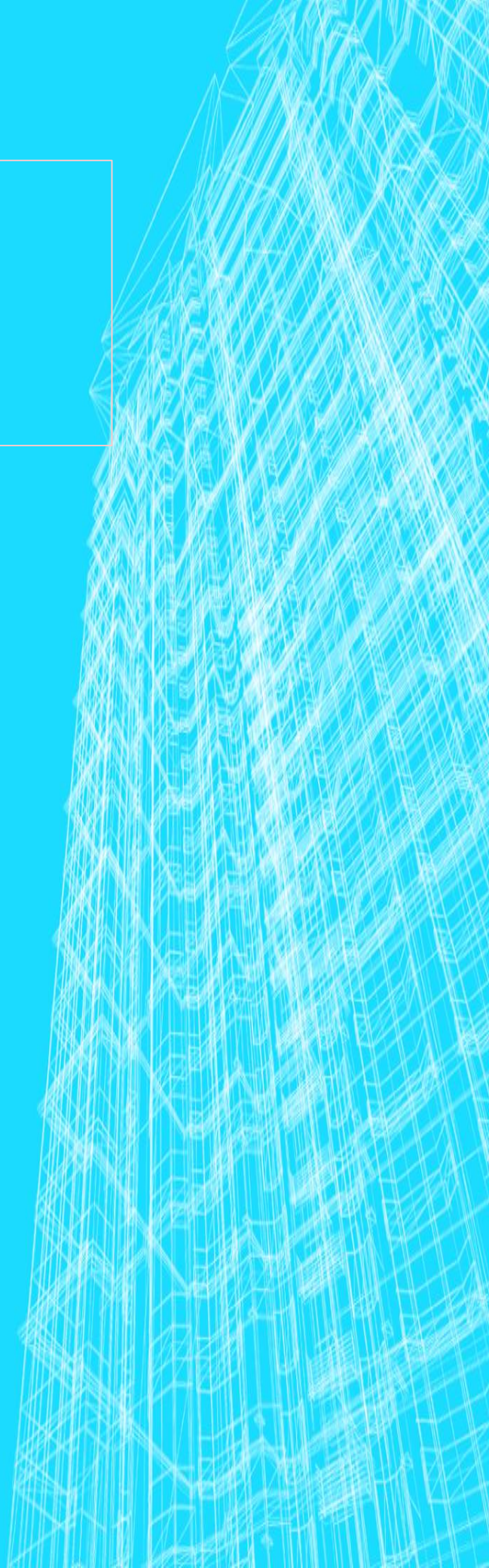


18TH EDITION CHANGES

AND WHAT THIS MEANS TO YOU



SUMMARY

Wiring regulations must keep pace as technology and the environmental legislation changes which results in periodic amendments to the regulations

The IET 18th Edition was ratified and published in July 2018.

All installations designed after 31st December 2018 are to be in compliance with BS7671: 2018.

Cadline have reviewed the changes and have identified the software changes necessary to meet these new requirements

The data in this document is believed to be accurate at the time of publication and is provided as a user guide to the changes and reviews to the software. It is assumed qualified electrical engineers have familiarised themselves with the regulation changes.

In no event should Cadline be liable for indirect or consequential loss in connection with or arising from the use of information on this document.

NOTE

This document doesn't constitute an exhaustive list of 18th edition changes but reflects revisions necessary to our software to achieve industry compliance

CHAPTER 41: PROTECTION AGAINST ELECTRIC SHOCK

Automatic disconnection in case of a fault. Regulation 411.3.2.2

Where the disconnection times in Table 41.1 used to apply to Final Circuits not exceeding 32A, it now applies to Final Circuits not exceeding 63A. Unless that Final Circuit is supplying only fixed connected current-using equipment, in which case it is still limited to 32A.

This will result in the Disconnection Time for some circuits being reduced from 5 seconds to 0.4 seconds. Be aware of this change when upgrading a Wiring project from 17th Ed Amd 3, to the new 18th Ed.

