SECURITY CLASSIFICATION: Customer Release

NUMBER: 108-5374

108-5374

Design Objectives

.040 II / .070 II Steering Column Connector

1. Scope :

1.1 Contents

This specification covers the requirements for product performance, test methods and quality assurance provisions of .040 II / .070 II Steering Column Connector.
Applicable product descriptions and part numbers are as shown in Appendix 1.

2. Applicable Documents :

The following documents form 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. Application Specification .

114-5159 Crimping .040 II Series Receptacle & Tab Contacts

114-5160 Crimping .070 II Series Receptacle & Tab Contacts

LTR	REVISION RECORD	DR	CHK	DATE
A	Revised RFA-2062	T.K	K.o	8/3 '92
0	Released RFA-1920	T.K	K.o	1/29 '92

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SHEET 1 OF 11

AMP
AMP (Japan), Ltd.
Kawasaki, Japan

LOC	LOC	NO.	REV.
J	A	108-5374	A

NAME .040 II / .070 II Steering Column Connector

2.2 Commercial Standards and Specifications :

A. JASO D605	Multi-pole Connector for Automobiles
B. JASO D7101	Test Methods for Plastic Molded Parts
C. JIS C3406	Low Voltage Wires and Cables for Automobiles
D. JIS D0203	Method of Moisture, Rain an 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 K6301	Physical Testing Methods for Vulcanized Rubber
H. JIS K2202	Motor Gasoline
J. JIS D0205	General Rules of Weatherability for Automobile 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 : Brass (Pre-Tin)
Phosphor Bronze (Pre-Tin)

B. Housing : PBT

3.3 Ratings :

A. Temperature Rating : −30 °C to 105 °C

3.4 Performance and Test Descriptions :

The product shall be designed to meet the electrical, mechanical and environmental performance requirements specified in Fig. 2. All tests shall be performed in the room 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 No. 114-5159, 114-5160.	Visually, dimensionally and functionally inspected per applicable quality inspection plan.
	Electrical Requirements		
3.5.2	Termination Resistance (Specified Current)	3 mΩ Max. (Initial) 10 mΩ Max. (Final)	Subject mated contacts assembled in housing to closed circuit current of 1 ± 0.05 A at open circuit voltage of DC 12 V Fig. 3. AMP Spec. 109-5311-2
3.5.3	Termination Resistance (Low Level)	3 mΩ Max. (Initial) 10 mΩ Max. (Final)	Subject mated contacts assembled in housing to closed circuit current of 50 mA Max. at open circuit voltage of 50 mV DC Max. Fig. 3. AMP Spec. 109-5311-1
3.5.4	Dielectric Strength	No creeping discharge nor flashover shall occur.	1 kVAC for 1 minute. Test between adjacent circuits of mated connectors. AMP Spec. 109-5301
3.5.5	Insulation Resistance	100 MΩ Min.	Impressed voltage 500 V DC. Test between adjacent circuits of mated connectors. AMP Spec. 109-5302
3.5.6	Current Leakage	3 mA Max.	14 V DC impressed AMP Spec. 109-5312 After exposure in test chamber in 60 ± 5 °C, 90~95 % R.H. for 1 hour, measure current leakage.

Fig. 2 (To be continued)

Para.	Test Items	Requirements	Procedures
3.5.7	Temperature Rising	65 °C Max. under loaded specified current.	Measure temperature rising by energized current. AMP Spec. 109-5310
3.5.8	Current Cycling	No ignition is allowed during the test.	Applied Corrent : I_1 (Fig. 6 & 7) 45 minutes "ON", 15 minutes "OFF". 200 cycles. Then, I_2 (Fig. 6) current applied to adjacent circuits 45 minutes "ON", 15 minutes "OFF". 100 cycles. AMP Spec. 109-5308
3.5.9	Overcurrent Loading	No ignition is allowed during the test.	Fig. 8 Rated Current 5 minutes "ON".
		Physical Requirements	
3.5.10	Vibration (High Frequency)	No electrical discontinuity greater than 1 msec. shall occur. 10 mΩ Max. (Final)	Vibration Frequency : 20~200 Hz / 3 min. Accelerated Velocity : (4.5 G) Vibration Direction : X, Y, Z Duration : 3 hours each AMP Spec. 109-5202
3.5.11	Contact Mating Force	.040 II Series : 5.8 N (0.6 kgf) Max. .070 II Series : 5.8 N (0.6 kgf) Max.	Operation Speed : 100 mm / min. Measure the force required to mate contacts. AMP Spec. 109-5206
3.5.12	Contact Unmating Force	.040 II Series : 0.98 N (0.10 kgf) Min. .070 II Series : 0.98 N (0.10 kgf) Min.	Operation Speed : 100 mm / min. Measure the force required to unmate contacts. AMP Spec. 109-5206
3.5.13	Connector Mating Force	78 N (8.0 kgf) Max.	Operation Speed : 100 mm / min. Measure the force required to mate connectors. AMP Spec. 109-5206

