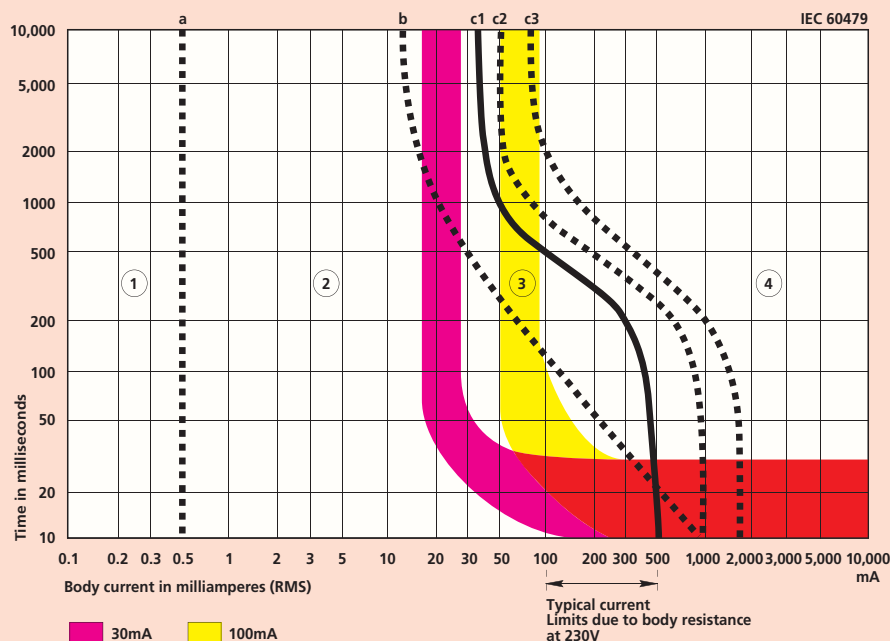


TIME/CURRENT ZONES OF EFFECT OF AC CURRENT (15–100Hz) ON PERSONS



Zone Physiological effects

- 1 Usually no reaction effects (no danger).
- 2 Usually no harmful physiological effects (usually no effects).
- 3 Usually no organic damage to be expected. Likelihood of muscular contraction and difficulty of breathing, reversible disturbances of formation and conduction of impulses in the heart, and transient cardiac arrest without ventricular fibrillation increases with current magnitude and time.
- 4 In addition to the effects of zone 3, probability of ventricular fibrillation increased up to 5% (Curve C2), up to 50% (Curve C3) and above 50% beyond Curve C3. Increasing with magnitude and time, pathophysiological effects such as cardiac arrest, breathing arrest and heavy burns may occur.

FAULT CURRENT SENSITIVITY

As the equipment is fed from the mains electrical supply, in the event of an earth fault the presence of semi-conductors may result in the normal ac waveform being replaced by a non-sinusoidal fault current. In some cases the waveform may be rectified or chopped. These waveforms are said to contain a pulsating dc component which can either partially desensitise or totally disable a standard Type AC RCD. International standards IEC 61008 (RCCBs) and IEC 61009 (RCBOs) divide RCDs into two performance classes:

Type AC

RCDs for which tripping is ensured for residual sinusoidal alternating currents, whether suddenly applied or slowly arising.

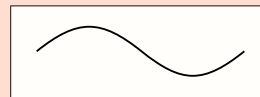
Type A

RCDs for which tripping is ensured for residual sinusoidal alternating currents and residual pulsating direct currents, whether suddenly applied or slowly arising.

To ensure the correct level of protection, check for the following symbols:

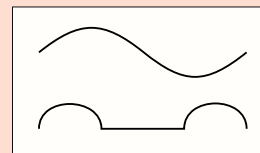
TYPE AC

normal ac sensitivity



TYPE A

pulsating dc sensitivity



Wylex RCDs are available as both Type AC and Type A devices.

Technical details for Type B RCDs available on request.

OPERATION

The RCD employs the current balance principle which involves the supply conductors to the load (phase and neutral) being wound onto a common transformer core to form the primary windings. Under healthy circuit conditions, the current in the phase conductor is equal to the current in the neutral, and the vector sum of the current is zero.

In the event of an earth fault, an amount of current will flow to earth, creating an out of balance situation in the transformer assembly. This out of balance is detected by the secondary winding of the transformer and at a pre-determined level of out of balance will activate the trip mechanism.

Single phase and neutral or three phase and neutral units (suitable for 3 or 4 wire systems) are available, the latter being suitable for balanced or unbalanced 3 phase loads.

The RCD trip mechanism will operate at a residual current of between 50–100% of its rating tripping current (sensitivity).

TRANSIENT EARTH LEAKAGE CURRENTS

All Wylex residual current devices incorporate a high level of immunity to tripping when subjected to transient earth leakage currents.

Such transients can occur when there is a significant level of capacitance to earth as can result from cable capacitance (particularly MICC) or RF filter networks. Wylex RCDs are therefore less susceptible to nuisance tripping due to transient earth leakage currents.

RESIDUAL TRIPPING CURRENTS

10mA-

Used in special applications where additional protection against contact is essential due to the nature of the installation.

30mA-

Tripping current designated by the IEE Wiring Regulations to provide additional protection.

100mA-

Suitable for use where protection is provided to guard against fire hazard, etc, rather than to provide additional protection to personnel, and where the earthing requirements need supplementing by RCD protection.

100mA time delay-

Suitable for use when total RCD protection is required to supplement the system earthing and where local 30mA RCDs are used to give additional protection. The time delay RCD will discriminate with the 30mA RCD.

300mA-

For use in large installations where plant and equipment protection are the main considerations and high levels of earth leakage are experienced.

If using RCDs in series, discrimination can only be achieved by using Type S devices in series with Types A or AC. See chart below.

BSEN61008-1:1995 RCBOs BSEN61009-1:1995

Type of RCD	Rated Residual Current (In) RCD to Trip between 50%-100% In	Tripping times				Scope
		1x In	2x In	5x In	500Amps	
Standard A & AC	Any Value, eg 10, 30, 100mA	300ms	150ms	40ms	40ms	Maximum-Trip
Time Delay (S)	Greater than 30mA, eg 100mA	500ms 130ms	200ms 60ms	150ms 50ms	150ms 40ms	Maximum-Trip Minimum-Non Trip