PS-79107
PRODUCT SPECIFICATION
2mm DUAL ROW VERTICAL RECEPTACLE ASSEMBLIES

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1.0 SCOPE

1.1 SUBJECT:

This specification details the mechanical, electrical and environmental performance of the .079" X .079" (2mm X 2mm) grid dual row vertical receptacle connector series numbers 79107, 79108, & 79109. This connector series is designed for through hole, flat flex cable, and surface mount applications respectively as described in Para 2.1. Mating connectors shall have .020"(.51mm) square or round posts whose axes are perpendicular to the plane of the PCB to which the 2mm series receptacles are soldered.

2.0 PRODUCT DESCRIPTION

2.1 The types covered in this specification are as follows:

2.1.1 A-79107-**** Vertical Receptacle with .118"(3.00mm) and .075"(1.91mm) long PC tails.

2.1.2 A-79108-**** Vertical Receptacle with .050"(1.27mm) long PC tails for FFC or FPC application.

2.1.3 A-79109-**** Vertical Receptacle with gull wing surface mount tails and optional hold down pegs.

Note: "****" Indicates the presence of a 4 digit code used to identify plating, mounting, and circuit size options.

2.2 The dual row vertical receptacle series is designed to connect; (1) PC board to PC board in parallel, (2) PC board to PC board perpendicular.

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2.3 The connector utilizes a dual beam female terminal designed to provide east-west mating and early entry mating when mated from the top.

2.4 The A-79107-**** series has PC tails for solder termination to either a .063"(1.57mm) or .031"(0.79mm) nominal thick PC board with .025"(0.64mm) minimum diameter holes (See Figure 1). The PC tails have a tapered lead-in for ease of insertion into the PC board.

2.5 The A-79109-**** surface mount version with pegs is also designed to accommodate bottom entry mating through a PC board. See Figure 2 for suggested PC board layout. Performance of bottom entry is expected to be similar to top entry, however data is not currently available.

2.6 This connector series is available in a range of circuit sizes from 4 circuit (2 X 2) through 50 circuit (2 X 25) in 2 circuit increments.

3.0 APPLICABLE DOCUMENTS

3.1 All documents referenced shall be of the latest revision.

3.2 The order of precedence detailing requirements of this specification shall be as follows:

1. Product Drawings
2. This Specification
3. Reference Documents

3.3 Reference Documents

3.3.1 MIL-STD-202: Test methods for electronics and electrical component parts.

3.3.2 MIL-STD-1344: Test methods for electrical connectors.

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3.3.3 ASTM-B103: Alloy 521.

3.3.4 QQ-N-290: Nickel plating.

3.3.5 MIL-G-45204: Gold plating.

3.3.6 MIL-T-10727: Tin plating.

3.3.7 MIL-M-24519: Molding plastics.

3.3.8 UL-94: Tests for flammability of plastic materials.

3.3.9 ES-88: Molex Finish Specification.

4.0 AMBIENT CONDITIONS

4.1 Ambient operating conditions for qualification shall be:

Temperature:	25° +/- 5° C
Relative Humidity:	50% +/- 20%
ATM Pressure:	650 - 800 mm Hg

5.0 GENERAL REQUIREMENTS

5.1 Design construction and physical dimensions shall be as specified on the A-79107, A-79108, and A-79109 product drawings.

5.2 Materials

5.2.1 Housing: 94V-0 glass filled Liquid Crystal Polymer. Oxygen index greater than 28.
Color: Black.

5.2.2 Terminal: Phosphor bronze, per ASTM-B103.

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5.3 Plating

5.3.1 All tin finishes to be per MIL-T-10727B and MIL-P-81728A. All gold finishes to be per MIL-G-45204B, Type II, Grade C, Class I. All nickel finishes to be per QQ-N-290, Class II. Also see Molex Plating Standard ES-88.

5.3.2 Plating Code 574 (Per Molex ES-88): .000030" (0.00076mm) min. gold plate in contact area with .000075" (0.00190mm) min. tin/lead (90/10) plate in tail area over .000050" (0.00127mm) min. nickel plate overall.

5.3.3 Plating Code 571 (Per Molex ES-88): .000015" (0.00038mm) min. gold plate in contact area with .000075" (0.00190mm) min. tin/lead (90/10) plate in tail area over .000050" (0.00127mm) min. nickel plate overall.

5.4 Recommended Printed Circuit Board Specification

5.4.1 PCB thickness: .062" +/- .007" (1.57mm +/- 0.18) and .031 +/- .005 (0.79mm +/- 0.13).

5.4.2 Recommended PCB Hole/SMT Land Pattern: See Figure 2 .

5.5 Recommended mating pin lengths:

5.5.1 For top entry mating, the recommended mating pin length is .120" to .170" (3.05mm to 4.30mm).

5.5.2 For bottom entry mating, the recommended mating pin lengths are .240" to .255" (6.10mm to 6.50mm) for a .047" PCB and

.255" to .270" (6.50mm to 6.85mm) for a .062" PCB. This dimension is measured from the bottom of the bottom entry PC board, not from the insulator on the mating header.

5.6 Sides of square pins must be parallel with the axis of the row within 5 (+/-) degrees.

6.0 AGENCY APPROVALS

6.1 U.L. Recognition: File E29179.

6.2 C.S.A. Recognition: File LR19980, Page 8, dated 8-21-91.

7.0 ELECTRICAL REQUIREMENTS

7.1 Insulation Resistance

7.1.1 Insulation resistance when tested per MIL-STD-202, Method 302, Condition B at ambient shall be as follows:
1. 5000 mega ohms minimum intially.
2. 1000 mega ohms minimum following humidity.

