

INTRODUCTION
 This document explains how to install Furse ESP Protectors for in-line mains power supplies:
ESP 120-5A, ESP 120-5A/BX, ESP 120-16A, ESP 120-16A/BX, ESP 240-5A, ESP 240-5A/BX, ESP 240-16A, ESP 240-16A/BX, ESP 277-5A, ESP 277-5A/BX, ESP 277-16A, ESP 277-16A/BX

Note /BX variants are supplied ready-boxed.

- 1. Safety note:**
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Warning! Installation by person with electrotechnical expertise only.

Warnung! Installation nur durch elektrotechnische Fachkraft.

Avvertenza! Fare installare solo da un elettricista qualificato.

Avertissement! Installation uniquement par des personnes qualifiées en électrotechnique.

Advertencia! La instalación deberá ser realizada únicamente por electricistas especializados.

2. Before installation

2.1 Check that the supply is fused for the application, at or below the ESP Protector's current rating.

	Current Rating
ESP 120-5A & ESP 120-5A/BX	5 Amps or less
ESP 240-5A & ESP 240-5A/BX	5 Amps or less
ESP 277-5A & ESP 277-5A/BX	5 Amps or less
ESP 120-16A & ESP 120-16A/BX	16 Amps or less
ESP 240-16A & ESP 240-16A/BX	16 Amps or less
ESP 277-16A & ESP 277-16A/BX	16 Amps or less

If the supply current exceeds the ESP Protector's current rating, do not use this Protector.

If the supply is not fused, a fuse equal to or less than the ESP Protector's rating should be added.

Further advice is available from Furse.

2.2 Make sure that the supply voltage is within the working voltage of the unit.

	Working Voltage
ESP 120-5A, ESP 120-5A/BX, ESP 120-16A & ESP 120-16A/BX	90 - 150 VRMS
ESP 240-5A, ESP 240-5A/BX, ESP 240-16A & ESP 240-16A/BX	200 - 280 VRMS
ESP 277-5A, ESP 277-5A/BX, ESP 277-16A & ESP 277-16A/BX	232 - 350 VRMS

3. Installation

3.1 Location

The ESP Protector should be installed close to the equipment it is protecting, either:

- (a) within the system (see Figure 1) or
- (b) on the fused connection (or spur unit) to the equipment

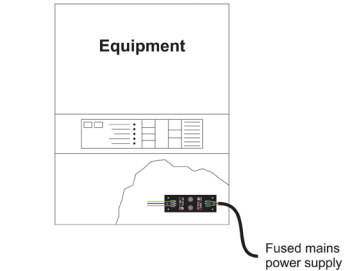


Figure 1: Installation within the system on a power supply fused at 5 A or less (ESP 120-5A, ESP 240-5A or ESP 277-5A) or 16 A or less (ESP 120-16A, ESP 240-16A or ESP 277-16A).



Figure 2: Installation of ready-boxed ESP Protector outside the equipment panel on a fused connection of 5 A or less (ESP 120-5A/BX, ESP 240-5A/BX, ESP 277-5A/BX) or 16 A or less (ESP 120-16A/BX, ESP 240-16A/BX, ESP 277-16A/BX).

Except where it is installed on a supply which leaves the building (to protect equipment inside the building from incoming transients).

In this case the ESP Protector should be installed as close as possible to where the cable leaves the building.

3.2 Enclose unboxed ESP Protectors

The following ESP Protectors are supplied ready-boxed and so do not require additional boxing:

ESP 120-5A/BX	ESP 120-16A/BX
ESP 240-5A/BX	ESP 240-16A/BX
ESP 277-5A/BX	ESP 277-16A/BX

The following ESP Protectors are supplied with exposed terminals and should be installed within a panel or enclosure, for reasons of electrical safety:

ESP 120-5A	ESP 120-16A
ESP 240-5A	ESP 240-16A
ESP 277-5A	ESP 277-16A

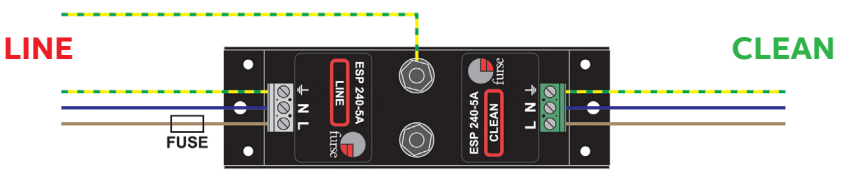


Figure 3: In-line connection for ESP 120-5A, ESP 240-5A or ESP 277-5A (on supplies fused at 5 A or less) and ESP 120-16A, ESP 240-16A or ESP 277-16A (on supplies fused at 16 A or less). Note how the ESP Protector can also be earthed from its earth stud.

