

**NOTE**

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.

## X-Low Insertion Force 250 F-Spring Terminal

### 1. SCOPE

#### 1.1. Content

This specification covers performance, tests, and quality requirements for X-LIF 250 F-Spring straight terminals and housing.

#### 1.2. Qualification

When tests are performed on the subject product line, procedures specified in Figure 2 shall be used. All inspections shall be performed using the applicable inspection plan and product drawing.

### 2. APPLICABLE DOCUMENTS AND FORMS

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 Specifications

114-106568	Application Specification – Flag receptacles with Tab-Lok crimping
501-106568	Qualification test report

#### 2.2. Commercial Standards and Specifications

IEC 61210	Flat quick-connect terminations for electrical copper conductors - Safety requirements
IEC 60512	International Standard – Connectors for Electronic Equipment – Tests and Measurements
EIA-364	Electrical Connector/Socket Test Procedures Including Environmental Classifications

“For updated standards and specifications, the latest edition of the reference document applies.”

#### 2.3. Reference Documents

109-1	General Requirements for Testing
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### 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. Materials

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

3.3. Ratings

- A. Voltage Rating: 600 VAC
- B. Temperature Rating :
  - 1. Brass Contacts (Tin Plated or Un-plated): 110°C (maximum) for POSITIVE LOCK Standard
- C. Current Rating: See Figure 1.

Cat.	Wire Size		Current [A]
	AWG	mm <sup>2</sup>	
2379911-X	14	2	15
	16	1.3	10
	18	0.82	7

Figure 1

3.4. Performance Requirements and Test Description

The product should meet the electrical, mechanical and environmental performance requirements specified in Figure 2. All tests shall be performed at ambient environmental conditions otherwise specified.

3.5. Test Requirements and Procedure Summary

TEST DESCRIPTION	REQUIREMENT	PROCEDURE
Examination of Product	Meets requirements of product drawing and TE application specification. Parts show no signs of damage or physical change.	EIA-364-18 Visual, dimensional and functional as per applicable inspection plan.
<b>ELECTRICAL</b>		
Low Level Contact Resistance	Initial: 3 milliohms (mΩ) maximum Final: 6 milliohms (mΩ) maximum	IEC 60512-2-2 Subject the mating terminals to 1A(DC) current and 2 V maximum open circuit voltage. 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
Temperature Rise	Temperature rise of any individual termination shall not exceed 30°C when subjected to the specified current indicated in Figure 1.	IEC 60512-5-1 Measure temperature rise above ambient created by the energizing current. Measurement must be taken in a place where there is no influence from air convection. Temperature rise = Temperature of contact – Ambient temperature

TEST DESCRIPTION	REQUIREMENT	PROCEDURE								
<b>MECHANICAL</b>										
Crimp Tensile Strength	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Wire Size [AWG]</th> <th style="width: 50%;">Min. Tensile Force [N (lbs.)]</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">18 [0.82]</td> <td style="text-align: center;">89 (20)</td> </tr> <tr> <td style="text-align: center;">16 [1.3]</td> <td style="text-align: center;">133 (30)</td> </tr> <tr> <td style="text-align: center;">14 [2.1]</td> <td style="text-align: center;">223 (50)</td> </tr> </tbody> </table>	Wire Size [AWG]	Min. Tensile Force [N (lbs.)]	18 [0.82]	89 (20)	16 [1.3]	133 (30)	14 [2.1]	223 (50)	<p>IEC 61210            Operation Speed: 25.4 mm/min            Measure the force required to break or pull-out wire from wire barrel crimp. Insulation barrel crimp shall not be fully closed.            Damage to other portions of terminals acceptable.            May require custom fixturing to hold terminal without deforming the wire crimp barrel.</p>
Wire Size [AWG]	Min. Tensile Force [N (lbs.)]									
18 [0.82]	89 (20)									
16 [1.3]	133 (30)									
14 [2.1]	223 (50)									
Mating Force	15N maximum	<p>IEC 60512-13-2            Operation Speed:            50 mm/min Max            Apply an axial push force mate the tab to receptacle terminal.            (plain test tab)</p>								
Locking Force	67N minimum	<p>IEC 60512-13-2            Operation Speed: 50 mm/min max.            Measure the force required to            Apply an axial pull force to release the tab from the receptacle (with locking feature)            (plain test tab)</p>								
Insertion force	10N maximum/cavity	<p>IEC 60512-13-2            Operation Speed:            50 mm/min Max            Apply an axial push force insert receptacle to housing</p>								
Retention force	70N minimum/cavity	<p>IEC 60512-13-2            Operation Speed:            50 mm/min Max            Apply an axial pull force to release the receptacle from the housing</p>								
Vibration	No physical damage. No discontinuities $\geq 1$ microsecond	<p>EIA-364-28, Test Condition I            Subject mated connectors to 10-55-10 Hz traversed in 1 minute at 1.52mm amplitude 2 hours each of 3 mutually perpendicular planes.</p>								

