108-5199

Product Specification

ASL Connector, Mass Termination Type

1. Scope:

This specification covers requirements for product performance and test methods of ASL mass termination type connectors.

1.1 Applicable Products:

The products of the following part numbers shall be governed under this specification.

Part Number	Descriptions	Remarks
173114-X	Receptacle Housing Assembly	AWG #26 - #28
173123-X		AWG #24
173116-X	Cap Housing Assembly	AWG #26 - #28
173124-X		AWG #24
173118-X	Post Header Assembly	Vertical Type
175666-X 175667-X	Receptacle Housing Assembly, Carrier Train Type	AWG #26 - #28 AWG #24

2. Product Descriptions:

The connectors of this product line are designed for wire-to-wire and wire-to-board termination by AMP insulation displacement mass termination wiring technique, as shown in Fig. 1.

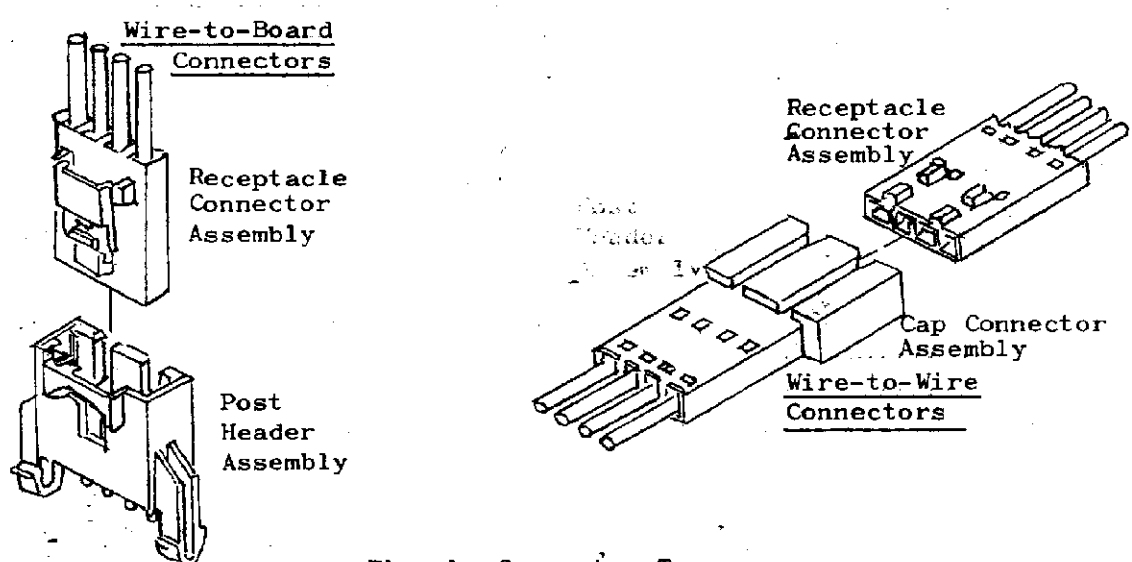

Fig. 1 Connector Types

LTR	REVISION RECORD	DR	CHK	DATE
B1	Revised RFA-1481			7-28-89
B	Revised RFA-1469		MS	4/7/89
A	Revised RFA-1040	MS		2/6/87
O	Released RFA-772			12-8-82

DR
CHK
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3. Product Specifications:

3.1 Product Design Feature, Construction and Dimensions:

Product design feature, construction and dimensions shall be conforming to the applicable product drawing(s).

3.1.1 Number of Positions:

10 types (2, 3, 4, 5, 6, 8, 10, 12, 16 & 20-Pos.) are available.

3.1.2 Number of Row and Centerline Spacing:

Connector positions are provided in one row, having centerline spacing of 2.54mm each.

3.1.3 Type of Post Header:

The type of post header shall be vertical.

3.1.4 Applicable Wire Range:

The wires to be used for termination shall be conforming to the data shown in Fig. 2.

