

# Neutral Current Reduction Module: Triplen Trap

ADVANCED SYSTEM PROTECTION FROM NEUTRAL CURRENTS

## Harmonic Heating: A Smoking Gun

Harmonics in today's office power systems burn contacts, melt insulation, corrupt digital signals with electrical noise and cause intermittent surges and interruptions that plague data center managers and facility engineers alike.

The electrical systems of yesterday's office buildings were not designed to support today's ever growing electronic office. Most of the plug loads contain switch mode power supplies (SMPS) drawing non-sinusoidal current, which overload building wiring and cause premature transformer failure. PDI's Triplen Trap reduces the negative effects of non-sinusoidal current.

## Reduce Neutral Currents to Withstand Non-Linear Loads

Phase currents in a three phase system combine on the neutral conductor where the current can be as high as 1.73 times the phase current. If the phase currents are close to full load, the neutral conductor will be overloaded. This is especially true in older buildings where the neutral conductor was rated for the same ampacity as the phase conductors.

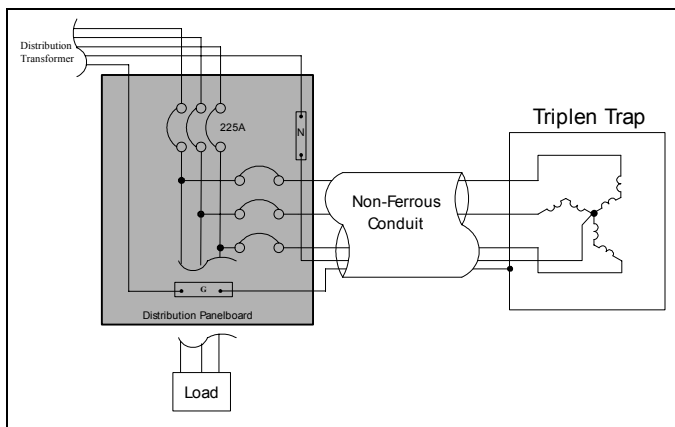


Triplens are the third order harmonics (3<sup>rd</sup>, 9<sup>th</sup>, 15<sup>th</sup>, 21<sup>st</sup>...) generated by SMPS. Triplens flow between the neutral conductor and the distribution transformer in search of a low

impedance return path.

PDI's Neutral Current Reduction Module provides the triplen currents with a new return path through the Triplen Trap. Connected to the three phases and the neutral conductors in the building wiring, the Triplen Trap becomes the low impedance return path for the triplen currents in the neutral conductor.

Designed for retrofits or upgrades to existing buildings, the Triplen Trap does not require removal of transformers or disconnection of power to the loads. Connected in parallel with the building's electrical system, the Triplen Trap **reduces neutral harmonic currents by at least 67%** (see table, reverse side).



Triplen Trap System Configuration

# Neutral Current Reduction Module: Triplen Trap

## SPECIFICATIONS

### Ratings

- 40 - 750 Amps
- K Factor Rating: K20
- 150°C Temperature Rise
- Class R 220°C Insulation
- Noise Level: per NEMA ST20 standards
- Input: 3-phase, 4 wire plus ground
- Applied Voltage: 208/120V, 60 Hz

*(consult factory for other ratings)*

### Features

- Copper Wound Construction
- Natural Convection Cooling
- Operating Efficiency: 98% typical
- Common Mode Noise Protection
- Transverse Mode Noise Protection
- UL Listed, CSA Certified

### Enclosure

- Drip-proof NEMA 1
- Removable Front and Rear Panels

### Operating Conditions

- 60 Hz Operating Range: 57-63 Hz
- 50 Hz Operating Range: 47-53 Hz
- Operating Temperature: ambient 0°C to 40°C
- Storage Temperature: ambient -10°C to +40°C
- Relative Operating Humidity: 90% non-condensing

## Triplen Trap Options

### Transient Suppression Network (TSN)

This feature provides an integrated system designed and engineered to meet ANSI/IEEE category C standards for transient voltages and surge currents.

### Lightning Arrestor/Surge Suppressor

The lightning arrestor protects the major insulation of the magnetics from high energy surges that are associated with lightning discharges. The suppressor increases the effectiveness of the lightning arrestor by reducing the rate of rise of high energy transient voltages.

### Adjustable Attenuation Taps

To prevent overloading due to future expansion, add additional taps. One tap increases the zero sequence impedance by 15%, two taps increase it by 20%. The tap configuration must be specified at time of system purchase.

### *Triplen Trap Installation Data*

Model Number	Neutral Rating (Amps)	Feeder fmr Ma: kVA	Feeder Xfmr Max Wire Size	Feeder Xfmr Min Wire .engtl	Min Phase Wire Size	Min Neutral Wire Size	Max Wire .engtl	Recommend Input Circuit Breaker Size
TT - 040	40	50	1/0	100	#8	#6	50	25
TT - 060	60	50	1/0	100	#8	#4	50	30
TT - 100	100	50	1/0	100	#6	#1	50	50
TT - 150	150	50	1/0	100	#4	2/0	50	70
TT - 175	175	50	1/0	100	#3	QTY=2, #3	50	80
TT - 200	200	75	4/0	100	#3	QTY=2, #2	50	90
TT - 250	250	75	4/0	100	#1	QTY=2, 1/0	50	120
TT - 300	300	75	4/0	100	2/0	QTY=2, 2/0	50	150
TT - 350	350	75	4/0	100	3/0	QTY=2, 3/0	50	160
TT - 400	400	75	4/0	100	QTY=2, #2	QTY=3, 1/0	50	200
TT - 500	500	125	500MCM	100	QTY=2, #1	QTY=3, 2/0	50	225
TT - 600	600	125	500MCM	100	QTY=2, 2/0	QTY=3, 3/0	50	300
TT - 750	750	125	500MCM	100	QTY=3, #1	QTY=4, 3/0	50	350

# PDI

creating the perfect wave

Power Distribution, Inc.  
4200 Oakleys Ct.  
Richmond, VA 23223  
Phone: (804) 737-9880  
Toll Free: (800) 225-4838  
Fax: (804) 737-1703  
Web: <http://www.pdicorp.com>