

# THYCON

Est.1968



**Triplen**

Triplen | 10kVA - 1MVA

## Concept

The Triplen is a self-contained power conditioning system designed to provide your computer centre with reliable computer grade power, while trapping system harmonic currents that could seriously overload the building cables.

## Applications

Thycon Triplen transformers are suitable for applications requiring:

- 3rd harmonic elimination
- isolation
- voltage transformation

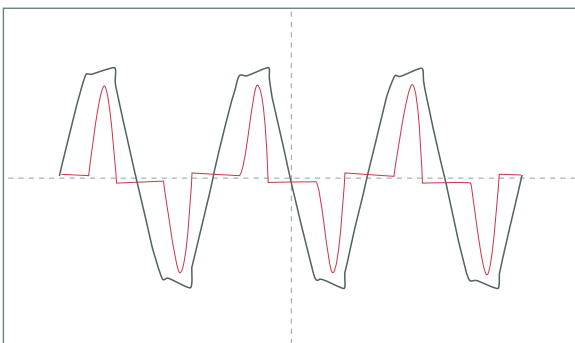
## Triplen features and benefits

- 3rd harmonic elimination
- single point grounding
- foil wound transformers
- computer grade quality power
- substantial system application savings as neutral cable rating is greatly reduced
- energy savings
- soft-start control
- high overload capacity
- robust technology
- no moving parts
- fuseless design
- high efficiency
- high reliability
- long life
- cost effective
- low maintenance cost
- compact, modular construction
- indoor or outdoor enclosures
- Australian made

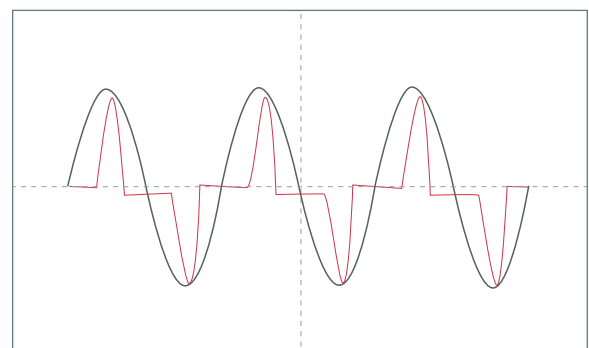
## Principle of operation

Modern computers utilising switch-mode power supplies can produce very high harmonic currents, in particular the third harmonic, with content level as much as 80% or even higher. These add arithmetically in the neutral cable of the building power supply to 240% or more of the rated phase current value. As it is frequent practice to rate the neutral cable, at best, to the same value as the phase cables, and as the cable losses are proportional to the square of the current, the additional losses in the neutral conductor can be five times greater than the conductor rating. Since neutral cables are not fused or otherwise protected against overloads, thermal cable destruction and electrical fire can be the final results.

