
1. SCOPE

1.1. Content

This specification covers performance, tests and quality requirements for the Tyco Electronics 1XN Right Angle RJ Point 5 Connector System. All designed for intra-building use only.

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.

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. Tyco Electronics Document

501-: Qualification Test Report (Right Angle RJ Point Five Connector System)

2.2. Industry Documents

- ANSI X3.263: Information Technology - Fibre Distributed Interface (MDI) - Token Ring Twisted Pair Physical Layer Medium Dependent (TP-PDM)
- EIA-364: Electrical Connector/Socket Test Procedure Including Environmental Classifications
- IEEE 802.3: Local Area Network; Carrier Sense Multiple Access With Collision Detection (CSMA/CD) Access Method and Physical Layer Specification
- TIA-568-C: Commercial Building Telecommunications Cabling Standard

2.3. Reference Document

109-197: Test Specification (AMP 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. Materials

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

3.3. Ratings

- Voltage:
 - 48 volts DC for signal pairs
- Current:
 - 0.1 ampere maximum per signal contact
 - 0.020 ampere maximum for LED signals
- Temperature:
 - Storage: -40 to 85°C
 - Operating: 0 to 70°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. | EIA-364-18. Visual and dimensional (C of C) inspection per product drawing. |
| Final examination of product. | Meets visual requirements. | EIA-364-18. Visual inspection. |
| ELECTRICAL | | |
| Low Level Contact Resistance (LLCR), RJ Point Five interface, cable and board side. | ΔR 30 milliohms maximum for non-magnetic product. | EIA-364-23. Subject non-magnetic specimens to 100 milliamperes maximum and 20 millivolts maximum open circuit voltage. Measure the DC resistance across each of the 8 signals on the RJ Point 5 interface. |
| Figure 1 (continued) | | |
| Insulation resistance. | 500 megohms minimum. | EIA-364-21. 500 volts DC, 2 minute hold. Test between adjacent contacts of mated magnetic specimens that are not electrically connected. Test between adjacent contact pairs on each plug of mated non-magnetic specimens. |
| Withstanding voltage. | One minute hold with no breakdown or flashover. | EIA-364-20, Condition 1. Subject specimens to 500 volts DC between adjacent contacts. |

| Test Description | Requirement | Procedure |
|------------------------------|---|--|
| | | EIA-364-20, Condition 1. Subject specimens to 2250 volts DC between bridged signal contacts on plug and board side and ground shield. One milliamp cutoff per port, 200 volts per second maximum ramp. |
| Temperature rise vs current. | 30°C maximum temperature rise at specified current. | EIA-364-70, Method 1. Stabilize at a single current level until 3 readings at 5 minute intervals are within 1°C. |
| Crosstalk (FEXT) | Requirements as specified on the applicable customer drawing. | TIA-568-C.2. |
| Crosstalk (NEXT). | Requirements as specified on the applicable customer drawing. | TIA-568-C.2. |
| Insertion Loss (IL). | Requirements as specified on the applicable customer drawing. | TIA-568-C.2. |
| Return Loss (RL). | Requirements as specified on the applicable customer drawing. | TIA-568-C.2. |
| Common Mode Rejection (CMR). | Requirements as specified on the applicable customer drawing. | TIA-568-C.2. |
| Functional test: LEDs. | All LEDs shall illuminate. | Using a current limiting power supply, apply 5 volts in both directions to all LEDs. |

Figure 1 (continued)

MECHANICAL

| | | |
|--|---|--|
| Random vibration. | No discontinuities of 1 microsecond or longer duration. See Note. | EIA-364-28, Test Condition VII, Condition D. Subject mated specimens to 3.10 G's rms between 20 to 500 Hz. Ninety minutes in each of 3 mutually perpendicular planes. Loopback contacts on plug side. No loopback needed on PCB side. |
| Mechanical shock. | No discontinuities of 1 microsecond or longer duration. See Note. | EIA-364-27, Condition A. Subject mated specimens to 50 G's half-sine shock pulses of 11 milliseconds duration. Three shocks in each direction applied along 3 mutually perpendicular planes, 18 total shocks. Loopback contacts on plug side. No loopback needed on PCB side. |
| Durability. | See Note. | EIA-364-9. Mate and unmate specimens with the plug locking tab inoperable for 250 cycles at a maximum rate of 600 cycles per hour. |
| Mating force. | 20.02 N [4.5 lbf] maximum. See Note. | EIA-364-13. Measure force necessary to mate individual ports of specimens at a maximum rate of 12.7 mm [.5 in] per minute. |
| Unmating force. | 20.02 N [4.5 lbf] maximum. See Note. | EIA-364-13. Measure force necessary to unmate individual ports of specimens with the plug locking tab inoperable at a maximum rate of 12.7 mm [.5 in] per minute. |
| Static pull, plug retention to jack, non-operational. | 44.48 N [10 lbf] minimum. Show no evidence of physical damage to the jack, plug shall not disengage from the jack. | EIA-364-98. Subject specimens to specified force with plug mated in jack and latch engaged. Cable shall be pulled in an axial direction and held for 60 seconds. |
| Dynamic pull, plug retention to jack, non-operational. | 22.24 N [5 lbf] minimum. Show no evidence of physical damage to the jack, plug shall not disengage from the jack. | EIA-364-98. Subject specimens to specified force with plug mated in jack and latch engaged. Cable shall be pulled at a 40 degree angle from normal hanging axis. Weighted end of cable shall be rotated through 360 degrees at a rate of 4 rpm for 3 total revolutions. |

