Category 5 Hurricane Surge Protective Device

Installation and Operation Guide

PSP PRODUCTS

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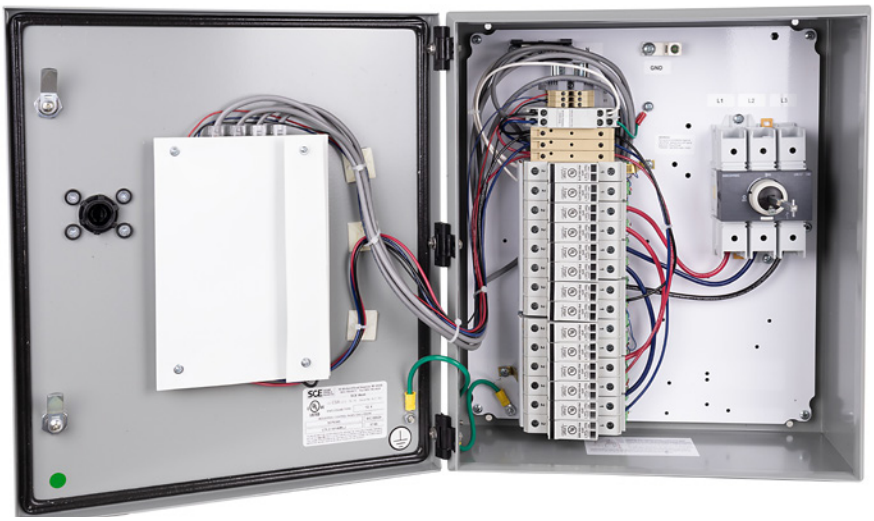
Category 5 Hurricane

Installation and Operation Guide

IMPORTANT: Reading and understanding this installation guide in its entirety is essential prior to installing and commissioning the surge protective device



Safety Precautions

The electrical system in which this surge protection device will be installed must be in proper working condition. Consult with trained personnel before proceeding with the installation, if there are any questions regarding system status. The potential exists for this unit to be damaged if the requirements of this guide are not followed. Failure to comply with the applicable requirements of this guide may result in voiding the warranty. Removal of warranty label will result in voiding the warranty.

Introduction

Proper installation of the Category 5 Hurricane Surge Protective Device (SPD) is essential to maximize performance and effective protection. Read the entire installation and operation guide prior to beginning installation. This manual does not replace national and local electrical codes. Verify compliance with all electrical codes.

Package Contents & Inspection

Upon reciept of the unit(s), inspect the entire package to ensure there are no signs of damage or mishandling. Remove packing material and inspect device for any obvious shipping damage. Immediately file a claim with the shipping company and inform PSP Products if any damage is found that is a result of shipping or handling.
Each package contains the following:

- (1) Prewired Surge Enclosure
- (1) Installation and Operation Manual

Product Description

The Category 5 Hurricane SPD is designed to protect electrical equipment from damaging effects of transient voltages created by direct and indirect lightning strikes, equipment switching or other surge causing disturbances. Metal Oxide Varistor (MOV) technology is utilized to achieve a high level of protection performance. MOVs in the Category 5 Hurricane units incorporate replaceable modules which allows for efficient maintenance. Each unit comes standard with status lights, audible alarm, auxiliary contacts, EMI/RFI filter and a fuse disconnect. A power switch handle and surge counter display is optional. The SPD devices described in this manual are UL/cUL Listed, conforming to UL 1283 and latest edition of UL 1449 and CSA 22.2 No.8. The enclosure is rated NEMA 4. All ratings are in accordance with ANSI C62.11, C62.33, C62.41 and NEMA LS1.

The Category 5 Hurricane is designed so that upon the end of life of an MOV, it will disconnect from the circuit , and signal the need for replacement visually, by auxillary contacts, and audibly. Consult this manual for instructions on troubleshooting and replacement of MOV modules. The possibility exists of a surge current greater than the rated capacity of an SPD, potentially allowing surge energy through to the protected equipment. Even though the SPD is working properly, additional SPDs may be required. These additional SPDs should be placed closer to the load(s).

Important: Risk of electrical shock. This device should only be installed by qualified personnel.

