



025 SERIES I/O CONNECTORS  
(H-Type V-Type 2Row, Wire to Wire)

**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 (H-Type V-Type 2Row, Wire to Wire Conn.).

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 TE Specifications:

- |    |          |   |
|----|----------|---|
| A. | 109-5000 | Test Specification, General Requirements for Test Methods     |
| B. | 114-5250 | Application Specification: Crimping of 025 Receptacle Contact |
| C. | 114-5291 | Application Specification: Crimping of 025 Tab Contact        |
| D. | 501-5372 | Test Report   |

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	Pre-Tinned or Selective-Gold or Selective-Tin
Receptacle(Female)	Copper Alloy	Pre-Tinned or Selective-Gold

Fig.1

B. Housing: PBT or SPS

3.3 Ratings:

A. Voltage Rating: 12 V DC

B. Temperature Rating:

Kind of Connectors	Rating[°C]
8POS.	-30~105
12POS.	-30~105
16POS.	-30~105
24POS.	-30~105
28POS.	-30~105
32POS.	-30~105
40POS.	-30~105

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 :

Para.	Test Items	Requirements	Procedures
3.5.1	Confirmation of Product	Meets requirements of product drawing and TE Specification 114-5250,114-5291.	Visually ,dimensionally and functionally inspected per applicable quality inspection plan
Electrical Requirements			
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
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
3.5.4	Dielectric Withstanding Voltage	No creeping discharge or flashover shall occur.	Impressed voltage 1kVAC for 1 min. Mated connector. Fig.6
3.5.5	Insulation Resistance	100 MΩ Min. (Initial) 100 MΩ Min. (Final)	Impressed voltage 500VDC Mated connector. Fig.6
3.5.6	Current Leakage	3mA Max.	Impressed voltage 14VDC Fig.7
3.5.7	Temperature Rise	60°C Max.	Measure temperature rising at wire crimped by applied current to all positions. Fig.11
3.5.8	Over Current Loading	No ignition is allowed during the test.	Apply the current to only one position. Applied Current : Fig. 8
Physical Requirements			
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)

Para.	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
3.5.11	Connector Mating Force	70N Max.	Operation Speed : 100mm/min. Measure the force required to mate connectors.
3.5.12	Connector Unmating Force	70N Max.	Operation Speed : 100mm / min. Measure the force required to unmate connectors. (without housing lock)
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.
3.5.14	Contact Insertion Force	10N Max. per contact	Measure the force required to insert contact into housing.
3.5.15	Contact Retention Force(Secondary Lock)	100N Min.	Measure contact retention force with secondary lock set it effect. Operation Speed : 100mm/min.
3.5.16	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.
3.5.17	Fasting Torque for Screw	No cracks and compression bucklings of housing permissible	Operation torque value on customer drawing.
3.5.18	Solderability	Wet Solder Coverage : (Plated area only) 95 % Min. (with substrate area) 50% Min. (without substrate area)	Solder bath : Sn-40Pb Solder Temperature :235 $\pm$ 5 $^{\circ}$ C Immersion Duration :5 $\pm$ 0.5sec. Flux : Alpha100
			Matte Tin plating only Solder bath : Sn-3Ag-0.5Cu Solder Temperature :250 $\pm$ 5 $^{\circ}$ C Immersion Duration :5 $\pm$ 0.5sec. Flux : ULF-300R

Fig.3 (To be continued)

