



PCB Terminal block Header and Push-in Plug

1. SCOPE

1.1. Content

This specification covers performance, tests, and quality requirements for the TE Connectivity (TE) Terminal block - Header and Push in Plug. This Push-in plug is designed to terminate solid and stranded of specific range with respect to the centerline spacing as mentioned in Table 1.

1.2. Qualification

When tests are performed on the subject product line, procedures specified in Table 3 shall be used. All inspections shall be performed using the applicable inspection plan and product drawing.

1.3. Qualification Test Results

Qualification testing on the subject product line is completed.
Refer Applicable document for test results.

2. APPLICABLE DOCUMENTS AND FORMS

The following documents 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

- 114-32242: Terminal block Header and Push in Connectors
- 502-139213: Qualification Test Report

2.2. Industry Documents

- IEC 60512 Connectors for Electronic Equipment Tests and Measurements.

2.3. Reference Document

- 109-197 TE Connectivity Test Specifications vs EIA and IEC Test Methods
- 109-1 General Requirements for Testing

3. REQUIREMENTS

3.1. Design and Construction

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

3.2. Ratings

Table 1

TE PN	Type	Pitch in mm	Voltage Max.	Current	Temperature	Wire size
X-2350397-X	Plug	5.0	300VAC	16A	-40° to 105°C	12-26 AWG(Sol/Str)
X-2350513-X	Header			16A		-
X-2351885-X	Header			16A		-
X-2350398-X	Plug	3.5	150VAC	8A	-40° to 105°C	16-24 AWG(Sol/Str)
X-2350514-X	Header			12A		-
X-2351886-X	Header			12A		-
X-2385001-X	Plug	2.5	150VAC	4A	-40° to 105°C	20-28 AWG(Sol/Str)
X-2385002-X	Header			4A		-
X-2385003-X	Header			4A		-
X-2385004-X	Plug	3.81	300VAC	8A	-40° to 105°C	16-28 AWG(Sol/Str)
X-2385005-X	Header			10A		-
X-2385006-X	Header			10A		-
X-2385007-X	Plug	5.08	300VAC	16A	-40° to 105°C	12-26 AWG(Sol/Str)
X-2385008-X	Header			16A		-
X-2385009-X	Header			16A		-
X-2385010-X	Plug	7.62	300VAC	20A	-40° to 105°C	12-26 AWG(Sol/Str)
X-2385011-X	Header			20A		-
X-2385012-X	Header			20A		-
X-2385013-X	Plug	3.5	150VAC	8A	-40° to 105°C	16-24 AWG(Sol/Str)
X-2385014-X	Header			8A		-
X-2385015-X	Header			8A		-

Table 2

Wire Size (AWG)	Pull force Min in N
28	4.5
26	8.9
24	13.4
20	28
16	40
12	60

3.3. Materials

Materials used in the construction of this product shall be as specified on the applicable product drawing. In case of a conflict between this document and the production drawing, Production drawing shall be considered.

- Housing : Polyamide 66, UL 94 V0, GREEN.
- Push Button(Plug) : Polyamide 66, UL 94 V0, ORANGE
- Contact : Phosphor Bronze (Plug); Post: Brass (Header)
- Contact Plating : Tin over Nickel
- Spring : Stainless steel

4. TEST REQUIREMENTS AND PROCEDURES

4.1 Product is designed to meet the electrical, mechanical and environmental performance requirements specified below:

i Unless otherwise specified, all tests shall be performed at ambient environmental conditions per TE specification 109-1

Table 3

TEST DESCRIPTION	REQUIREMENT	PROCEDURE		
Examination of product	Meets requirements of product drawing	Visually inspected per applicable quality inspection plan or IEC 60512-1-1 (Visual inspection)		
ELECTRICAL				
Contact Resistance (Termination Resistance)	PITCH in mm	Initial (mΩ)	Final (mΩ)	IEC 60512-2-1 (Contact resistance – millivolt level method) Contacts assembled in housing to closed circuit current of 100mA max at open circuit voltage of 20mV max.
	2.5	10	30	
	3.5	20	40	
	3.81	10	30	
	5.00	10	30	
	5.08	10	30	
	7.62	10	30	
Insulation Resistance.	PITCH in mm	Initial Min(MΩ)	Final Min(MΩ)	The insulation resistance shall be measured between two adjacent terminations having a minimum spacing using 500V IEC 60512-3-1, Method C
	2.5	2000	300	
	3.5	2000	2000	
	3.81	2000	900	
	5.00	2000	2000	
	5.08	2000	1400	
	7.62	2000	1400	
Voltage proof	Dielectric strength - Connector must withstand potential of 2000V for 1 min.	IEC 60512-4-1 Measured by applying voltage potential to adjacent contacts, and between the grounds in the mated connector assembly.		