Part Number Breakdown

C5H#-###-###-#-#

- **Add on options: DS**=Disconnect
- **Protection Mode: A**=All-Mode, **Leave Blank**=7 mode
- **NEMA Rating: 4M**=NEMA 4 Metal, **4XS**=NEMA 4X Stainless Steel, **4XP**=NEMA 4X Polycarbonate
- **Surge Rating Identifier: 240**=240kA/phase, **400**=400kA/phase, **500**=500kA/phase, **750**=750kA/phase
- **Voltage Identifier: 1**=120/240 1-phase, **2**=120/208 3-phase Wye, **3**=120/120/240 3-phase high-leg Delta, **4**=277/480 3-phase Wye, **5**=480 3-phase Delta, **6**=347/600 3-phase Wye, **8**=240/415 3-phase Wye, **9**=240 3-phase Delta

Description		C5H1	C5H2	C5H3	C5H4	C5H5	C5H6	C5H8	C5H9
System Voltage	VAC	120/240	120/208	120/120/240	277/480	480	347/600	220/380	240
System Wiring		3W+G (Single Phase)	4W+G (3-Phase Wye)	4W+G (3-Phase High-Leg Delta)	4W+G (3-Phase Wye)	3W+G (3-Phase Delta)	4W+G (3-Phase Wye)	4W+G (3-Phase Wye)	3W+G (3-Phase Delta)
Maximum Operating Voltage (MCOV)	L-N	150	150	150/320	320		550	275	
	N-G	150	150	150	320		550	275	
	L-G	150	150	150/320	320	550	550	275	275
	L-L	300	300	320	550	550	750	550	275
Voltage Protection Rating (VPR)	L-N	800	800	800/1,200	1,200		1,800	1,200	
	N-G	800	800	800/1,200	1,200		1,800	1,200	
	L-G	900	900	800/1,200	1,500	1,800	1,800	1,500	1,200
	L-L	1,800	1,800	1,800	2,000	3,000	3,000	2,000	2,000
Frequency (f)		50/60/400 Hz							
Nominal Discharge Current Per Mode (In)		20kA							
Maximum Discharge Current (Imax)		240–750kA (Depending on Model)							
Short Circuit Current Rating (SCCR)		200kA							
Sine Wave Tracking		Yes							
EMI/RFI Filtering		1283 Electromagnetic Interference Filter (-40 dB)							
Thermal Disconnecter		UL 60691							
Overload Disconnecter		Internal to Each Device							
Operating Temperature		-50 to +85°C							
Connection		By Screw Terminals, AWG Depends on Version							
Remote Signal Indicator		250 VAC Max, 2A							
Housing-Enclosure Material		NEMA 4 Metal Standard, Stainless Steel or Polycarbonate Option (NEMA 4X)							
Environmental Rating		IP66							
Standards Compliance									
IEC 61643-1 (International), EN 61643-11 (Europe), NF EN 61643-11 (France)		Class I & II							
UL1449 5th Edition		USA: Type 1, Canada: Type 2							
CSA C22.2 No. 8-M1986		Class 9091 32, Class 9091 92							
RoHS		Directive 2002/95/EC							
UL1283 - USA		Type 2							
UL96A		Compliant							

Product Pre-Installation

Prior to installing any enclosed SPD, please read and understand the operation manual, ensure that all safety precautions are taken and follow all applicable electrical codes.

1. Power must be disconnected prior to installation. Failure to do so may cause injury, death and/or equipment damage.
2. Ensure that the Category 5 Hurricane model selected is the proper one for the electrical system and voltage ratings.
3. NEC Article 285 states that Type 2 SPDs may only be placed on the load side of the main breaker or fuse at each utility service entrance.
4. Per National Electric Code (NEC), ensure that a proper neutral-ground bond has been made when power is supplied from an upstream transformer or any other type of separately derived power source. NEC Article 250.30 states this bond must be in place on all 3-phase WYE and 1-phase split systems.

WARNING

Verify that a proper neutral-ground bond has been made when power is supplied from an upstream transformer or any other type of separately derived power source. Power must be disconnected prior to installation, inspection or servicing. Failure to do so may cause injury, death and/or equipment damage.

Failure to provide this bond, as required by NEC 250.30 will void the warranty and can result in elevated phase to ground source voltage potentials. These voltages can cause damage to electrical equipment, pose a fire hazard or a safety hazard such as electrical shock, injury or death.

