

NUMBER: 108-5318

Customer Release

SECURITY CLASSIFICATION:

## Product Specification

108-5318

### .040 Series Multi Lock I / O Connector

(Non Inertia Type)

1. Scope :

1.1 Contents

This specification covers the requirements for product performance, test methods and quality assurance provisions of .040 Series Multi Lock I / O Connector (Non Inertia Type)  
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. 114-5111 Application Specification .040 Series Receptacle Contact Crimping Specification
- C. 501-5063 Test Report :

2.2 Commercial Standards and Specifications :

- A. JIS C 3406 Low Voltage Cable for Automobiles

PRINT	DIST.					DR.	SHEET 1 OF 9	 AMP (Japan), Ltd. Kawasaki, Japan		
						CHK.				
A		J-1601				<i>K. Yuasa</i> 30 SEP 92	J	A	108-5318	A
LTR		REVISION RECORD	DR	CHK	DATE	<i>D. Tomita</i>	.040 Series Multi Lock I / O Connector (Non Inertia Type)			

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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, or Plain brass with selective gold plating over nickel underplate

Receptacle contact: Pre-tinned phosphor bronze strip, or plain phosphor bronze strip with selective gold plating over nickel underplate

B. Housing :

Polybithylene: terephthalateresin (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 .	Visually, dimensionally and functionally inspected per applicable quality inspection plan.															
Electrical Requirements																		
3.5.2	Termination Resistance (Specified Current)	<table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td>Wire Size</td> <td>Test (A)</td> <td>Resistance</td> </tr> <tr> <td>mm<sup>2</sup> (AWG)</td> <td>Current</td> <td>mV / A</td> </tr> <tr> <td>0.5 (# 20)</td> <td>1</td> <td>(mΩ Max.)</td> </tr> <tr> <td></td> <td></td> <td>Initial : 10</td> </tr> <tr> <td></td> <td></td> <td>Final : 20</td> </tr> </table>	Wire Size	Test (A)	Resistance	mm <sup>2</sup> (AWG)	Current	mV / A	0.5 (# 20)	1	(mΩ Max.)			Initial : 10			Final : 20	Measure initial millivolt drop of contact test circuit in mated connectors, Fig. 3 AMP Spec. 109-5311-2
Wire Size	Test (A)	Resistance																
mm <sup>2</sup> (AWG)	Current	mV / A																
0.5 (# 20)	1	(mΩ Max.)																
		Initial : 10																
		Final : 20																

Fig. 1 (To be continued)

SHEET	<b>AMP</b>			AMP (Japan), Ltd. Kawasaki, Japan	
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NAME .040 Series Multi Lock I / O Connector (Non Inertia Type)					

Para.	Test Items	Requirements	Procedures
3.5.3	Termination Resistance (Low Level)	10 mΩ Max. (Initial) 20 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. 3 AMP Spec. 109-5311-1
3.5.4	Dielectric Strength	No creeping discharge nor flashover shall occur.	1.0 KVAC for 1 minute. Test between adjacent circuits of mated / unmated connectors. AMP Spec. 109-5301
3.5.5	Insulation Resistance	100 MΩ Min. (Initial) 100 MΩ Min. (Final)	Impressed voltage 500 V DC. Test between adjacent circuits of mated connectors. AMP Spec. 109-5302 Fig. 5
3.5.6	Current Leakage	1 mA Max.	12 V DC 60 °C Humidity 90~95 % 1 Hr AMP Spec. 109-5312 Fig. 4
3.5.7	Temperature Rising	30 °C Max. under loaded specified current.	Measure temperature rising by energized current. Fig. 7 AMP Spec. 109-5310 method
3.5.8	Current Cycling	20 mΩ Max. (Final)	Applied current ; Fig. 7 45 minutes "ON" 15 minutes "OFF"
<b>Physical Requirements</b>			
3.5.9	Vibration (High Frequency)	No electrical discontinuity greater than 1 μsec. shall occur. 20 mΩ Max. (Final)	Vibration Frequency : 20~200 Hz / 1 min. Accelerated Velocity : 44 m / s <sup>2</sup> (4.5 G) Vibration Direction : X. Y. Z Duration : 8 hours each AMP Spec. 109-5202 Fig. 6

Fig. 1 (To be continued)

