Introduction

This document explains how to install ready-boxed Furse ESP Lightning Barriers for two and four wire twisted pair data communication/ signal/telephone lines:

For two wire lines:
ESP 06D/BX I ESP 15D/BX I ESP 30D/BX I ESP 50D/BX I ESP 110D/BX I ESP TN/BX

For four wire lines:
ESP 06D/2BX I ESP 15D/2BX I ESP 30D/2BX I ESP 50D/2BX I ESP 110D/2BX I ESP TN/2BX

Note: Lightning Barriers with /I part numbers (eg ESP TN/BX/I) have IDC terminals (not screw terminals) and connections should be made using the correct tool.

1. Safety Note

1.1 ESP Lightning Barrier installation should be conducted by a qualified competent person and comply with all relevant Regulations and Legislation (including BS 7671 Wiring Regulations and Building Regulations).

1.2 Incorrect installation will impair the effectiveness of the ESP Lightning Barrier.

1.3 Always handle cables by their insulation.

1.4 Never work on Lightning Barriers, earthing or their cables during a storm.

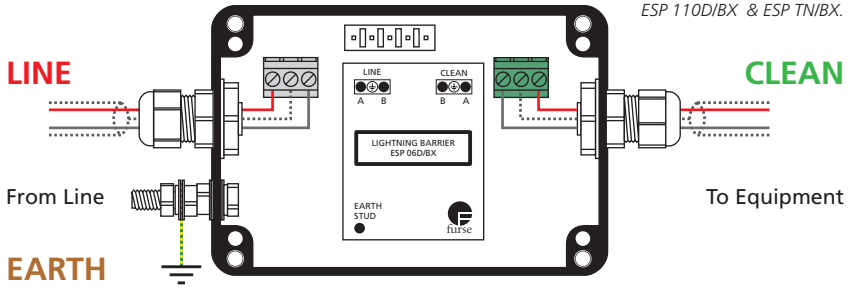


Figure 1: Series connection for two wire ESP 06D/BX, ESP 15D/BX, ESP 30D/BX, ESP 50D/BX, ESP 110D/BX & ESP TN/BX.

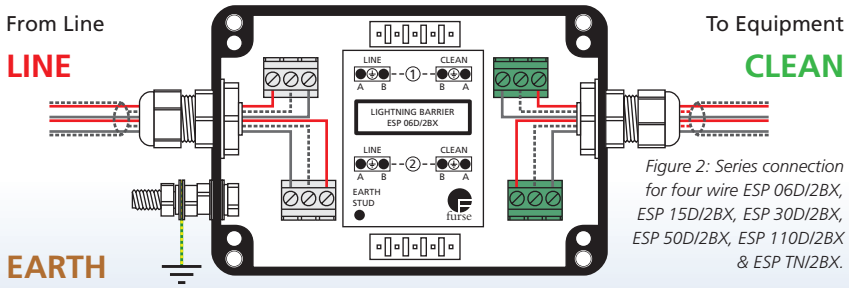


Figure 2: Series connection for four wire ESP 06D/2BX, ESP 15D/2BX, ESP 30D/2BX, ESP 50D/2BX, ESP 110D/2BX & ESP TN/2BX.

2. Before installation

2.1 Check that the voltage drop caused by the resistance of the unit does not interfere with the normal operation of the system.

	Line Resistance
ESP 06D/BX & ESP 06D/2BX, ESP 15D/BX & ESP 15D/2BX, ESP 30D/BX & ESP 30D/2BX, ESP 50D/BX & ESP 50D/2BX, ESP 110D/BX & ESP 110D/2BX	9.4 Ω
ESP TN/BX & ESP TN/2BX	4.4 Ω

2.2 Be sure that the Lightning Barrier's bandwidth will not restrict the system bandwidth.

	Bandwidth (-3 dB)
ESP 06D/BX & ESP 06D/2BX	800 kHz
ESP 15D/BX & ESP 15D/2BX	2.5 MHz
ESP 30D/BX & ESP 30D/2BX	4 MHz
ESP 50D/BX & ESP 50D/2BX	6 MHz
ESP 110D/BX & ESP 110D/2BX	9 MHz
ESP TN/BX & ESP TN/2BX	20 MHz

2.3 Ensure that the current passing through the Lightning Barrier does not exceed 300 mA, DC or AC RMS.

2.4 Make sure that the system's maximum line voltage (DC or AC peak) will never exceed the maximum working voltage of the Lightning Barrier.

Otherwise the Lightning Barrier will clamp signal voltages as though they were transient overvoltages.

	Normal Working Voltage	Maximum Working Voltage
ESP 06D/BX & ESP 06D/2BX	6 V	7.79 V
ESP 15D/BX & ESP 15D/2BX	15 V	19 V
ESP 30D/BX & ESP 30D/2BX	30 V	37.1 V
ESP 50D/BX & ESP 50D/2BX	50 V	58 V
ESP 110D/BX & ESP 110D/2BX	110 V	132 V
ESP TN/BX & ESP TN/2BX	-	296 V

3. Installation

3.1 Series connection

Furse ESP Lightning Barriers are connected in series with the data communication, signal or telephone line *(see Figures 1 & 2)*.

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

3.2 Lightning Barrier location

Lightning Barriers are usually located either:

(a) near to where the data/signal/telephone line enters or leaves the building, or

(b) close to the equipment being protected (or actually within its control panel)

Either way, it is important that the Lightning Barrier's connection to earth (or barrier earth bond) is kept short *(see Section 3.6 - Earthing, overleaf)*.

3.3 Fixing

These Lightning Barriers can be screwed to a flat surface - M5 mounting holes are located on the base, inside the Lightning Barrier but outside the seal, close to the cable glands *(See Figure 3)*.