Wire Size		Strand Composition (mm) (Tin-plated soft Annealed Copper)			Insulation	
mm^2	(AWG)	Number of A Strand	Diameter of a Strand	Diameter of Conductor	Diameter	Material
0.08	(#28)	1	0.32	0.32	0.9 - 1.35	PVC
	(#28)	7	0.127	0.38		
0.13	(#26)	1	0.4	0.40		
	(#26)	7	0.16	0.48		
0.2	(#24)	1	0.51	0.51		
	(#24)	7	0.203	0.61		

The specified data include tin-coated stranded wires.

Fig. 2

3.1.5 Thickness of Applicable Printed Circuit Board:

The thickness of the printed circuit board to be applicable for this connector product line shall be 1.6mm.

3.2 Material and Finish:

3.2.1 Receptacle and Pin Contact:

Receptacle and pin contact shall be made of pretinned phosphor bronze, having plated thickness of 0.8μm minimum.

3.2.2 Post

Post shall be made of pertinned brass, having 0.8μm minimum thick solder plating over 0.5μm minimum thick copper underplate.

3.2.3 Receptacle/Cap/Post Header Housings:

Housings shall be made of glass-filled polybuthylene-terephthalate (PBT), black, red, blue, orange and green, conforming to UL94V-0.

3.3 Appearance:

Connector assemblies shall be free from the defects such as damages, cracks, deformation, blister, dirt and burrs that are remarkably detrimental to connector functions and cosmetic merchandising value of the products.

4. Product Performance:

4.1 Ratings:

4.1.1	Voltage Rating:	250V AC and DC
4.1.2	Current Rating:	3.0A for AWG #24 wires 2.0A for AWG #26 wires 1.5A for AWG #28 wires
4.1.3	Temperature Rating:	-30 - +105°C

4.2 Quality Assurance Provisions:

4.2.1 Test Conditions:

Unless, otherwise specified, all the tests shall be performed under any combination of the following test conditions.

Temperature	15 - 35°C
Relative Humidity	45 - 75%
Atmospheric Pressure	650 - 800mmHg

4.2.2 Test Specimens:

4.2.2.1 All the specimens to be employed for the tests, shall be conforming to the applicable product drawing(s).

4.2.2.2 The wires used for termination shall be conforming to the requirements specified in Para. 3.1.4, and terminated by using applicable, specified application tooling.

4.2.2.3 Unless otherwise specified, no sample shall be reused for the test.

4.3 Electrical Performance Requirements:

Test Items (Paragraph No.)	Specified Requirements	Test Methods
Termination Resistance (Para. 4.3.1)	10 mΩ maximum (Initial)	Measure millivolt drop of the circuit shown in Fig. 4a & b by applying closed cricuit test current of 50mA maximum at open circuit voltage of 50mV DC maximum. Obtain termination circuit by calculation after deducting the resistance of 150mm long wire used for termination.
Insulation Resistance (Para. 4.3.2)	500 MΩ minimum	Insulation resistance shall be tested in accordance with Test Condition B, Test Method 302 of MIL-STD-202 (500V $^{+}_{-}$10%) by applying test potential between the adjacent contacts of the mated connectors.
Dielectric Strength (Para. 4.3.3)	After testing, no abnormalities such as insulation breakdown or flashover shall be evident.	Dielectric strength shall be tested in accordance with Test Method 301 of MIL-STD-202 by applying test potential of 600V AC (RMS) between the adjacent contacts of the mated pair of connectors for 1 minute.
Temperature Rising (Para. 4.3.4)	30°C maximum	After connecting all the contacts in the connector series wired, mate receptacle connector assembly with cap connector or post header, apply the test current of the intensity specified below. The temperature rising of the connectors shall be measured by using thermocouple after the temperature becomes stabilized. Test Current: 3.0A AWG #24 2.0A AWG #26 1.5A AWG #28

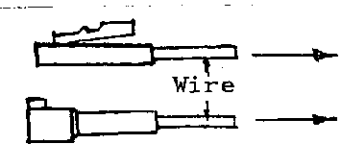
4.4 Physical Performance Requirements:

Contact Insertion/ Extraction Force (Para. 4.4.1)	Insertion Force: 200g max. Extraction Force: 30g min.	Measure insertion/extraction force of the contact by using pin gage specified in Fig. 5, to insert into or to extract from the receptqcle contacts loaded in the receptacle connector, on the tensile testing machine. The force required to insert or extract the gage pin by operating the head to travel with the speed at a rate of 100mm approximately a minute.