Fig. 2 (To be continued)

Para.	Test Items	Requirements	Procedures
3.5.14	Connector Unmating Force	78 N (8 kgf) Max.	Operation Speed : 100 mm / min. Measure the force required to unmate connectors. AMP Spec. 109-5206
3.5.15	Housing Locking Strength	98 N (10 kgf) Min.	Measure housing locking strength. Operation Speed : 100 mm / min. AMP Spec. 109-5210
3.5.16	Contact Insertion Force	9.8 N (1.0 kgf) Max. per contact.	Measure the force required to insert contact into housing. AMP Spec. 109-5211
3.5.17	Contact Retention Force (Pre-Lock)	49 N (5.0 kgf) Min.	Apply an axial pull-off load to crimped wire. Operation Speed : 100 mm / min. AMP Spec. 109-5212
3.5.18	Contact Retention Force (Secondary lock)	78 N (8.0 kgf) Min.	Measure contact retention force with secondary lock set in effect. Operation Speed : 100 mm / min.
3.5.19	Crimp Tensile Strength	Wire Size: mm² / (AWG); Crimp Tensile (min.): N / (kgf) 0.3 / 22 / 58 / 6.0 0.5 / 20 / 88 / 9.0 0.85 / 18 / 127 / 13.0 1.25 / 16 / 177 / 18.0 2 / 14 / 256 / 27.0	Apply an axial pull-off load to crimped wire of contact secured on the tester, Operation Speed : 100 mm / min. AMP Spec. 109-5205
3.5.20	Durability (Repeated Mate / Unmating)	10 mΩ Max. (Final)	Operation Speed : 100 mm / min. No. of Cycles : 50 cycles. AMP Spec. 109-5213
3.5.21	Resistance to "Kojiri"	10 mΩ Max. (Final)	AMP Spec. 109-5215

Fig. 2 (To be continued)

Para.	Test Items	Requirements	Procedures
3.5.22	Handling Ergonomics	No abnormalities allowed in manual mating / unmating handling.	Manually operated
3.5.23	Double Lock Plate Locking Strength	59 N (6.0 kgf) Max.	Operation Speed : 100 mm / min. Measure the force required to lock the double lock plate.
		Environmental Requirements	
3.5.24	Thermal Shock	10 mΩ Max. (Final)	Making this a cycle, repeat 100 cycles. AMP Spec. 109-5103
3.5.25	Humidity, Steady State	Termination resistance (Final) 100 mΩ Min. Termination resistance 10 mΩ Max (Final).	Mated Connector, 90~95 % R.H. 60±5 °C 96 hours AMP Spec. 109-5105
3.5.26	Salt Spray	10 mΩ Max. (Final)	Subject mated / unmated connectors to 5 % salt concentration for 96 hours : MIL-STD-202, Method 101 AMP Spec. 109-5101
3.5.27	Temperature Life (Heat Aging)	10 mΩ Max. (Final)	80+5 °C, Duration : 120 hours AMP Spec. 109-5104
3.5.28	Resistance to Cold	10 mΩ Max. (Final)	−50 °C±5 °C, 120 hours AMP Spec. 109-5108
3.5.29	Dust Bombardment	10 mΩ Max. (Final)	Subject JIS R5210 cement blow 14.7 N (1.5 kgf) per 10 seconds in 15 minutes intervals for 90 minutes. AMP Spec. 109-5110

Fig. 2 (end)

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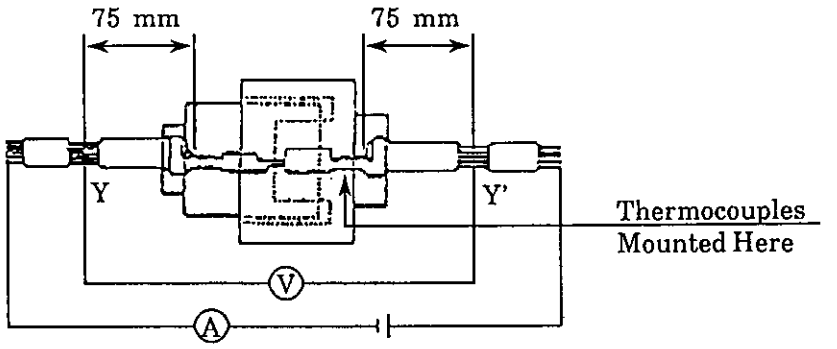
NAME

