



The impact to electrical trades of the newly launched SS 638 and SS 650, formerly SS CP 5 and SS CP 88.

Synopsis:

Share to our members the implementation, salient changes and the impact to electrical trades.

Speaker:

Er. Lim Say Leong, who represents SETA in the Working Group for revision of SS CP5.

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Regulatory Framework Governing Electrical Safety

- CP 5, CP 88 Parts 1& 2 have been revised to align with the BS 7671 2015 (Amd 3 and IEC Standards) taking into consideration local environment conditions and practices
- In view of the revision, renaming and renumbering of these three Singapore Standards Codes of practice, amendment to the regulations has been made by EMA for legislation.
- Singapore Standard SS 638 Code of Practice for Electrical Installations
- Singapore Standard SS 650 Part 1 Code of Practice for Temporary Electrical Installations Part 1
 - Construction and building sites
- Singapore Standard SS 650 Part 2 Code of Practice for Temporary Electrical Installations Part 2
 - Festive lighting, trade fairs, mini fairs and exhibition sites
 - Regulatory Framework Governing
 - Electrical Safety

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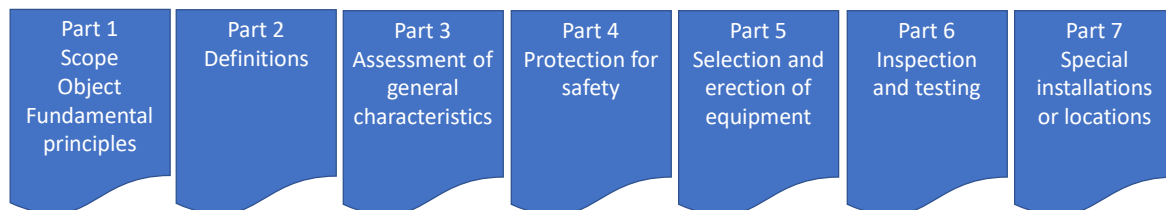
Development of SS in relation with BS 7671



Code of Practice or Electrical Installations in Singapore	UK IET Wiring Regulations
CP5:1997-First Publication	14 th IEE Wiring Regulations,1966
First Revision, CP5:1988	15 th IEE & establishment as BS 7671:1981
Second Revision, CP5: 1998	16 th IEE BS 7671:1991
Amendment No1, 2008*	17 th IET BS7671:2008 (in parts*)
Third Revision & Re-designated SS:638: 2018	17 th IET BS 7671:2008 Amendment 1,2011 Amendment 2, 2013 Amendment 3, 2015
Amendment No1, 2023?	18 th IET BS 7671: 2018

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Snapshot of the Standard, SS 638:2018



Modified adoption based on BS 7671 with consideration to local conditions, practices & regulations

4



When effective?



15 Nov 2019 to 14 Nov 2020
12 months of transition period

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Notable changes in numbering system

- No change in first three digits, naming of Parts, Chapters & Sections
- As per BS 7671 adopted the IEC decimal numbering system
 - flexibility to embody future changes & additions
e.g. 542.3L
- Dot separator with the implementation of ".200" sequence
 - SG(UK) only clauses e.g. 522.6.201
- *Clause numbering may not be running sequence*
e.g. 702.3 after 702.1 and 705.41 after 705.1L
- Letter ' L ' indicated amendments to suit local conditions

SS 638	SS CP5
Dot separator	Hyphenated separator
542.3L (Earthing conductor)	542-03L (Earthing conductor)
522.6.201 (Protection of cables)	522-06-05 (Protection of cables)

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Summary of the key changes

- **Part 1 Scope, Object & Fundamental Principles**
Updated & enhanced
- **Part 2 Definitions**
Based on IEC Vocabulary - Expanded & modified including some new symbols
- **Part 3 Assessment of General Characteristics**
 - Adds requirements for safety devices e.g. emergency lighting and fire protection
 - Chapter 36- Requires an assessment for each circuit for continuity of service

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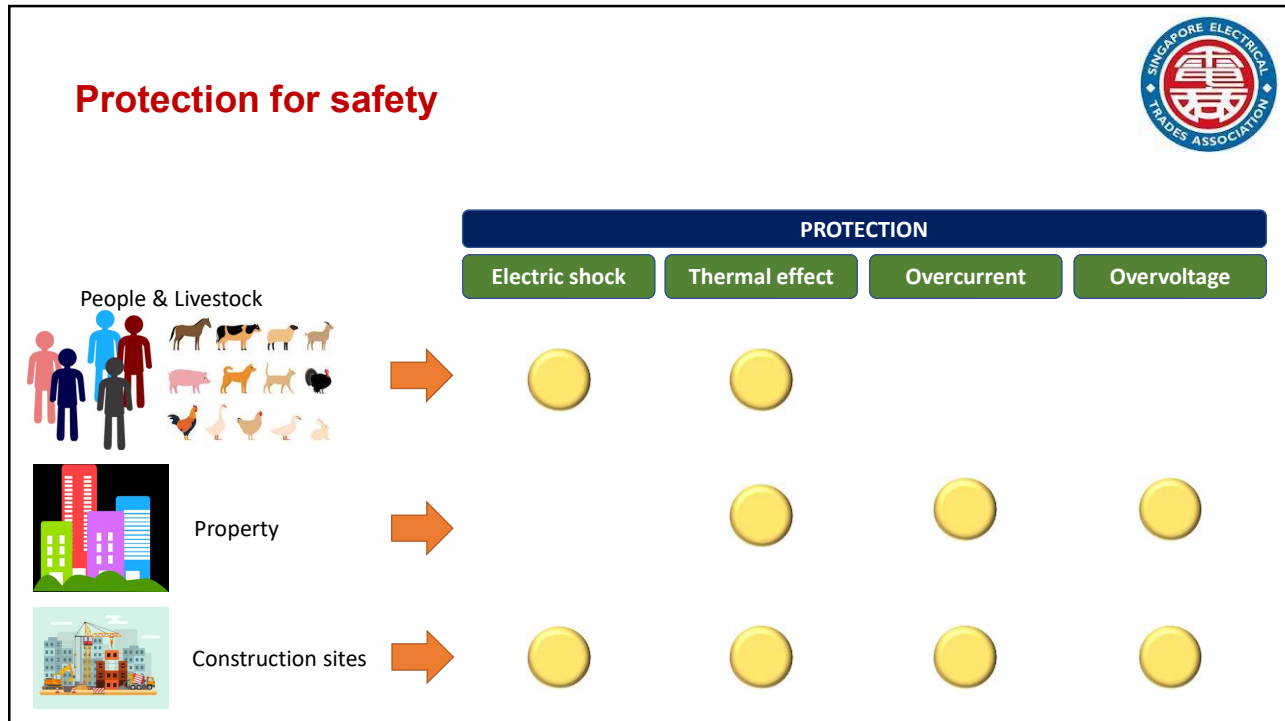


