

**1. Scope :**

## 1.1 Contents

This specification covers the requirements for product performance, test methods and quality assurance provisions of 025 Series I/O Connectors (SMD-Type.).

Applicable product description 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. | 114-5250 | Application Specification : Crimping of 025 Receptacle Contact                         |
| C. | 108-5668 | Product Specification: 025 SERIES I/O CONNECTORS<br>(H-Type V-Type 2ROW, Wire to Wire) |

## 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 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   | Portland Cement  |
| H. | MIL-STD-202 | Testing Method 208 : Method of Soldering                     |

**3. Requirements :**

3.1 Design and Construction :

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

3.2 Materials :

A. Contact :

Description	Material	Finish
Tab(Male)	Brass	Post-Tinned
Receptacle(Female)	Copper Alloy	Pre-Tinned

Fig.1

B. Housing : PPS GF40

3.3 Ratings :

A. Voltage Rating : 12 V DC

B. Temperature Rating :

Kind of Connectors	Rating [°C]
16 POS.	-30 ~ 80
40 POS.	

Fig.2

3.4 Performance Requirements and Test Descriptions :

The product shall be designed to meet the electrical, mechanical and environmental performance requirements specified in Fig.3 and Fig4. All tests shall be performed in the room temperature, unless otherwise specified.

3.5 Test Requirements and Procedures Summary :

Par.	Test Items	Requirements	Procedures
3.5.1	Confirmation of Product	Meets requirements of product drawing and AMP Specification 114-5250	Visually , dimensionally and functionally inspected per applicable quality inspection plan
<b>Electrical Requirements</b>			
3.5.2	Termination Resistance (Low Level)	8 mΩ Max. (Initial) 16 mΩ Max. (Final)	Subject mated contacts assembled in housing to 20 mV Max. Open circuit at 10 Ma. Fig. 5 AMP Spec. 109-5311-1
3.5.3	Termination Resistance (Specified Current)	8 mV/A Max. (Initial) 16 mV/A Max. (Final)	Subject mated contacts assembled in housing to 12 V Max. Open circuit at 1A. Fig.5 AMP Spec. 109-5311-2
3.5.4	Dielectric Withstanding Voltage	No creeping discharge or flashover shall occur.	Impressed voltage 1kVAC for 1 min. Mated connector. Fig.6 AMP Spec. 109-5301
3.5.5	Insulation Resistance	100 MΩ Min. (Initial) 100 MΩ Min. (Final)	Impressed voltage 500VDC Mated connector. Fig.6 AMP Spec. 109-5302
3.5.6	Current Leakage	3mA Max.	Impressed voltage 14VDC Fig.7 AMP Spec. 109-5312
3.5.7	Temperature Rise	60°C Max.	Measure temperature rising at wire crimped by applied current to all positions. Fig.11 AMP Spec. 109-5310
3.5.8	Over Current Loading	No ignition is allowed during the test.	Apply the current to only one position. Applied Current : Fig. 8
<b>Physical Requirements</b>			
3.5.9	Vibration (High Frequency)	No electrical discontinuity greater than 1 μ sec. shall occur. Satisfy requirements of test item on the "3.6 sequence".	Vibration Frequency : 20→200→20Hz/3min. Acceleration : 44.1 m / s <sup>2</sup> Vibration Direction : X, Y, Z Duration: 3hours each Mounting: Fig. 9

Fig.3 (To be continued)

