

**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.

## Design Objectives

### 108-5372

### Air Bag Connector

NUMBER: 108-5372

Customer Release

SECURITY CLASSIFICATION:

1. Scope :

1.1 Contents

This specification covers the requirements for product performance, test methods and quality assurance provisions of Air Bag Connector.

The applicable product descriptions and part number 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. 114-5082 : Application Specification crimping contacts for AMP-Econoseal J- II 070 & 250 Series
  - 114-5091 : Application Specification crimping contacts for .070 Series Receptacle
  - 114-5092 : Application Specification crimping contacts for .070 Series Tab Contacts
- C. CM-466J : Air Bag Conn.

PRINT	0	Release RFA-1908	TK	3/4 '94	DR.	3/4 '94	SHEET 1 OF 13	<b>AMP</b> AMP (Japan), Ltd. Kawasaki, Japan	LOC	LOC	NO.	REV.
	LTR	REVISION RECORD	DR	CHK	DATE	CHK.			Mar 4 '94	J	A	108-5372
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## 2.2 Commercial Standard and Specifications :

- A. JASO D605 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 Electronic Components
- G. JIS K6301 Physical Testing Method for Vulcanized Rubber
- H. JIS K2202 Gasoline for Automobiles
- J. JIS D0205 Test Method of Weatherability for Automotive Parts
- K. JIS R5210 Portland Cement

## 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 conforming to copper Alloy of ASTM B36, or pretinned phosphor bronze
- B. Housing and Double Lock Plate : Molded Polybutylene- Terephthalata (PBT) Conforming to UL 94 V-2.
- C. Accessories and Hardware : Seal Ring : Si Rubber  
Rubber Plug : Nitrile Butadiene Rubber

## 3.3 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.

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## 3.4 Test Requirements and Procedures Summary :

Para.	Test Items	Requirements				Procedures
3.4.1	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.
3.4.2	Contact Mating Force	2.94~9.8 N (0.3~1 kgf)				Operation Speed 20~200 mm / min Measure the force required to mate AMP Spec. 109-5206
3.4.3	Contact Unmating Force	1.47~7.84 N (0.15~0.8 kgf)				Operation Speed 20~200 mm / min Measure the force required to mate AMP Spec. 109-5206
3.4.4	Crimp Tensile Strength	Wire Size		Crimp Tensil (min.)		Apply an axial pull-off load to crimped wire of contact secured on the tester, Operation Speed : 20~200 mm / min. AMP Spec. 109-5205 Condition
		mm <sup>2</sup>	(AWG)	N	(kgf)	
		0.5	#20	78.4	8	
		0.85	#18	122.5	12.5	
		1.25	#16	176.4	18	
3.4.5	Contact Retention Force	58.8 N (6 kgf) Min.				Apply an axial pull-off load to crimped wire. Operation Speed : 20~200 mm / min. AMP Spec. 109-5212
3.4.6	Handling Ergonomics	No abnormalities allowed in manual mating / unmating handing.				Manually operated
3.4.7	Connector Mating Force	59 N (6 kgf) Max.				Operation Speed : 20~200 mm / min. Measure the force required to mate connectors. AMP Spec. 109-5206 Condition

Fig. 2 (To be continued)

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Para.	Test Items	Requirements	Procedures
3.4.8	Connector Unmating Force	59 N (6 kgf) Max.	Operation Speed : 20~200 mm / min. Measure the force required to unmate connectors. AMP Spec. 109-5206 Condition
3.4.9	Connector Locking Strength	98 N (10 kgf) Min.	Measure Connector locking Strength Operation Speed : 20~200 mm / min. AMP Spec. 109-5210
3.4.10	Termination Resistance (Low Level)	3 mΩ 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 50 mV Max. Fig. 3. AMP Spec. 109-5311-1
3.4.11	Termination Resistance (Specified Current)	3 mΩ Max. (Initial) 10 mΩ Max. (Final)	Measure by applying 1 A at 12 VDC to contacts in mated connectors by probing at 75 mm apart from wire crimp after temperature becomes stabilized AMP Spec. 109-5311-2 Fig. 3.
3.4.12	Temperature Rising	50 °C Max. under loaded specified current.	Measure temperature rising by energized current. Fig. 4, 5 AMP Spec. 109-5310 method
3.4.13	Overcurrent Loading	No ignition is allowed during the test.	5 minutes "ON". Fig. 6
3.4.14	Insulation Resistance	100 MΩ Min. (Final)	Impressed voltage 500 V DC. Test between adjacent circuits of mated connectors. AMP Spec. 109-5302 Fig. 7

Fig. 2 (To be continued)

