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

2. Application
2.1 Check Furse ESP 240T1/XXX Type 1 equipotential bonding SPDs are suitable for use on single phase mains supplies and power distribution boards, primarily to prevent flashover as a result of lightning, which may present a risk to life through dangerous sparking causing fire and/or electric shock.

Following BS EN/IEC 62305, installing Type 1 equipotential bonding SPDs alone does not protect sensitive electronic equipment from transient overvoltage damage. Type 1 SPDs should be used as part of a coordinated set of SPDs, with downstream Type 2 + 3 Full Mode SPDs typically installed at sub-distribution boards feeding electronic equipment.
On small, compact, metal-cased distribution boards, such as small MCB boards) the first way is preferable, although any outgoing way is suitable. On a large board (e.g. cubicle switchboard), it is better to install the SPD on the load side of the incoming isolator (e.g. in the metering section) for optimal protection.

(iii) directly to the busbars via suitable HRC fuses, switchfuses, MCBs or MCCBs - See 4.7.

(b) Protecting supplies going out of the building.

The connection methods 4.5a (i to iii) are not suitable for protecting a distribution board which provides a supply to outside the building either to a separate building or some other external load (e.g. site lighting). To protect the equipment inside the building from transient overvoltages entering the board on the outgoing feed, protection should be installed close to the external load.

4.6 Isolation

It is good practice to be able to isolate or disconnect the SPD from the supply.

The supply to the entire distribution board 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 ESP Protector (see 4.7 - Fuse connecting leads).

4.7 Fuse connecting leads

The connecting leads to the phase/live terminals of the SPD should be fused. This is to protect the connecting leads in the event of a short circuit. The fuse to the SPD (F<sub>in</sub>) should be lower than the upstream supply fuse F<sub>x</sub> by a sufficient enough factor to ensure fuse discrimination.

As a general guide a factor of at least 2 could be used (F<sub>in</sub> ≤ 0.5 F<sub>x</sub>), where the maximum fuse to the ESP 240T1/25/XXX SPD required is 250 A (if the supply fuse is 500 A 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:
(a) installing appropriate high rupture capacity (HRC) fuses or switchfuses in the connecting leads at the supply end of the lead, or
(b) installing an appropriate MCCB where the SPD is installed via an outgoing way (4.5b earlier), this should incorporate an appropriate HRC fuse, MCB or MCCB.

4.8 Size of connecting leads

The connecting leads between the terminals of the SPD and the power supply, should be multi stranded conductor no less than 16 mm<sup>2</sup> (copper). If required, the terminals on the SPD will accept connecting leads of up to 25 mm<sup>2</sup> (flexible) or 35mm<sup>2</sup> (solid/stranded).

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

WARNING: The longer the connecting leads (between the mains cable or busbars and the terminals of the SPD) the greater the additive voltage let-through by the installed protector. High additive voltages will place greater strain on coordinated downstream Type 2 or Type 3 SPDs and impair their performance or lower the lifespan of these protectors.

4.10 Bind connecting leads

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

5. SPD operation/status indication

5.1 The SPD includes an internal thermal supervision device which continually monitors its operation. Status is displayed via the front facing window.

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

Note: After the supervision device has disconnected surge protection, the SPD should be replaced (see 7.2) to prevent the risk of equipment damage.

6. Remote indication

6.1 A remote indication facility is provided for linking the ESP 240T1/XXX SPD to a management system/remote alarm. A volt free contact on the SPD allows a remote alarm to be tripped if a fault develops within the SPD. When a fault occurs (or the protective module is removed) terminals 11-12 (12 is Normally Closed NC) break contact and terminals 11-14 (14 is Normally Open NO) make contact – see Figure 5.

6.2 The fast-fit spring-type terminal for the volt free contact accepts solid cable from 0.25mm<sup>2</sup> up to 1.5 mm<sup>2</sup> and is located on the bottom of the SPD. The SPD's remote indication is rated at 1.0 Amp, 250 V AC. Note: For reliable contact operation, the minimum permissible load is 10 mA, 5 V DC.

6.3 The SPD is designed to trip out quickly in response to a high level of overvoltage. The SPD's remote indication is not intended to be connected to an external alarm system. If external indication is required, the remote alarm function can be used.

7. Maintenance

7.1 Maintenance should be conducted at least once a year and also following lightning activity. Visually check:
- Status indication window (green= ok, red/not connected)
- Condition of connecting leads and terminations

7.2 Figure 6 illustrates how to replace an ESP 240T1/XXX SPD's protection module (spares available from ABB Furse). First disconnect the supply to the SPD. To remove a protection module, its terminals are cut. The SPD's remote indication is closed (NC) break contact and terminals 11-12 (12 is Normally Closed NC) break contact and terminals 11-14 (14 is Normally Open NO) make contact – see Figure 5.

7.3 The SPD's remote indication is rated at 1.0 Amp, 250 V AC. Note: For reliable contact operation, the minimum permissible load is 10 mA, 5 V DC.

8. Application notes

8.1 ESP coordination

ESP 240T1/XXX SPDs are designed to fully co-ordinate with downstream SPD's of equivalent system voltage.

For example the ESP 240T1/25/XXX located at the main distribution board would coordinate effectively with an ESP 240T2/50/XXX, ESP 240 M1 or ESP 240 D1 SPD typically located at sub-distribution boards. No additional decoupling elements such as inductors are needed to ensure ESP SPD coordination. Always ensure SPDs of the same manufacturer are used on the same installation to ensure coordination. Mixing SPDs from alternative manufacturers' SPDs could result in damage to both SPDs and connected equipment through poor coordination.

8.2 RCD units

SPDs should ideally be installed before (or upstream of) residual current devices (RCDs) and not on the load side. SPDs 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 SPD should be fully disconnected from the circuit before testing. Otherwise the SPD 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. Hand tight connections only. (Maximum torque value for power terminals is 4.5 Nm, with stripping length 18 mm. The volt-free contacts are fast-fit spring-type, with stripping length 12 mm.

CONTACT US

ABB Furse
UK Office
Wilford Road
Nottingham NG2 1EB
Tel: +44 (0) 115 964 3700
Fax: +44 (0) 115 964 3701
National Sales Tel: +44 (0) 333 999 9900
National Sales Fax: +44 (0) 333 999 9901
E-Mail: enquiry@furse.com

www.furse.com

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.

Specifications subject to change without notice.