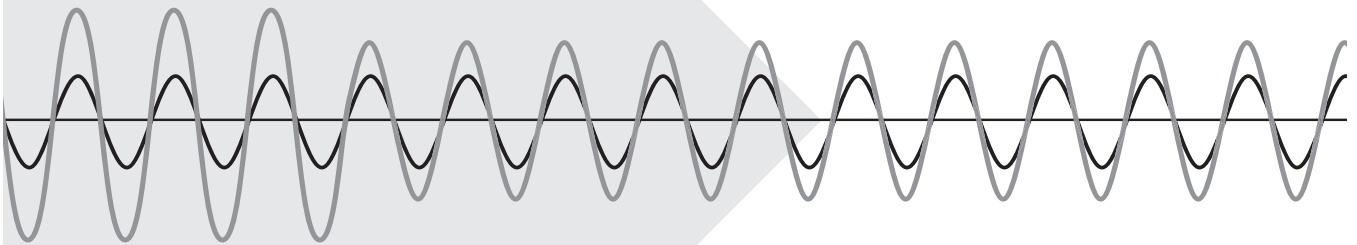


CG™ & CGP™
SURGE
PROTECTION

CurrentGuard™

Installation, Operation and Maintenance Manual

PN 750-0098-001 B00



Surge Protective Devices
CurrentGuard™
CurrentGuard™ Plus

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Guide to Installation and Assistance

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

Should you have questions about installing the CG or CGP please call Current Technology® Technical Support at 800.238.5000 or 804-236-3300, Monday through Friday, 8:00 a.m. to 5:00 p.m. (EST). Or, email us at currenttechnology@tnbpowersolutions.com

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.



△ W A R N I N G !

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.

△ W A R N I N G !

HAZARDOUS VOLTAGES PRESENT: Improper installation or misapplication may result in serious personal 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. This device is suitable for installation where the available short circuit current is 200,000 rms symmetrical amperes up to 600VAC or less. For countries outside of the US follow applicable electrical specifications for the country the unit is being used in.

△ W A R N I N G !

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.

△ W A R N I N G !

Do not HIPOT the CurrentGuard unit or the electrical system that the CurrentGuard unit is connected to without disconnecting the CurrentGuard conductors including phases, neutral and ground.

Pre-Installation Checklist

- 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 1:

Sample Model Number Scheme:

CG(P)150-120/208-3GY-SD



Table 1: Configuration Table

MODEL	NOMINAL VOLTAGE	L-N VOLTAGE RANGE	L-L VOLTAGE RANGE	CONFIGURATION
CG(P)xxx-220-1G	220	193-242	NA	1-Phase, 2-Wire + Ground
CG(P)xxx-230-1G	230	207-253	NA	1-Phase, 2-Wire + Ground
CG(P)xxx-240-1G	240	216-264	NA	1-Phase, 2-Wire + Ground
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	3-Phase Wye 4-Wire + Ground
CG(P)xxx-220/380-3GY	220/380	198-242	342-418	3-Phase Wye 4-Wire + Ground
CG(P)xxx-230/400-3GY	230/400	207-253	360-440	3-Phase Wye, 4-Wire + Ground
CG(P)xxx-277/480-3GY	277/480	249-305	432-528	3-Phase Wye 4-Wire + Ground
CG(P)xxx-347/600-3GY	347/600	312-382	540-660	3-Phase Wye 4-Wire + Ground
CG(P)xxx-120/240-3GHD	120/240	108-132 (A & C Phases) 187-229 (B Phases)	216-264	3-Phase High-Leg Delta 4-Wire+ground
CG(P)xxx-240-3DG	240	NA	216-264	3-Phase Delta 3-Wire + Ground
CG(P)xxx-380-3DG	380	NA	342-418	3-Phase Delta 3-Wire + Ground
CG(P)xxx-480-3DG	480	NA	432-528	3-Phase Delta 3-Wire + Ground
CG(P)xxx-600-3DG	600	NA	540-660	3-Phase Delta 3-Wire + Ground

NOTES/OPTIONS:

