
Clean Body 025/040 Sealed 147 Position Connector

1. SCOPE

1.1. Content

This specification covers performance, tests and quality requirements for the Tyco Electronics Clean Body 025/040 Sealed 147 Position Connector consisting of a 147 position header with three, 49 position plugs keyed for proper assembly.

1.2. Qualification

When tests are performed on the subject product line, procedures specified in Figure 1 shall be used. All inspections shall be performed using the applicable inspection plan and product drawing.

1.3. Qualification Test Results

Successful qualification testing on the subject product line was completed in May06. The Qualification Test Report number for this testing is 501-640. This documentation is on file at and available from Engineering Practices and Standards (EPS).

2. APPLICABLE DOCUMENTS

The following Tyco Electronics 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.

- 108-5911: Design Objectives (Clean Body 025/040 Sealed 132 Position Connector)
- 114-5278: Application Specification (Crimping Clean Body 025/040 Receptacle Contact)
- 408-10068: Instruction Sheet (Clean Body 025/040 Sealed 132 Position Connector)
- 501-640: Qualification Test Report (Clean Body 025/040 Sealed 147 Position Connector)
- 502-1208: Engineering Report (Terminal Holding Force Evaluation of 49 Position Sealed ECU Plug)

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. Materials

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

3.3. Ratings

Temperature: -40 to 100°C

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

Test Description	Requirement	Procedure
Initial examination of product.	Meets requirements of product drawing.	Visual and dimensional (C of C) inspection per product drawing.
Final examination of product.	Meets visual requirements.	Visual inspection.
ELECTRICAL		
Low level contact resistance.	10 milliohms maximum initial. 20 milliohms maximum final.	Subject specimens to 10 milliamperes maximum and 20 millivolts maximum open circuit voltage. See Figure 3.
Contact resistance, specified current.	10 millivolts/amperes maximum initial. 20 millivolts/amperes maximum final.	Measure resistance of mated contacts assembled in housing with 12 volts DC maximum open circuit applied with 1 ampere when short circuited. See Figure 3.
Insulation resistance.	100 megohms minimum.	500 volts DC, 30 second hold. Test between adjacent contacts and between contacts and housing of mated specimens. See Figure 4.
Withstanding voltage.	One minute hold with no breakdown or flashover. One milliampere maximum leakage current.	1000 volts AC at sea level. Test between adjacent contacts and between contacts and housing of mated specimens.
Temperature rise vs current.	30°C maximum temperature rise at specified current.	Stabilize at a single current level until 3 readings at 5 minute intervals are within 1°C. All contacts series wired.
Current cycling.	See Note.	Subject fully loaded and 100% energized specimens to 1000 cycles of 45 minutes ON and 15 minutes OFF. Apply enough current to induce a 40°C temperature rise.

Figure 1 (continued)

Test Description	Requirement	Procedure
MECHANICAL		
Vibration, sinusoidal.	No discontinuities of 1 microsecond or longer duration. See Note.	Subject mated specimens to 15.0 G's rms between 20 to 400 Hz. Three hours in each of 3 mutually perpendicular planes. Six minutes total sweep time. See Figure 5.
Durability.	See Note.	Manually mate and unmate specimens for 50 cycles.
Mating force.	147.1 N maximum.	Measure force necessary to mate specimens at a maximum rate of 100 mm per minute.
Unmating force.	147.1 N maximum.	Measure force necessary to unmate specimens at a maximum rate of 100 mm per minute with locking latch disabled.
Contact insertion force.	14.7 N maximum per contact.	Measure force necessary to insert contacts into the housing at a maximum rate of 100 mm per minute.
Contact retention force.	48 N minimum.	Apply axial load to contact at a maximum rate of 100 mm per minute with secondary lock disengaged.
Housing locking strength.	58.8 N minimum.	Measure the force necessary to overcome the lever lock of a fully loaded and mated specimen at a maximum rate of 100 mm per minute.
Crimp tensile.	See Design Objectives 108-5911.	This test not performed as part of product qualification. Shown for reference only.
Contact retention force with secondary lock engaged.	See Engineering Report 502-1208.	This test not performed as part of product qualification. Shown for reference only.
ENVIRONMENTAL		
Thermal shock.	See Note.	Subject specimens to 1000 cycles between -40 and 100°C with 30 minute dwells at each extreme.
Humidity, steady state.	See Note.	Subject mated specimens to 60°C and 90 to 95% RH for 96 hours.
Temperature life.	See Note.	Subject mated specimens to 100°C for 120 hours.
Mixed flowing gas.	See Note.	Subject mated specimens to SO ₂ atmosphere. SO ₂ at 10 ppm, 90 to 95% RH, and 40°C for 24 hours.