7.2 Dielectric Withstanding Voltage

7.2.1 Dielectric withstanding voltage shall be 500 VAC minimum at sea level. There shall be no breakdown or flash-over between adjacent contacts and leakage current shall not exceed 5.0 milliamps when unmated connectors are tested per MIL-STD-202, Method 301.

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7.3 Contact Resistance (Low Level)

7.3.1 Defined as the normal bulk resistance plus constriction resistance. The maximum value shall not exceed 15 milli-ohms total with a maximum change of 10 milliohms from initial following all stress tests. The method of measurement shall be per MIL-STD-1344A, Method 3002.1.

7.4 Current Rating

7.4.1 1.9 Amps DC or AC RMS per contact with no more than 30° C temperature rise above ambient. All contacts wired in series.

7.4.2 1.0 Amps DC or AC RMS per contact at 70° C with 30° C maximum temperature rise. All contacts wired in series.

7.5 Current Cycling

7.5.1 Subject the mated connectors to 75% of the current necessary to yield a 30° C temperature rise (as found in para. 7.4) in cycles of 45 minutes on and 15 minutes off for 240 hours after which the conditions of para 7.3 are met.

8.0 MECHANICAL REQUIREMENTS

8.1 Mating Force - Entire Connector

8.1.1 The maximum force to mate a connector pair shall be 10 oz. multiplied by the number of positions, excluding hardware, when cycled per MIL-STD-1344, Method 2013 for the following conditions:

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1. Ambient conditions.
2. Nonrigid fixturing of connector pairs.
3. 10 inches/minute max. cycling rate.
4. 50 mate/unmate cycles.

8.2 Individual Insertion/Withdrawal Forces

8.2.1 The force to insert and withdraw a steel gauge pin shall be 8 ounces maximum and 1.5 ounces minimum respectively, excluding hardware, when tested per MIL-STD-1344, Method 2014 for the following conditions:

1. Polished steel gauge pins per Fig 3.
2. Insertion depth to be .060" from the point at which gauge makes contact with the terminal beams.
3. Nonrigid fixturing shall be used.
4. 3 cycles.

8.3 Normal Force

8.3.1 The minimum normal "force" shall be 100 grams following thermal aging per para. 9.4.1 and 50 mating/unmating cycles per para. 8.4.1 when tested at minimum deflection as caused by an .020" +/- .001" square pin. Measurement shall be taken in a manner simulating actual use.

8.4 Durability

8.4.1 For the 15 microinch gold over 50 microinch nickel plating option, the connector shall meet the requirements of paras. 7.3 and 8.3 after the following sequential conditioning:

1. 50 mate/unmate cycles.
2. Seventeen hours of Flowers of Sulfur per Molex test procedure.

8.5 Terminal Strength

8.5.1 Solder tails shall withstand two hand bending cycles per MIL-STD-202, Method 211A, Condition "B" with no evidence of breaking or cracking of the base metal at 20X magnification.

8.6 Solderability

8.6.1 All terminals shall have 95% coverage per the requirements of MIL-STD-202, Method 208 with conditions as follows:
1. Solder Composition: 60/40 tin-lead per QQ-S-571 Type S.
2. Solder Temperature: 230° C +/- 5° C
3. Flux Type: Mildly activated, type RMA per MIL-F-14256.
4. Depth of Immersion: .080" (3.0mm)

8.7 Housing Retention

8.7.1 A tensile force is applied at a rate of 1 inch per minute to the housing perpendicular to the test board. The force at which the housing separates from the terminals is divided by the circuit size and recorded. This force to be 8 ounces minimum per terminal.

8.8 Individual Tensile (Surface Mount Only)

8.8.1 A tensile force perpendicular to the test board is applied at a rate of 1 inch per minute to individual surface mount terminals without housings. The force at which the terminal separates from the board is to be greater than 3 lbs.

8.9 Full Connector Tensile (Surface Mount Only)

8.9.1 A tensile force perpendicular to the board is applied at a rate of 1 inch per minute to the entire connector. The force at which the housing separates from the terminals should be greater than 1 lb. per terminal pair.

8.10 Shear Test (Surface Mount Only)

8.10.1 A shear force parallel to the board and perpendicular to the lay of the connector is applied at a rate of 1 inch per minute. The force at which the connector distorts or shears off the board should be greater than 2 lbs. per terminal pair. See Fig 4.

8.11 Solder Joint Fatigue (Surface Mount Only)

8.11.1 There shall be no evidence of physical damage and contact resistance shall meet the conditions of para. 7.3 and there shall be no loss of electrical continuity greater than 1 microsecond after the following tests:

1. Tension: Subject the test board, as shown in Fig. 5, to .060" deflection perpendicular to the lay of the connector for 200 cycles. Repeat the above on a new sample except deflect parallel to the lay of the connector as shown in Fig. 6.
2. Compression: Subject the test board as shown in Fig. 7 to .060" deflection perpendicular to the lay of the connector for 200 cycles. Repeat the above on a new sample except deflect parallel to the lay of the connector as shown in Fig. 8.

9.0 ENVIRONMENTAL REQUIREMENTS

9.1 Resistance to Cleaning Solvents

9.1.1 Any markings shall remain legible and no damage or deterioration of the connector shall occur when tested per MIL-STD-202, Method 215. The following solvents shall be used:
1. 1-1-1 Trichloroethane
2. Freon TMS and TMC

9.2 Temperatures

9.2.1 The product is designed to operate at -55° C to 105° C continuous and withstand +219° C during vapor soldering without any deterioration of performance or physical damage.

9.3 Thermal Shock

9.3.1 There shall be no evidence of any physical damage. Connectors shall meet the dimensional requirements of the product drawings and contact resistance of para. 7.3. when tested per MIL-STD-202, Method 107, Condition A-1.

