



powerstar

## Voltage Optimisation

Optimising your incoming voltage to improve your power quality, reduce energy bills, and lower carbon emissions.



# Who is Voltage Optimisation Suitable for?

Sites that are being supplied with overvoltage will see the most benefit from Voltage Optimisation, but almost all sites will be able to secure savings via improved energy efficiency. Most infrastructure and equipment will operate more efficiently and with less need for maintenance at lower voltages.

Voltage Optimisation is best suited to environments where there is sensitive or critical electrical equipment, with long operating hours and a high level of electricity consumption. This means it performs well in sectors such as:

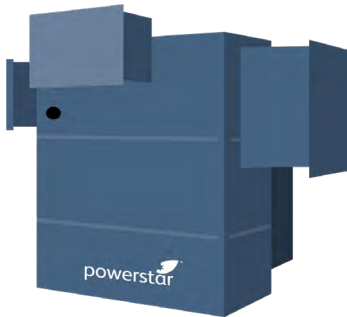
-  Manufacturing
-  Food and Drink
-  Retail and Leisure
-  Healthcare
-  Public Sector

## The Powerstar Range

The Patented Powerstar Voltage Optimisation equipment is available in a broad range of sizes to meet all site requirements. The “LITE” version provides a fixed voltage reduction and has undervoltage control (UVC) as standard, while the “MAX” version dynamically regulates the incoming site voltage to ensure that a target voltage level is always achieved. The system can be applied on either the Low Voltage (LV) or High Voltage (HV) installations of your site.



VO LITE	VO MAX	HV MAX
Fixed voltage Optimisation Undervoltage Control (UVC) as standard	Dynamic voltage Optimisation	Amorphous High Voltage (HV) transformer with dynamic voltage Optimisation
Subtracts a set voltage from incoming supply	Dynamically adjusts voltage subtraction to hit target value irrespective of incoming supply variations	Addition of a low-loss HV transformer to the unit allows maximum energy saving on HV supplies
Online monitoring of performance	Online monitoring of performance	Online monitoring of performance
Small sites, saving dependent on supply	Best returns for most sites	Large sites with own HV transformers



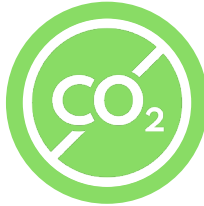
## Benefits to the Customer



Typical Energy Savings  
6% to 10%



Voltage is reduced and regulated so equipment will run more efficiently



Reduced CO<sub>2</sub> Emissions



Savings on your electricity bill from day one & finance options available

## Why Choose Powerstar?



15 Year Warranty



Worldwide patented technology with 10,000+ units installed worldwide



50 Year Lifespan



24/7 Online proof of savings



Made in Britain



Hundreds of case studies and reference sites



Constant market leader for over 15 years



Savings Guaranteed - we refund the difference if not

### Remote Monitoring

The Voltage Optimisation LITE & MAX systems are supplied with remote online monitoring.

Real time performance:

- Remote monitoring of all VO units via cloud based platform
- Logging of site consumption, harmonics, power factor and voltage, stored on local secure FTP server, specifically for client and site
- Alarms are remotely recorded and stored, giving historic insights into asset performance
- Ability to perform remote updates and software upgrades
- Savings tests (on/off) can be tailored remotely and performed instantly as part of the verification
- Dedicated remote service team in place for continuous remote support
- Ability to troubleshoot remotely, removing the need for majority of site visits

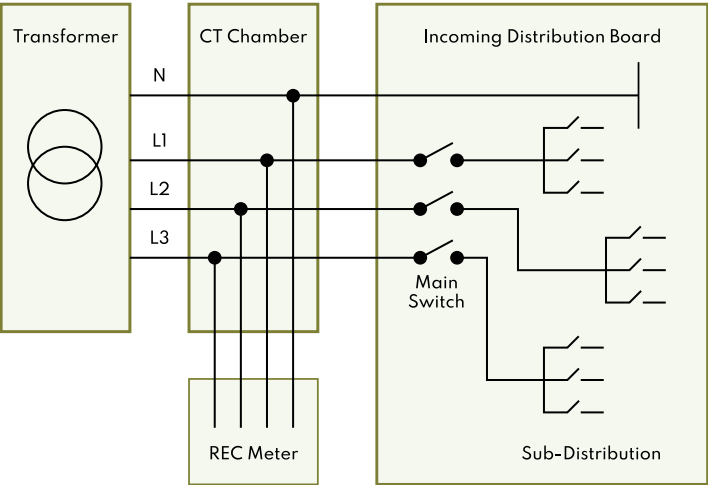
# Technical Specifications

The Powerstar Voltage Regulation equipment is available in a broad range of sizes to meet all site requirements. The “LITE” version provides a fixed voltage reduction while the “MAX” version dynamically regulates the incoming site voltage to ensure that a target voltage level is always achieved. The system can be applied on either the Low Voltage (LV) or High Voltage (HV) installations of your site.

