SPECIAL PROJECT

BLAKLEY ELECTRICS

Achieve Zero Off-load Losses with Eco-Tx Plant Room Transformers

When a transformer is connected to a mains supply it consumes electricity and emits heat 24/7, even when no equipment is being powered. The consumption and heat are caused by off-load losses, which result from the transformer core being magnetised and occur when it is connected to a mains supply. Although off-load losses are comparatively modest, they do generate heat, they incur cost, they add to the carbon footprint but serve no useful purpose.

On a recent project, minimising the carbon footprint of the installation and avoiding unnecessary heat sources had a high priority and the Blakley Projects Team developed a transformer which only consumes power (a) when a plug is inserted into the socket on the transformer and (b) when the socket switch is moved to the ON position. To ensure the system is as robust as possible, the switch on the socket can only be rotated to the ON position when a plug is inserted into the socket. In addition, the plug can only be withdrawn from the socket when the switch is turned to the OFF position. With this solution, no off-load losses can occur unless a plug remains in the socket and the socket switch is in the ON position. Whilst it is possible for a loose plug to be inserted into a socket and for the socket switch to be turned to the ON position (causing off-load losses) this would not be normal practice.

The transformers with Eco-Tx feature were supplied in wall mounting IP44 enclosures and incorporated transformer windings rated at 1 kVA and 2 kVA with a voltage ratio of 230:110CTE. They provide a Reduced Low Voltage (RLV) supply and are fitted with one or two 16A 110V 2P+E sockets to BS EN 60309-2. Transformers incorporated double-pole MCB protection and 110V RCD protection could also have been provided. Versions with an IP55 rating or enclosures made from GRP could also be supplied.

Our 1 kVA transformer has off-load losses of 27W which, if left on 24/7, would consume 236kWHr per annum. The 2 kVA has off-load losses of 43W, which would consume 376kWhr per annum (24/7). The cost of electricity is dependent on the tariff but is likely to be in the region of £0.14 per kWHr (and is likely to increase in future). Therefore the off-load losses of a single 2kVA transformer could incur a cost of £50 per annum even if the transformer is never used.

Although CO_2 emissions per kWHr of electricity have fallen in recent years thanks to the move to renewable energy sources, in 2019 it was calculated to be 0.256kg per kWHr. Therefore the off-load carbon emissions for a single 1kVA would be 60kg per annum and 96kg per annum for a single 2kVA transformer (if off load 24/7). The elimination of unnecessary heat also reduces consumption and emissions associated with cooling.

If you would like to investigate the adoption of transformers with the Eco-Tx feature, please contact our Customer Services teams at Crayford or Wakefield, who will be pleased to be of assistance.

Switch on socket cannot be turned to the ON position until a plug is inserted and so there are no off-load losses.

With a plug inserted, the switch on the socket can be turned to the ON position, which energises the transformer core.

The plug cannot be removed from the socket until the socket switch is in the OFF position i.e. only once the transformer is de-energised.

THE POWER PROFESSIONALS

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