
Coupler Modular Jack

1. SCOPE

1.1. Content

This specification covers the performance, tests and quality requirements for the Modular Jack Coupler. This assembly is designed to accept the standard modular plug used in telephone systems. The Modular Jack Coupler is designed in 6 and 8 positions with a 1 to 1 pin configuration.

1.2. Qualification

When tests are performed on the subject product line, the procedures specified in 109-Series Test Specifications 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. 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 (TE) Documents

- A. 109-1: General Requirements for Test Specifications
- B. 109 Series: Test Specifications as indicated in Figure 1.
- C. 501-94: Test Report

2.2. Commercial Standards

- A. F.C.C. Rules and Regulations Part 68: Connection of Terminal Equipment to the Telephone Network.
- B. REA Bulletin 345-81, PE-76: Specification for Modular Telephone Set Hardware.

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. Housing: Phenylene oxide based resin, oxygen index 28 minimum
- B. Contact: Phosphor bronze, selective gold over nickel

3.3. Ratings

- A. Current: 1 ampere maximum
- B. Operating Temperature: -40 to 60°C.

3.4. Performance and Test Description

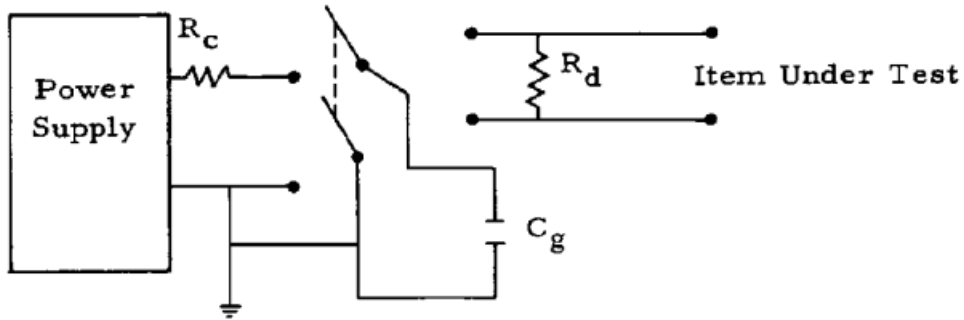
Coupled assemblies shall be designed to meet the electrical, mechanical and environmental performance requirements specified in Figure 1.

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 inspection plan. |
| ELECTRICAL | | |
| Termination Resistance, Dry Circuit | 40 milliohms ΔR maximum. | Subject mated assembly to 50 mv open circuit at 100 ma maximum, see Figure 7; Test Specification 109-6-1. |
| Dielectric Withstanding Voltage | 1000 vac (rms) dielectric withstanding voltage, one minute hold. | Test between adjacent conductors of unmated connector assemblies; Test Specification 109-29-1. |
| Insulation Resistance | 500 megohms minimum | Test between adjacent circuits of unmated modular jack; Test Specification 109-28-3. |
| Surge | Insulation resistance. | Subject mated modular jack and plug mounted on P.C.B. to surge voltage, see Figure 2. |
| MECHANICAL | | |
| Vibration Sinusoidal | No discontinuities greater than 1 microsecond. No physical damage. | Subject mated assemblies to 10-55-10 Hz traversed in 1 minute at .06 inches total excursion; 2 hours in each of 3 mutually perpendicular planes; Test Specification 109-21-1. |
| Insertion Force | See Figure 4. | Measure force to fully insert modular jack onto specified gage, see Figure 4; Test Specification 109-41. |
| Plug Retention | Plug shall not dislodge from jack assembly and shall maintain electrical continuity. | Apply load to mated modular plug in 3 directions, see Figure 5, at a rate of 2 inches/ minute, to a maximum of 20 pounds. |
| Durability | No evidence of damage cracking or chipping. | Mate and unmate jack and plug assemblies for 500 cycles; at a rate of 20 cycles/minute; Test Specification 109-27 |
| ENVIRONMENTAL | | |
| Humidity-Temperature Cycling | No evidence of damage cracking or chipping. | Subject mated jack and plug, mounted on printed circuit board, to humidity-temperature cycling, see Figure 3. |
| Life | No evidence of damage cracking or chipping. | Subject mated jack and plug, mounted on printed circuit board, to humidity-temperature cycling followed by 200 mating and unmating cycles. |
| Thermal Shock | No evidence of damage cracking or chipping. | Subject unmated connector to 5 cycles between -40 and 60°C; Test Specification 109-22 |

Figure 1

Surge Test: The plugs and jacks shall be tested by connecting terminals to a surge generator equivalent to that shown in Figure 2. Circuit constants shall be so proportioned that a surge, having a wave shape of approximately 10X103 microseconds with a crest amplitude of 1000 volts, is produced across the wave forming resistor R_d . The value of R_d shall be chosen to ensure the proper wave shape. Plugs and jacks shall be subjected to 5 surges of each polarity at one minute intervals.



