NETCONNECT* EtherSeal Modular Jacks and Plugs

1. SCOPE

1.1. Content

This specification covers performance, test, and quality requirements for NETCONNECT* EtherSeal modular jack and modular plug kits. These assemblies are designed for installation into various outlet faceplates, surface mount boxes, and enclosures. Modular jacks incorporate IDC terminals for terminating both shielded or unshielded twisted pair communications cable. Modular jacks will accommodate 22 to 24 AWG solid conductors and 24 AWG stranded conductors only. The maximum conductor insulation diameter is 1.27 mm [.050 in]. The unshielded Cat 5e solid modular plug kits accommodate 24, 26 and 28 AWG solid conductors provided the insulated conductor diameter is 0.89 to 0.99 mm [.035 to .039 in]. These modular plug kits will accommodate an unshielded, pliable, loose, cable jacket of 4.83 to 5.59 mm [.190 to .220 in] diameter or an unshielded, rigid, hard cable jacket of 4.83 to 5.08 mm [.190 to .200 in] diameter. The unshielded Cat 5e stranded plug kits accommodate 24 AWG stranded conductors only, provided the insulated conductor diameter is less than or equal to 0.99 mm [.039 in]. These plug kits will accommodate a cable jacket of 4.83 to 5.59 mm [.190 to .220 in] diameter. The shielded Cat 5e solid plug kits accommodate 24 and 26 AWG solid conductors provided the insulated conductor diameter is 0.89 to 0.99 mm [.035 to .039 in]. These plug kits will accommodate an unshielded, pliable, loose, cable jacket of 4.83 to 5.59 mm [.190 to .220 in] diameter or an unshielded, rigid, hard cable jacket of 4.83 to 5.08 mm [.190 to .200 in] diameter. The shielded Cat 5e stranded plug kits accommodate 24 or 26 AWG stranded conductors only, provided the insulated conductor diameter is 0.89 to 0.99 mm [.035 to .039 in]. These plug kits will accommodate a shielded, pliable, loose, cable jacket of 4.83 to 5.21 mm [.190 to .205 in] diameter or a shielded, rigid, hard cable jacket of 4.83 to 5.08 mm [.190 to .200 in] diameter.

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 on 30Nov04. The Qualification Test Report number for this testing is 501-595. This documentation is on file at and available from Engineering Practices and Standards (EPS).

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 the specification and the referenced documents, this specification shall take precedence.

2.1. Tyco Electronics Documents

501-595: Qualification Test Report

2.2. Industrial Standards

- EIA-364: Electrical Connector/Socket Test Procedures Including Environmental Classifications
- IEC-60512: Electromechanical Components for Electronic Equipment; Basic Testing Procedures and Measuring Methods Part 1:General
- IEC-60529: Degrees of Protection Provided by Enclosures (IP Code)
- NEMA 250: Enclosures for Electrical Equipment (1000 Volts Maximum)

2.3. Reference Documents

Additional documents that may be used for reference.

- 108-1916: Product Specification (NETCONNECT Toolless Jacks)
- 108-1990: Product Specification (NETCONNECT SL Series Jacks and Category 6 Plugs)
- 114-6016: Application Specification (Modular Plug Connectors (Standard and Small Conductor))
- 114-6053: Application Specification (High Performance Modular Plug Connectors)
- 408-8874: Instruction Sheet (Assembly Instructions for EtherSeal Plug Kits)
- 408-8875: Instruction Sheet (Assembly Instructions for EtherSeal Receptacle Kits)
- 408-8417: Instruction Sheet (SL Series 110Connect Modular Jack)
- 408-8602: Instruction Sheet (Shielded SL Series 110Connect Modular Jacks)
- 408-4542: Instruction Sheet (3-Pair and 4-Pair Unshielded Toolless Outlet Jack)
- 408-4588: Instruction Sheet (4-Pair Shielded Toolless Outlet Jack)
- IEC-61076-3: Connectors for Use in D.C.; Low-frequency Analogue and Digital High-speed Data Applications - Part 3: Rectangular Connectors with Assessed Quality - Sectional Specification

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

- Voltage: 150 volts AC maximum
- Current: 1.5 amperes maximum
- Temperature: -40 to 85˚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
Examination of product.	Meets requirements of product drawing.	Visual, dimensional and functional per applicable quality inspection plan.
ELECTRICAL		
Contact resistance.	ΔR 20 milliohms maximum.	IEC-60512-2-1. Subject mated plug and terminated jack to 20 millivolts maximum open circuit voltage at 100 milliamperes maximum. See Figure 3.
Insulation resistance.	500 megohms minimum.	IEC-60512-3-1. Test voltage of 100 ± 15 volts DC, Method A. Test between adjacent contacts of mated plug and terminated jack.
Voltage proof.	1 minute hold with no breakdown or flashover.	IEC-60512-4-1. 1000 volts AC at sea level. Test between adjacent contacts of mated plug and jack.
MECHANICAL		
Vibration.	No discontinuity of 10 microseconds or longer duration.	IEC-60512-6-4. Subject mated specimens to sinusoidal vibration, 10-500-10 Hz, traversed logarithmically at a rate of 1 octave per minute, at an amplitude of 0.3 mm peak-to-peak, or 5 g's (gravity units), whichever is less, for 2 hours in each of 3 mutually perpendicular axes (total 6 hours of exposure).
Mechanical shock.	No discontinuity of 10 microseconds or longer duration.	IEC-60512-6-3. Subject mated specimens to 30 g's, half-sine shock pulses of 11 milliseconds duration. 3 shocks in each direction applied along 3 mutually perpendicular planes, 18 total shocks.
Insertion and withdrawal forces.	116 N maximum.	IEC-60512-13b.
Effectiveness of coupling device.	50 N for 60 ± 5 seconds.	IEC-60512-15f. Rate of load application shall be 44.5 N per second maximum.
Mechanical operation, half of the specified number of operations.	See Note.	IEC-60512-9a. N/2 operations, speed 10 mm per second maximum, rest 5 seconds (unmated) with locking device inoperative. N=750.