SHEET 3 OF 9	<b>AMP</b>			AMP (Japan), Ltd. Kawasaki, Japan	
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Para.	Test Items	Requirements	Procedures
3.5.10	Vibration + Current Cycle	No electrical discontinuity greater than 1 $\mu$ sec. shall occur. 20 m $\Omega$ Max. (Final)	Vibration Frequency : 20~200 Hz / 1 Min. Accelerated Velocity : 44 m / s <sup>2</sup> (4.5 G) Vibration Direction : X, Y, Z Duration : 200 hours each Test Current : 4.4 A DC Fig. 6 45 minutes "ON", 15 minutes "OFF"
3.5.11	Contact Mating Force	981 mN~5.9 N (0.1~0.6 kgf)	Operation Speed : 100 mm / min. Measure the force required to mate connectors. AMP Spec. 109-5206
3.5.12	Contact Unmating Force	981 mN~5.9 N (0.1~0.6 kgf)	
3.5.13	Conector Mating Force	6 Pos. 39.2 N (4 kgf) Max. 16 Pos. 88 N (9 kgf) Max. 20 Pos. 98 N (10 kgf) Max.	
3.5.14	Conector Unmating Force	6 Pos. 39.2 N (4 kgf) Min. 16 Pos. 88 N (9 kgf) Min. 20 Pos. 98 N (10 kgf) Min.	Operation Speed : 100 mm / min. Measure the force required to unmate connectors. AMP Spec. 109-5206
3.5.15	Connector Locking Strength	98 N (10 kgf) Min.	Measure connector locking strength. Operation Speed : 100 mm / min. AMP Spec. 109-5210
3.5.16	Contact Retention Force	49 N (5 kgf) Min.	Apply an axial pull-off load to crimped wire. Operation Speed : 100 mm / min. AMP Spec. 109-5212
3.5.17	Contact Retention Force (secondary lock)	78.5 N (8 kgf) Min.	Measure contact retention force with secondary lock set in effect. Operation Speed : 100 mm / min.

Fig. 1 (To be continued)

SHEET	<b>AMP</b> AMP (Japan), Ltd. Kawasaki, Japan			
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	3.5.18	Crimp Tensile Strength	Wire Size mm <sup>2</sup>	(AWG)	Crimp Tensile (min.) N	(kgf)	Apply an axial pull-off load to crimped wire of contact secured on the tester, Operation Speed : 100 mm / min. AMP Spec. 109-5205
			0.3	(# 22)	59	(6)	
			0.5	(# 20)	88	(9)	
	3.5.19	Durability (Repeated Mate / Unmating)	20 mΩ Max. (Final)				Operation Speed : 100 mm / min. No. of Cycles : 30 cycles. AMP Spec. 109-5213
	3.5.20	Resistance to "Kojiri"	20 mΩ Max. (Final)				Repeated mating / unmating by hand, 30 cycles AMP Spec. 109-5215
	3.5.21	Solderability	Wet Solder Coverage : 95 % Min.				Solder Temperature : 230 ± 5 °C Immersion Duration : 5~10 seconds Flux : Alpha 100 AMP Spec. 109-5203
	Environmental Requirements						
	3.5.22	Thermal Shock	20 mΩ Max. (Final)				- 30 °C / 120 min. 80 °C / 120 min. Making this a cycle, repeat 5 cycles. AMP Spec. 109-5103
	3.5.23	Humidity, Steady State	Current Leakage 1 mA max. (Final) Insulation Resistance (Final) 100 MΩ Min. Termination Resistance 20 mΩ Max. (Final)				Mated / Unmated Connector, 90~95 % R.H. 60 °C 96 hours AMP Spec. 109-5105
3.5.24	Industrial Gas (SO <sub>2</sub> )	20 mΩ Max. (Final)				SO <sub>2</sub> Gas : 10 ppm, 95 % R. H. namaltenperature 24 hours AMP Spec. 109-5107	
3.5.25	Temperature Life (Heat Aging)	20 mΩ Max. (Final)				120 °C, Duration : 120 hours AMP Spec. 109-5104	
3.5.26	Resistance to Cold	20 mΩ Max. (Final)				- 50 °C ± 5 °C, 120 hours AMP Spec. 109-5108	

Fig. 1 (To be continued)

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			Kawasaki, Japan		
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Para.	Test Items	Requirements	Procedures
3.5.27	Dust Bombardment	20 mΩ Max. (Final)	Subject JIS R 5210 cement blow 1.5 kg per 10 seconds in 15 minutes intervals for 60 minutes. AMP Spec. 109-5110

Fig. 1 (end)

3.6 Product Qualification Test Sequence

Test Items	Test Group									
	1	2	3	4	5	6	7	8	9	10
	Test Sequence									
Confirmation of Product	1	1	1	1	1, 8	1, 11	1, 11	1, 13	1, 15	1, 11
Termination Resistance (Rated Current)			4							
Termination Resistance (Low Level)			3		3, 5, 7	3, 6, 8	3, 6, 8	8, 6 8, 10	2, 7 9, 14	3, 6, 8
Dielectric Strength				3					4, 12	
Insulation Resistance				2					3, 11	
Current Leakage				4					5, 10	
Temperature Rising			5							
Current Cycling								9		
Vibration (High Frequency)								7		
Connector Mating Force			2			2, 10	2, 10	2, 12		2, 10
Connector Unmating Force			6			4, 9	4, 9	4, 11		4, 9
Connector Locking Strength		2								
Contact Retention Force			7							
Contact Retention Force (Double Lock)			8							
Contact Mating Force	2									
Contact Unmating Force	3									
Crimp Tensile Strength	4									
Durability (Repeated Mating / Unmating)									6	
Resistance to "Kojiri"							5	5		5
Solderability					2					
Vibration And Current Cycling										7
Thermal Shock					4					
Humidity (Steady State)					6				8	
Industrial SO <sub>2</sub> Gas									13	
Temperture life (Heat Aging)						5				
Resistance to Cold						7				
Dust Bombardment							7			

Numbers indicate the sequence in which the tests are performed.

