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Safeguarding Love Ones

CBs & RCD Socket-outlets

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Regarding love ones & enhancing reliability

How much would you invest in consumer products?



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How much would you invest in your dream home or renovating your house?



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How much would the electrical components in your house cost?



Safeguarding love ones & enhancing reliability

Safety at home

How much time and money do you spend to enhance insurance or hospitality plan/package to ensure your loves are fully protected?

How important is it to safeguard our life and our love ones at home?

How much you know about the electrical safety in your home and have you thought of how enhance it?

Regarding love ones & enhancing reliability

al practice

Is the current requirement for a 30mA RCCB adequate to protect your love ones at home?

Is there a need for additional protection?

regarding low voltages & enhancing reliability

60364

practical practice

5.3 Where a residual current protective device (RCD) is used for fault protection, the following conditions shall be fulfilled:

the disconnection time as required by 411.3.2.2 or 411.3.2.4, and

$$R_A \times I_{\Delta n} \leq 50 \text{ V}$$

where

R_A is the sum of the resistance in Ω of the earth electrode and the protective conductor for the exposed conductive-parts,

$I_{\Delta n}$ is the rated residual operating current of the RCD.

E 1 Fault protection is provided in this case also if the fault impedance is not negligible.

E 2 Where discrimination between RCDs is necessary see 535.3 of IEC 60364-5-53.

E 3 Where R_A is not known, it may be replaced by Z_S .

E 4 The disconnection times in accordance with Table 41.1 relate to prospective residual fault currents significantly higher than the rated residual operating current of the RCD (typically $5 I_{\Delta n}$).

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Effects of current on human beings and livestock

Table 1 – Total body impedances Z_T for a current path hand to hand a.c. 50/60 Hz, for large surface areas of contact in dry conditions

Table 2 – Total body impedances Z_T for a current path hand to hand a.c. 50/60 Hz, for large surface areas of contact in water-wet conditions

Table 3 – Total body impedances Z_T for a current path hand to hand a.c. 50/60 Hz, for large surface areas of contact in saltwater-wet conditions

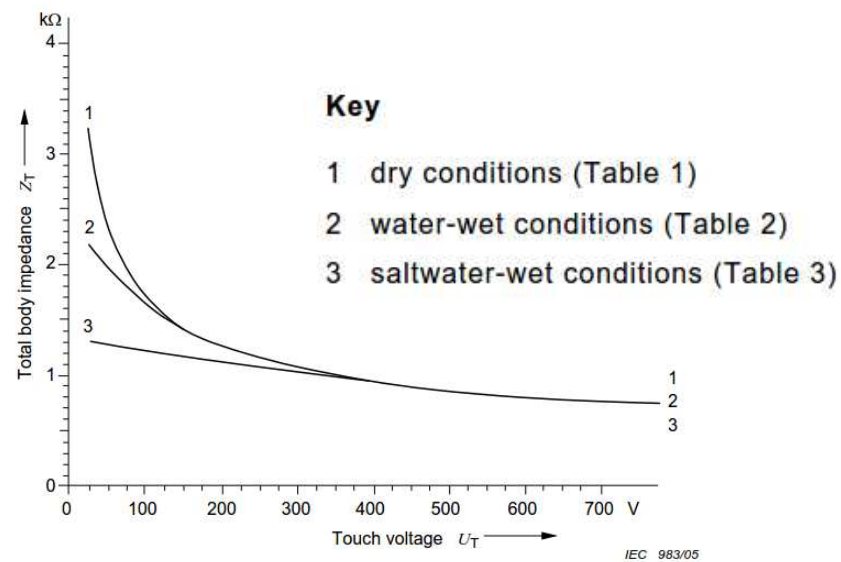
The values indicated in Tables 1 to 3 have been derived from measurements carried out on corpses and on living persons (adults, males and females) as described in Annex A.

