

PRODUCT SPECIFICATION

108 - 61021

.090II Series Multi-Lock Connector(wire to wire type)

1. Scope :

1.1 Contents

This specification covers the requirements for product performance, test methods and quality assurance provisions of **.090II SERIES Multi-Lock I/O CONNECTOR(MLC)**. 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, the specification shall take precedence.

2.1 AMP Specification:

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

B. 114-61004 Application Specification .090 Series Recep.and Tab Contact Appl. Spec.

2.2 Commercial Standards and Specifications:

JIS C 3406 Low Voltage Cables for Automobile

				ORG	AMP AMP MFG KOREA				
				CHK					
C1	REVISED (RD97-281)	01,08,'98	APP	NO	REV	LOC			
				108-61021	C1	DS			
LTR	REVISION RECORD	APP	DATE	PAGE 1 OF 10	TITLE .090II Series Multi-Lock Connector (wire to wire type)				

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:

Tab contact: Pre-tinned brass

Receptacle contact: Pre-tinned brass

B. Housing: Polyester PBT Molding Compound

C. Others:

3.3 Ratings:

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 Fig. 2. All tests shall be performed in the room temperature, unless otherwise specified.

3.5 Test Requirements and Procedures Summary:

Para.	Test Item	Requirements	Procedures
3.51	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.

Fig. 2 (to be continued)

Para.	Test Item	Requirements	Procedures
Electrical Requirements			
3.5.2	Termination Resistance (Specified Current)	Test (A) Resistance Current mV/A(MAX.) 1 Initial : 3 Final : 10	Measure initial millivolt drop of contact test circuit in mated connectors, 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 10mA Max. at open circuit voltage of 20mV Max. Fig. 3 AMP Spec. 109-5311-1
3.5.4	Dielectric Strength	No creeping discharge nor flashover shall occur.	1.8 kVAC for minute. Test between adjacent circuit of mated connectors. AMP Spec. 109-5301
3.5.5	Insulation Resistance	100 MΩ Min. (Initial) 100 MΩ Min. (Final)	Impressed voltage 500V DC. Test between adjacent circuits of mated connectors. AMP Spec. 109-5302 Fig.5
3.5.6	Current Leakage	3mA Max.	12 V DC 60°C Humidity 90-95 % 1 Hr AMP Spec. 109-5312 Fig.4
3.5.7	Temperature Rising	60°C Max. under loaded specified current.	Measure temperature rising by energized current. Fig.7 AMP Spec. 109-5310 Method
3.5.8	Current Cycling	10mV/A Max. (Final) 10mΩ Max. (Final) No ignition is allowed during the test.	Applied current ; Fig.7 45 minutes "ON" 15 minutes "OFF" 200 cycles AMP Spec. 109-5308

Fig. 2 (to be continued)

Para.	Test Item	Requirements	Procedures
3.5.9	Vibration (High Frequency)	No electrical discontinuity greater than 10 μ sec. shall occur. 10m Ω Max. (Final) 10mV/A Max.(Final)	Vibration Frequency: 20-200 / 1 min. Accelerated Velocity: 44 m/s ² (4.5 G) Vibration Direction: X, Y, Z Duration: 8 hours each AMP Spec. 109-5202 Fig. 6
3.5.10	Physical Shock	No electrical discontinuity greater than 1 μ sec. shall occur.	Vibration Frequency: 20-200 / 1 min. Accelerated Velocity: 44 m/s ² (4.5 G) Vibration Direction: X Duration: 8 hours each AMP Spec. 109-5208 Fig. 8
3.5.11	Contact Mating Force	1 kgf Max.	Operation Speed: 100mm / min. Measure the force to with actual tab AMP Spec. 109-5206 Condition
3.5.12	Contact Unmating Force	150 g Min.	Operation Speed: 100mm / min. Measure the force to with actual tab AMP Spec. 109-5206 Condition
3.5.13	Connector Mating Force	2Pos : 29.4N (3 kgf)Max. 4Pos : 49N (5 kgf)Max. 6Pos : 58.8N (6 kgf)Max. 8Pos : 68.6N (7 kgf)Max. 10Pos : 78.4N (8 kgf)Max. 12Pos : 88.2N (9 kgd)Max. 14Pos : 98N (10 kgf)Max. 16Pos : 107.8N (11 kgf)Max. 18Pos : 118N (12 kgf)Max. 20Pos : 137N (14 kgf)Max. 22Pos : 157N (16 kgf)Max.	Operation Speed: 100mm / min. Measure the force required to mate connectors. AMP Spec. 109-5206 Condition