Installation Instructions

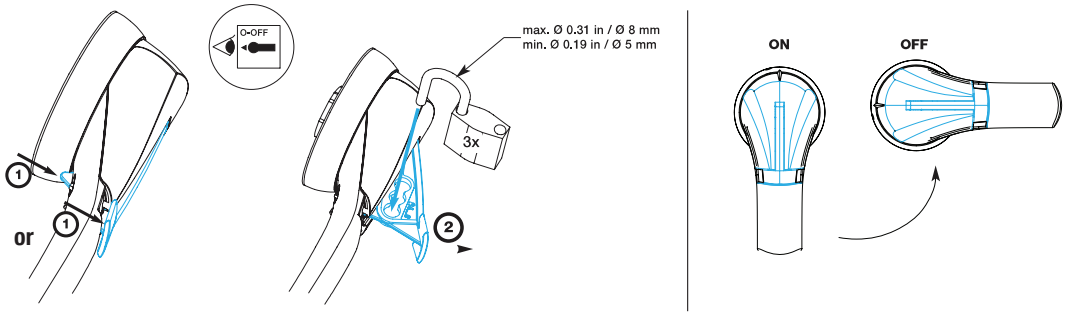
1. Mounting Instructions
   Category 5 Hurricane enclosures are constructed with a NEMA 4 (description below) painted steel enclosure. Refer to dimensions (see dimension drawings). The Category 5 Hurricane enclosure can be installed in indoor/outdoor locations as close to the protected circuit as possible. Avoid long wire runs between the SPD and protected circuit, as this will reduce performance. Take care to ensure the surface or structure the unit will be mounted on is stable and capable of bearing the load. Mounting brackets are included. Knock out holes should be made to the side of the enclosure nearest to the wiring terminals. Avoid foreign particles from entering the enclosure. Metal shavings can cause internal shorts.

   Type 4 enclosures constructed for either indoor or outdoor use to provide a degree of protection to personnel against access to hazardous parts; to provide a degree of protection of the equipment inside the enclosure against ingress of solid foreign objects (falling dirt and windblown dust); to provide a degree of protection with respect to harmful effects on the equipment due to the ingress of water (rain, sleet, snow, splashing water, and hose directed water); and that will be undamaged by the external formation of ice on the enclosure.
2. Disconnect Power Handle and Shaft Attachment (For Enhanced Version)
   Turn the handle and shaft as shown below. This allows the unit to be energized and de-energized for startup and servicing.
3. Final check and energizing
   Ensure that all requirements of this manual have been met and the unit is installed properly. Upon verifying this, power can be re-connected and the unit energized. Close the unit door, reconnect power and turn the handle to the ON position. The unit is now connected to and is protecting the circuit.
4. Torque and wire size for power connections
   Category 5 Hurricane range presents different means for grid connection. Typical wires sizes as well as corresponding torques are listed in the following table below.

Connection Type	Wire	Torque
Neutral Connection	AWG#10, 5mm^2	35in. lbs, 4Nm
Line Connection on Switch	AWG#10, 5mm^2	100in. lbs, 11.3Nm
Line Connection on Fuse Holder	AWG#10, 5mm^2	35in. lbs, 4Nm
Line Connection on SPD	AWG#10, 5mm^2	20in. lbs, 2.6Nm
Ground Connection	AWG#10, 5mm^2	20in. lbs, 4Nm