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Effects of current on human beings and livestock

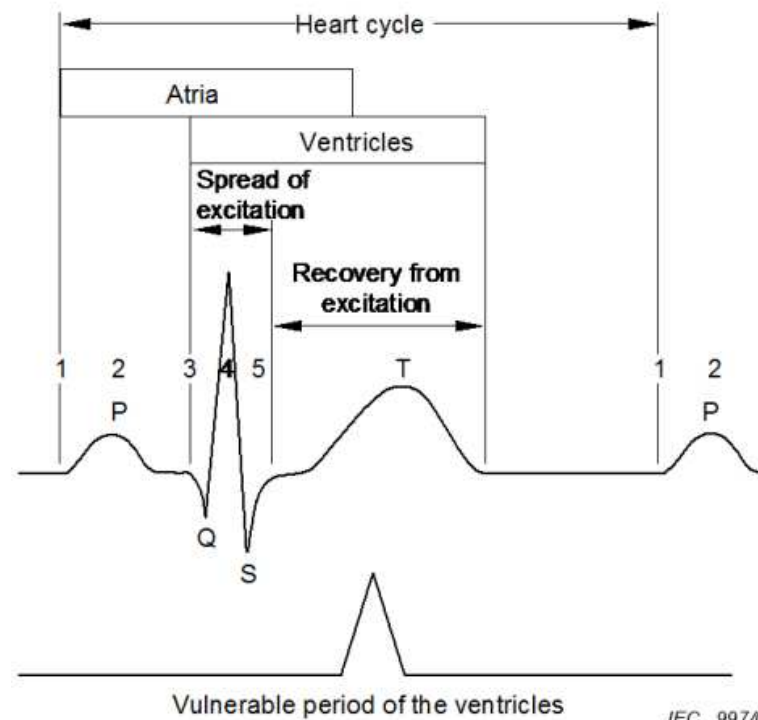
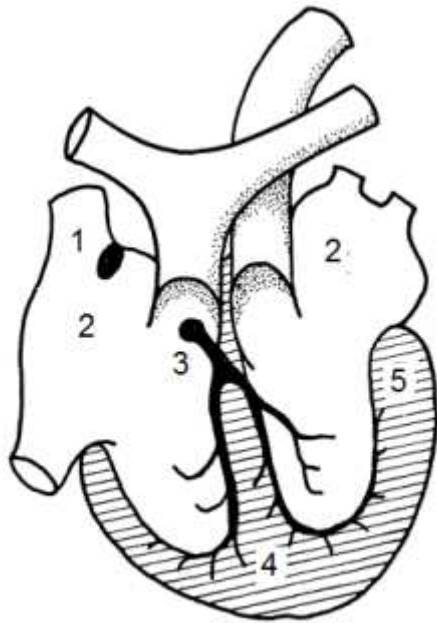
Figure 4 – Total body impedances Z_T (50 %) for a current path hand to hand, for large surface areas of contact in dry, water-wet and saltwater-wet conditions for a percentile rank of 50 % of the population for touch voltages $U_T = 25 \text{ V}$ to 700 V , a.c. 50/60 Hz



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urrence of the vulnerable period of ventricles during the cardiac cycle



IEC 997/05

NOTE The numbers designate the subsequent stages of propagation of the excitation.

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Effects on ECG & blood pressure

