

1.0 SCOPE

1.1. Content:

This specification covers performance, tests and quality requirements ding rail spring clamp type Terminal Block connector (**without ground function**). Applicable product descriptions and part numbers are as shown on product drawing.

1.2. Qualification:

When tests are performed on the subject product line, procedures specified shall be used. All inspections shall be performed using the applicable inspection plan and product drawing.

2.0 APPLICABLE DOCUMENTS

The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, the latest edition of the document applies. In the event of conflict between the requirements of this specification and the product drawing, the product drawing shall take precedence. In the event of conflict between the requirements of this specification and the referenced documents, this specification shall take precedence.

2.1 TE Connectivity Documents:

114-137138: Application Specification for ding rail spring clamp type Terminal Block Connector

501-137138: Qualification Test Report for ding rail spring clamp type Terminal Block Connector

3.0 REQUIREMENTS

3.1 Design and Construction

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

3.2 Materials

Materials used in the construction of this product shall be as specified on the applicable product drawing.

3.4 Ratings

A. Voltage: see table 3

B. Current: see table 3

B. Wire Size: see table 3

C. Operating Temperature: -40 to 105°C

D. Storage Environment:

Temperature: - 25°C to 40°C Relative humidity: 15%-70%

3.5 Performance and Test Description

Product is designed to meet the electrical, mechanical and environmental performance requirements. Unless otherwise specified, all tests shall be performed in the room temperature (5~35°C), relative humidity (45~85%), air pressure (86~106kPa), and special case temperature (18~22°C), relative humidity (60~70%), unless otherwise specified.

3.6 Test Requirements and Procedures Summary

3.6.1 Examination:

Test Description	Requirement	Procedure
Examination of the product	Meets visual requirements.	Visual inspection per product drawing. Per EIA-364-18

3.6.2 ELECTRICAL

Test Description	Requirement	Procedure
Contact Resistance (LLCR)	20 mΩ Max	Subject mated contacts assembled in housing to closed circuit current of 100 mA Max. at open circuit voltage of 20mV Max. Per EIA-364-23
Insulation resistance.	2000 MΩ Min.	Unmated connector with 500 V DC between: (a) Terminal and terminal (for mult-level type and two adjacent terminal blocks) (b) Terminal and Body for 1 min. Per IEC 60998-1/60998-2-2
Dielectric Withstanding Voltage	No flashover or breakdown shall occur during the test	Applying a voltage of substantially sine –wave form, having a frequency of 60 Hz and 1000V +2 times rated Voltage between adjacent contacts or test objects for 1 min. Current: 10mA a) Live parts that are not conductively interconnected; b) Live parts and the surface to which the terminal block is mounted. Per UL1059 Clause 12 (See note 1)
Heat cycling Test	The temperature rise for the last on period shall not be more than 5°C (9°F) higher than the first on period.	A current of 150 percent of rated current is to be passed through the connections for 84 on periods of 3.5 hours, each followed by a 0.5 hour off period. The temperature rise for each connection is to be determined at the end of the first on period and again at the end of the final on period. 2 adjacent terminal blocks are connected in series
Temperature Rise	Temperature Rise For general type: The temperature rise should be 30°C Max.	6 adjacent terminal blocks are connected in series (see figure 2). Wire lengths shall be 0.46m for 16 AWG (1.3 mm ²) and smaller, and 1.22m per terminal for 14AWG (2.1 mm ²) and larger. The current shall be passed through the termination continuously for a period of 30 days. Temperatures are to be measured and recorded approximately every 24 hours. Carrying rated current and the max. size wire see table 3 (Per UL1059 Clause 31)
	For Any bus, strap, or clip that mates with another similar bus, strap, or clip to facilitate a disconnection arrangement of a 2 piece terminal block: The temperature rise of connection point for bus, strap or clip should be 50°C Max. The temperature rise of product should be 30°C Max.	Using buses, straps or clips to connect 6 pcs terminal block in series. Input and output Wire lengths shall be 0.46m for 16 AWG (1.3 mm ²) and smaller, and 1.22m per terminal for 14AWG (2.1 mm ²) and larger. The current shall be passed through the termination continuously for a period of 30 days. Temperatures are to be measured and recorded approximately every 24 hours. Carrying rated current and the max. size wire see table 3 (Per UL1059 Clause 31)
	For a fuse type terminal block (Any bus, strap or fuse clip when tested with a dummy fuse): The temperature rise should be 30°C Max.	6 adjacent terminal blocks are connected in series (see figure 2). Wire lengths shall be 0.46m for 16 AWG (1.3 mm ²) and smaller, and 1.22m per terminal for 14AWG (2.1 mm ²) and larger. The current shall be passed through the termination continuously for a period of 30 days. Temperatures are to be measured and recorded approximately every 24 hours. Carrying rated current and the max. size wire see table 3 (Per UL1059 Clause 31)
	For a fuse type terminal block (Any bus, strap or fuse clip when tested with a fuse): The temperature rise should be 85°C Max. The temperature rise of product should be 30°C Max.	6 adjacent terminal blocks are connected in series (see figure 2). Wire lengths shall be 0.46m for 16 AWG (1.3 mm ²) and smaller, and 1.22m per terminal for 14AWG (2.1 mm ²) and larger. The current shall be passed through the termination continuously for a period of 30 days. Temperatures are to be measured and recorded approximately every 24 hours. Carrying rated current and the max. size wire see table 3 (Per UL1059 Clause 31)

