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.

NUMBER: 108-5303

SECURITY CLASSIFICATION: Customer Release

Design Objectives

108-5303

"187" Series Connectors

1. Scope :

1.1 Contents

This specification covers the requirements for product performance, test methods and quality assurance provisions of "187" Series Connectors.
The applicable product description and part numbers are as shown in Appendix 1.

2. Applicable Documents :

The following documents from a part of this specification to the extent specified herein. In the event of conflict between the requirements of this specification and the product drawing, the product drawing shall take precedence. In the event of conflict between the requirements of this specification and the referenced documents, this specification shall take precedence.

2.1 AMP Specifications :

A. 109-5000 : Test Specification, General Requirements for Test Methods

B. 114-5123 : Application Specification, Crimping "187" Series, Tab and Receptacle Contacts

C. 501- : Test Report

LTR	REVISION RECORD	DR	CHK	DATE
A	RELEASED	Y2		3/4 94

DR. 4. Mar '94 Y. Fujiwara
CHK. Mar. 4 94
APP.

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AMP
AMP (Japan), Ltd.
Kawasaki, Japan

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2.2 Commercial Standard and Specifications :

A. JASO D7002 Automotive Multi-Pole Connectors

B. JASO D7101 Test Methods for Molded Plastic Parts

C. JIS C3406 Low Voltage Cables for Automobiles

D. JIS D0203 Method of Moisture, Rain and Spray Test for Automobile Parts

E. JIS D0204 Method of High and Low Temperature Test for Automobile Parts

F. JIS D1601 Vibration Testing Method for Automobile Parts

G. JIS R5210 Partland Cement

H. JIS C0023 Basic Environmental Testing Procedures Parts Tests-Test Ka : Salt mist

3. Requirements :

3.1 Design and Construction :

Product shall be of the design, construction and physical dimensions specified in the applicable product drawing.

3.2 Materials :

A. Contact : Pretinned brass or pretinned phosphor bronze

B. Housing : PBT Molding Compound

3.3 Ratings :

A. Temperature Rating : −30 °C to 105 °C
(Ambient Temperature + Temperature Rising by Energized Loading)

3.4 Performance and Test Descriptions :

The product is designed to meet the electrical, mechanical and environmental performance requirements specified in Fig. 2. All tests are performed at ambient temperature, unless otherwise specified.

3.5 Test Requirements and Procedures Summary :

Para.	Test Items	Requirements	Procedures
3.5.1	Confirmation of Product	Product shall be conforming to the requirements of applicable product drawing and Application Specification .	Visually, dimensionally and functionally inspected per applicable quality inspection plan.
3.5.2	Termination Resistance (Low Level)	3 m Ω Max. (Initial) 10 mΩ Max. (Final)	Subject mated contacts assembled in housing to closed circuit current of 10 mA Max. at open circuit voltage of 20 mV Max. Fig. 1. AMP Spec. 109-5311-1
3.5.3	Termination Resistance (Specified Current)	3 mV/A MAX (Initial) 10 mV/A MAX (Final)	Measure initial millivolt drop of contact test circuit in mated connectors, Fig. 1. AMP Spec. 109-5311-2
3.5.4	Insulation Resistance	100 MΩ Min. (Final)	Impressed voltage 500 V DC. Test between adjacent circuits of mated connectors. AMP Spec. 109-5302 Fig. 2
3.5.5	Dielectric Strength	No creeping discharge nor flashover shall occur.	1.0 KVAC for 1 minute. Test between adjacent circuits of mated connectors. AMP Spec. 109-5301 Fig. 2
3.5.6	Current Leakage	3 mA Max.	12 V DC 60 °C Humidity 90~95 % 1 Hr AMP Spec. 109-5312 Fig. 3
3.5.7	Current Cycling	10 mΩ Max. (Final) No ignition is allowed during the test.	Applied Corrent : I × kd Fig. 4, 5. 45 minutes "ON", 15 minutes "OFF" 300 cycles. 50 % current to be applied to contacts excepting 4 positions in the center area of connector. AMP Spec. 109-5308

Fig. 2 (To be continued)