.040II / .070 II Steering Column Connector

3.6 Product Qualification Test Sequence

Test Items	Test Group																
	1	2	3					4							5		6
	Test Sequence																
Confirmation of Product	1		1					1							1		20	1
Termination Resistance (Specified Current)	4		4	11	14	18	21	4	12	16	19	23	26	29	4	12	15	
Termination Resistance (Low Level)	3		3	10	13	17	20	3	11	15	18	22	25	28	3	11	14	
Dielectric Strength			7					7	13						7		16	
Insulation Resistance			6		15			6							6			
Current Leakage			5					5			20				5		17	
Temperature Rising						19												
Current Cycling					16													
Overcurrent Loading																	21	
Vibration (High Frequency)													27					
Connector Mating Force			2					2							2		19	
Connector Unmating Force			8					8							8		18	
Contact Insertion Force																		2
Connector Locking Strength																		3
Contact Retention Force (Pre-Lock)							24											
Contact Mating Force	2																	
Contact Unmating Force	5																	
Crimp Tensile Strength		1																
Durability (Repeated Mating / Unmating)															10			
Housing Locking Strength							23											
Resistance to "Kojiri"												24						
Handling Ergonomics	6		9				22	9							9			
Double Lock Plate Locking Strength																		4
Thermal Shock											21							
Humidity (Steady State)										17								
Salt Spray																13		
Temperature Life (Heat aging)								10										
Resistance to Cold									14									
Dust Bombardment					12													

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



Frem the measured readings, deduct the resistance of the 150 mm long wire used for termination. When testing for rated current measurement, apply 12 V DC, 1 A to the circuit.

For obtaining uniformity of the current density on the probing points Y-Y', apply soldering on the probing points prior to testing.

Fig. 3 Measurement of Termination Resistance

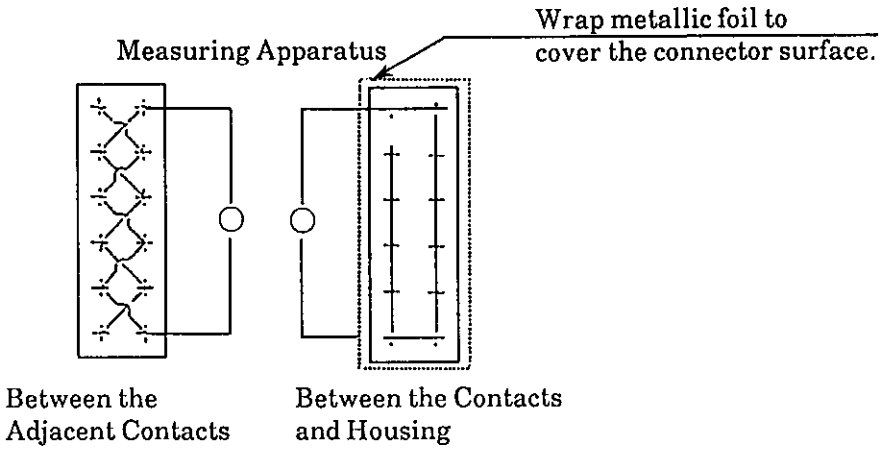


Fig. 4

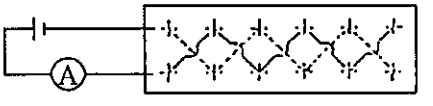


Fig. 5

Maximum Allowable Current

Wire Size (mm^2)	Allowable Current (DC A)
0.3	9
0.5	11
0.85	15
1.25	19
2.0	25

Fig. 6

Reduction Coefficient (kd)

Number of Energized Contacts	Reduction Coefficient
1	1
2~3	0.75
4~5	0.6
6~8	0.55
9~12	0.5
13~	0.4

Fig. 7

(1) $I_1 = K_d \cdot I_{max}$ ..... Current applied to all positions

(2) $I_2 = I_{max}$ ..... Current applied to every other positions in multi-pole connector

Wire Size (mm^2)	Test Method I		Test Method II	
	Test Current (A)	Duration (Minutes)	Test Current (A)	Duration (Seconds)
0.3	25	5	50	5
0.5	30		80	
0.85	40		110	
1.25	45		170	
2	70		250	

