



REGULATOR FOR
ENERGY & **WATER**
SERVICES

Electrical Installations Regulations Updates

*Aġġornamenti
tar-Regolamenti dwar
l-installazzjonijiet elettrici*



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Electrical Installations Regulations Updates - for your awareness

When acquiring or specifying RCDs, one needs to specify three (3) parameters:

Current rating - the maximum load current it can handle.

Sensitivity – the level of leakage current, normally to earth, that will trigger the RCD to trip.

Type - this is determined by the type of load which it is intended to protect i.e. whether the load is AC only or AC with various DC components or immunity to frequencies different from 50Hz.

One of the main objectives in the design of an electrical installation is the protection of the user of that installation against electrical hazards, in particular, electric shocks which can be life threatening. Earth leakage protection is provided through an RCD – Residual Current Device (sometimes referred to RCCB – Residual Current Circuit Breaker), with one RCD protecting all circuits in a premises or multiple RCDs protecting separate circuits individually.

Only RCDs with a tripping current of 30mA sensitivity (**refer to BS 7671 Table 3A for time-current performance**) provide protection against electric shocks should users accidentally come into physical contact with live parts.

However, the suitability of an RCD does not depend solely on the tripping current (30mA) since there are other issues that need to be considered, when selecting the RCD to be installed, such as the appropriate Type of RCD for the specific use.

Types of RCD's, their identification and their appropriate use:

Type AC



Type A



Type F



Type B



Aġġornamenti tar-Regolamenti dwar l-Installazzjonijiet Elettriċi – għall-għarfien tiegħek.

Meta wieħed jakkwista jew jispeċifika l-RCDs, wieħed jehtieg li jispeċifika tlett (3) parametri:

Kurrent – il-kurrent massimu li jista' jimmaniġġja l-RCD;

Sensittività – il-livell ta' leakage tal-kurrent li tippermetti li jgħaddi lejn l-earth, li jattiva l-RCD;

Tip – dan huwa determinat mit-tip ta' apparat elettriku (*load*) li huwa maħsub biex jipproteġi, jiġifieri jekk il-*load* hijiex AC biss, jew AC b'xi komponenti DC jew immunità għal frekwenzi differenti minn 50Hz.

Wieħed mill-oġġettivi ewlenin fid-disinn ta' installazzjoni elettrika huwa l-protezzjoni tal-utent ta' dik l-installazzjoni kontra perikli elettriċi, b'mod partikolari, xokkijiet elettriċi li jistgħu jkunu ta' theddida għall-ħajja. Il-protezzjoni kontra *earth leakage* hija pprovduta permezz ta' RCD – *Residual Current Device* (xi kultant imsejha RCCB – *Residual Current Circuit Breaker*), b'RCD waħda li tipproteġi *s-circuits* kollha go fond jew RCDs multipli li jipproteġu *circuits* separati individwalment.

RCDs bi *tripping current* ta' sensittività ta' 30mA biss (**irreferi għat-Tabella 3A fil-BS7671 għall-prestazzjoni tal-ħin versu kurrent**) jipprovdu protezzjoni kontra xokkijiet elettriċi jekk l-utenti jiġu f'kuntatt fiżiku aċċidentalment ma' partijiet li fihom il-kurrent (*live*).

Madankollu, l-adegwatezza ta' RCD ma tiddependix biss fuq it-*tripping current* (ta' sensittività ta' 30mA) peress li hemm fatturi oħra li jehtieg li jiġu kkunsidrati meta tintgħażel l-RCD li għandha tiġi nstallata, bħat-tip xieraq ta' RCD għall-użu speċifiku.

Tipi ta' RCDs, l-identifikazzjoni u l-użu xieraq tagħhom:

Tip AC



Tip A



Tip F



Tip B



Solar Photovoltaic Protection

PV systems equipped with inverters “without at least simple separation between the AC side and the DC side” e.g. a **transformer less inverter**, require a **Type B** RCD type (BS 7671:2008 reference 712.411.3.2.1.2)

Protection of other circuits in the Premises

531.3.3 of BS:7671:2018 and now also specifically provided through the latest amendments (LN 283 of 2024 to the local Electrical Installations Regulations S.L. 545.24, the RCD to be installed shall be of the “appropriate type” that is the type is select to cater for the type of loads to be connected to the installation. (refer to Regulations 20(5) and 21(6)),

(i) For installations involving **inverter technologies**, e.g. Inverter air-conditioning, inverter washing machines etc., any fault to earth may cause an earth leakage with an offset DC current, which a Type AC RCD would not detect and hence will not clear. The earth fault current would hence persist.

This is a main concern when the output of the inverter voltages or any other type of supplies i.e. downstream of power controlling electronics e.g. uninterruptible power supplies (UPS's), exceeds 50V AC. In such cases an RCD **Type A**, as minimum, should be used.