NOTES

- (a) Select values of C_g and R_d to produce 10X103 microsecond wave shape across R_d with the test item disconnected from the circuit.
- (b) Charge capacitor bank C_g through current limiting resistor R_c to 1000 volts and connect the test item into the circuit in the off-hook condition.
- (c) Discharge C_g thru forming circuit and test item monitoring wave shape and action on oscilloscope.

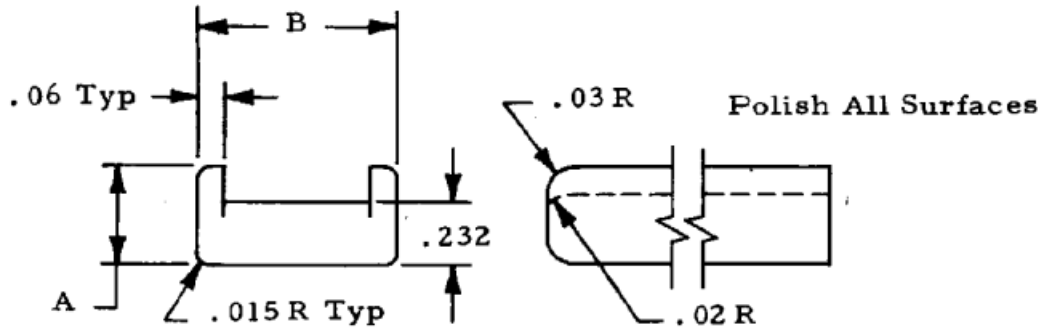
Figure 2
Surge-Test Diagram

| State of Test | Temperature °C | | | Time For Changes | For |
|---------------|----------------|----|------|------------------|---------|
| | From | To | Hold | | |
| 1 | 5 | 60 | | 2 hours | |
| 2 | | | 60 | | 4 hours |
| 3 | 60 | 5 | | 3 hours | |
| 4 | | | 5 | | 3 hours |

NOTE

The assembled hardware shall be placed at 95 (+0, -5) percent RH at room temperature. Then, while the RH is held at or returned to 95%, the temperature shall be reduced to 5°C (41°F), a maximum rate of 15°C (50°F) per hour. The temperature shall then be cycled linearly for 10 cycles as specified above with a RH of 95%.

Figure 3
Humidity-Temperature Cycle Procedure

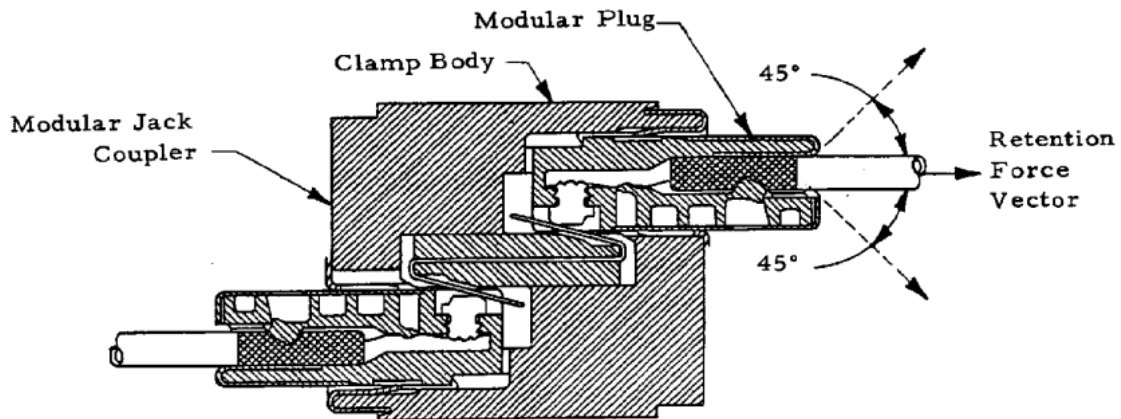


| Gage Number (a) | Gage Block Dimensions in Inches (b) | | | |
|-----------------|-------------------------------------|------|------------|------|
| | 6 position | | 8 Position | |
| | A | B | C | D |
| 1 | .266 | .386 | .264 | .464 |
| 2 | .254 | .392 | .254 | .474 |
| 3 | .275 | .376 | .274 | .456 |

NOTE

- (a) To be tested in numerical sequence
- (b) Acceptance is obtained by meeting the following Requirements:
1. The 6 or 8 position jack shall be capable of accepting gage 1 and the gage shall be capable of being removed with a maximum force of 5 pounds.
 2. The jack shall not accept gages 2 or 3. Removal forces do not include forces contributed by contact springs nor shall external forces be applied to the jack that will affect these removal forces

Figure 4
Insertion-Force Test Gage



NOTE Load is to be applied in each of 3 directions shown.

