BLAKLEY ELECTRICS

CASE STUDY
DATA SHEET

3300V Tunnel Transformer with 400V and 110V Outputs

The UK tunnelling sector is currently experiencing a very high level of activity thanks to demand from the rail, water and power sectors. Many of the tunnels have single drives of up to 10kM in length, which present a wide range of engineering challenges, including how best to provide LV and RLV supplies to meet small power and temporary lighting requirements during the construction and fit out stages of a project. Blakley Electrics have been closely linked with many major tunnelling projects over the last 30 years and have recently completed the supply of some 30kVA tunnel transformers, which transform 3300V three-phase to 400V at 23kVA and 110V at 7kVA.

Tunnel transformers are usually fed from a dedicated 3300V supply which runs in parallel to the 11kV supply required to feed the Tunnel Boring Machine. Having separate supplies for both loads enables the systems to be extended independently, which brings operational benefits during the main tunnelling phase and also allows the 11kV system to be removed for the fit-out phase of a project.

Transformers are usually spaced every 300m to 400m along the tunnel. The maximum spacing is usually dictated by the length of the 110V lighting circuit, which is typicallly 150m for higher wattage fittings illuminating large rail tunnels and 200m for lower wattage fittings illuminating smaller cable tunnels. Lighting circuits generally run inbye and outbye from the transformer, resulting in a spacing of every 300m or 400m.

The transformers are fed via a single 3300V power cable with connections to and from the transformer made via Victor half couplers rated at 500A. These are rugged connectors that were originally developed to meet the very onerous conditions found in deep mines. An electrical interlock can be provided for the 3300V circuit and couplers can be fitted with caps to provide ingress protection until they are mated. The primary windings of the transformer are protected by fuses, which can be accessed via a removable cover at the front of the transformer.

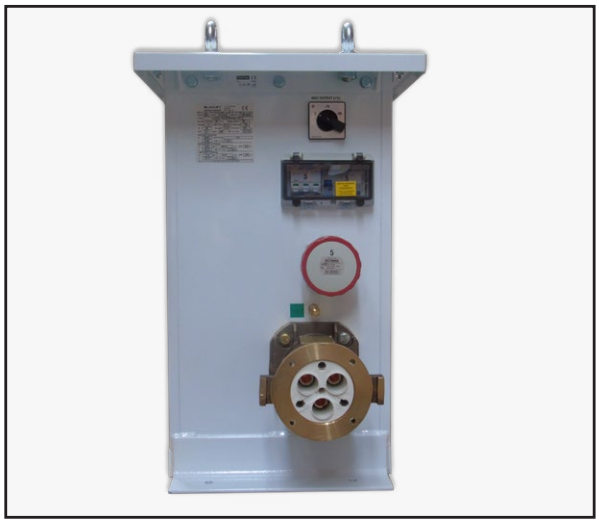
As volt drop can be an issue at the end of very long circuits, each of the secondary windings incorporates tappings of +5% and +10%. The tappings can be used to increase the voltage output, if volt drop is greater than expected. Tapping adjustment of each winding is via independent off load tap changing switches and adjustment can be made without the need to remove lids and covers.

400V and 110V socket outlets are rated at IP67 to BS EN 60309-2. In accordance with the recommendations of BS 6164 they are protected by MCB and 30mA RCD. The Blakley Flori-67 110V lighting system plugs in to the 110V sockets.

If you would like to discuss tunnel power transformers in ratings from 5kVA to 200kVA please contact the Blakley Projects Team who will be pleased to be of assistance.

A7040223, Tunnel Transformer, 30kVA, 3300V to 400V @ 23 kVA and 110V RLV @ 7 kVA

A7040223, showing 3300V Victor half coupler, 110V distribution and access cover to HV fuses



A7040223, showing 3300V Victor half coupler 400V distribution and tap changing switch

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