Fig. 2 (to be continued)

Para.	Test Item	Requirements	Procedures																
3.5.14	Connector Unmating Force	2Pos : 1.96~29N (0.2~3 kgf) 4Pos : 3.92~49N (0.4~5 kgf) 6Pos : 5.9~58.8N (0.6~6 kgf) 8Pos : 7.85~68.6N (0.8~7 kgf) 10Pos : 9.8~78.5N (1~8 kgf) 12Pos : 11.8~88.2N (1.2~9kgf) 14Pos : 13.7~98N (1.4~10kgf) 16Pos : 15.7~107.8N (1.6~11kgf) 18Pos : 17.7~118N (1.8~12kgf) 20Pos : 19.6~137N (2~14kgf) 22Pos : 21.5~157N (2.2~16kgf)	Operation Speed : 100 mm / min. Measure the force require to unmate connectors. AMP Spec. 109-5206 Condition																
3.5.15	Connector Locking Strength	98N (10 kgf) Min.	Measure connector locking strength . Operation Speed : 100mm / min. AMP Spec. 109-5210																
3.5.16	contact Insertion Force	9.8N (1 kgf) Max.	Measure the force required to insert contact into housing. AMP Spec. 109-5211																
3.5.17	Contact Retention Force (Without Double lock)	59N (6 kgf) Min.	Apply an axial pull-off load to clipped wire. Operation Speed : 100mm / min. AMP Spec. 109-5212																
3.5.18	Contact Retention Force (With Double lock))	98N (10 kgf) Min.	Measure contact retention force with secondary lock set in effect. Operation Speed :100mm / min.																
3.5.19	Crimp Tensile Strength	<table border="1"> <thead> <tr> <th>Wire Size</th> <th>Crimp Tensile(min.)</th> </tr> <tr> <th>mm² (AWG)</th> <th>N (kgf)</th> </tr> </thead> <tbody> <tr> <td>0.2 (# 24)</td> <td>68.6 (7)</td> </tr> <tr> <td>0.3 (# 22)</td> <td>78.5 (8)</td> </tr> <tr> <td>0.5 (# 20)</td> <td>88 (9)</td> </tr> <tr> <td>0.85 (# 18)</td> <td>127 (13)</td> </tr> <tr> <td>1.25 (# 16)</td> <td>177 (18)</td> </tr> <tr> <td>2.0 (# 14)</td> <td>196 (20)</td> </tr> </tbody> </table>	Wire Size	Crimp Tensile(min.)	mm ² (AWG)	N (kgf)	0.2 (# 24)	68.6 (7)	0.3 (# 22)	78.5 (8)	0.5 (# 20)	88 (9)	0.85 (# 18)	127 (13)	1.25 (# 16)	177 (18)	2.0 (# 14)	196 (20)	Apply an axial pull-off load to crimped wire of contact secured on the tester, Operation Speed : 100mm /min. AMP Spec. 109-5205 Condition
Wire Size	Crimp Tensile(min.)																		
mm ² (AWG)	N (kgf)																		
0.2 (# 24)	68.6 (7)																		
0.3 (# 22)	78.5 (8)																		
0.5 (# 20)	88 (9)																		
0.85 (# 18)	127 (13)																		
1.25 (# 16)	177 (18)																		
2.0 (# 14)	196 (20)																		
3.5.20	Durability (Repeated Mate/ Unmating)	10 mΩ Max. (Final) 10 m V/ A Max. (Final)	Operation Speed : 100mm / min. No. of Cycle : 30 cycles. AMP Spec. 109-5213																
3.5.21	Resistance to "Kojiri"	10 mΩ Max. (Final) 10 m V/ A Max. (Final)	Repeated mating / unmating by hand, 30 cycles AMP Spec. 109-5215																

Fig. 2 (to be continued)