9.4 Temperature Life

9.4.1 The requirements of paras. 7.3 and 8.3 shall be met following thermal life per MIL-STD-202, Method 108, Test Condition "C" (500 hours at 105° C). Connectors shall remain in initial mated or unmated condition throughout thermal exposure.

9.5 Humidity (Cyclical)

9.5.1 There shall be no evidence of physical damage, or discoloration and the requirements of paras. 7.1, 7.2, and 7.3 shall be met following testing per MIL-STD-1344, Method 1002, Type II, 96 hours (omit steps 7A and 7B). Th the Connectors shall be mated during exposure.

9.6 Humidity (Steady State)

9.6.1 There shall be no evidence of physical damage, discoloration, or corrosion and the requirements of paras. 7.1, 7.2, & 7.3 shall be met following testing per MIL-STD-202 Method 103, Condition A. No polarizing voltage measurement shall be taken.

9.7 Resistance to Solder Heat

9.7.1 There shall be no evidence of any physical damage and the connectors shall meet the dimensional requirements of the product drawings following:

1. MIL-STD-202, Method 210, Test Condition C (260° C 10 seconds).
2. Standard wave soldering process.

9.8 Vibration

9.8.1 There shall be no evidence of any physical damage, loosening of parts or loss of electrical continuity greater than 1.0 microsecond when mated connectors are tested per MIL-STD-202, Method 204, Test Condition A.

9.9 Mechanical Shock

9.9.1 There shall be no evidence of any physical damage or loosening of parts. Nor shall there be any interuption of electrical continuity longer than one microsecond when tested per MIL-STD-202F, Method 213B, Condition A:
1. 1/2 Sine Wave.
2. 50 G, 11 millisecond pulse.
3. 3 shocks each along 3 mutually perpendicular axis, 18 shocks total.

9.10 Corrosive Atmosphere

9.10.1 Connectors shall meet the requirements of para. 7.3 when exposed to Flowers of Sulfur following conditioning per para. 8.4.

10.0 QUALITY ASSURANCE PROVISIONS

10.1 Materials Inspection

10.1.1 Materials inspection shall consist of certification supported by verifying data. Mechanical, chemical and electrical testing shall be done on a random basis.

11.0 PACKAGING

11.1 Unless otherwise specified, product will be packaged in tubes per packaging specifications PK-70783-0180 and PK-70783-0217.

12.0 QUALIFICATION REQUIREMENTS

12.1 Ambient conditions for qualification shall be per para. 4.1

12.2 Qualification testing shall be performed on samples taken from production lots.

12.3 Sample Grouping

12.3.1 Test group I shall consist of (20) A-79107-0024 (50 circuit, 15u" gold, through hole), (2) A-79109-0024 (50 ckt, 15u" gold, surface mount) connectors, and (22) 87089-5013 headers.

12.3.2 Test groups II & III shall consist of (16) A-79107-0024, (2) A-79109-0024 connectors, and (18) 87089-5013 headers each.

12.3.3 Test group IV shall consist of (4) A-79107-0024 connectors.

12.3.4 Test group V shall consist of (18) A-79107-0024 connectors mounted and loose as needed.

12.3.5 Test group VI shall consist of (24) A-79109-0024 and (26) A-79109-0260 connectors.

12.4 Sample Preparation

12.4.1 Through Hole: Four A-79107-0024 connectors are to be wave soldered to each through hole PC board.

12.4.2 Surface Mount: Solder paste consisting of metal alloy 63/37 eutectic tin-lead and a rosin mildly activated (RMA) flux is to be stenciled onto the solder lands of the surface mount boards in a layer no thicker than .010"(0.25mm). The surface mount connectors will then be vapor phase reflowed to the PC boards in approved equipment. Flourinert Liquid

FC-70 is to be used with a primary vapor zone reflow time of 15 seconds and a secondary vapor zone dwell time of 45 seconds. Each test board shall be cleaned immediately in a vapor degreaser and cleaned with freon TMS for at least 3 minutes.

