BLAKLEY ELECTRICS

CASE STUDY
DATA SHEET

Distribution Assemblies for Tunnelling

On large tunnel projects, Tunnel Boring Machines (TBMs) have changed tunnelling from a quasi mining activity in to a mobile production line. Once a TBM is up and running (which is no mean feat), it burrows away, 24 hours a day, seven days a week, edging forward metre by metre. The major manual activities associated with maintaining the TBM's progress revolve around keeping the machine powered at 11kV, keeping it supplied with tunnel segments and removing hundreds of tonnes of spoil.

Whilst TBMs have revolutionised the tunnelling of long drives, they have not supplanted the individual input required to create cross passages between tunnels or "boxes" to accommodate underground ticket halls or crossovers. These activities no longer solely rely on men working with picks and shovels. Instead, roadheaders, drilling machines, shotcrete rigs and other pieces of heavy plant have largely mechanized the process. However, the working conditions are extreme, it is potentially a very dangerous environment and all of the equipment has to be fit for purpose, including the electrical distribution equipment.

If these activities were taking place above ground, such as in an open-cast mine, the heavy plant would have self-contained diesel hydraulic power. However, because all of these activities are taking place underground, with limited ventilation, there is the added complication of supplying heavy mobile plant with electricity and, in some cases, compressed air. Larger machines can have a power requirement in excess of 200kW, which is outside the scope of the day to day electrical connectors commonly used in construction. Instead, mining connectors are often used for the high current applications. In addition, the electrical system has to be able to "move forward" as work progresses, to keep the machines powered. Blakley designs and manufactures bespoke tunnel distribution assemblies, which combine a cable link box (to enable the electrical system to be easily extended) with high current sockets to power heavy plant. Alongside are images of typical 250A and 400A assemblies.

400A Cable link Box / 350A Socket Assembly

The 400A assembly incorporates incoming and outgoing terminals capable of terminating a main 240mm^2 4C SWA cable in and through. A 400A switch is incorporated to control the supply to the next box once installed. Within each box is a 350A MCCB with variable RCD protection, which feeds a 350A Victor mining socket via a 400A TP contactor. The Victor mining socket requires an electrical interlock to ensure all connectors are properly mated prior to energisation, which is achieved by the use of a Blakley Electrics Earth Continuity Monitor working in conjunction with the 400A contactor. Once all of the connectors in the circuit are properly mated, power can be applied via easy to use ON / OFF actuators.

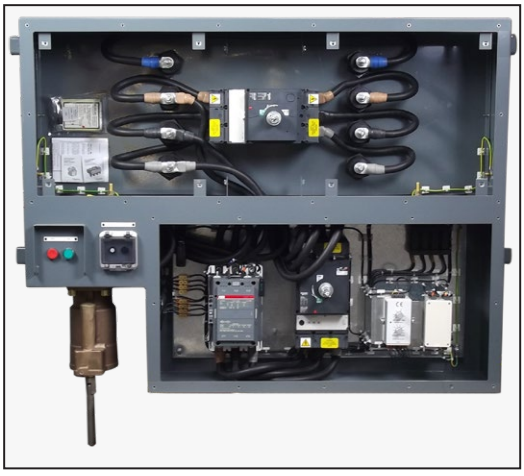
250A Cable link Box / Socket Assembly

The 250A assembly incorporates incoming and outgoing terminals capable of terminating a main 185mm^2 4C SWA cable in and through. A 250A switch is incorporated to control the supply to the next box once installed. Within each box are various MCBs rated up to 125A with variable or fixed RCD. Socket outlets are fitted at 125A, 63A and 32A rating and they all incorporate mechanical interlocking to prevent the insertion or withdrawal of plugs on load. The 32A and 63A sockets are standard industrial sockets to BS EN 60309 part 2. The 125A socket is a decontactor socket to BS EN 60309 part 1, which is far more compact than a standard 125A interlocked socket. In addition, any decontactor coupler sockets fitted to 125A extension leads are also mechanically interlocked, which is a major safety benefit arising from the use of this type of socket.

Please see over the page for examples of other tunnel distribution assemblies.

250A Cable Link Box / Distribution Assembly

400A Cable Link Box / 350A Socket with covers in place



400A Cable Link Box / 350A Socket with covers removed

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Free-standing and wall mounting tunnel assemblies incorporating mining and industrial socket outlets up to 400A rating.