AMP*

QUALIFICATION TEST REPORT

Single Line, High Voltage
Commercial LGH* Connector

501-117 Rev. 0

Product Specification:	108-36034 Rev 0
CTL No.:	CTL4086-001-001
Date:	May 24, 1990
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AMP

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CORPORATE TEST LABORATORY

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Commercial LGH Connector

1. Introduction

1.1 Purpose

Testing was performed on AMP's Commercial LGH Connector to determine if it meets the requirements of AMP Product Specification 108-36034, Rev. 0.

1.2 Scope

This report covers the electrical, mechanical, and environmental performance of the Commercial LGH Connector, manufactured by the Federal Systems Unit of the Aerospace & Government Systems Sector. The testing was performed between October 25, 1989 and March 26, 1990.

1.3 Conclusion

The Commercial LGH Connector meets the electrical, mechanical, and environmental performance requirements of AMP Product Specification 108-36034, Rev. 0.

1.4 Product Description

The Commercial Single Line Connectors incorporate crimp, Snap-In contacts of the Type XI, XII, and III+ families. Housings are made of self-extinguishing plastic, UL rated 94V-0. The 10 kVac connectors accept 20/24 AWG wire. The 20 kVac connectors accept 22/20 AWG and 18/16 AWG wires. The 30 kVac connectors accept 16/8 AWG wire.

1.5 Test Samples

The test samples were randomly selected from current production, and the following part numbers were used for test:

Test Group	Quantity	Part Number	Description
1,2,3	15	863103-2	LGH Plug (12 kVac)
	15	863104-2	LGH Receptacle (12 kVac)
	15	66261-1	Type XII Pin (12 kVac)
	15	66740-8	Type XII Soc. (12 kVac)
1,3	10	867157-1	LGH Plug (8 kVac)
	10	867156-1	LGH Receptacle (8 kVac)
	10	203816-6	Type XI Pin (8 kVac)
	10	203802-6	Type XI Soc. (8 kVac)
	10	861610-1	LGH Plug (4 kVac)
	10	861753-1	LGH Receptacle (4 kVac)
	10	66400-1	Type III+ Pin (4 kVac)
	10	66399-1	Type III+ Soc. (4 kVac)

1.6 Qualification Test Sequence

	Test Groups		
Test or Examination	1	2	3
Examination of Product	1,9	1,9	1,8
Termination Resistance, Specified Current	3,7	2,7	
Dielectric Withstanding Voltage			2,6
Insulation Resistance			3,7
T-Rise vs. Current		3,8	
Vibration, Discontinuity	5		
Vibration, Energized		6	
Physical Shock	6		
Mating Force	2		
Contact Separating Force	8		
Durability	4		
Thermal Shock		4	4
Humidity-Temperature Cycling		5	5

The numbers indicate sequence in which tests were performed.

2. Summary of Testing

2.1 Examination of Product - All Groups

All samples submitted for testing were selected from normal production lots. They were inspected and accepted by the Product Assurance Department of the Federal Systems Unit of the Aerospace & Government Systems Sector.

2.2 Termination Resistance, Specified Current - Groups 1,2

All termination resistance measurements taken at the specified current were less than the specification requirements.

Test Group	No. of Samples	Condition	Spec. Max.	Max.
1	5	Initial	1.40	0.31
	5		9.00	2.19
	5		11.00	3.42
1	5	After Mechanical	1.40	0.51
	5		9.00	4.55
	4		11.00	6.59
2	5	Initial	1.40	0.42
2	5	After Current Verification	1.40	0.77

All values in milliohms

2.3 Dielectric Withstanding Voltage - Group 3

There was no dielectric breakdown or flashover between adjacent contacts, when tested in accordance with table below:

Connector Rating	Sea Level		1500 feet	
	kvdc	kvac	kvdc	kvac
10 kvdc/ 4 kvac	15	6	15	6
20 kvdc/ 8 kvac	30	12	30	12
30 kvdc/12 kvac	40	16	40	16

Leakage current was less than 1.0 milliamperes.

2.4 Insulation Resistance - Group 3

All insulation resistance measurements were greater than the specification requirement of 5000 megohms for the initial measurement, and 100 megohms for measurement taken after test.

2.5 Temperature Rise vs. Current - Group 2 (Type XII Contact)

All samples had a temperature rise of less than 30°C above ambient, when specified current was applied.

Condition	Wire Size AWG	Wire Size	Test Current	Temperature Rise (Max.)
Initial		12 AWG	15.0	6.0°
After Current Verification		12 AWG	15.0	11.9°

All Temperatures in Degrees Celsius

2.6 Vibration, Discontinuity - Group 1

There were no discontinuities of the contacts greater than one microsecond during vibration. Following vibration, there were no cracks, breaks, or loose parts on the connector assemblies.

2.7 Vibration, Energized - Group 2

Following vibration, there were no cracks, breaks, or loose parts on the connector assemblies.

2.8 Physical Shock - Group 1

There were no discontinuities of the contacts greater than one microsecond during physical shock. Following physical shock testing, there were no cracks, breaks, or loose parts on the connector assemblies.

2.9 Mating Force - Group 1

All mating force measurements were less than the specification requirement of 2.0 pounds for Type XI contacts, 3.0 pounds for Type III+ contacts, and 15 pounds for Type XII contacts.

2.10 Contact Separating Force - Group 1

All contact separating forces were greater than the specification minimum requirement of 0.75 ounces for Type XI contacts, 1.5 ounces for Type III+ contacts, and 5.0 ounces for Type XII contacts.

2.11 Durability - Group 1

There was no physical damage to the samples, as a result of mating and unmating the connector 500 times.