Par.	Test Items	Requirements		Procedures
3.5.10	Shock	No electrical discontinuity greater than 1 $\mu$ sec. shall occur.		Acceleration : 980m/s <sup>2</sup> Waveform : Half sine wave Duration : 6msec.Velocity Number of Drops: 3 drops each directions of X,-X, Y,-Y,Z and -Z axes, totally 18 drops Mounting : Fig. 9 AMP Spec. 109-5208
3.5.11	Connector Mating Force	16P	47.2N Max	Operation Speed : 100mm/min. Measure the force required to mate connectors. AMP Spec. 109-5206
		40P	70N Max	
3.5.12	Connector Unmating Force	16P	32.2N Max	Operation Speed : 100mm / min. Measure the force required to unmate connectors. (without housing lock) AMP Spec. 109-5206
		40P	70N Max	
3.5.13	Connector Locking Strength	100N Min.		Apply an axial pull-off load to one of the mated housing, measure locking strength. Operation Speed : 100mm/min. AMP Spec. 109-5210
3.5.14	Resistance to "Kojiri"	Satisfy requirements of test item on the "3.6 sequence".		Repeated mating-unmating by hand in up-down and right-left directions for 10 cycles. AMP Specification, 109-5215
3.5.15	Solderability	Wet Solder Coverage : 95 % Min.		Solder Temperature:235 $\pm$ 5 $^{\circ}$ C Immersion Duration:5 $\pm$ 0.5sec Flux: Alpha100 Solder: Sn-Pb Solder AMP Specification, 109-5203
3.5.16	Solderability (Reflow Soldering)	Fillet shall be formed around all contact.		Test connector on P.C.B. Pre-Heat 150 $\pm$ 10 $^{\circ}$ C60-120s Soldering 200 $^{\circ}$ C 50sec Max. Peak Temperature: 215 $\pm$ 5 $^{\circ}$ C 10sec Max Temperature shall be measured at contact. Solder: Sn-Pb Solder Paste Temperature at PCB :260 $^{\circ}$ CMax.

Fig.3 (To be continued)

Par.	Test Items	Requirements	Procedures
3.5.17	Handling Ergonomics	No abnormalities allowed in manual mating/unmating handling.	Manually operated.
3.5.18	Thermal Shock	Satisfy requirements of test item on the "3.6 sequence".	-30°C/30min, 80°C/30min. Making this a cycle, repeat 1000 cycles. Monitor resistance-variation at closed circuit current of 10mA during the test. AMP Spec. 109-5103
3.5.19	Humidity (Steady State)	Satisfy requirements of test item on the "3.6 sequence". Current Leakage : 3mA Max.	90~95%R. H. , 60°C , 96hours Monitor current leakage during the test. AMP Spec. 109-5105
3.5.20	Industrial Gas (SO <sub>2</sub> )	Satisfy requirements of test item on the "3.6 sequence".	Unmated connector SO <sub>2</sub> Gas : 25ppm, 75% R. H. 25°C, 96 hours AMP Spec. 109-5107
3.5.21	Temperature Life (Heat Aging)	Satisfy requirements of test item on the "3.6 sequence".	100°C, 120hours AMP Spec. 109-5104
3.5.22	Resistance to Cold	Satisfy requirements of test item on the "3.6 sequence".	-30°C, 120hours AMP Spec. 109-5108
3.5.23	Humidity-Temperature Cycling	Satisfy requirements of test item on the "3.6 sequence".	Condition : Fig. 10 Making this condition a cycle, Repeat 10 cycles. Monitor resistance-variation at closed circuit current of 10mA during the test.
3.5.24	Dust Bombardment	Satisfy requirements of test item on the "3.6 sequence".	Subject JIS R 5210 cement blow of 1.5kg per 10 seconds in 15 minutes intervals for 8 cycles, with mating/unmating per 2 cycles. AMP Spec. 109-5110

Fig.3 (To be continued)

Par.	Test Items	Requirements	Procedures
3.5.25	Compound Environment Resistance	Satisfy requirements of test item on the "3.6 sequence". No electrical discontinuity greater than 1 $\mu$ sec. shall occur.	Temperature : 80°C Vibration Frequency : 20→200→20Hz/3Min. (Log) Acceleration : 44.1m/s <sup>2</sup> Vibration Direction : X, Y, Z Duration : 300hours Test Current : Fig. 12 Mounting : Fig. 9 Monitor resistance-variation, and after this test check if instant cutoff occurs for an hour on "3.5.9 vibration".
3.5.26	Condensation	Satisfy requirements of test item on the "3.6 sequence".	0°C/10min.80°C/90~ 95%/30min. Making this a cycle, repeat 48 cycles. Monitor current leakage during the test.
3.5.27	Resistance to Reflow Soldering Heat	Tested housing shall no evidence of deformation or fusion of housing and no physical damage.	Test connector on P.C.B. Pre-Heat 150±10°C60-120s Soldering 200°C 50sec Max. Peak Temperature: 235±5°C 10sec Max Temperature shall be measured at contact. Solder: Sn-Pb Solder Paste Temperature at PCB :260°CMax