12.5 Qualification testing shall be performed per the test sequence shown Figs. 9-15.

13.0 APPENDIX

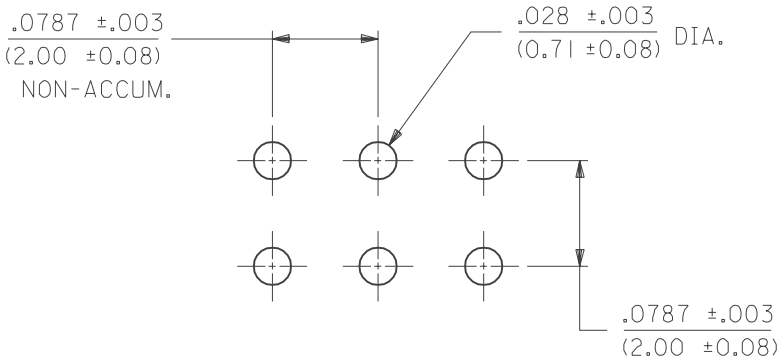

FIGURE 1
RECOMMENDED P.C. BOARD HOLE LAYOUT

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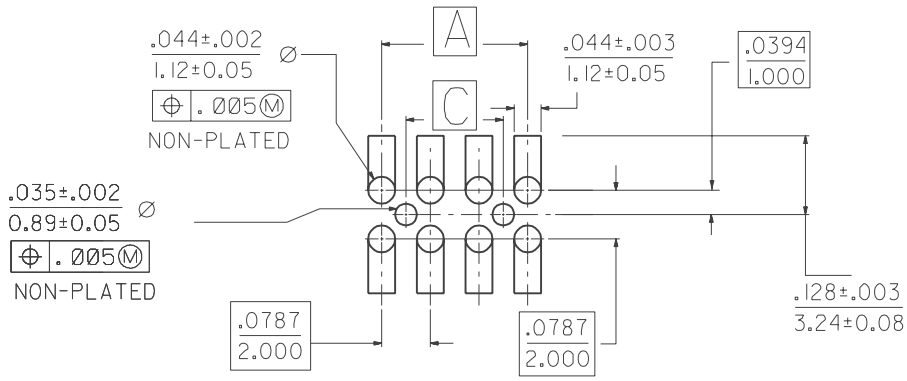
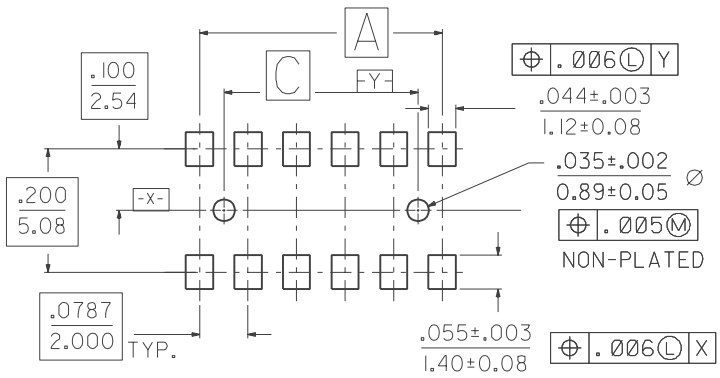


BOTTOM ENTRY LAND LAYOUT



SMT PC BOARD LAND LAYOUT

FIGURE 2
RECOMMENDED P.C. BOARD LAND LAYOUTS

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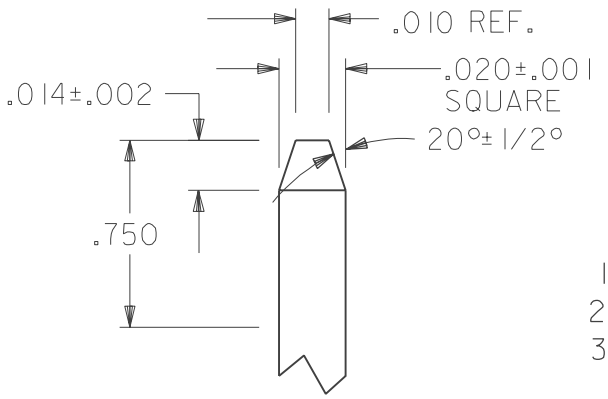

NOTES:

1. MATERIAL: TOOL STEEL.
2. FINISH: 4 MICROINCH MAX.
3. .020±.001 MUST BE HELD OVER .750" DIMENSION.

FIGURE 3
GAUGE PIN

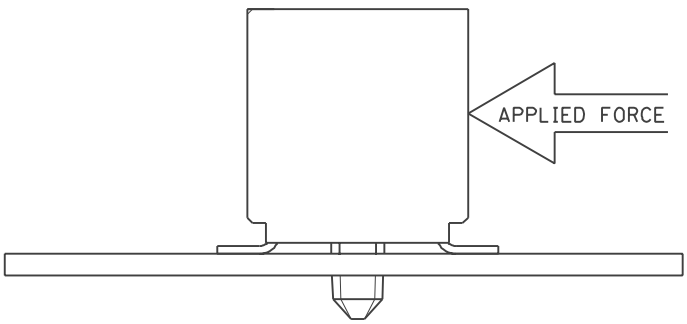

FIGURE 4
PERPENDICULAR SHEAR

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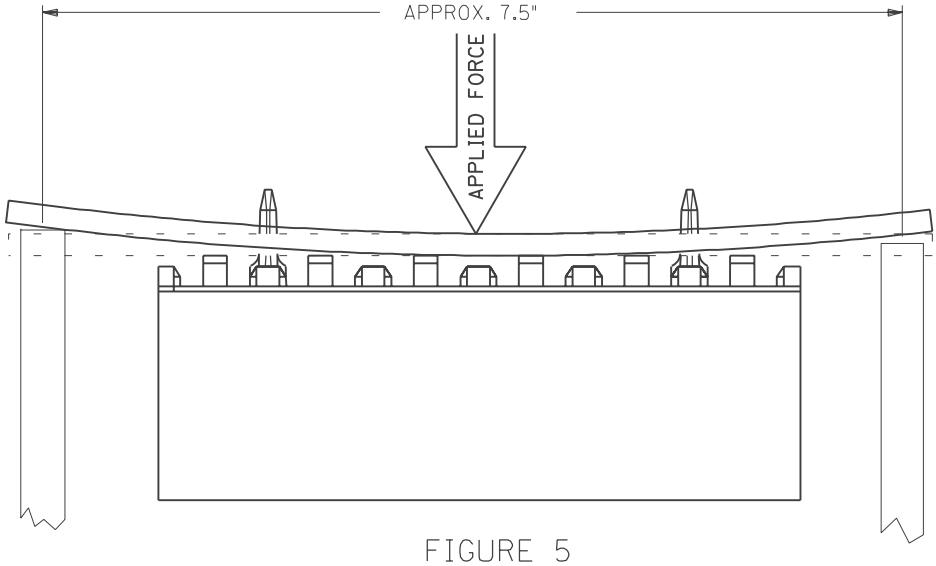

FIGURE 5
PERPENDICULAR SOLDER JOINT FATIGUE (TENSION)