Protection for safety

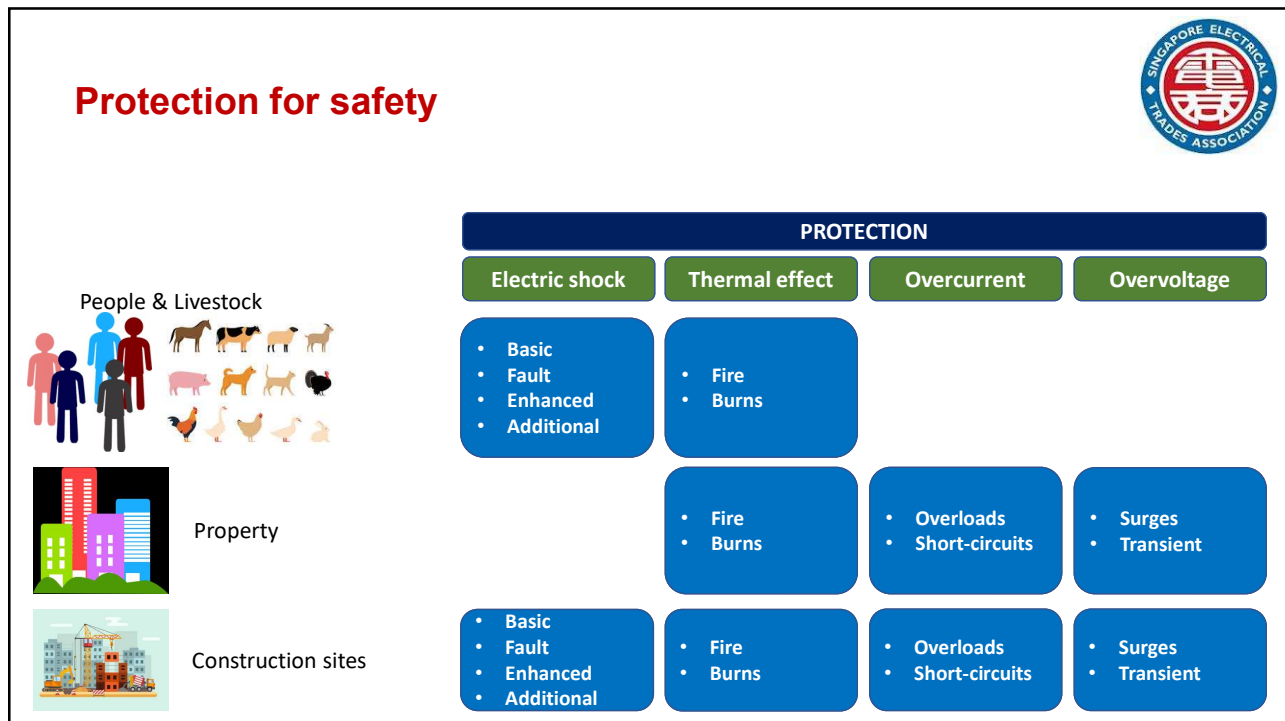
Part 4 – Protection for safety

- Part 4 – 41 Electric shock
- Part 4 – 42 Thermal effect
- Part 4 – 43 Overcurrent
- Part 4 – 44 Overvoltage – Refer to Clause 534 & Appendix 16 and SS 555


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Part 4 - PROTECTION FOR SAFETY

Chapter 41 – Protection against electric shock

- protection in use **without** a fault

basic protection

New

protection against direct contact
- protection **under fault** conditions

fault protection


New

SS 638

protection against indirect contact


SS CP 5

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Shock risk protection

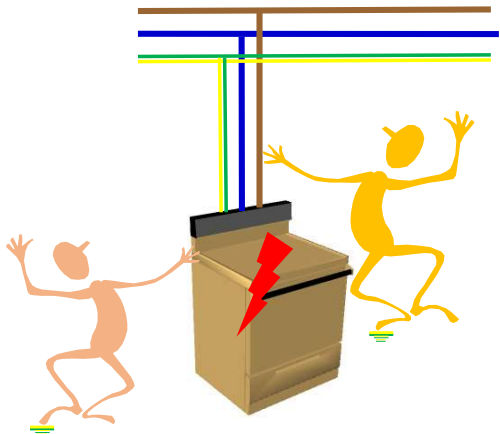
Two types of electric shock risk protection



Basic protection (direct contact)



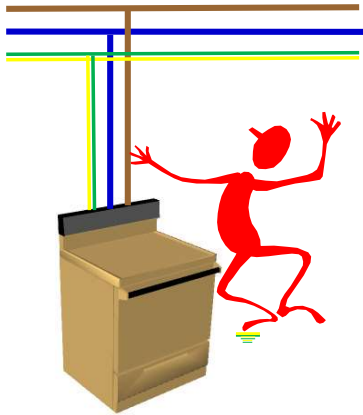
Fault protection (indirect contact)



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Current through human body



People and livestock are sensitive to current, and not to voltage.

The body resistance R_b is variable with the touch voltage. Average about 2000 ohms.

$$U_T = 230 \text{ V}$$

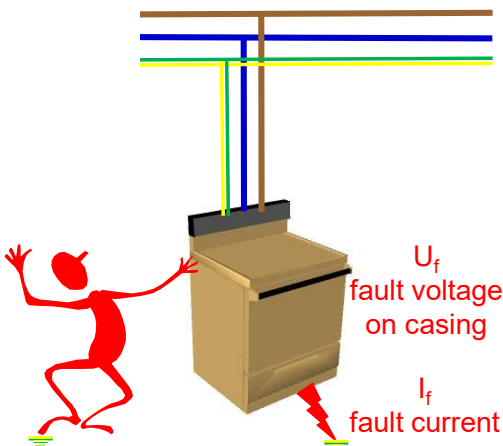
$$I_b = \frac{230 \text{ V}}{2000 \Omega} = 115 \text{ mA}$$

We need Basic Protection (direct contact)

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Current through human body



When an earth fault occurs, the earth fault current:

- will cause voltage to appear between exposed metal parts and earth
- may be of such magnitude and duration to cause excessive temperature rise in the conductors through which it flows thereby creating a fire hazard

