187 SERIES Positive Lock (MARK II) CONNECTOR with PROTECTOR & TAB GUIDE

1. SCOPE 2

1.1 CONTENT 2

1.2 QUALIFICATION 2

2. APPLICABLE DOCUMENTS 2

2.1 TYCO ELECTRONICS DOCUMENTS 2

3. REQUIREMENTS 2

3.1 DESIGN AND CONSTRUCTION 2

3.2 MATERIALS 2

3.3 TECHNICAL DATA 2

3.4 PERFORMANCE AND TEST DESCRIPTION 3

3.5 TEST REQUIREMENTS AND PROCEDURES SUMMARY 3

3.6 QUALIFICATION AND REQUALIFICATION TEST SEQUENCE 5

4. QUALITY ASSURANCE ACTIONS 6

4.1 Test Conditions 6

4.2 Tests 6

4.3 ACCEPTANCE 6

4.4 QUALITY CONFORMANCE INSPECTION 6

5. REVISION HISTORY 10

6. SPECIFICATION APPROVAL 10

1. Scope

1.1. Content

This specification covers the requirements for product performance, test methods and quality assurance provisions of 187 SERIES POSITIVE LOCK (MARKII) CONNECTOR.

1.2. Qualification

When testing the named products the following specified specifications and standards shall be used. All tests have to be done using the applicable inspection plan and product drawing.

2. Applicable Documents

The following mentioned documents, if they are referred, are part of this specification. In case of conflict between the requirements of this specification and the product drawing or in conflict between the requirements of this specification and the referenced documents, this specification has got precedence.

2.1. Tyco Electronics Document

A 109-5000 : TEST Specification, General Requirements for Test Methods
B 114-5041 : Application Specifications

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 Material

A. Contact: Pre-tinned Brass (P/N: 170324-1,170325-1,170326-1)
B. Housing: 66 Nylon(UL94V-0)

3.3 Technical Data

A. Voltage: 250VAC
B. Current: Refer to Fig 3 for maximum allowable current to be applied.
C. Temperature: -30 to 105℃

3.4 Performance and Test Description

Product is designed to meet the electrical, mechanical and environmental performance requirements specified in Figure 1. Unless otherwise specified, all tests shall be performed at ambient environmental conditions.

3.5 Test Requirements and Procedures Summary

Para	Test items	Requirements	Procedures
3.5.1.	Examination of product.	The product shall show no evidence of cracks, breakage, damage.	Visually, dimensionally and functionally inspected per applicable quality inspection plan.
Electrical Requirements			
3.5.2	Termination Resistance (Low Level)	3mΩ Max(Initial) 6mΩ Max(Final)	Subject mated contacts assembled in housing to 20mV Max open circuit at 10mA Fig.5 TE Spec. 109-5311-1
3.5.3	Insulation Resistance	1000 MΩ min (Initial) 100 MΩ min (Final)	Impressed voltage 500VDC.Test between adjacent circuits and between the surface of housing and contact of mate connectors TE Spec109-5302
3.5.4	Dielectric with standing voltage.	No creeping discharge nor flashover shall occur. Current Leakage:1mA	2kVAC for 1 min. Test between connector/earth of unmated connectors. TE Spec 109-5301
3.5.5	Temperature Rising	30℃ maximum under loaded specified current or rating current.	Contact-loaded and mated connector is tested by applying test current shown in Fig 5

