

**Installation, Operation
and Maintenance Manual**

PN 750-0098-001

CurrentGuard™ CurrentGuard™ *Plus*

**Surge
Protective
Devices**



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Installation Assistance

The Importance of Correct Installation

WARNINGS!

Thank you for choosing the Current Technology® CurrentGuard™ series Surge Protective Device (SPD). We look forward to fulfilling your facility-wide surge protection needs.

Monday through Friday, 8:00 a.m. to 5:00 p.m. (EST) at 800.238.5000.

This manual provides guidelines for the proper installation of the CurrentGuard family of devices. Proper product selection and compliance with these guidelines will help your new suppression system provide years of reliable service. If installers are unsure about the facility electrical configuration or have other installation-related questions, it is recommended they consult with a master electrician or other qualified electrical professional.

When shortcuts are taken or installation procedures are not followed, the CurrentGuard system may be damaged or may not provide adequate protection. It is extremely important to follow these installation procedures carefully.



WARNING! The CurrentGuard™ warranty is voided if the unit is damaged as a result of improper installation or the installer's failure to verify the following conditions prior to installation.



WARNING! HAZARDOUS VOLTAGES PRESENT Improper installation or misapplication may result in serious personnel injury/or damage to electrical system. Read the complete installation instructions before proceeding with installation. Remove all power to the electrical panel before installing or servicing the surge protective device (SPD).

IMPORTANT SAFETY INSTRUCTIONS All work must be performed by licensed and qualified personnel. The electrical system must be properly grounded in accordance with the U.S. National Electrical Code, state and local codes or other applicable codes for this SPD to function properly. Do not connect CurrentGuard device to the line side of the main service breaker or disconnecting means. This device is suitable for installation where the available short circuit current is 200,000 rms symmetrical amperes up to 600VAC or less.



WARNING! Check to ensure that a proper bond is installed between neutral and ground at the transformer upstream from all 3-phase WYE, 3-phase high leg DELTA or split-phase CurrentGuard device (See NEC Article 250). If the transformer is not accessible, check the main service disconnect/panel for the N-G bond. Lack of a proper bond will damage CurrentGuard and void the warranty.

Before Installation: System Configuration Verification

Confirm that the voltage(s) and service configuration shown on the CurrentGuard product label are consistent with the voltage and service configuration of the facility. A model number is on the right side of the CurrentGuard unit. Each model number corresponds to the configurations printed in the table below:

Example of a SPD model number: CGP150-120/208-3GY

MODEL	NOMINAL VOLTAGE	L-N VOLTAGE RANGE	L-L VOLTAGE RANGE	CONFIGURATION
CG(P)xxx-120/240-2G	120/240	108-132	216-264	Split-Phase 3-wire+ground
CG(P)xxx-120/208-3GY	120/208	108-132	187-229	Three-Phase WYE 4-wire+ground
CG(P)xxx-220/380-3GY	220/380	198-242	342-418	Three-Phase WYE 4-wire+ground
CG(P)xxx-277/480-3GY	277/480	249-305	432-528	Three-Phase WYE 4-wire+ground
CG(P)xxx-347/600-3GY	347/600	312-382	540-660	Three-Phase WYE 4-wire+ground
CG(P)xxx-120/240-3GHD120/240		108-132 (A&C PHASES) 187-229 (B PHASES)	216-264	Three-Phase high-leg DELTA 4-wire+ground
CG(P)xxx-240NN-3DG	240	NA	216-264	Three-Phase DELTA 3-wire+ground
CG(P)xxx-380NN-3DG	380	NA	342-418	Three-Phase DELTA 3-wire+ground
CG(P)xxx-480NN-3DG	480	NA	432-528	Three-Phase DELTA 3-wire+ground
CG(P)xxx-600NN-3DG	600	NA	540-660	Three-Phase DELTA 3-wire+ground

(P) for CurrentGuard Plus

xxx denotes surge rating per mode (40, 60, 80, 100, 150 or 200)

Environmental Condition Verification

Confirm that the environmental conditions are consistent with the following ranges:

- Ambient Temperatures: Between -40° and +158°F.
- Relative Humidity: Between 5% and 95% non-condensing.
- Altitude: Less than 13,000 feet.