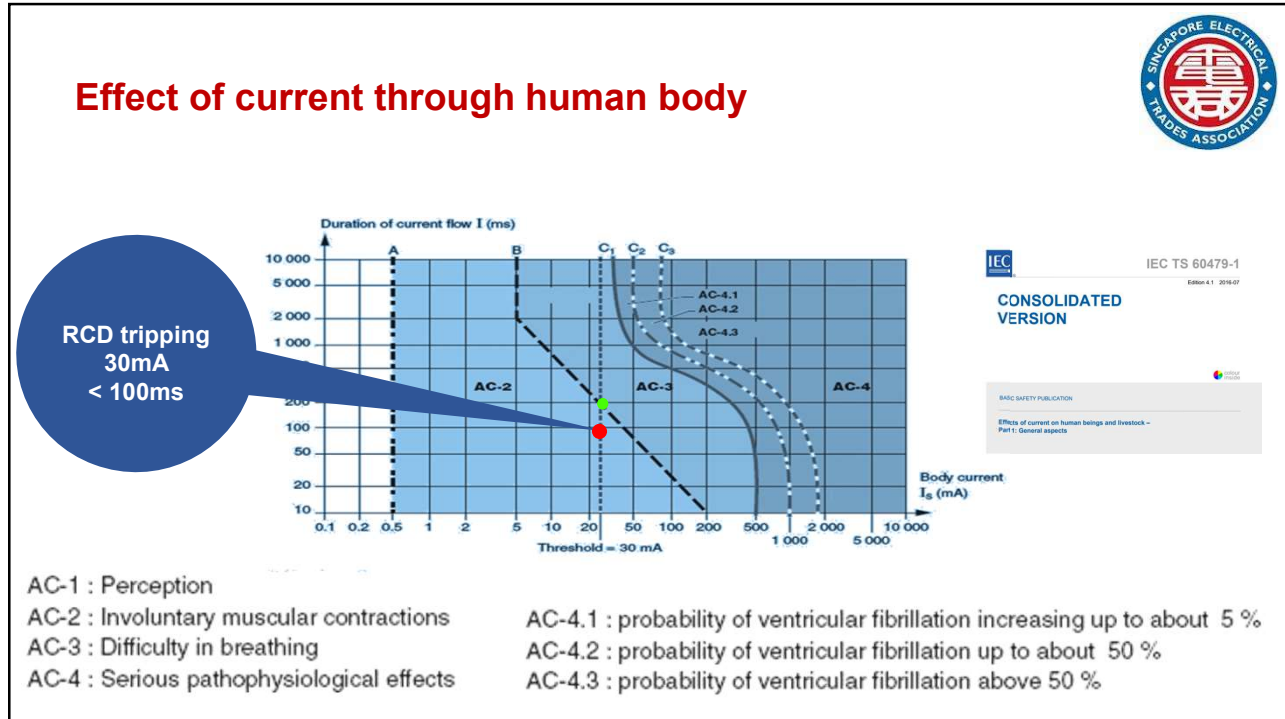
$$I_f = \frac{230}{10 + 10} = 11.5 \text{ A}$$

$$U_f = 11.5 \times 10 = 115 \text{ V}$$

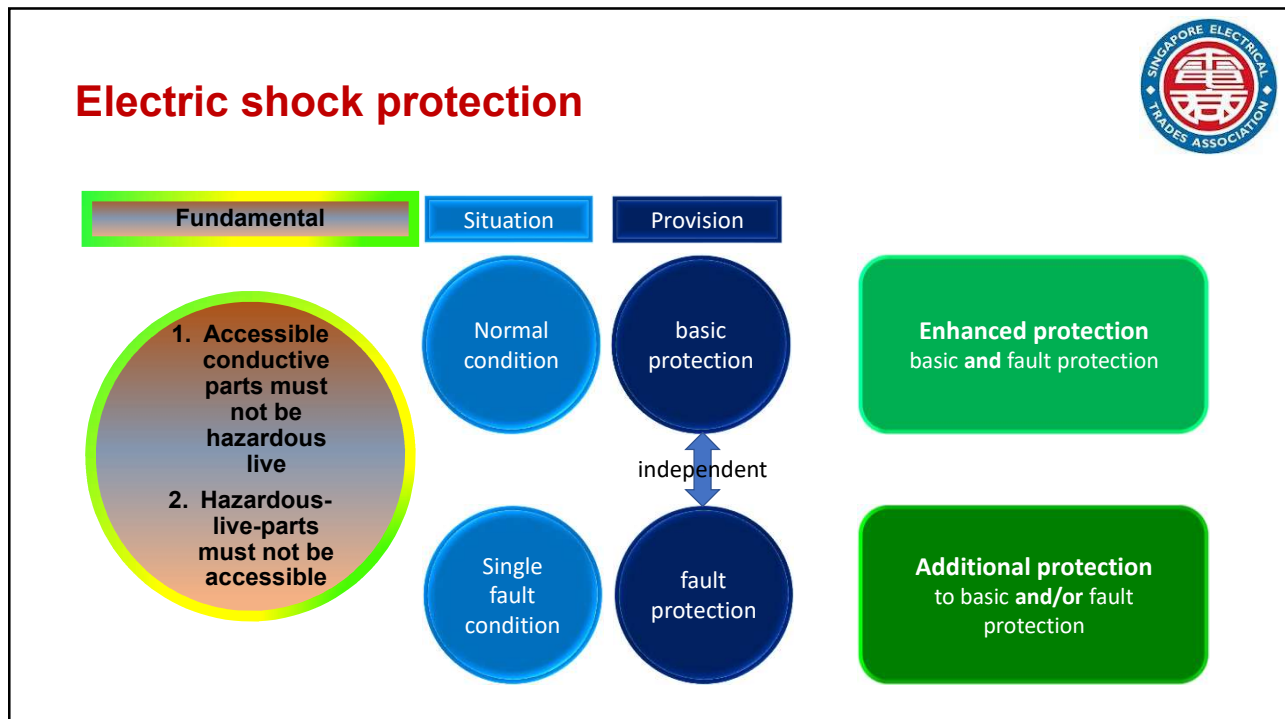
$$I_b = \frac{115 \text{ V}}{2000 \Omega} = 57.5 \text{ mA}$$

We need Fault Protection (indirect contact)