(ii) An RCD **Type F** may be required where **frequency conversion** is involved.

(iii) An RCD **Type B** may be required in case of **three phase** installations.

In selecting the type of RCD required, one should consult the BS:7671. In the case of certain loads with high inherent leakage current, one should refer to the manufacturer's recommendations or the requirements of S.L. 545.24, as applicable.

Protezzjoni Fotovoltajka Solari

Sistemi PV mgħammra b' inverter mingħajr mill-inqas separazzjoni sempliċi bejn in-naħa tal-AC u n-naħa tad-DC eż. Inverter mingħajr transformer, jeħtieġu RCD tat-Tip B (BS 7671:2008 referenza 712.411.3.2.1.2)

Protezzjoni ta' circuits oħra fil-Fond

531.3.3 ta' BS:7671:2018 u issa wkoll speċifikament ipprovdut permezz tal-aħħar emendi (AL 283 tal-2024 għar-Regolamenti dwar l-Installazzjonijiet Elettriċi, LS 545.24), l-RCD li trid tiġi installata għandha tkun tat-"tip xieraq", jiġifieri t-tip għandha tintgħażel biex tipprovidi għat-tip ta' apparat elettriku (*loads*) li għandu jiġi konness mal-installazzjoni (ara r-Regolamenti 20(5) u 21(6)),

(i) Għal installazzjonijiet li jinvolvu **teknoloġiji tal-inverter**, eż. impjant tal-arja kkundizzjonata b'inverter, magni tal-ħasil b'inverter eċċ., kwalunkwe ħsara li tista' tikkawża **earth leakage** li jinkludi kurrent DC, li RCD tat-Tip AC ma taqbadx, u għalhekk ma tneħħix il-kurrent tal-ħsara lejn l-earth. Il-kurrent tal-ħsara fl-earth għalhekk jippersisti.

Din hija ta' thassib meta l-*output* tal-vultaġġi tal-*inverter* jew kwalunkwe tip ieħor ta' provvisti, jiġifieri d-*downstream* tal-elettronika li tikkontrolla l-enerġija eż. provvisti tal-enerġija mingħajr interruzzjoni (UPS), li jaqbeż il-50V AC. F'każijiet bħal dawn, bħala minimu għandha tintuża l-RCD tat-**Tip A**.

(ii) RCD tat-**Tip F** tista' tkun meħtieġa fejn **konverżjoni tal-frekwenza** hija involuta.

(iii) RCD tat-**Tip B** tista' tkun meħtieġa fil-każ ta' installazzjonijiet **three phase**.

Meta jintgħażel it-tip ta' RCD meħtieġ, wieħed għandu jikkonsulta l-BS:7671. Fil-każ ta' ċertu apparat elettriku (*loads*) b'kurrent ta' *leakage* inerenti għoli, wieħed għandu jirreferi għar-rakkomandazzjonijiet tal-manifattur jew għar-rekwiżiti tal-L.S. 545.24, kif applikabbli.

Other risks of electric shocks through inappropriate earthing.

In principle **all metal or conductive appliances or fittings** which can come in contact with live conductors except doors and apertures, are to **be bonded to a common earth**.

For the Maltese islands it is recommended that the earth system resistance does not exceed 50 – Ohms. The earth system may consist of various electrodes connected independently to a Main Earthing Terminal to ensure redundancy and adequate low resistance; in case one electrode fails or deteriorates. Electrical installations in the same block should share one common earth system to ensure equipotential bonding. Otherwise, if more than one earth system is created in the same block, the current towards the earth caused by the fault may cause an increase in the voltage of the earth system until the fault is cleared. If an individual is momentarily in touch with different earth systems at the same time, **the potential difference between the earth systems may cause an electric shock.**

Premises like a maisonette, a shop, or garage which form part of a block (e.g. apartments), but which are not interlinked to the common overlying premises of the block, should have their own meter installed in their own entrance and their own earth electrode. In case that such underlying premises needs to extend an electrical service e.g. to the roof of the block, with the roof owner's permission, e.g. a photovoltaic system, an outdoor unit, or air handling unit, a water flow pump, etc. (refer to Regulation 22A(c) of the Electrical Installations Regulations, S.L. 545.24), this is possible as long as: **the two earth systems are connected and so become one, and means of isolation to the dedicated circuit extended to the roof is provided in the meter room/common parts next to the meters of the overlying premises interconnected to the roof.**

IMPORTANT: Ensure that you are familiar with S.L. 545.24, and in particular with the new requirements introduced in Regulation 22A.



Riskji oħra ta' xokkijiet elettrici kawża ta' earthing mhux xieraq.