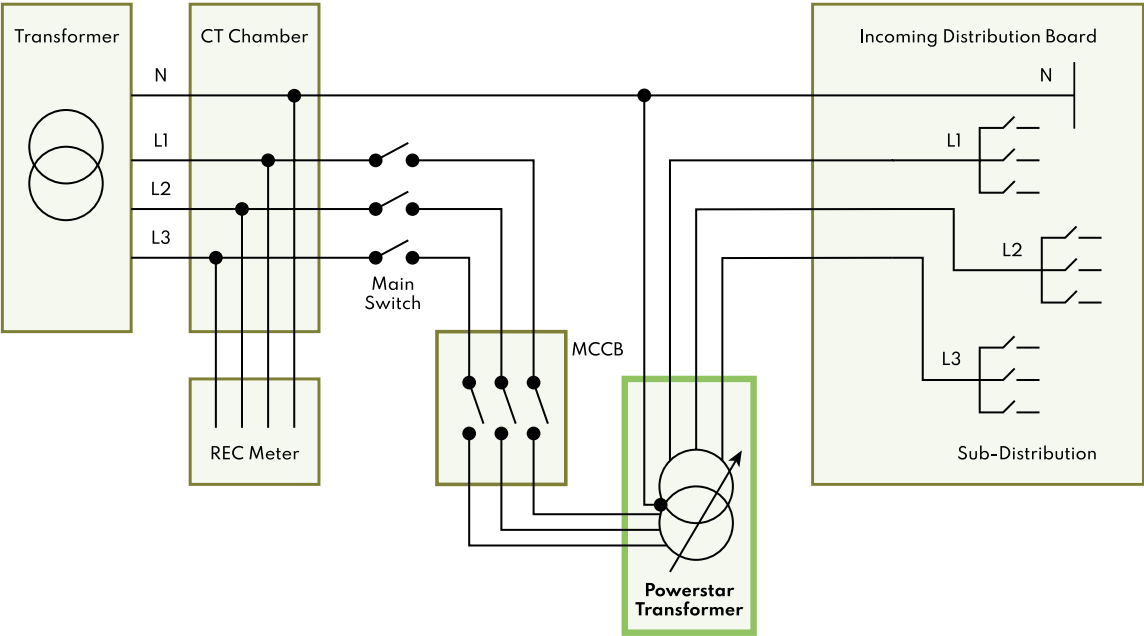
	VO LITE	VO MAX	HV MAX
<b>Capacity Range</b>	72-453kVA	72-2500kVA	500-2500kVA
<b>Case Size (min/max W x D x H mm)</b>	520 x 380 x 630 / 750 x 530 x 890	810 x 650 x 1810 / 2690 x 900 x 1810	Subject to design
<b>Unit Weight</b>	Weight is approximately 1.1kg for every 1kVA - e.g. 1000kVA unit is 1100kg		Subject to design
<b>Voltage Rating</b>	415V		6.6kV/415V or 11kV/415V
<b>Cooling Type</b>	ANAN		ANAN/ONAN/KNAN
<b>Voltage Reduction Range</b>	5-30V		
<b>Voltage Regulation Type</b>	Fixed	Dynamic	
<b>Remote Monitoring</b>	Additional Extra	Included	
<b>Under Voltage Controller</b>	Additional Extra	Included	
<b>Bypass</b>	Additional Extra		Included
<b>Warranty</b>	15 years		
<b>Inspection</b>	Recommended Annually		