- *S* for Stainless Steel Enclosure
- *D* for 200 KAIC External Disconnect (CGP Only)
- *SD* for 200 KAIC External Disconnect & Stainless Steel Enclosure (CGP only)
- *(P)* for CurrentGuard Plus
- *xxx* denotes surge rating per mode (40, 60, 80, 100, 120, 150 or 200)
- The Power System Operation Frequency is between 47–63 HZ

- Confirm that the environmental conditions are consistent with the following ranges:
- Ambient Temperatures: Between -40° and +158°F (-40° to 70°C).
 - Relative Humidity: Between 5% and 95% non-condensing.
 - Altitude: Less than 13,000 feet (4,000 m).

Service Configurations

Figures 1–5 show the electrical relationship between CurrentGuard and these four basic service configurations: Single-Phase, 2-Wire; Split-Phase, 3-Wire; 3-Phase, 4-Wire Wye; 3-Phase, 3-Wire Delta and 3-Phase, 4-Wire High-Leg Delta.

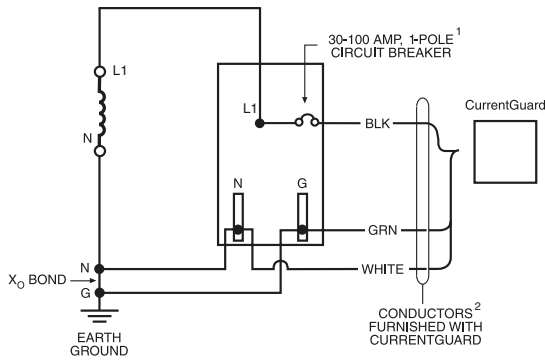


Figure 1
Single-Phase, 2-Wire

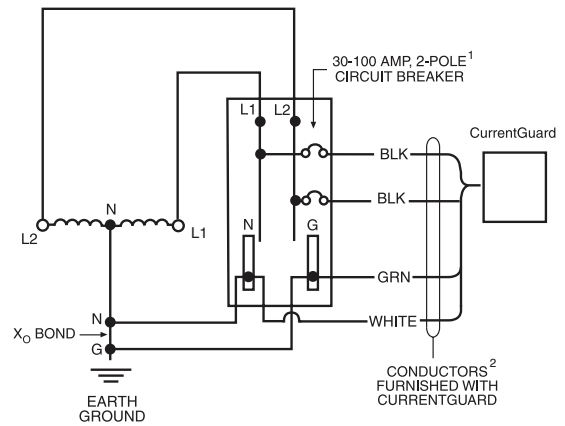


Figure 2
Split-Phase, 3-Wire

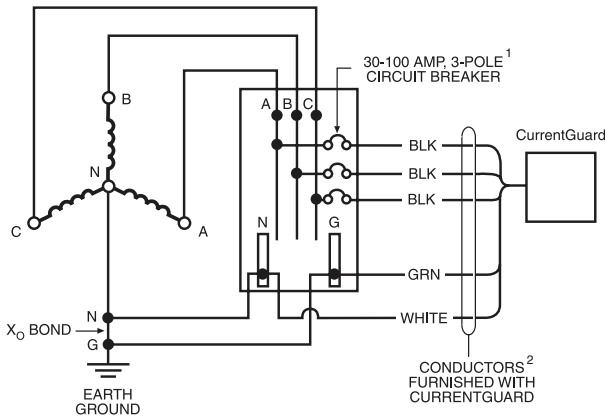


Figure 3
3-Phase, 4-Wire Wye

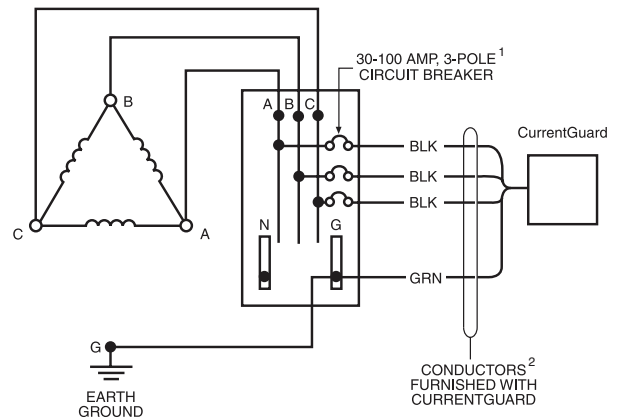
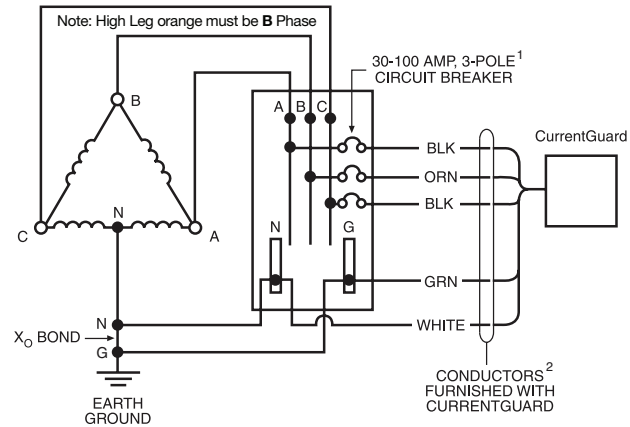


Figure 4
3-Phase, 3-Wire Delta

Figure 5
3-Phase, 4-Wire High-Leg Delta



¹Optional – All CurrentGuard Plus units can be connected without an upstream breaker/fuse.

²Only 40kA units are furnished with #10AWG conductors. All other products are furnished with compression lugs that can accept #14AWG to #4AWG wire.

Conductor Sizing & 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.

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. Terminals are identified with markers (Phase A, B, C, Line 1, Line 2, Neutral or Ground)