Wiring Connection Diagrams

Figures 1-4 show the electrical relationship between CurrentGuard and these four basic service configurations: Split-phase, 3-wire; Three-phase, 4-wire WYE; Three-phase, 3-wire DELTA and Three-phase, 4-wire high-leg DELTA.

Fig. 1: Split Phase, 3-Wire

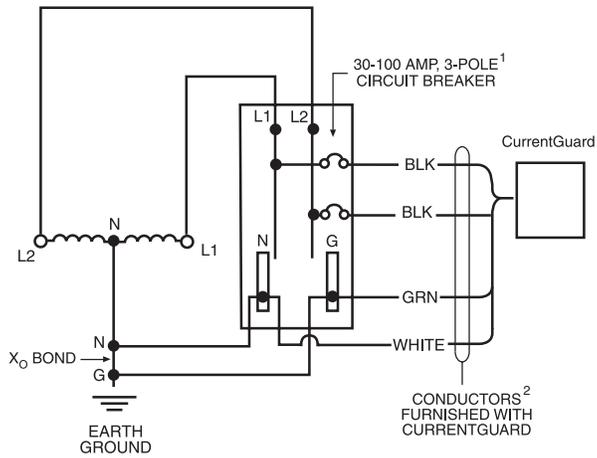


Fig. 2: 3-Phase, 4-Wire WYE

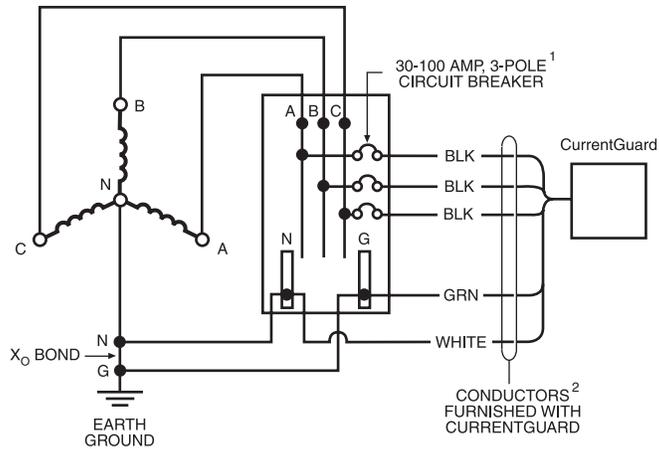


Fig. 3: 3-Phase, 3-Wire DELTA

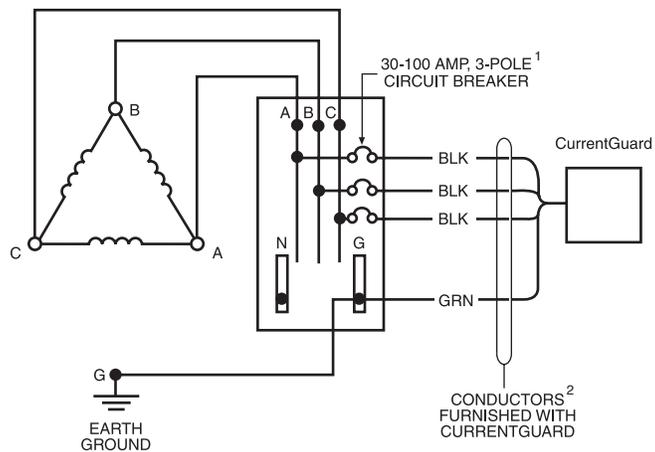
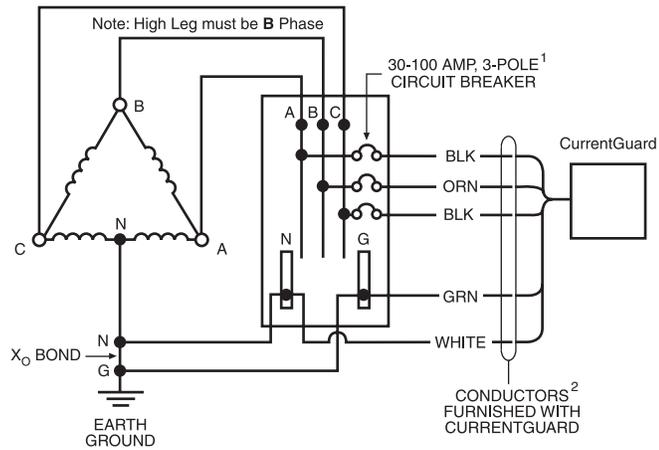


Fig. 4: 3-Phase, 4-Wire High-Leg DELTA



1. Optional – All CurrentGuard Plus units can be connected without an upstream breaker/fuse.
2. Applies to 40, 60 and 80 kA units only.

