SURGE PROTECTION DEVICES LTD

INSTALLATION GUIDE

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BS 7671: 2018 Amendment 2

Regulation 443.4.1:
Protection against transient overvoltages shall be provided where the consequence caused by overvoltage could:
i. Result in serious injury to, or loss of human life, or
ii. Result in failure of a safety service, as defined in part 2, or
iii. Result in significant financial loss or data loss

For all other cases SPDs shall be fitted to protect against transient overvoltages, unless the owner of the installation declines such protection and wishes to accept the risk of damage to both wiring and equipment as tolerable.

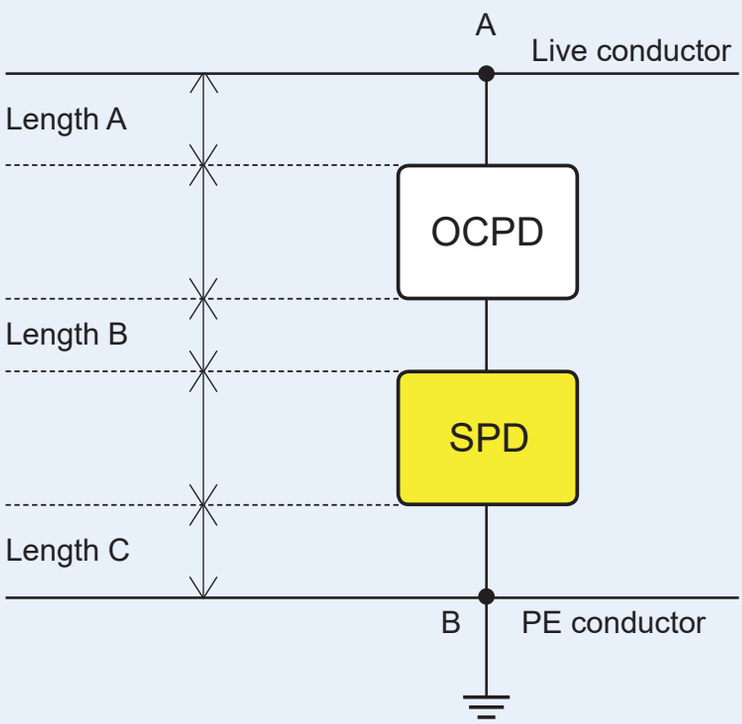
BS 7671 defines safety services as:
"An electrical system for electrical equipment provided to protect or warn persons in the event of a hazard, or essential to their evacuation from a location"

This will mean that any distribution board supplying electrical equipment that would fall in to the definition of a safety service, as described above, will require an SPD. Therefore, now that domestic installations are not exempt from these requirements, a smoke alarm that is supplied from a consumer unit, rather than a battery, must be protected by an SPD.

The basic position of section 443 is now that SPDs shall be installed. In practical terms, most installations will have distribution boards that require surge protection due to the indents above. However, if a distribution board supplied non of the circuits listed above, then a discussion is encouraged between the electrical designer and the client to ensure that no unacceptable losses occur from overvoltage.

When applying these regulations, it is important to understand that the regulations are not retrospective, therefore will only apply if you are installing a new distribution board or making a significant amendment to an existing installation.

Figure 534.8



Cable Length

Regulation 534.4.8 tells us that that the conductors for the SPD installation shall preferably not exceed 0.5m and in no case exceed 1m.

As figure 534.8 from page 169 of BS 7671:2018 shows, this is measured from the live supply through to the overcurrent protection device (Length A), then from the overcurrent protection device to the SPD (Length B), and from the SPD to the closest earth point (Length C). Length A + Length B + Length C must be less than 1m in length.

There are examples of these measurements explained throughout this guide book.