MECHANICAL

Connector Mating/ Unmating force	<table border="1"> <thead> <tr> <th>PITCH in mm</th> <th>Mating force per contact Max (N)</th> <th>Un-Mating force per contact Min (N)</th> </tr> </thead> <tbody> <tr><td>2.5</td><td>6</td><td>3</td></tr> <tr><td>3.5</td><td>6</td><td>3</td></tr> <tr><td>3.81</td><td>7</td><td>3</td></tr> <tr><td>5.0</td><td>10.5</td><td>6</td></tr> <tr><td>5.08</td><td>10.5</td><td>6</td></tr> <tr><td>7.62</td><td>16</td><td>6</td></tr> </tbody> </table>	PITCH in mm	Mating force per contact Max (N)	Un-Mating force per contact Min (N)	2.5	6	3	3.5	6	3	3.81	7	3	5.0	10.5	6	5.08	10.5	6	7.62	16	6	Subject terminated contact and posts to mate and un-mate, to measure the force required to insert and extract by operating at a rate of 25.4 mm/min per contact IEC 60512-13-1 (Engaging and separating forces)
PITCH in mm	Mating force per contact Max (N)	Un-Mating force per contact Min (N)																					
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3.5	6	3																					
3.81	7	3																					
5.0	10.5	6																					
5.08	10.5	6																					
7.62	16	6																					
Contact Retention Force	<p>Force per contact</p> <table border="1"> <thead> <tr> <th>PITCH in mm</th> <th>Min (N)</th> </tr> </thead> <tbody> <tr><td>2.5</td><td>15</td></tr> <tr><td>3.5</td><td>20</td></tr> <tr><td>3.81</td><td>12</td></tr> <tr><td>5.0</td><td>15</td></tr> <tr><td>5.08</td><td>15</td></tr> <tr><td>7.62</td><td>10</td></tr> </tbody> </table>	PITCH in mm	Min (N)	2.5	15	3.5	20	3.81	12	5.0	15	5.08	15	7.62	10	Apply axial pull-off load to contact mounted on housing and measure the force required to dislodge contact from housing. IEC-60512-15-1 Test 15a							
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2.5	15																						
3.5	20																						
3.81	12																						
5.0	15																						
5.08	15																						
7.62	10																						
Vibration.	No discontinuities of 1 microsecond or longer duration. no physical damage,	10-55-10 Hz traversed in 1 minute at 1.52mm amplitude 2 Hours each of 3 mutually perpendicular planes IEC 60512-6-4.																					
Mechanical shock	No discontinuities of 1 microsecond or longer duration. no physical damage,	Subject mated connector, acceleration 50g, half sine wave pulses of 11msec, duration: 3 shocks, in each direction, 18 shocks in total IEC 60512-6-3.																					
Durability	Contact resistance (Final) shall be met.	IEC 60512-9-1 (Durability). <table border="1"> <thead> <tr> <th>No. of cycles(min)</th> <th>Plating thickness (min)</th> </tr> </thead> <tbody> <tr> <td>25</td> <td>3µm Tin</td> </tr> </tbody> </table>	No. of cycles(min)	Plating thickness (min)	25	3µm Tin																	
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Rotating test	The conductor shall neither slip out of the clamping unit nor break near the clamping, nor shall the conductor be damaged.	As per spec UL 486E																					
Conductor tensile force test (Pull test)	The conductor Pull out force should be as per Table 2.	As per spec UL 486E The force shall be applied in one smooth and continuous application, in the direction of the axis of the conductor and perpendicular to the direction of wire entry.																					