Para.	Test Items	Requirements	Procedures
3.5.8	Temperature Rising	60 ℃ Max. under loaded specified current.	Measure temperature rising by energized current. Applied Current : I × kd Fig. 4, 5 AMP Spec. 109-5310 method
3.5.9	Handling Ergonomics	No abnormalities allowed in manual mating / unmating handing.	Manually opearated
3.5.10	Crimp Tensile Strength	Wire Size: mm² / (AWG); Crimp Tensil (min.): N / (kgf) 0.3 / #22 / 78.5 / 8 0.5 / #20 / 88.3 / 9 0.85 / #18 / 127 / 13 1.25 / #16 / 177 / 18 2.0 / #14 / 265 / 27 3.0 / #12 / 294 / 30	Apply an axial pull-off load to crimped wire of contact secured on the tester, Operation Speed : 100 mm / min. AMP Spec. 109-5205 Condition
3.5.11	Contact Retention Force with Spencer	98 N (10 kgf) Min.	Apply an axial pull-off load to crimped wire. Operation Speed : 100 mm / min. AMP Spec. 109-5212
3.5.12	Contact Mating Force	14.7 N (1.5 kgf) Max. per cocntact	Operation of Speed 100 mm / min. Measure the force required to mate AMP Spec. 109-5202 Condition
3.5.13	Connector Mating Force	8 Pos. 98 N (10 kgf) Max.	Operation Speed : 100 mm/ min. Measure the force required to mate connectors. AMP Spec. 109-5206 Condition
3.5.14	Connector Unmating Force	8 Pos. 78.5 N (8 kgf) Max.	Operation Speed : 100 mm / min. Measure the force required to unmate connectors without locking device set in effect. AMP Spec. 109-5206 Condition

Fig. 2 (To be continued)

Para.	Test Items	Requirements	Procedures
3.5.15	Connector Locking Strength	98.1 N (10 kgf) Min.	Measure connector locking strength. Operation Speed : 100 mm / min.
3.5.16	Contact Retention Force (Secondary Lock)	98.1 N (10 kgf) Min.	Measure contact retention force with secondary lock set it effect. Operation Speed : 100 mm / min.
3.5.17	Durability (Repeat Mate / Unmating)	10 mΩ Max. (Final)	Operation Speed : 100 mm / min. No. of Cycles : 30 cycles. AMP Spec. 109-5213
3.5.18	Resistance to "Kojiri"	10 mΩ Max. (Final)	Repeat 30 cycles of "Kojiri" mating and unmating test conditioning by hand. AMP Spec. 109-5215
3.5.19	Vibration (High Frequency)	No electrical discontinuity greater than 1 μsec. shall occur. 10 mΩ Max. (Final)	Vibration Frequency : 20~200 Hz / 1 min. Accelerated Velocity : 44 m / s² (4.5 G) Vibration Direction : X, Y & Z Directions Duration : X & Z Directions : 2 hours Y Directions : 4 hours AMP Spec. 109-5202 Condition
3.5.20	Temperature Life (Hear Aging)	10 mΩ Max. (Final)	120 °C. Duration : 120 hours AMP Spec. 109-5104- Condition
3.5.21	Resistance to Cold	10 mΩ Max. (Final)	−50 °C ± 5 °C, 120 hours AMP Spec. 109-5108-
3.5.22	Thermal Shock	10 mΩ Max. (Final)	−30 °C / 2 hours 80 °C / 2 hours Making this a cycle, repeat 5 cycles. AMP Spec. 109-5103 Condition
3.5.23	Humidity, Steady State	Termination resistance 10 mΩ Max. (Final)	Mated / unmated Connector, 90~95 % R. H. 60 °C 96 hours AMP Spec. 109-5105

Fig. 2 (To be continued)

Para.	Test Items	Requirements	Procedures
3.4.24	Salt Spray	10 mΩ Max. (Final)	Subject mated connectors to 5 % salt spray exposure for 192 hours with 1 hour suspension in a halfway. Measurement shall be made after 1 hour drying after rinsing by tap water, after completion of exposure, per JIS C 5028.
3.4.25	Dust Bombardment	10 mΩ Max. (Final)	Subject mated connectors to 90-minute cement blow, dispersed by compressed air at a rate of 1.5 kg per 10 seconds in intervals of 15 minutes. Cement to be conforming to JIS R 5210, Portland Cement AMP Spec. 109-5110
3.5.26	Icing	10 mΩ Max. (Final)	Immerse in boiling water for 1 hours freeze at − 30 °C
3.5.27	Industrial Gas (SO_2)	10 mΩ Max. (Final)	SO_2 Gas : 10 ppm, 95 % R.H. Room temperature for 24 hours. AMP Spec. 109-5107 Condition
3.5.28	Resistance to Oil	10 mΩ Max. (Final)	Immerse mated connectors in oil. 50 ± 5 °C See Fig. 7

