NUMBER 108-5062

AMP SECURITY CLASSIFICATION Customer Release

DESIGN OBJECTIVES

The product described in this document has not been fully tested to ensure conformance to the requirements outlined below. Therefore, AMP (Japan), Ltd. makes no representation or warranty, express or implied, that the product will comply with these requirements. Further, AMP (Japan), Ltd. may change these requirements based on the results of additional testing and evaluation. Contact AMP Engineering for further details.

In case when "product specification" is referred to in this document, it should be read as "design objectives" for all times as applicable.

1. Scope:

The purpose of this specification is to establish general requirements for DUO-TYNE Flag Connector comprised of the following part numbers.

2. Applicable Product Catalog Numbers and Descriptions:

(1) 170144 DUO-TYNE Flag Contact
(2) 280011 DUO-TYNE Flag Connector Housing
(3) 583661 Keying Plug

3. Product Function and Characteristic:

3.1 Product Component Parts:

DUO-TYNE Flag Connector assembly under this product specification consists of the following component parts.

3.1.1 Contacts:

Contacts shall be crimped onto the applicable wires, and installed in the connector housing without use of any tool. The inserted contacts shall be capable of mating with the circuit ends of printed circuit board.

3.1.2 Housing shall accommodate the contacts crimped onto the wires and guide them to make proper contact to the printed circuit board. The crimped wires are led out of the housing in the direction perpendicular to the mating ends.

3.1.3 Keying Plug:

The function of keying plug is to prevent housing assembly from mismating with the printed circuit board.

4. Specifications:

4.1 Design, Construction and Dimensions:

Design, construction and dimensions of the connector assembly shall be conforming to the applicable customer product drawings.

4.2 Material:

The materials used for the connector assembly shall be conforming to the applicable customer product drawings.

LTR	REVISION RECORD	DR	CHK	DATE
A_1	Design Objectives	K.N	[illegible]	10-15-74
A	Revised per RFA73-83	[illegible]		9-13-74

DR [illegible] 2-12-74
CHK [illegible] 2-12-74
APP [illegible] 2-12-74

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4.3 Finish:

Surface finish of the contact shall be conforming to the applicable customer product drawings.

4.4 Applicable Thickness of Printed Circuit Board:

Applicable printed circuit board shall have thickness of 1.6 $^{+0.15}_{-0.1}$ mm.

4.5 Voltage Rating:

Voltage rating of the connector assembly shall be not greater than 300V AC and 750V DC.

4.6 Current Rating:

Current rating of the connector assembly shall be not greater than 5A.

4.7 Temperature Rating:

Temperature rating of the connector assembly shall be in the range of -40°C and +105°C.

4.8 Appearance:

Connector housing shall not show any abnormalities such as flaw, crack, dirt and burrs which are detrimental to the connector functions.

5. Performance:

5.1 Initial Performance:

5.1.1 Termination Resistance:

When tested in accordance with the test method specified in Para. 7.1, the termination resistance per mated pair of contacts shall be not greater than 20mΩ. For the gold-plated contacts, the termination resistance shall be not greater than 10mΩ.

5.1.2 Insulation Resistance:

When tested in accordance with the test method specified in Para. 7.2, the insulation resistance between each adjacent contacts and between the contacts and ground shall be not greater than 5000MΩ.

5.1.3 Dielectric Strength:

When tested in accordance with the test method specified in Para. 7.3, each adjacent contacts shall withstand test voltage of 2200V AC (RMS) for one minute, and shall show no evidence of abnormalities by breakdown and flashover.

5.1.4 Insertion/Extraction Force:

When tested in accordance with the test method specified in Para. 7.4, the insertion/extraction force per mated pair of contacts shall be conforming to the values specified in the table below.

	Specified Values (g)	Test Gage Applied
Insertion Force	Not greater than 800g.	Gage No. 1, in Figure 4
Extraction Force	Not less than 15g.	Gage No. 2, in Figure 4

5.1.5 Crimp Tensile Strength:

When tested in accordance with the test method specified in Para. 7.5, the crimp tensile strength shall be conforming to the values specified in the table below.

Wire Size		Tensile Strength
(mm^2)	(AWG)	(kg)
0.1	#26	1.0 Min.
0.2	#24	2.0 Min.
0.3	#22	3.0 Min.
0.5	#20	7.0 Min.
0.75	#18	10.0 Min.

