

## 110V Reduced Low Voltage Transformers, Distribution and Socket Solutions for Permanent London Underground (LUL) Installations

Blakley Electrics manufactures a series of assemblies that when used together can provide a compliant 110V Reduced Low Voltage (RLV) transformer, distribution and socket outlet solution that is London Underground (LUL) APR approved.

### LUL APR Approved 110V RLV Equipment

The 110V RLV solution packages together our LUL APR approved Transformer Distribution Cubicles and 110V socket outlet assemblies. The configuration of these assemblies has been designed in conjunction with London Underground to meet their various requirements. The protective devices fitted in both assemblies have been carefully selected to ensure discrimination between each other and to provide compliance with all relevant standards. There is also the added benefit that by using the Blakley '110V Cable Calc Tool' and a suitable cable calculation software package, the installation of the 110V RLV equipment can be designed to be fully compliant with BS7671:2008 (17th Edition of IET Wiring Regulations).

### RLV Products in Detail

#### TDC and TDCR series - LUL APR 2071

Transformer Distribution Cubicles (TDCs) are composite assemblies comprising of a 125A double-pole incoming isolator feeding a 6kVA, 240V to 110V step-down, double-wound transformer with 6, 9 or 12 way outgoing double-pole MCBs. TDCRs incorporate RCCB / MCB or RCBO protected outgoing ways.



#### LV9 and LV9R series – LUL APR 1935

LV9 and LV9R assemblies are 16A or 32A, 110V, 2P+E socket outlets incorporating an integral double-pole MCB (LV9) or RCBO (LV9R). They are available in surface or flush mounting configurations with a range of finishes.

#### RCD Protection at 110V

TDCR and LV9R assemblies incorporate RCD protection in the form of either an RCCB or an RCBO. These assemblies are intended for installations with a high earth fault loop impedance ( $Z_s$ ), where RCD protection is needed to achieve the 5 second disconnection time required for 110V RLV systems. To provide the optimum solution for different installation types (see over the page), RCD protection within TDCRs can be 30mA Instantaneous or 300mA Selective, whilst RCBOs within LV9R sockets are 30mA Instantaneous.



#### RCD Discrimination

To ensure discrimination with the 30mA RCBOs fitted in LV9R socket outlet assemblies, distribution MCBs within TDCRs are fed from one or more Selective 300mA RCD.

#### RCD Protection and 110V RLV Systems

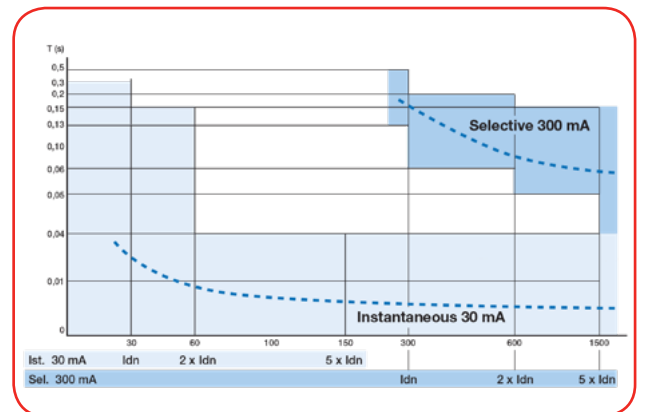
The RCCBs and RCBOs fitted within TDCR and LV9R assemblies are suitable for use on 110V RLV systems with 55V to earth and are compliant with the 2015 amendments to BS EN 61008 and BS EN 61009. The 2015 amendments require that only dedicated 110V versions of RCCBs and RCBOs are used on 110V systems. Due to these amendments the test circuit of standard RCCBs and RCBOs rated for use at 230V will FAIL TO OPERATE if used on 110V systems.

#### Use of Double-Pole RCBOs on 110V Systems

On 110V systems with 55V to earth, both legs are live conductors (L1 & L2), therefore both legs MUST be protected against short-circuit and overcurrent. The RCBOs fitted within our TDCR and LV9R assemblies are double-pole devices and include short-circuit and overcurrent protection in each pole. Standard 1P+N and DPN RCBOs only provide short-circuit and overcurrent protection in one pole with the second pole a basic switch intended to disconnect a neutral. Only true double-pole RCBOs are suitable for RLV applications.

#### LV9 / LV9R Material Compliance

The majority of LV9 and LV9R socket assemblies are located in platform or concourse (public) locations, where material compliance is particularly important. The Blakley Electrics LV9 / LV9R assemblies are fully compliant with LU Fire and Safety Standard 1-085 due to the incorporation of less than 100g of non-compliant materials. The compliance of our LV9R assemblies is due solely to the incorporation of a DP 110V RCBO. Please note: alternative arrangements such as DP MCB and RCCB combinations or an MCB with Vigi RCD both exceed the 100g non-compliant materials limit of LU Standard 1-085 and are therefore NOT suitable for use in public locations.