Para.	Test Items	Requirements	Procedures
3.5.19	Handling Ergonomics	No abnormalities allowed in manual mating/unmating handling.	Manually operated.
3.5.20	Retention Force of Tab	20N Min. (PBT housing) 15N Min. (SPS housing)	Measure the retention force between housing and tab contact. Operation speed : 100mm/min
3.5.21	Resistance to soldering heat	Application to SPS housing only. No gap with PCB and omission of screw. Retention Force of Tab : 15N Min.	Test connector solder dipped after mounted on PCB with screw. It should be checked and measured after test connector become room temperature. Solder temperature : $260 \pm 5^{\circ}\text{C}$ Immersion duration : $10 \pm 1$ sec.
Environmental Requirements			
3.5.22	Thermal Shock	Satisfy requirements of test item on the "3.6 sequence".	$-40^{\circ}\text{C}/30\text{min.}$ , $100^{\circ}\text{C}/30\text{min.}$ Making this a cycle, repeat 1000 cycles. Monitor resistance-variation at closed circuit current of 10mA during the test.
3.5.23	Humidity (Steady State)	Satisfy requirements of test item on the "3.6 sequence". Current Leakage : 3mA Max.	90~95%R. H. , $60^{\circ}\text{C}$ , 96hours Monitor current leakage during the test.
3.5.24	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. $25^{\circ}\text{C}$ , 96 hours
3.5.25	Temperature Life (Heat Aging)	Satisfy requirements of test item on the "3.6 sequence".	$120^{\circ}\text{C}$ , 120hours
3.5.26	Resistance to Cold	Satisfy requirements of test item on the "3.6 sequence".	$-40^{\circ}\text{C}$ , 120hours
3.5.27	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.
3.5.28	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.

Fig.3 (To be continued)

Para.	Test Items	Requirements	Procedures
3.5.29	Compound Environment Resistance	Satisfy requirements of test item on the "3.6 sequence". No electrical discontinuity greater than 1 $\mu$ sec. shall occur.	<p>Temperature : 80°C</p> <p>Vibration Frequency : 20→200→20Hz/3Min. (Log)</p> <p>Acceleration : 44.1 m/s<sup>2</sup></p> <p>Vibration Direction : X, Y, Z</p> <p>Duration : 300hours</p> <p>Test Current : Fig. 12</p> <p>Mounting : Fig. 9</p> <p>Monitor resistance-variation, and after this test check if instant cutoff occurs for an hour on "3.5.9 vibration".</p>
3.5.30	Condensation	Satisfy requirements of test item on the "3.6 sequence".	<p>0°C/10min.,80°C/90~95%/30min.</p> <p>Making this a cycle, repeat 48 cycles.</p> <p>Monitor current leakage during the test.</p>

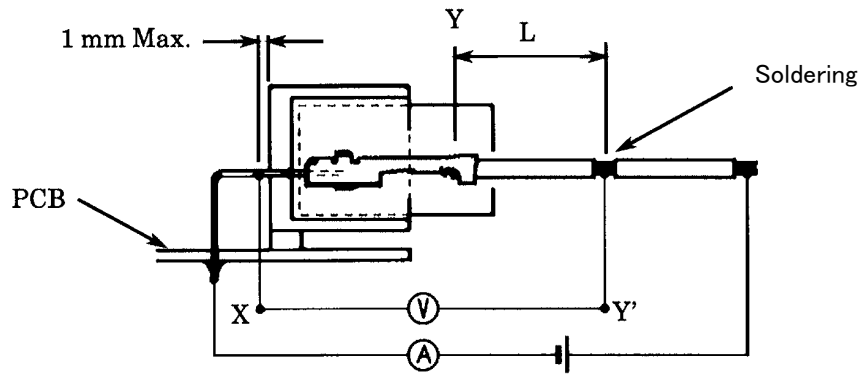
Fig. 3 (End)

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 (a)																
3.5.1	Confirmation of Product	1	1	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	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				5,11					
3.5.5	Insulation Resistance	6							4,11				4,10				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		4					10	14		12		14					
3.5.14	Contact Insertion Force		2															
3.5.15	Contact Retention Force		3					9	13		11	5	13					
3.5.16	Resistance to "Kojiri"						4											
3.5.17	Fasten Torque for Screw		5					11			13		15					
3.5.18	Solderability		6															
3.5.19	Handling Ergonomics							8			10	4	12					
3.5.20	Retention Force of Tab																2	4
3.5.21	Resistance to Soldering Heat																	2
3.5.22	Thermal Shock							4										
3.5.23	Humidity (steady state)								6									
3.5.24	Industrial SO <sub>2</sub> Gas									4								
3.5.25	Temperature Life (heat aging)				4	2					5			4				
3.5.26	Resistance to Cold											2						
3.5.27	Humidity-Temperature Cycling												6					
3.5.28	Dust Bombardment													5				
3.5.29	Compound Environment Resistance														5			
3.5.30	Condensation																3	

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

Fig.4



Deduct resistance of Y-Y' (wire "L") from X-Y'