Fil-prinċipju, it-tagħmir u l-armar kollu **tal-metall jew li hu konduttiv** li jista' jiġi f'kuntatt ma' konduttur *live*, hliet bibien u aperturi, **għandu ikun marbut (wired) ma' earth komuni.**

Għall-gżejjer Maltin, huwa rakkomandat li r-reżistenza tal-earth system, m'għandhiex taqbeż il-50 Ohms. L-earth system tista' tikkonsisti minn diversi electrodes konnessi indipendentement ma' *Main Earthing Terminal* biex tiżgura *redundancy* u reżistenza baxxa adegwata; f'każ li *electrode* wiehied ifalli jew jiddeterjora. Installazzjonijiet elettrici fl-istess blokk għandhom jużaw *earth system* waħda komuni biex jiżguraw ekwipotenza. Inkella, jekk tinholoq aktar minn *earth system* waħda fl-istess blokk, il-kurrent lejn l-earth kkawżat waqt il-ħsara ikkaġunat mill-fault, jista' jikkawża żieda fil-vultaġġ fuq dik l-earth system sakemm il-ħsara tiġi rranġata. Jekk individwu jiġi f'kuntatt mal-earth systems differenti fl-istess ħin, **id-differenza potenzjali bejn l-earth systems tista' tikkawża xokk elettriku.**

Fond bħal *maisonette*, ħanut, jew garaxx, li jiffurmaw parti minn blokka bini (eż. appartamenti) iżda li **mhux interkonnessi ma' partijiet sovrastanti komuni tal-blokk**, għandu jkollhom il-meter tagħhom installat fid-daħla tagħhom stess u jkollhom l-electrode tal-earth tagħhom stess. Fil-każ li l-fond sottostanti jeħtieġ li jestendi s-servizz tal-elettriku, eż. għas-saqaf tal-blokka, bil-permessi tas-sid tas-saqaf, eż. b'sistema fotovoltajka, unità *outdoor*, jew unità *air-handling*, pompa tal-ilma eċċ. (irreferi għar-Regolament 22A(c) tar-Regolamenti dwar l-Installazzjonijiet Elettrici, LS 545.24), dan huwa permess sakemm: **iż-żewġ earth systems huma konnessi u b'hekk isiru wiehied, u mezz ta' iżolament għas-circuit dedikat estiż sas-saqaf huwa pprovdut fil-kamra tal-meters/partijiet komuni hdejn il-meters tal-fond sovrastanti interkonness mas-saqaf.**

IMPORTANTI: Kun żgur li int familjari mar-rekwiżiti tal-L.S. 545.24, u b'mod partikolari r-rekwiżiti l-ġodda introdotta fir-Regolament 22A.

EV Charging in private premises.

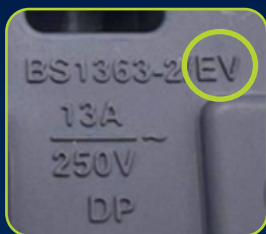
An **Electric Vehicle charger** must be supplied through a **dedicated final circuit** appropriately protected for the current capacities without applying any diversity. One final circuit can supply only one EV charging point.

The earth fault protection in the case of EV Chargers must be carried through:

(i) an RCD Type A or an RCD Type F, and in any case in combination with an RDC-DD (Residual Direct Current-Detecting Device) either external or incorporated in the EV charger (wall box); or

(ii) an RCD Type B.

Note: the appropriate type of EV socket connection shall be used, as depending on the mode of charging. In Mode 1 or 2, if the standard 3-pin BS 1363-2 socket is used, it shall be ensured that it is one having the mark EV.



Iċċarġjar ta' vetturi elettrici f'fond privat.

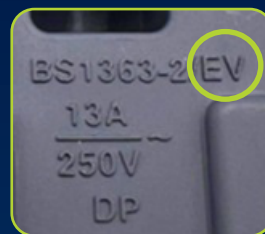
Ċarġer ta' Vettura Elettrika irid jiġi fornut permezz ta' **final circuit dedikat** protett b'mod xieraq għall-kapaċitajiet tal-kurrent mingħajr ma tiġi applikata xi diversità. *Final circuit* wieħed jista' jipprovdi biss punt wieħed ta' ċċarġjar tal-EV.

Il-protezzjoni kontra *earth fault* fil-każ ta' ċarġers tal-EV trid titwettaq permezz ta':

(i) RCD tat-Tip A jew RCD tat-Tip F, u fi kwalunkwe każ flimkien ma' RDC-DD (Apparat li jaqbad residual current DC) estern jew inkorporat fil-ċarġer tal-EV (*Wall-Box*); jew

(ii) RCD tat-Tip B.

Innota: It-tip ta' sokkit tal-EV xieraq għandu jintuża, skont il-modalità tal-iċċarġjar. Fl-1 jew it-2 modalità, jekk jintuża s-sokit standard *3-pin BS 1363-2*, għandu jiġi żgurat li huwa wieħed li għandu **I-marka EV**.



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