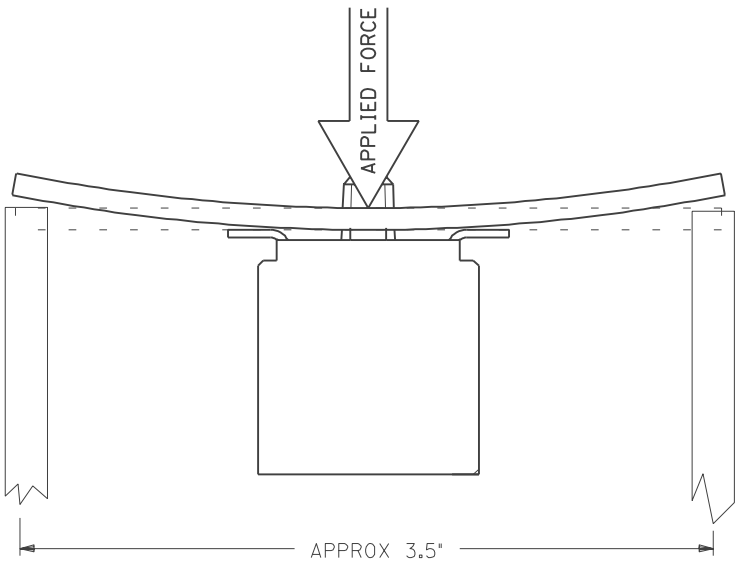

FIGURE 6
PARALLEL SOLDER JOINT FATIGUE (TENSION)

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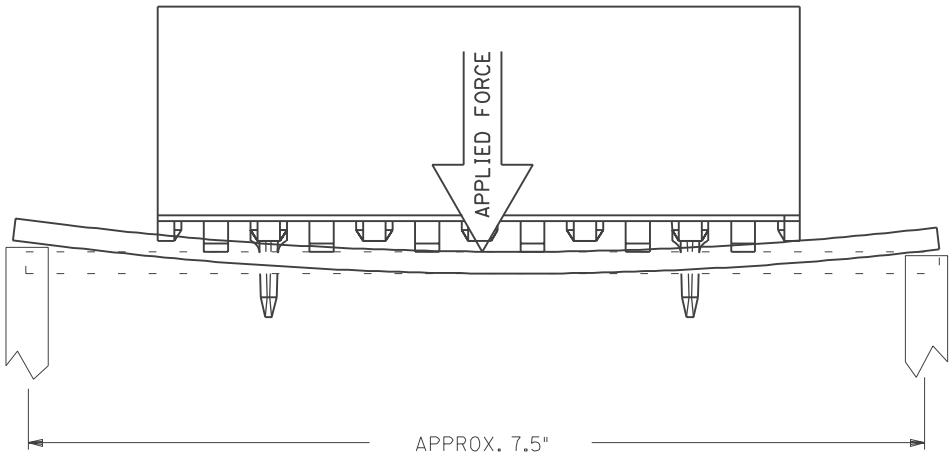

FIGURE 7

PERPENDICULAR SOLDER JOINT FATIGUE (COMPRESSION)

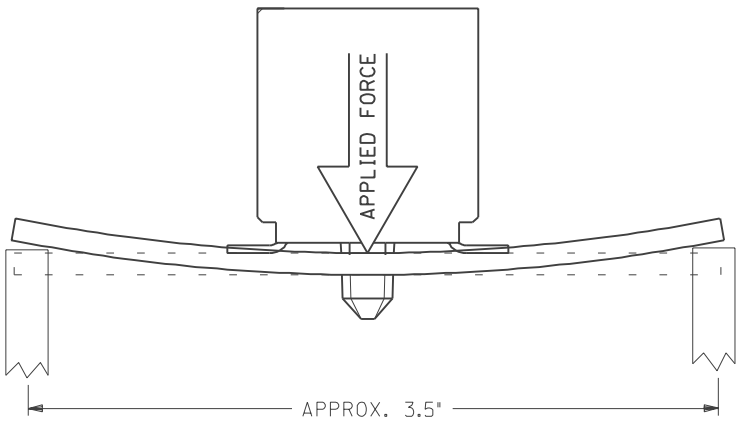

FIGURE 8

PARALLEL SOLDER JOINT FATIGUE (COMPRESSION)

