



The product described in this document has not been fully tested to ensure conformance to the requirements outlined below. Therefore, TE Connectivity (TE) makes no representation or warranty, express or implied, that the product will comply with these requirements. Further, TE may change these requirements based on the results of additional testing and evaluation. Contact TE Engineering for further details.

Nector T 3pos Splice

1. SCOPE

1.1. Content

This specification covers performances, tests and quality requirements of the: “Nector T 3 position Splice” with part numbers 2330191-1; 2330192-1 and 2330196-1 applied according application specification 114-133122.

1.2. Qualification

All inspections shall be performed using the applicable inspection plan and product drawing.

2. APPLICABLE DOCUMENTS AND FORMS

The following documents and forms constitute a part of this specification to the extent specified herein. Unless otherwise indicated, the latest edition of the document applies.

2.1. TE Documents

- 2330191: Customer drawing Nector T 3pos wire-to-wire Splice
- 2330192: Customer drawing Nector T 3pos wire-to-wire Splice Panel mount
- 2330196: Customer drawing Nector T 3pos T-Splitter
- 114-133122: Application Specification
- 107-133122: Packaging Specification
- 501-19298: Qualification Report
- CE_CERT_520_00001_C3

2.2. Industry Documents

- IEC 60998-2-1: Requirements for connecting devices with screw-type clamping units

2.3. Reference Document

- 109-197: TE Test Specification

3. REQUIREMENTS

3.1. Design and Construction

Product shall be of the design, construction, materials and physical dimensions specified on the applicable product drawing.

3.2. Ratings: Applicable to 2330191-1; 2330192-1 and 2330196-1 as shown in Table below.

Cable types: H05VV-F

Voltage	IEC ratings		Operating Temperature	IP rating
	Current	Conductor size		
250 V ac	16 A	1.5 mm ²	-40 °C to 85 °C	IP67, IP68 (1 meter for 2 hours)
	20 A	2.5 mm ²		
	25 A	4.0 mm ²		

3.3. Test Requirements and Procedures Summary

Unless otherwise specified, all tests shall be performed at ambient environmental conditions.

TEST DESCRIPTION	REQUIREMENT	PROCEDURE
Visual Examination of Product	The product shall not have visible marks of damage, break, or defect before and after the execution of the tests.	EIA-364-18B
ELECTRICAL		
Contact resistance	Initial: max 10 mΩ. After testing: max 20 mΩ. <i>Excluding bulk resistance</i>	EIA-364-23 100 mA max and 20 mV max open circuit voltage. All connections to be measured from: Cable ↔ Splice ↔ Cable
Insulation resistance	500 MΩ minimum	IEC 60998-1 §13.3 500 V dc, 1 minute. - Between all lines - Current carrying parts and housing
Electric strength	No breakdown or flashover	IEC 60998-1 §13.4 3000 V ac: 2330191-1 & 2330192-1 1500 V ac: 2330196-1 - For 1 min - Between all lines - Current carrying parts and housing
Temperature rise	ΔT max = 30 °C	IEC 60998-1 §15 Each conductor wired in loop, energized at rated current
MECHANICAL		
Cable Rotating	No visual damage	IEC 60998-2-1 §10.104

	<i>Test smallest and largest cable sizes, on in-line splice</i>	Mass depends on wire size (refer to Table 103), applied for 15 min.
Cable Pull	Wire must not come out of terminal <i>Applicable to 2330191-1 and 2330196-1</i>	IEC 60998-2-1 §10.105
Mechanical strength	No visual damage	IEC 60998-1 §14.2 50 falls with cable length of 100 mm
Sinusoidal vibration	No discontinuities > 1 μ s	EIA-364-28, Condition I Subject mated specimens to 10 Hz to 55 Hz traversed in 1 min with 1.5 mm maximum total excursion. 2 h in each of 2 out of 3 mutually perpendicular planes
Mechanical Shock	No discontinuities > 1 μ s	EIA-364-27, Condition A 50 G's half-sine shock pulses of 11 ms duration. 3 shocks in each direction applied along 3 mutually perpendicular planes, 18 total shocks

ENVIRONMENTAL

Ingress Protection IP68	2 h submerged 1 m depth Tested with H05VV-F cable type.	IEC 60529
Humidity / Temperature cycling	Contact resistance maximum 20 m Ω	EIA-364-31, Method IV 10 cycles (10 days) between 25 °C and 65 °C at 90% to 100% RH
Thermal shock	Contact resistance max 20 m Ω . No physical damage and meet requirements of additional tests as specified in the Product Qualification and Re-qualification Test Sequence shown in Figure 5	EIA-364-32, Test Condition I 25 cycles between -40 °C and 85 °C with 30 min dwells at temperature extremes and 1 min transition between temperatures, under load
Resistance to ageing	Contact resistance max 20 m Ω . No functional damages	IEC 60998-1 §12.1 In natural ventilated oven 70 °C \pm 2 °C for 168 h
Resistance to heat	<i>Test smallest and largest wire sizes</i>	IEC 60998-1 §16.3 Metal ball of \varnothing 5 mm pressed down on test subject supported by metal plate of 3 mm thick with a force of 20 N. Test temperature: 125 °C \pm 2 °C for those parts of installation couplers which retain current-carrying parts and parts of the earthing circuit in position.