Para.	Test Item	Requirements	Procedures
3.5.22	H a n d l i n g Ergonomics	No abnormalites allowed in manual mating / unmating handling.	Manually operated
Environmental Requirements			
3.5.23	Thermal Shock	10mΩ Max. (Final) 10m V/A Max. (Final)	-40℃ / 60 min. 120℃ / 60 min. Making this a cycle, repeat 100 cycles. AMP Spec-5103 Condition
3.5.24	Humidity, Steady State	Termination resistance (Final) 10m V/A Max. (Final) Low Level 10mΩ Max. Current Lakege 3 mA Max.	Mated Connector, 90~95% R.H. 60℃ 48 hours : AMP Spec. 109-5105
3.5.25	Salt Spray	10 mΩ Max. (Final) 10 mV/A Max. (Final)	Subject Unmated connectors to 5 % salt concentration for 48 hours MIL-STD-202, Method 101 AMP Spec. 109-5101 Condition
3.5.26	Industrial Gas (SO ₂)	10 mΩ Max. (Final) 10 mV/A Max. (Final)	SO ₂ Gas : 10 ppm, 95% R.H. normal temperture 24 hours AMP Spec. 109-5107 Condition
3.5.27	Temperture Life (Heat Aging)	10 mΩ Max. (Final) 10 mV/A Max. (Final)	120℃, Duration : 120 Hrs. AMP Spec. 109-5104 Condition
3.5.28	Resistance to Cold	10 mΩ Max. (Final) 10 mV/A Max. (Final)	-50℃±5℃, 120 hours AMP Spec. 109-5108 Condition
3.5.29	Icing	10 mΩ Max. (Final) 10 mV/A Max. (Final)	Immerse in boiling water for 60 minutes, freeze at -30℃
3.5.30	Dust Bombardment	10 mΩ Max. (Final) 10 mV/A Max. (Final)	Subject JIS R5210 cement blow 1.5 kg per 10 seconds in 15 minutes intervals for 60 minutes, AMP Spec. 109-5110

Fig. 2 (end)

3.6 Product Qualification Test Sequence

Test Items	Test Group(a)						
	1	2	3	4	5	6	7
	Test Sequence(c)						
Confirmation of Product	1	1	1	1	1	1	1,13,19
Termination Resistance (Specified Current)	4			4,12 15,18 22,25	3,6,9 12,16	3,6 9,12	3,6 12,16
Termination Resistance (Low Level)	3			3,11 14,17 21,25	2,5,8 11,15	2,5 8,11	2,8 11,15
Dielectric Strength				7			6,17
Insulation Resistance				6			5
Current Leakage				5,19	13		4,18
Temperature Rising				23			
Current Cycling				20			
Vibration (High Frequency)						7	
Physical Shock						10	
Connector Mating Force	2			2			
Connector Unmating Force	5			8			
Connector Locking Strength				27		14	
Contact Insertion Force			2				
Contact Retention Force				28		15	
Crimp Tensile Strength		2					
Resistance to "Kojiri"				10		4	7
Handling Ergonomics	6			9,26		13	20
Thermal Shock					14		
Humidity (Steady State)					10		
Salt Spray							10
Industrial SO ₂ Gas							14
Vibration And Current Cycling					4		
Temperature life (Heat Aging)					7		
Icing				16			
Dust Bombardment				13			

(a) See Para 4.1.A.

(b) Numbers indicate sequence in which tests are performed.

(c) Discontinuities shall not take place in this group, during tests.