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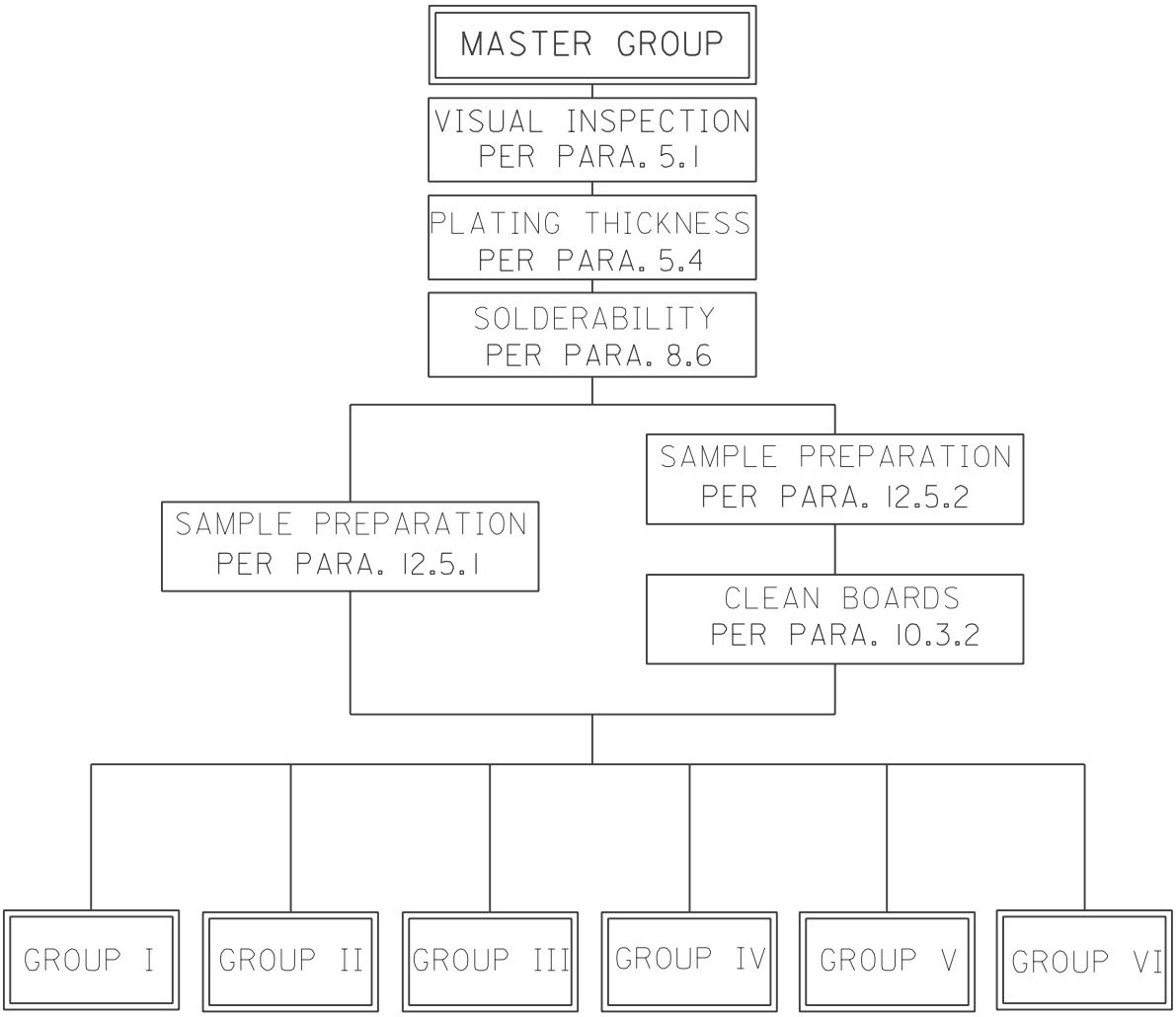

FIGURE 9

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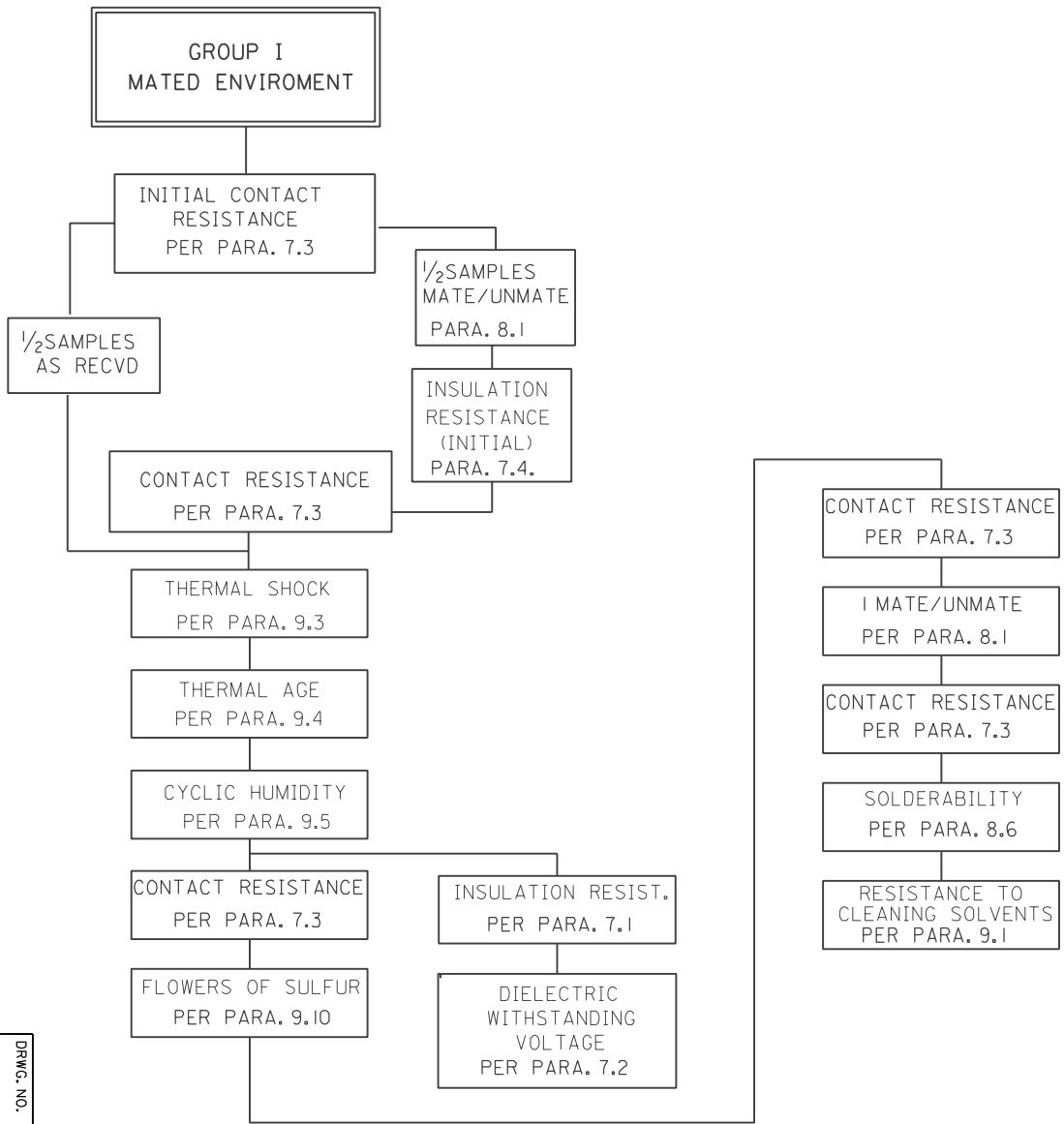