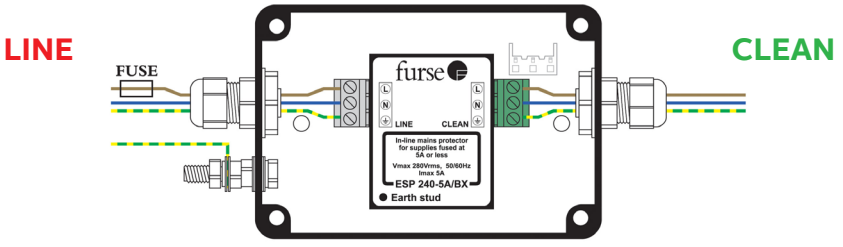


Figure 4: In-line connection for the ready-boxed ESP 120-5A/BX, ESP 240-5A/BX or ESP 277-5A/BX (on supplies fused at 5 A or less) and ESP 120-16A/BX, ESP 240-16A/BX or ESP 277-16A/BX (on supplies fused at 16 A or less). Note how the ESP Protector can also be earthed from its earth stud.

Often this will be the housing or panel of the equipment being protected (see Figure 1).

Where, at CCTV cameras, the ESP Protector is in use alongside other Lightning Barriers for video and telemetry, these can be installed together in a single enclosure (see Figure 7, overleaf) close to the camera.

This should be no more than 1 metre from the equipment. A suitable enclosure is available from Furse.

3.3 Series connection

These ESP Protectors are connected in-line (or series) with the supply to be protected (see Figures 3 & 4).

The dirty, or line side of the ESP Protector should be connected to the cable carrying the incoming transient overvoltages - this is usually the cable from the power supply. The output or clean side ensures a transient free supply to the equipment being protected.

Maximum torque is 0.5 Nm power terminals, with cable stripping length 8 mm.

Note: Do NOT use power driven screwdrivers to make connections to the ESP Lightning Barrier.

If the ESP Protector is connected to a supply leaving the building (to prevent transients being injected back into the building) its line end will be connected to the supply leaving the building.

3.4 Fixing methods

- (a) **ESP 120-5A, ESP 120-16A, ESP 240-5A, ESP 240-16A, ESP 277-5A, ESP 277-16A**

These ESP Protectors can be:

- (a) screwed to a flat surface - remove the DIN rail foot and use the centre mounting holes by the clean and line screw terminals - see Figure 5, overleaf (to enable drop in replacement the outer holes mimic the fixing centres of the ESP Protector's previous design)

- (b) clipped onto a 'top hat' DIN rail - see Figure 6, overleaf

(c) installed on a Combined Mounting and Earthing (CME) kit - the twin M6 earth studs on the top of the ESP Protector can be used to install it on an accessory CME kit (see Section 3.7 - Cross bonding from Lightning Barriers)

Figure 7 shows an ESP 240-5A installed on a CME 4 alongside Lightning Barriers for CCTV video and telemetry lines.

(b) **ESP 120-5A/BX, ESP 120-16A/BX, ESP 240-5A/BX, ESP 240-16A/BX, ESP 277-5A/BX, ESP 277-16A/BX**

These ESP Protectors are supplied ready-boxed with the Protector's electronics within an inner compartment which becomes sealed once the lid is affixed (see Figure 8).

Ready-boxed ESP Protectors can be screwed to a flat surface - M5 mounting holes are located on the base, inside the Protector but outside the seal, close to the cable glands.

The ESP Protector must be mounted before it is connected.

Only screw the lid in place after the ESP Protector is fully connected (see Sections 3.5 - 3.7), to retain the Protector's IP rating.

Hand tighten screws, do not use power driven screwdrivers. Enclose the screws using the plastic screw protectors provided.

3.5 Connection to live, neutral and earth

Connections are made to each supply conductor including earth. Terminals marked L, N, E (or Ⓧ) must be connected to live, neutral and earth respectively.



Figure 6: DIN rail mounting ESP 240-5A (or 16A, ESP 120-5A or 16A, ESP 277-5A or 16A).

The screw terminals will accommodate conductor of up to 4 mm².

We recommend that these are terminated with a boot lace ferrule.

Hand tighten connections - do not use power driven screwdrivers.

3.6 Earthing

It is essential that the ESP Protector is earthed.

If the ESP Protector is being installed on a supply without an earth conductor (eg double insulated) the Protector must be connected to the local power earth via the M6 stud(s) provided.