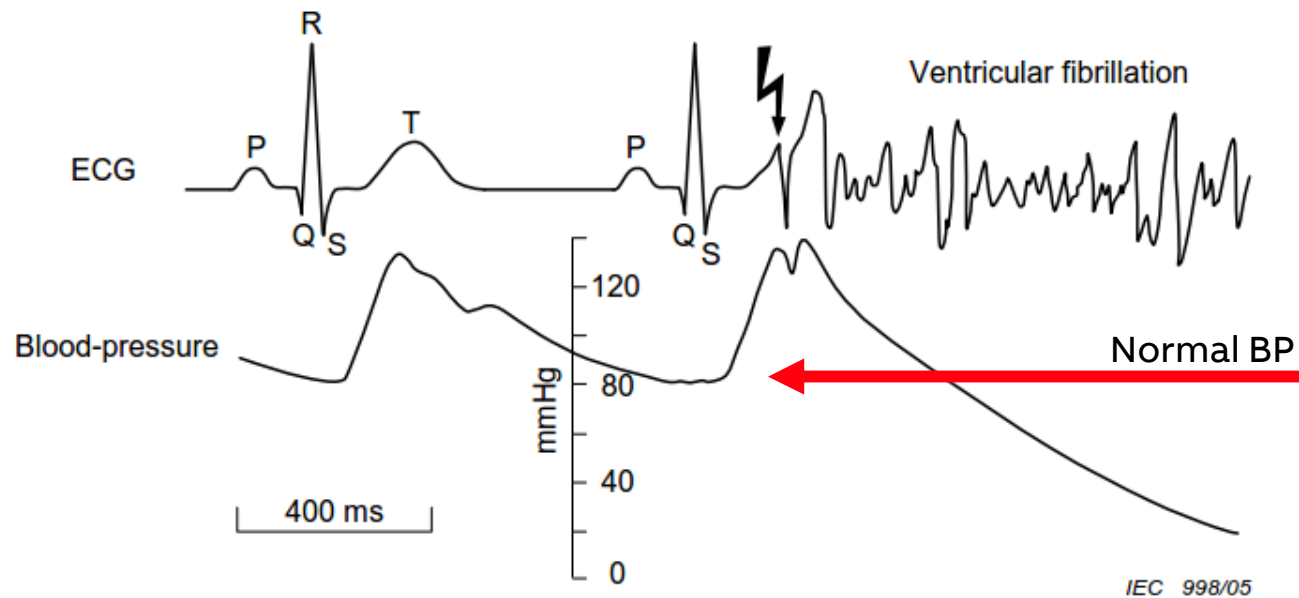


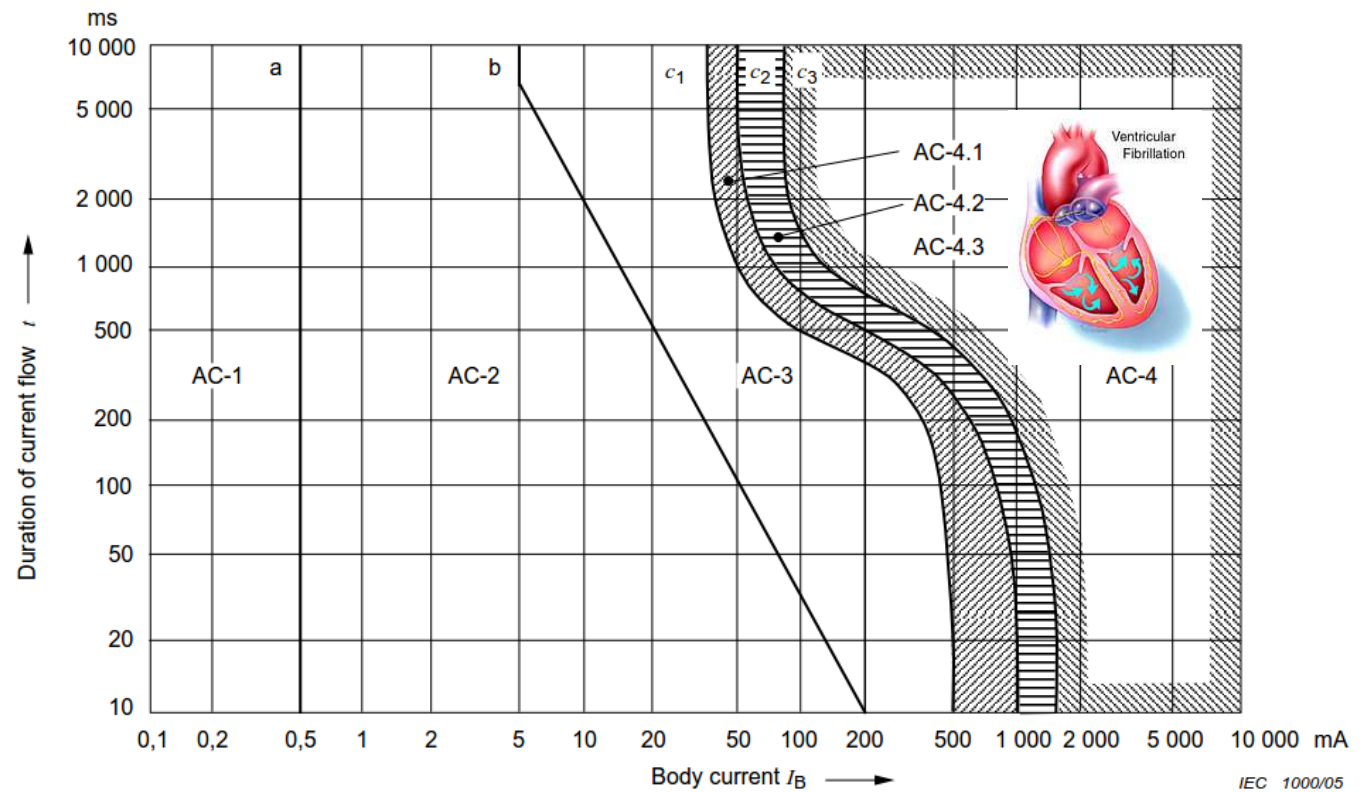
Figure 18 – Triggering of ventricular fibrillation in the vulnerable period – Effects on electro-cardiogram (ECG) and blood pressure