3.6.3 Mechanical

Test Description	Requirement	Procedure
Connection of conductors	Shall be accepted one conductors	Terminals shall accept one conductor of the same or of different nominal cross-sectional areas or composition. (Use solid wire for 30~10AWG, stranded wire for 8AWG and larger size) (see table 3)
Secureness test	The joint between a terminal and the wire of a sample set shall be intact after test.	Wire size see table 3 (Solid & Stranded), Duration time : 15minutes, the wire should be stranded for 8AWG and larger size. Per UL 486E, section12.
Conductor tensile force test(Pull test)	After the Rotating test and the terminal shall not separate from the wire as a result.	The force (refer to table 2) should be applied in one smooth and continuous application, for 1 min, in the direction of the axis of the conductor. Using the max. size and Min. size wire(solid and stranded) refer to table 3 , the wire should be stranded for 8AWG and larger size. (Per UL486E Table14.1)

3.6.4 Environmental

Test Description	Requirement	Procedure
Low temperature test	See Note 3	Temperature :-40 °C; Humidity: 0% Duration:24 hr
High temperature test	See Note 3	Temperature :105 °C; Humidity: 0% Duration:24 hr
High temperature and high humidity test	See Note 3	Temperature :40 °C; Humidity: 90% Duration:24 hr
Accelerated Aging test	There is no evidence of blistering, cracking, softening, or melting of any of the part. Any distortion shall not affect the integrity of the device.	Temperature :105 °C; Duration:168 hr, Per CSA 222.

NOTE

1. Fuse type terminal block must fix the fuse or dummy fuse when testing.
2. A terminal block using spring force connectors is to be tested using both solid and stranded wire for 30 - 10 AWG (0.05 - 5.3 mm²) wire sizes and using stranded wire for 8 AWG (8.4 mm²) and larger wire sizes unless the terminal is marked according to UL1059 section 34.2 in which case the wire used is to be of the type the terminal block is rated.
3. 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 Figure 2.

3.6.5 Product Qualification and Requalification Test Sequence

Test group	A	B	C	D	E	F	G
Examination of product	1,3	1,3	1,4	1,4	1,6	1,6	1,6
Contact resistance					5	5	5
Insulation resistance.					3	3	3
Dielectric Withstanding Voltage					4	4	4
Heat cycling Test	2						
Temperature Rise		2					
Connection of conductors			2				
Secureness test				2			
Conductor tensile force test(Pull test)				3			
Low temperature test					2		
High temperature test						2	
High temperature and high humidity test							2
Accelerated Aging test			3				
Sample size	2	6	3	6	3	3	3

4.0 Quality Assurance Provisions

4.1 Qualification Testing

A. Specimen Selection

Specimens shall be prepared in accordance with applicable Instruction Sheets and shall be selected at random from current production.

B. Test Sequence

Qualification inspection shall be verified by testing specimens as specified.

