
Automotive MATE-N-LOK* Connectors

1. SCOPE:

1. This specification covers multi-contact electrical connectors.

2. PRODUCT DESCRIPTION:**2.1 TRADEMARK - AUTOMOTIVE MATE-N-LOK****2.2 TYPES:**

2.2.1 PANEL-MOUNT - This connector is made in 1, 2, 3, 4, 6, 8, 10, and 12 circuit sizes. The cap portion is panel mounted and accepts the pin contact while the plug accepts the socket contact. Both housings accept single wire terminals with a 14-22 AWG range or double wire terminals with 2 - 18 AWG wires or 1 - 18 and 1-16 AWG wires stacked.

2.3 DESIGN AND CONSTRUCTION - Connectors are of the design, construction and physical dimensions specified on the appropriate drawings.

2.3.1 HOUSING MATERIAL - Housings are molded of Nylon.

2.3.2 TERMINAL MATERIAL - Terminals are fabricated of pre-tinned brass conforming to ASTM-B36, Alloy 6.

2.3.3 CRIMP DATA - The crimp provides uniform attachment, adequate tensile strength, electrical conductivity and resists corrosion and vibration. (See paragraph 4.5)

2.3.4 ENGAGEMENT-DISENGAGEMENT - All plugs and caps are capable of being engaged and disengaged by hand without the aid of tools. Polarization of housings prevents mis-mating.

2.3.5 INTERCHANGEABILITY - All pin and socket contacts are designed to mate with each other regardless of wire range.

3. PERFORMANCE:**3.1 ELECTRICAL TEST:**

3.1.1 POTENTIAL DROP - When tested as specified in 4.1.1, the potential drop at the specified test current shall not be greater than listed in Table I.

TABLE I

MAXIMUM POTENTIAL DROP IN MILLIVOLTS

Wire Size (AWG)	Test Current (Amperes)	Potential Drop (Millivolts)
22	2	7
20	4	11
18	7	15
16	10	21
14	15	27

- 3.1.2 **CONTACT RESISTANCE** - When tested as specified in 4.1.2, the contact resistance across mated terminals will not average more than 2.0 milliohms. The maximum variation between initial and final readings shall be 0.03 milliohms.
- 3.1.3 **INSULATION RESISTANCE** - When tested as specified in 4.1.3, the insulation resistance shall not be less than 500K megohms between the two adjacent contacts, or between contacts and ground potential.
- 3.2 **CONTACT RETENTION** - When tested as specified in 4.2, the individual contact retention force within housings will not be less than twenty-four (24) pounds.
- 3.3 **ENGAGEMENT AND DISENGAGEMENT FORCES** -
 - 3.3.1 **TERMINAL ENGAGEMENT FORCES** - When tested as specified in 4.3.1, the maximum engagement forces, disregarding the effects of locking features required to engage positive-locking type connectors, shall be 3 pounds per circuit with tin-plated terminals.
 - 3.3.2 **HOUSING DISENGAGEMENT FORCES** - When tested as specified in 4.3.3, the force required to separate the connector halves having positive locking features engaged shall be a minimum of thirty-five (35) pounds for multiple circuit housings and an average of twenty (20) pounds for single circuit housings.
 - 3.3.3 **PANEL RETENTION FORCE** - Mounted housings with mating half engaged must withstand a minimum push-out force of 50 pounds.

- 3.4 **TERMINATION TENSILE** - When tested as specified in 4.4, the minimum tensile force shall be as listed in Table II.

TABLE II
TENSILE FORCE

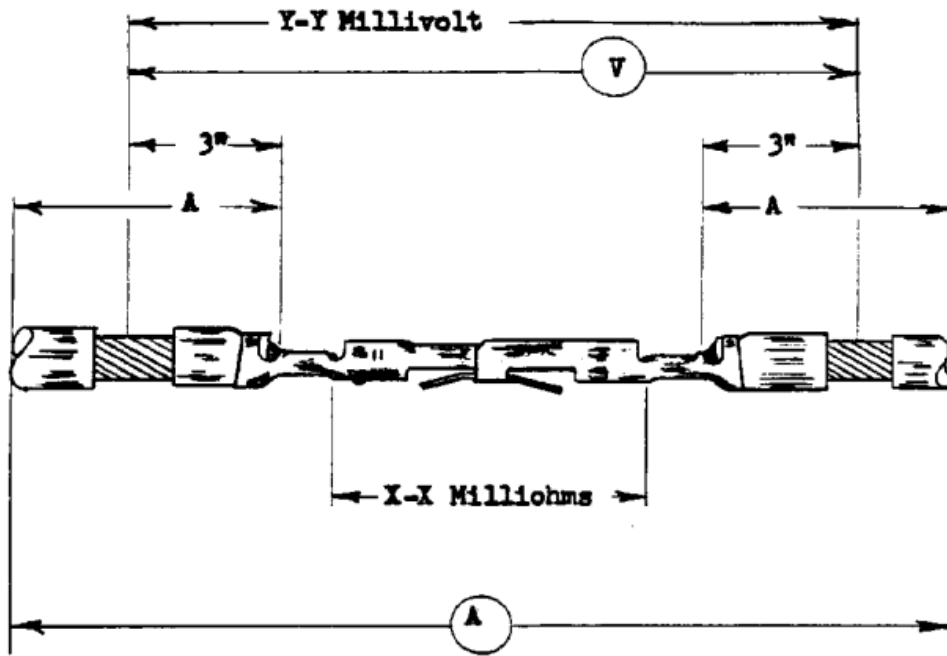
Wire Size	Force (Lbs.)
22	15
20	20
18	30
16	40
14	60
12	70
(20)(20)	15 per wire
(20)(18)	15 per wire
(20)(16)	15 per wire
(18)(18)	25 per wire
(18)(16)	25 per wire