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Overcurrent

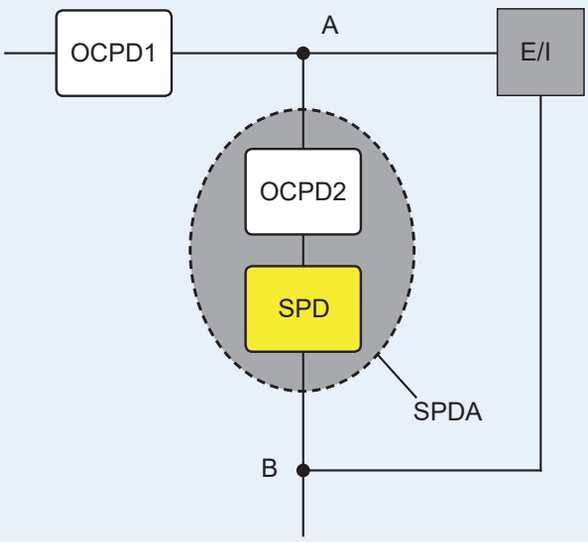
BS 7671:2018 tells us that SPD installations shall be protected against overcurrent, regulation 534.4.5 details that this can be done with either an MCB or an in-built fuse.

This overcurrent protection is there to protect the technology inside the SPD and to also protect the installation in case of an SPD failure. What is quite important to note is that regulation 534.4.5.2 tells us that in the case of the overcurrent protection device operating from an SPD failure, the continuity of the supply must not be affected. This means that whatever overcurrent protection you use for the SPD, it must not be the district network operator (DNO) fuse, as if this operates then the supply to the installation would be immediately disconnected.

At SPD Ltd we recommend all of our devices are fitted with the relevant sized MCB. Not only does this give the SPD the overcurrent protection required, it also provides a point of isolation, should the SPD require maintenance, or if the board requires resistance testing, as the results would be skewed with the presence of an SPD in the circuit.

As figure 534.5 shows, the overcurrent device specified by the SPD manufacturer should be second to the overcurrent protection device for the installation. The manufacturer specified overcurrent device and the SPD form the complete SPD assembly, which is referred to as the SPDA in BS 7671.

Figure 534.5



Can be found on page 166 of BS 7671:2018

Key

OCPD 1 – Overcurrent Protection Device in the Installation
OCPD 2 – Overcurrent Protection Device specified by the SPD manufacturer
SPD – Surge Protection Device
SPD A – SPD Assembly
E/I – Equipment / Installation to be protected
A and B – Connection Points of the assembly

Cable Sizes

Regulation 534.4.10 gives us minimum cable sizes for the SPD installation, these are in the table below. But remember, these are the minimum required cable sizes to BS 7671:2018 and some manufacturers will vary from this. Ensure you consult the relevant data sheets for your SPD installations.

TYPE OF SPD	LIVE/NEUTRAL CABLE MINIMUM	EARTH CABLE MINIMUM
Type 1	6mm²	16mm²
Type 2	2.5mm²	6mm²

SURGE PROTECTION SELECTION CHART

These devices are designed to CT2 so are suitable for any earthing system

Does the building have an external lightning protection system or is fed by overhead power lines?

YES

Is the supply three phase or single phase?

THREE PHASE (Dom, Comm, Ind)

SY12350KA4P

SINGLE PHASE (Dom, Comm, Ind)

SY12325KA2P

NO

If you are working from a sub-distribution board that does not feed external circuits

START FROM HERE

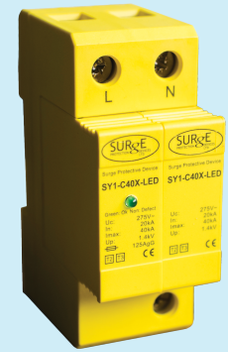
Is the supply three phase/single phase or is it a domestic installation?

THREE PHASE (Comm, Ind)

SY2C40XLED

SINGLE PHASE (Comm, Ind)