Figure 1 (continued)

Test Description	Requirement	Procedure
Resistance to cold.	See Note.	Subject mated specimens to $-40 \pm 5^{\circ}\text{C}$ for 120 hours.
Watertight sealing.	98 kPa minimum initial. 29.4 kPa minimum final. No visible air bubbles.	Submerge mated specimens to a depth of 100.0 mm in plain ambient water. Tubing inserted in 1 wire cavity shall be pressurized at 10.0 kPa and held for 30 seconds. Observe for air bubbles. After 30 seconds, increase the air pressure in increments of 10.0 kPa until the specified pressure is reached. No air bubbles shall be visible and the wire ends of the specimen shall remain sealed. Test shall be performed while applying a tensile load of 5 N to the wire harness at a 45 degree angle. See Figure 6.
Dust bombardment.	See Note.	Subject mated specimens to cement dust at a rate of 1.5 kg per 10 seconds in 15 minutes. Repeat for 8 cycles, mating and unmating every 2 cycles.
Water resistance.	See Note.	Subject mated specimens to $100 \pm 3^{\circ}\text{C}$ for 40 minutes, then to water splashing for 20 minutes while energized at 12 volts. Repeat for 48 cycles.

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 2.

Figure 1 (end)

3.6. Product Qualification and Requalification Test Sequence

Test or Examination														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Initial examination of product	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Low level contact resistance				2,4			2,6	2,6	2,6	2,6	2,4	2,6	2,6	
Contact resistance, specified current	2,4					2,4	8	8	8	8	5	8		
Insulation resistance														
Withstanding voltage													8	
Temperature rise vs current					2									
Current cycling				3										
Vibration, sinusoidal						3								
Durability	3						4(c)	4(c)	4(c)	4(c)		4(c)	4(c)	
Mating force		2												
Unmating force		3												
Contact insertion force			2											
Contact retention force			3											
Housing locking strength								9						2
Thermal shock							5							
Humidity, steady state								5						
Temperature life									5					
Mixed flowing gas									5					
Resistance to cold													5	
Watertight sealing							3,7	3,7	3,7	3,7		3,7	3,7	
Dust bombardment											3			
Water resistance												5		
Final examination of product	5	4	4	5	3	5	9	10	9	9	6	9	9	3

- NOTE**
- (a) See paragraph 4.1.A.
 - (b) Numbers indicate sequence in which tests are performed.
 - (c) One connector assembly durability cycle only.

Figure 2

4. 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. All test groups shall each consist of a minimum of 5 specimens and/or 30 data points.

B. Test Sequence

Qualification inspection shall be verified by testing specimens as specified in Figure 2.

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 of Figure 1. 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.

4.4. 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.