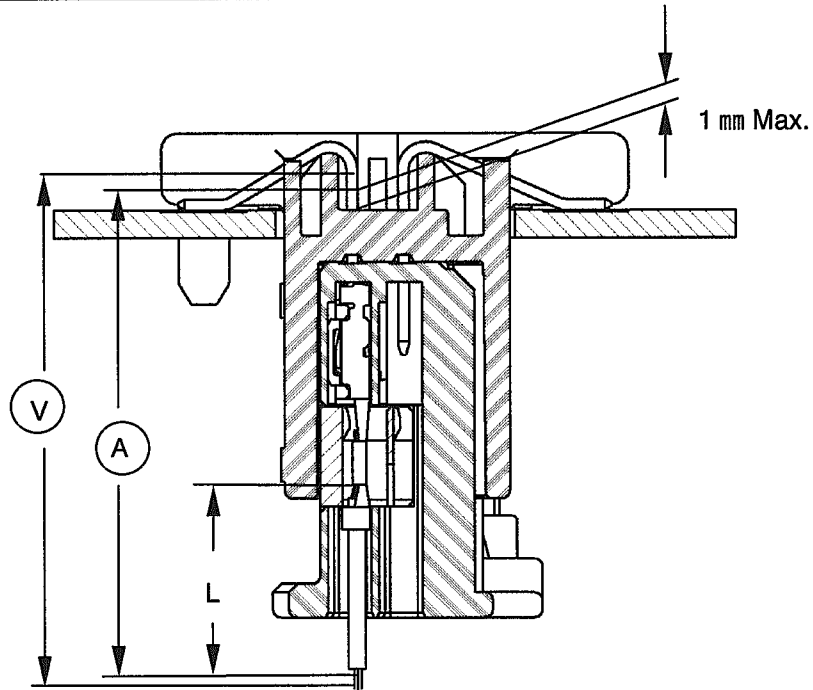
Fig. 3 (End)

3.6 Product Qualification Test Sequence

No.	Test Examination	Test Group																
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
		Test Sequence <sup>(a)</sup>																
3.5.1	Confirmation of Product	1	1,4	1,5	1,6	1,4	1,5	1,5	1,8	1,5	1,6	1,3	1,7	1,6	1,7	1,5	1,3	1,3
3.5.2	Termination Resistance (Low Level)	3		2,6	2,7		2,6	2,6	2,9	2,6	2,7		2,8	2,7	2,8			
3.5.3	Termination Resistance (Rated Current)	4		3,7	3,8		3,7	3,7	3,10	3,7	3,8		3,9	3,8	3,9			
3.5.4	Dielectric withstanding Voltage	7							5,12				5,12					
3.5.5	Insuration Resistance	6							4,11				4,11				2,6	
3.5.6	Current Leakage								7								4	
3.5.7	Temperature Rise	5									4,9				5			
3.5.8	Over Current Loading			4														
3.5.9	Vibration (High Frequency)				5										6			
3.5.10	Shock					3												
3.5.11	Connector Mating Force	2																
3.5.12	Connector Unmating Force	8																
3.5.13	Connector Locking Strength		2					9	14		11		13					
3.5.14	Resistance to "Kojiri"						4											2
3.5.15	Solderability		3															
3.5.16	Solderability(Reflow)																	
3.5.17	Handling Ergonomics							8			10	4	12					
3.5.18	Thermal Shock							4										
3.5.19	Humidity (Steady State)								6									
3.5.20	Industrial SO2 Gas									4								
3.5.21	Temperature Life (Heat Aging)										5							
3.5.22	Resistance to Cold											2						
3.5.23	Humidity-Temperature Cycling												6					
3.5.24	Dust Bombardment													5				
3.5.25	Compound Enviroment Resistance														4			
3.5.26	Condensation															3		
3.5.27	Resistance to Reflow Soldering Heat																2	