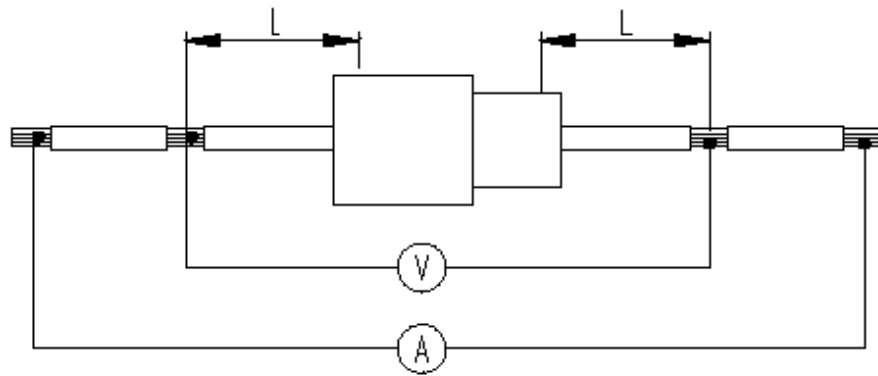
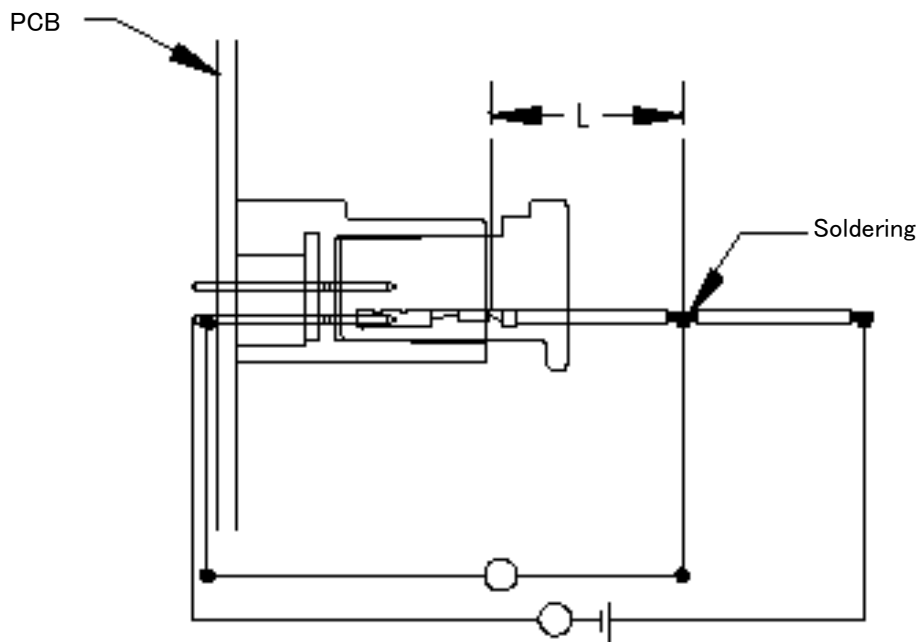