Figure 1 (cont)

Test Description	Requirement	Procedure
ENVIRONMENTAL		
Water jet spray.	IP 65, No leakage on contacts.	IEC-60529-14.2.5.
Immersion.	IP 67, no leakage on contacts.	IEC-60529-14.2.7. 1 meter for 30 minutes.
Solid foreign objects.	No deposit of dust observable inside enclosure.	IEC-60529-13.4 and 13.6.
Access to hazardous parts.	Adequate clearance between access probe and hazardous parts.	IEC-60529-12.2.
Rapid change of temperature.	See Note.	-40 to 85˚C, mated specimens, 25 cycles, t1 = 30 minutes, recovery time 2 hours.
Climatic damp heat.	See Note.	21 cycles low temperature 25˚C, high temperature 85˚C, 5 cold subcycle -10˚ C, humidity 93%, half specimens mated, half specimens unmated.
Flowing gas corrosion test.	See Note.	IEC 68-2-60, 1995-12, Method 2 exposure. Half specimens mated, half specimens unmated, 4 days.
Electrical load and temperature.	See Note.	IEC-60512-5-9b 500 hours at ambient temperature of 85˚C; 0.5 ampere applied to 5 specimens, 5 specimens no current.
Prolonged submersion.	See Note.	NEMA 250, 5.12.
Salt spray.	See Note.	EIA-364-26, Condition C. Expose specimens to 5% spray for 500 hours.

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	Test Group (a)					
	1	2	3	4	5	6
	Test Sequence (b)					
Examination of product	1,7	1,18	1,11	1,6	1,7	1,5
Contact resistance		4,8,12	2,6	2,5	2,6	2,4
Insulation resistance		5,9,13	7		4	
Voltage proof		6,10,14	8		5	
Vibration				3		
Mechanical shock				4		
Insertion force		2,15				
Withdrawal force		3,16				
Effectiveness of coupling device		17				
Mechanical operation (c)			3,5			
Water jet spray	2					
Immersion	3					
Solid foreign objects	5					
Access to hazardous parts	6					
Rapid change of temperature		7				
Climatic damp heat		11				
Flowing gas corrosion test			4			
Electrical load and temperature					3	
Prolonged submersion	4					
Salt spray						3

NOTE
(a) See paragraph 4.1.A.
(b) Numbers indicate sequence in which tests are performed.
(c) Test shall be done n/2 cycles for sequence 3 and n/2 cycles for sequence 5, n=750.

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. Each test group shall each consist of 10 sets of EtherSeal receptacles mounted to IP67 rated enclosures coupled with EtherSeal cable assemblies.

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.

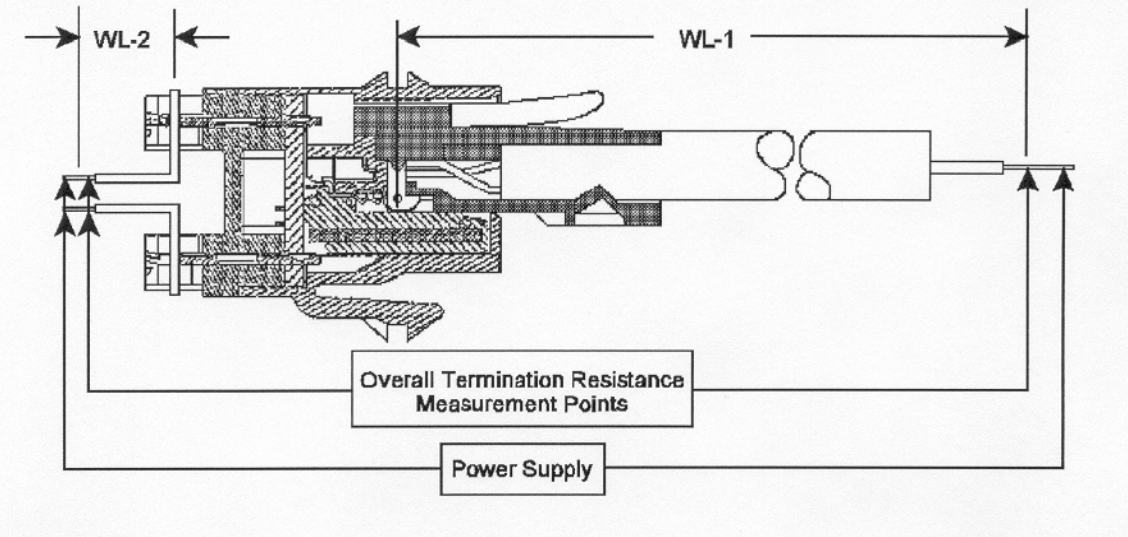

Figure 3
Contact Resistance Measurement Points