | IP 20                 |
| Removable Display                  | IP 65, UL Type 1 & 12 |

| <b>ENVIRONMENTAL</b>                  |   |
|---------------------------------------|---|
| 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<br>CE Pollution Degree 2     |
| Storage Temperature                   | - 4 to 176°F [- 20 to 80°C]                 |

| <b>ISOLATION</b>    |                  |
|---------------------|------------------|
| 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
- DC - Direct Current

**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<br>2 Leg | 1 Zone<br>2 Leg | 1 Zone<br>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
- D - DeviceNet
- I - Ethernet/IP
- E - Modbus TCP (Ethernet)
- S - Modbus RTU (RS-485)
- N - PROFINET
- P - PROFIBUS

\*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□□" to be appended to the model number which would be supplied by Control Concepts, Inc.

# 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                       |

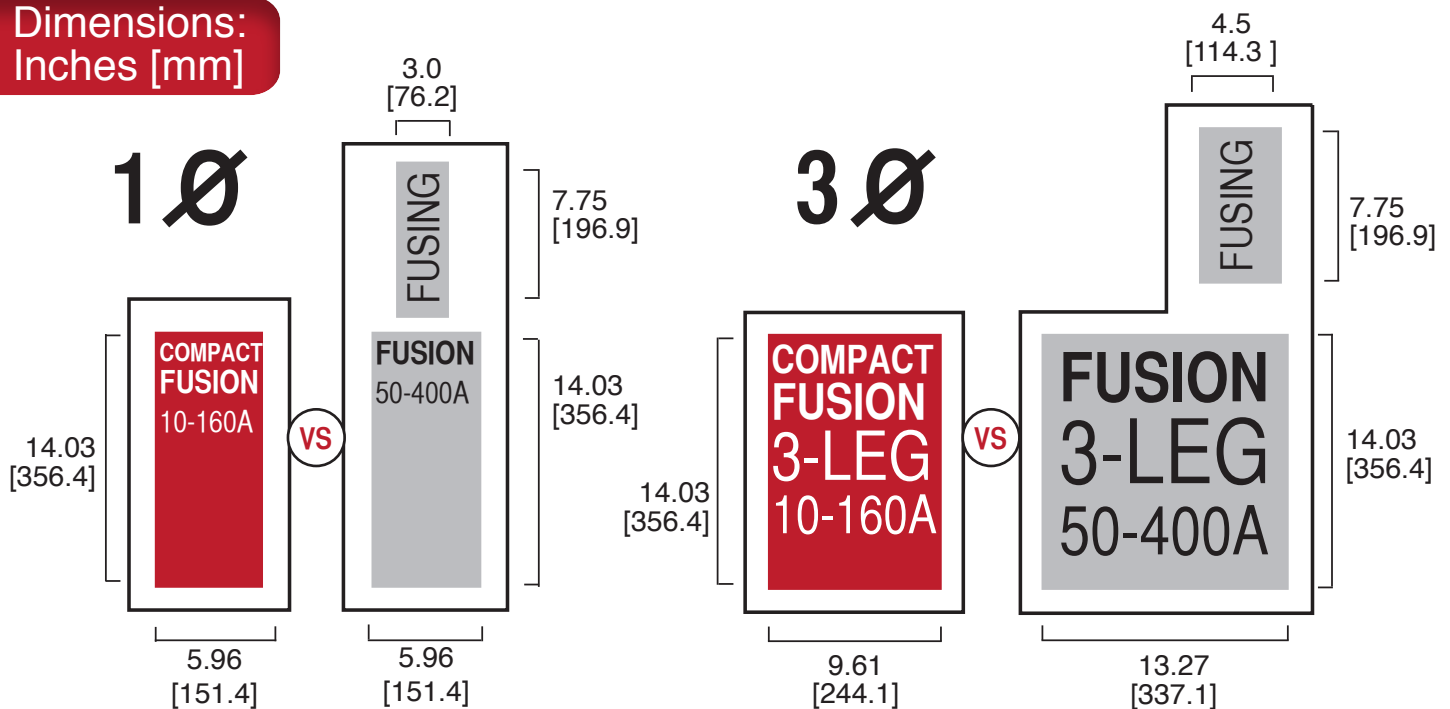
\*DeviceNet depth = 9.82 [249.4]  
See Manual for panel layout.

## 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 RTU (RS-485), 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:

- |                               |                   |                     |
|-------------------------------|-------------------|---------------------|
| - S for Modbus RTU (RS-485)   | - D for DeviceNet | - I for EtherNet/IP |
| - E for Modbus TCP (Ethernet) | - N for PROFINET  | - 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)

### FUSES AND OTHER ACCESSORIES

- A wide range of fuses and fuse blocks are available.
- Please contact factory for fuse sizing and any other accessory needs and we would be happy to accommodate you.

## CONTACT/ORDERING INFORMATION

TEL: (952) 474-6200 | (800) 765-2799  
FAX: (952) 474-6070 | [www.ccipower.com](http://www.ccipower.com)  
18760 Lake Drive East, Chanhassen, MN 55317, USA