5.1.6 Contact Retention Force:

When tested in accordance with the test method specified in Para. 7.6, contacts shall not be pulled off from the connector housing cavities by pull-off load of not less than 1.0kg applied to the contact in axis direction.

5.2 Environmental Performance:

5.2.1 Vibration:

When tested in accordance with the test method specified in Para. 7.7, the electrical discontinuity greater than 1 microsecond shall not occur in the test circuit during the test. After the test conditioning, the connector assembly shall meet the requirements of termination resistance specified in Para. 5.1.2 and of appearance specified in Para. 5.1.1.

5.2.2 Humidity:

When tested in accordance with the test method specified in Para. 7.8, the insulation resistance per Para. 5.1.3 shall be not less than 500MΩ. The tested sample shall be satisfied with the requirements for termination resistance specified in Para. 5.1.2 and for appearance specified in 5.1.1.

5.2.3 Temperature Cycling:

When tested in accordance with the test method specified in Para. 7.9, the tested sample shall be satisfied with the requirements for termination resistance specified in Para. 5.1.2, and for appearance specified in Para. 5.1.1.

5.3 Durability Performance:

5.3.1 Insertion/Extraction Force(After Repeated Cycles):

When tested in accordance with the test method specified in Para. 7.10, the extraction force at 11th. cycle shall be not less than 15g per contact. The tested sample shall be satisfied with the requirements for the termination resistance specified in Para. 5.1.2.

6. Quality Assurance Provisions:

6.1 Environmental Conditions:

Unless, otherwise specified, the performance tests under this specification shall be conducted under any combination of the following environmental conditions.

Room Temperature:	20 - 30°C
Relative Humidity:	30 - 80%
Barometric Pressure:	860 - 1060m bar

6.2 Test Specimens:

The test specimens used in the performance tests shall be not reused, unless, otherwise specified.

7. Test Method:

7.1 Termination Resistance:

Measure the millivolt drop value between the probing points(X - X') at the open circuit voltage of 50mV and closed circuit current of 50mA Max. DC, and convert it to termination resistance, after subtracting the resistance value of crimped wire of 75mm in length.

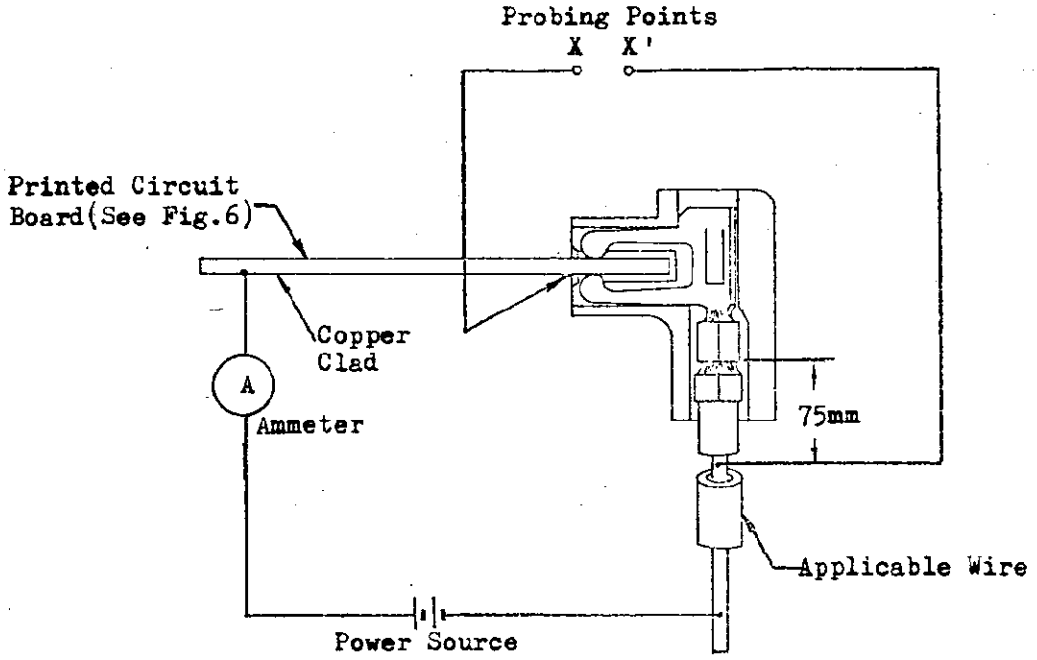


Figure 1

7.2 Insulation Resistance:

Measure the insulation resistance in accordance with Test Condition B, Test Method 302 of MIL-STD-202D and record the insulation resistance between each adjacent contacts of the connector without mating with the connector assembly.