SY1C40XLED

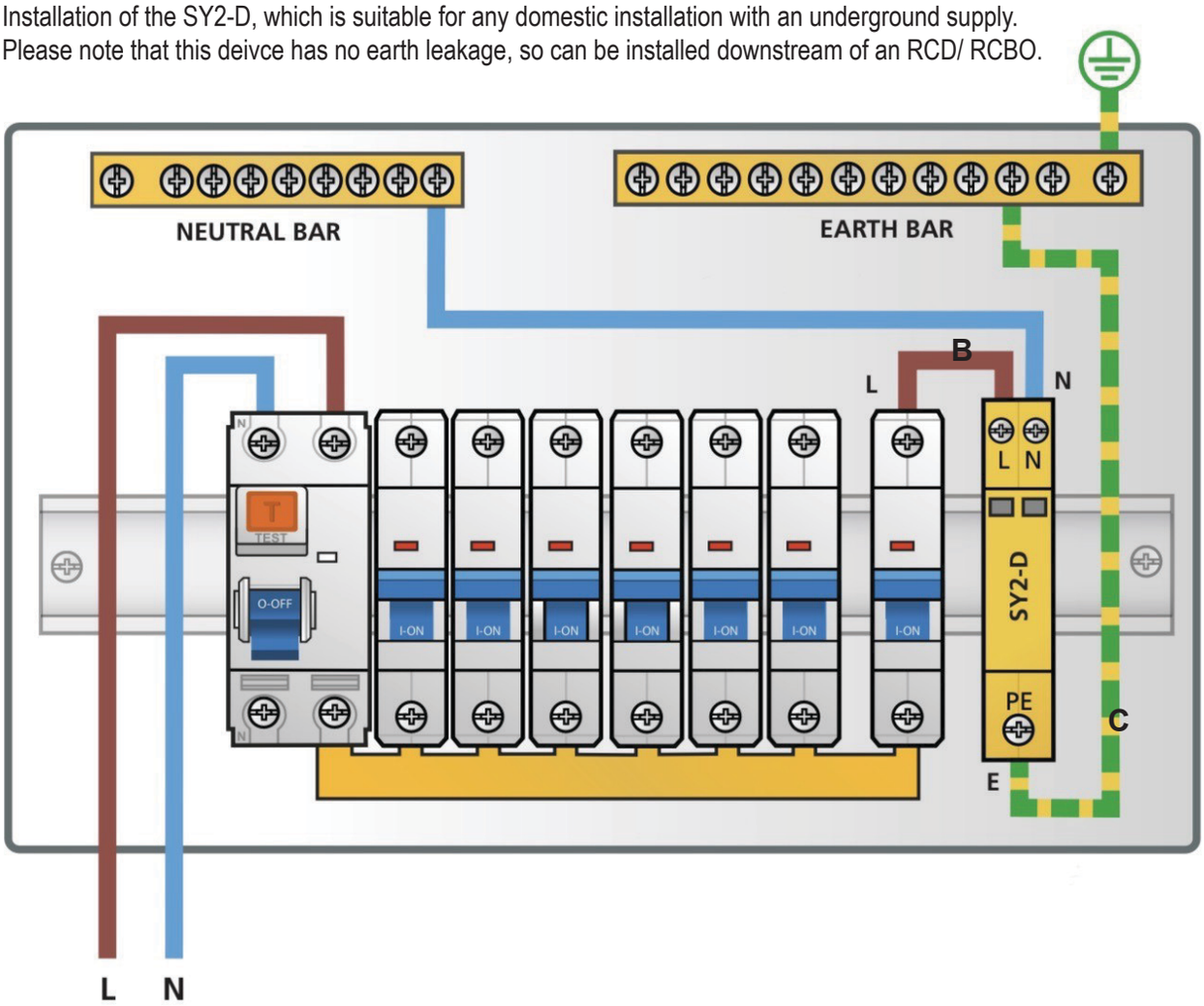


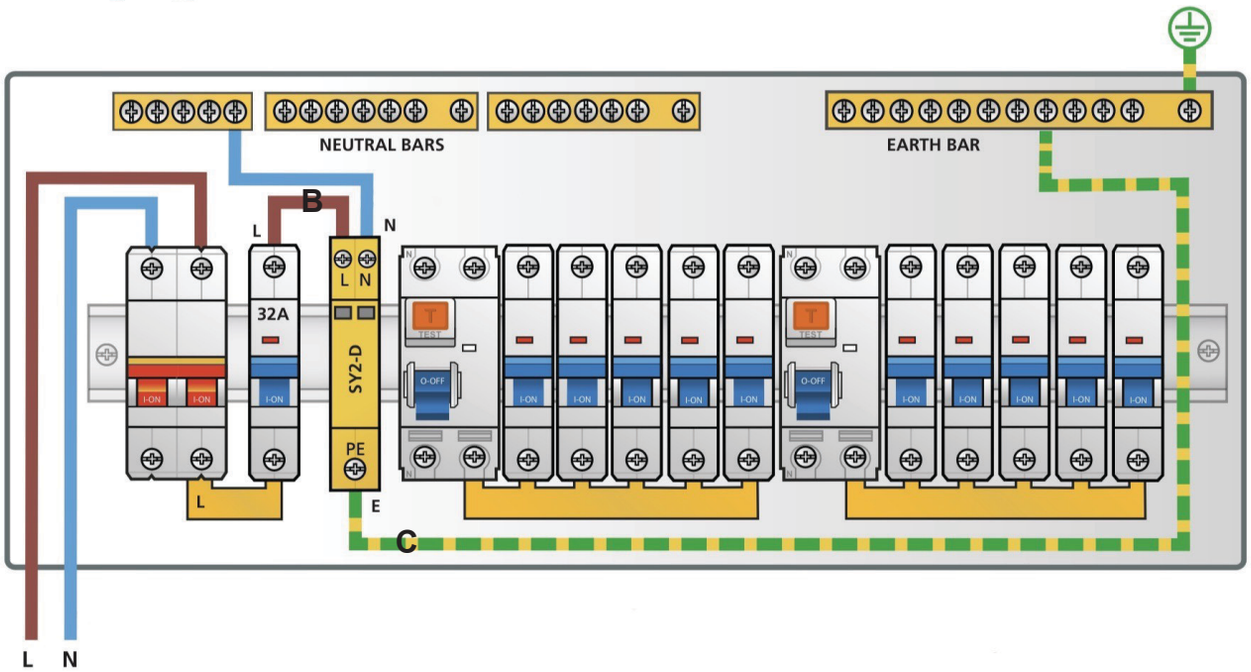
DOMESTIC

SY2-D

Domestic Installations