Conductor Routing



CAUTION: CurrentGuard's performance will be limited severely if the conductors are (a) too long, (b) are of too small a wire gauge, (c) have too many bends or (d) have sharp bends.

The factors listed above should be addressed during the design of an installation to reserve a suitable place for CurrentGuard next to its point of connection to the electrical system. The selected mounting location should allow for the shortest possible conductor runs and a direct route with a minimum of bends. If bends are required, they should be *sweeping* bends. Do not make sharp 90° bends for appearance purposes because they will severely decrease the effectiveness of CurrentGuard.

Binding or twisting conductors together using tie-wraps or electrical tape increases the protection performance of the device.

All CurrentGuard series units must be connected in parallel with the electrical system. CurrentGuard units have built-in over-current fusing rated up to 200,000 rms symmetrical ampere at 600VAC and can be connected directly to the electrical distribution system bus without an upstream over-current protection device (OCPD). However, the use of an external OCPD is recommended.

If the SPD is connected to a dedicated overcurrent protection device, a 60A breaker is recommended (30A minimum, 200A maximum). The advantage of using a dedicated over-current device for the SPD (even if the upstream breaker is 200A or less) is that it allows the SPD to be de-energized during service without disturbing the electrical service to the rest of the facility.

Upstream Over-Current Protection Device

Conductor Sizing

Current Technology recommends installing CurrentGuard by using the following conductor size for phase, ground and neutral connections. The conductor length should be as short as possible to ensure the maximum level of protection. Use a larger conductor (not to exceed the maximum allowed per a given model) where space and bending radii permit.

Example of a SPD model number: CGP150-120/208-3GY

PRODUCT LABEL DESIGNATION	SURGE CURRENT CAPABILITY	RECOMMENDED	CONDUCTOR SIZE MAXIMUM	CONDUCTOR SIZE MINIMUM
CG(P)40-xxxxx	40kA/mode ¹	#10AWG	#10AWG	#10AWG
CG(P)60-xxxxx	60kA/mode ¹	#10AWG	#10AWG	#10AWG
CG(P)80-xxxxx	80kA/mode ¹	#10AWG	#10AWG	#10AWG
CG(P)100-xxxxx	100kA/mode ²	#6AWG	#3AWG	#10AWG
CG(P)120-xxxxx	120kA/mode ²	#6AWG	#3AWG	#10AWG
CG(P)150-xxxxx	150kA/mode ²	#4AWG	#3AWG	#10AWG
CG(P)200-xxxxx	200kA/mode ²	#3AWG	#3AWG	#10AWG

(P) for CurrentGuard Plus

¹ 40 through 80kA units are shipped with #10AWG leads. Leads should be shortened during installation in order to minimize conductor length.

² 100 through 200kA units are shipped with compression box lugs.