(To be continued)

Test Items (Paragraph No.)	Specified Requirements	Test Methods
Connector Insertion/ Extraction Force (Para. 4.4.2)	See table below	Measure the force required to insert extract receptacle connector into or from cap connector or post header on the tensile testing machine, by operating the head to travel with the speed at a rate of 100mm a minute without locking mechanism set in effect.
Durability (Para. 4.4.3) (Repeated Insertion & Extraction)	After test conditoning, connector assemblies shall show no abnormalities in appearance. Low level termination resistance shall be 20mΩ max., and the requirements for insertion/extraction force per Para. 4.4.2 shall be met.	Repeat insertion and extraction of the connectors in the same manner as specified in Para. 4.4.2 for 24 cycles, and measure the force required to insert and extract the connectors at the 25th cycle.
Connector Locking Strength (Para. 4.4.4)	Connector Locking Strength 2.0 kg (min.)	Securely fasten receptacle connector on the tensile testing machine with the counterpart cap connector or post header mated with the locking mechanism set in effect. Measure the force required to separate the connectors, by operating the head to travel with the speed at a rate of 100mm approximately a minute.
Contact Retention Force (Para. 4.4.5) (Wire)	Contact Retention Force 1.5 kg (min.)	Securely fasten wire-terminated connector on the tensile testing machine, and apply a pull-off load to the terminated wire, by operating the head to travel with the speed at a rate of 100mm approximately a minute. The force required to pull-off or to break the terminated wire with or without breakage at its termination, shall be measured and recorded.

No of Pos.	Insertion Force (kg)	Extraction Force
2	2.0 max.	0.1 min.
3		
4		0.2 min.
5	3.0 max.	
6		0.3 min.
8	4.5 max.	
10		0.5 min.
12		
16	6.0 max.	0.8 min.
20		



Direction of Pull-Off Load

4.4 (Continued)

Test Items (Paragraph No.)	Specified Requirements	Test Methods
Post Retention Force (Para. 4.4.6)	Post Retention Force 2.0 kg min.	Place post header on a test fixture on a sturdy, stationery bench, and apply an axial push-in force to the tip end of the post from the header mating side as shown in Fig. 6. The force required to dislodge the post from the post header shall be measured and recorded.
Vibration (Low Frequency) (Para. 4.4.7)	No electrical discontinuity greater than 1 microsecond shall take place in the test circuit during the test, and low level termination resistance shall be 20mΩ max. after the test. No physical abnormalities shall be present.	Vibration testing shall be done in accordance with Test Method 201 of MIL-STD-202, after all the contacts series wired and applying test current of 0.1A flowing through the circuit with the connectors mated together. The connectors are securely fastened on the vibration testing machine. The vibratile test conditioning shall be such that the sweeping vibratile frequencies changing 10-55-10 Hz to reciprocate one cycle a minute, with the amplitude of 1.52mm maximum both sides is applied to three axial directions (X, Y and Z) for two hours each, totally 6 hours, and during vibration, the circuit shall be monitored for discontinuity by using appropriate measuring apparatus.
Physical Shock (Para. 4.4.8)	No electrical discontinuity greater than 1 microsecond shall take place by the shock, and low level termination shall be 20mΩ max. after the test. No physical abnormalities shall be present.	Physical shock shall be tested in accordance with Test Condition A, Test Method 213 of MIL-STD-202, after all the contacts series wired and applying test current of 0.1A flowing through the circuit with the connectors mated together. The intensity of the shock shall be 50G's maximum to produce a sine wave within 11 milliseconds. The shock shall be applied in normal and reversed directions 3 times each to 3 axial directions, totally making 18 shocks. The circuit shall be monitored for detecting discontinuity taking place by the shock.

