Installation Instructions

CS3 Three Phase Solid State Relay

CHROMALOX
Advanced Thermal Technologies

PK522-3
0037-75550
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Important Safeguards

⚠WARNING

HIGH VOLTAGE is used in the operation of this equipment; DEATH ON CONTACT may result if personnel fail to observe safety precautions.

Learn the areas containing high-voltage connections when installing or operating this equipment.

⚠WARNING

Be careful not to contact high-voltage connections when installing or operating this equipment.

Before working inside the equipment, turn power off and ground all points of high potential before touching them.

⚠WARNING

ELECTRIC SHOCK HAZARD: Any installation involving control equipment must be performed by a qualified person and must be effectively grounded in accordance with the National Electrical Code to eliminate shock hazard.

CS3 Three-Phase Solid State Relay

General

The CS3 Series of solid state relays are an ideal, low cost power control solution for switching resistive 3-phase loads found applications in such as furnaces, ovens, heat treating, injection molding, thermoforming, press platens, commercial food equipment, semiconductor, lighting and drying, just to name a few.

The CS3 Series power controllers feature:

- Rugged, industrial design & touch-safe exterior
- Conservative, continuous service ratings at 40°C
- Up to 3 x 55 Amps and up to 600 VAC
- AC and DC Voltage command signals
- Zero cross firing
- Easy terminal access via removable covers
- Integrated heat sink and fan
- SCR thermal protection with LED indication
- Optional over temperature alarm
- Optional load / line interrupt alarm
- USA & Canadian UL component recognition
- CE conformity

Installation and Operation

⚠CAUTION

The owner/installer must provide all necessary safety and protection devices and follow all current electrical wiring standards and regulations. Failure to do so may compromise the integrity of the controller and / or cause product failure resulting in a safety risk to operational and service personnel.

⚠CAUTION

This controller utilizes a heat sink which is designed to cool the unit during operation. Under no circumstance should air flow around the controller be compromised in any way. Failure to do so may result in the overheating of the controller, product failure, product temperatures and even fire.

⚠WARNING

During continuous operation, the heat sink can reach very high temperatures, and keeps a high temperature even after the unit is turned off due to its high thermal inertia.

Higher voltages may be present. DO NOT work on the power section without first cutting out electrical power to the panel. Failure to do so may cause serious injury or death.

To ensure proper performance, maximum safety and reliability, it is essential to install the unit correctly. This includes proper mounting, spacing, hardware and wiring. See below:

1. Maximum surrounding air temperature is 40°C in "Open Type Equipment" which is suitable for use in pollution degree 2.

2. Install the unit vertically (max 10° inclination from vertical axis).

3. Spacing:

- Minimum vertical distance between unit and panel wall: 3.94" (100 mm)
- Minimum horizontal distance between unit and panel wall: .79" (20 mm)
- Minimum vertical distance between adjacent power control units: 11.81" (300 mm)
- Minimum horizontal distance between adjacent power control units: .79" (20 mm)