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

Fig.4



Deduct resistance of wire "L"

Fig.5

Wrap metallic foil to cover the connector surface

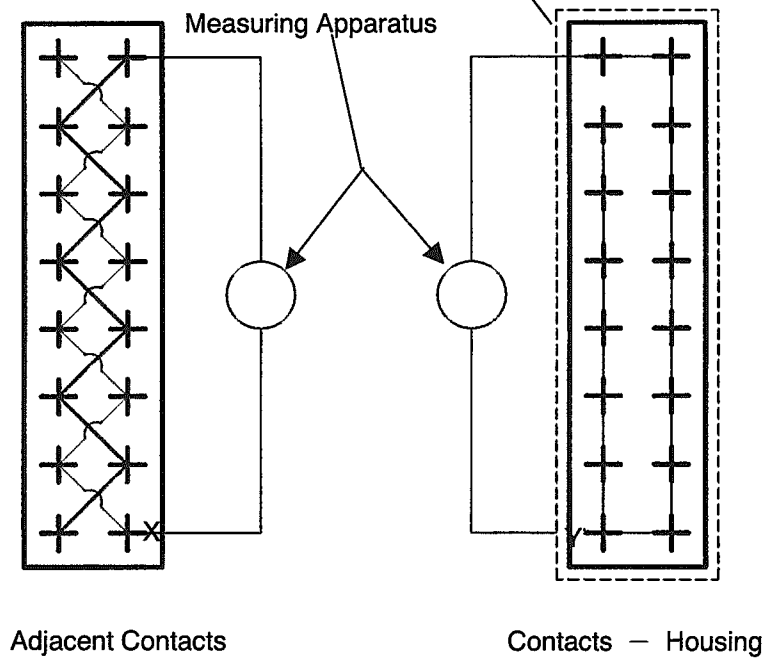


Fig.6



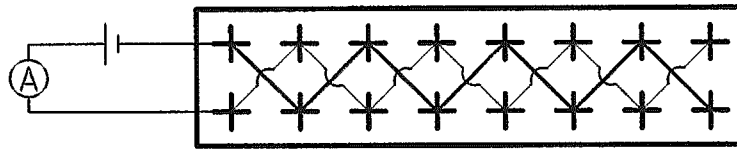


Fig.7

Fig.7

Wire Size (mm <sup>2</sup> )	Test Current (A)	Duration
0.5	16.5	60 min.
	20.2	200 sec.
	22.5	5 sec.
	30.0	1 sec.