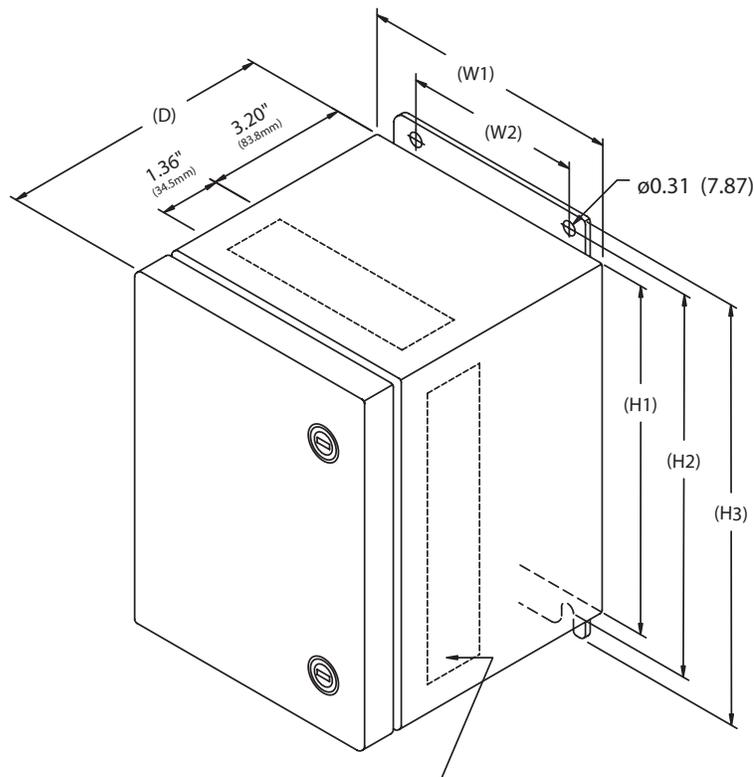
Mounting

Mount the CurrentGuard to the building structure using construction methods and hardware appropriate for your site. Install the conduit and pull the conductors as specified above or according to the engineer's design.

Conduit Openings

If desired, punch holes at this time for the conduit or nipple or wait until the CurrentGuard is mounted to the building structure. Punch holes only in the shaded areas as shown in the following illustration.

**Fig. 5:
Conduit Openings and
Enclosure/Mounting
Dimensions**



ALLOWABLE AREA FOR CONDUIT ENTRY

Dim	CG40	CGx60-80	CGP100-200
H1	8.00 (203.2)	10.00 (254.0)	14.00 (355.6)
H2	8.75 (222.3)	10.75 (273.1)	14.75 (374.7)
H3	9.50 (241.3)	11.50 (292.1)	15.50 (393.7)
W1	6.00 (152.4)	8.00 (203.2)	12.00 (304.8)
W2	4.00 (101.6)	6.00 (152.4)	10.00 (254.0)
D	6.20 (157.5)	6.20 (157.5)	6.20 (157.5)
Weight	20.0 (9.07)	30.0 (13.6)	40.0 (18.2)

All measurements in inches (mm) and pounds (kg)

Electrical Connections



CAUTION: Prior to installation ensure the system configuration and voltage is equivalent to the CurrentGuard unit being installed.

Following all applicable National Electrical Code standards as well as state and local codes, connect phase, neutral* and ground to CurrentGuard. The 40kA, 60kA and 80kA units come with 36 inches of #10 AWG conductors. Each phase conductor is labeled (Phase A, B or C). The 100kA, 150kA and 200kA units come with compression box lugs. The installer must provide the appropriate conductors. Ensure that the conductor lengths are kept as short and straight as possible. On all high-leg delta systems, the high-leg (208V L-N) must be connected to the Phase B of the SPD. (color-coded orange according to NEC)

* The 3-wire plus ground Delta CurrentGuard does not have a neutral conductor.