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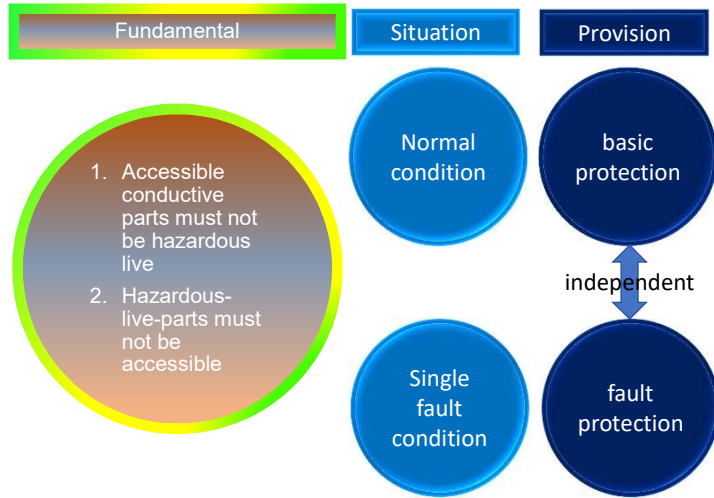
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Electric shock protection



Additional protective provision



Source: CHINT

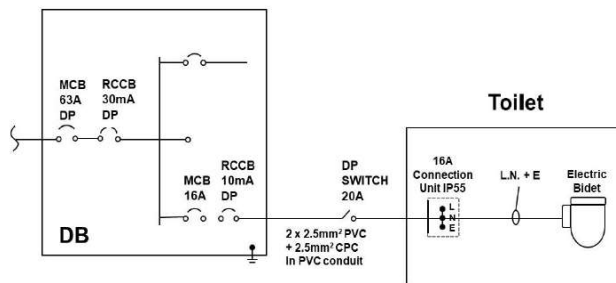
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Electric Bidets

Clause 701.55.2L

Final circuit for bidet must be protected by a 16 A MCB and RCCB of voltage independent type complying to SS 97 with 10 mA rated residual operating current at the DB.



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Part 4 - PROTECTION FOR SAFETY

Chapter 41 – Protection against electric shock

410L Introduction

This chapter deals with protection against electric shock as applied to electrical installations. It is based on IEC 61140, which is a basic safety standard that applies to the protection of persons and livestock. IEC 61140 is intended to give fundamental principles and requirements that are common to electrical installations and equipment or are necessary for their co-ordination.

The fundamental rule of protection against electric shock, according to IEC 61140, is that hazardous-live-parts shall not be accessible and accessible conductive parts shall not be hazardous-live, either in use without a fault or in single fault conditions.

According to 4.2 of IEC 61140, protection under normal conditions is provided by basic protective provisions and protection under single fault conditions is provided by fault protective provisions. Alternatively, protection against electric shock is provided by an enhanced protective provision which provides protection in use without a fault and under single fault conditions.

In SS CP 5, 1998:

- (i) protection in use without a fault (now designated basic protection) was referred to as protection against direct contact, and
- (ii) protection under fault conditions (now designated fault protection) was referred to as protection against indirect contact.

- **Fundamental is based on IEC 61140**, which applies to the protection of persons and livestock against electric shock
 - is that hazardous-live-parts should not be accessible; and
 - accessible conductive parts should not be hazardous-live, either in use without a fault or in single fault conditions.
- **Protection under normal conditions** is provided by basic protective provisions
- **Protection under single fault conditions** is provided by fault protective provisions
- Alternatively, protection against electric shock is provided by an **enhanced protective provision** which provides protection in use without a fault and under single fault conditions.

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Electric shock protection

Fault protection (formerly indirect contact)

Earth Fault loop impedance Z_s

$$U_o \leq Z_s \times I_a$$

$$\leq 50V$$

For SS 650

$$U_o \leq Z_s \times I_a$$

$$\leq 25V$$

I_a Magnetic tripping current of the MCB

U_o Nominal voltage to Earth

** If Z_s too high, RCD to be used.

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Protective measures and provisions

Basic provisions

- Basic insulation
- Barriers or enclosures
- Obstacles
- Placing out of arm's reach
- Limitation of voltage
 - Limitation of steady-state touch current and charge
 - Potential grading

Fault provisions

- Supplementary insulation
- Protective-equipotential bonding
 - Protective screening
- Automatic disconnection of supply
- Non-conductive environment
 - Potential grading

Enhanced provisions

- Reinforced insulation
- Protective separation
 - Limited-current source
 - Protective impedance device

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Additional protection

additional protection
protection against electric shock in addition to basic protection and/or fault protection



Source: CHINT

411.3.3L Additional protection

In a.c. systems, additional protection by means of an RCD in accordance with rated residual operating current not exceeding 30 mA in accordance with 415.1 shall be provided for:

- (i) socket-outlets with a rated current not exceeding 32 A that are for use by ordinary persons and are intended for general use, and
- (ii) portable equipment with a current rating not exceeding 32 A for use outdoors.

In addition, for domestic installations, all socket outlet and lighting circuits shall be protected by one or more RCD with rated residual operating current not exceeding 30 mA in accordance with 415.1.

An exception to (i) is permitted for socket-outlets serving fire alarms, battery chargers, public address and medical equipment or equipment with inherent high leakage current. For such applications, alternative method of protection shall be provided and the affected socket-outlets shall be labelled and clearly identified.

NOTE 1 – See also 314.1L(iv) and 531.2.4 concerning the avoidance of unwanted tripping.

NOTE 2 – The requirements of 411.3.3L do not apply to FELV systems according to 411.7 or reduced low voltage systems according to 411.8.

NOTE 3 – Socket-outlets not protected by RCD e.g. for fire alarms, battery chargers and medical equipment shall be labeled with words in white against a red background as shown.

CAUTION
SOCKET-OUTLET NOT PROTECTED BY RCD

NOTE 4 – Socket-outlet circuit used for electric vehicle charging shall comply with 1.7.6 of TR 25.

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Murphy Law – Let stay vigilant



Source: CHINT

Workmanship and materials

- All equipment must be periodically
 - Maintained
 - Inspected
 - Test

All above are not foolproof, and we cannot compromise on safety.....a device which can stay vigilant all the time must be installed.....RCD

Clause 514.12.2

This installation, or part of it, is protected by a device which automatically switches off the supply if an earth fault develops. Test quarterly by pressing the button marked 'T' or 'Test'. The device should switch off the supply and should then be switched on to restore the supply. If the device does not switch off the supply when the button is pressed, seek expert advice.