- 3.5 **OPERATING TEMPERATURE** - Connectors have a maximum approved operating temperature of 105°C (221°F).

4. **PROCEDURES:**

4.1 **ELECTRICAL TEST -**

- 4.1.1 **POTENTIAL DROP** - The potential drop of each mated pair of terminals assembled in housings shall be measured at the test currents specified in Table I. The potential drop shall be measured across the entire contact mated length, and shall include three (3) inches of wire from the end of the wire crimps as shown on Figure I. Measurements shall be taken after the temperature of the wire has stabilized. The potential drop for two crimps and a friction joint is the difference between the millivolt drop of the six (6) inches of wire and the total millivolt drop Y-Y.



A = 3 foot minimum length of continuous lead
(for heat dissipation)

FIGURE 1

4.1.2 **CONTACT RESISTANCE** - Contact resistance shall be measured across the friction connection of the MATE-N-LOK terminals (X-X in Figure 1) both initially and after fifty (50) insertions using the following current-voltage conditions:

Short Circuit Current: 50 Milliamperes

Open Circuit Voltage: 50 Millivolts

Resistance values and resistive change per connection shall not exceed the maximum values as specified in 3.1.2.

4.1.3 **INSULATION RESISTANCE** - The insulation resistance shall be tested in accordance with Method 302, Test Condition B of MIL-STD 202. The insulation resistance shall be measured separately between adjacent pair of contacts, and between the body (ground potential) and the contacts. (See 3.1.3)

4.2 **CONTACT RETENTION** - The housings shall be filled with terminals. Measurements shall be made on individual terminals. The load shall be applied uniformly at approximately one pound per second. (See 3.2)

4.3 **ENGAGEMENT AND DISENGAGEMENT FORCES** -

4.3.1 **ENGAGEMENT FORCES** - The housings shall be filled with terminals. The mounting half of the connector shall be mounted and held stationary. The other half shall be engaged and disengaged at a uniform load rate of approximately one pound per second. (See 3.3.1)

4.3.2 **HOUSING DISENGAGEMENT FORCES** - The connector shall be filled with terminals. The mounting half of the connector shall be mounted and held stationary. The other half shall be engaged and disengaged at a uniform load rate of approximately one pound per second. The locking feature shall be employed. (See 3.3.3)

4.3.3 **PANEL RETENTION FORCE** - The mounting half of the connector is mounted in the panel and the mating housing engaged. A uniform force is applied opposite to the mounting direction.

4.4 **TENSILE** - Contacts crimped to a minimum 6" length of wire shall be placed in a standard tensile-testing machine and sufficient force applied to pull the wire out of the terminal or break the wire. The test shall be made with a head travel speed of one inch per minute.

Values must not be less than those listed in Table II. (See 3.4)

4.5 CRIMP DATA - See AMP Specification 115-8000 and 115-8001.

5. EQUIPMENT AND QUALIFICATIONS:

5.1 The following pieces of equipment were used in the determination of values set forth herein.

5.1.1 Hunter Tensile Tester, Model D-105T.

5.1.2 Sanborn Recorder, Model #296.

5.1.3 Carrier Preamplifier, Sanborn, Model #350-1100B.

5.1.4 Daytronic Transducer 152A100.

5.1.5 Weston Ammeter, Model 433 or 904.

5.1.6 Hewlett - Packard Vacuum Tube Voltmeter, Model 400H.

5.1.7 Minneapolis-Honeywell Temperature Potentiometer, Model 2714.

5.1.8 Electrical Products Company Variac.

5.1.9 Sola Electric Company Current Transformer, Model 22-134.