ENVIRONMENTAL

Dry heat/ Temperature Life (Heat Aging)	Contact resistance (Final) shall be met.	Temperature: -40 to 105°C Duration: 24 hours. IEC 60512-11-9
(Damp Heat) Humidity, Steady State	Insulation Resistance 2000M Ω min. Contact resistance (Final) shall be met	Subject mated connectors to steady state humidity at 40°C±2°C and 90 R.H for 24 hrs. IEC 60512-11-12
Thermal Shock.	Contact resistance (Final) shall be met.	Subject mated connector assemblies on 5 cycles – 40 °C and +105°C for Tin Plated Contact for 30 minutes each duration at temperature extremes. IEC 60512-11-4 (Rapid change in Temp/thermal shock)
Solderability	The contact solder tails should be covered by a continuous new solder coating for 95% Minimum of affected area. No Physical damage shall occur	IEC 60512-12-1. Solder bath temp. 235°C Aging 3, 16 hours at 155°C

4.2 Product Qualification and Requalification Test Sequence

Table 4

Test or Examination	Test Group						
	1	2	3	4	5	6	7
	Test Sequence(a)						
Initial examination of product	1	1	1	1	1	1	1
Contact resistance	3, 7	2,4	2,4				
Insulation resistance				2,6			
Voltage Proof				3,7			
Vibration	5						
Mechanical shock	6						
Durability	4						
Mating Force	2						
Un-mating force	8						
Contact retention in housing							2
Thermal shock				4			
Humidity, Steady State †			3	5			
Dry Heat / Temperature life		3					
Solderability						2	
Rotating test					2		
Pull test					3		
Final examination of product	9	5	5	8	4	3	3



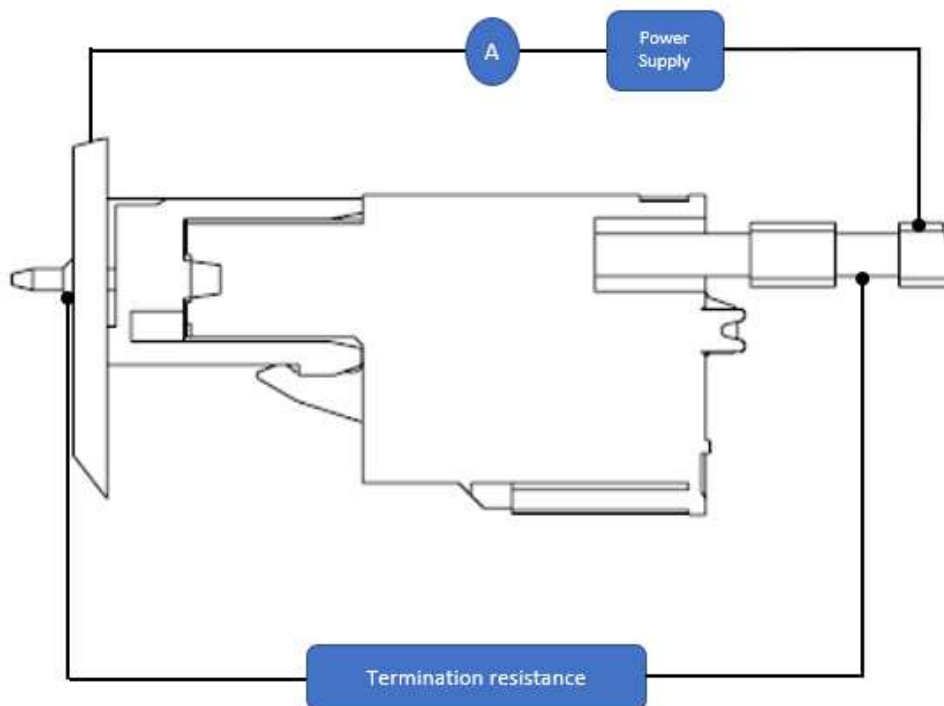
Note:

a - Numbers indicate sequence in which tests are performed.

5. QUALIFICATION TEST

Qualification test shall be performed according to the test methods and requirements specified in Table 3 according to sequence specified by Table 4

Figure 1 – Contact Resistance Measurement Set up



6. QUALITY ASSURANCE PROVISIONS

6.1. SAMPLE SELECTION

The test specimens to be used for the performance evaluation testing, shall be prepared in accordance with TE Application Specification 114-32242. They shall be selected at random from production. At least 5 connectors of the 6 positions or at least 30 contacts shall be used for each test group.

6.2. RE-QUALIFICATION TESTING

If the changes significantly affecting form, fit or function are made to product or manufacturing process, product assurance shall coordinate re-qualification testing, consisting of all or part of original testing sequence as determined by development/product, quality and reliability engineering.

6.3. ACCEPTANCE

Acceptance is based on verification that product meets requirements defined in section 4. Failures attributed to equipment; test setup or operator deficiencies shall not disqualify product. When product failure occurs, corrective action shall be taken, and samples resubmitted for qualification. Testing to confirm corrective action is required before resubmitting.

6.4. QUALITY CONFORMANCE INSPECTION

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