Table 2: Maximum Recommended Conductor Size

PRODUCT LABEL DESIGNATION	SURGE CURRENT CAPABILITY	CONDUCTOR SIZE
CG40-xxxx	40kA/mode	#10AWG
CG(P)60-xxxx	60kA/mode	#6AWG
CG(P)80-xxxx	80kA/mode	#6AWG
CG(P)100-xxxx	100kA/mode	#4AWG
CG(P)120-xxxx	120kA/mode	#4AWG
CG(P)150-xxxx	150kA/mode	#4AWG
CG(P)200-xxxx	200kA/mode	#4AWG

(P) for CurrentGuard Plus

Upstream Overcurrent Protection Device

The CurrentGuard series units are a Type 1 SPD which is suitable for use in both Type 1 and Type 2 SPD applications. The CurrentGuard series is a one-port SPD and is to be connected in parallel with the electrical system. It may be connected via a circuit breaker, molded case switch, fused switch, or connected directly to the bus of the panelboard or switchboard it is protecting. If direct bus connection is used, Current Technology® recommends installing the CurrentGuard Series behind a disconnect switch or other disconnecting means for ease of serviceability.

If the SPD is connected to a dedicated OCPD, a 60A breaker is recommended (30A minimum, 200A maximum).

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 in Table 2 or according to the engineer's design.

Indoor vs Outdoor Installations

NEMA 12 enclosures are suitable for Indoor use only. NEMA 4 enclosures are suitable for Indoor or Outdoor use. NEMA 4X stainless steel enclosures are suitable for corrosive environments as well. For direct sunlight applications, Current Technology® suggests shading the monitoring components. All conduits and fittings must be rated and properly installed such that the final installation maintains the NEMA rating.