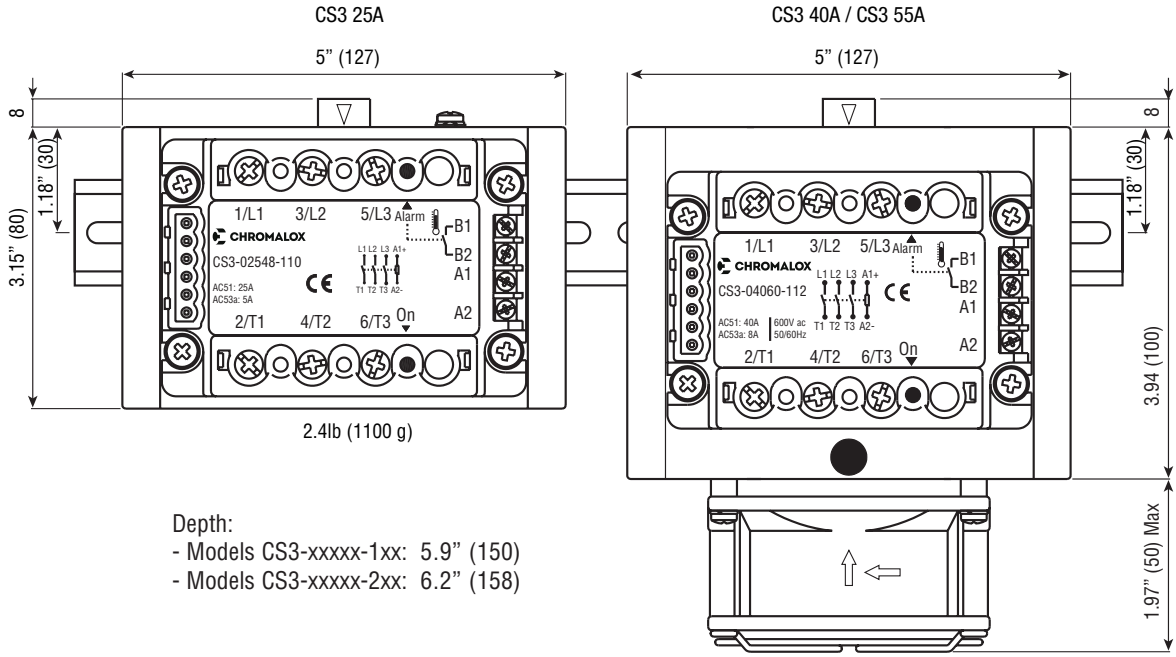
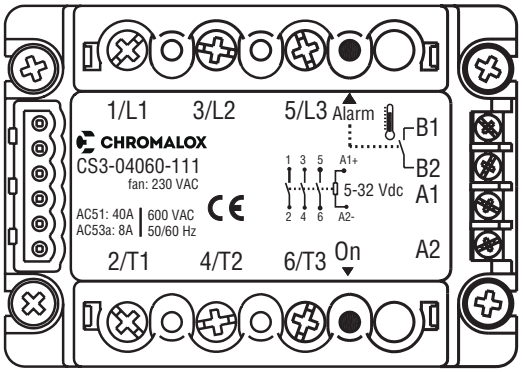


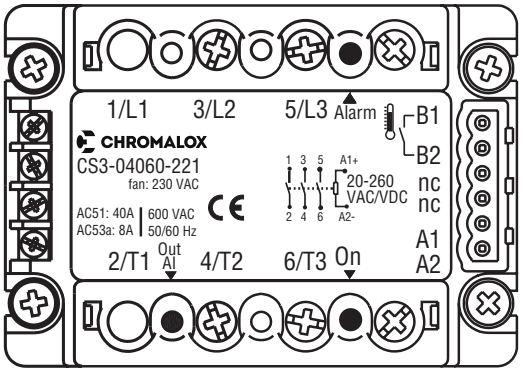
Figure 1

CS3 with VDC Control Signal Input



Label	Connection / Indication
L1, L2, L3	Line 1, Line 2, Line 3 VAC Input
T1, T2, T3	Load 1, Load 2, Load 3 VAC Output
A1	(+) VDC Control Signal Input
A2	(-) VDC Control Signal Input
B1	Alarm Output (option)
B2	Alarm Output (option)
ON	Red LED - Command Signal Indication
Alarm	Yellow LED - Over Temp. Indication
GND	Earth Ground (Not shown, varies by model)