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Figure 20

Conventional time/current zones of effects of a.c. currents (15 to 100 Hz) on humans for a current path corresponding to hand to feet.



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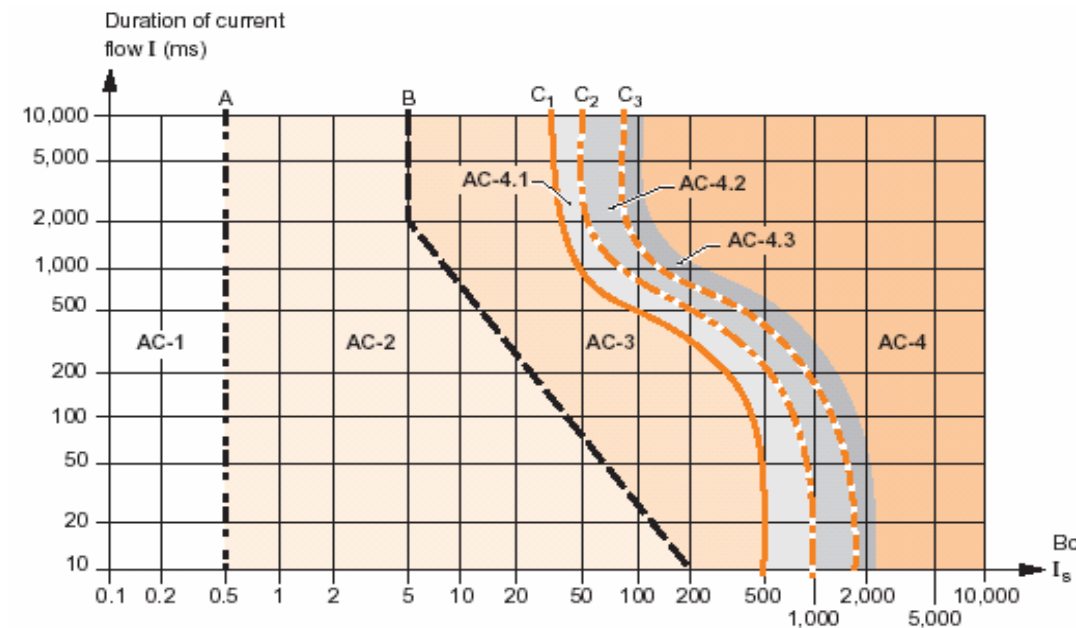
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Description of time/current zones

Figure 11 – Time/current zones for a.c. 15 Hz to 100 Hz for hand to feet pathway – Summary of zones of Figure 20

Zones	Boundaries	Physiological effects
AC-1	Up to 0,5 mA curve a	Perception possible but usually no 'startled' reaction
AC-2	0,5 mA up to curve b	Perception and involuntary muscular contractions likely but usually no harmful electrical physiological effects
AC-3	Curve b and above	Strong involuntary muscular contractions. Difficulty in breathing. Reversible disturbances of heart function. Immobilization may occur. Effects increasing with current magnitude. Usually no organic damage to be expected
AC-4	Above curve c_1	Patho-physiological effects may occur such as cardiac arrest, breathing arrest, and burns or other cellular damage. Probability of ventricular fibrillation increasing with current magnitude and time
	c_1 - c_2	AC-4.1 Probability of ventricular fibrillation increasing up to about 5 %
	c_2 - c_3	AC-4.2 Probability of ventricular fibrillation up to about 50 %
	Beyond curve c_3	AC-4.3 Probability of ventricular fibrillation above 50 %

For durations of current flow below 200 ms, ventricular fibrillation is only initiated within the vulnerable period if the relevant thresholds are surpassed. As regards ventricular fibrillation, this figure relates to the effects of current which flows in the path left hand to feet. For other current paths, the heart current factor has to be considered.



