

Environmental Tests of TEP 150-4815WI

(1) Compliance with Input Requirements

Nominal Input voltage	EN50155			Result
	Permanent Input range	Transient		
	(0.7~1.25Vin)	100 ms (0.6*Vin)	1 sec (1.4*Vin)	
36V	25.2Vdc ~ 45Vdc (25Vdc ~ 45Vdc)	21.6V (22V)	50.4V (61V)	Meet (TEP 150-4815WI input voltage is 18Vdc to 75Vdc)
48V	33.6Vdc ~ 60Vdc (34Vdc ~ 60Vdc)	28.8V (29V)	67.2V (67V)	Meet (TEP 150-4815WI input voltage is 18Vdc to 75Vdc)

(2) Relative humidity

Standard	IEC-68-2-3 (Tested according following Standard)	EN50155 (Railway)	Result
Conduction	56 days @ 40°C ±2°C; 93% relative Humidity	2*25h @ 40°C	Meet

(3) Compliance with Isolation Requirements

Input Nominal	Our I/O Specifications	Rolling stock EN50155	Result
24Vdc	2250Vdc for 1min	500V/ 50Hz for 1 min	Meet
48Vdc	2250Vdc for 1min	500V/ 50Hz for 1 min	Meet

(4) Compliance with EMC

EMI	Basic Standard	EN55022 (Tested according following Standard)	EN50121-3-2 (Railway)	Result
	Conducted Emission	EN 55022 Class A	EN 55011	Meet
	Radiated Emission	EN 55022 Class A	EN 55011	

(5) EMS

EMS	Basic Standard	EN61204-3 (Tested according following Standard)	EN50121-3-2 Railway	Result
	EN61000-4-2 ESD	Contact discharge Level: ±6kv criteria B Air discharge Level: ±8kv criteria B	Contact discharge Level: ±6kv criteria B Air discharge Level: ±8kv criteria B	Meet
	EN61000-4-3 RS	Level: 10V/m criteria A	Level: 10V/m criteria A (EN50155) Level: 20V/m criteria A (EN50155)	Meet We have to perform a test at an external test EMC lab to see if this requirements can be meet
	EN61000-4-4 EFT	Level: ±2kv criteria B (with capacitor)	Level: ±2kv criteria A	Meet
	EN50155/ EN61000-4-5 Surge	Level: 1kv criteria B (with capacitor)	EN50155 Level: 1.8kv criteria B	Need external Capacitor between +Vin and -Vin. (440µF 100V KY E/C) (220µF 100V KY X 2 PCS)
	EN61000-4-6 CS	Level: 10V/m criteria A	Level: 10V/m criteria A	Meet

(6) Vibration and Shock

	<i>ITEM</i>	Tested according following standard	<i>Railway</i>	Result
Vibration and Shock	Vibration	<i>MIL-STD-810F</i>	<i>EN 61373</i>	Meet (MIL-STD-810F is stricter than EN 61373)
	Shock	<i>MIL-STD-810F</i>	<i>EN 61373</i>	Meet (MIL-STD-810F is stricter than EN 61373)

(7) "Interruptions of voltage supply" and "Supply change over" :

Please check with customer which level they need. We can meet S1 & C1. We need to add external at the input side large capacitor to comply with S2 & C2 requirements.

	<i>Class</i>	<i>EN50155 (Railway)</i>	Result
Interruptions of voltage supply	Class S1	no interruption	Meet
	Class S2	10ms interruptions	Need with 2200µF 100V E/C between +Vin and -Vin

	Class	EN50155 (Railway)	Result
Supply Change Over	Class C1	at 0,6 Un during 100 ms (without interruptions).	Meet
	Class C2	during a supply break of 30 ms.	Need with 6600µF 100V E/C between +Vin and -Vin

(8) OTHERS

Beside the EN 50155, there's a standard "RIA12" concerning Surge Protection. In this standard, the item Surge Voltage of 3.5 Normal Vin (please refer to below table). It needs to be able to withstand for 20ms. The TEP 150-4815WI cannot meet this standard.

"RIA12" is no relation with EN50155. It's a dependent standard. If the customer needs RIA12, we have to design an external Input Transient Voltage Protector for this requirement.

V_N	3.5(V_N)
24V	84V
36V	126V
48V	168V
72V	252V
96V	336V
110V	385V