

Tube Train Maintenance Depots

The London Underground Tube network is the oldest mass transit system in the world and carries in excess of 1.25 billion passengers per annum. The system is split into eleven lines and runs for 7 days a week with only a short period each night for track, station and train maintenance. To service and maintain the trains, each line has its own maintenance depot (or depots) where repairs, cleaning and routine maintenance all take place over night. In total there are 14 depots and the equipment they require presents a variety of challenges for manufacturers and installation designers.

The environment within depots is very harsh (with indoor and outdoor locations, washdown areas, etc.) and electrical supplies to users of portable tools and specialist plant must be protected to the highest standard. In addition, equipment must be durable and supplies resilient, to ensure disruption is minimised and work is completed on time. Blakley Electrics have designed specialist assemblies for installation in LUL maintenance depots for many years. Whilst assemblies change in detail to meet the requirements of different locations, there are a number of common themes that influence the basic design of equipment for depots.

London Underground's safety policy dictates the widespread use of 110 volts to power maintenance equipment. The restricted space in the pits prevents the installation of local transformers, which results in long circuits from transformers to the pit sockets. These long runs create a number of issues. Firstly, to overcome volts drop, the pit sockets have to be capable of looping-in and out over sized cables. This can result in the need to terminate 16mm² or 35mm² cables (in and out) in a socket rated at only 16A. Secondly, if the specification requires multiple sockets on a circuit to be fed at full load, simultaneously, the supply protection will exceed the socket rating, necessitating an MCB to be fitted into each socket. Thirdly, in order to achieve disconnection times, there is a need to incorporate RCD protection in the Transformer Distribution Cubicles, which supply the 110V power to the socket circuits. In order to ensure a fault on one tool or machine does not trip the supply RCD in the transformer, individual sockets need to incorporate RCD protection to discriminate with the RCDs installed in the transformers (the RCDs in the transformers need to be Selective type with time delay).

In addition to the electrical design, there are also mechanical design requirements. Assemblies need to have a high IP rating (IP55) and enclosures for wet areas need to be made from stainless steel. Unlike equipment installed in Underground Stations, the use of moulded sockets is permissible, which makes it possible to meet higher IP ratings. Overleaf are drawings and images of typical assemblies for depots.



Maintenance Depot with Elevated Rails



16A Socket in Stainless Steel Enclosure



Serviced Tube Trains

Transformer Distribution Cubicles and SMB series Socket Assemblies for London Underground Maintenance Depots

SMBR series Socket Assemblies

Enclosure

Surface mounting providing protection to IP55. Can be made from mild steel with a painted finish or from stainless steel with a natural finish.

Terminations

Fitted with loop-in and loop-out terminals capable of terminating 16mm² or 35mm² conductors

Socket Outlet

Fitted with a 16A or 32A, 2P+E, 110V, IP67 socket to BS EN 60309-2. Also available with multiple sockets and 230V sockets.

Protection

Fitted with a DP 30mA RCCB only, when circuit is protected by an MCB of the same rating as the socket (16A MCB feeding a circuit of 16A sockets or 32A MCB feeding a circuit of 32A sockets).

When the circuit protection at the source exceeds the socket rating, an RCBO is incorporated in the socket, which provides double-pole overcurrent protection and 30mA RCD protection.

All of the residual current devices we incorporate into SMBR assemblies have test circuits suitable for operation on a 110V RLV supply.

Type References, mild steel, 16mm² loop-in / out terminals

SMBR/LL16/S1-16/IP55, 16A 110V socket, RCCB protection only

SMBR/LL16/OC/S1-16/IP55, 16A 110V socket, RCBO protection

SMBR/LL16/S1-32/IP55, 32A 110V socket, RCCB protection only

SMBR/LL16/OC/S1-32/IP55, 32A 110V socket, RCBO protection

Type References, stainless steel, 16mm² loop-in / out terminals

SMBR/SS/LL16/S1-16/IP55, 16A 110V socket, RCCB protection only

SMBR/SS/LL16/OC/S1-16/IP55, 16A 110V socket, RCBO protection

SMBR/SS/LL16/S1-32/IP55, 32A 110V socket, RCCB protection only

SMBR/SS/LL16/OC/S1-32/IP55, 32A 110V socket, RCBO protection

Transformer Distribution Cubicles (TDCR)

TDCRs combine a double-wound transformer and a double-pole MCB / RCD distribution arrangement housed in a robust floor standing enclosure providing protection to IP55. Cable entry and exit is through the top of the enclosure.

Transformer are typically rated at 6 kVA with dual secondary 55V windings and they utilise Class F insulation materials. The transformers provide a Reduced Low Voltage (RLV) supply in accordance with BS7671.

TDCRs can be fitted with RCD protection for individual outgoing circuits (DP RCBO, MCB + RCCB or MCB + Selective RCCB) or MCBs can be group protected by RCCBs (Selective or instantaneous).

A range of enclosure sizes is available, which can incorporate up to 24 no. double pole devices (any combination of MCB, RCCB or RCBO). TDCRs are generally made to order and we would be pleased to quote project specific type references, etc., at the time of enquiry.

If you have a requirement for equipment within a London Underground or mainline Rail Depot, please contact the Blakley Project Team who will be pleased to be of assistance.



16A SMBR in painted enclosure



32A SMBR in stainless steel enclosure



16A SMBR in stainless steel enclosure



TDCR with a Selective RCCB per MCB