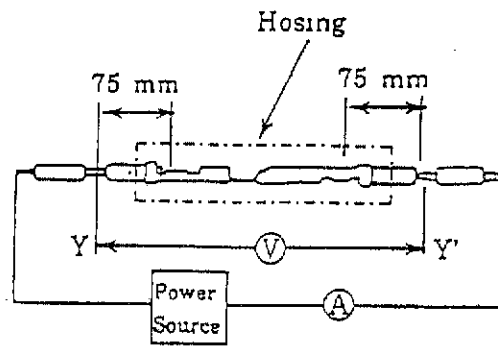


Fig. 3

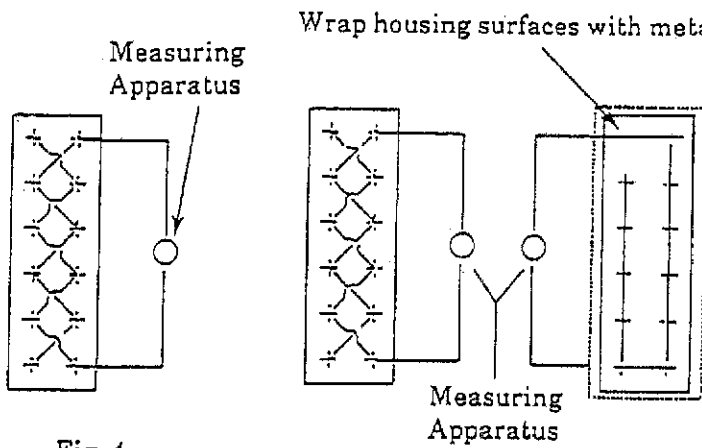


Fig. 4

Fig. 5

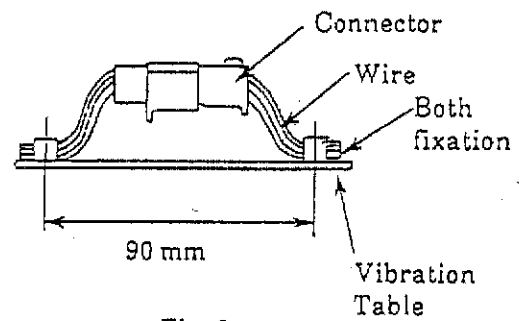


Fig. 6

Wire Size (mm ²)	Current Max.(A)	No. of Pos	Reduction Coefficient
0.2mm ²	DC 6A	1	1
0.3mm ²	DC 8A	2~3	0.75
0.5mm ²	DC 11A	4~5	0.6
0.85mm ²	DC 15A	6~8	0.55
1.25mm ²	DC 19A	9~12	0.5
2.0mm ²	DC 25A	13&Over	0.4

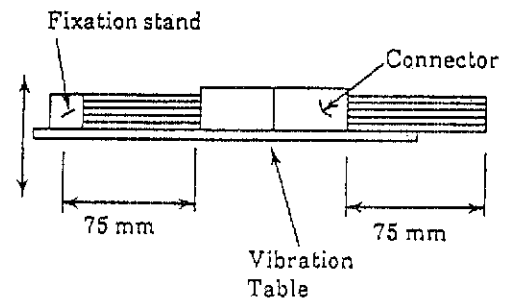


Fig. 8

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

Fig. 7

Quality Assurance Provisions :

1. Sample Preparation

The test samples to be used for the tests shall be prepared by randomly selected from the current production, and terminated in accordance with 114-61004, Application Specification,

Termination of .090 Series Receptacle Contacts.

No sample shall be reused, unless otherwise specified.

2. Test Conditions :

All the tests shall be performed under any combination of the following test conditions, unless otherwise specified.

Temperature : 15~35°C

Relative Humidity : 45~75%

Atmospheric Pressure : 86.7~107kPa (650~800 mmHg)

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

Appendix 1

Part Number	Description
368083	Receptacle Contact (2.0 mm ²)
368084	Receptacle Contact (0.5~1.25 mm ²)
368085	Receptacle Contact (0.3~0.5 mm ²)
368086	Tab Contact (2.0 mm ²)
368087	Tab Contact (0.5~1.25 mm ²)
368088	Tab Contact (0.3~0.5 mm ²)
368170	Plug Housing 2 Pos.
368172	Plug Housing 4 Pos.
368174	Plug Housing 6 Pos.
368176	Plug Housing 8 Pos.
368178	Plug Housing 10 Pos.
368180	Plug Housing 12 Pos.
368182	Plug Housing 14 Pos.
368184	Plug Housing 16 Pos.
368186	Plug Housing 18 Pos.
368188	Plug Housing 20 Pos.
368190	Plug Housing 22 Pos.
368169	Cap Housing 2 Pos.
368171	Cap Housing 4 Pos.
368173	Cap Housing 6 Pos.
368175	Cap Housing 8 Pos.
368177	Cap Housing 10 Pos.
368179	Cap Housing 12 Pos.
368181	Cap Housing 14 Pos.
368183	Cap Housing 16 Pos.
368185	Cap Housing 18 Pos.
368187	Cap Housing 20 Pos.
368189	Cap Housing 22 Pos.