ENVIRONMENTAL

TEST DESCRIPTION	REQUIREMENT	PROCEDURE
Temperature and humidity cycling	See note	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.
Current cycling	Test current 30A for 14AWG Temperature rise between T1 and T2 shall not exceed 15°C. Neither T1 nor T2 shall exceed 85°C.	IEC 61210 Subject terminals to 500 cycles. T1 shall be measured after the 24 <sup>th</sup> cycle and T2 shall be measured after the 500 <sup>th</sup> cycle. Terminals terminated overload test current to be 200% of the nominal test current. One cycle includes 45 minutes on and 15 minutes off.
Elevated temperature test	Test current 30A for 14AWG Temperature rise shall not exceed 45°C.	IEC 61210 Subject terminals in a heating cabinet at 60 °C. The samples are subjected to eight cycles of elevated temperature. Each cycle consists of 23hours applying the test current as specified
Temperature life	See note	EIA-364-17, Method A, Test condition 4. Mate connector exposed to the condition of 105±2°C for 96 hours. Recovery time 1~2 hours Mate connector exposed to the condition of -40±2°C for 96 hours. Recovery time 1~2 hours
Salty spray	Final Termination Resistance: 6mΩ (maximum)	EIA-364-26, Test condition A Subject mated specimen to 5% salty condition for 96 hours. After this test, rinse the samples in water , sit it for 1 hour for drying at room temperature of 38 °C ±3 °C.

Figure 2 (end)



**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 Figure 3.

3.6. Product Qualification and Requalification Test Sequence

TEST OR EXAMINATION	TEST GROUP						
	A	B	C	D	E	G	F
	TEST SEQUENCE (b)						
Examination of product	1,4	1,4	1,3	1,4	1,3	1,9	1, 3
Mating force	2						
Locking force	3						
Insertion force		2					
Retention force		3					
Contact resistance						2,4,6,8	
Crimp tensile strength			2				
Current cycling				2			
Temperature life						7	
Temperature rise					2		
Temperature and humidity cycling						5	
Salt spray							2
Elevated temperature test				3			
Vibration						3	

Figure 3



**NOTE**

- (a) Samples shall be prepared in accordance with applicable instruction sheets. They shall be selected at random from current production.
- (b) Numbers indicate sequence in which tests are performed.

**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 shown in Figure 4.

Temperature	15°C – 35°C
Relative Humidity	45% – 75%
Atmospheric Pressure	86.6 – 106.6 kPa

Figure 4

4.2. 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 in Figure 3.

4.3. 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.

4.4. Acceptance

Acceptance is based on verification that the product meets the requirements in Figure 2. 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 resubmittal.

4.5. 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.

Note: Wire sizing based upon UL1015 wire

AWG	CMA	Stranding	
		Strands	Φ inch
18	1600	16	x .0100
16	2600	26	x .0100
14	4100	41	x .0100

5. REFERENCE PART NUMBER

Here listed available part number for reference

PN	Description
2379911-X	250 FSPRING REC. 18-14AWG TPBR
2379907-X	250 HSG REC. F-SPRING 10MM 8MM 3P
2380041-X	250 HSG. F-SPRING REC 10MM 8MM 4P