Fig. 2

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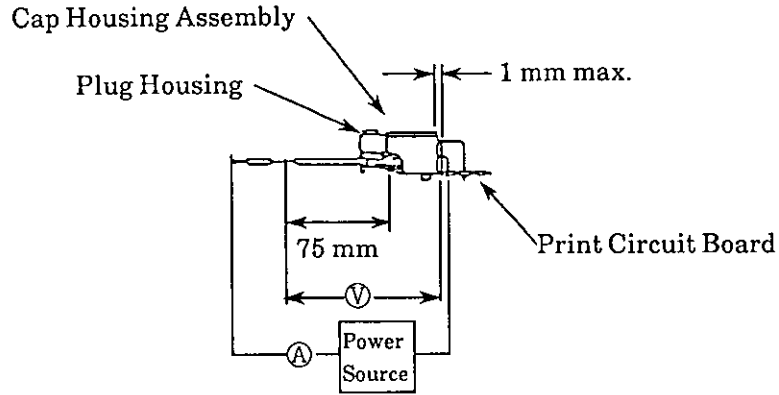


Fig. 3

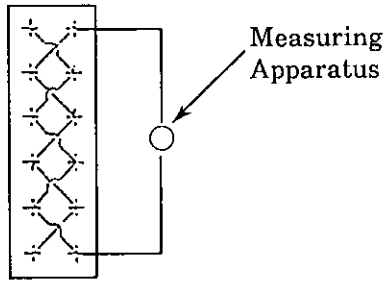


Fig. 4

Wrap housing surfaces with metallic foil.

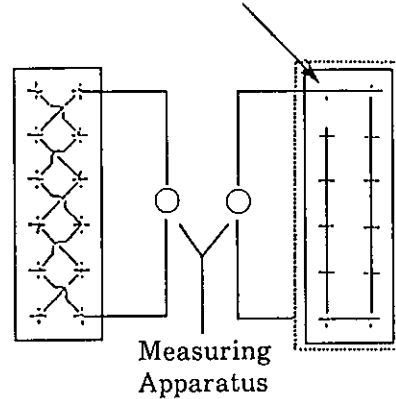


Fig. 5

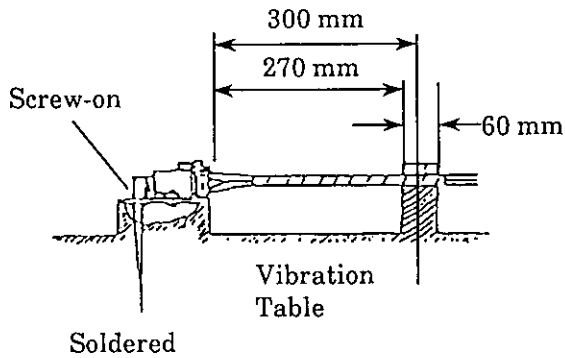


Fig. 6

Wire Size (mm <sup>2</sup> )	Current Max. (A)	No. of Pos.	Reduction Coefficiency
0.3 mm <sup>2</sup>	8.0 DC	1	1
0.5 mm <sup>2</sup>	11.0 DC	2~3	0.75
		4~5	0.6
		6~8	0.55
		9~12	0.5
		13 & Over	0.4

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

Fig. 7

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## 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 114-5111, Application Specification, Termination of 040 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 : 86.7~107 kPa (650~800 mmHg)

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Part Number	Description
173716	Receptacle Contact (0.3~0.5 mm <sup>2</sup> )
173681	Receptacle Contact (0.3~0.5 mm <sup>2</sup> )
175507	6 Pos. Plug Housing
174909	16 Pos. Plug Housing
174910	20 Pos. Plug Housing
175506	6 Pos. Cap Housing (Horizontal Type)
175615	16 Pos. Cap Housing (Horizontal Type)
175975	20 Pos. Cap Housing (Horizontal Type)
174912	36 Pos. Cap Housing (Horizontal Type)

## Appendix 1

SHEET	<b>AMP</b>		AMP (Japan), Ltd. Kawasaki, Japan	
	9 OF 9	LOC J	LOC A	NO. 108-5318
REV. A				
NAME .040 Series Multi Lock I / O Connector (Non Inertia Type)				