Combined Category D, C, B tested data link protector and Combined Type 1, Type 2 and Type 3 tested mains protector (to BS EN 61643) suitable for Solid State Interlocking (SSI) mains power and data links. Protectors are Network Rail approved. For use on lines at boundaries from LPZ 0 through to LPZ 3 to protect sensitive electronic equipment.

**Features & benefits**

- Accepted for use on Network Rail infrastructure. NRS PADS references: ESP SSI/M - 086/047066; ESP SSI/B - 086/047067; ESP SSI/120AC - 086/047058 and ESP SSI/140AC - 086/047059 (Network Rail Approval PA05/00471)
- Very low let-through voltage (enhanced protection to IEC/BS EN 62305) between all sets of conductors - Full Mode protection (ESP SSI/120AC and ESP SSI/140AC) and all signal lines (ESP SSI/M)
- ESP SSI/B (or ESP SSI/B/G) modified base can be permanently wired into the system
- ESP SSI/M plug-in protection module can be replaced without interfering with the operation of the system
- ESP SSI/B (or ESP SSI/B/G) incorporates a 100 Ω terminating resistance that can be connected if required
- ESP SSI/B (or ESP SSI/B/G) can be flat mounted, or a built-in DIN rail foot allows simple clip-on mounting to top-hat (ESP SSI/B) or G DIN rails (ESP SSI/B/G)
- ESP SSI/120AC and ESP SSI/140AC are a compact size for easy installation in trackside cabinets and control rooms
- ESP SSI/120AC and ESP SSI/140AC have three way visual indication of protector status and advanced pre-failure warning

**Application**

To prevent transient overvoltage damage to Solid State Interlocking (SSI) systems, protectors should be fitted in trackside cabinets and equipment rooms, on both the data link and the mains power lines.  
- For single phase mains power supplies of 90-150 Volts, use the ESP SSI/120AC (formerly ESP 120X)
- For single phase mains power supplies of 90-165 Volts, use the ESP SSI/140AC (formerly S065)
- For SSI data links, use the ESP SSI/B (or ESP SSI/B/G) base unit with the ESP SSI/M protection module

Use ESP PTE002 SSI tester for line-side testing of SSI/M modules. NRS PADS: 094/020033

**Installation**

**ESP SSI/B:** Connect in series with the data link either near where it enters the trackside location cabinet or the equipment room.  
**ESP SSI/120AC and ESP SSI/140AC:** Install in parallel, within the trackside cabinet or equipment room. The protector should be installed on the load side of the fuses, at the secondary side of the step-down transformer. Connect, with very short leads, to phase (BX), neutral (NX or CNX) and earth.

Parallel connection of single phase protectors ESP SSI/120AC and ESP SSI/140AC (fuses not shown for clarity)
ESP SSI Series - Technical specification

**Electrical specification ESP SSI/M ESP SSI/B**

<table>
<thead>
<tr>
<th>ABB order code</th>
<th>7TCA085400R0169</th>
<th>7TCA085400R0166</th>
</tr>
</thead>
</table>

**Maximum signal voltage**

- 7 V

**Maximum common mode stand-off voltage**

- 90 Vrms

**In-line resistance (per line, ±10%)**

- 4.5 Ω

**Leakage:**

- (Line to line impedance) > 1 MΩ

- (Line to earth impedance) > 10 kΩ

**Differential bandwidth (50 Ω system)**

- 10 MHz

ESP SSI/B:

This is a modified 11 pin ‘relay type’ socket containing a 100 Ω ±5% wire-wound 2.5 W resistor connected between terminals 8 and 9. Internal links between terminals 2 & 3, 9 & 10, and 1 & 11.

**Transient specification ESP SSI/M ESP SSI/B**

**Let-through voltage**

- C2 test 2 kV 1.2/50 µs, 1 kA 8/20 µs to BS EN/EN/IEC 61643-21 (Line to Line)(6)
  - 15 V(3)

- C2 test 4 kV 1.2/50 µs, 2 kA 8/20 µs to BS EN/EN/IEC 61643-21 (Line to Earth)(6)
  - 250 V(3)

- B2 test 4 kV 10/700 µs, 100 A 5/310 µs to BS EN/EN/IEC 61643-21 (Line to Line)(6)
  - 15 V(3)

- B2 test 4 kV 10/700 µs, 100 A 5/310 µs to BS EN/EN/IEC 61643-21 (Line to Earth)(6)
  - 300 V(3)

**Maximum surge current**

- D1 test 10/350 µs to BS EN/EN/IEC 61643-21 (Line to Earth)
  - Per signal wire 2.5 kA
  - Per pair 5 kA

- Maximum discharge current test 8/20 µs to BS EN/EN/IEC 61643-21 (Line to Earth)(6)
  - Per signal wire 10 kA
  - Per pair 20 kA

ESP SSI/120AC ESP SSI/140AC

<table>
<thead>
<tr>
<th>ABB order code</th>
<th>7TCA085460R0059</th>
<th>7TCA085460R0060</th>
</tr>
</thead>
</table>

**Nominal voltage - Phase - Neutral Uo (RMS)**

- 120 V

**Maximum working voltage - Phase - Neutral Uc (RMS)**

- 150 V

**Working voltage (RMS)**

- 90-150 V

**Frequency range**

- 47-63 Hz

**Current rating (supply)**

- See installation instructions

**Leakage current (to earth)**

- < 60 μA

**Indicator circuit current**

- < 10 mA

**Volts free contact:**

- Screw terminal

- Current rating 1 A

- Nominal voltage (RMS) 250 V

**Mechanical specification ESP SSI/M ESP SSI/B**

**Temperature range**

- -40 to +80 ºC

**Connection type**

- Screw terminal

**Conductor size (stranded)**

- 16 mm²

**Earth connection**

- Screw terminal

**Volt free contact**

- Connect via screw terminal with conductor up to 2.5 mm² (stranded)

**Case material**

- FR Polymer UL-94 V-0

**Weight:**

- Unit 0.065 kg

- Packaged (per 50) 3.25 kg

**Dimensions**

- See diagram below

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(1) Maximum signal voltage (DC or AC peak) measured at 200 µA

(2) ‘Let-through’ voltage is the maximum transient voltage ‘let-through’ to the equipment to be protected. C2 test (to BS EN/EN/IEC 61643-21) 2 kV 1.2/50 µs, 1 kA 8/20 µs. ‘Let-through’ voltage (±10%)

(3) ‘Let-through’ voltage is the maximum transient voltage ‘let-through’ to the equipment to be protected. C2 test (to BS EN/EN/IEC 61643-21) 4 kV 1.2/50 µs, 2 kA 8/20 µs. ‘Let-through’ voltage (±10%)

(4) Minimum permissible load is 5 V DC, 10 mA to ensure reliable contact operation

(5) The maximum transient let-through of the protector throughout the test (100%), per mode

(6) Line to Line are differential/transverse modes

(7) Line to Earth are common/longitudinal modes

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