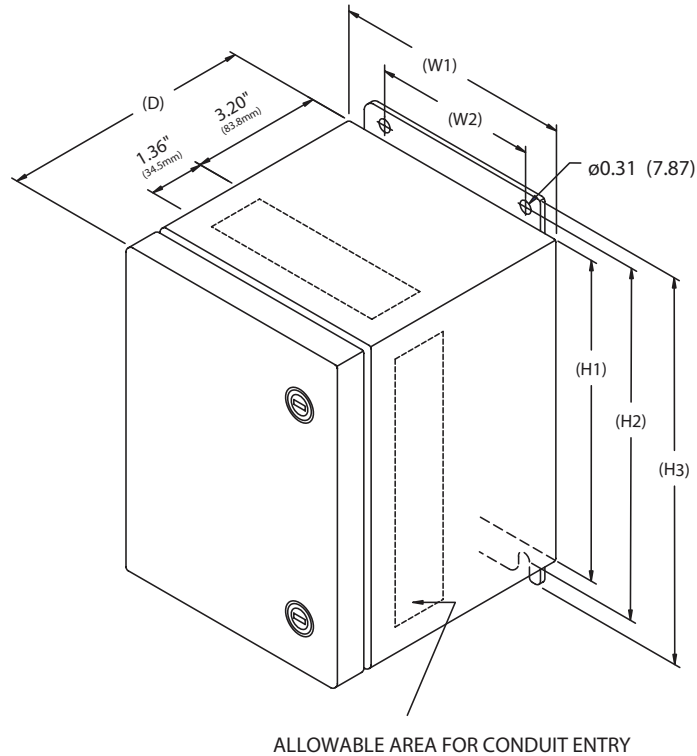
Conduit Openings

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 designated areas as shown in the following illustration.

CAUTION: Careful consideration must be made when selecting an area for conduit entry. There are several components inside the enclosure that may interfere with the conduit entry path, therefore, ensure the path is clear of all objects before drilling. Damages caused by installation errors are not covered under the product warranty.

See Figure 6 for conduit openings and enclosure dimensions.

Figure 6
Conduit Openings and
Enclosure/Mounting Dimensions



ALLOWABLE AREA FOR CONDUIT ENTRY

Dim	CG40	CG & CGP 60–80	CG & CGP 100–200
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	6.75 (171.5)	8.75 (222.3)	12.75 (323.9)
W2	4.75 (120.7)	6.75 (171.5)	10.75 (273.1)
D	6.30 (160.0)	6.30 (160.0)	6.30 (160.0)
Weight	20 (9.1)	30 (13.6)	40 (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 units come with 36 inches of #10AWG conductors. Each phase conductor is labeled (Phase A, B or C). The 60kA, 80kA, 100kA, 120kA, 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

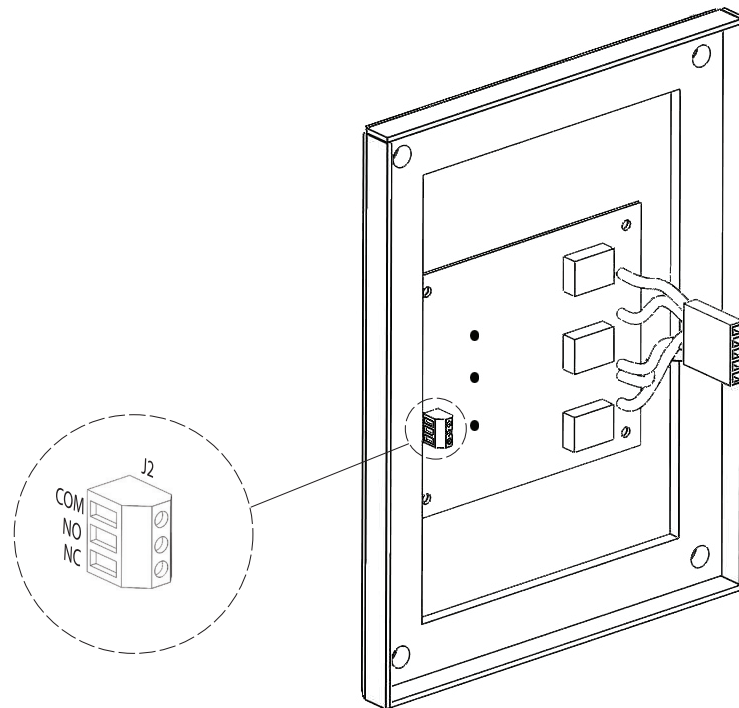
All CurrentGuard units come standard with one set of Form “C” dry relay contacts for the surge protective device status. These contacts are for connection to a user-provided remote alarm and monitoring circuit. The relay contacts are rated 65VDC/150VAC with maximum switching power of 30WDC/60VA AC. See Figure 7 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” (normally open) and “COM” (common) are an open circuit and terminals “NC” (normally closed) 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–#20AWG is recommended.