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NUMBER: 108-5372  Customer Release  SECURITY CLASSIFICATION:	Para.	Test Items	Requirements	Procedures
	3.4.15	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. 7
	3.4.16	Resistance to "Kojiri"	10 mΩ Max. (Final)	Repeated mating / unmating by hand 10 cycles AMP Spec. 109-5215
	3.4.17	Vibration (High Frequency)	No electrical discontinuity greater than 1msec. shall occur. 10 mΩ Max. (Final)	Vibration Frequency : 20~200 Hz/3 min. Accelerated Velocity : 44 m/s <sup>2</sup> (4.5 G) Vibration Direction : XYZ Duration : 4 hours (Y) 2 hours each (X, Z) AMP Spec. 109-5202 Condition
	3.4.18	Current Cycling	10 mΩ Max. (Final) No ignition is allowed during the test.	Applied Corrent : Fig. 4, 5. 45 minutes "ON", 15 minutes "OFF" 300 cycles. AMP Spec. 109-5308
	3.4.19	Temperature Life (Heat Aging)	10 mΩ Max. (Final)	Sealed Type : 120 °C, Duration : 5 days Non Sealed type : 80 ± 3 °C Duration : 5 days AMP Spec. 109-5104- Condition
	3.4.20	Resistance to Cold	10 mΩ Max. (Final)	- 40 °C ± 3 °C, 120 hours AMP Spec. 109-5108 Condition
	3.4.21	Icing	10 mΩ Max. (Final)	Immerse in boiling water for 1 Hr freeze at - 40 ± 3 °C

Fig. 2 (To be continued)

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Para.	Test Items	Requirements	Procedures
3.4.22	Dust Bombardment	10 mΩ Max. (Final)	Subject JIS R 5210 cement blow of 1.5 kgf per 10 seconds in 15 minutes intervals for 90 minutes. AMP Spec. 109-5110
3.4.23	Humidity, Steady State	Current Leakage 3 mA Max. Termination resistance 10 mΩ Max. (Final)	Mated Connector, 90~95 % R. H. 80±3 °C 96 hours AMP Spec. 109-5105 Fig. 9
3.4.24	Water Splash	10 mΩ Max. (Final) Current Leakage : Non-Sealed Conn. ; 3 mA Max. Sealed Conn. ; 100μA Max.	Sealed Conn. ; Expose mated connectors under 120 °C for 40 minutes, splash Water for 20 minutes. 48 cycles, Test, Voltage : 12 V Non-Sealed Conn. ; Dip in the tap water for 5 minutes and dry in the room temperature for 10 minutes 32 cycles AMP Spec. 109-5109 Condition
3.4.25	Salt Spray	10 mΩ Max. (Final)	Subject mated connectors to 15 % salt concentration for 24 hours : hours : 4 cycle MIL-STD-202, Method 101 AMP Spec. 109-5101 Condition
3.4.26	Watertight Sealing	49 kPa (0.5 kgf/cm <sup>2</sup> ) Min. (Initial) 29 kPa (0.3 kgf/cm <sup>2</sup> ) Min. (Final)	Blow compressed air at 9.8 kPa (0.1 kgf / cm <sup>2</sup> ) into mated conn. through a small hole. Increase pressure by 9.8 kPa (0.1 kgf / cm <sup>2</sup> ) graduation until air leaks. AMP Spec. 109-5111
3.4.27	Resistance to Oil	10 mΩ Max. (Final)	Immerse mated connectors in oil. Engine oil (50±3 °C) 2 hours →Gasoline 10 minutes (Room Temperature) →Window washing liquid 2 hours (Room Temperature) →Dry in room temperature

Fig. 2 (To be continued)

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Para.	Test Items	Requirements	Procedures
3.4.28	Resistance to Coolant	10 mΩ Max. (Final)	Immerse mated connectors into commercially suppliable L.L.C (long life coolant) at $50 \pm 2$ °C for 2 hours After the duration lines in tap water for 5 minutes and have it dried before subsequent measurement.
3.4.29	Resistance to Dilute Sulfuric Acid		Immerse mated connectors into commercially suppliable dilute sulfuric acid (specific gravity 1.26) at $50 \pm 3$ °C for 1 min. After rinsing with tap water, dry in the room temperature.
3.4.30	Industrial Gas (SO <sub>2</sub> )	10 mΩ Max. (Final)	SO <sub>2</sub> Gas : 10 ppm, 95% R.H. $40 \pm 3$ °C, 24 hours AMP Spec. 109-5107 Condition
3.4.31	Resistance to Ozon	10 mΩ Max. (Final)	$40 \pm 2$ °C, JIS K 6301 Ozon $50 \pm 5$ ppm. AMP Spec. 109-5115
3.4.32	Resistance to Stress Corrosion	Contact shall be free from defects such as cracks	Dewaxing contact wash by 10% H <sub>2</sub> SO <sub>4</sub> solution, wash by water and dry. Immerse contacts into free Ammonia 6 N, copper concentration 10.2 g/l solution 3 hours.
3.4.33	Resistance to Weather	No abnormalities allowed	JIS D0205 Sunshine carbon weather meter 150 Hrs HSG JIS D0205 Para. 5.4 150 hr.
3.4.34	Vibration + Current Cycle	No electrical discontinuity greater than 1 μsec. shall occur. 10 mΩ Max. (Final)	See Fig. 10