Fig. 5





Wrap metallic foil to cover the connector surface

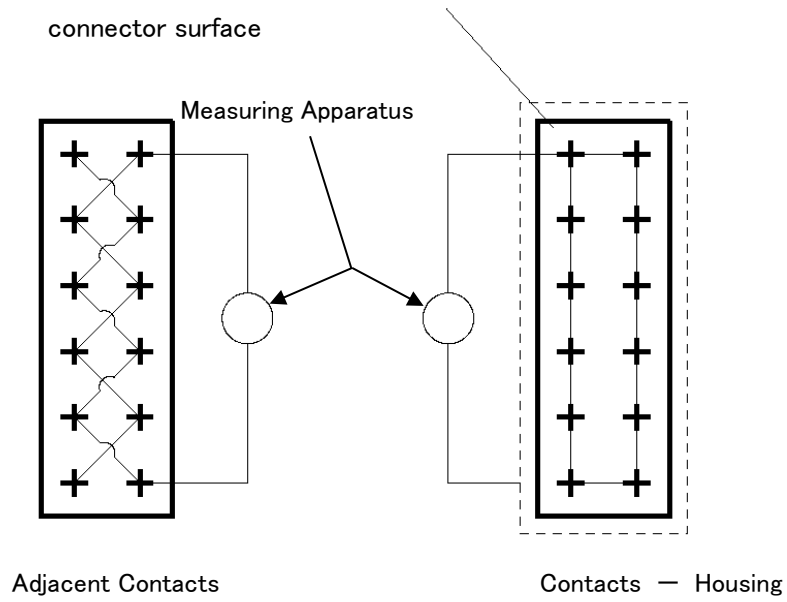


Fig. 6

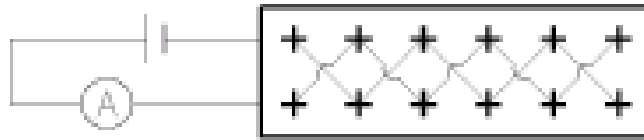


Fig.7

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

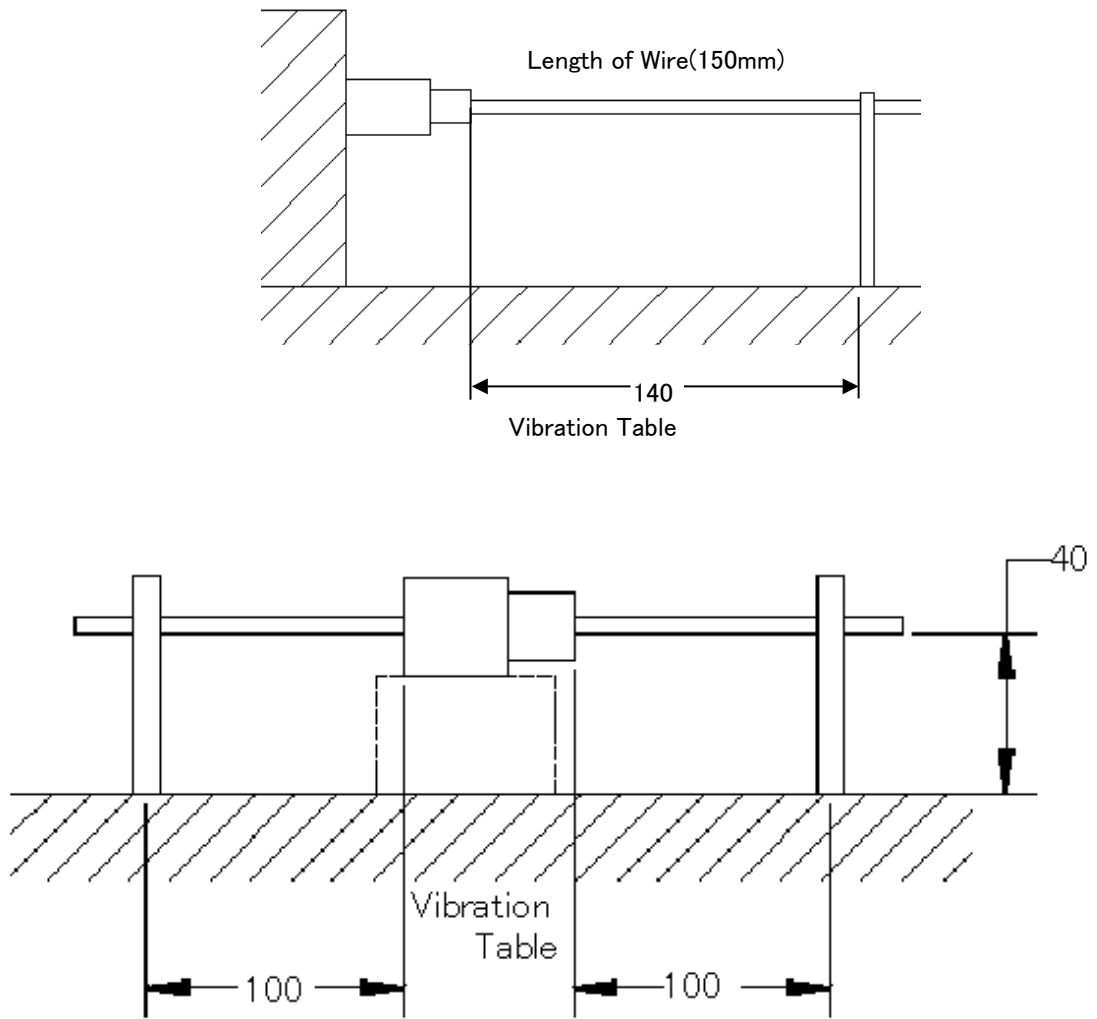