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Protection against thermal effects

- Protection against
 - **fire** (people, livestock and properties)
 - **burns** (people and livestock)
- Electrical equipment selected must not present **fire hazard** to adjacent materials
 - equipment must not generate arcs/sparks or concentration of heat
 - provide additional protection in location classified with risk of fire
 - consider conditions of evacuation
- Accessible parts of electrical equipment within arm's reach must not exceed permissible temperature limit to avoid **burns**
 - Selected equipment must have relevant information on maximum temperature in normal service

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Protection against overcurrent

• Protection against

- overload
- short-circuit

• Overloads

- **circuit conductors must be protected against thermal effects that is detrimental to insulation**
 - Maintaining the temperature within allowable limits under normal usage
 - Coordination between characteristics of protective devices and of insulation of conductors
 - Location of overload protective device
 - Omission of overload protective device
 - Protection of wiring systems in parallel

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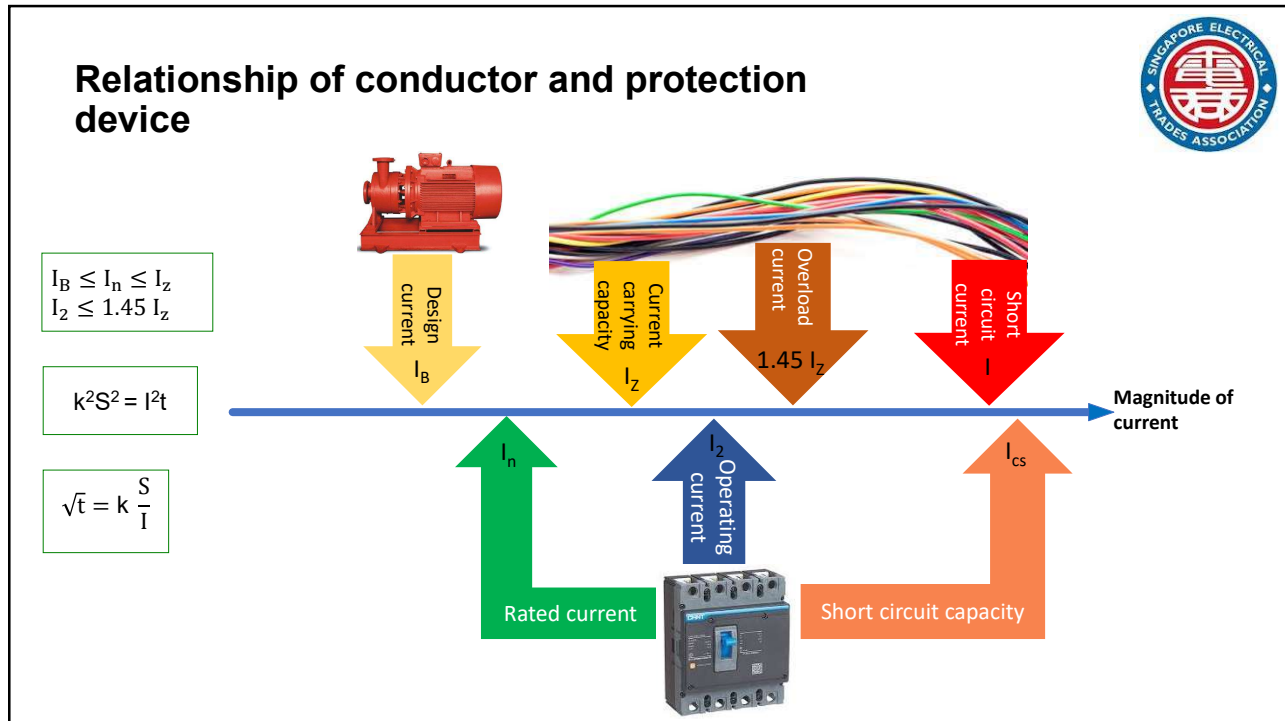


Protection against overcurrent

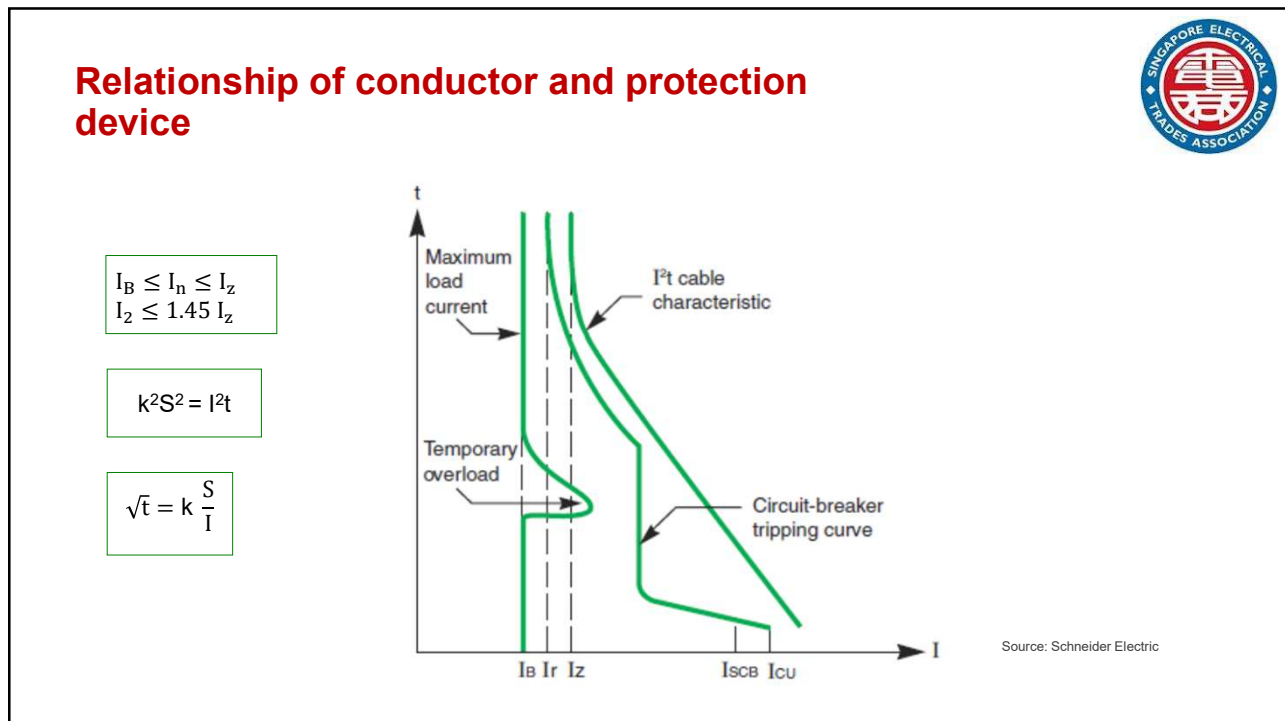
• Short-circuits

- **Circuit conductors must be protected against thermal and mechanical effects detrimental to insulation**
 - Maintaining the temperature within allowable limits under normal usage ($t \leq 5s$)
 - Coordination between characteristics of protective devices and of insulation of conductors
 - Location of short-circuit protective device
 - Omission of short-circuit protective device
 - Protection of wiring systems in parallel