7.3 Dielectric Strength:

Measure the dielectric strength of the connector in accordance with Test Method 301 of MIL-STD-202D by applying test voltage of 2200V AC (RMS) for one minute between each adjacent contacts and inspect for the evidence of insulation break-down and flashover during and after the test.

7.4 Initial Insertion/Extraction Force:

Fasten the connector assembly onto the standard tensile testing machine and operate the insertion/extraction check gage as shown in Figure 4 to insert into and extrect from the connector assembly by the head travelling speed at a rate of 100mm per minute. Measure the initial insertion and extraction force per contact.

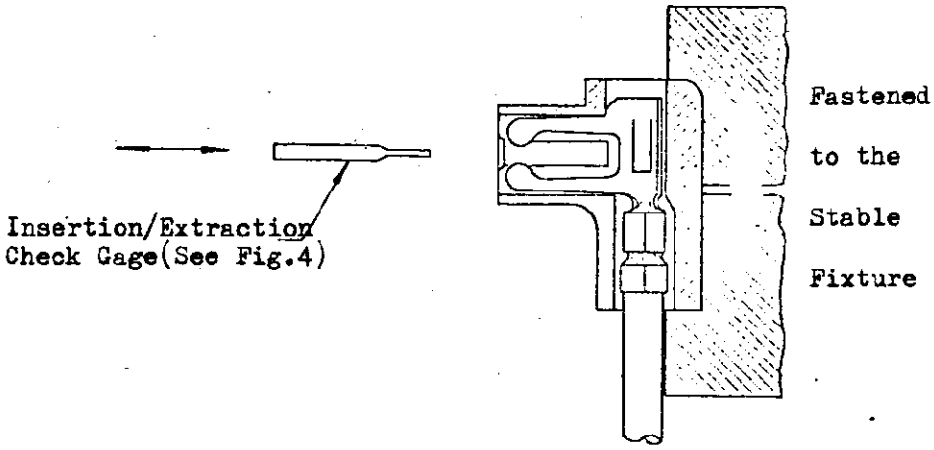


Figure 2

7.5 Crimp Tensile Strength:

Fasten the contact onto the standard tensile testing machine which was crimped onto 150mm long wire, and apply the pull-off load in axis direction by the head travelling speed at a rate of 100mm per minute. Insulation support of the contact shall be not crimped for this test. The crimp tensile strength of the contact is determined when the wire breaks or is pulled out of the wire crimp.

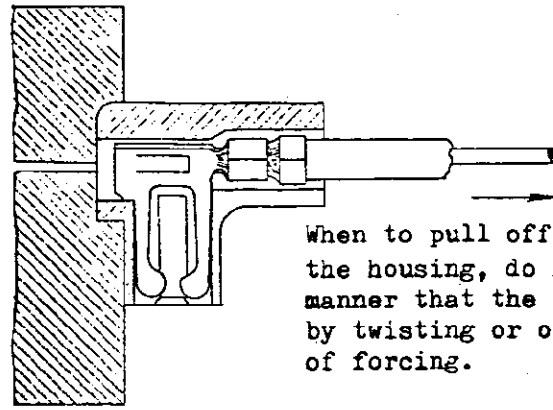
7.6 Contact Retention Force:

Repeat insertion and extraction of the contact into and from the connector housing by using AMP extraction tool P/N 810992-1 ten times. Measure the 11th. contact retention force on the standard tensile testing machine by the head travelling speed at a rate of 100mm per minute in axis direction as shown in Figure 3.

Fasten to the

Standard Tensile

Testing Machine



When to pull off the contact from the housing, do not pull it in such manner that the contact is deformed by twisting or other improper way of forcing.

Figure 3

7.7 Vibration:

Conduct the vibration testing of the connector assembly which is mated with the gage tab in accordance with Test Method 201A of MIL-STD-202D and also the test conditions specified below.

(1) Pre-test of Vibration Conditioning:
Termination resistance (per Para. 5.1.2)

(2) Mounting Method:
Fasten the printed circuit test board on the vibration fixture.

(3) Circuit Combination:
Connect more than ten friction contact areas in series.