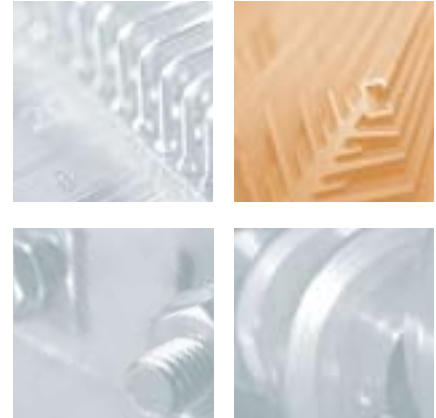
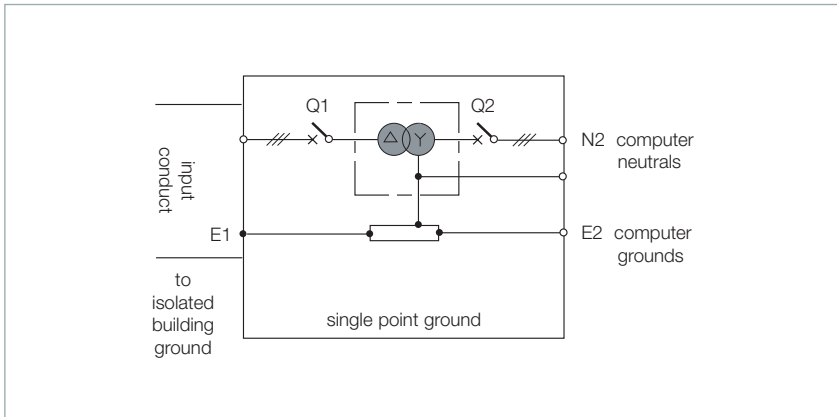
The Triplen harmonic current limiter reduces the third harmonic currents and consequently the neutral currents to zero. With a balanced load, the third harmonic currents are also removed from the phase cables of the building power supply and so are all other harmonic currents that are multiples of three. Other harmonics generated by the computer centre, usually only odd numbered and with amplitude varying inversely to their frequency, are many times smaller than the third and can generally be disregarded. Optional filters can be fitted to the Triplen limiter should these odd-numbered harmonics (i.e. 5th, 7th, 11th etc.) need to be reduced. The traces below show the building power supply voltage waveform with the third harmonic current present, with and without the Triplen limiter.



Waveform without the Triplen limiter



Waveform with the Triplen limiter



*Triplen single line diagram*

### Computer grade power

In addition to keeping your building power supply free from damaging harmonic currents, the Triplen restores voltage to computer grade quality, provides galvanic isolation between the building power supply and computers, and blocks RFI, EMI, common-mode noise and spikes.

### Single point grounding

Effective grounding of computer equipment is essential in any computer centre in order to ensure operator safety and accurate information processing. A single point is established at installation as a dedicated earth. The neutral may be isolated and earthed separately from the computer cabinet.

### Foil wound transformers

Thycon foil wound transformers produce a better power supply quality and better shielding at reduced cost. Transformer dimensions are also reduced because hot spots, common in wire wound transformers, are non-existent with foil. The use of foil also makes vertical clamping of coils unnecessary as axial forces are not present.

*Triplen restores voltage to computer grade quality, provides galvanic isolation ... and blocks RFI, EMI, common-mode noise and spikes.*

### Installation and testing

The Triplen is designed for simple installation and testing. All that is required is the installation of power cables and control and monitoring cabling. The Triplen is tested comprehensively prior to delivery and needs minimal site commissioning.

### Reliability and maintenance requirements

Thycon has been supplying transformers for 40 years and has demonstrated their high reliability and low maintenance demands in critical applications for defence, telecommunications, computer centres and manufacturing.

Transformers can be forced or naturally cooled, which contributes to high reliability and low ongoing maintenance. The power components (transformers, switchgear and instrument transformers) are all standard commercial products of proven reliability and life expectancy.



*Triplen transformer foil coil winding machine*



*Waveforms*

Thycon Triplen maintenance requirements are dependent on environmental and application conditions. We accommodate customer requirements from basic to full warranty maintenance. Each maintenance plan ensures the equipment operates in top condition with maximum availability of engineers and parts at minimum cost to the customer. Qualified engineers perform the maintenance with the full back up and resources of Thycon.

### **Training and support**

Training and support can be provided to on-site personnel to ensure that they are fully versed in the operation, maintenance and fault rectification of the Thycon Triplen.