Figure 7 Remote Monitoring Terminal Block

Contacts shown in energized normal state
(no fault condition).



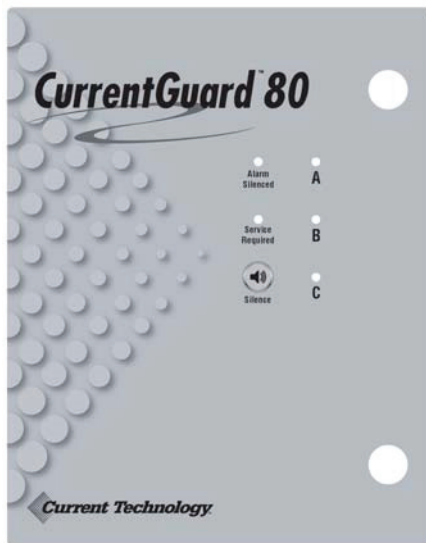
COVER REAR VIEW

Verification and Power Up

△ W A R N I N G ! 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 the input connector 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.

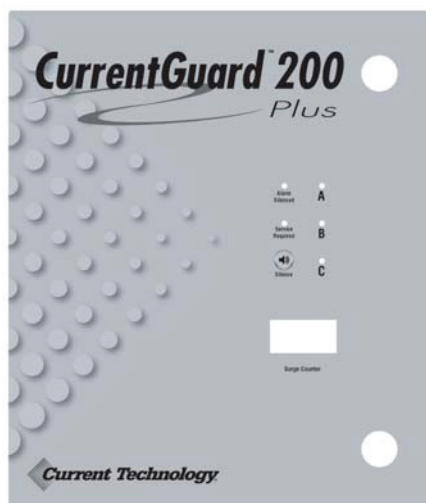
Figure 8 CurrentGuard Diagnostics



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.

Figure 9 CurrentGuard Plus Diagnostics



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 CurrentGuard Plus 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, 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

Installation Assistance

Our staff is available to support you.

**Monday through Friday, 8:00 a.m to 5:00 p.m. (EST):
800.238.5000 or 804.236.3300.
currenttechnology@tnbpowersolutions.com**

Standards and Listings

The following standards and listings apply to the CG/CGP product line:

- UL Listed 1449 4th Edition for Type 1 and Type 2 SPD applications, cUL, and UL 1283
- Meets Requirements for UL 96A
- Compliant to IEEE C62.41.1-2002, C62.41.2-2002 and C62.45-2002
- NFPA 70 [NEC], Article 285
- RoHS Compliant

Returns and Warranty Procedures

A Return Material Authorization (RMA) number must be obtained from T&B Power Solutions Customer Service department before replacement products can be shipped. Go to www.tnbpowersolutions.com/ct_rma_form to complete an online return material authorization request form. 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	15478-0113-001
Date of Purchase	January 2, 2013
Description of Failure	"Service Required" indicating light
Desired Action from Current Technology	Replace

Warranty Statement

Current Technology 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, Current Technology shall either repair or replace the defective Product, or part thereof, upon return to Current Technology manufacturing facility in Richmond, Virginia with transportation charges prepaid. The applicable warranty period is outlined below in the warranty period section.

Current Technology 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 CURRENT TECHNOLOGY. 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 Current Technology under this warranty is expressly limited to the replacement or repair of the defective part thereof, at Current Technologys' sole option.

IN NO EVENT SHALL CURRENT TECHNOLOGY BE LIABLE FOR SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES OF ANY KIND OR CHARACTER, NOR SHALL CURRENT TECHNOLOGYS' 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 Current Technology within thirty (30) days of discovery of any CurrentGuard product defect.

Model #

Date of Purchase

Date Installed

Installer

Warranty Period

CurrentGuard™	10 Years from original date of purchase
CurrentGuard™Plus	15 Years from original date of purchase



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