

INTRODUCTION

This document explains how to install Furse ESP Protectors for in-line mains power supplies:

- ESP 120D-10A, ESP 120D-32A,
- ESP 120DS-10A, ESP 120DS-32A,
- ESP 240D-10A, ESP 240D-32A,
- ESP 240DS-10A, ESP 240DS-32A,
- ESP 277D-10A, ESP 277D-32A,
- ESP 277DS-10A, ESP 277DS-32A



1. Safety note:

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 120D-10A & ESP 120DS-10A	10 Amps or less
ESP 240D-10A & ESP 240DS-10A	10 Amps or less
ESP 277D-10A & ESP 277DS-10A	10 Amps or less
ESP 120D-32A & ESP 120DS-32A	32 Amps or less
ESP 240D-32A & ESP 240DS-32A	32 Amps or less
ESP 277D-32A & ESP 277DS-32A	32 Amps or less

If the supply current exceeds the ESP Protector's current rating, do not use this Protector. Instead, consider ESP*M1 or ESP*D1 parallel-connected SPDs.

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 120D-10A, ESP 120DS-10A, ESP 120D-32A & ESP 120DS-32A	90-150 VRMS
ESP 240D-10A, ESP 240DS-10A, ESP 240D-32A & ESP 240DS-32A	200-280 VRMS
ESP 277D-10A, ESP 277DS-10A, ESP 277D-32A & ESP 277DS-32A/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 (see Figure 2)

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.

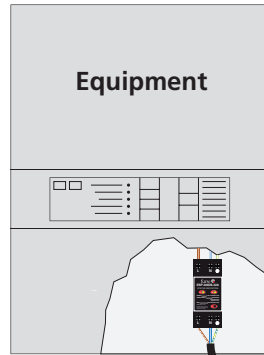
3.2 Enclose unboxed ESP Protectors

ESP In-Line Mains Protectors for 10 A and 32 A have exposed terminals and should be installed within a panel or enclosure, for reasons of electrical safety.

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

3.3 Series connection

The ESP Protector is connected in-line (or series) with the supply to be protected (see Figure 2a & 2b).



Fused mains power supply

Figure 1: Installation within the system on a power supply fused at 10 A or less (ESP 120D-10A, ESP 240D-10A, ESP 277D-10A, ESP 120DS-10A, ESP 240DS-10A or ESP 277DS-10A) or 32 A or less (ESP 120D-32A, ESP 240D-32A, ESP 277D-32A, ESP 120DS-32A, ESP 240DS-32A or ESP 277DS-32A).

It can be mounted in any orientation and is bi-directional to surges, to simplify installation.

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

3.4 Fixing methods

The ESP Protector can be clipped onto a 'top hat' DIN rail.

It includes an innovative DIN foot for connection to 35 mm DIN rails.

This DIN foot, comprising spring loaded steel DIN mounts, enables rapid positioning on to the rail (see Figure 3a & 3b).

Pull the spring loaded steel DIN mount down and out to lock into place ready for siting the ESP Protector.

3.5 Position the ESP Protector at the preferred location on the DIN rail and press the protector back to release the springs. The protector locks into place.



Figure 2a & 2b: Installation of 'D' and 'DS' variants.

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.

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

We recommend that these are terminated with a boot lace ferrule. Maximum torque value for power terminals is 0.8 Nm, with cable stripping length 9.5 mm. The torque rating for the volt-free contacts is 0.25 Nm and cable stripping length 7 mm.

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 DIN rail.

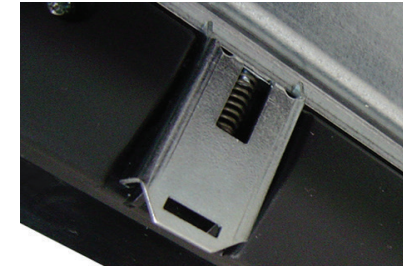
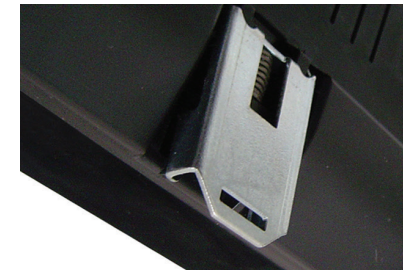


Figure 3a & 3b: Innovative spring loaded DIN foot shown open and locked in place.

3.7 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 4, overleaf).

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

4. Status indication

The ESP Protector gives a continuous visual display of its status.

It has a two colour LED indicator light, for each phase and neutral:

- Green only** = Full protection, power on.
- Green + Red** = WARNING. Reduced protection, replace as soon as possible.
- Red only** = NO PROTECTION. Replace immediately.
- No lights** = No power connection or system fault. Check external fuses and connections.

5. Remote indication (DS variants only)

A remote indication of the reduced protection state is provided for linking the protector to a building management system, remote telemetry, PLC or directly to an indication light or buzzer.

The ESP Protector has both a normally open and a normally closed volt free contact.

The terminal for the volt free contact accepts 2.5 mm² cable (solid or stranded conductor) and is located on the bottom of the ESP Protector.

It has three terminals, marked:

- NO** = Normally Open
- NC** = Normally Closed
- C** = Common

The normally open (NO) contact is open when the ESP Protector is healthy and power is present. The normally closed (NC) contact is closed when the unit is healthy and power is present.

As well as providing warning of the reduced protection state, the normally closed volt free contact can also be used to signal power loss on one or more phases, eliminating the need for special relays. See Figure 3.

	Unit Healthy		Reduced or No protection	
	NO	NC	NO	NC
Power Present	OPEN	CLOSED	CLOSED	OPEN
Power Absent	CLOSED	OPEN	CLOSED	OPEN

Figure 3: Operation of normally closed (NC) and normally open (NO) volt free contact.

5.2 The ESP units remote indication is rated at 1 A, 250 Vac. A minimum load of 10 mA, 5 V DC is required to ensure reliable contact operation.

6. Maintenance

Maintenance should be conducted at least once a year and also following lightning activity. Visually check:

- Visual status indication lights (see 6. Status indication for interpretation)
- Condition of connecting leads and terminations

7. Application notes

7.1 ESP coordination

The ESP Protector is designed to fully coordinate with upstream/downstream ESP Protectors of equivalent system voltage. For example an ESP 240D-10A located at a sub-distribution board would coordinate effectively with an ESP 240 D1 Protector located at a main distribution board. No additional decoupling elements such as inductors are needed to ensure ESP Protectors achieve coordination.

Always ensure ESP Protectors are used on the same installation to ensure coordination.

Mixing ESP Protectors with alternative manufacturers' units could result in damage to both protectors and connected equipment through poor coordination.

7.2 RCD units

ESP Protectors should ideally be installed before (or upstream of) residual current devices (RCDs) and not on the load side.

ESP Protectors should only be installed on the load side of the RCDs if the load in question is external to the building.

This should help to reduce any spurious tripping of such devices due to transient overvoltages.

Special transient hardened RCDs (type 'S') can be obtained from a number of manufacturers.

8.3 Insulation tests (flash testing)


The ESP Protector should be fully disconnected from the circuit before testing. Otherwise the ESP Protector will treat the insulation test as a transient overvoltage and control the voltage to a low level - thereby defeating the object of the test.

8.4 Use of powered screwdrivers

The use of powered screwdrivers is not recommended unless measures are taken to ensure screws are tightened correctly and not damaged.

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.



Notes



For in-line mains protectors
 Din mount protectors for 120, 240 & 277 Volts up to either 10 or 32 Amps
 INSTALLATION INSTRUCTIONS



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