(4) Circuit Test Current Load: 0.1 - 1A DC

7.8 Humidity:

Perform the humidity test of the connector assembly which is mated with the printed circuit board in accordance with Test Method 106C of MIL-STD-202D. Before conditioning the sample, measure the termination resistance of the connector assembly as a pre-test in accordance with Para. 5.1.2. After conditioning the sample, measure the termination resistance of the connector assembly in accordance with Para.5.1.2 and insulation resistance with Para. 5.1.3 as post-tests and visually inspect the appearance 30 minutes after the sample is taken out from the test chamber to the room temperature and normal humidity, without applying test current on the circuit.

7.9 Temperature Cycling:

Perform the temperature cycling test of the connector assembly which is mated with the printed circuit board in accordance with Test Method 102A of MIL-STD-202D. Before conditioning the sample, measure the termination resistance of the connector assembly in accodance with Para. 5.1.2 as a pre-test. After conditioning the sample, measure the termination resistance again in accordance with Para. 5.1.2, and visually inspect the appearance with Para. 5.1.1, as post-tests, 30 minutes after the sample is taken out of the test chamber to the room temperature and normal humidity.

7.10 Insertion/Extraction Force(After Repeated Cycles):

Insertion/extraction test is performed by using test gages specially prepared to fit the number of position of the housing as specified in Figure 5. Insert and extract the gage ten cycles, and measure the extraction force at 11th. extraction by using test gage No.2 in Figure 4. Measurements shall be made in accordance with the test method specified in Para. 7.4. After measurement, insert the printed circuit test board and measure the termination resistance at its 12th. insertion in accordance with the method specified in Para. 5.1.2.

8. Special Instructions for Application:

8.1 Wires:

Annealed stranded copper wires only shall be used for crimping this product. Other wires such as single wire, aluminium wire and hard copper wires must not be used.

8.2 Tooling:

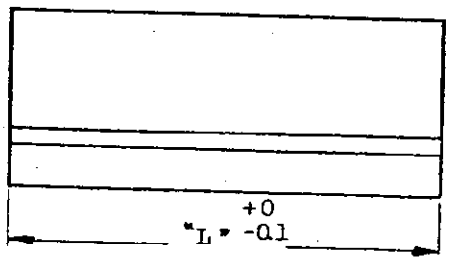
Proper AMP application tooling shall be used for crimping and extracting contacts from the housing.

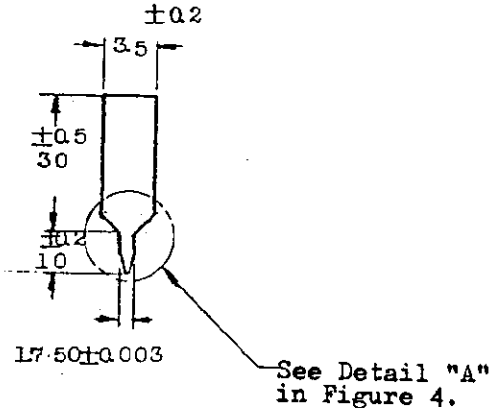
8.3 External Force Applied on Connector Assembly:

Connector assembly must be free from excessive external force, especially by twisting when being used.

9. Applicable Documents:

MIL-STD-202D, Test Methods for Electronic and Electrical Component Parts.