<table>
<tr><th>Para</th><th>Test items</th><th>Requirements</th><th>Procedures</th></tr>
<tr><td colspan="4">Mechanical Requirements</td></tr>
<tr><td>3.5.6</td><td>Crimp Tensile Strength</td><td><table><tr><td colspan="2">Wire Size</td><td>MIN</td></tr><tr><td>mm²</td><td>(AWG)</td><td>N(kgf)</td></tr><tr><td>0.2</td><td>24</td><td>19.6 (2)</td></tr><tr><td>0.3</td><td>22</td><td>49.0 (5)</td></tr><tr><td>0.5</td><td>20</td><td>78.4 (8)</td></tr><tr><td>0.75</td><td>18</td><td>117.6 (12)</td></tr><tr><td>1.25</td><td>16</td><td>205.8 (21)</td></tr><tr><td>2.0</td><td>14</td><td>245.0 (25)</td></tr></table></td><td>Apply an axial pull-off load to crimped wire of contact secured on the tester,
Operation Speed : 100mm/min.
TE Spec. 109-5205
Condition B</td></tr>
<tr><td>3.5.7</td><td>Contact Retention Force</td><td>49.0N (5kgf) Min</td><td>Apply an axial pull-off load to crimped wire
Operation Speed: 100mm/min
TE Spec. 109-5212</td></tr>
<tr><td>3.5.8</td><td>Connector Mating Force</td><td>1Pos:29.4N (3.0kgf) Max.</td><td>Operation Speed : 100mm/min.
Measure the force required to mate connectors.
TE Spec. 109-5206 condition B</td></tr>
<tr><td>3.5.9</td><td>Connector Unmating Force</td><td>1Pos.:5.88~29.4N(0.6~3.0kgf)</td><td>Operation Speed: 100mm.min Measure the force required to unmated connectors. TE Spec. 109-5206
Condition B</td></tr>
<tr><td>3.5.10</td><td>Contact Locking Strength</td><td>6.0kg Min(Initial)</td><td>Measure contact locking strength.
Operation Speed : 100mm/min.</td></tr>
<tr><td>3.5.11</td><td>Vibration (Low Frequency)</td><td>No electrical discontinuity greater than 1μ sec. Shall occur.
6mΩ Max (Final)</td><td>Subject mated connectors to 10-55-10Hz traversed in 1 minute at 1.52mm amplitude 2 hours each of 3 mutually perpendicular planes. 100mA applied
Mounting : Fig. 6</td></tr>
</table>

Para	Test item	Requirements	Procedures
Environmental Requirements			
3.5.12	Humidity, Steady State	Insulation Resistance 100 mΩ Min.(Final) Termination Resistance 6 mΩ Max (Final)	Mated connector, 90-95% R.H . 40℃ 96 hours TE Spec 109-5105-1
3.5.13	Thermal Shock	6 mΩ Max.(Final)	Subject terminal inserted into housing to 5 cycles between -40℃/30 min. and 105℃ /30 min; TE Spec 109-5103
3.5.14	Salt Spray	6mΩ Max (Final)	Subject mated connectors to 5% salt concentration for 96 hours: After the test, rinse the sample in water, sit it for one(1) hour for drying at room temperature. TE Spec 109-5101 Condition B

Fig 1 (End)

3.6 Qualification and Requalification Test Sequence

Test of Examination	Test Group (a)					
	1	2	3	4	5	6
	Test Sequence (b)					
Examination of product					1	1
Termination Resistance (Low Level)						2,4,6 8,10
Dielectric withstanding voltage					5,8	
Insulation Resistance					4,7	
Temperature rising				1		
Vibration(Low Frequency)						3
Contact Locking Strength			1			
Contact Retention Force		1				
Connector Insertion Force					2	
Connector Extraction Force					3	
Crimp Tensile Strength	1					
Thermal Shock						7
Humidity(Stead State)					6	5
Salt Spray						9

Fig 2

4. Quality Assurance Actions

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 ~ 106.6 Kpa

Fig. 3

4.2 Tests

4.2.1 Test Specimens

The test specimens to be employed for the tests shall be conforming to the requirements Specified in the applicable product drawing. The crimped contacts shall be prepared in accordance with the requirements of applicable application Specification (114-5041)

4.2.2 Applicable Wire

The wires to be used for crimping the samples for performance testing shall be conforming to the requirements specified in Fig.4

Wire Size	Calculated Cross Section of Conductor mm²	Number of Strands /Diameter of Strand N/DIA mm	Applicable Wire Type	Current A(DC)
#24	0.22	11/0.16	UL1569/3398	2.5
#22	0.31	17/0.16	UL1569/3398	3.0
#20	0.51	21/0.18	UL1569/3398	5.0
#18	0.76	41/0.18	UL1569/3398	7.0
#16	1.27	26/0.25	UL1569/3398	12.0
#14	1.96	41/0.25	UL1569	15.0

Fig 4

4.3 Acceptance

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 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 applicable product drawing and this specification.