(Para. 4.4, End)

4.5 Environmental Performance Requirements:

Test Items (Paragraph No.)	Specified Requirements	Test Methods
*Humidity, Cycling (Para. 4.5.1)	After test conditioning, low level termination resistance shall be 20mΩ maximum, and insulation resistance shall be 500MΩ minimum. The requirements for dielectric strength per Para. 4.3.3 shall be met.	Humidity cycling test shall be done in accordance with Test Method 106 of MIL-STD-202, excepting Step 7b, by exposing the sample under the test atmosphere changing between -10°C and 65°C with relative humidity of 80-98% for 10 cycles.
*Thermal Shock (Para. 4.5.2)	After test conditioning, low level termination resistance shall be 20mΩ maximum, and no physical abnormalities shall be present.	Thermal shock test shall be done in accordance with Test Condition A, (see table below.), Test Method 107 of MIL-STD-202 by exposing the test samples under the test conditioning for 5 cycles in the procedure specified in the table.
*Heat Resistivity (Para. 4.5.3)	After test conditioning, low level termination resistance shall be 20mΩ maximum, and no physical abnormalities shall be present.	Mated pair of connetors shall be tested in accordance with Test Method 108 of MIL-STD-202, by exposing samples under heat atmosphere of 105°C for 240 hours.
*Salt Spray (Para. 4.5.4)	After test conditioning, low level termination resistance shall be 20mΩ maximum, and the evidence of remarkable corrosive affection and physical abnormalities shall be present.	Mated pair of connectors shall be tested in accordance with Test Condition B, Tes Test Method 101 of MIL-STD-202 by expsoing the samples under 5% salt spray test conditioning for 48 hours.

Step	Temperature (°C)	Duration (min.)
1	$-55\ ^{+0}_{-3}$	30
2	$25\ ^{+10}_{-5}$	5 max.
3	$85\ ^{+3}_{-0}$	30
4	$25\ ^{+10}_{-5}$	5 max.

(To be continued)

4.5 (Continued)

Test Items (Paragraph No.)	Specified Requirements	Test Methods
Post Solderability (Para. 4.5.5)	More than 95% of tested area shall be covered with uniformly fresh, wet solder except the sheared surfaces	After immersing soldering end of the post of post header into the flux (Alpha 100, GX-5 or GX-7) for 5 - 10 seconds, immerse into the soldering tub which is filled with melted 60% tin, 40% lead solder whose temperature is controlled at 230 $\pm$5°C, for 3 $\pm$0.5 seconds. After immersion, take out the sample and inspect the surfaces.
Soldering Heat Resistivity (Para. 4.5.6)	After testing, the sample connector shall appear normal without deformation and defects that are detrimental to connector functions.	With the post header mounted on the printed circuit board, immerse the soldering portion of posts and kinking portion of housing into soldering tub which is filled with melted solder controlled at 260 $\pm$5°C, for 10 $\pm$0.5 seconds. After immersion, take out the sample and inspect the appearance.

For measuring the samples of the asterisk-marked test items, recondition the samples in the room temperature for 1 hour after completion of the test duration.