Connecting Form C Dry Contacts

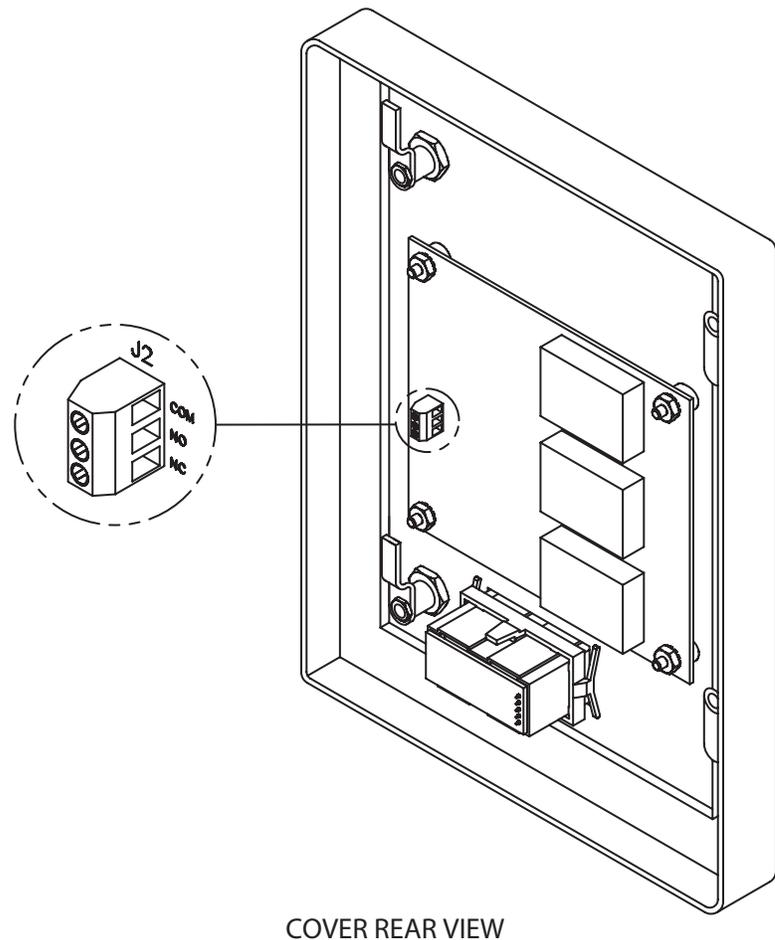
All CurrentGuard units come standard with one set of Form "C" dry relay contacts for the surge protective device status. These contacts are for connection to a user-provided remote alarm and monitoring circuit. The relay contacts are rated 150VDC/125VAC with maximum switching power of 30WDC/60VA AC. See Figure 6 for the form C contact configuration and terminal location on the monitor board. The annotations on the diagram match the markings on the terminal block.

When input power is present on all phases, terminals "NO" and "COM" are an open circuit and terminals "NC" and "COM" are a closed circuit. The contacts change state when the unit has encountered failure to one or more phases.

The installer must provide the appropriate raceway and wiring for the monitoring circuit, observing the restrictions and conduit openings illustrated in an earlier section of this manual. The installer must route the monitoring conductors to the terminal blocks on the door-mounted main monitoring board. Route the wires to allow the door to be opened and closed properly. Tighten screws on terminals to 3.5 in-lbs (0.4 Nm). This terminal block will accept wire sizes #28AWG to #16AWG. #18 – #20 AWG is recommended.

Fig. 6 Remote Monitoring Terminal Block

(Contacts shown in shelf state. Contacts change state upon application of input voltage)



Verification and Power Up



WARNING: It is recommended that the cover of the CurrentGuard unit along with its associated cabling be installed prior to applying power. The monitoring harness, which exits the epoxy and connects to J2 on the monitor board, contains line voltage when power is applied to the unit.

Apply power to CurrentGuard by closing the over current protection device or switch feeding the suppressor.

Fig. 7 CurrentGuard Diagnostics

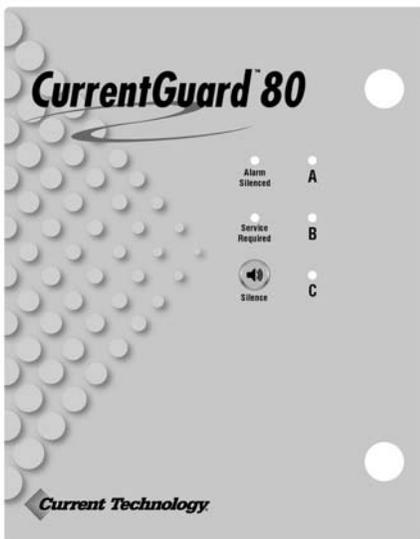
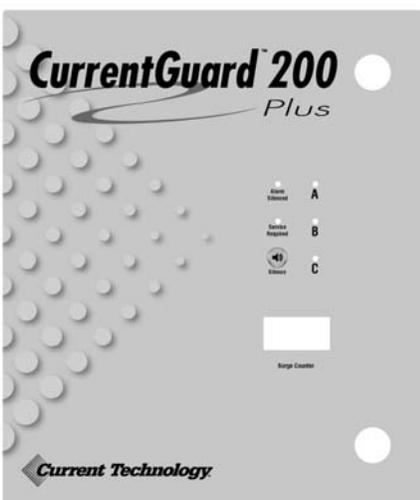


Fig. 8 CurrentGuard Plus Diagnostics



For CurrentGuard Units (model number begins with CG)

Verify that all "Phase Protection Status" indicating lights are illuminated. The "Service Required" indicating light illuminates only upon failure of one or more phases (indicating an alarm condition). Audible alarm should not operate under normal conditions. The audible alarm can be "muted" by pressing the "ALARM SILENCE" button, which subsequently will illuminate the "ALARM SILENCED" light. Pressing the "ALARM SILENCE" button again will enable the alarm.