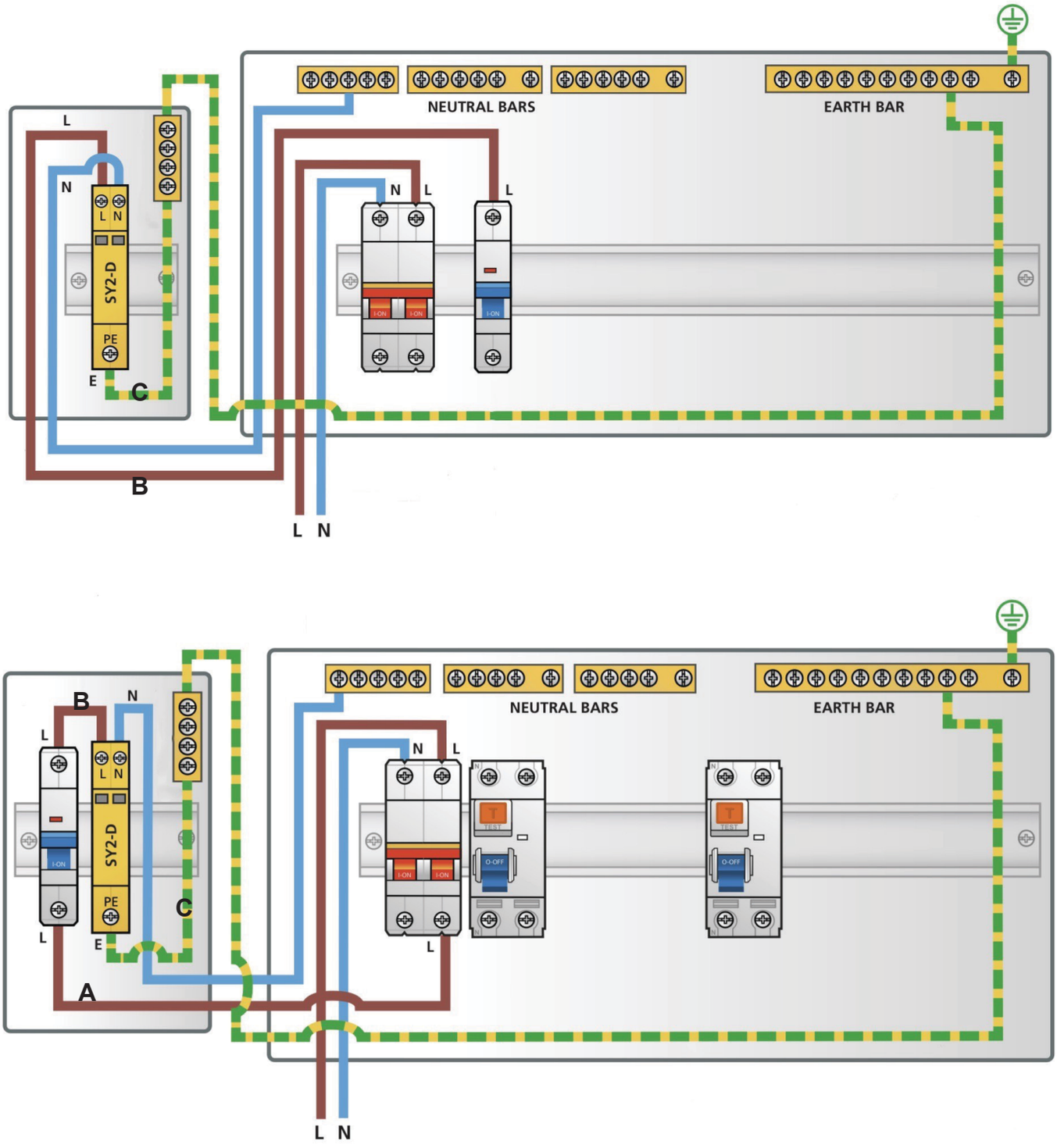
Installation of the SY2-D, which is suitable for any domestic installation with an underground supply.
Please note that this deivce has no earth leakage, so can be installed downstream of an RCD/ RCBO.