## THE POWER PROFESSIONALS

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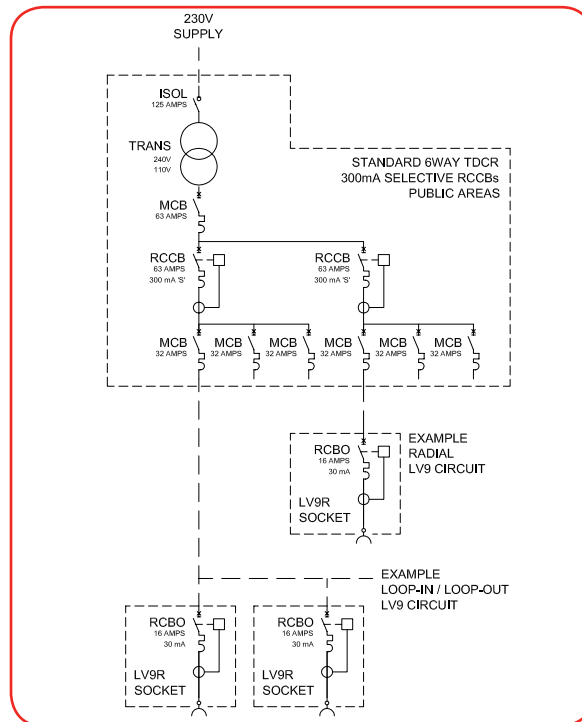
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## RCD Configurations in Public Areas

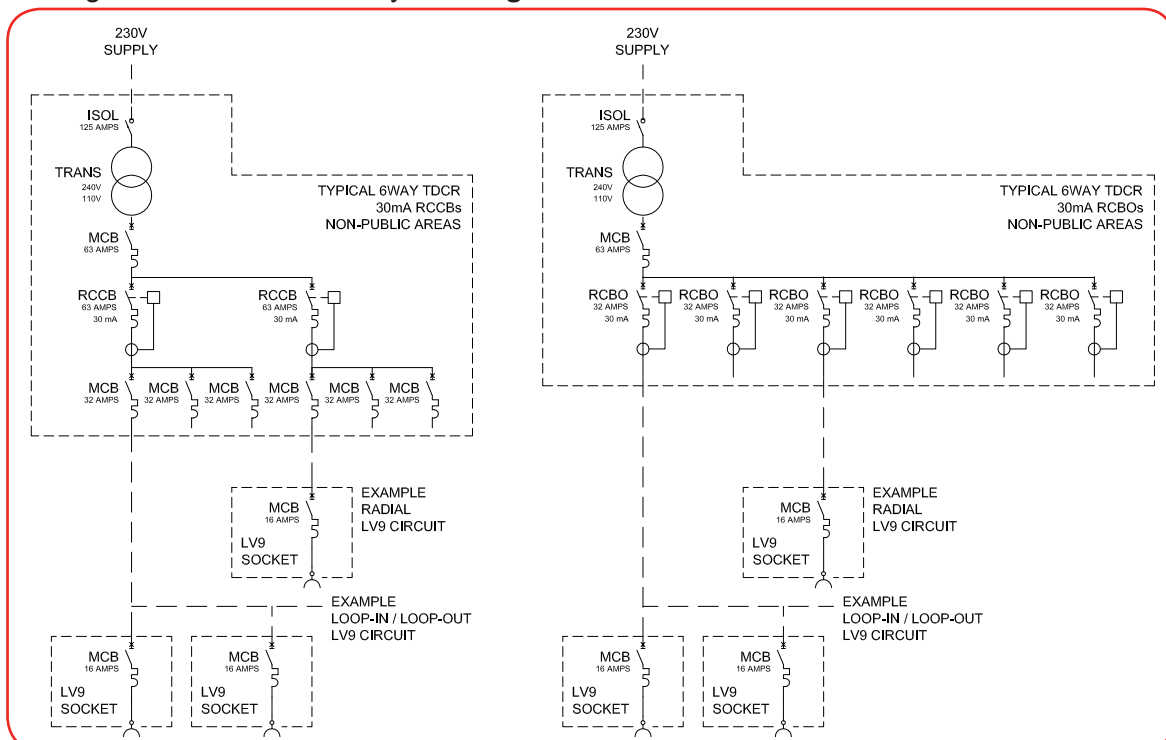
110V sockets in public areas are typically fed from transformers located in remote switch rooms, which are only accessible to authorised persons. For this reason socket assemblies in public locations should generally be LV9Rs with integral 30mA RCBO protection, fed from TDCR assemblies fitted with 300mA Selective RCCBs. This combination ensures that any long cable runs between the TDCR and LV9R are suitably protected by Selective RCD and that any damaged or faulty appliances fed from the sockets will only trip the 30mA RCBOs within the LV9Rs, which can be reset locally by trained operators. See **Fig 1** for further details.



**Fig 1**  
Single line diagram only,  
all devices are double-pole.

## RCD Arrangements in Non-Public Areas

110V sockets in Non-Public areas are typically fed from transformers that are either positioned locally or are relatively easy to access. For this reason, in non-public locations, LV9 sockets with MCB protection are generally the standard, fed from TDCR assemblies that incorporate 30mA RCCBs or 30mA RCBOs. This ensures that the cabling between the TDCR and LV9 is suitably protected but it does mean that RCDs will require resetting at the TDCR assembly. See **Fig 2** for further details.



**Fig 2**  
Single line diagram only,  
all devices are double-pole.