For CurrentGuard Plus Units (model number begins with CGP)

The number of surges detected by the SPD is displayed on an eight-digit LCD display on the front of the SurgeTrack door. The LCD counter is battery backed to maintain the number of surges even during a power loss. Press the button on the counter to reset the surge count.

Troubleshooting

Your CurrentGuard system does not require scheduled maintenance. The unit's heavy-duty construction is designed to provide years of uninterrupted service. The unit contains no serviceable parts.

INDICATION	PROCEDURE
One or more phase protection status indicating lights are off, service required indicating light is on and form C alarm contacts have changed state	Verify that the input power feeding CurrentGuard is energized using a voltage tester. If power is present, contact factory for assistance: 800-238-5000

Technical Assistance

Our staff is ready to support you and answer any questions.
Monday through Friday, 8:00 a.m. to 5:00 p.m. (EST) at 800-238-5000

Returns and Warranty Procedures

CurrentGuard units are warranted for a period of 7 years from date of purchase. CurrentGuard Plus units are warranted for a period of 10 years from date of purchase. In the event that any module or subassembly within the SPD fails to perform as specified during the warranty period, call our Technical Support at 800-238-5000 to obtain a Return Material Authorization number. We will immediately ship a replacement for the defective parts free of charge (installation labor and site preparation excluded). Return the defective parts to Current Technology within 30 days of receiving the replacement. Failure to return the defective parts will result in billing for the replacement parts. To help expedite the return procedures, please have the following information at hand when you contact Current Technology:

INFORMATION	EXAMPLE
Model Number	CGP80-277/480-3GY
Serial Number	15478-0105-001
Date of Purchase	January 2, 2005 (1st week)
Sales Order Number	15478
Description of Failure	"Service Required" indicating light illuminated
Desired Action from Current Technology	Replace

Ten-Year Limited Warranty

Danaher Power Solutions warrants that CurrentGuard and CurrentGuard Plus surge protective device (the "Product"), shall meet applicable industry standards and specifications and be free from defects in materials and/or workmanship. Should any failure of the Product to conform to this warranty appear within the warranty period, Danaher Power Solutions shall either repair or replace the defective Product, or part thereof, upon return to Danaher Power Solutions manufacturing facility in Richmond, Virginia with transportation charges prepaid. The applicable warranty period is outlined below in the warranty period section.

Danaher Power Solutions shall have no liability under this warranty for any problems or defects directly or indirectly caused by misuse of the Product, alteration of the Product (including removal of any warning labels), accidents, or improper installation, application, operation, or repair of the Product.

THIS WARRANTY REPRESENTS THE ENTIRE WARRANTY OF DANAHER POWER SOLUTIONS. ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, ORAL OR WRITTEN, INCLUDING, BUT NOT LIMITED TO, THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED.

The liability of Danaher Power Solutions under this warranty is expressly limited to the replacement or repair of the defective part thereof, at Danaher Power Solutions sole option.

IN NO EVENT SHALL DANAHER POWER SOLUTIONS BE LIABLE FOR SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES OF ANY KIND OR CHARACTER, NOR SHALL DANAHER POWER SOLUTIONS' LIABILITY EVER EXCEED THE PURCHASE PRICE PAID FOR SUCH DEFECTIVE PRODUCT.

This warranty is not transferable and may only be enforced by the sole purchaser. Claims under this warranty must be submitted to Danaher Power Solutions within thirty (30) days of discovery of any CurrentGuard product defect.

Warranty Period

CurrentGuard™	7 Years from original date of purchase
CurrentGuard™ Plus	10 Years from original date of purchase



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