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Threshold of let-go

is the maximum value of touch current at which a person holding electrodes can let go the electrodes

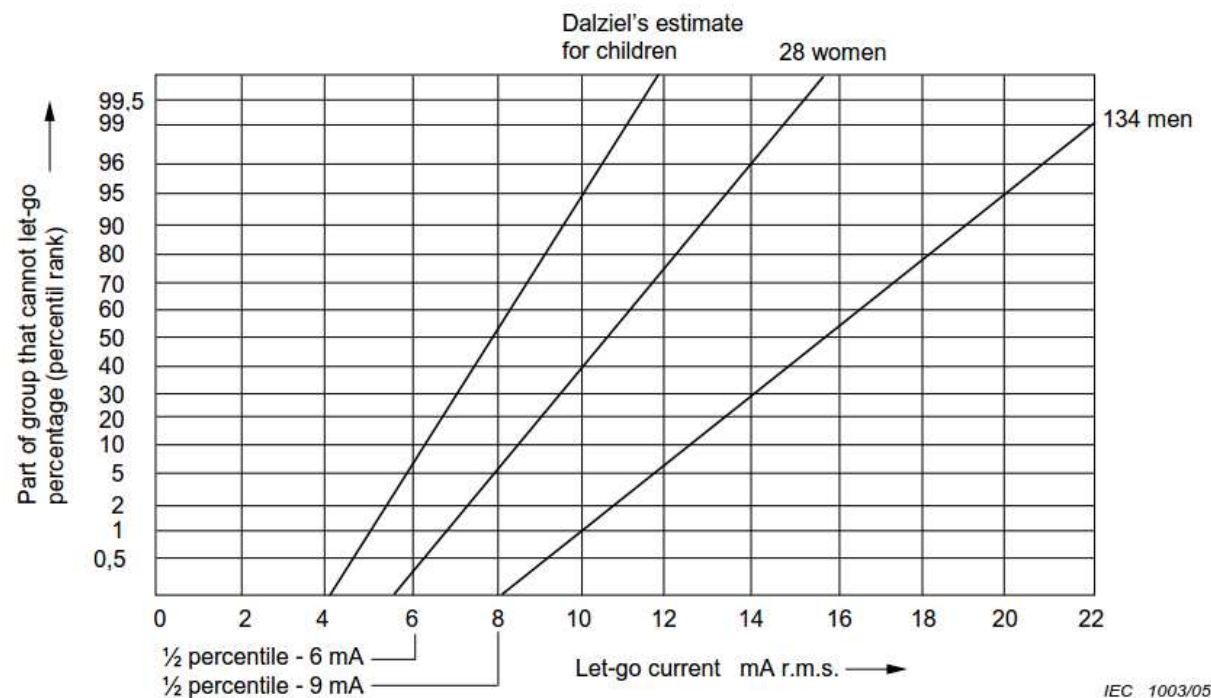


Figure 23 – Let-go currents for 60 Hz sinusoidal current

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60479-1 © IEC:2005

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entricular fibrillation is fatal because it denies blood flow which transports required oxygen. Electrical accidents that do not involve ventricular fibrillation can also be fatal. Other effects affect respiration and might prevent the person from shouting for help. These related mechanisms include functional disturbance of respiratory control, paralysis of respiratory muscles, damage to the neural activation pathways for these muscles, and damage to the respiratory control mechanism within the brainstem. These effects, if permanent, lead inevitably to death. If a person is to recover from a reversible respiratory effect, prompt artificial respiration is mandatory. Nonetheless, the person may still die. If current flows through critical parts such as the spinal cord or the respiratory control centre, death can occur. These effects are under consideration and thresholds are not yet defined.

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61008 & IEC61009

Operating current of RCDs

Individual operating current limits

Product Standard IEC 61008/9 require that RCDs must intervene in presence of a residual current within a defined current limit.