Handle Lock Option

Padlocking the handle



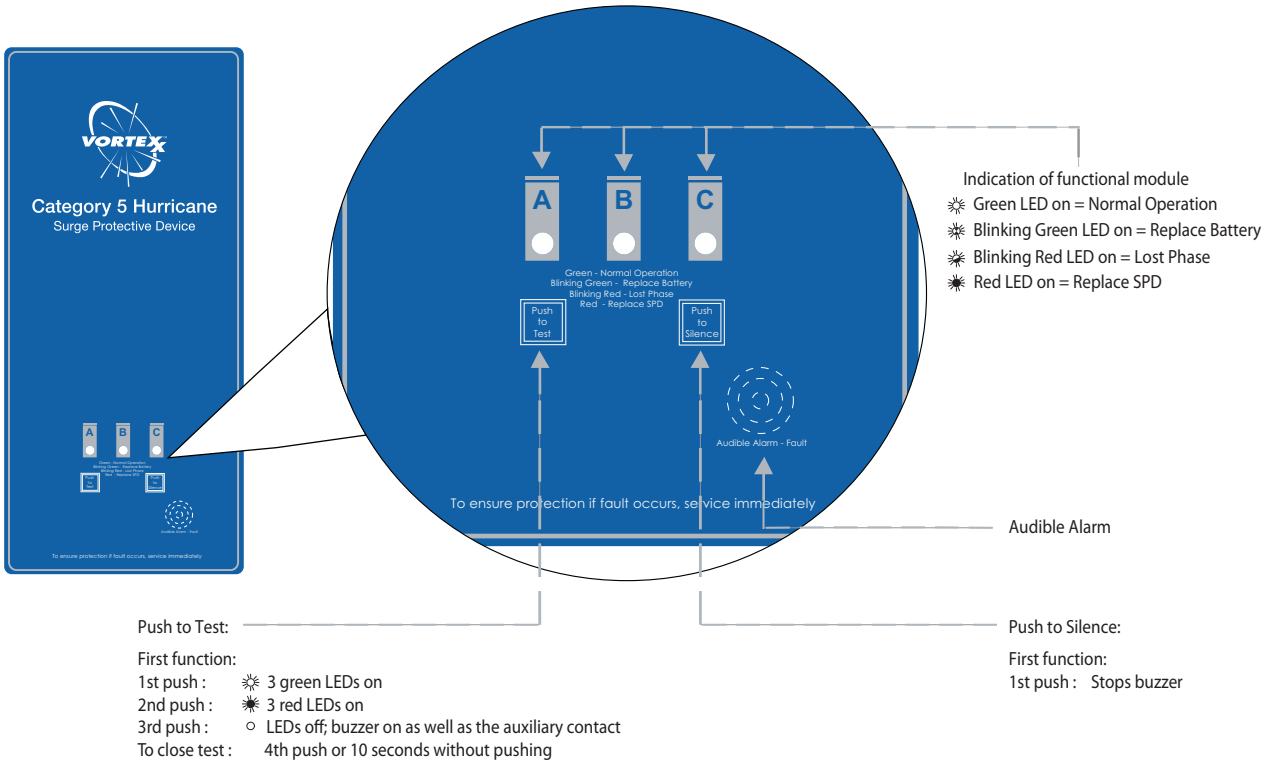
Maintenance

As each installation is different, a preventative maintenance schedule is not specified. The SPD should be periodically checked by qualified personnel to ensure proper operation. When inspecting the unit, check the connection integrity to the network.

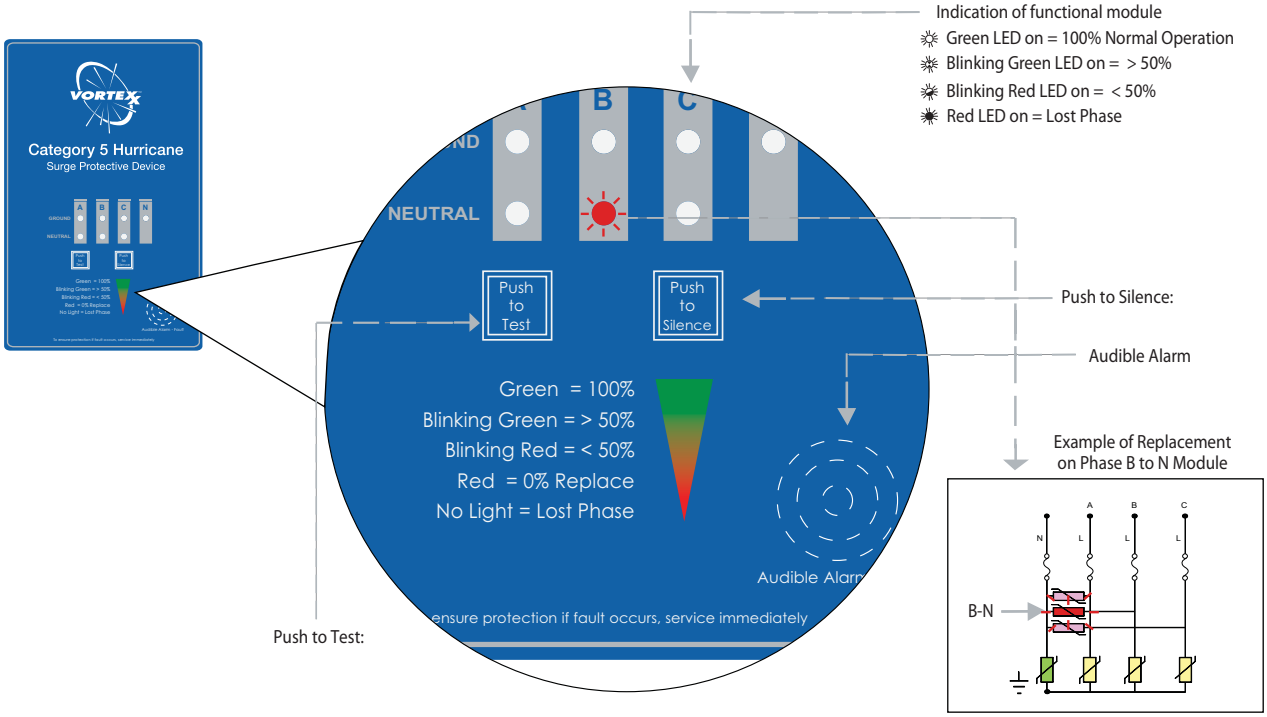
Diagnostics

Upon energizing the unit, check to ensure proper operation. Units with the Basic Display will show green LEDs for all modules and no alarms. Should LED's appear RED or RED BLINKING, turn the handle to the OFF position, disconnecting the unit from the circuit. Check to make sure the electrical network is in good working order and all instructions in this manual have been followed. If the condition persists, remove power to system and consult the troubleshooting section of this manual to determine if any MOV modules are defective. For technical support please contact PSP Products at 703-687-4057.