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Protection against overvoltage and electromagnetic disturbances

- Protection against
 - temporary overvoltage
 - transient overvoltage
- Take measures against electromagnetic disturbances (eg. EMC)
- Electrical equipment must be selected with adequate voltage withstand to overvoltage

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Protection against overvoltage and electromagnetic disturbances

- As in SS 555
- Assess risk of overvoltage due to atmospheric origin and installation
 - Based on external influences
 - Based on risk assessment
 - Classification of impulse withstand voltages of equipment (Class I to IV)
- Mitigate influence of electromagnetic disturbances
- Reduction of emission of electromagnetic disturbances
- Erection of earthing and equipotential bonding
- Segregation of power cables from those used for transmitting signals

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Protection for safety



In brief, protection for safety covers

- Electric shock
- Thermal effect
- Overcurrent
- Overvoltage

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Chapter 41 Protection against electric shock



- The terms “protection against direct contact” becomes “**basic protection**” and “protection against indirect contact” becomes “**fault protection**”
- More stringent Addition protection by RCD for socket outlets up to 32 A- Note that certain exception allowed for specific labelled socket outlets (411.3.3L & 415.1.1L)
- Maximum earth fault loop impedances given in tables revised & updated.

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Chapter 42 Protection against thermal effects

- New Section 421 on “Protection against fire caused by electrical equipment”
- New Section 422 on “Precautions where particular risks of fire exist”.

Chapter 43 Protection against overcurrent

- Minor changes
- Included requirements of Chapter 47, Section 473 “Protection against overcurrent” of SS CP 5 : 1998.

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Overview of Key Changes in Part 5 Selection & Erection of Equipment

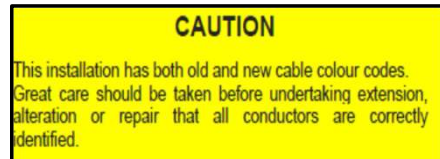
Chapter	SS 638	CP 5	What is new?
51	Common rules	Common rules	Updated
52	Selection & erection of wiring systems	Selection & erection of wiring systems	New requirements of concealed cables
53	Protection, isolation, switching, control & monitoring	Switchgear (For protection, isolation and switching)	Sections 476 & 537 of CP5 combined into 537
54	Earthing arrangements & protective conductors	Earthing arrangements & protective conductors	Section 607 of CP5 included here
55	Other equipment	Other equipment	New auxiliary circuits requirements in section 557
56	Safety services	Supplies for safety services	New clauses for emergency services

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Chapter 51 Common Rules

- Editorial update and
- Adding new clause **512.1.5L** *Compatibility*
Equipment & accessories operating temperature limit to 70 °C in normal services
- Adding new clause **512.1.6L** *Impulse withstand voltage*
Selection requirements as per SS 555
- Amendment on **514** *Identification & Notices – Table 51 for New colour codes*
- Standardise warning notices
Words in black against a yellow background in legible type not smaller than illustrations in **514.12.1L**



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Chapter 52 Selection and Erection of Wiring Systems

- Requirements for cables concealed in a wall or partition
 - New *Section 522.6L Impact (AG) including concealed wiring*
introducing new Clauses (522.6.202L) to align with Section 15 of Electricity (Electrical Installations) Regulations
- Updating 526 Electrical Connections
Inserting a note in **526.5L** as requested by SCDF to address fan coil fire cases
NOTE – Care shall be taken to prevent improper jointing of cables, for example, cables shall not be connected by twisting the core wires together manually and insulating the joints made with electrical tapes

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Chapter 53 Protection, Isolation, Switching, Control and Monitoring



- Adding new clause 532 Devices for protection against the risk of fire
 - Reduce the likelihood of fire risks associated with earth fault - the circuit shall be protected by RCD of rated residual operating current not exceeding 300mA

- Adding new Section 534 Devices for protection against overvoltage
 - Selection, erection and coordination of surge protection devices

- Adding new Section 536 Coordination of protective devices
 - Selectivity between overcurrent devices
 - Selectivity between RCDs

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Chapter 53 Protection, Isolation, Switching, Control and Monitoring



Changes & editorial update to Section 537 Isolation and Switching

- Combining former SS CP 5
 - Chapter 46, Section 476 "Isolation and switching" and
 - Chapter 53, Section 537 "Isolating and switching devices" into this new Section

- Adding new Table 53.4L Guidance on the selection of protective, isolation & switching devices
 - Guidance on Standard used, suitability usage of devices for Isolation, Emergency switching & Functional Switching, the details include 19 types of protective & isolation devices, e.g circuit breaker, RCD, plug & socket, switch fuse connection unit & device with semiconductors etc*

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Chapter 54 Earthing Arrangement & Protective Conductors

Changes & editorial update to Chapter 54

- Combining former SS CP 5, Chapter 54,
 - Section 541 General
 - Section 542 Earthing arrangement
 - Section 543 Protective conductor
 - Section 544 Earthing arrangements for protective purposes
 - Section 545 Earthing arrangements for functional purposes
 - Section 546 Earthing arrangements for combined protective & functional purposes
 - Section 547 Protection bonding conductors
 - Section 607 Earthing requirements for installation of equipment having high earth leakage currents

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Chapter 55 Other Equipment

- 551 Low voltage generating sets

551.1	Requirements to ensure safe connection of LV generating set including small scale embedded generators
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551.4.2	Protection by RCD in accordance with Chapter 41
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- 554 Current – using equipment

Adding new clause 554.1.8L requirements of water heaters under CPS Scheme

- 557 Auxiliary circuits

557	Covering AC or DC auxiliary circuits, power supplies, protection, functional safety, voltage and current transformer's
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Chapter 55 Other Equipment

559 Luminaires and lighting installations

559.3	General requirements for installations
559.4	Protection of surrounding against thermal effects
559.5	Wiring systems)
559.6 & 559.7	Controlgear & compensation capacitors
559.8	Protection against electrical shock for display stands for luminaires - SELV or PELV or 30mA RCD
559.9	Considerations given to stroboscopic effect
Table 55.3	Explanation of symbols used in controlgear for luminaires

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Chapter 56 Safety Services

- Introducing new requirements for emergency escape lighting and fire protection applications.