Fig. 2 (End)

5. Test Sequence:

Test Items	Paragraph No.	Sample Groups 1	2	3	4	5	6	7	8	9	10	11	12
Appearance	3.3	1	1	1	1	1	1	1	1	1	1	1	1
Termination Resistance (Low Level) (Initial)	4.3.1	3	2	2	2	2							
Insulation Resistance	4.3.2		5										
Dielectric Strength	4.3.3		6										
Temperature Rising	4.3.4						2						
Contact Insertion/ Extraction Force	4.4.1							2					
Connector Insertion/ Extraction Force (Initial)	4.4.2	2											
Durability	4.4.3	4											
Connector Locking Retention Force	4.4.4								2				
Contact Retention Force	4.4.5									2			
Post Retention Force	4.4.6										2		
Vibration, High Frequency	4.4.7			3									
Physical Shock	4.4.8			4									
Humidity Cycling	4.5.1		3										
Thermal Shock	4.5.2				3								
Heat Resistivity	4.5.3					3							
Salt Spray	4.5.4	6											
Post Solderability	4.5.5											2	
Soldering Heat Resistivity	4.5.6												2
Termination Resistance (low Level) (Final)	4.3.1	5,7	4	5	4	4							
Appearance	3.3	8	7	6	5	5	3						3

Notes:

(1) The numbers in the columns indicate the sequence in which the tests are performed.
(2) Sample Groups 1 through 6 and 8 consist of receptacle connector mated with cap connector and post header.
(3) Sample Group 7 consists of receptacle connector, and Sample Group 9 consists of receptacle connector and cap connector.
(4) Sample Groups 10 through 12 consist of post header only.

Fig. 3

Measuring Termination Resistance, Low Level

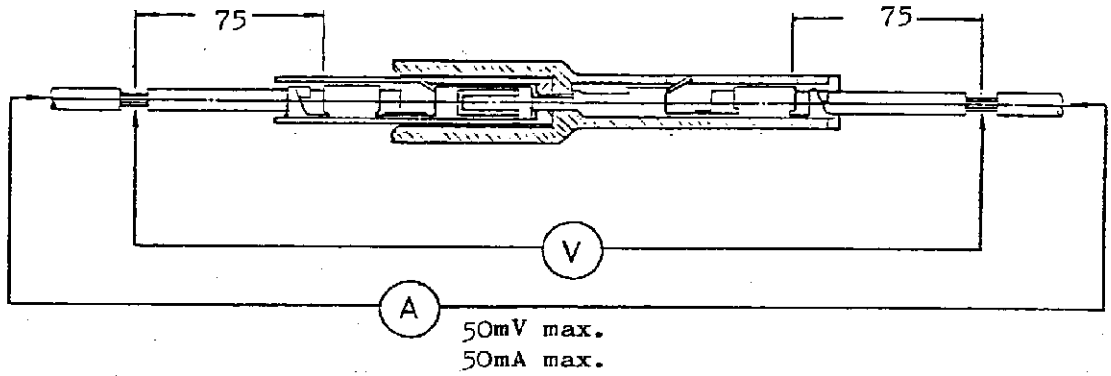
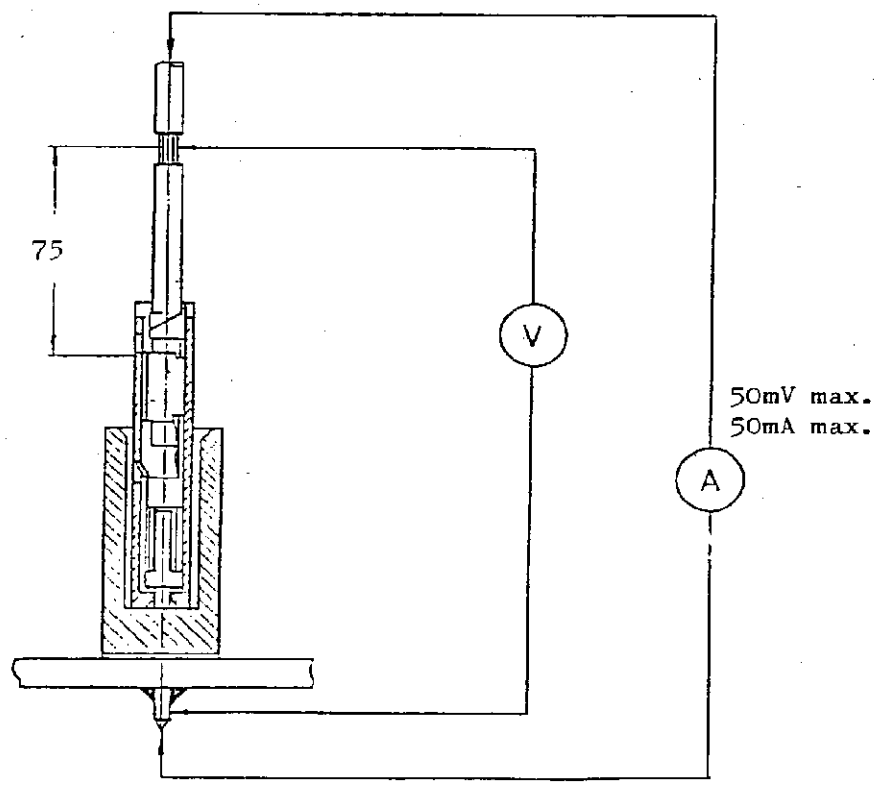
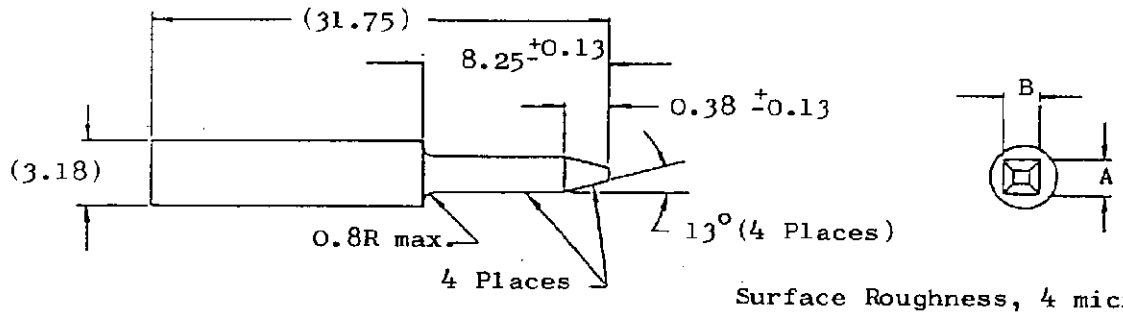


