AMP*

QUALIFICATION TEST REPORT

POWER RING,
HOUSING AND TERMINAL ASSEMBLY

501-164 Rev. 0

Product Specification:	108-1191 Rev. 0
CTL No.:	CTL1071-013-005
Date:	January 30, 1992
Classification:	Unrestricted
Prepared By:	Terrance M. Shingara

*Trademark of AMP Incorporated

COPYRIGHT 1992
BY AMP INCORPORATED
ALL INTERNATIONAL RIGHTS RESERVED.

Table of Contents

(R1071TS)

AMP

AMP INCORPORATED

HARRISBURG, PENNSYLVANIA 17105 PHONE: 717-564-0100 TWX: 510-657-4110

CORPORATE TEST LABORATORY

Qualification Test Report
POWER RING, Housing and Terminal Assembly

1. Introduction

1.1 Purpose

Testing was performed on the AMP Power Ring housing and terminal to determine its conformance to the requirements of AMP Product Specification 108-1191 Rev.0.

1.2 Scope

This report covers the electrical, mechanical, and environmental performance of the AMP Power Ring manufactured by the Consumer Products Business Unit of the Automotive/Consumer Business Group. The testing was performed between April 20 1991 and December 16,1991.

1.3 Conclusion

The AMP Power Ring housing and terminal meets the electrical, mechanical, and environmental performance requirements of AMP Product Specification 108-1191 Rev. 0.

1.4 Product Description

The Power Block and Power Rings allow easy attachment of power cords or direct wiring of appliances to 10 through 6 AWG cable in accordance with National Electrical Code requirements.

The housings are made of black Phenolic with steel (zinc or nickel plated) hardware. The contacts are Brass or tin plated Brass.

1.5 Test Samples

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

Test Group	Quantity	Part Number	Description
1,2,3,4,5	18 ea.	520943-1	Power Ring Ass'y AWG12
1,3	18 ea.	520943-1	Power Ring Ass'y AWG18
1,2,3,5	6 ea.	520942-2	Power Block

1.6 Qualification Test Sequence

	Test Groups				
Test or Examination	1	2	3	4	5
Examination of Product	1	1,9	1,8	1,3	1,5
Termination Resistance, Dry Circuit	3,5	2,7			2,4
Dielectric Withstanding Voltage			3,7		
Insulation Resistance			2,6		
Current Cycling					3
T-Rise vs. Current		3,8			
Static Heating, Contact				2	
Vibration	4	6			
Strength of Housing	6				
Contact Insertion Force	2				
Contact Retention	7				
Crimp Tensile	8				
Thermal Shock			4		
Humidity-Temperature Cycling		4	5		
Temperature Life		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 current production lots. They were inspected and accepted by the Product Assurance Department of the Automotive/Consumer Business Group.

2.2 Termination Resistance, Dry Circuit - Groups 1,2,5

All crimp resistance measurements, taken at 100 milliamperes dc. and 50 millivolts open circuit voltage, were less than 1.00 milliohms.

Test Group	No. of Samples	Condition	Min.	Max.	Mean
1	18	Initial	0.21	0.88	0.379
		After Vibration	0.29	0.79	0.427
2	9	Initial	0.29	0.36	0.312
		After Current Ver.	0.22	0.68	0.455
5	9	Initial	0.30	0.41	0.359
		After Current Cyc.	0.32	0.56	0.401

All values in milliohms

All total (crimp & front end) resistance measurements, taken at 100 milliamperes dc. and 50 millivolts open circuit voltage, were less than 2.00 milliohms.

Test Group	No. of Samples	Condition	Min.	Max.	Mean
2	9	Initial	0.61	0.68	0.630
		After Current Ver.	0.68	1.21	0.959

All values in milliohms

2.3 Dielectric Withstanding Voltage - Group 3

No dielectric breakdown or flashover occurred when a test voltage was applied between adjacent contacts.

2.4 Insulation Resistance - Group 3

All insulation resistance measurements were greater than 5000 megohms.

2.5 Current Cycling - Group 5

No evidence of physical damage was visible to the test samples, after 500 cycles of cycling the current on and off at a current of 37.5 amperes. The cycling current represented 125% of the specified current.

2.6 Temperature Rise vs. Current - Group 2

All samples had a temperature rise of less than 50 C above ambient when a specified current of 30.0 amperes dc was applied.

2.7 Static Heating, Contacts - Group 4

All contacts had a temperature rise of less than 50 C above ambient when a specified current of 95.0 amperes dc was applied.

2.8 Vibration - Groups 1,2

No discontinuities of the contacts were detected, on group 1 samples, during vibration. Following vibration, no cracks, breaks, or loose parts on the connector assemblies were visible.

2.9 Housing Lock Strength - Group 1

With 50 in/lb applied to each screw no cracks, breaks, or loose parts on the connector assemblies were visible.

2.10 Contact Insertion Force - Group 1

The force required to insert each contact into the housing was less than 10 pounds.

2.11 Contact Retention - Group 1

No physical damage occurred to either the contacts or the housing, and no contacts dislodged from the housings as a result of applying an axial load of 30 pounds to each contact.

2.12 Crimp Tensile - Group 1

All tensile values were greater than 70 pounds for AWG12 and 20 pounds for AWG18.

2.13 Thermal Shock - Group 3

No evidence of physical damage to either the terminals or the housing was visible as a result of thermal shock.

2.14 Humidity-Temperature Cycling - Groups 2,3

No evidence of physical damage to either the terminals or the housing was visible as a result of exposure to humidity-temperature cycling.

2.15 Temperature Life - Group 2

No evidence of physical damage to either the terminals or the housing was visible as a result of exposure to an elevated temperature.

