

DATASHEET

Specific systems protection ESP SSI Series



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

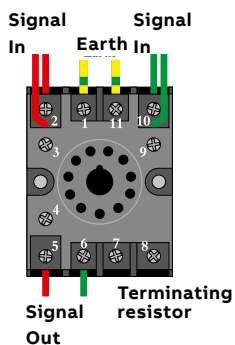
- Accepted for use on Network Rail infrastructure. NRS PADS references: ESP SSI/M - 086/047066; ESP SSI/B - 086/047067; ESP SSI/120AC - 086/047058 and ESP SSI/140AC - 086/047059 (Network Rail Approval PA05/00471)
- Very low let-through voltage (enhanced protection to IEC/BS EN 62305) between all sets 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

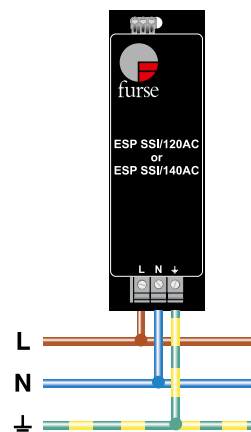


- 1 - Earth in Line
- 2 - Primary signal in + Line
- 3 - Secondary signal in + Line
- 4 - Not connected
- 5 - Signal out + (to DLM) Clean
- 6 - Signal out - (to DLM) Clean
- 7 - Not connected
- 8 - 100 Ω terminating Clean resistor
- 9 - Primary signal in - Line
- 10 - Secondary signal in - Line
- 11 - Earth in Line

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
ABB order code	7TCA085400R0168	7TCA085400R0166
Maximum signal voltage ⁽¹⁾	7 V	
Maximum common mode stand-off voltage	90 Vrms	
	100 mA	10 A, 250 V
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 U_p		
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) ⁽⁷⁾	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) ⁽⁷⁾	300 V ⁽³⁾	
Maximum surge current		
D1 test 10/350 μs to – Per signal wire 2.5 kA BS EN/EN/ – Per pair 5 kA IEC 61643-21 (Line to Earth)		
Maximum discharge – Per signal wire 10 kA current test 8/20 μs – Per pair 20 kA to BS EN/EN/ IEC 61643-21 (Line to Earth)		

Mechanical specification	ESP SSI/M	ESP SSI/B
Temperature range	-40 to +80 °C	
Connection type	–	Screw terminal
Fixing connection: – Flat mount	–	2 x M4 fixing holes with 33 mm centres
– Top Hat Din rail mount (ESP SSI/B)	–	An integral clip
– G Din rail mount (ESP SSI/B/G)	–	2 x mounting clips with screws
Case material	FR Polymer UL-94 V-0	
Weight: – Unit	0.065 kg	0.075 kg
– Packaged (per 50)	3.25 kg	3.9 kg
Dimensions	See diagram below	

⁽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%)

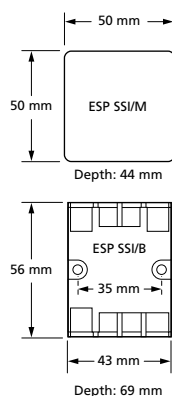
⁽³⁾ 'Let-through' voltage is the maximum transient voltage 'let-through' to the equipment to be protected. C2 test (to BS EN/EN/IEC 61643-21) 4 kV 1.2/50 μs, 2 kA 8/20 μs. 'Let-through' voltage (±20%)

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

⁽⁵⁾ The maximum transient voltage let-through of the protector throughout the test (±10%), per mode

⁽⁶⁾ Line to Line are differential/transverse modes

⁽⁷⁾ Line to Earth are common/longitudinal modes



Electrical specification	ESP SSI/120AC	ESP SSI/140AC
ABB order code	7TCA085460R0059	7TCA085460R0060
Nominal voltage - Phase - Neutral U_o (RMS)	120 V	140 V
Maximum working voltage - Phase - Neutral U_c (RMS)	150 V	165 V
Working voltage (RMS)	90-150 V	90-165 V
Frequency range	47-63 Hz	
Current rating (supply) - see installation instructions	100 A	
Leakage current (to earth)	< 60 μA	
Indicator circuit current	< 10 mA	
Volt free contact: ⁽⁴⁾	Screw terminal	
– Current rating	1 A	
– Nominal voltage (RMS)	250 V	

Transient specification	ESP SSI/120AC	ESP SSI/140AC
Type 1 (BS EN/EN), Class I (IEC)		
Nominal discharge current 8/20 μs (per mode) I_n	5 kA	
Impulse discharge current 10/350 μs (per mode) $I_{imp}(4)$	2.5 kA	
Total discharge current 10/350 μs (total to earth) $I_{total}(4)$	5 kA	
Type 2 (BS EN/EN), Class II (IEC)		
Nominal discharge current 8/20 μs (per mode) I_n	5 kA	
Let-through voltage U_p at I_n ⁽⁵⁾	460 V	540 V
Maximum discharge current I_{max} (per mode) ⁽⁶⁾	20 kA	
Type 3 (BS EN/EN), Class III (IEC)		
Let-through voltage at U_{oc} of 6 kV 1.2/50 μs and I_{sc} of 3 kA 8/20 μs (per mode) ⁽⁷⁾	400 V	500 V

Mechanical specification	ESP SSI/120AC	ESP SSI/140AC
Temperature range	-40 to +80 °C	
Connection type	Screw terminal	
Conductor size (stranded)	16 mm ²	
Earth connection	Screw terminal	
Volt free contact	Connect via screw terminal with conductor up to 2.5 mm ² (stranded)	
Case material	Steel	
Weight: – Unit	0.5 kg	
– Packaged	0.6 kg	

Dimensions	See diagram below
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