# Electrical Distribution Schematic - Low Voltage

Typical Electrical Distribution Schematic



Installation Method 1 - Divert cables via MCCB



Types of Containment



Cable Tray



Ladder Rack



Trunking



Flexible Conduit

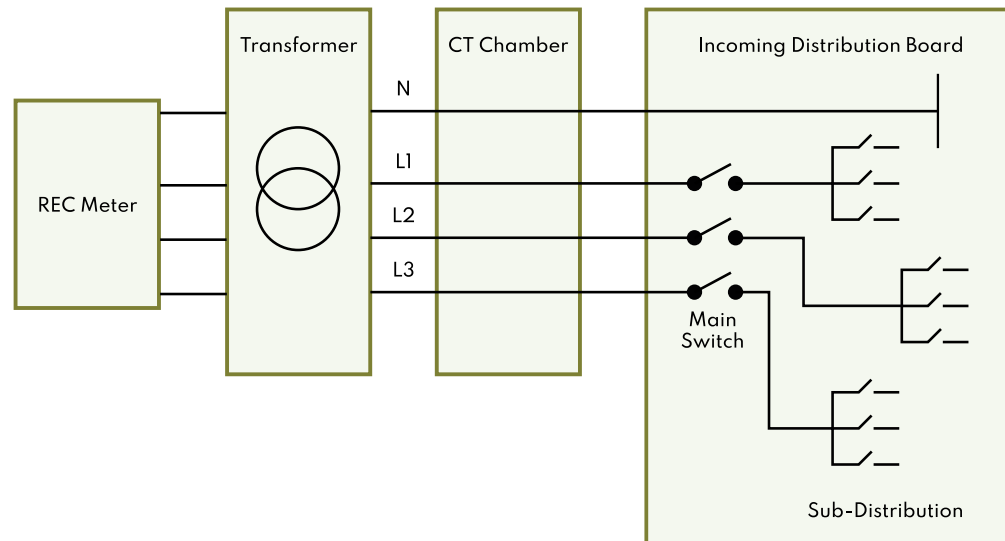


Cable Trench

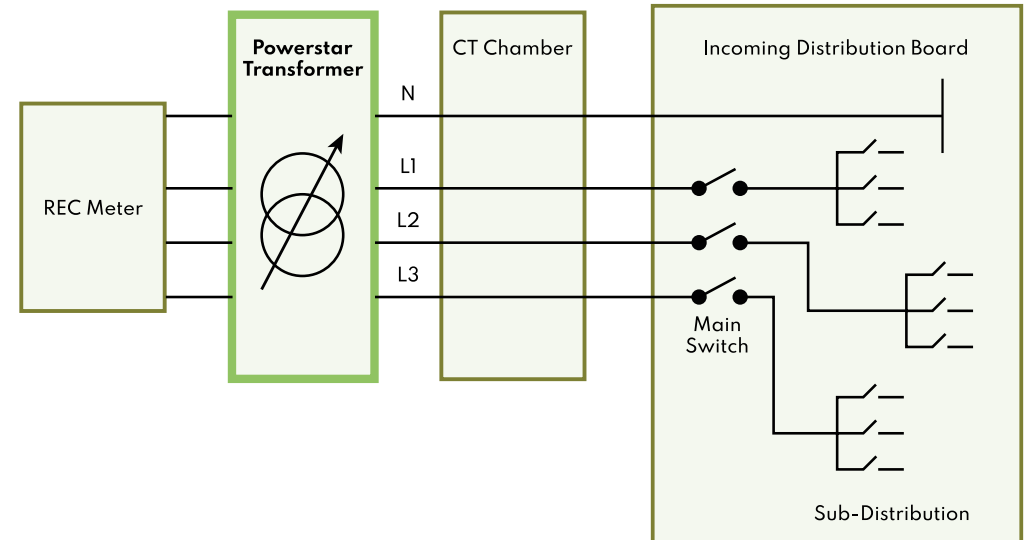


# Electrical Distribution Schematic - High Voltage

Typical Electrical Distribution Schematic



Installation Method



# Savings Verification Process

## Portal % Saving Figure

The online portal for the Powerstar unit shows an indicative Savings % based on the difference between the Load Current  $I_L$  and Supply Current  $I_S$  as this is the factor that reduces the kWh registered on the fiscal meter.

$$\text{Savings \%} = (1 - (I_L / I_S)) \times 100$$

## Supply Meter

Measures the electrical parameters at the supply into the Powerstar unit.

**These will be the same as measured by the fiscal meter.**

The current measured will be lower than the current measured on the Load meter due to the current cancelled out by the Back EMF.

Supply



$M_F$

## Powerstar Unit

$M_S$

Back EMF

$M_L$

Load

## Fiscal meter

Energy costs are determined by the kWh registered by this meter.

The meter calculates kWh from the voltage, current and power factor.

$$\text{kWh} = V \times I \times \sqrt{3} \times \text{PF} / 1000$$

## Load Meter

This measures the electrical characteristics as seen by the load.

The Load Voltage will be lower due to the reduction by the Powerstar unit.

The Load Current will be reduced while the Powerstar unit is operational due to any increase in the efficiency of equipment downstream operating closer to the design voltage. This reduction in current will not be taken into account in the savings % shown on the unit and can only be determined by on/off testing.

## Why Powerstar?

Powerstar is the leading Voltage Optimisation provider that **designs and manufactures its products in the UK**. From design and testing, through to commissioning, installation and aftercare, Powerstar supports you to ensure your chosen energy solution delivers exactly what you need from it. We have been trusted to implement thousands of Voltage Optimisation units across the globe for a variety of organisations, from manufacturing companies, hotels, gyms and supermarket chains to clients with critical services such as the police, fire brigade, the NHS, government departments, local authorities, education facilities, and SMEs across a range of industries.



## Our Customers

Powerstar have installed 6000 units installed around the world



## Our Credentials



## Get in Touch

To find out how Powerstar can help you achieve your energy management goals, contact us using the details below:

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