FIGURE 10

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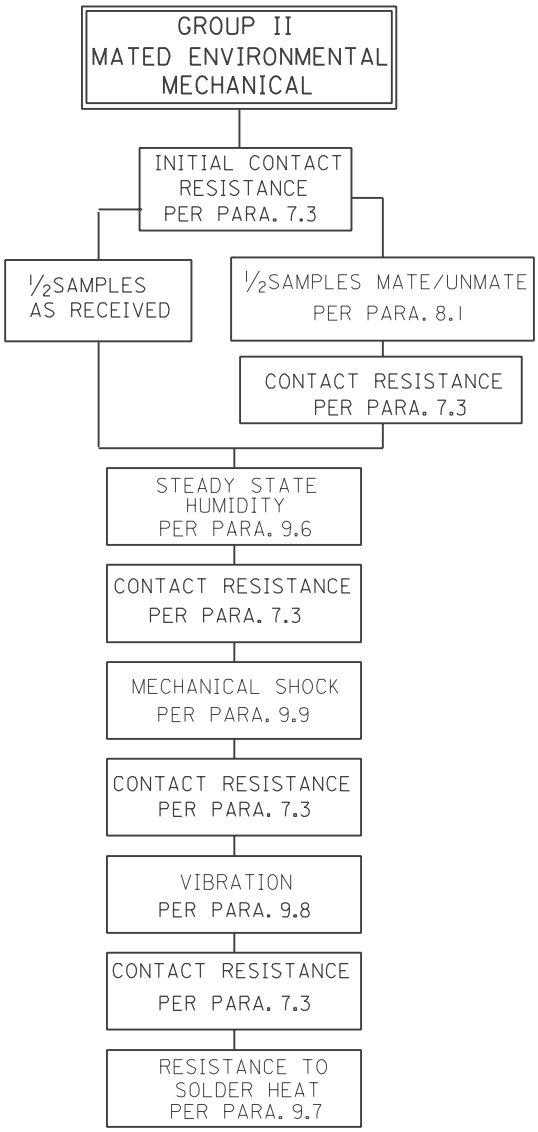

FIGURE 11

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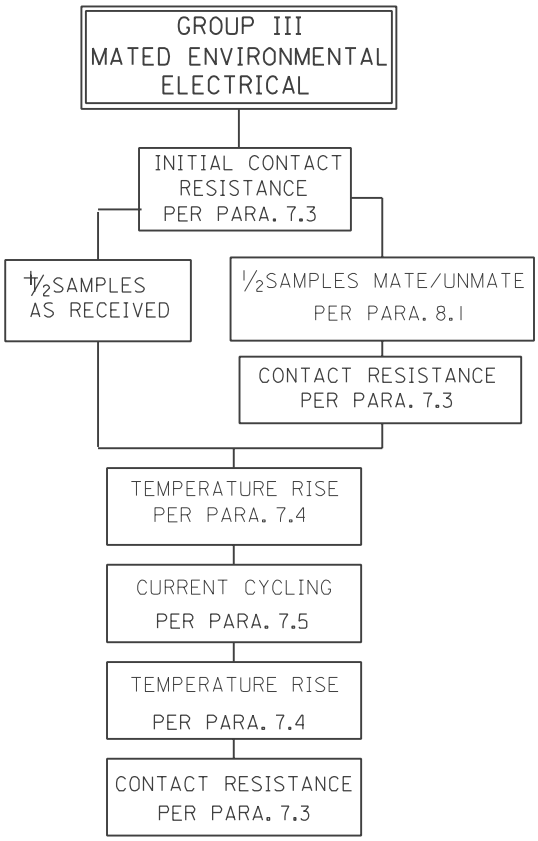

FIGURE 12

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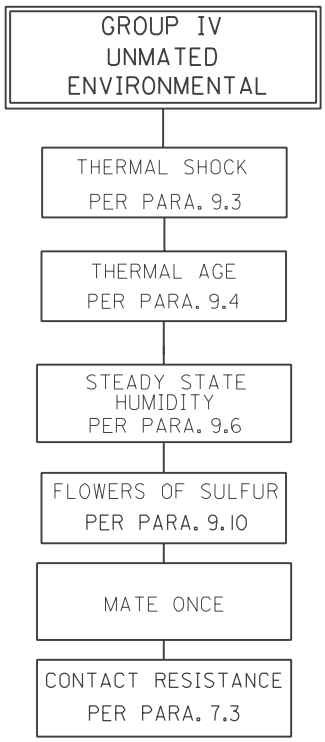