Fig. 4a Wire-to-Wire Termination



Unit: mm

Fig. 4b Wire-to-Board Termination



Surface Roughness, 4 microinches
JIS B 601 0.4S or equivalent
Mating Surfaces Only

	A	B
1	0.660 +0.0000 -0.0025	0.660 +0.0000 -0.0025
2	0.610 +0.0025 -0.0000	0.610 +0.0025 -0.0000

Fig. 5 Insertion/Extraction Force
Testing Gage Dimensions

Unit: mm

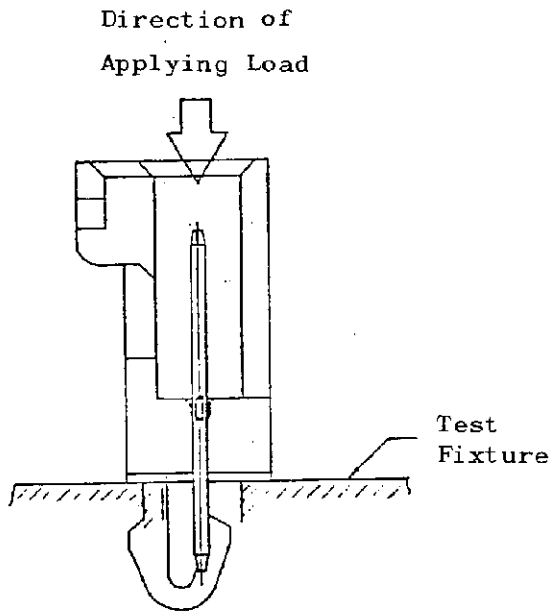


Fig. 6 Measuring Post Retention Force