Revisions for circuits supplying socket outlets. Regulation 411.3.3

All Socket Circuits not exceeding 32A (used to be 20A) and all mobile equip not exceeding 32A for use outdoors, will need an RCD not exceeding 30mA. An exception is permitted where a documented Risk Assessment determines that RCD protection is not necessary, unless those circuits are in a Dwelling. In which case an exception is not permitted, and RCDs must be used.

If the project's or board's Premises/Location Type is set to Dwelling, the provision of RCD protection is now mandatory. The program will prompt the user to select an RCD not exceeding 30mA from the available RCD Types and ranges within the software. Because there are no exceptions to this new requirement, Standard Socket Circuits will display a Fault condition if this requirement is not met

CHAPTER 41: PROTECTION AGAINST ELECTRIC SHOCK

Additional requirements for circuits supplying luminaires.

Regulation 411.3.4

This new regulation requires all AC final circuits within a Dwelling that are supplying luminaires, to be protected by an RCD rated no higher than 30mA.

As for Socket Circuits above, when the board's Premises/Location Type is set to Dwelling, the program will prompt the user to select an RCD not exceeding 30mA from the available RCD Types and ranges within the software. Because there are no exceptions to this requirement, the Lighting Circuit will display a Fault condition if this requirement is not met.

Chapter 42:Protection against thermal effects

Protection against fire caused by electrical equipment

New Reg (421.7) requires the installation of Arc Fault Detection Devices (AFDDs) in AC final circuits to reduce the risk of fire initiated by an arc originating from a fault current

The addition of AFDD s to the generic and each manufacturers' database to allow the engineer to select AFDDs on final circuits to BSEN 62606

CHAPTER 44:PROTECTION AGAINST VOLTAGE AND ELECTROMAGNETIC DISTURBANCES

Protection against overvoltages of atmospheric or switching origin.

Regulation 443 now brought in line with BS EN 62305, where the consequences of overvoltage can affect; Human Life, Public Services, Commercial Activity or a Large Number of Individuals. The functionality has also been added to carry out a Risk Assessment using the details of the AC Supply Lines.

Edit General "Overvoltage" tab revised to take into consideration the risk type to force the Software to apply SPD's as Necessary. User entry of SPD data to comply

PART 8 : ENERGY EFFICIENCY






The introduction of Part 8 relates to energy efficiency

Building Reg's and 18th edition both require metering to be separated for different load classifications to determine separate metering strategies for energy consumption purposes

load classifications can be set up on ways or sections of split boards and normal distribution boards. Display Summary shows the breakdown of each load type for future metering strategy purposes

The introduction of Type F, Type AA and Type AC switchgear.

Depending on the type of circuit checks are in place to ensure the correct sequence of RCDs are being used (AC,A, F and B) and at the correct rating lead to status warning messages regarding non compliance. These devices feature in the 18th edition Generic and Manufacturers' databases

RCCB Type	Residual / Leakage current components				Transient Resistant
	AC 50Hz 	AC 50Hz Pulse 	Smooth DC 	AC>50Hz<kHz 	3kA/20µs Current Wave 
AC	✓	✗	✗	✗	✗
A	✓	✓	< 6mA ⁽¹⁾	✗	✗
F	✓	✓	< 10mA ⁽¹⁾	✓	✓
B	✓	✓	✓ ⁽¹⁾	✓	✓

1. Type B RCCBs detect DC residual currents and trip if the smooth DC current exceeds the trip threshold.
Note: Type A, AKV and F will function safely with smooth DC residual currents present up to the levels indicated but they do not detect smooth DC. Therefore they must not be installed upstream of Type B RCCBs.