Fig. 9

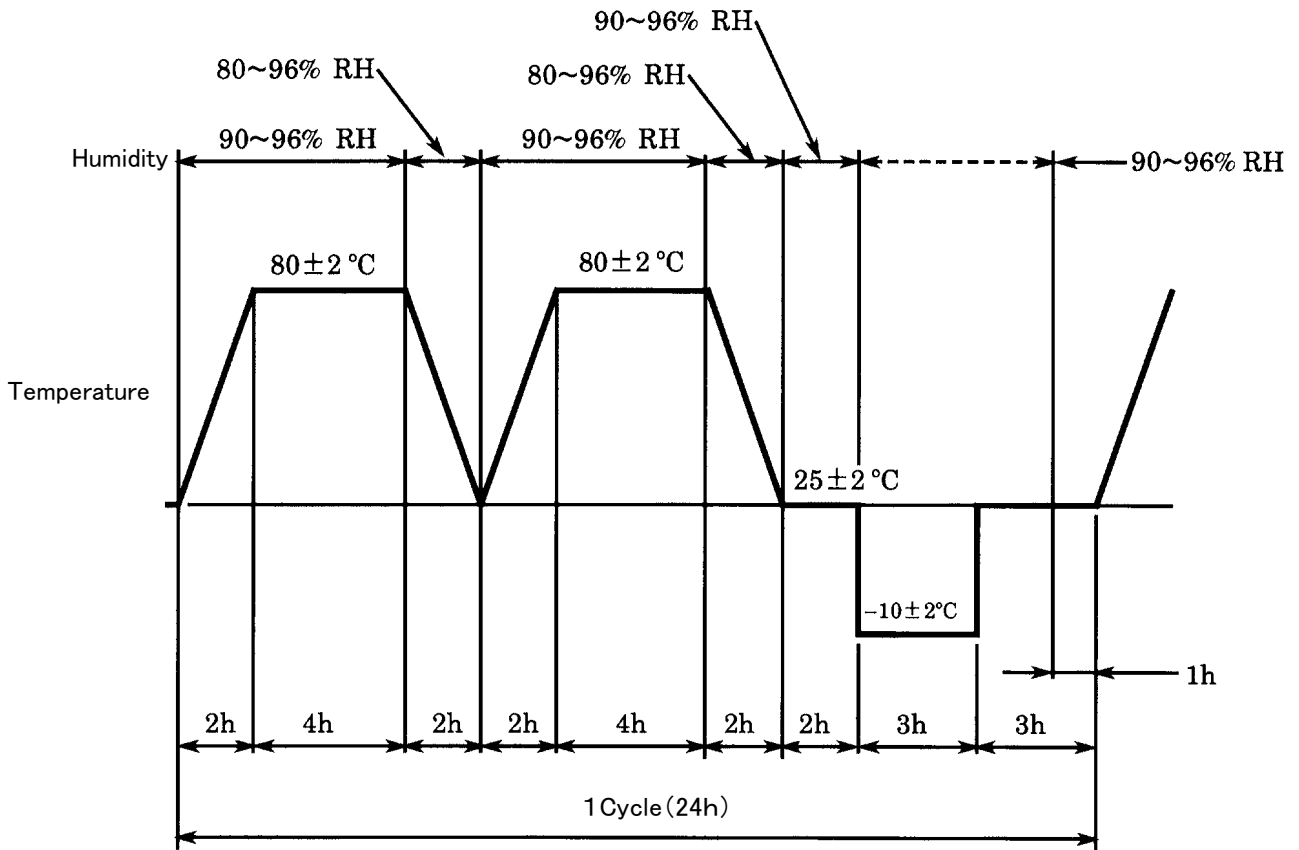


Fig. 10

Kind of Connectors	Wire Size(mm <sup>2</sup> )	Test Current(A)	Temperature Rise
8 POS.	0.5	6.05	60°C max.
12 POS.	0.5	5.5	
16 POS.	0.5	4.4	
24 POS.	0.5	3.3	
28 POS.	0.5	3.3	
32 POS.	0.5	2.2	
40 POS.	0.5	2.2	

