POWERSTAR HV MAX V CONVENTIONAL SUPER LOW LOSS TRANSFORMER

Powerstar HV MAX offers greater efficiencies and more savings potential that conventional super-low loss transformers, below the main differentials of Powerstar HV MAX are outlined:

Powerstar HV MAX is a fully integrated system

Powerstar HV MAX is a fully integrated system comprising of electronic dynamic voltage optimisation technology coupled together with a super low loss amorphous core HV transformer all on the HV side. It allows for up to 38,000V (other inputs available) and regulated at nominal 480V (or user defined output) up to a maximum of 690V.

The Powerstar HV MAX transformer delivers greater efficiencies (99.1%)

Powerstar HV MAX uses 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.

This ribbon of steel is 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.

Super low loss amorphous core transformers deliver an efficiency of 99.1%. In comparison, conventional transformers use silicon steel within their core, which is usually supplied in coil form and cut into laminations which are then used to form the transformer core. Traditional steel core transformers deliver an efficiency of 97% when new.

The role of a distribution transformer is to convert high-voltage electricity supplied from a power station into lower-voltage electricity for safe use. Transformers operate 24 hours a day, seven 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.

Amorphous core transformers significantly reduce no-load losses by using an amorphous alloy for the iron core, around which the transformer windings that carry the electricity are coiled.

The key to reducing energy loss lies in reducing the no-load losses and the amorphous core reduces the Powerstar HV MAX no-load loss to around one third of the losses in conventional transformers . Combining an amorphous core HV/LV transformer with the Powerstar MAX dynamic voltage optimization system produces consistently double digit savings with associated reductions in CO2 emissions.

Exceeds EU Eco Design 2021 Specifications

On 1st 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. This ensures a future proofed 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.

POWERSTAR HV MAX V

CONVENTIONAL SUPER LOW LOSS TRANSFORMER

- **The only system to integrate HV/LV distribution with electronic dynamic optimisation**

Powerstar HV MAX is the only system utilising an amorphous core HV/LV distribution transformer complete with integrated electronically regulated voltage optimisation.

This unique capability minimises installation costs substantially especially where access and/or space limitations exist.

Additionally costs are reduced due to reduction in expensive cable requirements by having two separate systems, as well as coordination, project management and logistics when managing two separate installations.

Plant shutdowns are expensive; we should always where possible opt for the installation option that minimises risk in the shortest time frame available.

The Powerstar HV MAX can be supplied with either a separate MAX unit and HV/LV transformer where spatial constraints exist or as a combined HV/LV transformer and MAX unit where the existing space permits.

The combined HV/LV transformer and MAX unit provides the added benefit of reducing installation time and reducing the labour required. This compares to other systems on the market that require added installation time and labour

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

Powerstar HV MAX can deliver savings both on the HV and LV side. The system also uses the patented Powerstar voltage optimization technology to create induced negative power to the supply.

Therefore:

- **60%-70**% of the total savings come from the unique Powerstar design.
- **10%** from the efficiency of the super low loss HV transformer
- **20%-30%** from improvements of equipment efficiencies

Conventionally available VO technologies are available for use on the LV side, available figures show they can only deliver approximately 30% of the Powerstar technology due to the fact as stated above that approximately 70% of the projected savings are delivered by our negative voltage feedback system.

The Powerstar system matches the incoming electrical supply to the needs of the on-site equipment and returns any excess energy back to the grid. It achieves this by generating real negative power which flows in the direction of the supply and is subtracted from the incoming power.

- **Savings are 100% guaranteed**

All savings from the patented voltage optimization system are 100% guaranteed.

Before an installation it is recommended 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 – Compares 28 days pre install kWh data against 28 days post install kWh data.
Step 2 – Compares 28 days post install kWh data against the same dates a year previous (pre install).
Step 3 – Compares 84 days (12 weeks) post install kWh data against the same dates a year previous (pre install).
Step 4 – This involves a regression analysis. An accurate model is created based upon pre install kWh consumption data and variables such as the temperature.

In an extremely rare case that savings achieved are less than stated in the proposal, the shortfall in terms of £ based on p/ kWh used in the proposal will be calculated

This figure is multiplied by the payback period as stated in the proposal and issued as a one-off payment.

An example of this is as follows:

Proposal states 10% saving worth £15,000 per annum giving a payback of 2.8 years.

Actual energy savings achieved = 8% (2% less that stated) worth £12,000

Shortfall = £3,000 (£15,000 stated – £12,000 achieved) .