Fig. 8

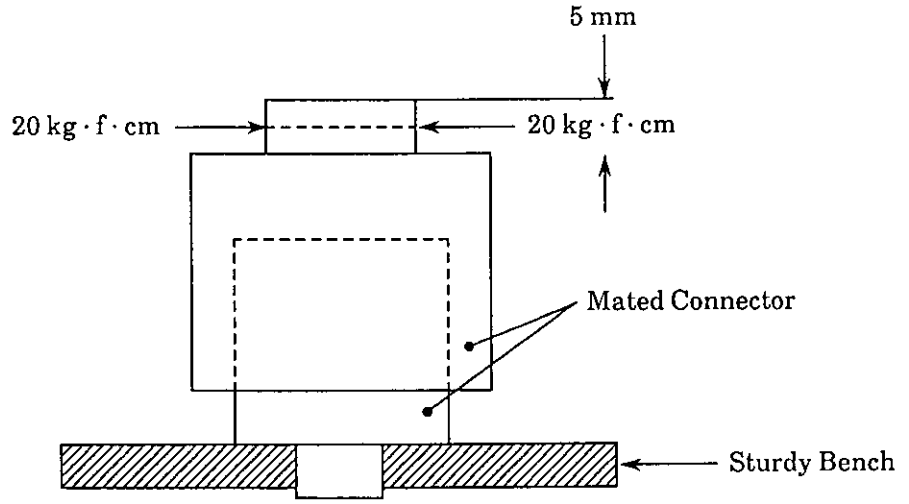


Fig. 9

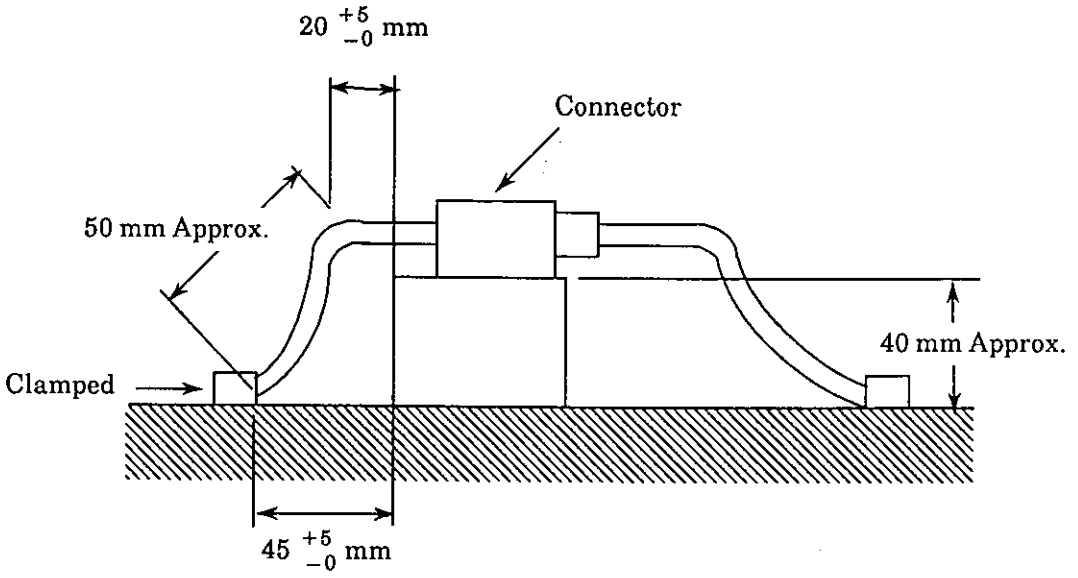


Fig. 10

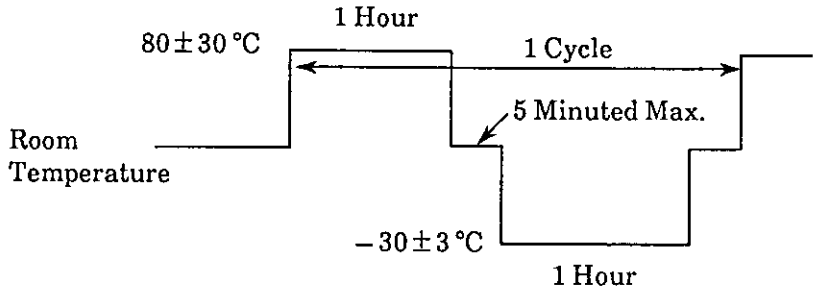


Fig. 11

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	LOC J	LOC A	NO. 108-5374		REV. A
NAME .040 II / .070 II Steering Column Connector					

Appendix 1

Prod. P/N	Description
175265	.040 II Series S Receptacle Contact
175268	.070 II Series S Receptacle Contact
175269	.070 II Series M Receptacle Contact
175270	.070 II Series L Receptacle Contact
175271	.040 II Series S Tab Contact
175272	.070 II Series S Tab Contact
175273	.070 II Series M Tab Contact
175274	.070 II Series L Tab Contact
178688	.040 II / .070 II Steering Column Connector, 32-Pos. Cap Housing
178689	.040 II / .070 II Steering Column Connector, 14-Pos. Plug R Housing
178690	.040 II / .070 II Steering Column Connector, 18-Pos. Plug L Housing
178691	.040 II / .070 II Steering Column Connector, 18-Pos. Cap Housing
178692	.040 II / .070 II Steering Column Connector, 18-Pos. Plug Housing