Individual operating current ($I_{\Delta n}$)

Value of residual current which causes the RCD to operate under specified conditions

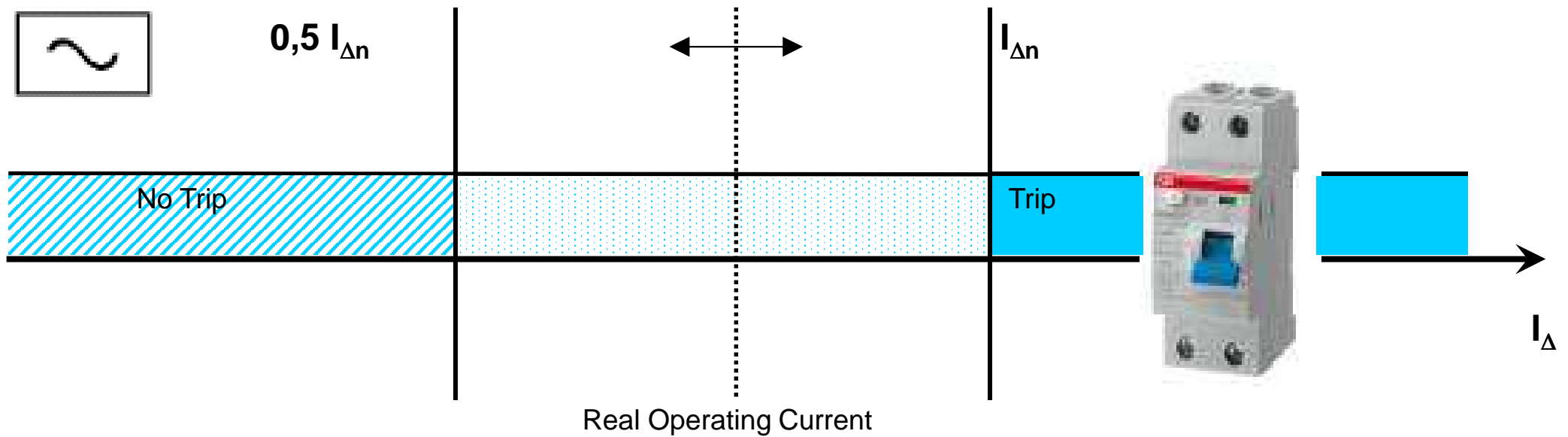
Individual non-operating current ($I_{\Delta n0}$)

Value of residual current ($=0.5 I_{\Delta n}$) at and below which the RCD doesn't operate under specified conditions