Display "E" Enhanced Series

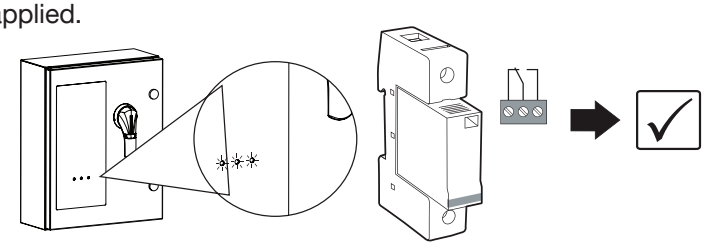


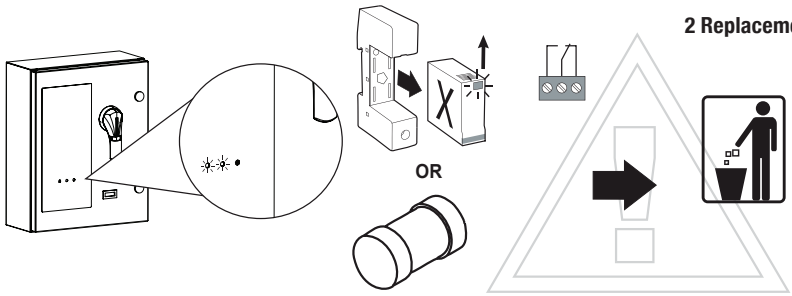
Display "S" Standard & Basic Series



Troubleshooting

First, check the disconnect fuse status, as well as the 2A Fuse protecting the display board and the DUC 31 (check using a meter, check the diagnostics on page 4 for references). Replace any defective fuses. If no fuses are defective, see below on identifying defective modules, replacing and re-starting the unit. Should defective fuses be identified, replace. Upon replacing any defective fuses, energize the unit by closing the door and turning the handle to the ON position. If all module LEDs are green, the unit is working properly. If any LEDs are red or not lit, refer to identifying defective modules, replacing and re-starting the unit. If any module is defective, and needs to be replaced, a red flag will appear on the face of the module. Before Replacing a blown fuse, make sure the circuit is not interrupted by another fault in the system or the fuse will blow again when power is applied.