For both of the above installtion methods, we can disregard length A as the MCB is directly on the busbar, so the only lengths we need to consider are Length B & Length C to BS 7671: 2018 534.4.8. Remember the maximum cable length allowed is 0.5m-1m.

Domestic Installation in a seperate enclosure fed from within the consumer unit.



If the MCB for the SPD is located in the consumer unit, on the bus bar, then as with previous installtions, we can disregard length A, BUT installers must be mindful that when we move outside the consumer unit, the cable length B from the MCB to the SPD can increase, so care needs to be taken to ensure that this cable is as short as possible.

When installing the MCB in the enclosure with the SPD, we are adding in a length A, so again care must be taken to ensure that the cable lengths do not exceed the 1m maximum allowed to regulation 534.4.8. Figure 534.9 on page 170 of BS 7671:2018 does illustrate that we are allowed to use a local earth bar in the enclosure to shorten the cable distance to the earth terminal, so this can be useful when working outside of the consumer unit.

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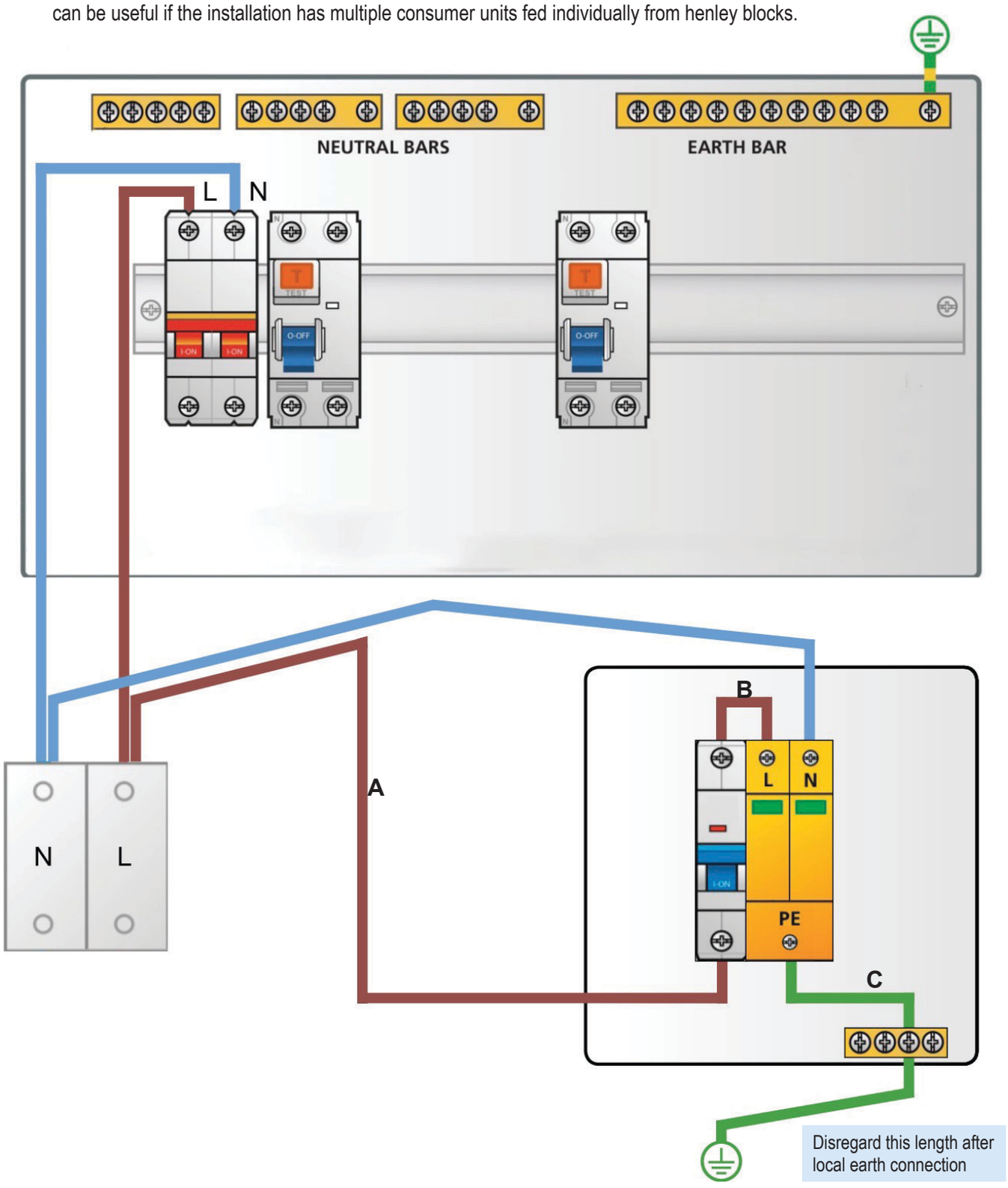
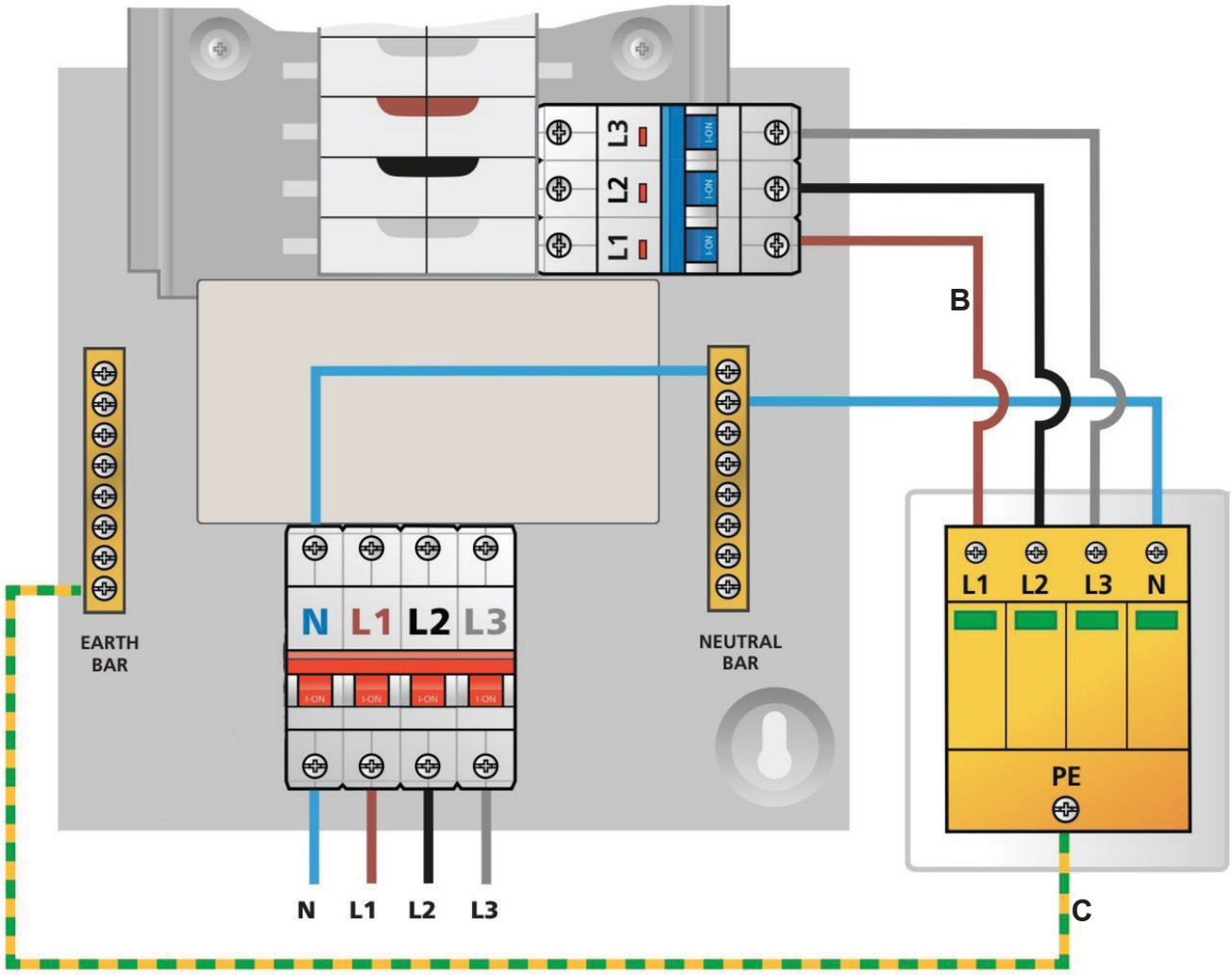
Domestic installation
installed from Henley Blocks