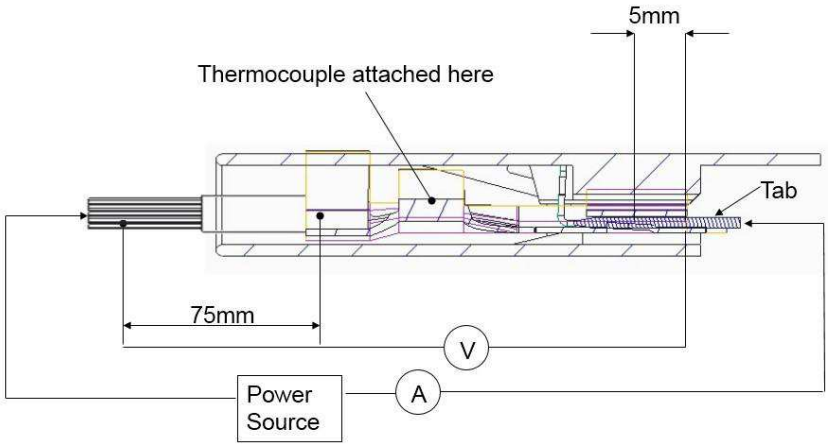

Fig. 5 Termination Resistance

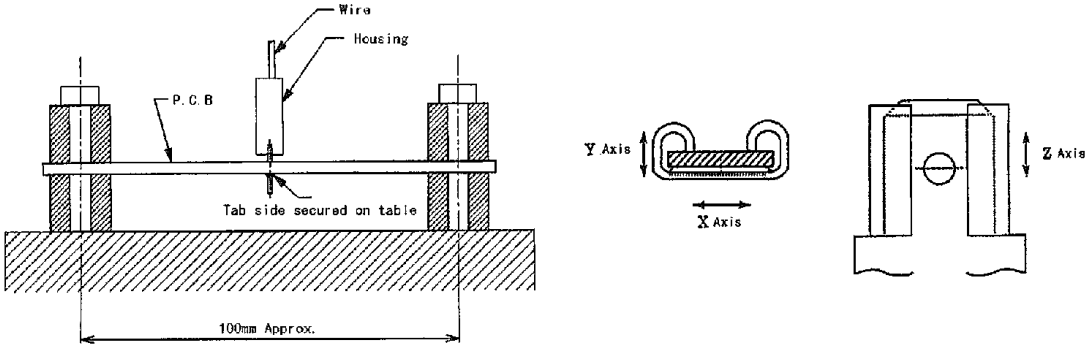

Fig 6 Vibration (Low Frequency)

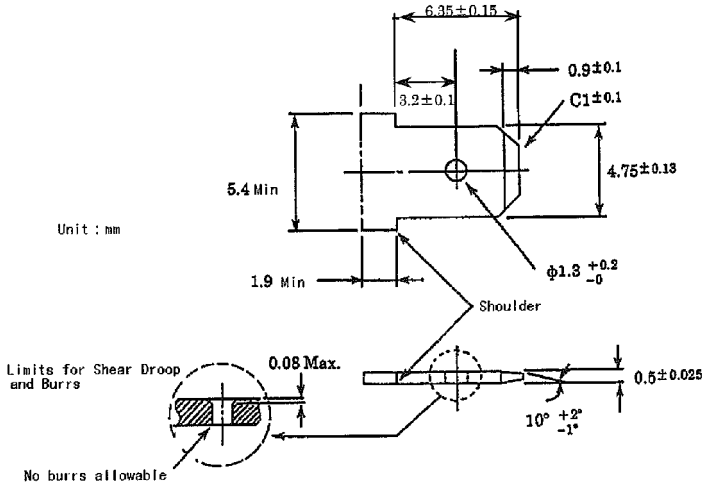

Fig 7 Mating TAB Design

Tab contacts for mating with “187”series positive Lock Contacts comply with the design specified in Fig 8.

5. Revision History

Current Revision	New Revision	Changes	Reason for Change	EC No.(DATE)
A				

6. Specification Approval

Prepared by,

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Senior Product Engineer

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Product Engineering Manager