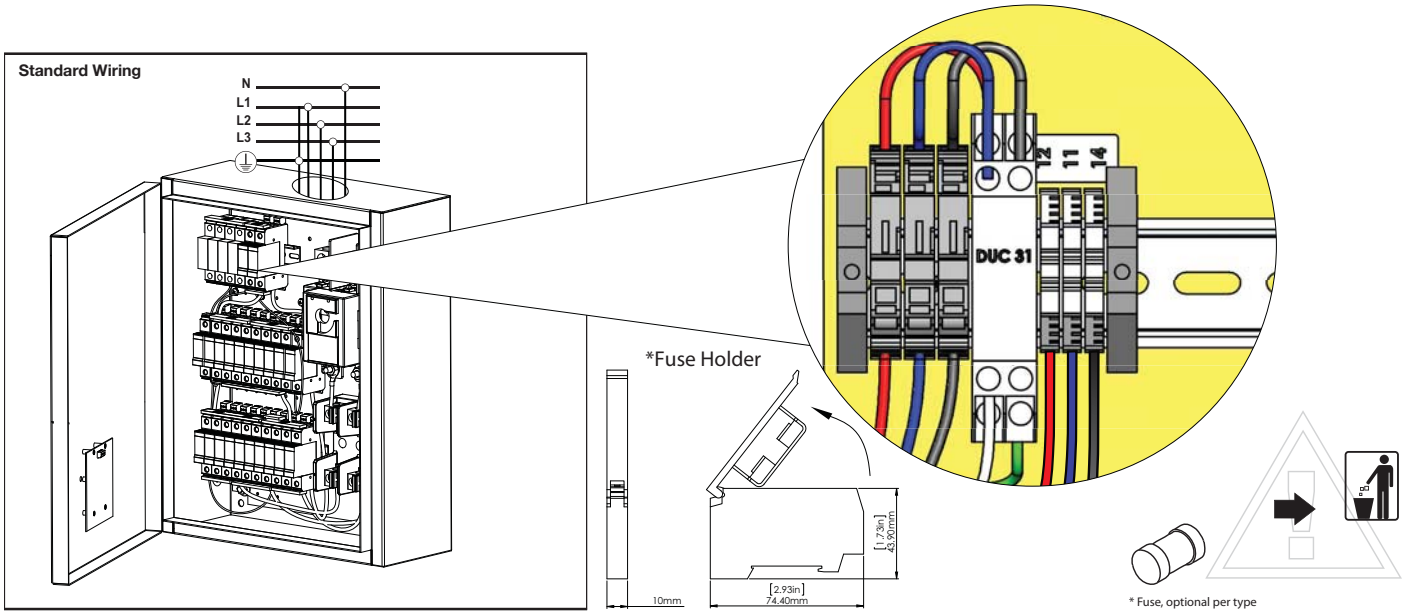




***Fuse, Optional Per Type**

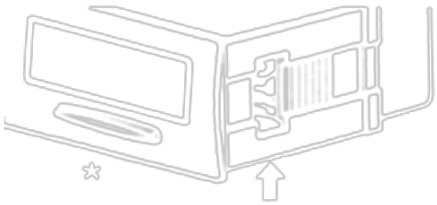
DUC31 & Fuses

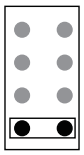
The DUC31 has been designed to offer a passive sinewave tracking option for the entire line of PSP Products DIN-rail mounted AC SPD. It is mainly utilized in industrial application, especially automation, in order to reduce the noise originating from the transient events. The first principle of operation is to create a filter using the natural Inductance of the wires of which it is connected. This association of inductors in series and capacitors in parallel to the equipment to the protect makes a Low Pass Filter. Corresponding fuses are used to protect the circuit of the DUC31. Replacement may be necessary if a phase is lost in the diagnostic display board.



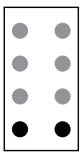
Surge Counter/Diagnostic LCD Display

The KAL-D06 counters are small, lithium battery powered, totalizing counters that are panel mounted. The counters are designed as replacements for standard electro mechanical counters. They use the latest custom CMOS technology and incorporate an 8 digit, 0.354" (9mm) high, LCD display. It operates from a long life lithium battery (life 10 years) and can be operated from contact closure or high speed electronic devices. No separate alkaline batteries are required. The front reset button can be enabled by adding a jumper to the lower pins as shown in the illustration below. Jumpers will be included with package contents.