### **Control and monitoring**

The Triplen system monitor features a simple and effective user interface that incorporates:

- a *Start* push button interlocked with amplitude, frequency and phase rotation monitoring of the input supply

*Effective grounding of computer equipment is essential ... in order to ensure operator safety and accurate information processing.*

- an output amplitude, frequency and phase rotation monitor with automatic disconnect command for out-of-tolerance conditions
- emergency stop via a fully guarded push-button for total power isolation (input and output)

### **Options**

- ground fault interrupter
- custom specified alarms module, local or remote
- line and load parameters display (volts, current etc.)
- line disturbance analysis
- diagnostic terminal

## Technical specifications TPL50 - TPL300

	<i>TPL50</i>	<i>TPL100</i>	<i>TPL150</i>	<i>TPL200</i>	<i>TPL300</i>
<b>Input - three phase, three wire</b>					
Voltage	415 V	415 V	415 V	415 V	415 V
Voltage tolerance	+10% - 15%	+10% - 15%	+10% - 15%	+10% - 15%	+10% - 15%
Frequency	50 Hz ± 5%	50 Hz ± 5%	50 Hz ± 5%	50 Hz ± 5%	50 Hz ± 5%
Phase current	75 A RMS	150 A RMS	225 A RMS	300 A RMS	450 A RMS
Inrush current (maximum)	<150 Apeak	<300 Apeak	<450 Apeak	<600 Apeak	<900 Apeak
<b>Output - three phase, four wire</b>					
Voltage	415/240V	415/240V	415/240V	415/240V	415/240V
Rating	50kVA	100kVA	150kVA	200kVA	300kVA
Phase current	100 A RMS	200 A RMS	300 A RMS	400 A RMS	600 A RMS
Output impedance	<1.5%	<1.5%	<1.5%	<1.5%	<1.5%
Noise attenuation: (electrical at 10kHz)					
Common mode	>55dB	>55dB	>55dB	>55dB	>55dB
Common/transverse mode	>80dB	>80dB	>80dB	>80dB	>80dB
Transient suppression (minimum energy absorption):	200 joules	200 joules	200 joules	200 joules	200 joules
Filters (optional) 5th and 7th harmonic	25A RMS	50A RMS	75A RMS	100A RMS	150A RMS
Ambient audible noise at 1 metre	<60dB	<60dB	<60dB	<60dB	<60dB
Ambient temperature	<35degC	<35degC	<35degC	<35degC	<35degC
<b>Dimensions</b>					
w x d x h (mm)	600 x 800 x 1200	600 x 800 x 1200	600 x 800 x 1600	600 x 800 x 1600	600 x 800 x 1600

Specifications are subject to change without notice

## Technical specifications TPL400 - TPL800

	<i>TPL400</i>	<i>TPL500</i>	<i>TPL600</i>	<i>TPL800</i>
<b>Input - three phase, three wire</b>				
Voltage	415 V	415 V	415 V	415 V
Voltage tolerance	+10% - 15%	+10% - 15%	+10% - 15%	+10% - 15%
Frequency	50 Hz ± 5%	50 Hz ± 5%	50 Hz ± 5%	50 Hz ± 5%
Phase current	600 A RMS	750 A RMS	900 A RMS	1200 A RMS
Inrush current (maximum)	<1200 Apeak	<1500 Apeak	<1800 Apeak	<2400 Apeak
<b>Output - three phase, four wire</b>				
Voltage	415/240V	415/240V	415/240V	415/240V
Rating	400kVA	500kVA	600kVA	800kVA
Phase current	800 A RMS	1000 A RMS	1200 A RMS	1600 A RMS
Output impedance	<1.5%	<1.5%	<1.5%	<1.5%
Noise attenuation: (electrical at 10kHz)				
Common mode	>55dB	>55dB	>55dB	>55dB
Common/transverse mode	>80dB	>80dB	>80dB	>80dB
Transient suppression (minimum energy absorption):	200 joules	200 joules	200 joules	200 joules
Filters (optional) 5th and 7th harmonic	200A RMS	250A RMS	300A RMS	400A RMS
Ambient audible noise at 1 metre	<60dB	<60dB	<60dB	<60dB
Ambient temperature	<35degC	<35degC	<35degC	<35degC
<b>Dimensions</b>				
w x d x h (mm)	600 x 800 x 1600	600 x 1000 x 1600	1200 x 800 x 1600	1200 x 800 x 1600

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