Fig. 2 (End)

2. Product Qualification Test Sequence

Test or Examination	Test Group						
	1	2	3	4	5	6	7
	Test Sequence (a)						
Confirmation of Product	1	1	1	1	1	1	1, 16, 22
Termination Resistance (Rated Current)	4			4, 12, 15,18, 22, 25	3, 6, 9, 12, 16	3, 6, 9	3, 9, 12, 15,19
Termination Resistance (Low Level)	3			3, 11, 14, 17, 21, 24	2, 5, 8, 11, 15	2, 5, 8	2, 8, 11, 14, 18
Dielectric Strength				7			6, 20
Insulation Resistance				6			5
Current Leakage				5, 19	13		4, 21
Temperature Rising				23			
Current Cycling				20			
Vibration (High Frequency)						7	
Connector Mating Force				2			
Connector Unmating Force				8			
Contact Retention Force				28			
Contact Retention Force (Secondary Lock)			3			12	
Contact Mating Force	2		2				
Contact Unmating Force	5						
Crimp Tensile Strength		2					
Durability (Repeat Mate / Unmating)							7
Housing Locking Strength				27		11	
Resistance to "Kojiri"				10		4	
Handing Ergonomics	6			9, 26		10	23
Thermal Shock					14		
Humidity (Steady State)					10		
Salt Spray							10
Industrial Gas (SO_2)							17
Temperature Life (Hear Aging)					4		
Resistance to Cold					7		
Icing				16			
Resistance to Oil							13
Dust Bombardment				13			

(a) Numbers indicate the sequence in which the tests are performed.

The applicable product descriptions and part numbers are as shown Appendix 1.

Product Part No.	Description
175044	"187" Series Tab Contact (0.3~0.5 mm^2)
175046	"187" Series Tab Contact (0.5~1.25 mm^2)
175048	"187" Series Tab Contact (2.0~3.0 mm^2)
175038	"187" Series Receptacle Contact (0.3~0.5 mm^2)
175040	"187" Series Receptacle Contact (0.5~1.25 mm^2)
175042	"187" Series Receptacle Contact (2.0~3.0 mm^2)
175987	8 Pos. Cap Housing Assembly
175979	8 Pos. Plug Housing Assembly