- Adding new Installations requirements for safety services

560.6 : Electrical sources for safety services

560.7 : Circuit of safety services &

560.8 : Wiring systems – to select the relevant code of practice appropriately for safety services that the circuit integrity will not be impaired during a fire.
(see Note1 of 560.81L)

SS 563-1 Emergency lighting

SS CP 10 Electrical Fire Alarm Systems

SS CP 52 Automatic Fire Sprinkler System

SS 546 Emergency voice communication system

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Common Cases of Non-Compliance in Electrical Installations

S/No	Situation posing immediate safety hazards or of serious nature	Non-compliance of CP 5	Non-compliance of SS 638
1	No provision of residual current circuit breaker (RCCB) of 30 mA sensitivity for domestic SSO / lighting circuits	1005 & 2403 (471-08-06L)	
	No provision of residual current circuit breaker (RCCB) for SSO in non-domestic electrical installation		
	No provision of residual current circuit breaker (RCCB) of 30 mA sensitivity for SSO and portable equipment for use outdoors with rated current not exceeding 32A		411.3.3L

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Common Cases of Non-Compliance in Electrical Installations

S/No	Situation posing immediate safety hazards or of serious nature	Non-compliance of CP 5	Non-compliance of SS 638
	Exception given to SSO not protected by RCD, e.g. fire alarm, battery chargers, public and medical equipment, these SSO shall be labeled with words in white against a red background		411.3.3L
2	Insulation resistance value less than 0.5 M Ω for low voltage circuit	2101 713-05 Table 71A	
	Insulation resistance value less than 1.0 M Ω for low voltage circuit		612 Table 61

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Common Cases of Non-Compliance in Electrical Installations

S/No	Situation posing immediate safety hazards or of serious nature	Non-compliance of CP 5	Non-compliance of SS 638
3	No metallic conduit or trunking for a non-sheathed insulated cable installed in wall or partition at a depth of less than 50mm from a surface	Electricity (Electrical Installations) Regulations, Part III, Section 15	522.6.202L
4	Additional point(s) sharing air-con or water heater final circuit or induction hob etc	2209 314-01-03	314.3
5	Non weatherproof electrical equipment installed in outdoor conditions	130-08-01	132.5.1 (SS 650 Part 1 & Part 2)

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Common Cases of Non-Compliance in Electrical Installations (new clauses)

S/No	Situation posing immediate safety hazards or of serious nature	Non-compliance of CP 5	Non-compliance of SS 638
6	Solar PV Power Supply System does not comply with SS638, examples 6.1 No provision of Type B RCD for Inverters 6.2 Fail the anti-islanding test 6.3 No provision of warning notice for dual supply		712L
7	Electrical installation does not comply with SS638 for locations containing Bath or Shower, examples 7.1 Erection of switchgear, controlgear and accessories installed in Zone 0 7.2 Socket outlets installed less than 3m away from boundary of Zone 1 7.3 Electric Bidet not protected by 16A MCB and RCCB of 10mA rated residual operating current at the DB		701L

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Common Cases of Non-Compliance in Electrical Installations (new clauses)

S/No	Situation posing immediate safety hazards or of serious nature	Non-compliance of CP 5	Non-compliance of SS 638
8	Electrical installation does not comply with SS638 for Swimming Pool & Other Basins, examples 8.1 Source of SELV installed in Zone 0 or 1 8.2 Switchgear or controlgear installed in Zone 0 or 1		702
9	Electrical installation does not comply with SS638 for Outdoor Lighting Installation, examples 9.1 No provision of residual current circuit breaker (RCCB) of 30 mA sensitivity for telephone kiosks, bus shelters and sign		714

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Part 5 Selection and erection of equipment

Chapter	SS 638	CP 5	What is new?
51	Common rules	Common rules	Updated
52	Selection & erection of wiring systems	Selection & erection of wiring systems	New requirements of concealed cables
53	Protection, isolation, switching, control & monitoring	Switchgear (For protection, isolation and switching)	Sections 476 & 537 of CP 5 combined into 537
54	Earthing arrangements & protective conductors	Earthing arrangements & protective conductors	Section 607 of CP 5 included here
55	Other equipment	Other equipment	New auxiliary circuits requirements in section 557
56	Safety services	Supplies for safety services	New clauses for emergency services

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Part 7 Special installations or locations particular requirements - Additional sections & updates to previous Part 6



- Locations containing a bath or shower (Section 701L)
- Swimming pools and other basins (Section 702)
- Construction and demolition site installations – deleted and considered in SS 650: 2019 Part 1
- Solar photovoltaic (PV) power supply systems (Section 712L)
- Outdoor lighting installations (Section 714)
- Extra-low voltage lighting installations (Section 715) - New
- Operating and maintenance gangways (Section 729) - New

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Annexes



- A(L) Medical Locations
 - Informative
 - applicable to hospitals, clinics, healthcare facilities
- Revised Cable Colour Code
 - Existing CP5 A1 document retained with editorial update
 - New warning labels added

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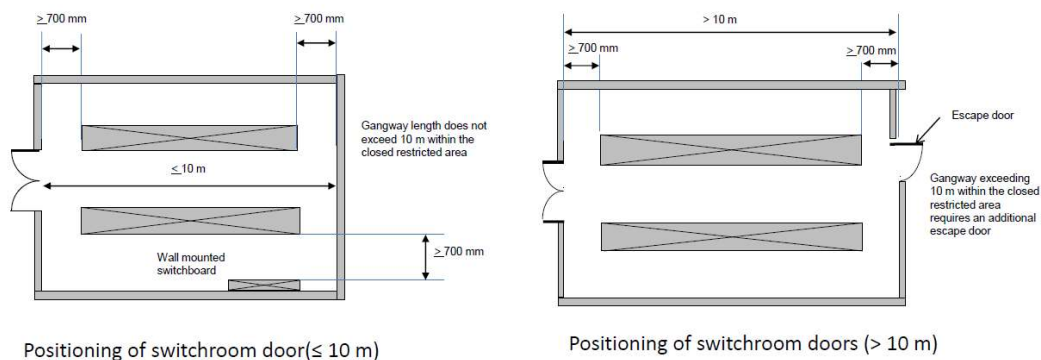
Operating & maintenance gangway

- This section applies to restricted areas such as switchrooms, which are access only by skilled or instructed persons
- 729.513.2 requires that the width of gangways and access areas shall be adequate for work, operational access, emergency access, emergency evacuation and for transport of equipment
- 729.513.2.1 gives the minimum gangway width for restricted access areas where basic protection is provided by barriers or enclosures
- 729.513.2.2 gives the minimum gangway width for restricted access areas where the protective measure of obstacles is applied
- 729.513.2.3 gives the requirements for access of gangways