Fig.8

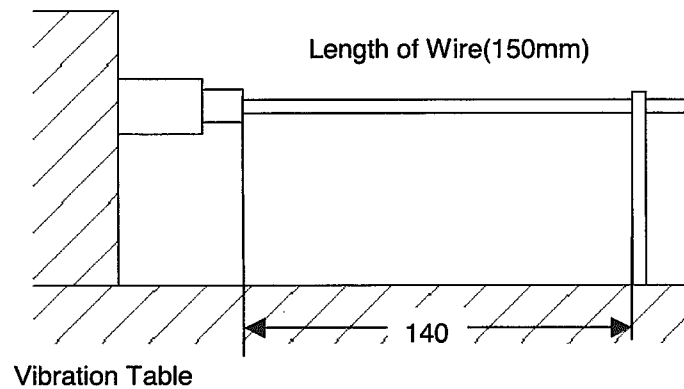


Fig. 9

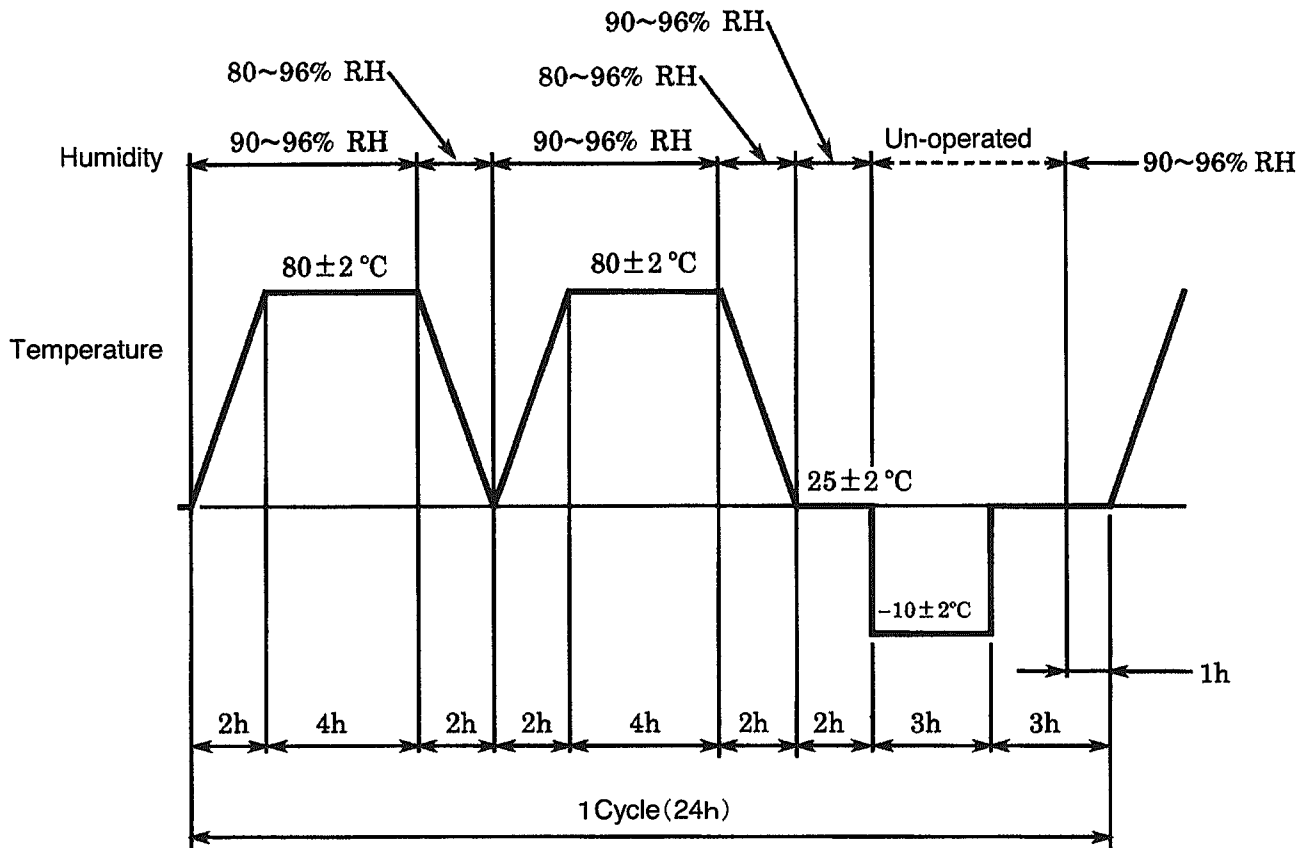


Fig. 10

Kind of Connectors	Wire Size(mm <sup>2</sup> )	Test Current(A)	Temperature Rise
16 POS.	0.5	4.4	60°C max.
40 POS.	↑	2.2	

Fig.11

Kind of Connectors	Wire Size(mm <sup>2</sup> )	Test Current(A)	Test Time
8 POS.	0.5	2.4	45min.ON, 15min.OFF
12 POS.	↑	1.2	300cycles

Fig.12

Product Part No.*	Description
1612040	025 SER 16POS. CAP ASSY SMD-Type(MALE CONNECTOR)
1318386	025 SER 16POS. PLUG ASSY (FEMALE CONNECTOR)
1473875	025 SER 40POS. CAP ASSY SMD-Type(MALE CONNECTOR)
1318389	025 SER 40POS. PLUG ASSY (FEMALE CONNECTOR)
1123343	025 RECEPTACLE CONTACT

## Appendix.1

\*Note : Part number is consisted from listed base number and 1 digit numeric prefix and suffix with dash. Refer to catalog or customer drawing for specific part numbers for each base number. When prefix is zero, zero and dash are omitted.