Figure 1 (continued)

| | | |
|-------------------------------|----------------------------------|--|
| Press fit insertion force. | 31.14 N [7 lbf] maximum per pin. | Measure force necessary to press specimens onto a PCB into proper seating location at a maximum rate of 6.35 mm [.25 in] per minute. |
| Press fit extraction force. | 22.24 N [5 lbf] maximum per pin. | Measure force necessary to extract specimens from a PCB at a maximum rate of 6.35 mm [.25 in] per minute. |
| ENVIRONMENTAL | | |
| Thermal shock. | See Note. | EIA-364-32. Subject mated specimens to 5 cycles between -40 and 60°C with 30 minute dwell at temperature extremes and 1 minute transition between temperatures. |
| Humidity/temperature cycling. | See Note. | EIA-364-31, Method IV. Subject mated specimens to 10 cycles (10 days) between 25 and 60°C at 80 to 100% RH. |
| Temperature life. | See Note. | EIA-364-17, Method A. Subject receptacles mated to dummy plugs without cable to 85°C for 500 hours. Subject unmated plugs with cable to 60°C for 500 hours. |
| Mixed flowing gas. | See Note. | EIA-364-65, Class IIA. Subject mated specimens to environmental Class IIA for 14 days (unmated for 7 days, then mated for 7 days). |

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(b) | 2(b) | 3(b) | 4(c)(d) | 5(c)(e) | 6(c)(e) | 7(d) | 8(b)(e) |
| | Test Sequence (f) | | | | | | | |
| Initial examination of product | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| LLCR, RJ Point Five interface, cable and board side | 2,5,7,9,12 | 2,4,6 | 2,4 | | 2,4,7 | | | |
| Insulation resistance | | | | 2,6 | | | | |
| Withstanding voltage | | | | 3,7 | | | | |
| Temperature rise vs current | | | | | | | | 2 |
| FEXT | | | | | | 6(k) | | |
| NEXT | | | | | | 2 | | |
| IL | | | | | | 3 | | |
| RL | | | | | | 4 | | |
| CMR | | | | | | 5(h) | | |
| Functional test: LEDs(Rec. side) | 13(i) | ,7 | | | | | | |
| Random vibration | | | | | 5 | | | |
| Mechanical shock | | | | | 6 | | | |
| Durability | 8 | | | | 3 | | | |
| Mating force | 3,10 | | | | | | | |
| Unmating force | 4,11 | | | | | | | |
| Static pull, plug retention to jack, non-operational | | | | | | | 2 | |
| Dynamic pull, plug retention to jack, non-operational | | | | | | | 3 | |
| Press fit insertion force(Rec. side) | | | | | | | 4 | |
| Press fit extraction force(Rec. side) | | | | | | | 5 | |
| Thermal shock | | 3 | | 4 | | | | |
| Humidity/temperature cycling | | 5 | | 5 | | | | |
| Temperature life | 6(b) | | | | | | | |
| Mixed flowing gas | | | 3(b) | | | | | |
| Final examination of product | 14 | 8 | 5 | 8 | 8(h) | 7 | 6 | 3 |

- (a) See paragraph 4.1.A.
- (b) Test Groups shall be performed with only ports 1, 2, 7, 10, 15 and 16 populated with cable plugs.
- (c) Test Groups shall be performed with parts NOT mounted to PCBs for entire test group.
- (d) Two adjacent ports shall be tested per specimen. All corner ports and 2 random center ports shall be tested.
- (e) Testing shall be conducted by removing individual modules from the main receptacle assembly.
- (f) Numbers indicate sequence in which tests are performed.
- (g) Parts shall be measured before insertion onto PCB and/or after removal from PCB. Vertical header contact shall be probed not soldered.
- (h) This test is not applicable when evaluating non-magnetic receptacles.
- (i) LED functional test shall be performed with current-limiting power supply. Verify illumination on both LED's, both directions, all ports.
- (j) Precondition specimens with 25 durability cycles.
- (k) This test is not applicable when evaluating magnetic receptacles.

Figure 2

4. QUALITY ASSURANCE PROVISIONS

4.1. Qualification Testing

A. Specimen Selection

RJ Point Five receptacle and plug specimens shall be selected at random from current production lots and prepared for testing in accordance with current Application Specifications and Instruction Sheets. Test groups 1, 2, 3, 4 and 7 shall each consist of 3 specimens. Test group 5 shall consist of 6 specimens. Test groups 6 and 8 shall each consist of 4 specimens.

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.