110, 187 & 250 Series FASTON Terminals

1. SCOPE

1.1. Content

This specification defines the performance, tests, and quality requirements for FASTON contact, including 250 ,187 and 110 series.

1.2. Qualification

When tests are performed on the subject product line, procedures specified in 3.4 shall be used. All inspections shall be performed using the applicable inspection plan and product drawing. All contacts must be crimped to comply with Application Specification using the appropriate TE Applicator or Hand Tool as specified.

2. 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 (TE) Documents

TE Product Drawings (Customer Drawings)

2.2. Industry Documents

UL 310	Standard for Electrical Quick Connect Terminals
EIA-364	Electrical Connector/Socket Test Procedures Including Environmental Classifications
IEC 60251	Standard for Connectors for Electronic Equipment

2.3. Reference Documents

109-197	Test Specification (TE Test Specifications vs. EIA and IEC Test Methods)

3. REQUIREMENTS

3.1. Design and Construction

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

3.2. Ratings

Current: 3 – 20 Amps

Temperature Rating

- Plain Brass or Tin-Plated Brass – Up to 110°C/-30°C
- Silver Plated Brass – Up to 130°C/-30°C
- Plain Bronze or Tin-Plated Bronze – Up to 110°C/-40°C
- Silver Plated Bronze – Up to 130°C/-40°C
- Nickel Plated Steel – Up to 250°C/-30°C

3.3. Performance and Test Description

Product is designed to meet the electrical, mechanical, and environmental performance requirements specified in 3.4. Unless otherwise specified, all tests shall be performed at ambient environmental conditions.

3.4. Test Requirements and Procedures Summary

<table>
<tr><th>Test Description</th><th>Requirement</th><th>Procedure</th></tr>
<tr><td>Initial Examination of Product</td><td>Meets the requirements of product drawing; no defective abnormalities such as cracks, breakage, damages, loose of parts, rust and fusion that are detrimental to connector functions, shall be present.</td><td>EIA-364-18
Visually and tactually inspect parts for appearance in accordance with applicable Q.I.P (Quality Inspection Procedure) and product drawing for presence of stated defects.</td></tr>
<tr><td>Final Examination of Product</td><td>After testing, no physical damage such as cracks, breakage, damages, loose of parts, rust and fusion that are detrimental to connector functions, shall be present.</td><td>EIA-364-18
Visually and tactually inspect parts for appearance in accordance with applicable Q.I.P (Quality Inspection Procedure) and product drawing for presence of stated defects.</td></tr>
<tr><td colspan="3">Electrical</td></tr>
<tr><td>Termination Resistance</td><td>Initial: 3 milliohms (mΩ) maximum
Final: 6 milliohms (mΩ) maximum</td><td>EIA-364-23
Subject the circuit to 1A (DC) current. After temperature has stabilized, probe 2 points on the mated tab contact that with one point 75 mm from the wire crimp. Calculate resistance after deducting bulk wire resistance. See Figure 1.

At 100 mA max and 20 mV max open circuit voltage.</td></tr>
<tr><td>Temperature Rising</td><td><table><tr><th>Wire Size (AWG)</th><th>Test Current (Amps)</th><th>Temperature Rise (°C)</th></tr><tr><td>24</td><td>3</td><td>30</td></tr><tr><td>22</td><td>3</td><td>30</td></tr><tr><td>20</td><td>5</td><td>30</td></tr><tr><td>18</td><td>7</td><td>30</td></tr><tr><td>16</td><td>10</td><td>30</td></tr><tr><td>14</td><td>15</td><td>30</td></tr><tr><td>12</td><td>20</td><td>30</td></tr><tr><td>10</td><td>24</td><td>30</td></tr></table></td><td>UL 310 Para 6.5.2 and IEC 60512-5-1
Measure the temperature rise above ambient created by the energizing current. Measurement must be taken at a place where there is no influence from air convection. Stabilize temperature at a single current level until 3 readings at 5 minute intervals are within 1°C. The probing point shall be soldered to stabilize the measurement reading.</td></tr>
<tr><td>Current Cycling</td><td><table><tr><th>Wire Size (AWG)</th><th>Test Current (Amps)</th></tr><tr><td>24</td><td>6</td></tr><tr><td>22</td><td>6</td></tr><tr><td>20</td><td>10</td></tr><tr><td>18</td><td>14</td></tr><tr><td>16</td><td>20</td></tr><tr><td>14</td><td>30</td></tr></table></td><td>UL310 Para 6.5.3
Subject terminals to 500 cycles. T1 shall be measured after the 24th cycle and T2 shall be measured after the 500th cycle. Terminals terminated overload test current to be 200% of the nominal test current. One cycle includes 45 minutes on and 15 minutes off.</td></tr>
</table>