FIGURE 13

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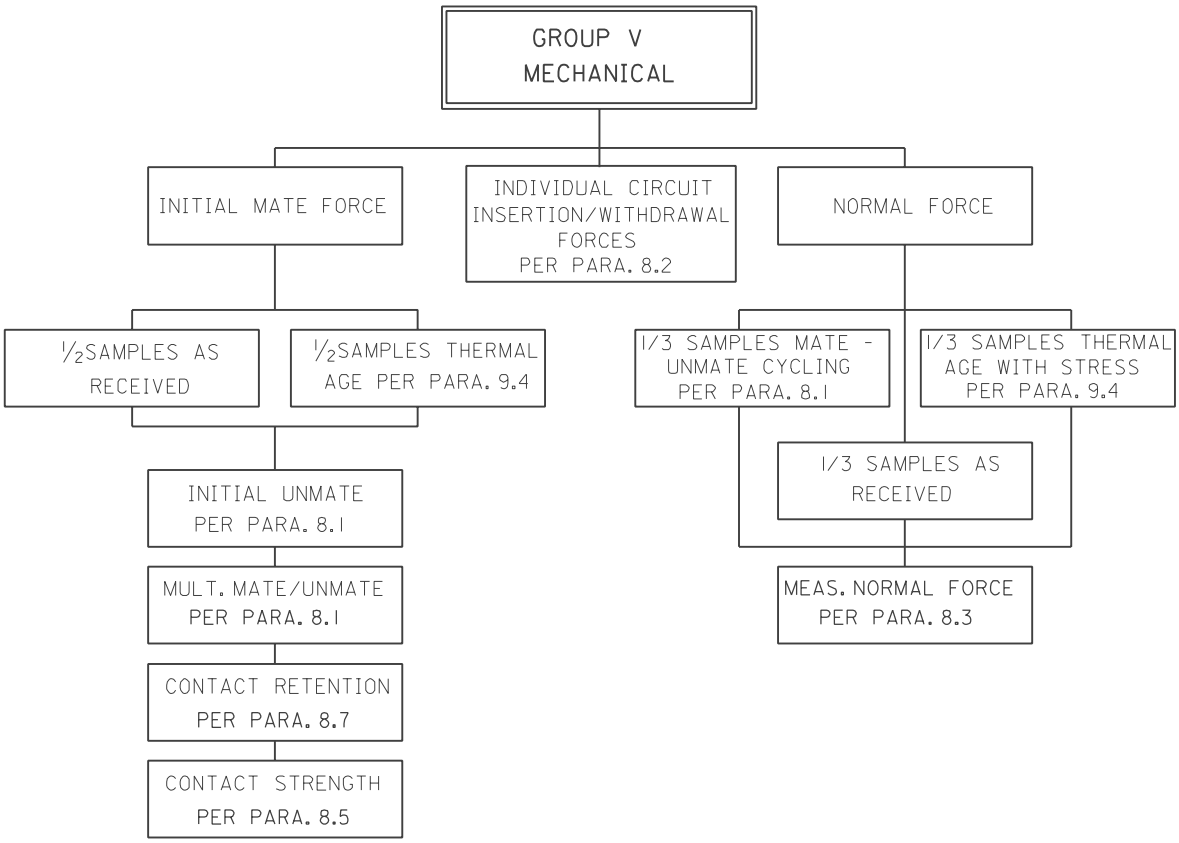

FIGURE 14

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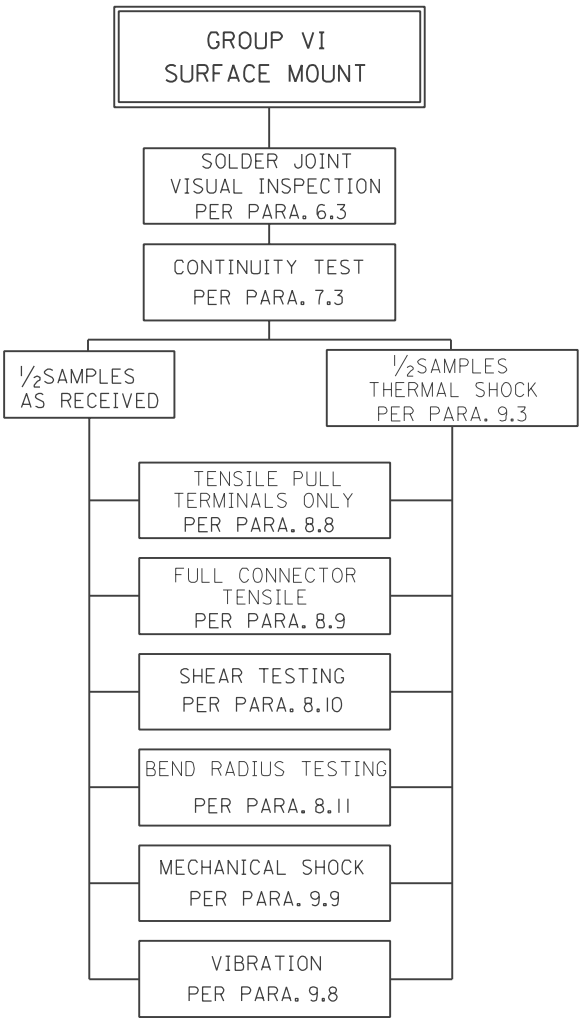

FIGURE 15

DRWG. NO. PS-79107

MOLEX INCORPORATED

LISLE, ILL. 60532 U.S.A.

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REV.	COMMENTS	DATE	ENG.
A1	X-Release per ERO 28846	08/29/92	MJM
A2	Revised to CAD per ECR U10973	05/20/91	RWB
A3	Mod Sec2.3.1 per ECR U11204	07/10/91	RWB
A4	Mod Sec2.3.2 per ECR U11814	09/03/91	RWB
A5	Mod Sec4.3 per ECR U12276	11/25/92	RWB
A6	Re-wrote Spec per ECN U20337	02/28/92	RWB
AA	Re-wrote Spec per ECN U40449	04/04/94	WGM
AA1	Rel to S'pore per ECN #S2001-0287	010426	SEE
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