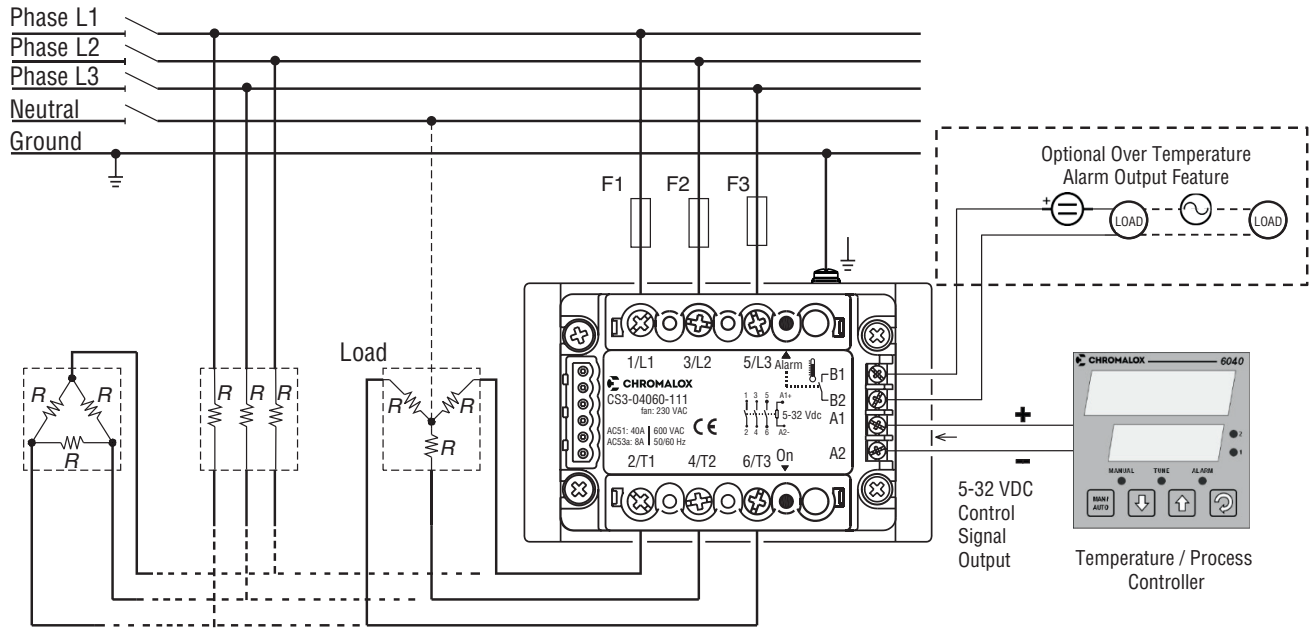
CS3 with VAC Control Signal Input



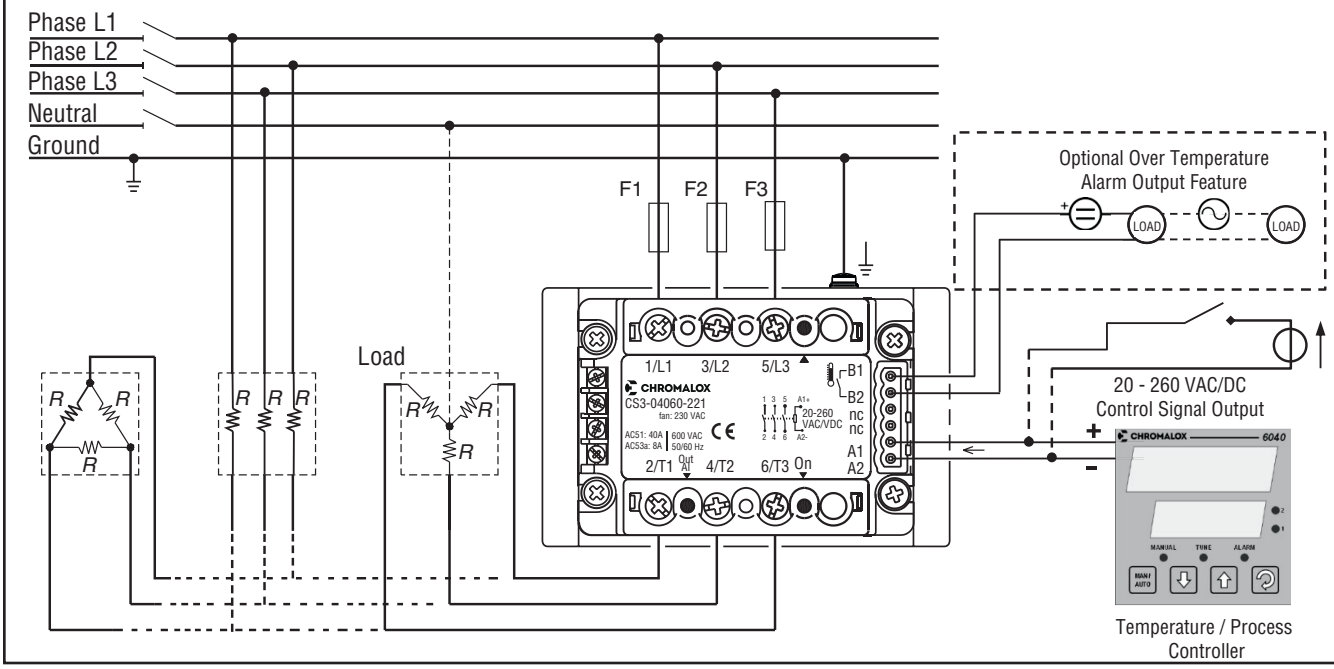
Label	Connection / Indication
L1, L2, L3	Line 1, Line 2, Line 3 VAC Input
T1, T2, T3	Load 1, Load 2, Load 3 VAC Output
A1, A2	AC Control Signal Input
B1	Alarm Output (option)
B2	Alarm Output (option)
ON	Red LED - Command Signal Indication
Alarm	Yellow LED - Over Temp. Indication
OUT-AL	Red LED - Load/Line Interrupt Alarm (Alarm Code 2 Only)
GND	Earth Ground (Not shown, varies by model)