3. Test Methods

3.1 Examination of Product

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

3.2 Termination Resistance, Low Level

Termination resistance measurements at low level current were made, using a four terminal measuring technique (Figure 1). The test current was maintained at 100 milliamperes dc, with an open circuit voltage of 50 millivolts dc.

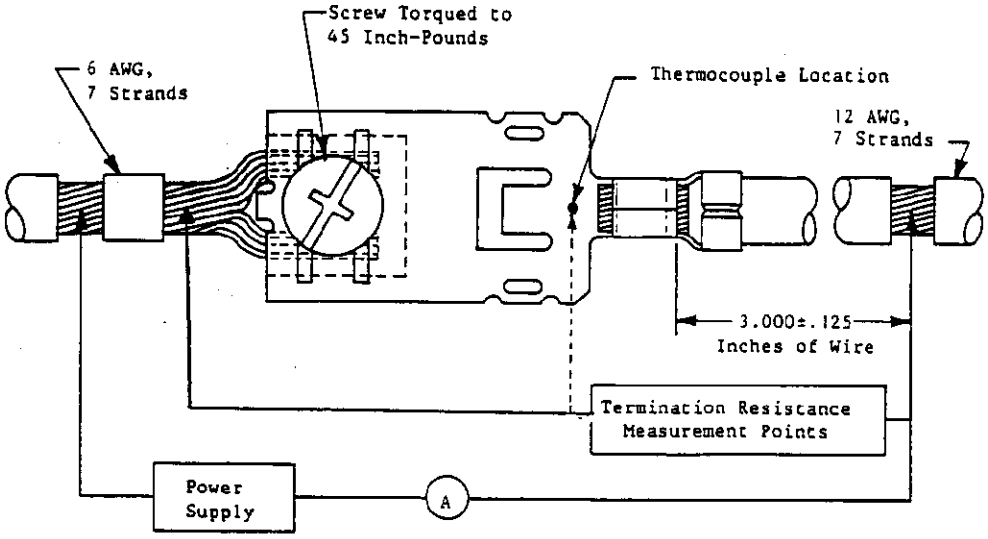

Figure 1
Typical Termination Resistance Measurement Points

3.3 Dielectric Withstanding Voltage

A test potential of 1500 vac was applied between the adjacent contacts. This potential was applied for one minute 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 minutes before the resistance was measured.

3.5 Current Cycling

The connectors were cycled on and off at 125% of the specified current. Testing consisted of 500 cycles, with each cycle having current on for 45 minutes and current off for 15 minutes.

3.6 Temperature Rise vs Specified Current

Connector temperature was measured, while energized at the specified current of 30 amperes ac. 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.

3.7 Static Heating, Contact

Static Heating was performed to verify the current carrying capability of the friction interface between the Power Ring Terminal and screw assembly(Figure 2). Connector temperature was measured, while energized at the specified current of 95 amperes ac. 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.

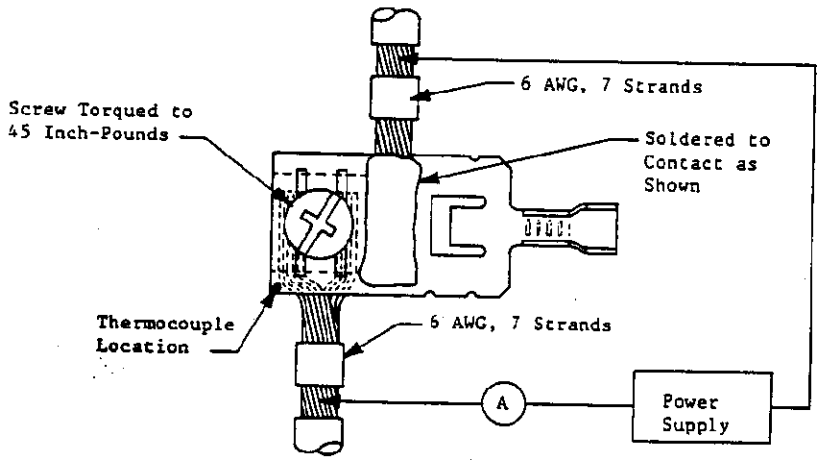

Figure 2
Static Heating

3.8 Vibration, 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 minutes. This cycle was performed for 2 hours 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.

3.9 Strength of Housing

An rotational load of 50 inch/pounds was applied to each screw assembly mounted in the housing.

3.10 Contact Insertion

The force required to insert the Power Ring Terminal into the Power Block was measured.

3.11 Contact Retention

An axial load of 30 pounds was applied to each contact and held for 60 seconds. The force was applied in a direction to cause removal of the contacts from the housing.

3.12 Crimp Tensile

An axial load was applied to each contact at a crosshead rate of 1.0 inch per minute. This force was applied until the contact and the wire separated.

3.13 Thermal Shock

Mated connectors were subjected to 25 cycles of temperature extremes, with each cycle consisting of 30 minutes at each temperature. The temperature extremes were -40 C and 125 C. The transition between temperatures was less than one minute.

3.14 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%.

3.15 Temperature Life

Mated samples were exposed to a temperature of 150 C for 24 hours.

4. Validation

Prepared by:

Terrance M. Shingara 2/7/92
Terrance M. Shingara
Test Engineer
Design Assurance Testing
Corporate Test Laboratory

Reviewed by:

Richard A. Groft 2/26/92
Richard A. Groft
Supervisor
Design Assurance Testing
Corporate Test Laboratory

Approved by:

William Zelner 2/12/92
William Zelner
Manager
Product Assurance
Automotive/Consumer Business Group (North)