

# WHY CHOOSE POWERSTAR HV MAX?



## HV MAX

### **Powerstar HV MAX, a fully integrated system**

Powerstar HV MAX provides a combined solution to two common problems – transformer inefficiencies and a high supply voltage.

It combines a super low-loss amorphous core HV/LV transformer with integrated electronic-dynamic voltage optimisation technology, allowing for 11,000V input (other inputs available) and regulated 380V or user defined output.

### **Powerstar HV MAX delivers greater efficiencies**

Powerstar HV MAX features a super low-loss amorphous core transformer, which is a highly efficient electrical transformer, with a magnetic core comprised of ferromagnetic amorphous metal alloyed with a glass former.

Thin ribbons of steel are wound to form the transformers core. The materials used in amorphous core transformers have high magnetic susceptibility, low coercivity and high electrical resistance.

This results in amorphous core transformers delivering a reduction in standing losses, greater efficiency levels and increased energy savings in comparison to conventional transformers.

This is due to the internal structure of the material, which is more flexible than cold rolled grain oriented silicon steel (CRGO) laminations that make up the typical present day transformer, meaning easy magnetisation and demagnetisation can take place. The ability to switch magnetisation at a quicker rate than CRGO is what delivers the lower losses, resulting in an efficiency of 99.1%.

The role of a distribution transformer is to convert high voltage (HV) electricity supplied from a power station into lower voltage electricity for safe use on the low voltage (LV) side. Transformers operate 24 hours a day, 7 days a week, during which time they undergo constant losses of 2% to 4% of the electricity that passes through them.

This loss is divided into two different categories: load losses caused by the load on the transformer during the use of electricity, and no-load losses caused regardless of whether a load is present.

The key to reducing energy loss in a transformer lies in reducing the no-load losses. An amorphous core reduces no-load loss to around one third of the losses in conventional transformers, resulting in typically 1% to 3% annual savings simply from upgrading an existing transformer to the amorphous core HV transformer used in Powerstar HV MAX.

In addition, double digit savings can be expected from the integrated electronic-dynamic voltage optimisation technology through energy consumption savings. As a result, annual energy consumption savings from Powerstar HV MAX average around 13%.

### **Exceeds EU Eco Design 2021 Specifications**

On 1<sup>st</sup> July 2015, the European Commission introduced new European Union regulations which require all HV/LV transformers to meet minimum efficiency specifications, with stricter design regulations to come into force in July 2021. The purpose of the regulations is to stop the installation of inefficient transformers across Europe.

All Powerstar HV MAX transformers not only meet - but exceed - the standards due to come into force in 2021. This will provide a much more efficient solution that delivers greater savings and ensures a future-proof system that provides greater levels of efficiency and financial savings over the transformers lifespan, even in comparison to systems that just meet the current or future design regulations.

### **The only UK manufactured system to integrate HV/LV distribution with electronic-dynamic voltage optimisation**

Powerstar HV MAX is the only UK manufactured system utilising an amorphous core HV/LV distribution transformer combined with integrated electronically regulated voltage optimisation technology. This capability minimises installation costs substantially, especially where access and/or space limitations exist.

Additionally costs are reduced due to the reduction in expensive cable requirements for having two separate systems, as well as coordination, project management and logistics when managing two separate installations. Plant shutdowns are expensive, and we will always, where possible, opt for the installation option that minimises risk in the shortest time frame available.

However, as Powerstar HV MAX is a fully bespoke solution, it can be supplied as either a combined HV/LV transformer and MAX unit or as two separate units depending on spatial constraints and requirements.

**EXCEEDS 2021 ECO DESIGN  
SPECIFICATIONS TODAY!**

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## HV MAX

**Powerstar HV MAX delivers savings on both the High Voltage (HV) & Low Voltage (LV) side, and creates negative power feedback (back EMF) due to its patented design**

Powerstar HV MAX delivers savings on both the HV and LV side. The requirement to do so is because in the UK, on average, voltage is supplied to a building at 242V; however, the ideal operating voltage for most electrical equipment is 220V.

Optimising and cleansing the voltage to an optimal level on the LV side reduces electricity consumption and costs, carbon emissions, and unnecessary wear and tear to on-site electrical equipment.

To achieve this, the system utilises the patented Powerstar voltage optimisation technology to create induced negative power to the supply. This induced negative power feedback (back EMF) enables significant, instantaneous savings to be obtained through Powerstar's voltage optimisation technology.

The Powerstar system matches the incoming electrical supply to the needs of the on-site equipment, resulting in excess transformed voltage. The excess voltage (negative power) then flows in the direction of the supply and is subtracted from the incoming power.

*Examples of BACK EMF savings can be found in the Powerstar brochure.*

### Savings are 100% guaranteed

All savings from Powerstar's patented voltage optimisation system are 100% guaranteed.

Before an installation a full site survey is carried out at each facility to conclude what savings can be made. All analysis is based upon IPMVP (International Performance Measurement and Verification Protocol) and is carried out via the steps below:

- Step 1** – Comparison of kWh data, 28 days pre-install and 28 days post-install
- Step 2** – Comparison of kWh data, 28 days post-install against the same date year on year (pre-install)
- Step 3** – Comparison of kWh data, 84 days post-install against the same dates year on year (pre-install)
- Step 4** – Regression analysis based on kWh consumption and variables such as weather, holiday periods etc.
- Step 5** – Verification snapshot of the savings achieved from negative power feedback (back EMF)

In the unlikely situation that the savings outlined in the proposal are not achieved, the guarantee would result in the client receiving a one-off payment to cover the shortfall as outlined in the following example:

**The proposal guarantees:** 10% saving worth £15,000 per annum with 2.8 year payback period

**Actual savings achieved:** 8% saving worth £12,000 per annum

**Shortfall:** 2% saving worth £3,000 per annum

**100% guarantee payback:** one-off payment of £3,000 x 2.8 = £8,400



### Case Studies

Below are a few examples of energy efficiency savings results from a variety of industries following installations of Powerstar HV MAX systems.

**Paragon Quality Foods Ltd (Food service supplier)**  
Annual consumption savings: 12.3%

**Patrington Haven Leisure Park (Caravan park)**  
Annual consumption savings: 16.9%

**System 3 Ltd (Glass manufacturer)**  
Annual consumption savings: 10.9%

**Holmfirth Dyers Limited (Fabric dyeing and finishing)**  
Annual consumption savings: 10.9%

**MORE CASE STUDIES ARE AVAILABLE AT [WWW.POWERSTAR.COM](http://WWW.POWERSTAR.COM)**