The Lightning Barrier must be mounted before it is wired up.

Only screw the lid in place after the Lightning Barrier is fully connected, to retain the Barrier's IP rating.

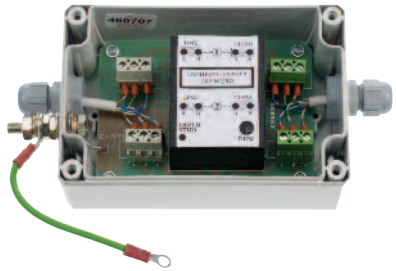


Figure 3. M5 mounting holes are located on the base, inside the protector but outside the seal, close to the cable glands.

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

3.4 Line, clean, screen and earth connections

Cable wires should be terminated with a boot lace ferrule.

The Lightning Barrier's grey ***line*** terminal should be connected to the dirty, incoming line - ie from where the transient overvoltage is expected.

The Lightning Barrier's green ***clean*** terminal should be connected to the line going to the protected equipment.

Cable screens can be earthed through connection to the terminals marked with the earth symbol: ⏚

The input/***line*** and output/***clean*** connections are paired:

A → A

B → B

Additionally, on four wire units the ***line*** and ***clean*** terminals are paired:

LINE ----- 1 ----- CLEAN

LINE ----- 2 ----- CLEAN

...continued overleaf

The Lightning Barrier must be connected to earth by connecting a crimped earth cable to the Barrier's earth stud. This can be seen in *Figures 1 & 2, overleaf. See also Section 3.6 - Earthing*.

3.5 Keep clean cables away from dirty cables

Clean outgoing cables should never be routed next to dirty incoming cables or dirty barrier earth bonds *(See Figure 4)*.

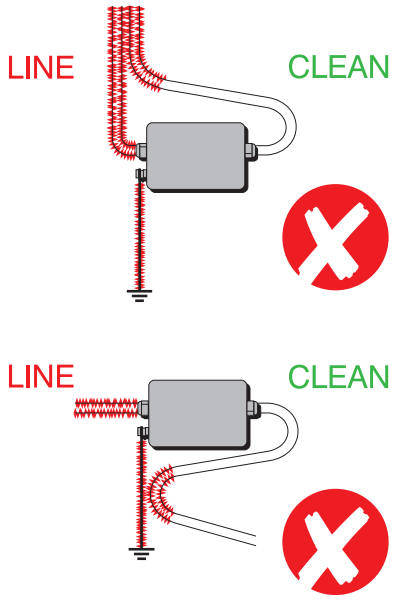
If rows of Lightning Barriers are installed close to each other, dirty ***line*** and ***clean*** cables must be kept at least 5 cm apart.

3.6 Earthing

Protectors for mains power supplies and Lightning Barriers for data/signal/telephone lines should be connected to the same earth point.

The Lightning Barrier should therefore be bonded to the main electrical earth or earth star point.

10 mm² stranded green/yellow cable should be used for this bond.



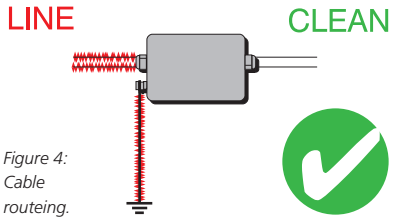


Figure 4: Cable routeing.

This barrier earth bond should be less than 1 metre long (otherwise the effectiveness of the Lightning Barrier will be reduced).

Barrier earth bonds of 2, 3 or 4 metres are allowed if:

(a) 2, 3 or 4 parallel earth bonds are used and these parallel earth bonds are kept at least 5 cm apart from each other, or

(b) both the main earth bar and the Lightning Barriers are located on a large metal sheet, the Barriers can be bonded to the metal sheet which in turn is bonded to the earth bar

Where even 4 metres of connecting lead is not sufficient, the data/signal/telephone line should be re-routed to bring it within 4 metres of the Lightning Barrier.

In circumstances where the line cannot ideally be re-routed, the Lightning Barrier can alternatively be connected to the electrical earth local to the equipment being protected (eg the earth bar of the local power distribution board) *(see Figure 5)*.

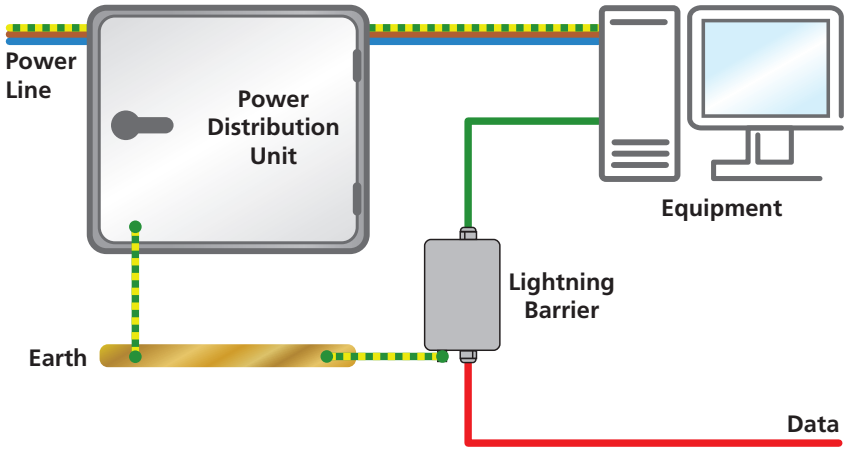


Figure 5: If connection to the main electrical earth is not possible, the Lightning Barrier can be connected to the earth local to the protected equipment.

NOTES:

Thomas&Betts

ESP D/BX & D/2BX Series

Installation instructions for ready-boxed lightning barriers

furse

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