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Operating & maintenance gangway



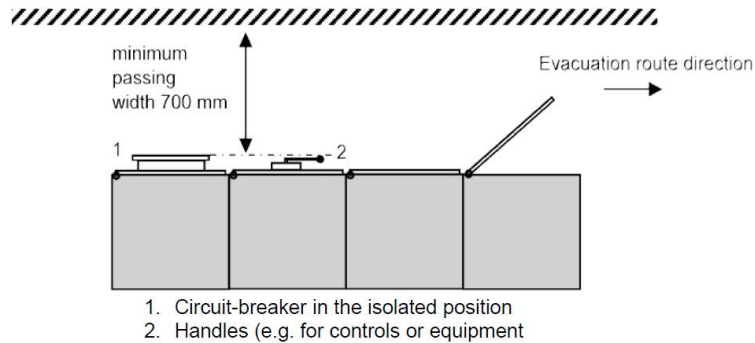
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Operating and maintenance gangways

- Additional requirements for closed restricted access areas

Figure A729.1 – Minimum passing width in case of evacuation – Case 1

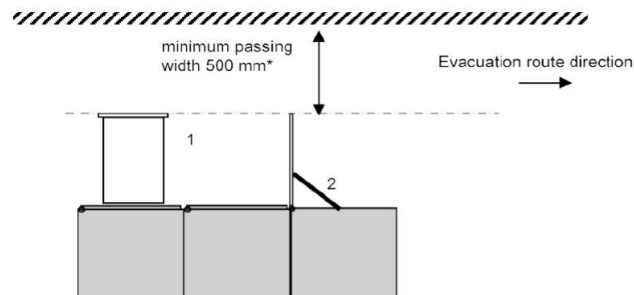


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Operating and maintenance gangways

Figure A729.2 – Minimum passing width in case of evacuation – Case 2



1. Circuit-breaker in the position "completely extracted"
2. Fixing device of a door
3. The minimum width gangway of 500 mm shall be taken into consideration between the wall and the circuit-breaker in the position "completely extracted" and equipment door in the 90 degree position.

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Changes to Appendices

Appropriate changes made to reference standards & include new Appendices :

Appendix 8(L)	Current-carrying capacity and voltage drop of busbar trunking system
Appendix 10(L)	Protection of conductors in parallel against overcurrent
Appendix 13	Methods for measuring the insulation resistance / impedance of floors and walls to earth or to the protective conductor system.
Appendix 14(L)	Measurement of earth fault loop impedance: Considerations of the increase of the resistance of conductors with increase of temperature
Appendix 16	Devices for protection against overvoltage

A new 49 pages Index included for ease of cross references

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Overview of SS 650 Part 1 and 2

- Most of the technical requirements and guidance stated in CP 88 Parts 1 & 2 are retained in SS 650 Parts 1 & 2 since these measures have been widely practiced at site by operators in worksites and fair sites and hence greatly reduced incidents of electric shock as shown in the accident statistics during the last 10 years
- For example,
 - Guidance on the installation of a mobile generating set and earthing system to prevent electric shock
 - Requirement for the provision of a main incoming switchboard to provide isolation function, overcurrent and earth fault protection for safety, etc
 - Supply voltage for equipment, hand held tools and portable lamps in various situations
 - Stringent requirements for protection by residual current device
 - Installation of cables within construction and building sites;
- Use of socket-outlet-assembly(SOA) fitted with industrial socket outlets, MCB and RCCB of 30mA tripping sensitivity for tapping electricity supply for lighting, hand-held tools and appliances;
- Provision of RCCB of 30mA tripping sensitivity for all final circuits;
- Automatic disconnection for a fault in reduced voltage system

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Key changes to SS 650

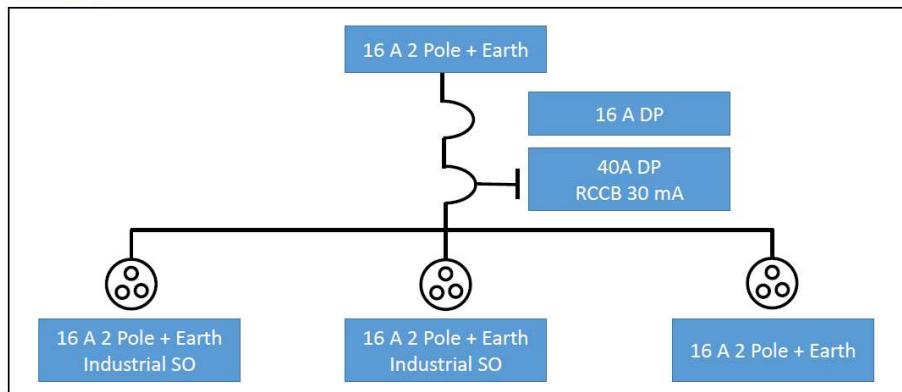
Item	Amendment	Comments
Basic protection – defined as protection against electric shock under fault-free conditions.	New definition introduced in Part 1 & Part 2 to align with SS 638	For low voltage installations, systems and equipment, basic protection generally corresponds to protection against direct contact that is “ <u>contact of persons or livestock with live parts</u> ”.
Fault protection - defined as protection against electric shock under single fault conditions.	New definition introduced in Part 1 & Part 2 to align with SS 638	For low voltage installations, systems and equipment, fault protection generally corresponds to protection against indirect contact, mainly with regard to <u>failure of basic insulation</u> . Indirect contact is “ <u>contact of persons or livestock with exposed-conductive-parts which have become live under fault conditions</u> ”.

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Update of SS 650

Item	Comments
Updated the requirement of “Single-phase SOA fed from 16 A single-phase 230 V source”	Same set up as introduced under Amendment to SS CP 88 Part 1 made in year 2002



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Updates to SS 650

Item		Comments		
Updating of Table 1 – Max earth fault loop impedance for a disconnection time 5 s and U _o of 55 volts (single-phase)		Modified to align SS 650 Part 1 with SS 359 and BS EN 60898		
IEC60898	B	C	D	
Rating amperes (In)	U _o / 5 In	U _o / 10 In	U _o / 20 In	
6	1.83	0.92	0.47	
10	1.10	0.55	0.28	
16	0.69	0.34	0.18	
20	0.55	0.28	0.14	
25	0.44	0.22	0.11	
32	0.34	0.17	0.09	
40	0.28	0.14	0.07	
50	0.22	0.11	0.06	
63	0.17	0.09	0.04	
80	0.14	0.07	0.04	
100	0.11	0.05	0.03	
125	0.09	0.04	0.02	

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Thank you

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