Fig.11

Kind of Connectors	Wire Size(mm <sup>2</sup> )	Test Current(A)	Test Time
8 POS.	0.5	3.3	45min.ON、15min.OFF 300cycles
12 POS.	0.5	3	
16 POS.	0.5	2.4	
24 POS.	0.5	1.8	
28 POS.	0.5	1.8	
32 POS.	0.5	1.2	
40 POS.	0.5	1.2	

Fig.12

Product Part No.*	Description
1376350	025 SER 8POS. CAP ASSY H-Type (MALE CONNECTOR)
6376350	
1376352	025 SER 8POS. PLUG ASSY (FEMALE CONNECTOR)
1318772	025 SER 12POS. CAP ASSY H-Type (MALE CONNECTOR)
6318772	
1473898	025 SER 12POS. CAP ASSY V-Type (MALE CONNECTOR)
1318774	025 SER 12POS. PLUG ASSY (FEMALE CONNECTOR)
1376675	025 SER 12POS. PLUG ASSY (FEMALE CONNECTOR) SHORT BODY
1318382	025 SER 16POS. CAP ASSY H-Type (MALE CONNECTOR)
6318382	
1565476	025 SER 16POS. CAP ASSY V-Type (MALE CONNECTOR)
1376106	025 SER 16POS. WIRE TO WIRE CAP ASSY (MALE CONNECTOR)
1473203	025 SER 16POS. WIRE TO WIRE CAP ASSY(MALE CONNECTOR)PIGGY BACK BRACKET
1318386	025 SER 16POS. PLUG ASSY (FEMALE CONNECTOR)
1318853	025 SER 24POS. CAP ASSY H-Type (MALE CONNECTOR)
6318853	
1376111	025 SER 24POS. CAP ASSY V-Type (MALE CONNECTOR)
1376103	025 SER 24POS. WIRE TO WIRE CAP ASSY (MALE CONNECTOR)
1318917	025 SER 24POS. PLUG ASSY (FEMALE CONNECTOR)
1612904	025 SER 24POS. CAP ASSY V-Type(MALE CONNECTOR)
1612906	025 SER 24POS. PLUG ASSY (FEMALE CONNECTOR)
1565373	025 SER 28POS. CAP ASSY H-Type (MALE CONNECTOR)
1565375	025 SER 28POS. CAP ASSY V-Type (MALE CONNECTOR)
1565380	025 SER 28POS. PLUG ASSY (FEMALE CONNECTOR)
1565377	025 SER 28POS. WIRE TO WIRE CAP ASSY (MALE CONNECTOR)
1318745	025 SER 32POS. CAP ASSY H-Type (MALE CONNECTOR)
6318745	
1318747	025 SER 32POS. PLUG ASSY (FEMALE CONNECTOR)
1318384	025 SER 40POS. CAP ASSY H-Type (MALE CONNECTOR)
6318384	
1376113	025 SER 40POS. CAP ASSY V-Type (MALE CONNECTOR)
1318389	025 SER 40POS. PLUG ASSY (FEMALE CONNECTOR)
1565287	025 SER 12POS. PLUG ASSY KEYING (FEMALE CONNECTOR)
1565894	025 SER 12POS. WIRE TO WIRE CAP ASSY (MALE CONNECTOR)
1123343	025 RECEPTACLE CONTACT
1376109	025 TAB CONTACT
*1612446-2	025 12POS. CAP ASSY ( V-TYPE)
*1612446-3	025 40POS. CAP ASSY ( V-TYPE)
†1-1612446-0	025 SER 40POS. CAP ASSY H-Type (MALE CONNECTOR)
2134962	025 SER 28POS. CAP ASSY H-Type Short Tine (MALE CONNECTOR)
1746315	025 SER 72 (8+24+40) POS. CAP ASSY H-Type (MALE CONNECTOR)

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.

\*Note: This part number will be superseded by X-1473898-X.

\*Note: This part number will be superseded by X-1376113-X.

†Note: This part number will be superseded by X-1318384-X.