		After one hour remove the specimen and cool down within 10 s in cold water.
Temperature life	Contact resistance max 20 mΩ. No cracks or damages. No physical damage and meet requirements of additional tests as specified in the Product Qualification and Re-qualification Test Sequence shown in Figure 5	In oven at 100 °C for 300 hours.
Glow Wire	No visible flame or self-extinguishes flames within 30 s of glow wire removal	IEC 60998-2-1 §18 (According to IEC 60695-2-10) Test temperature: 850°C
Mixed flow gas test (Sulphuric acid gas)	No rusting, visual inspection	According to IEC 60068-2-60 Test duration: 10 days


NOTE

Shall meet visual requirements, show no physical damage, and meet requirements of additional tests as specified in the Product Qualification and Requalification Test Sequence shown in Table 1

3.4. Product Qualification Test Sequence:

TEST OR EXAMINATION	TEST GROUP ^(a)			
	A	B	C	D
	TEST SEQUENCE			
Visual examination of product	1,15,19	1, 9	1, 9,11	1,11
Contact resistance	2, 4, 8,12, 14	2, 4, 6,	2, 4, 6, 8	2,4,6,8
Insulation resistance	5, 9, 17	7	9	9
Electric strength	6, 10, 18	8	10	10
Temperature rise			3, 7	
Cable Rotating		3 ^(b)		
Cable Pull		5		
Mechanical strength	13			
Sinusoidal vibration				3
Mechanical shock				5
Ingress protection IP68	11			
Humidity/Temp. cycling	7			
Resistance to ageing	3			
Resistance to heat	16			
Temperature life			5	
Glow Wire		10		
Mixed flow gas				7

Table 1

i **NOTE**

a) Sample preparation per below table:

Product	Wire Size (stranded)	Test samples qty / Group				Total qty
		A	B	C	D	
In-line Splice 2330191-1	1.5 mm ²	5	5	5	5	20
	2.5 mm ²	5	5	5	5	20
	4.0 mm ²	5	5	5	5	20
T-Splitter 2330196-1	1.5 mm ²	5	5	5	5	20
	2.5 mm ²	5	5	5	5	20
	4.0 mm ²	5	5	5	5	20

Table 2

b) Pull test for the Jumper cable (refer Figure 1). Central unit and End splice must be clamped.

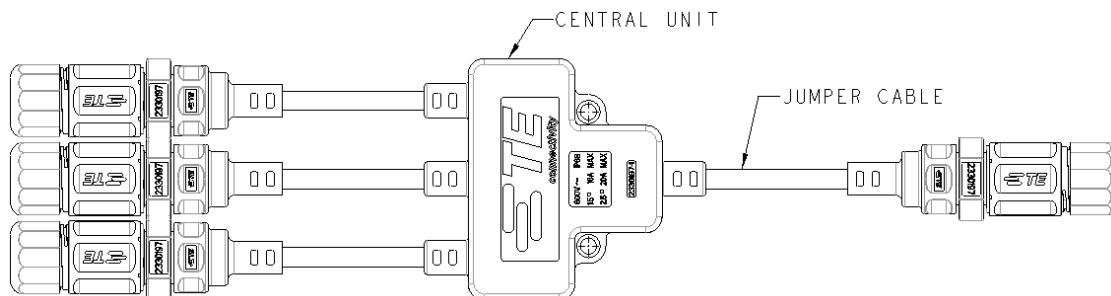


Figure 1

3.5. Yearly verification test sequence:

TEST OR EXAMINATION	TEST GROUP	
	A	B
	TEST SEQUENCE	
Visual examination of product	1, 9	1, 12
Contact resistance	2, 8	2, 8, 11
Insulation resistance	3, 7	3, 7
Electric strength	4, 6	4, 6, 10
Ingress protection IP68	5	
Humidity/Temp. cycling		5
Temperature rise		9

Table 3

4. SAMPLE COMPOSITION AND PREPARATION

Connectors are designed to meet the electrical, mechanical and environmental performance requirements according to specified test conditions.

The samples shall be prepared in accordance with product drawings, they shall be selected at random from current production.

4.1. Yearly Verification Testing

To ensure the product quality yearly verification testing need to be done at TE controlled laboratory.

5 samples per test group for minimum and maximum cable size.

Testing to be done each year in January.

4.2. Re-Qualification Testing

If changes significantly affect fit, form or function are made to the product or the manufacturing process, of which negative influence of the product quality cannot be excluded, product assurance shall coordinate requalification testing, consisting of all or part of the original testing sequence as determined by development/product, quality and reliability engineering.