Figure 5
Plug Retention

3.6. Connector Tests and Sequences

| Test or Examination | Test /group (a) (d) | | | | | | | |
|-------------------------------------|---------------------|------|------|------|------|------|------|------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| | Test Sequence (b) | | | | | | | |
| Examination of Product | 1, 4 | 1, 5 | 1, 5 | 1, 7 | 1, 5 | 1, 9 | 1, 8 | 1, 8 |
| Termination Resistance, Dry Circuit | | 2, 4 | 2, 4 | 4, 6 | | 2, 6 | | 3, 6 |
| Dielectric Withstanding Voltage | 3 | | | | | 8 | 3, 7 | |
| Insulation Resistance | 2 | | | | 2, 4 | 3, 7 | 2, 6 | |
| Surge | | | | | 3 | | | |
| Vibration | | | 3 | | | | | |
| Insertion Force | | | | 2 | | | | 2 |
| Plug Retention | | | | 3 | | | | 7 |
| Durability | | | | 5 | | | | 4 |
| Humidity-Temperature Cycling (c) | | | | | | 5 | 5 | 5 |
| Life | | 3 | | | | | | |
| Thermal Shock | | | | | | 4 | 4 | |

NOTE

- (a) See Para. 4.1.A
- (b) Numbers indicate sequence in which tests are performed.
- (c) Insulation resistance to be checked within 30 minutes after humidity- temperature cycling.
- (d) Test groups 7 and 8 are for Retention of Qualification only.

Figure 6

4. QUALITY ASSURANCE PROVISIONS

4.1. Qualification Testing

A. Sample Selection

Modular jack couplers shall be prepared in accordance with applicable Instruction Sheets. They shall be selected at random from current production. Test group 1 shall consist of 30 data points. Test group 2, 3, 5 and 6 shall consist of 30 data points from modular jack coupler assemblies mated with modular plugs and mounted on boards. Test group 4 shall consist of 30 modular jack coupler assemblies mated with modular plugs.

B. Test Sequence

Qualification inspection shall be verified by testing samples as specified in Figure 6.

C. Acceptance

1. Requirements put on test samples, as indicated in the requirements portion of Figure 1, exist as either the upper or lower statistical tolerance limit (95% confidence, 99% reliability). All samples tested in accordance with this specification shall meet the stated tolerance limit.
2. Failures attributed to equipment, test setup, or operator deficiencies shall not disqualify the product. When product failure occurs, corrective action shall be taken and samples resubmitted for qualification.

4.2. Quality Conformance Inspection

The applicable quality inspection plan will 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.

4.3. Retention of Qualification

If, in a 5 year period, no changes to the product or process occur, the product shall be subjected to 7 and 8 groups of the testing described in the test sequence, see Figure 6. Test group 7 shall consist of 10 modular jack assemblies. Test group 8 shall consist of 10 modular jack assemblies mated with plugs (12 inch wire) and mounted on test boards. Justification for exceeding this time limit shall be documented and approved by the division manager.

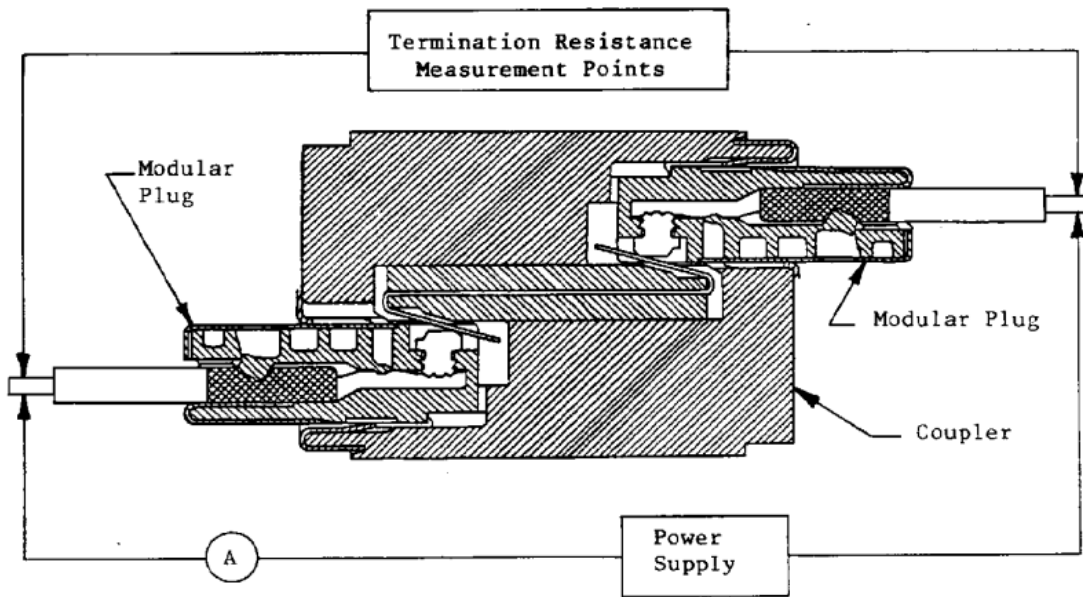


Figure 7
Termination Resistance Measurement Points