Introduction

This document explains how to install Furse MMP Protectors for mains power supplies:

MMP BB Series
MMP BT Series

1. Safety Note

1.1 MMP Protector 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 MMP Protector.

1.3 Always handle cables by their insulation.

1.4 Never work on MMP Protectors, earthing or their cables during a storm.

2. Application

2.1 Furse Type 1+2 (Class I+II) MMP BB and MMP BT Series Protectors are suitable for use on single and three phase mains supplies & power distribution boards to prevent transient overvoltages (surges) damaging equipment.

3. Before installation

3.1 Ensure that the MMP Protector's maximum voltage is suitable for the installation.

	Maximum Voltage
MMP B150B	150 Vac / 200 Vdc
MMP B275B	275 Vac / 350 Vdc
MMP B385B	385 Vac / 350 Vdc
MMP B440B	440 Vac / 580 Vdc
MMP BT255B	255 Vac

4. Installation

4.1 Mounting location

MMP Protectors should be installed very close to the power supply to be protected.

Usually the protector will be installed in a power distribution panel or right next to it in an enclosure.

4.2 Enclose the MMP Protector

MMP Protectors have exposed terminals and therefore, for electrical safety, must be installed within a power distribution panel, if possible behind a suitable viewing window, or within in a separate enclosure (MMP ENC4 or MMP ENC8), as close as possible to the power distribution panel *(see 4.8 - Length of connecting leads)*.

When mounting in an existing metal panel or enclosure, ensure that the enclosure is securely bonded to the earth bar to which the MMP Protector(s) will be connected.

Where installing in an enclosure, gland the enclosure on to the power distribution panel to protect cabling and the IP rating of the enclosure. MMP Protectors should always be installed in a dry environment.

4.3 Parallel connection

MMP Protectors are connected in parallel with the supply to be protected *(see Figures 1-8 overleaf)*. The connecting leads do not carry the load current of the supply, only the current associated with suppressing the transient overvoltage.

Connecting leads to the MMP Protector(s) need to be kept short in order to minimise additive inductive voltages.

The total lead length between live conductors, SPD and the earth conductor should ideally be no more than 0.5 m *(see Section 4.8 - Length of connecting leads)*. **The connecting leads between the supply and the MMP terminals should be as short as possible, otherwise the effectiveness of the protector may be reduced.**

Individual phase and neutral terminals to the MMP Protectors are not pre-labelled.

Care should be taken so that the phase and neutral inputs are correctly noted for future reference. If the Furse enclosure (MMP ENC4) is used, the label provided can be used to denote the **L1**, **L2**, **L3** and **N** connections.

Connections should be made to each supply conductor including earth.

The side marked **L/N** on the MMP Protector is connected to a line conductor (**L1**, **L2** or **L3**). In the case of the MMP B***B/2 & MMP B***B/1+1T (single phase) or MMP B***B/4 & MMP B***B/3+1T (three phase), the protectors are also connected to the neutral conductor (**N**). The protector should be earthed via the local main earth or earth star point.

In multi-protector installations only one of the MMP modules needs to be earthed as they are bonded together by a busbar-style strip.

Note: Hand tighten connections only. Do NOT use power driven screwdrivers to make connections to MMP Protectors.

4.4 System variations

For TN-C systems, each line conductor is connected to earth via an individual surge protection mode *(see Figures 1 & 2, overleaf)*.

For TN-S and TN-C-S systems, each line conductor, plus the neutral conductor, is connected to earth via an individual surge protection module *(see Figures 3-6, overleaf)*.

For TT systems (3+1 circuit), the type of installation recommended is in accordance with E DIN VDE 0100 part 534/A1:1996-10 *(see Figures 7 & 8, overleaf)*. The line conductors **L1**, **L2** and **L3** are connected to the neutral conductor (**N**) via individual surge protection modules. The neutral terminal is also connected to the earth (**PE**) conductor via the rightmost BT protector. All protectors should be installed on the input (power) side of the RCD. **Note: ensure this type of installation is not in violation of any national regulations.**

4.5 Isolation

It is good practice to be able to isolate or disconnect the MMP Protector(s) from the supply.