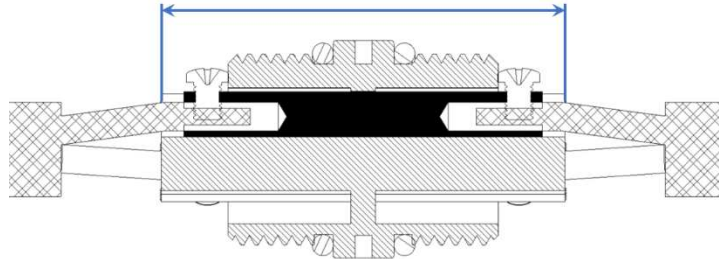
4.3. Quality Conformance Inspection

The applicable TE Connectivity quality inspection plan will specify the sampling acceptable quality level to be used. Dimensional and functional requirements shall be in accordance with the applicable product drawing and this specification.

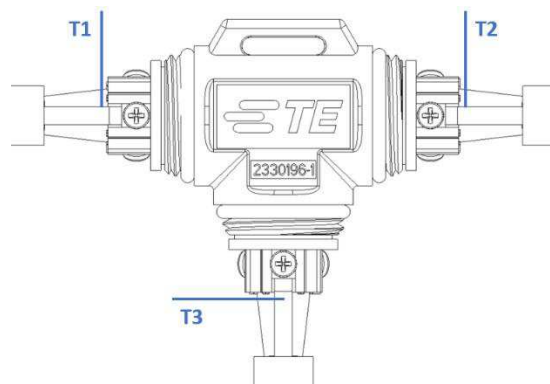
5. TEST SETUP

5.1. Low level contact resistance: Measurement points

- **Inline Splice:** wire conductor to wire conductor



- **T-Splitter Splice:** wire conductor to wire conductor



Test points for resistance measurement: to be checked on Line, Neutral & Ground

T1 ↔ T2

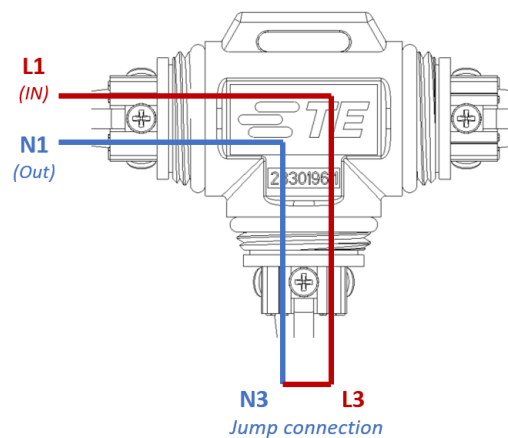
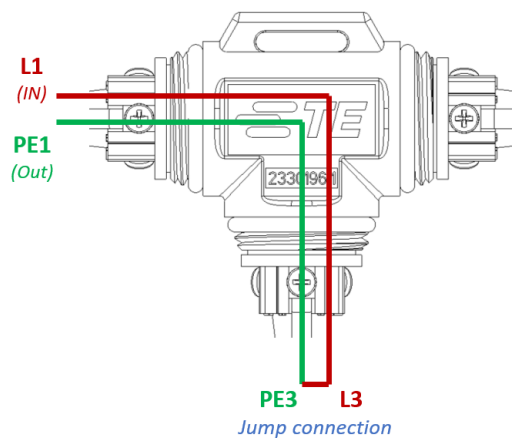
T1 ↔ T3

5.2. Temperature rise test:

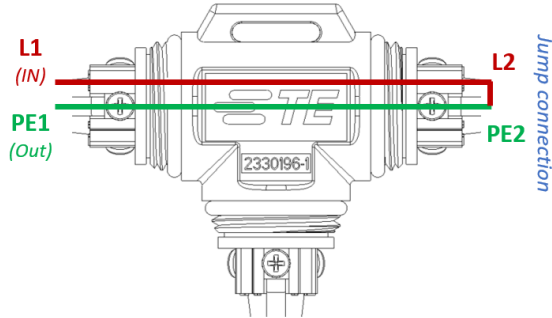
5.2.1 Circuit diagram for T-splitter.

Branch Circuit 1: Line 1 → Line 3 → Ground 3 → Ground 1

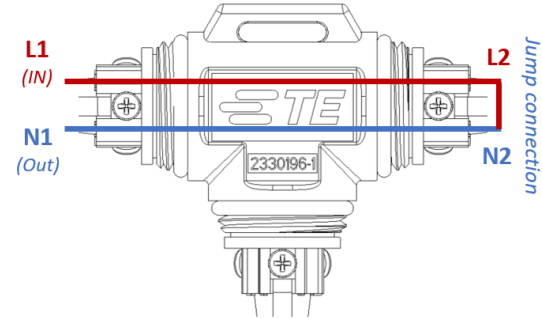
Branch Circuit 2: Line 1 → Line 3 → Neutral 3 → Neutral 1



Straight Circuit 1: Line 1 → Line 3 → Ground 3 → Ground 1



Straight Circuit 2: Line 1 → Line 3 → Neutral 3 → Neutral 1



5.2.1 Tc points for T-splitter:

Suitable size holes (or max Ø3.0) must be drilled at locations shown in below image, maximum 3mm depth. Thermocouple must be placed inside these holes ensuring the tip is in contact with hole bottom surface. Thermocouple must be secured with thermal conductive glue.