Appendix 1

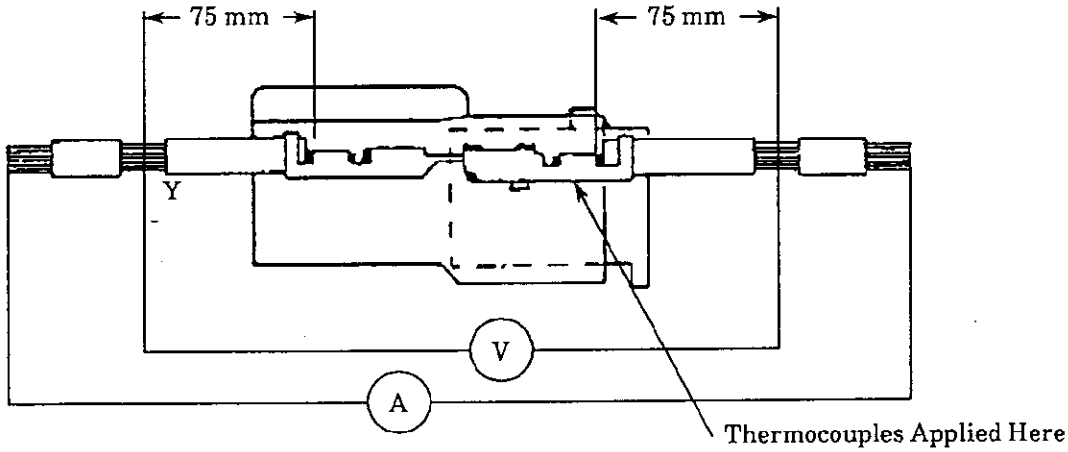

Fig. 1

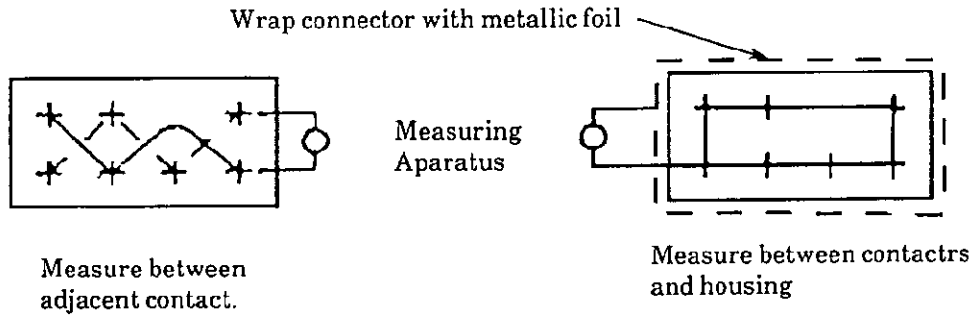

Fig. 2

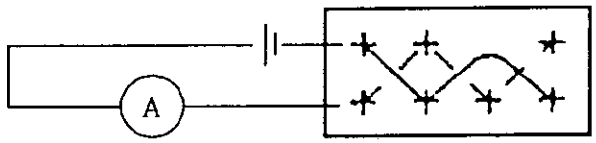

Fig. 3

Wire Size	I (Amperes)
0.3 mm^2	8.0 Dc.
0.5 mm^2	11.0 Dc.
0.85 mm^2	15.0 Dc.
1.25 mm^2	19.0 Dc.
2 mm^2	25.0 Dc.
3 mm^2	34.0 Dc.

Fig. 4

Number of Positions	kd (Reduction Coefficient)
1	1
2-3	0.75
4-5	0.6
6-8	0.55
9-12	0.5
13 and over	0.4

Fig. 5

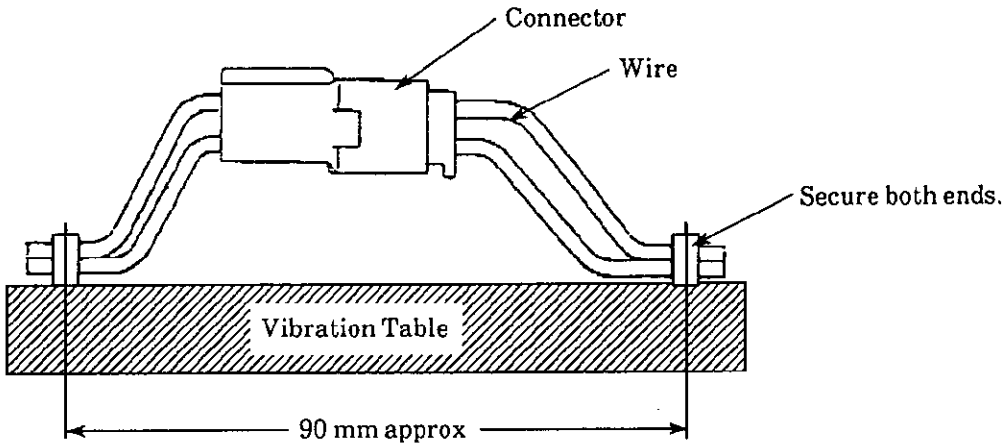

Fig. 6

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NAME Design Objectives
"187" Series Connector

Test Step	Oil Name	Duration
1	Torque Converter Oil	1 hour
2	Transmission Oil	1 hour
3	Engine Oil	1 hour
4	Clutch Oil	1 hour
5	Brake Oil	1 hour

Fig. 7

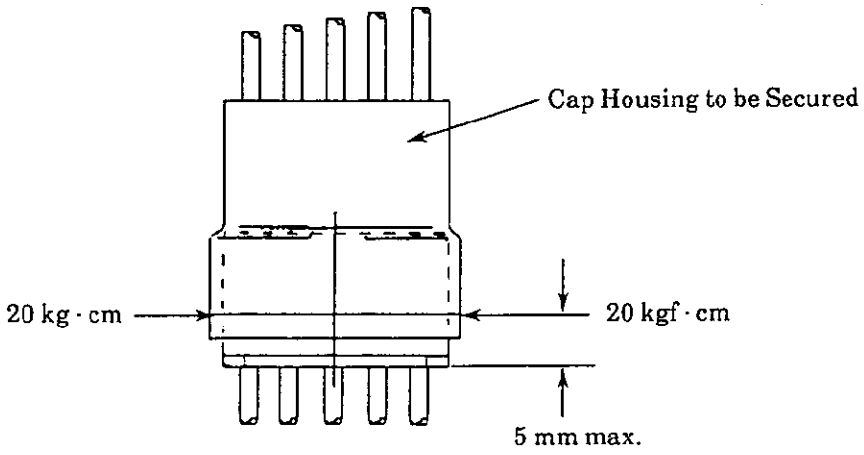

Fig. 8