Fig. 2 (End)

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2. Product Qualification Test Sequence

Test or Examination	Test Group																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	Test Sequence (a)																
Confirmation of Product	1																
Termination Resistance (Rated Current)											1		3				
Termination Resistance (Low Level)										1			2			2	2
Dielectric Strength															1		
Insulation Resistance														1			
Temperature Rising												1					
Over Current Loading													1				
Vibration (High Frequency)																	1
Connector Mating Force							1										
Connector Unmating Force								1									
Contact Retention Force					1												
Contact Mating Force		1															
Contact Unmating Force			1														
Crimp Tensile Strength				1													
Housing Locking Strength									1								
Resistance to "Kojiri"																1	
Handing Ergonomics						1											

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

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2. Product Qualification Test Sequence

Test or Examination	Test Group																
	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
	Test Sequence (a)																
Confirmation of Product		2	2	2						2	2	2	2	2	2	2	
Termination Resistance (Low Level)	2	3	3	3	2	2		2		3	3	3	3				2
Temperature Rising																	3
Current Cycling	1																
Housing Locking Strength																3	
Resistance to Weather																1	
Vibration + Current Cycling																	1
Resistance to Coolant											1						
Humidity (Steady State)						1											
Salt Spray								1									
Industrial SO <sub>2</sub> Gas													1				
Temperature Life (Heat Aging)		1															
Resistance to Cold			1														
Watertight Sealing									1					3			
Water Splash								1									
Icing				1													
Resistance to Oil										1							
Dust Bombardment					1												
Resistance to Dilute sulfuric acid												1					
Resistance to Ozon														1			
Resistance to Stress Corrosion															1		

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

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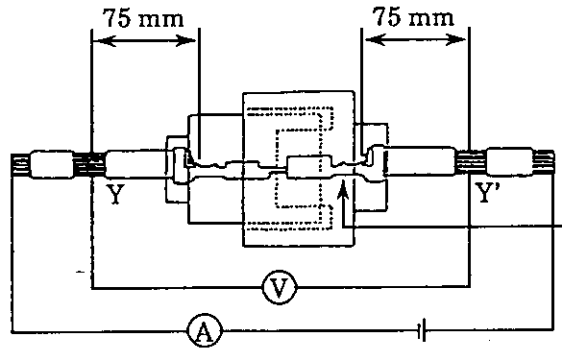


Fig. 3

Wire size (mm <sup>2</sup> )	Current Max (A)
0.5	11
0.85	14.5
1.25	18

Fig. 4

Note ; The acceptable current carrying capacity is obtained by the specified maximum efficiency obtained by the number of contacts above table.

No. of Pos.	Kd (Reduction coefficient)
2~3	0.75
4~5	0.6

Fig. 5

as Current Max. × Kd.

Wire Size (mm <sup>2</sup> )	Test I		test II	
	Current Carrying Capacity (A)	Current Time	Current Carrying Capacity (A)	Current Time
0.5	25	5 min.	85	5 min.
0.85	30		120	
1.25	40		170	

Fig. 6

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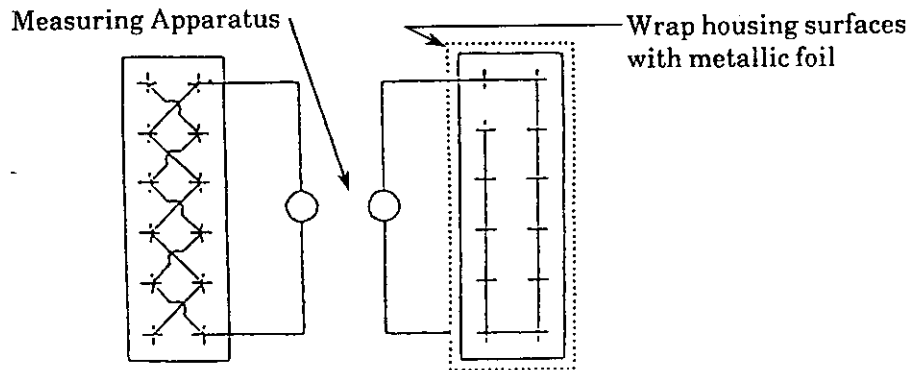


Fig. 7

	Open circuit voltage	current	electrical discontinuity
I	12 V	1 A	1 ms Min.
II	1 V Max.	$10 \pm 0.5$ mA	1 ms Min.