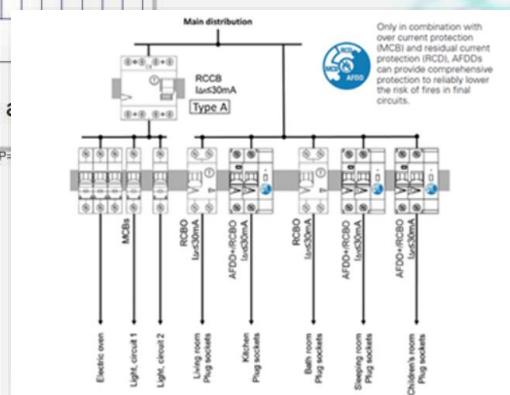
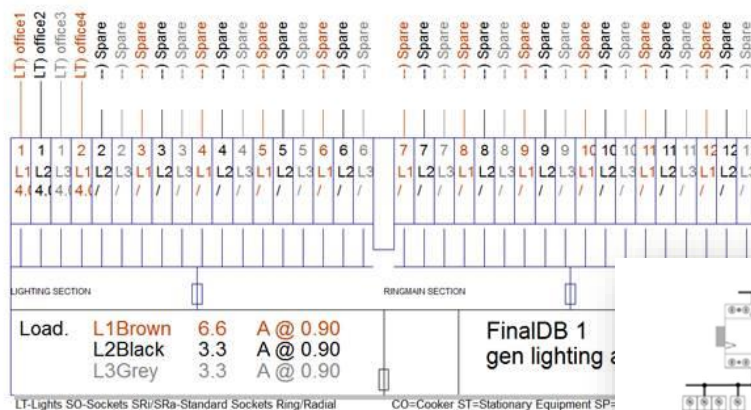
2. Type EV RCCBs trip if the smooth DC current > 6mA i.e. They must only be used for protecting a single ECVF.

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SPLIT BOARDS FACILITY

The introduction of **Split Boards facility** means the software can now handle and model correctly split boards with multiple dedicated sections servicing different circuit types. Switchgear can be used to protect each section as well as final circuits.

Each section can be allocated a “Load type” for future metering purposes with regulatory caveats being applied based on circuit type, building type ect. Sections can be edited and ways copied from one section to another with checks applied accordingly. Revisions to the calculations have been applied to take into consideration the more complex switchgear arrangements relating to split boards. Checks are also applied to make sure the correct RCD/RCBO etc is being used on the right circuit type. Switch disconnectors can now be shown as part of a distribution board



CPD Databases now include specific protective devices as required in the 18th Edition.

The Wiring program now has the additional functionality of different RCD Types, RCBOs & AFDDs, as required by specific circuit types:

Depending on the type of circuit, if RCDs are used at the origin of Split Section Boards, or at origin of the Parent Board, checks are in place to ensure the correct sequence of RCDs are being used and at the correct rating. These protective devices feature in a new 18th Edition Generic database and in the revised latest versions of each of the Manufacturers' CPD databases. Where circuits are required to have their own individual RCDs, checks are also in place for this condition.

VEHICLE CHARGING INSTALLATIONS.

Regulation 722.411.4.1

There have been many changes made by the IET regarding the provision of Electric Vehicle (EV) charging points. The changes covering the conductor arrangement and system earthing, specifically in a TN system state:

A PME earthing facility shall not be used as the means of earthing for the protective conductor contact of a charging point located outdoors or that might reasonably be expected to be used to charge a vehicle located outdoors unless one of the following methods is used:

Because the load on an AC distribution system is normally dynamic and fluctuating constantly, below is a summary of the new methods:

(i) The maximum voltage between the main earthing terminal of the installation and Earth in the event of an open-circuit fault in the PEN conductor of the low voltage network supplying the installation does not exceed 70 V rms.

(ii) The main earthing terminal is connected to an installation earth electrode by a protective conductor. The resistance of the earth electrode to Earth shall be such that the maximum voltage between the main earthing terminal of the installation and Earth in the event of an open-circuit fault does not exceed 70 V rms.

