

1. RCD Test Resistors

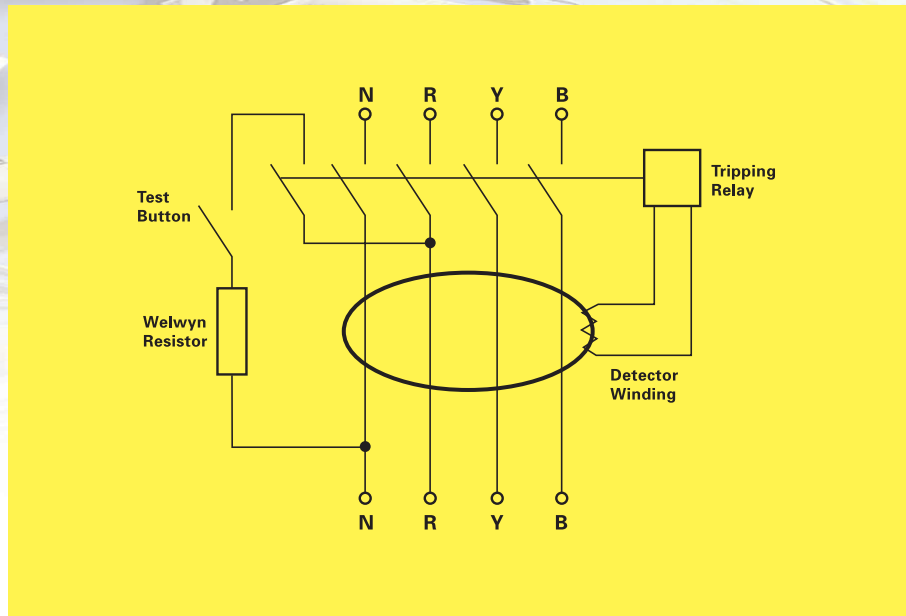
One specialist application for protection resistors is in RCD (Residual Current Device) or GFD (Ground Fault Detector) protection circuits, where these resistors form part of the test circuit as shown in the diagram.

In normal operation, if the RCD detects a current imbalance it will trip a relay causing an open circuit. The purpose of the test circuit is to create this imbalance and cause the relay to operate.

The resistor performs two functions in the test circuit; firstly it creates the load to produce the current imbalance. Secondly the resistor must withstand the initial current, to allow the relay to operate, but then if the relay fails to open the circuit after a given time the resistor must fuse safely.

Typically the relay will operate in 30 to 40 milliseconds. If it fails to do so the Welwyn resistor will fuse safely in 450ms to 2 seconds. The value of this resistor will depend upon the required characteristics of the circuit.

Pulse withstanding capability is typically 4000 volts with a 1.2/50-microsecond waveshape and the resistor can absorb up to 50 joules depending upon the value.



The resistor will fuse safely with 330 watts applied.

The MO-S series of metal oxide resistors has proved very effective in this application, due to their energy handling capabilities and overload withstand ability. Special versions of the MO-S series have also been produced, as detailed in the

example above, which incorporate fusing capabilities to provide fail safe protection. Other designs of RCD's have used Surface Mounted Chip (LR/CR series) resistors in parts of the control circuit.

These 'electronic' versions are usually found in industrial RCD's and in domestic units outside the United Kingdom.

Power Metal Oxide Film Resistors

MO-S Series

- Small size for power rating
- Can replace carbon composition in many pulse handling applications
- Flameproof protection



Electrical Data

		MO1/2S	MO1S	MO2S	MO3S	MO4S	MO5S
Power rating at 70°C	watts	0.5	1.0	2.0	3.0	4.0	5.0
Resistance range	ohms	10R - 50K		10R - 100K		10R - 10K	10R - 100K
Limiting element voltage	volts	250		350		500	
TCR	ppm/°C			350			
Isolation tolerance	volts	350		500		700	
Resistance tolerance	%			5, 10			
Standard values				E24 preferred			
Thermal impedance	°C/watt	140	110	80	60	44	35
Ambient temperature range	°C			-55 to +155			