Wiring Diagrams

Wiring CS3 with VDC Control Signal Input



Wiring CS3 with VAC/VDC Control Signal Input (Code 2)



Specifications

General

Category of use: AC51, AC53a
Switching Mode: ..... Zero Cross
Input/Output Isolation Voltage: ..... 4,000 VAC RMS
Operational Voltage Range
- 480VAC models: ..... 24 - 530 VAC
- 600VAC models: ..... 24 - 660 VAC

Nominal Frequency: ..... 50 - 60 Hz
Non-repetitive peak voltage
- 480VAC models: ..... 1200 Vp
- 600VAC models: ..... 1200 Vp

Zero Voltage Turn-on: ..... ≤ 20V
Activation time: ..... = 1/2 cycle
Deactivation time: ..... = 1/2 cycle
Potential drop at rated current: ..... = < 1.4 Vrms
Power factor ..... = 1
IP20 Protection

Inputs

VDC Input (Type "1")
Control voltage: ..... 5 - 32 VDC
Maximum input: ..... < 18 mA @5 VDC to 22 mA @ 32 V
Maximum reverse voltage: ..... 36 VDC
Activation voltage: ..... > 4.5 VDC
Deactivation voltage: ..... < 3 VDC

VAC Input (Type "2")
Control voltage: ..... 20 - 260 VAC/DC
Activation voltage: ..... > 15 VAC/DC
Deactivation voltage: ..... < 6 VAC/DC
Current draw: ..... ≤ 8 mAac/dc @ 260 VAC/DC

Outputs

Specification	CS3-025		CS3-040		CS3-055	
Rated Current (@ 40˚C continuous service)	AC51	AC53	AC51	AC53	AC51	AC53
	3 X 25A	3 X 5A	3 X 40A	3 X 8A	3 X 55A	3 X 15A
Maximum Surge Current (t=20 ms)	400 A		600 A		1,150 A	
Maximum I^2t for fusing (blowout)	645 A^2s		1,010 A^2s		6,600 A^2s	
Critical dV/dt Off-state (minimum)	1,000 V/µs					
Off-state Leakage Current (@ Rated Voltage)	< 3 mA					

Integrated Thermal Protection

The SSR temperature is constantly monitored. If the maximum temperature limit (230°F/110°C) is exceeded, current to the load is interrupted and the YELLOW over-temperature condition LED illuminates.