2.12 Thermal Shock - Groups 2,3

There was no evidence of physical damage to either the contacts or the connector, as a result of thermal shock.

2.13 Humidity-Temperature Cycling - Groups 2,3

There was no evidence of physical damage to either the contacts or the connector, as a result of exposure to humidity temperature cycling.

3. Test Methods

3.1 Examination of Product

The product drawings and inspection plans were used to examine the samples. They were examined visually and functionally.

3.2 Termination Resistance, Specified Current

Termination resistance measurements taken at the specified current were made, using a four terminal measuring technique (Figure 1).

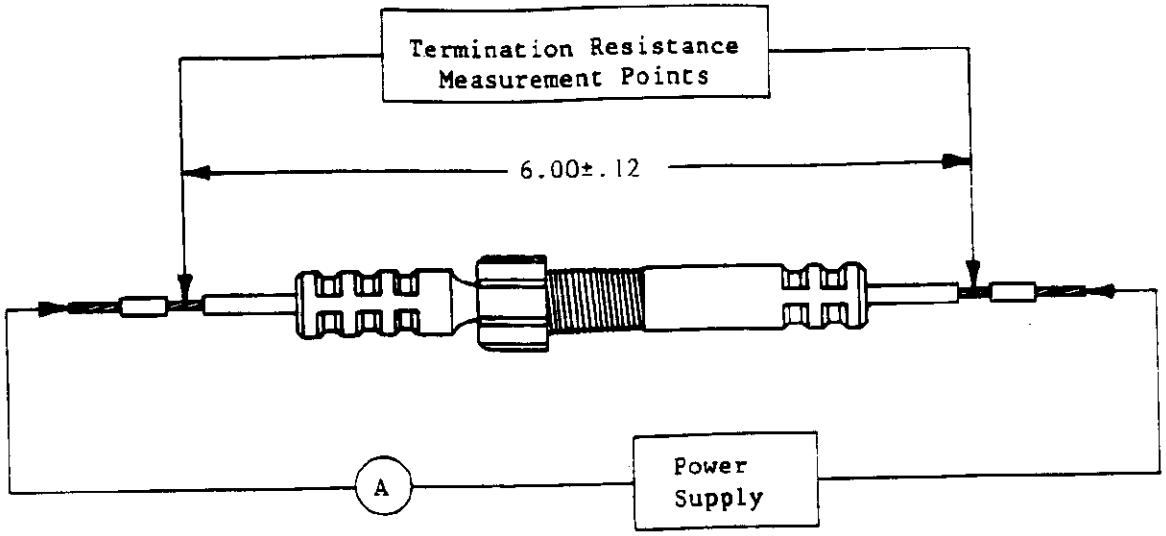

Figure 1
Typical Termination Resistance Measurement Points

3.3 Dielectric Withstanding Voltage

The test potential was applied between the adjacent contacts. This potential was applied for 3 minutes and then returned to zero.

3.4 Insulation Resistance

Insulation resistance was measured between adjacent contacts, using a test voltage of 500 volts dc. This voltage was applied for one minute, before the resistance was measured.

3.5 Temperature Rise vs. Specified Current

The connector temperature was measured, while energized at the specified current. Thermocouples were attached to the connectors to measure their temperatures. This temperature was then subtracted from the ambient temperature to find the temperature rise. When three readings at five minute intervals were the same, the readings were recorded.

3.6 Vibration, Discontinuity, Sine

Mated connectors were subjected to sinusoidal vibration having a simple harmonic motion with an amplitude of 0.06 inch, double amplitude. The vibration frequency was varied uniformly between the limits of 10 and 55 Hz and returned to 10 Hz in 1 minute. This cycle was performed 120 times in each of three mutually perpendicular planes, for a total vibration time of 6 hours. Connectors were monitored for discontinuities greater than one microsecond, using a current of 100 milliamperes in the monitoring circuit.

3.7 Vibration, Energized, Sine

Mated connectors were subjected to sinusoidal vibration having a simple harmonic motion with an amplitude of 0.06 inch, double amplitude. The vibration frequency was varied uniformly between the limits of 10 and 55 Hz and returned to 10 Hz in 1 minute. This cycle was performed 120 times in each of three mutually perpendicular planes, for a total vibration time of 6 hours. Connectors were energized at specified current, and total circuit voltage drop was monitored.

3.8 Physical Shock

Mated connectors were subjected to a physical shock test, having a sawtooth waveform of 30 gravity units (g peak) and a duration of 11 milliseconds. Three shocks in each direction were applied along the three mutually perpendicular planes, for a total of 18 shocks. The connectors were monitored for discontinuities greater than one microsecond, using a current of 100 milliamperes in the monitoring circuit.

3.9 Mating Force

The force required to mate individual contacts was measured, using a free floating fixture with the rate of travel at 0.5 inch/minute.

3.10 Contact Separating Force

Separating forces were acquired by withdrawing a 0.0615 inch gage from the Type III+ Socket, a 0.0390 inch gage from the Type XI Socket, and a 0.250 inch gage from the Type XII Socket.

3.11 Durability

Connectors were mated and unmated 500 times, at a rate not exceeding 200 per hour.

3.12 Thermal Shock

Mated connectors were subjected to five cycles of temperature extremes, with each cycle consisting of 30 minutes at each temperature. The temperature extremes were -15°C and 85°C. The transition between temperatures was less than one minute.

3.13 Humidity-Temperature Cycling

Mated connectors were exposed to 10 cycles of humidity-temperature cycling. Each cycle lasted 24 hours and consisted of cycling the temperature between 25°C and 65°C twice, while the relative humidity was held at 95%.

4. Validation

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