The supply to the entire distribution panel should not be switched off on many computer power supplies and other critical loads. The means of isolation should therefore be installed in the connection to the MMP Protectors.

4.6 Fuse connecting leads

The connecting leads the to **L1**, **L2** and **L3** terminals should be suitably fused. This is to protect the connecting lead in the event of a short circuit. The fuse to the MMP Protectors (F_{SPD}) should be lower than the upstream supply fuse F_S by a sufficient enough factor to ensure fuse discrimination. As a general guide a factor of at least 2 could be used ($F_{SPD} \leq 0.5\ F_S$), where the maximum fuse to the protector required is 250 Amps (if the supply fuse is 500 Amps or greater). Refer to the fuse manufacturer's operating characteristics to ensure discrimination, particularly where an installation includes a mixture of types of fuse, or of fuses and circuit breakers.

Live/phase connecting leads can be fused by either installing appropriate high rupture capacity (HRC) fuses or switchfuses in the connecting leads at the supply end of the lead, or installing an appropriate MCCB or type 'C' MCB.

4.7 Size of connecting leads

The size (cross-sectional area) of the connecting leads between the terminals of the MMP Protector(s) and the power supply should be a minimum size of 16 mm² multi-stranded conductor (copper).

Note: the size of connecting leads to the MMP Protector(s) must not be less than the size of leads of the associated system.

If required, the protector's terminals will accept connecting leads of up to 25 mm² (multi-stranded copper conductor).

4.8 Length of connecting leads

The connecting leads should be kept as short as possible and ideally should not exceed 25 cm (10 inches) from the busbars to the MMP Protector's terminals.

Protectors can be mounted upside down or on their side if this facilitates shorter connecting leads.

WARNING: The longer the connecting leads (between cable/busbars and the protector's terminals) the greater the voltage let-through the protector.

If the let-through voltage is higher than the withstand voltage level of the equipment to be protected, damage will result.

4.9 Bind connecting leads

Connecting leads should be tightly bound together using Ty-Raps®, tape or spiral wrap. This should be done for the entire length of the cable or as far as is possible.

5. Protector operation/status indication

5.1 MMP Protectors include an internal thermal supervision device which continually monitors its operation. Status is displayed via the front facing windows.

During normal operation the status display is clear. Should a fault occur, the supervision device disconnects the MMP Protector from the mains supply and displays a red indicator in the status windows.

Note: After the supervision device has disconnected surge protection, the MMP Protector(s) should be replaced to prevent the risk of flashover causing dangerous sparking and equipment damage.

6. Remote indication

6.1 **This section is only applicable to MMP Protectors with the /S suffix in the part number.**

The remote indication facility enables the MMP Protector to be linked to a building management system.

A volt free contact on the MMP Protector (/S versions) allows a remote alarm to be tripped if a fault develops within the protector. When a fault occurs terminal **NC** breaks contact and terminal **NO** makes contact.

6.2 Unless further specific surge protection is in place the signalling wires should only be used inside the building or the MMP surge protection may be affected.

6.3 The terminal for the volt free contact accepts 1.5 mm² cable and is located on the top of the MMP Protector. The MMP Protector's remote indication is rated at 0.5 Amp, 250 V AC.

7. Maintenance

7.1 Maintenance should be conducted at least once a year and also following lightning activity. Visually check status indication window (clear = ok, red = fault/disconnected) and condition of connecting leads and terminations. If the status indication window shows red, the replaceable module of the MMP Protector should be replaced. Contact Furse.

...continued overleaf

8. Application notes

8.1 MMP coordination

MMP Protectors are designed to fully coordinate with upstream/downstream MMP Protectors of equivalent system voltage. No additional decoupling elements such as inductors are needed to ensure MMP Protectors achieve coordination. Always ensure MMP Protectors are used on the same installation to ensure coordination. Mixing MMP Protectors with alternative manufacturers' units could result in damage to both protectors and connected equipment through poor coordination.