4.2. Requalification Testing

If changes significantly affecting form, fit or function are made to the product or manufacturing process, 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. Acceptance

Acceptance is based on verification that the product meets the requirements. Failures attributed to equipment, test setup or operator deficiencies shall not disqualify the product. If product failure occurs, corrective action shall be taken and specimens resubmitted for qualification. Testing to confirm corrective action is required before resubmitted.

4.4. Quality Conformance Inspection

The applicable quality inspection plan shall 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

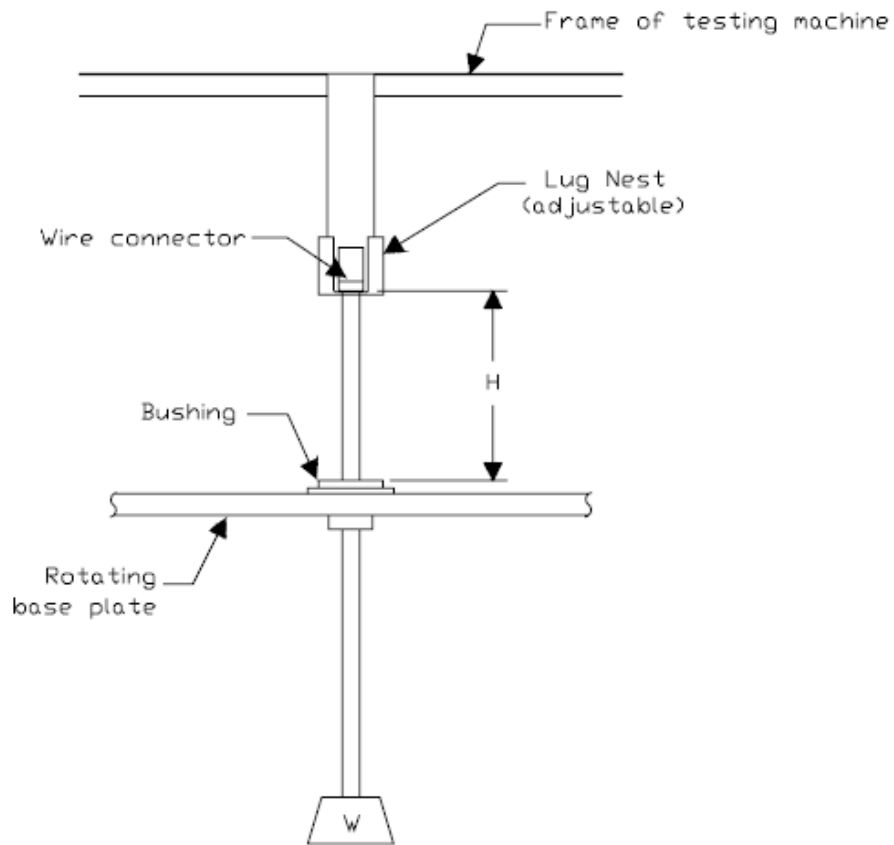


Fig 1 Secureness test setup

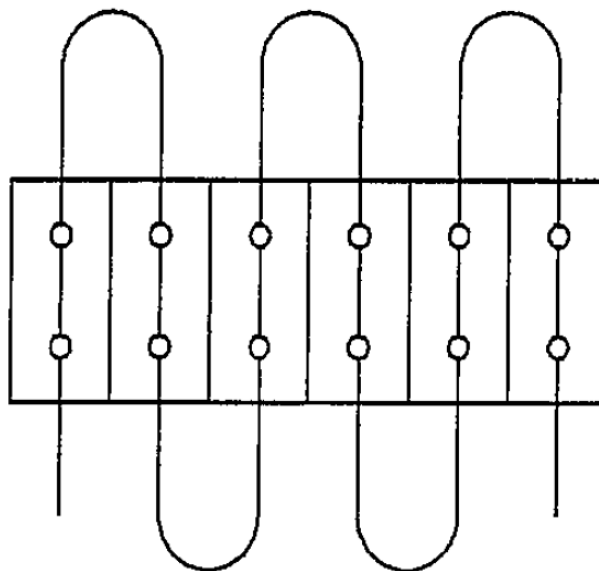


Fig 2 Connection in series for Temperature Rise

Table 1
Test values for secureness test

Size of Conductor		Diameter of Bushing Hole		Height		Weight	
AWG	(mm ²)	Inch	(mm)	Inch	(mm)	Pounds	Kg
18	(0.82)	1/4	(6.4)	10-1/4	(260)	1	(0.45)
16	(1.3)	1/4	(6.4)	10-1/4	(260)	1	(0.45)
14	(2.1)	3/8	(9.5)	11	(279)	1.5	(0.68)
12	(3.3)	3/8	(9.5)	11	(279)	2	(0.9)
10	(5.3)	3/8	(9.5)	11	(279)	3	(1.4)
8	(8.4)	3/8	(9.5)	11	(279)	4.5	(2)
6	(13.3)	1/2	(12.7)	11-3/4	(298)	6.5	(2.9)
4	(21.2)	1/2	(12.7)	11-3/4	(298)	10	(4.5)
3	(26.7)	9/16	(14.3)	12-1/2	(318)	13	(5.9)
2	(33.6)	9/16	(14.3)	12-1/2	(318)	15	(6.8)
1	(42.4)	5/8	(15.9)	13-1/2	(343)	19	(8.6)

Table 2
Test values for pullout force

Size of Conductor		Pullout Force	
AWG	mm ²	Pounds	N
30	(0.05)	1/2	2.2
28	(0.08)	1	4.5
26	(0.13)	2	8.9
24	(0.20)	3	13.4