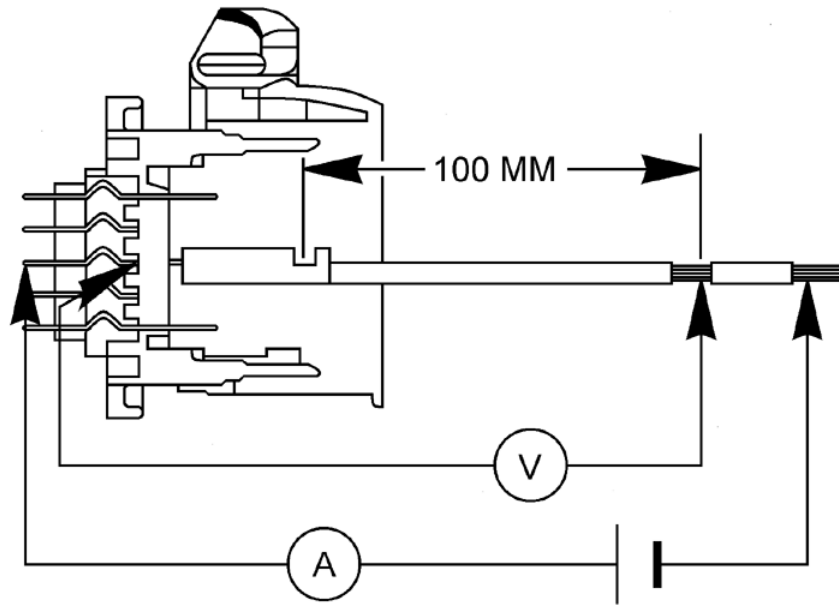


Figure 3
Low Level Contact Resistance Measurement Points

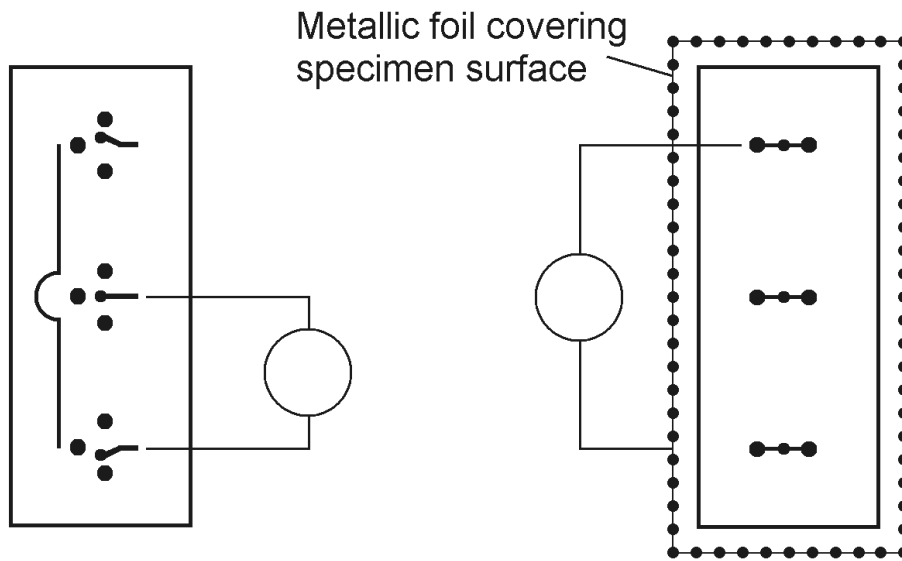


Figure 4
Insulation Resistance

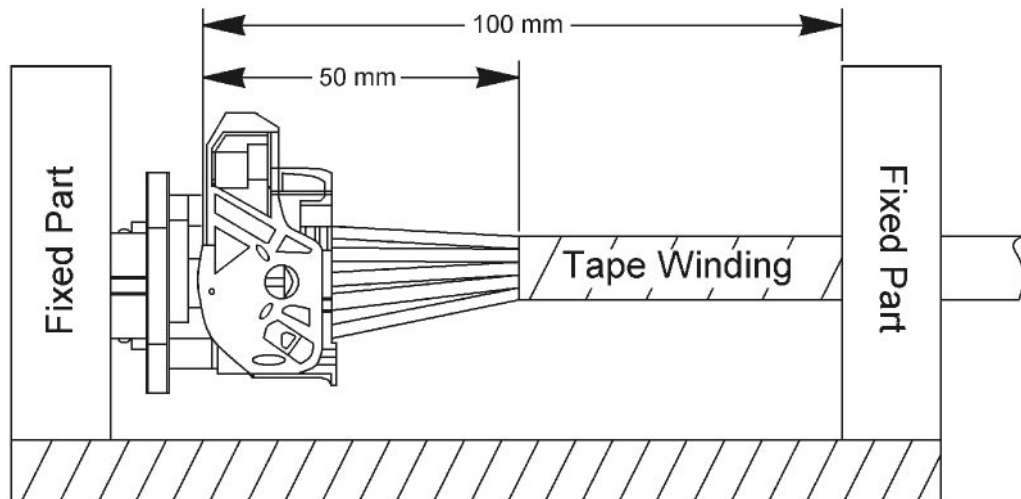


Figure 5
Vibration & Mechanical Shock Mounting Fixture

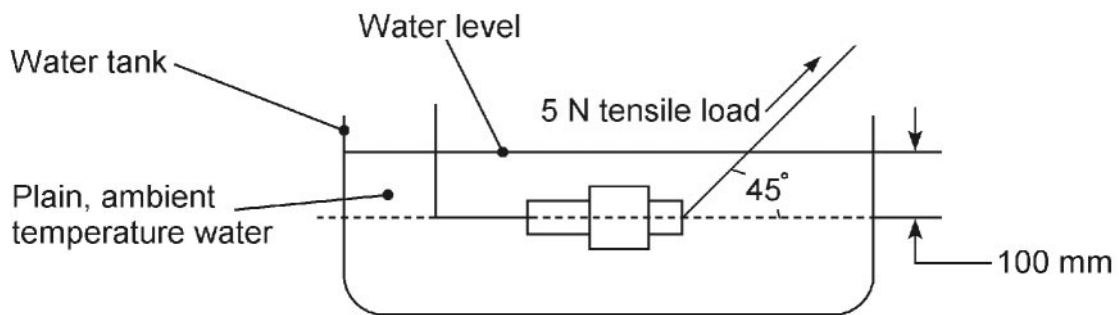


Figure 6
Water Resistance