(iii) Protection against electric shock is provided by a device which disconnects the charging point from the live conductors of the supply and from protective earth in accordance with Regulation 543.3.3(ii) within 5s in the event of the voltage between the circuit protective conductor and Earth exceeding 70 V rms. Please refer to regulation 722.411.4.1 A722 for full details and Annex for more information..



Additionally, new levels of Protective Measures are specified in regulation 722.531.2.101

Except for circuits using the protective measure of Electrical Separation, each charging point shall be protected by its own RCD of at least type A, having a rated residual operating current not exceeding 30mA.

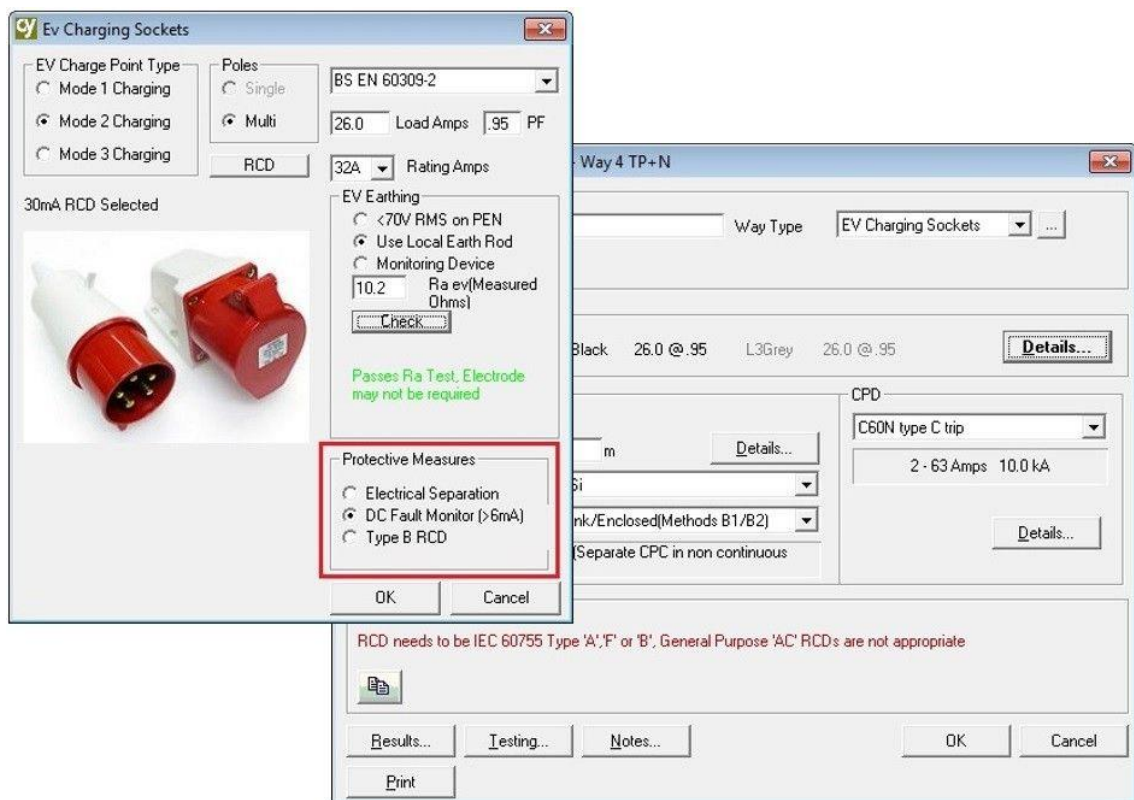
Each charge point incorporating a socket-outlet or vehicle connector complying with the BS EN 62196 series, protective measures against DC fault current shall be taken, except where provided by the EV charging equipment. The appropriate measures, for each connection point, shall be as follows:

- RCD type B; or
- RCD type A and appropriate equipment that ensures disconnection of the supply in case of DC fault current above 6 mA.