Front Panel Reset Enabled



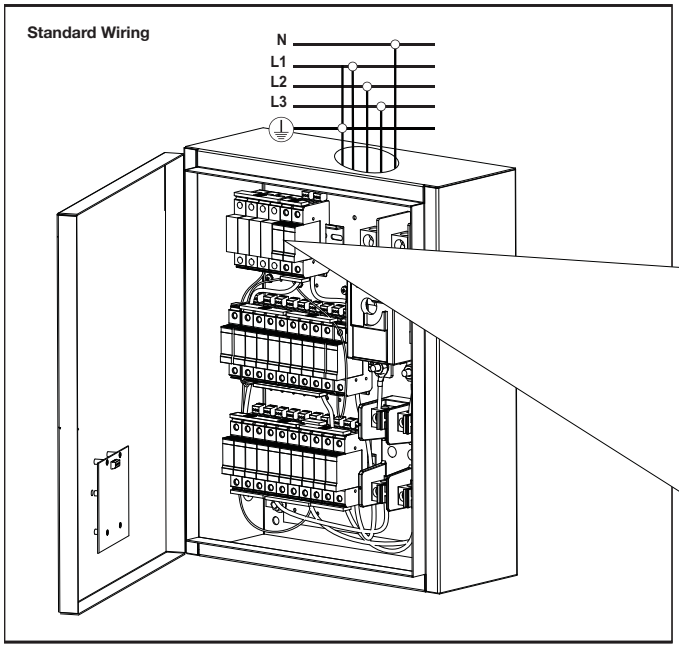
Front Panel Reset Disabled

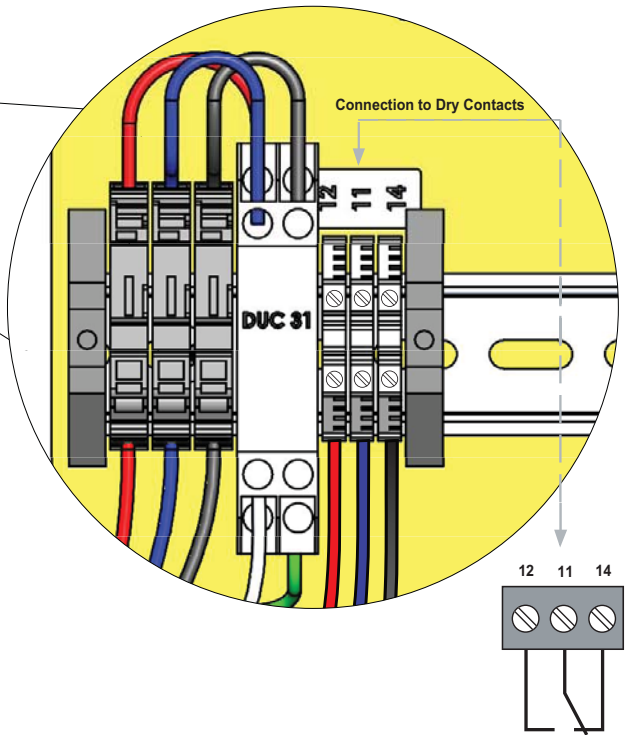
Remote Wiring Dry Contacts

A “form C” contact which is a three wire contact: Normally Open (NO), Normally Closed (NC), and a Common (C). Dry Contacts allow a remote piece of equipment or instrumentation to use its own control loop and loop through the dry contacts.

*Contacts

Classification	Standard
Load	Resistive Load
Contact Type	Bifurcated Crossbar
Contact Material	Ag + Au-alloy
Rated Load	0.5A at 125VAC; 2A at 30VDC





#26 AWG Min.
#12 AWG Max.
Torque: 0.8-1.6 n/m
7-19.66 in/lbs

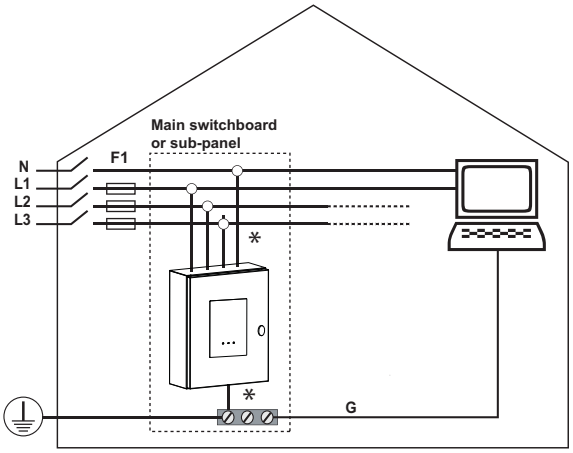
Product Selection

Selecting the proper surge protection device can be a complicated task. Consult qualified personnel to ensure the electrical system is in good working order and for proper sizing of an SPD. Reference technical data table and electrical drawings provided in the manual. For product selection support please contact PSP Products or visit our website.

Technical Data

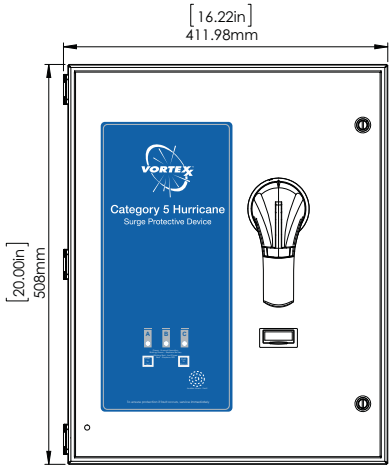
Description		C5H1	C5H2	C5H3	C5H4	C5H5	C5H6	C5H8	C5H9
System Voltage	VAC	120/240	120/208	120/120/240	277/480	480	347/600	220/380	240
System Wiring		3W+G (Single Phase)	4W+G (3-Phase Wye)	4W+G (3-Phase Hghi-Leg Delta)	4W+G (3-Phase Wye)	3W+G (3-Phase Delta)	4W+G (3-Phase Wye)	4W+G (3-Phase Wye)	3W+G (3-Phase Delta)
Maximum Operating Voltage (MCOV)	L-N	150	150	150/320	320		550	275	
	N-G	150	150	150	320		550	275	
	L-G	150	150	150/320	320	550	550	275	275
	L-L	300	300	320	550	550	750	550	275
Voltage Protection Rating (VPR)	L-N	800	800	800/1,200	1,200		1,800	1,200	
	N-G	800	800	800/1,200	1,200		1,800	1,200	
	L-G	900	900	800/1,200	1,500	1,800	1,800	1,500	1,200
	L-L	1,800	1,800	1,800	2,000	3,000	3,000	2,000	2,000