22	(0.32)	4.5	20
20	(0.52)	6.75	30
18	(0.82)	6.75	30
16	(1.3)	9	40
14	(2.1)	11.5	50
12	(3.3)	13.5	60
10	(5.3)	18	80
8	(8.4)	20.5	90
6	(13.3)	21	94
4	(21.2)	30	133
3	(26.7)	35	156
2	(33.6)	42	186
1	(42.4)	53	236

Table 3
Product Series and Parameters

Conductor Section (mm ²)	Series Describe	TE Series	Part Number	Rated Voltage (V)	Rated Current (A)	Conductor Size Range (AWG)
1.5	1 in-1 out	DTS 1.5	2271552-*	600	15	28-14
	1 in-2 out	DTS 1.5 TW	2271553-*	600	15	28-14
	2 in-2 out	DTS 1.5 TE	2271554-*	600	15	28-14
2.5	1 in-1 out	DTS 2.5	2271555-*	600	20	28-12
	1 in-2 out	DTS 2.5 TW	2271556-*	600	20	28-12
	2 in-2 out	DTS 2.5 TE	2271557-*	600	20	28-12
	2 level	DTS 2.5 DO	2271558-*	600	20	28-12
	2 level interconnect	DTS 2.5 DOC	2271735-*	600	20	28-12
	3 level	DTS 2.5 3L	2271736-*	300	20	28-12
	1 pole COMBI	DTS 2.5/1P	2271576-*	600	5 (D Class)	28-12
				300	20 (B&C Class)	
	DTS 2.5/1P PLUG	DTS 2.5 PG	*-2271730-*	600	5 (D Class)	28-12
300				20 (B&C Class)		
Switch-small-TG	DTS 2.5-SW	2271577-*	600	16	28-12	
4	1 in-1 out	DTS 4	2271559-*	600	30	28-10
	1 in-2 out	DTS 4 TW	2271560-*	600	30	28-10
	2 in-2 out	DTS 4 TE	2271579-*	600	30	28-10
	2 level	DTS 4 DO	2271580-*	600	30	28-10
	Big Switch	DTS4 FU SSW	2271582-*	600	10	28-10
	FUSE	DTS 4 FU	2271642-*	600	10	28-10
	Fuse with LED	DTS 4-FU 24	2271583-*	24	10	28-10
	Fuse with LED	DTS 4-FU 60	2271584-*	60	10	28-10
	Fuse with LED	DTS 4-FU 250	2271585-*	250	10	28-10
6	1 in-1 out	DTS 6	2271587-*	600	45	24-8
10	1 in-1 out	DTS 10	2271589-*	600	65	24-6
16	1 in-1 out	DTS 16	2271591-*	600	65	24-4
35	1 in-1 out	DTS 35	2271593-*	600	115	14-2