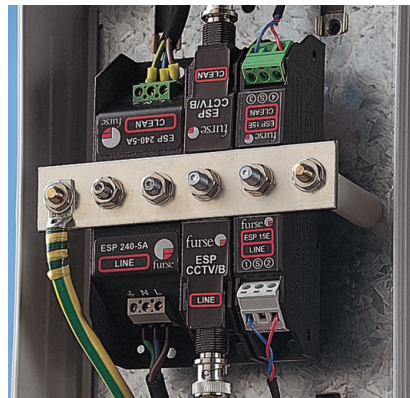


Figure 7: Installation of ESP 240-5A (or 16A, ESP 120-5A or 16A, ESP 277-5A or 16A) next to Lightning Barriers on a CME kit.

Use either or both of the M6 earth studs on the top of the ESP 120-5A, ESP 120-16A, ESP 240-5A, ESP 240-16A, ESP 277-5A or ESP 277-16A.

Ready-boxed ESP Protectors (part code ending /BX) have an earth stud on the line side of the Protector.

If ESP Protectors are mounted on metal plates or DIN rails, or in metal panels or enclosures, this metalwork should, as a matter of general electrical safety, be bonded to earth.

3.7 Cross bonding from Lightning Barriers

Lightning Barriers for telephone, signal and CCTV lines can be earthed by cross bonding them to the earth stud(s) of the ESP 120-5A, ESP 120-16A, ESP 240-5A or ESP 240-16A, ESP 277-5A or ESP 277-16A (or ready-boxed derivatives).

This can be achieved by installing the Lightning Barriers together on a CME kit (see Figure 7).

The Lightning Barriers can therefore derive their earth connection via the ESP 120-5A, ESP 120-16A, ESP 240-5A or ESP 240-16A, ESP 277-5A or ESP 277-16A.

3.8 Keep clean cables away from dirty cables

Clean outgoing cables should never be routed next to dirty incoming cables or dirty earth leads (or cross bonds) (see Figure 9).

This applies to lines within or external to the equipment panel.



Figure 8: The ready-boxed ESP 240-16A/BX (or ESP 240-5A/BX, ESP 120-5A/BX, ESP 120-16A/BX, ESP 277-5A/BX or ESP 277-16A/BX) can be flat mounted via M5 mounting holes located outside the inner seal of the unit.

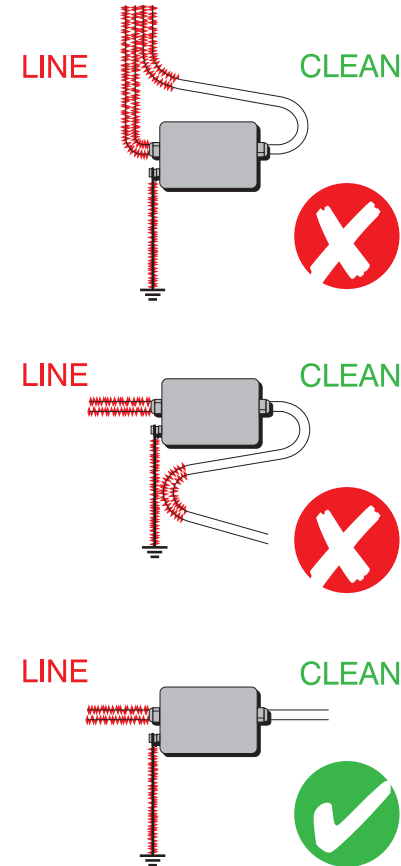
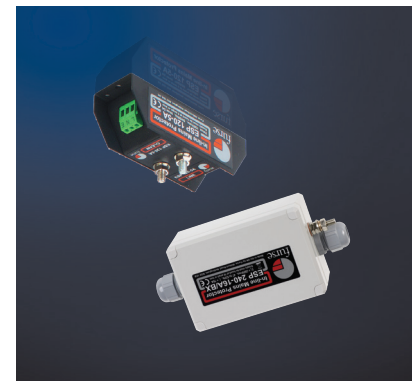


Figure 9: Cable routing.



nd /BX variants
ESP 277-5A, ESP 277-16A,
ESP 240-5A, ESP 240-16A,
ESP 120-5A, ESP 120-16A,
protectors
for mains wire-in

INSTALLATION INSTRUCTIONS



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Environment

Consider the protection of the environment!
Used electrical and electronic equipment must NOT be disposed of with domestic waste. The device contains valuable raw materials which can be recycled. Therefore, contact ABB for disposal of this equipment.



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Figure 5: Flat mounting the ESP 240-16A (or ESP 120-5A, ESP 120-16A, ESP 240-5A, ESP 277-5A, ESP 277-16A).