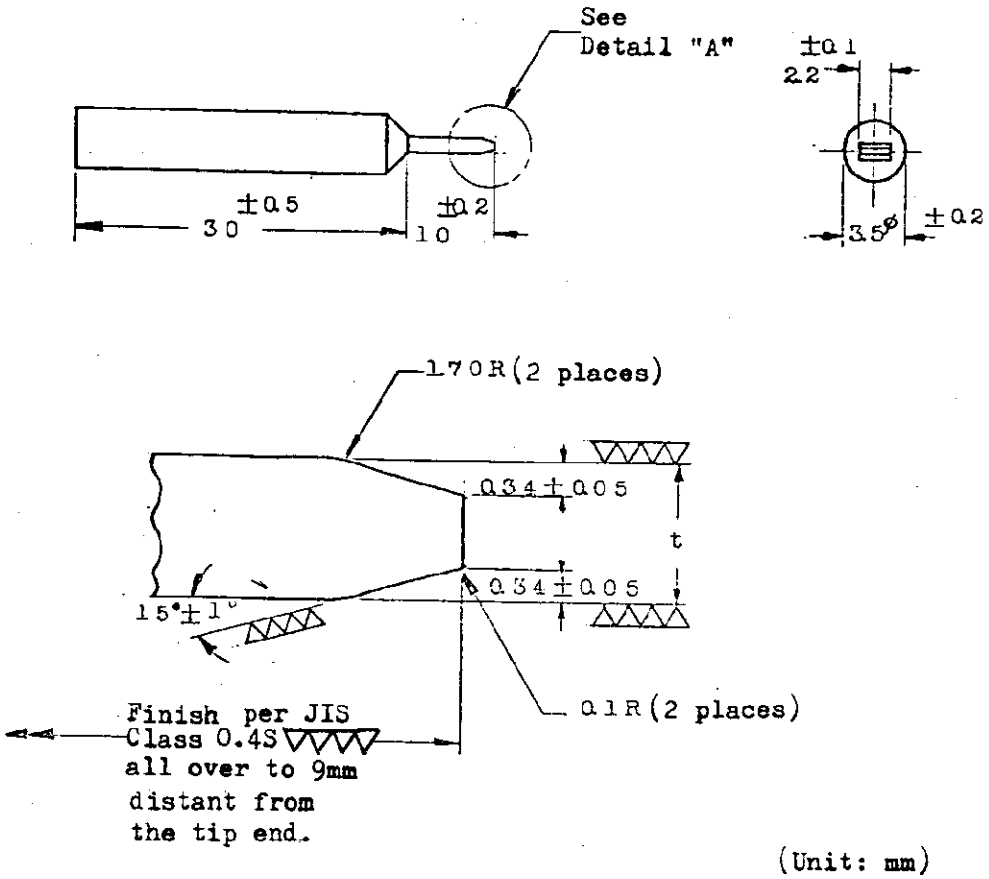
(Unit: mm)

Gage Nos.	Number of Positions	"L"
- 1	3	10.16
- 2	5	18.08
- 3	6	22.05
- 4	9	33.96
- 5	12	45.85
- 6	14	53.77
- 7	15	57.71
- 8	18	69.62
- 9	22	85.47

Notes:

1) Material: SKS-1
2) Hardness: RC 50 - 55
3) Finish: Same as Figure 4.

Figure 5



Detail "A"

(Unit: mm)

	"t" ±0.003
Gage No. 1	1.750
Gage No. 2	1.450

Note:

1. Material: SKS-1
2. Hardness: RC 50 - 55
3. Finish: JIS 0.4S ▽▽▽▽ ($4\sqrt{}$ per MIL-STD)

Figure 4

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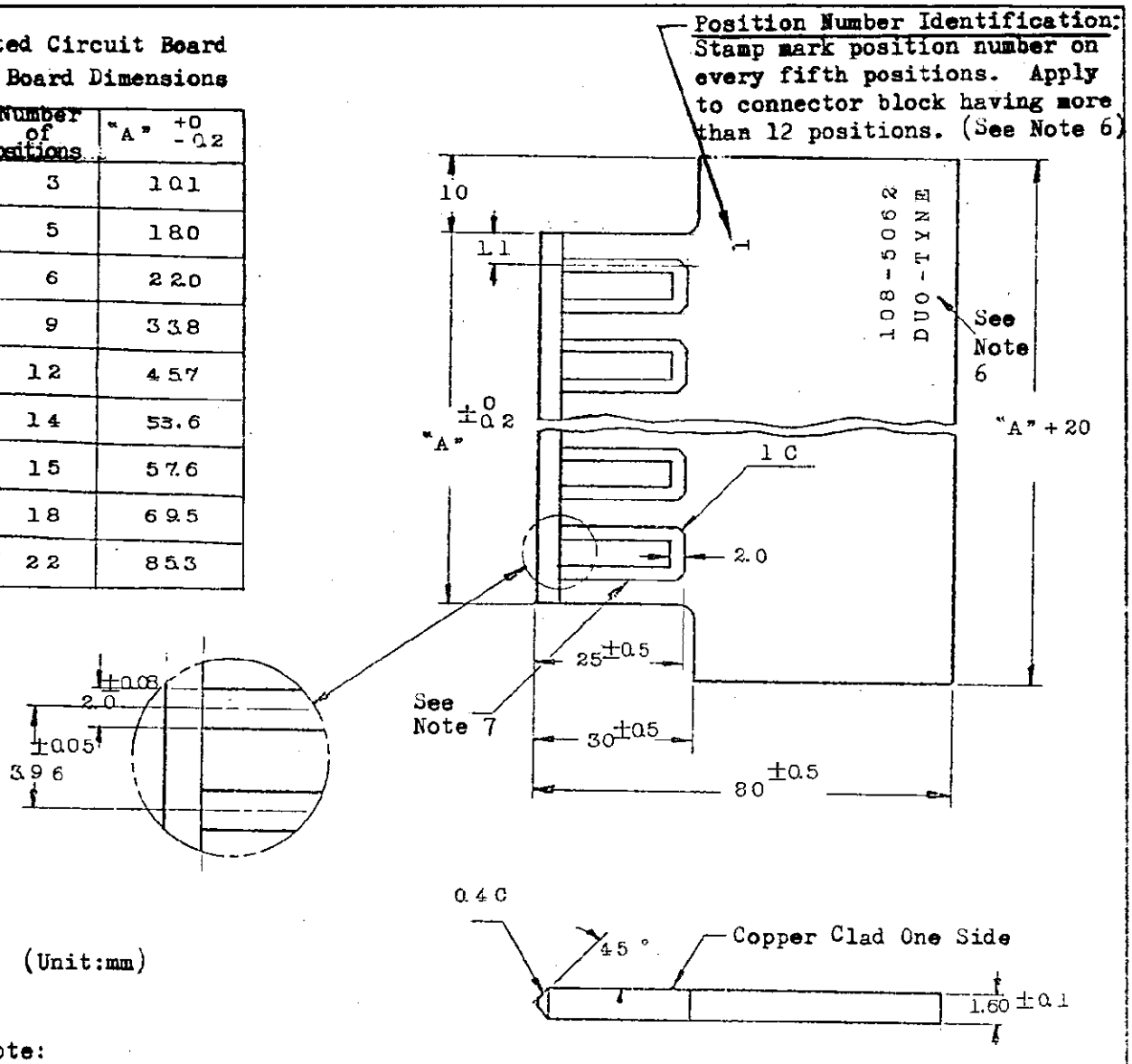
Printed Circuit Board Test Board Dimensions