<table>
<tr><td>Current Cycling Continued</td><td><table><tr><td>12</td><td>40</td></tr><tr><td>10</td><td>48</td></tr></table></td><td></td></tr>
<tr><td colspan="3">Mechanical</td></tr>
<tr><td>Contact Insertion Force</td><td>250 series: 76N max.
187 Series:67N max.
110 Series: 53N max.</td><td>UL 310, Para 6.4
Operation Speed: 25.4 mm/min
Measure the force required to mate the tab to receptacle terminal.</td></tr>
<tr><td>Contact Extraction Force</td><td>First time extraction
250 series: 13 min.
187 Series: 13 min.
110 Series: 9N min.</td><td>UL 310, Para 6.4
Operation Speed: 25.4 mm/min
Apply an axial pull force to release the tab from the receptacle</td></tr>
<tr><td>Wire Crimp Tensile Strength</td><td><table><tr><th>Wire Size (AWG)</th><th>Crimp Tensile (min.) (N)</th></tr><tr><td>24</td><td>22.3</td></tr><tr><td>22</td><td>36</td></tr><tr><td>20</td><td>58</td></tr><tr><td>18</td><td>89</td></tr><tr><td>16</td><td>133</td></tr><tr><td>14</td><td>223</td></tr><tr><td>12</td><td>311</td></tr><tr><td>10</td><td>356</td></tr></table></td><td>UL 310, Para 6.3
Operation Speed: 25.4 mm/min
Apply an axial pull force to the crimped wire. Crimp tensile strength is determined when the wire is broken or is pulled off. Exclude insulation crimp.</td></tr>
<tr><td colspan="3">Environmental</td></tr>
<tr><td>Humidity Steady-State</td><td>Final Termination Resistance: 6 mΩ (maximum)</td><td>EIA-364-31, Condition A, Method II
Subject mated contacts to environment at 40±5°C and 90-95% RH for 96 hours. Sample shall be placed in the chamber out of the path of falling water drops. Measurement shall be taken upon completion of exposure period.</td></tr>
<tr><td>Thermal Shock</td><td>Final Termination Resistance: 6 mΩ (maximum)</td><td>EIA-364-32, Test Condition VII
Subject mated specimens to 5 cycles between -40°C and 105°C with 30 minute dwell time at temperature extremes and 5 minute (maximum) transition between temperatures.</td></tr>
</table>

NOTE
Shall meet the visual requirements, show no physical damage, and met requirements of additional tests as specified in the Product Qualification and Requalification Test Sequence.

3.5. Product Qualification and Requalification Test Sequence

TEST OR EXAMINATION	TEST GROUP			
	1	2	3	4
	TEST SEQUENCE (a)			
Examination of Product	1, 3	1, 4	1,4	1, 7
Termination Resistance				2,4,6
Temperature Rising			2	
Contact Insertion Force		2		
Contact Extraction Force		3		
Wire Crimp Tensile Strength	2			
Humidity Steady-State				3
Thermal Shock				5
Current Cycling			3	

(a) Numbers indicate sequence in which tests are performed.

(b) Prepare samples in accordance with UL 310. Fit must be sufficient to produce good thermal contact and void of free movement between thermocouple and contact. Thermocouple lead must have strain relief suitable to protect interface.

4. QUALITY ASSURANCE PROVISIONS

4.1. Test Conditions

Unless otherwise specified, all the tests shall be performed in any combination of the following test conditions.

Temperature	15-35℃
Relative Humidity	45-75%
Atmospheric Pressure	86.6-106.7KPa

4.2. Re-Qualification Testing

If changes that significantly affecting form, fit, or function are made to the product or manufacturing process, product assurance shall coordinate re-qualification 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 of 3.4. 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 re-submitted for qualification. Testing to confirm corrective action is required before re-submittal.

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.

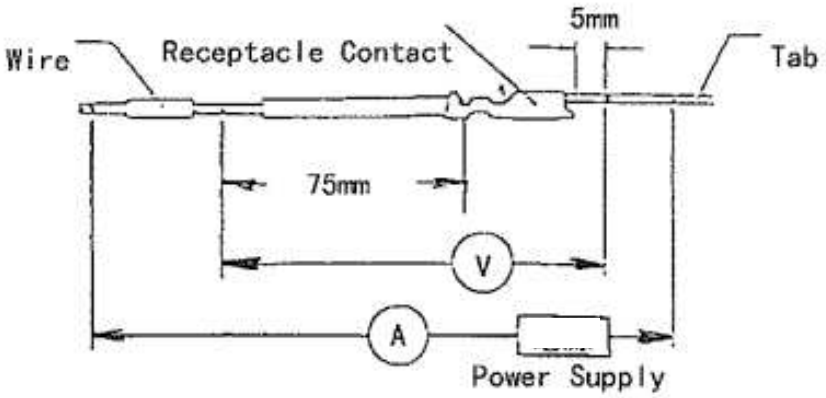

Figure 1: Termination Resistance Measurement Method