RCDs shall comply with one of the following standards: BS EN 61008-1, BS EN 61009-1, BS EN 60947-2 or BS EN 62423.

(ii) The main earthing terminal of the installation is connected to an installation earth electrode by a protective conductor complying with Regulation 544.1.1.

(iii) Protection against electric shock is provided by a device which disconnects the charging point from the live conductors of the supply and from protective earth in accordance with Regulation 543.3.3(ii) within 5s in the event of the voltage between the circuit protective conductor and Earth exceeding 70 V rms. The device shall not operate if the voltage exceeds 70 V rms for less than 4 s. The device shall provide isolation.



As can be seen in the screen shot above, all these new requirements have been incorporated into the software.

MOTOR SELECTION IN WIRING COMPLIES WITH NEW RECOMMENDATIONS OF 17.12 APPENDIX 17

17.12 Efficiency measures for equipment Motors and controls
An AC induction motor will consume more energy than it actually needs when operated at less than full-load conditions. This excess consumption of energy is dissipated by the motor in the form of heat. A better choice of motor and motor control will improve the global energy efficiency of the electric motor system.

Motors with a rated output of 0.75 kW – 375 kW must meet either the IE3 efficiency level or the IE2 level and be equipped with a variable speed drive. The energy efficiency classes are as follows: - IE2 (High efficiency) - IE3 (Premium efficiency) - IE4 (Super premium efficiency).

NOTE 1: Commission Regulation (EC) No 640/2009, as amended, implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for electric motors. Reference may also be made to BS EN 60034-30-1

The screenshot shows the 'Motor Entry' software interface with the title 'Using Cymap Provided Data'. It features a 'Details' tab and a 'Search' button. A table lists 13 motor entries with columns for Voltage, kW, Number of Poles, Eff FL, Efficiency class, Amps FL, PF FL, and a selection arrow. Below the table are various input fields for motor specifications: Voltage (400V), FLC (Any), kW Rating (Any), No of Poles (4), Efficiency % (Any), Synch Speed (Any), Power Factor (Any), FL Torque(NM) (Any), and Frequency (Any). A 'Total Motors: 35' indicator and a 'Reset' button are also present. At the bottom, there are dropdowns for 'Manufacturer' (Any), 'Design' (Any), and 'Enclosure' (Any). A red circle highlights the 'IEC Efficiency Class' section, which includes radio buttons for 'None', 'IE1', 'IE2', 'IE3', and 'IE4' (which is selected), followed by 'Search' and 'Select' buttons. A 'Print' button is located at the bottom left, and 'OK' and 'Ca' buttons are at the bottom right.

	Voltage	kW	Number of	Eff FL	Efficiency class	Amps FL	PF FL	
1	400	400	4	97.1	4	700	0.84	1E
2	400	355	4	96.8	4	625	0.85	1E
3	400	450	4	96.8	4	817	0.82	1E
4	400	630	4	97	4	1060	0.88	1E
5	400	560	4	96.8	4	950	0.88	1E
6	400	500	4	96.8	4	850	0.88	1E
7	400	560	4	96.9	4	925	0.9	1E
8	400	630	4	96.9	4	1080	0.87	1E
9	400	315	4	96.7	4	545	0.87	1E
10	400	355	4	96.7	4	610	0.87	1E
11	400	200	4	96.7	4	345	0.85	1E
12	400	500	4	96.8	4	830	0.89	1E
13	400	560	4	96.9	4	925	0.9	1E

Motor Entry Using Cymap Provided Data

Details Search

Voltage = 400 Synch Speed = Any

FLC (Amps) = Any Power Factor = Any

kW Rating = Any FL Torque(NM) = Any

No of Poles = 4 Frequency = Any

Efficiency % = Any Total Motors: 35

Reset

Manufacturer Any Design Any Enclosure Any

☐ None ☐ IE1 ☐ IE2 ☐ IE3 ☒ IE4 IEC Efficiency Class

Search Select

Print OK Ca



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