Fig. No.	Number of Positions	"A" +0 -0.2
1	3	10.1
2	5	18.0
3	6	22.0
4	9	33.8
5	12	45.7
6	14	53.6
7	15	57.6
8	18	69.5
9	22	85.3



(Unit:mm)

Note:

1) Material: G-10(Glass Filled Epoxy Board)
2) Copper Conductor Thickness: 35μ (1 oz.) Copper Clad One Side
3) Finish: Half Glossy Tin-plated Thickness 3μ Min.
4) Non-accumulative Tolerance to circuit pattern pitch dimensions.
5) Warpage shall be within 0.2 in full length.
6) Letter size and marking position are to be arranged by the manufacturer's option.

Figure 6

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10. Test Sequence:

No.	Test Subject	Specified Limits	Applicable Paragraphs	Test Groups A	B	C	D	E	F	G
1.	Appearance	Contacts &.housing shall have no flaws, breakage, scabs, dirt &. burrs which are detrimental to connector functions.	5.1.1	X	X	X	X	X	X	X
2.	Termination Resistance	Not greater than 10mΩ for gold-plated contact; not greater than 20mΩ for tin-plated contact.	5.1.2				X	X	X	X
3.	Insulation Resistance	Not less than 5000MΩ between each adjacent contacts.	5.1.3					X		
4.	Dielectric Strength	No abnormalities shall occur after test conditioning under 2200V AC for one minute.	5.1.4	X						
5.	Initial Insertion &. Extraction Force	Insertion Force:Not greater than 800g. Extraction Force:Not less than 15g. per contact.	5.1.5							X
6.	Crimp Tensile Strength	Must conform to the specified values in Para. 5.1.6.	5.1.6		X					
7.	Contact Retention Force	Not less than 1.0kg(after 10th. insertion &. extraction.	5.1.7			X				
8.	Vibration	No electrical discontinuity greater than 1μ/sec shall not occur.	5.2.1				X			
9.	Humidity	Insulation resistance after environmental conditioning shall be not less than 500MΩ.	5.2.2					X		
10.	Temperature Cycling	The samples shall meet the requirements specified in Para. 5.1.2 &. 5.1.1.	5.2.3						X	
11.	Insertion &.Extraction Force(after repeated cycles).	Extraction force shall be not less than 15g. per contact after 10th. insertion &. extraction, conforming to Para. 5.1.2.	5.3.1							X
12.	Termination Resistance	Same as requirements in column No.2.	5.1.2				X	X	X	X
13.	Insulation Resistance	Same as requirements in column No. 9.	5.1.3					X		
14.	Appearance	Same as requirements in column No. 1.	5.1.1				X	X	X	

X denotes test to be performed. Arrow marks denote the sequence of tests.

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