8.2 RCD units

MMP Protectors should ideally be installed before (or upstream of) RCDs and not on the load side. MMP 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)

MMP Protectors should be fully disconnected from the circuit before testing.

Otherwise the MMP 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 (maximum torque value is 4.5 Nm for these terminals).

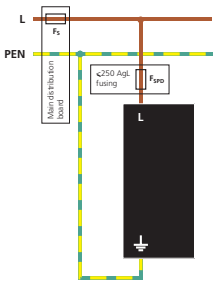

Figure 1: 1-phase TN-C installation

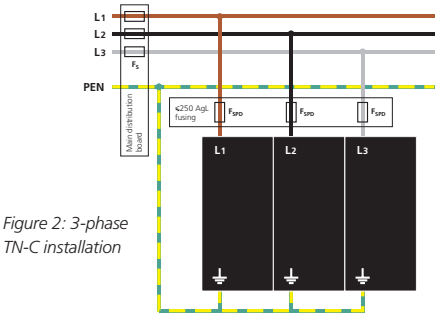

Figure 2: 3-phase TN-C installation

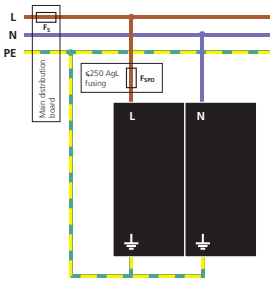

Figure 3: 1-phase TN-S installation

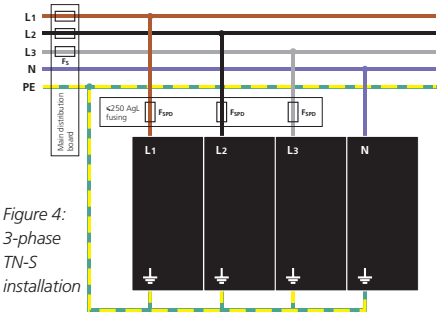

Figure 4: 3-phase TN-S installation

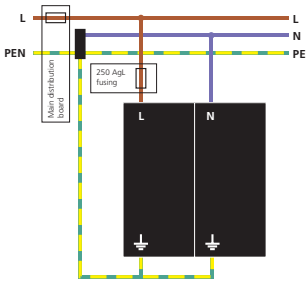

Figure 5: 1-phase TN-C-S installation

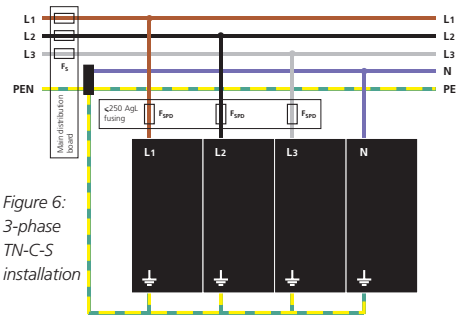

Figure 6: 3-phase TN-C-S installation

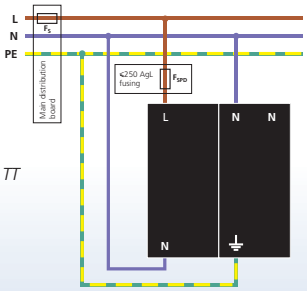

Figure 7: 1-phase TT installation

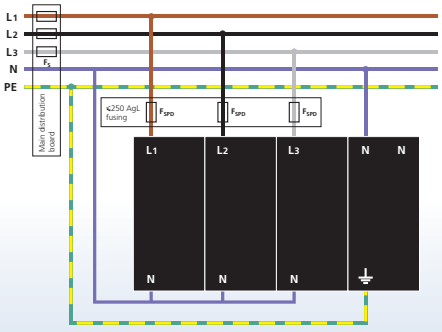

Figure 8: 3-phase TT installation

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