Alarm Output Option

The Alarm Output is a Solid State Switch (isolated contact) which controls a connected device during an alarm event, such as a horn or light.
- Requires external 24 VAC/DC power supply
- Ratings: Imax = 150 mA
  Vmax = 32 VAC/DC
  Z close < 15 Ω (impedance)

For Models with 24 VDC Input Control Signal

The alarm output function **closes** the isolated solid state output switch when it detects the following fault condition:

The control signal is active, but:
- The internal temperature limit of the SSR has been exceeded (Alarm Option Code 1)

For Models with 20 - 260 VAC/DC Input Control Signal

The alarm output function closes the isolated solid state output switch when it detects any of the following fault conditions:

The control signal is active, but:
- The internal temperature limit of the SSR has been exceeded (Alarm Option Code 1)
- There is no current on the load (zero current or interrupted load) (Alarm Option Code 2)
- There is no line voltage power supply (Alarm Option Code 2)

Environment Conditions

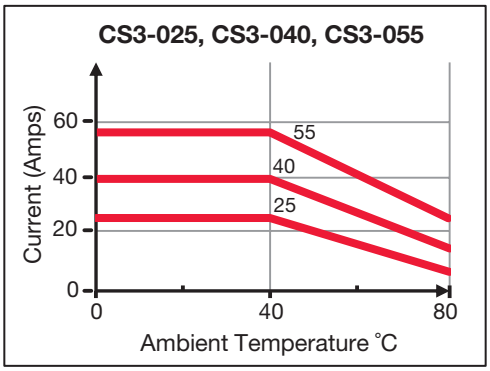
Operating Temperature Range: ..... -20˚C to 80˚C
Max. Relative Humidity: ..... 50% @ 40˚C
Max. Installation Altitude: ..... 2000m above sea level
Pollution Level: 2
Storage Temperature: ..... -20˚C to +85˚C
Junction Temperature: ..... 125˚C

This device conforms to ECC 2004/108/CE and 2006/95/CE and subsequent modifications including with reference to product standard EN 60947-4-3 (Low-voltage switchgear and control gear – AC contactors and semiconductor motor starters).

The product is designed for type A environments. Use of the product in type B environments may cause undesired electromagnetic noise. In this case, the user should take appropriate steps for improvement.

Derating Curves

Rated Current versus Ambient Temperature for each CS3 Model
(These curves reflect units tested complete with approved heat sinks and fans, if applicable)



Ordering Information

Model	3-Phase, 3- Leg Solid State Relay Power Controller - DIN Rail Mount
CS3	The CS3 Series are DIN Rail mounted 3-phase, 3-leg solid state relays with integrated heatsink for switching resistive loads in industrial applications. Standard features: Zero-voltage turn-on, LED input status indicator, IP20 touch protection, two different input control signal choices, integrated SCR thermal protection with LED signal indication, operating voltage up to 600 VAC. Optional features: Alarms for over temperature protection and load/line interruption* conditions. Approvals: CE, UL, cUL

Code	Current @ 104°F (40°C) Ambient, continuous service
025	25 Amps
040	40 Amps
055	55 Amps

Code	Voltage
48	480 VAC
60	600 VAC

Code	Input Control Signal
1	5 - 32 VDC
2	20 - 260 VAC/DC

Code	Alarm Options
0	None
1	Termal Protection
2*	Interrupted Load or Line & Thermal Protection

External 24 V Power Supply is Required to Power the Alarms

Code	Fan (for 40A & 55A Versions Only)
0	No Fan (25 Amp Only)
1	**Fan (230 VAC Power Supply Requirement)
2	**Fan (120 VAC Power Supply Requirement)

CS3 -	**040**	**48-**	**1**	**1**	**2**	**Typical Model Number**

Notes:
* Available ONLY for input control signal code 2
** Fan requires customer supplied voltage.

The following Chromalox Temperature Controllers offer a suitable 24 VDC power supply for the alarm option:
- 40 Series: 6040 / 8040 / 4040
- 50 Series: 6050 / 4050
- 60 Series: 6060
- 80 Series: 4080 / 4081 / 4082

Limited Warranty:
Please refer to the Chromalox limited warranty applicable to this product at
http://www.chromalox.com/customer-service/policies/termsofsale.aspx.

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