

BS7671 Amendment 2: – Emergency Stop or Switching Off for EV installations?

Chaz Andrews technical manager at Doepke – discusses the crucial difference between Emergency Stop, Emergency Switching Off and BS7671 product performance requirements.

BS7671 Amendment 2, Part 2, now includes a definition for “Emergency Switching Off”. If you are designing or specifying equipment, note the subtle differences between the performance requirements for various products providing this function – reference Amendment 2 Table 537.4 and approximately fifteen associated regulations.



The difference between STOP and OFF

Do not confuse these terms, the reliability and performance requirements for emergency stop circuits associated with some mechanical equipment, may be less than that required by BS7671 for emergency switching off - see below:

Emergency Stop

Removing or stopping a non-electrical hazard specifically related to moving parts of a machine e.g. crushing, shearing, entangling, trapping. The level of injury / hazard (risk assessment) determines the performance requirements of emergency stop equipment, which is often significantly less than that associated with risks of an electrical nature.

Emergency Switching Off

Removing an electrical hazard related to the supply voltage.

The Electricity at Work Regs 1989 Guidance Note (2) 35; refers to “*Fatally Dangerous*” when considering a 230v AC supply i.e. we should always consider the failure to select the appropriate means for “emergency switching off” as potentially fatal. This requires a clear understanding of BS7671 Table 537.4, the notes below the table and the associated clauses.

BS7671 537.3.3.4 for simplicity and reliability recommends the use of hand operated switching devices where practicable. If you are considering using a combination of products to provide this safety function, BS7671 requires a fail-to-safety design i.e. when a failure occurs, the combination must fail in a predictable manner to a "safe state." BS7671 does not cover the requirements for emergency stop equipment or failure-to-safety design principles for emergency switching off. Refer to the machine safety standards or specific equipment standards such as EV chargers, Lifts etc. [Doepke Technical Publication 28](#) provides additional information on this subject – see Download tab on Doepke website.

EV Charging – Emergency Switching Off

The associated hazards are purely electrical, manufactures do not have to provide emergency switching in the chargepoint – see BS EN IEC 61851-1 clause fifteen. There may be a requirement to provide emergency switching as part of the installation due to site conditions and or the chargepoint manufacturer’s installation recommendations - see EV charging equipment CoP 5.7.1).

Select devices for emergency switching-off in accordance with BS7671 Table 537.4 and 537.3.3: They must be readily accessible in a location close to the danger - see 537.3.3.6 and be capable of latching in the Off Position, if the means of switching off and on again are not within the control of the same person – see 537.3.3.7

Understanding Table 537.4: Example extracts taken from Table 537.4 to highlight key points and their significance with regard to selecting products for emergency switching off – see BS7671 for the complete table and the notes.

Example only: Extracts from BS7671 Table 537.4			
Device	Standard	Isolation (4)	Emergency Switching (2)
Contactor	BS EN 60947-4-1	Yes (1)	Yes
	BS EN 61095	No	No
Circuit-breaker	BS EN 60898	Yes (3)	Yes
	BS EN 60947-2	Yes (1)	Yes
	BS EN 61009-1	Yes (3)	Yes
RCD	BS EN 60947-2	Yes (1)	Yes
	BS EN 61008	Yes (3)	Yes
	BS EN 61009	Yes (3)	Yes

(1) 947-4 Contactors and 947-2 circuit breakers require additional tests to verify suitability for isolation. MCBs (60898), RCBOs and RCCBs include tests as standard, to prove they are suitable for isolation.

(2) In addition to meeting Regulation group 537.3; products for emergency stopping must(shall) be suitable for isolation – see Regulation group 5.3.7.2

(3) Products suitable for on-load operation e.g. in situations where the operator is an ordinary person they may not be aware that some products ,may not be suitable for on-load isolation. Consequently the product must meet this requirement.

(4) In addition to TT installations, some installations may have harmonic currents flowing in the N wire.

Keep it simple

Circuit designs using a remotely operated combination of products must be based on failure-to-safety technics. BS7671 does not cover the design requirements for these circuits, however existing safety standards relating to machines, give guidance on designing safety related control systems. BS7671 537.3.3.4 for simplicity and reliability recommends the use of hand operated switching devices for emergency switching off.

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