Regarding low ones & enhancing reliability

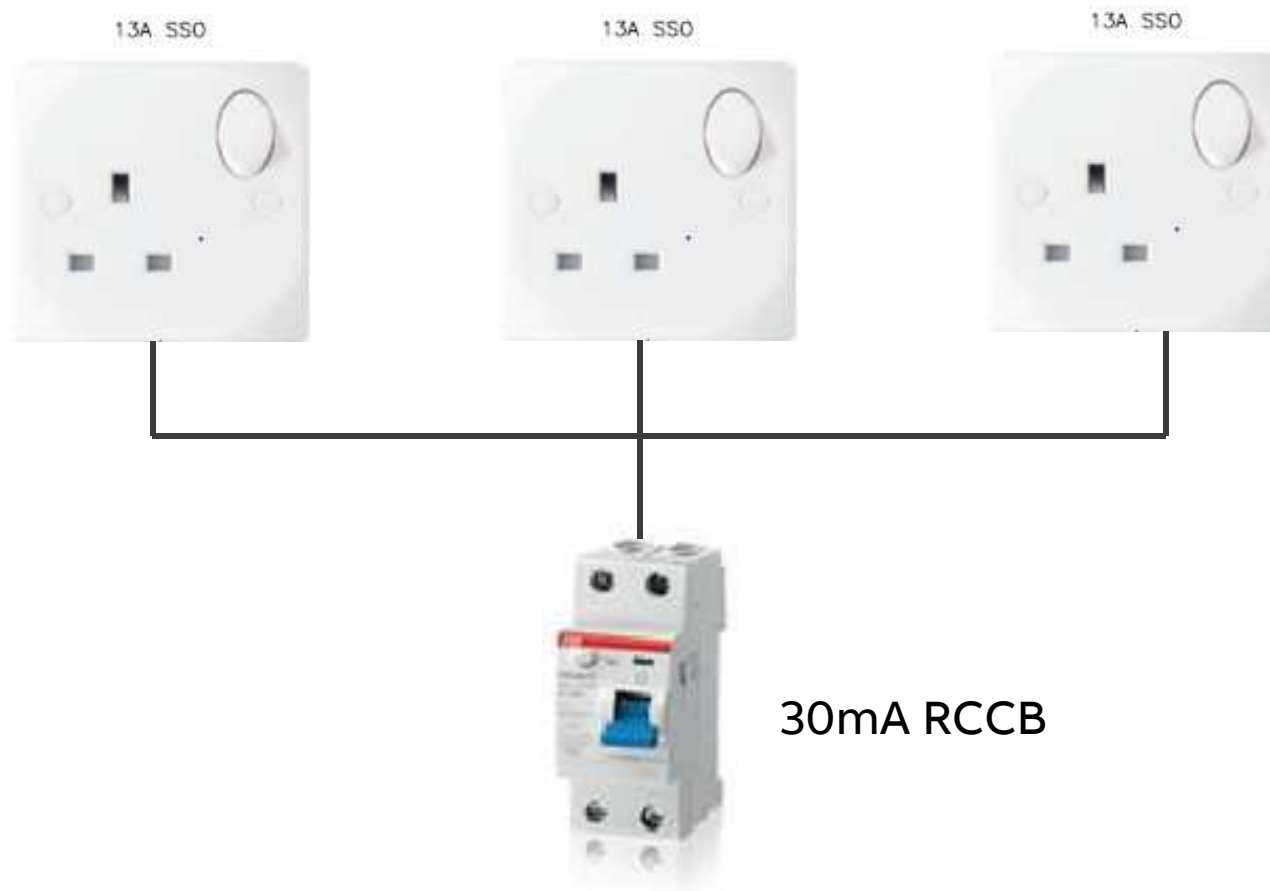
61008 & IEC61009

Operating current of RCDs



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Protection for Socket Outlet



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Protection for Socket Outlet

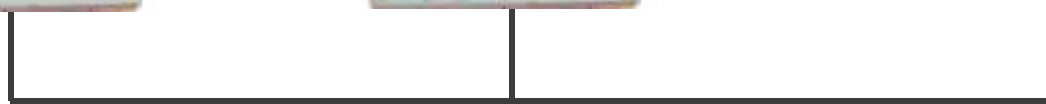
30mA SRCD
13A RCD SOCKET
30mA



30mA SRCD
13A RCD SOCKET
30mA



30mA SRCD
13A RCD SOCKET
30mA



30mA RCCB

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Protection for Socket Outlet