Application

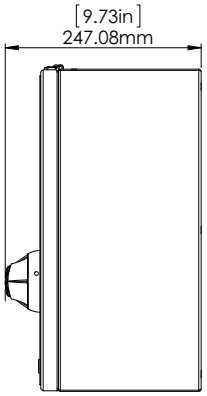


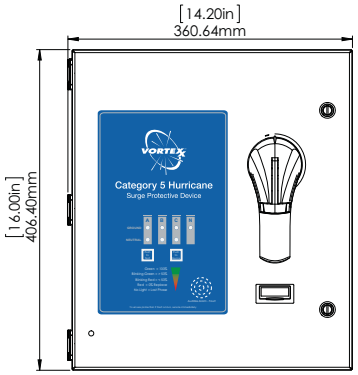
* Shortest distance possible

Dimensional Drawings

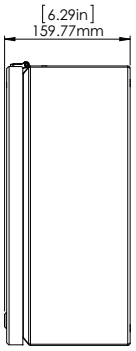


750 Imax

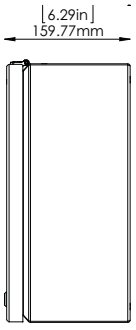


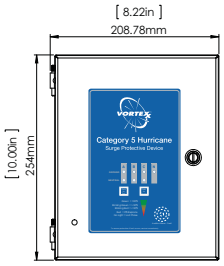


240-500 Imax

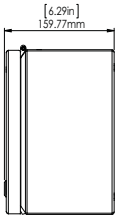


400-500 Imax

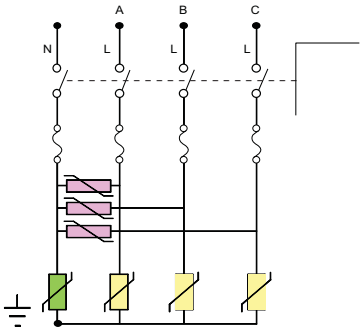
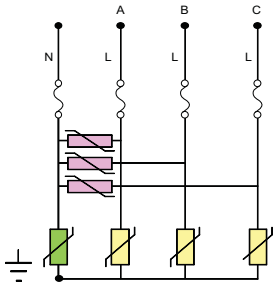
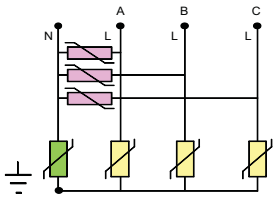
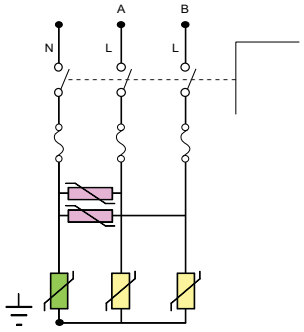
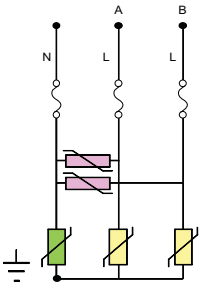
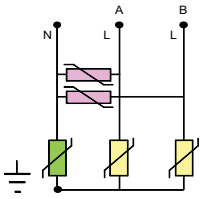
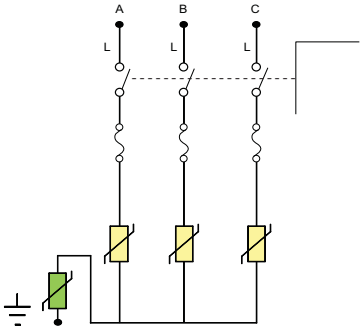
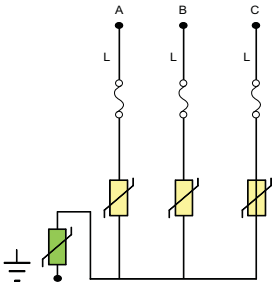
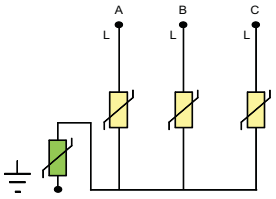




240 Imax



Electrical Drawing & Assembly

Skeme	Electrical drawing		
	Enhanced	Standard	Basic
Y			
T			
D			

Scan the QR code or visit pspproducts.com to learn more about this product's warranty.