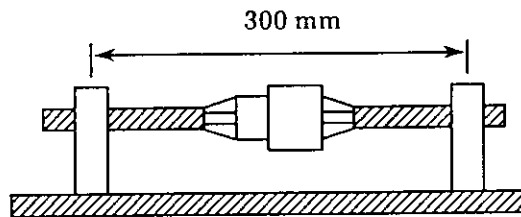


Fig. 8

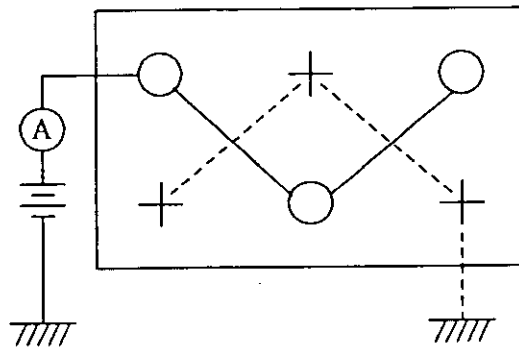
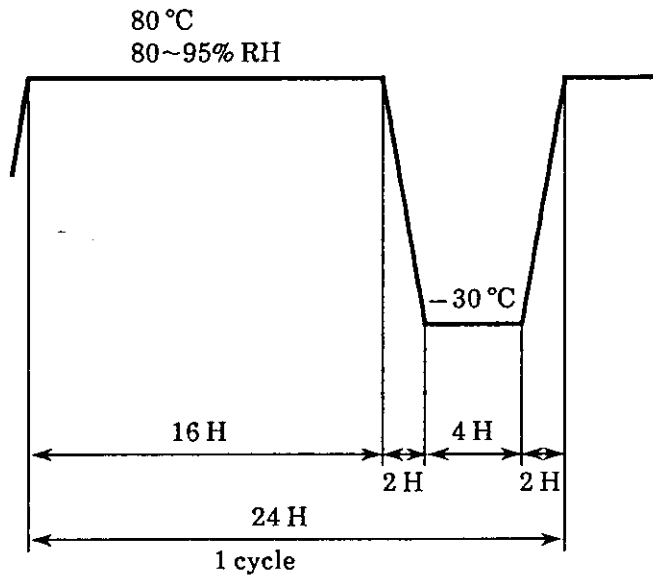


Fig. 9

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Temperature } 80±3°C 80~95% RH -30±3°C Heat cycles  
 Humidity }  
 Vibration 3.4.17 & Fig. 8  
 Current See Fig. 5 & 3.4.18  
 Time 300 Hr

Fig. 10

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

Product Part No.	Product Descriptions
173645	.070 Series Tab Contact (Non Water Proof)
173631	.070 Series Rec. Contact (Non Water Proof)
171661	.070 Series Tab Contact (Water Proof)
171662	.070 Series Rec. Contact (Water Proof)
172888	.070 Rubber Plug
175901	2 Pos. Cap. HSG (Water Proof)
175906	4 Pos. Cap. HSG (Water Proof)
175912	3 Pos. Cap. HSG (Non Water Proof)
175920	5 Pos. Cap. HSG (Non Water Proof)
175903	1 Pos. DBL Lock Plate (Water Proof)
175909	3 Pos. DBL Lock Plate (Water Proof)
175916	1 Pos. DBL Lock Plate (Non Water Proof)
175915	2 Pos. DBL Lock Plate (Non Water Proof)
175922	4 Pos. DBL Lock Plate (Non Water Proof)
175900	1 Pos. Plug HSG Ass'y (Water Proof)
175798	1 Pos. Plug HSG Ass'y (Water Proof)
175905	3 Pos. Plug HSG Ass'y (Water Proof)
175793	1 Pos. Plug HSG Ass'y (Non Water Proof)
175792	2 Pos. Plug HSG Ass'y (Non Water Proof)
175911	1 Pos. Plug HSG (Non Water Proof)
175919	4 Pos. Plug HSG (Non Water Proof)
175902	1 Pos. DBL Lock Plate (Water Proof)
175908	3 Pos. DBL Lock Plate (Water Proof)
175914	1 Pos. DBL Lock Plate (Non Water Proof)
175921	4 Pos. DBL Lock Plate (Non Water Proof)

Appendix 1

SHEET		<b>AMP</b>		AMP (Japan), Ltd. Kawasaki, Japan	
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