10mA SRCD



10mA SRCD



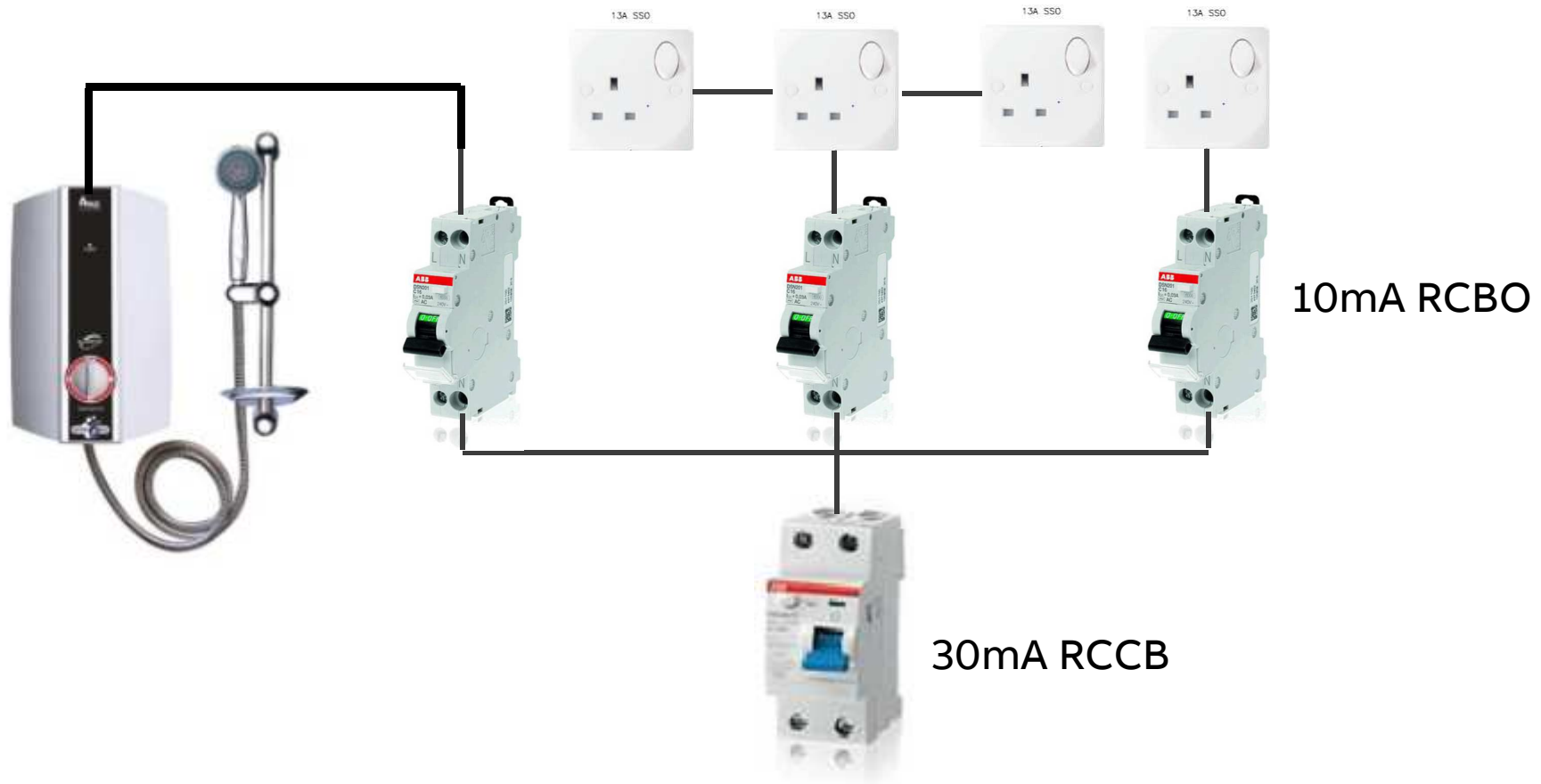
10mA SRCD



30mA RCCB

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Protection for Socket Outlet or home appliance



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lications at home



A RCCB 10mA RCBO



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Specific Applications

Hospitals

Activity Centers

Tool laboratory / workshop

Old Care centers

Folks home

Supports / Libraries / Community centers

(charging areas for mobile devices)



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A RCCB & RCBO



10mA RCCB
(36mm)



10mA RCBO
(18mm)



10mA RCBO
(36mm)

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A RCCB & RCBO



10mA RCCB
(36mm, VI)



10mA RCBO
(18mm, VD)



10mA RCBO
(36mm, VI)

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Socket Outlets

CRS113 / CRS112



CRS213 / CRS212



CRSM113 / CRSM 112



CRSM213 / CRSM212



Healthcare



Childcare



Agriculture /
veterinary



Residential



Commercial



Extra protection



Eldercare



Datacenter /
finance



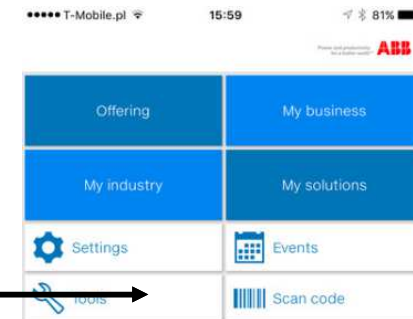
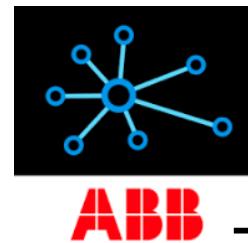
Discrimination

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Participating Counterfeiting – Non Compliant products



- Clear printed standard : IEC, SNI (for Indonesia)
- Laser printing. Not easy to duplicate
- Barcode. ABB connect (apps) to know its detail description and LSO contact



- Get from official distributor/partner



ABE