This configuration can be used for either type 1 or type 2 devices. It is also worth noting that this installation method can be useful if the installation has multiple consumer units fed individually from henley blocks.



When installing the MCB in the enclosure with the SPD, we are adding in a length A, which will be the length of cable from the henley block to the MCB, so again care must be taken to ensure that the cable lengths do not exceed the 1m maximum allowed to regulation 534.4.8. Figure 534.9 on page 170 of BS 7671:2018 does illustrate that we are allowed to use a local earth bar in the enclosure to shorten the cable distance to the earth terminal, so this can be useful when working outside of the consumer unit.

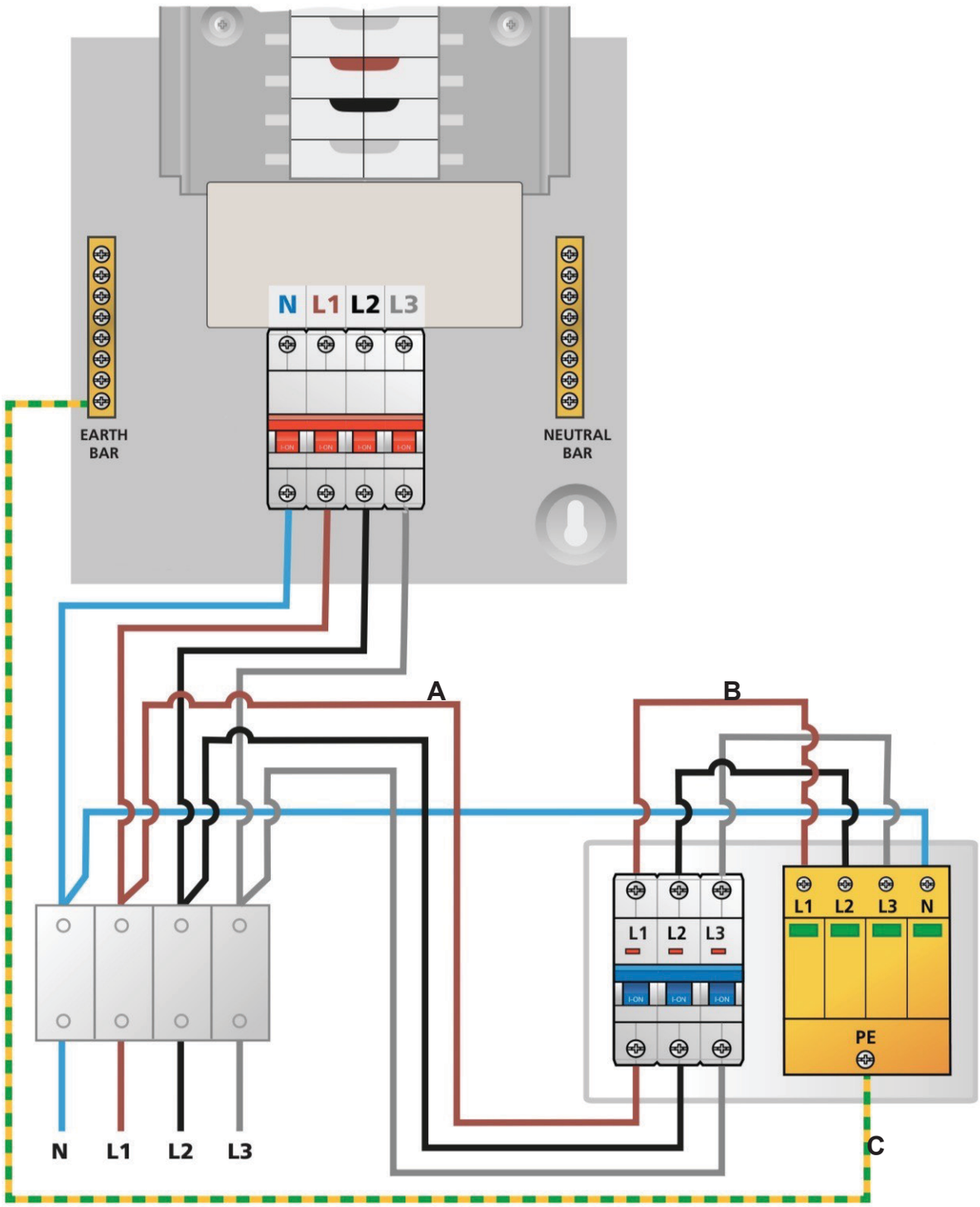
Three Phase Installation



If the MCB for the SPD is located in the board on the bus bar, then as with the previous installations, we can disregard length A, BUT installers must be mindful that when we move outside the consumer unit, the cable length B from the MCB to the SPD can increase, so care needs to be taken to ensure that this cable is as short as possible. Length B is only measured once, even though there is a cable per phase.

Please also note that for a three phase supply, a three phase SPD will need to be installed across all three phases and neutral to give 100% protection, even if the board only has single phase MCB's installed. Length C could be shortened by using a local earth in the enclosure with the SPD as allowed in BS 7671:2018, but the usefulness of this will depend on your installation.

Three Phase Installation from Henley Blocks or a Bus Bar System



When installing the MCB in the enclosure with the SPD, we are adding in a length A, which will be the length of cable from the henley block to the MCB, so again care must be taken to ensure that the cable lengths do not exceed the 1m maximum allowed to regulation 534.4.8. If working from a live bus bar, the MCB feeding the SPD can be installed on the bus bar meaning that again Length A is 0.

Length C could be shortened by using a local earth in the enclosure with the SPD as allowed in BS 7671:2018, but the usefulness of this will depend on your installation. Please also note that for a three phase supply, a three phase SPD will need to be installed accross all three phases and neutral to give 100% protection, even if the board only has single phase MCB's installed.

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Lightning and surge protection devices for Industrial, Commercial and Domestic Electrical Installations

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