BLAKLEY ELECTRICS

CASE STUDY
DATA SHEET

Temporary Supplies for Electric Plant and Vehicle Charging

As major construction companies begin to grapple with the challenge of becoming carbon neutral, the adoption of electrically powered plant and on-site vehicles is going to be high on the wish list of many. As with electric cars, a long battery range and fast charging will be essential ingredients if the transition from diesel to electric is to be successful. In tunnelling, the move to electric power has further benefits, as it also removes all concerns associated with fumes and other hazards associated with operating diesel engines underground.

On one of the UK's current tunnel projects the decision has been made to adopt Multi Service Vehicles (MSVs) to move all people and materials (including concrete tunnel segments) to the workface by a fleet of electrically powered MSVs. These vehicles will be in high demand, particularly when the site is operating 24/7. These large vehicles incorporate on-board charging, which requires a 400V three-phase supply rated at 90A. The on-board charging equipment is supplied via a Marechal plug, which has 5 main pins (3P+N+E) and 4 auxiliary pins. Two of the auxiliary pins are used to detect that a vehicle is connected to the socket, one of the pins is used for the pilot-earth loop (see below) and one pin is spare.

In order to protect the supply to each vehicle, the socket outlets are protected by MCCBs, each with MRCD series variable RCD protection. Each socket is also protected by an Earth Continuity Monitor (ECM), which helps to ensure that the vehicle is effectively earthed. This is achieved by monitoring an ELV pilot-earth loop from the socket to the vehicle. Each ECM controls a contactor within the distribution assembly. If the impedance of the pilot-earth loop circuit exceeds a pre-set figure the contactor cannot be closed. Similarly, if the impedance rises above the pre-set figure, the ECM will cause the contactor to drop out. The ECM also incorporates pilot core protection, which requires a diode to be incorporated in the vehicle. If there is a short-circuit in the pilot earth loop the ECM drops out the contactor, helping to ensure the station is always effectively earthed. The contactors are controlled by external ON / OFF switches, which means that doors or covers do not need to be opened for routine ON / OFF operation. Diode Reversal and ECM By-pass switches are also incorporated. The assembly incorporates a 4 way TP MCB pan assembly to meet local small power requirements.

The distribution assemblies are mounted within protective crash frames, which reduce the risk of physical damage in the harsh tunnel environment.

If you need to provide high powered supplies for on-board charging or to provide supplies for charging stations installed in harsh environments, please contact the Blakley team who will be pleased to assist.

A7085396 - 250A Assembly in Crash Frame. Fitted with 2 no. 90A Marechal Decontactor Sockets

Distribution Door Open Showing MCCBs, MRCDs and Switches for Diode Reversal and ECM By-pass

A7085396 - Doors open and Internal IPXXB Shield Plates Removed

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