

**025 (0.64III) Series Connector**

**1. SCOPE**

1.1. Content

This specification covers the requirements for product performance, test method and quality assurance provisions for the TE Connectivity (TE) 025 (0.64III) Series Connector.

Applicable product description and part numbers are as follow.

| Part Number | Part Description                          |
|-------------|---|
| X-2237145-X | 8P 1 Row 025 (0.64) Cap SMT (Male)        |
| X-2291172-X | 8P 025 (0.64) Cap SMT (Male)              |
| X-2237149-X | 8P 025 (0.64) Cap SMT (Male)              |
| X-2291173-X | 12P 025 (0.64) Cap SMT (Male)             |
| X-2291174-X | 16P 025 (0.64) Cap SMT (Male)             |
| X-2237067-X | 24P 025 (0.64) Cap SMT (Male)             |
| X-2237138-X | 32P 025 (0.64) Cap SMT (Male)             |
| X-2237147-X | 8P 1 Row 0.64III Plug Assy (Female)       |
| X-1717103-X | 8P 0.64III Plug Assy (Female)             |
| X-1717106-X | 12P 0.64III Plug Assy (Female)            |
| X-1746872-X | 12P 0.64III Plug Assy Short Body (Female) |
| X-1717109-X | 16P 0.64III Plug Assy (Female)            |
| X-2237049-X | 16P 0.64III Plug Assy (Female)            |
| X-2237152-X | 16P 0.64III Plug Assy Short Body (Female) |
| X-1717112-X | 24P 0.64III Plug Assy (Female)            |
| X-1717118-X | 32P 0.64III Plug Assy (Female)            |
| X-1674311-X | 0.64III Receptacle Contact                |

Note: The model number (part number) is configured with a single digit number with a dash in the list parent number. For more information on the dash with a number for each parent numbers refer to the drawing or catalog for the customer. It should be noted that if the prefix is zero, zero and dash are omitted.

1.2. Qualification

When tests are performed on the subject product line, procedures specified in Figure 1 and 2 shall be used. All inspections shall be performed using the applicable inspection plan and product drawing.

**2. APPLICABLE DOCUMENTS**

The following documents and forms constitute 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. Unless otherwise indicated, the latest edition of the document applies.

## 2.1. TE Documents

- 109-1 : Test Specification (General Requirements for Testing)
- 109-201 : Component Heat Resistance to Lead-Free Reflow Soldering
- 114-5329 : Application Specification (Crimping 0.64III Receptacle Contact)
- 108-5931 : Product Specification
- 501-5596 : Qualification Test Report
- 501-166000 : Qualification Test Report

## 2.2. Industry Document

- JASO D605: Multi-pole Connector for Automobiles
- JASO D7101: Test Methods for Plastic Molded Parts
- JIS C3406: Low Voltage Wires and Cables for Automobiles
- JIS D0203: Method of Moisture, Rain and Spray Test for Automobile Parts
- JIS D0204: Method of High and Low Temperature Test for Automobile Parts
- JIS D1601: Vibration Testing Method for Automobile Parts
- JIS R5210: Portland Cement

## 3. REQUIREMENTS

### 3.1. Design and Construction

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

### 3.2. Materials

#### A. Tab (Male)

Material: Copper Alloy

Finish: Post-Tin

#### B. Receptacle (Female)

Material: Copper Alloy

Finish: Pre-Tin

#### C. Housing (Male)

Material: PPS

#### D. Housing (Female)

Material: PBT

### 3.3. Ratings

- Voltage Rating: 12V DC
- Temperature Rating: -40 to 105°C  
(Ambient temperature + Temperature rise due to energized current)

### 3.4. Performance Requirements and Test Description

The product is designed to meet the electrical, mechanical and environmental performance requirements specified in Figure 1 and 2. All tests shall be performed in the room temperature, unless otherwise specified.

## 3.5. Test Requirements and Procedures Summary

| Item No    | Test Description                           | Requirement  | Procedure   |
|------------|--|--|---|
| 3.5.1      | Confirmation of Product                    | Meet requirements of product drawing and TE Specification 114-5329   | Visually, dimensionally and functionally inspected per applicable quality inspection plan   |
| ELECTRICAL |  |  |   |
| 3.5.2      | Termination Resistance (Low Level)         | 8 mΩ Max (Initial)<br>16 mΩ Max (Final)  | Subject mated contacts assembled in housing to 20mV Max open circuit at 10mA<br>Figure 3  |
| 3.5.3      | Termination Resistance (Specified Current) | 8 mΩ Max (Initial)<br>16 mΩ Max (Final)  | Subject mated contacts assembled in housing to 12V Max open circuit at 1A<br>Figure 3   |
| 3.5.4      | Dielectric Withstanding Voltage            | No creeping discharge or flashover shall occur   | Impressed voltage 1kVAC for 1 min on mated connector<br>Figure 4  |
| 3.5.5      | Insulation Resistance                      | 100 MΩ Min (Initial)<br>100 MΩ Min (Final)   | Impressed voltage 500VDC on mated connector<br>Figure 4   |
| 3.5.6      | Current Leakage                            | 3mA Max  | Impressed voltage 14VDC<br>Figure 5   |
| 3.5.7      | Temperature Rise                           | 60°C Max   | Measure temperature rising at wire crimped by applied current to all positions<br>Figure 9  |
| 3.5.8      | Over Current Loading                       | No ignition is allowed during the test   | Apply the current to only one position<br>Applied Current Figure 8  |
| MECHANICAL |  |  |   |
| 3.5.9      | Vibration (High Frequency)                 | No electrical discontinuity greater than 1μsec shall occur.<br>Satisfy requirements of test item on the "3.6 sequence" | Vibration Frequency: 20→200→20Hz/3min<br>Acceleration: 44.1m/s <sup>2</sup><br>Vibration Direction: X, Y, Z<br>Duration: 3hrs each<br>Mounting Figure 6   |
| 3.5.10     | Shock                                      | No electrical discontinuity greater than 1μsec shall occur   | Acceleration: 980m/s <sup>2</sup><br>Waveform: Half sine wave<br>Duration: 6msec Velocity<br>Number of Drops: 6 drops each direction of X, -X, Y, -Y, Z, and -Z axes, total 18 drops<br>Mounting Figure 6 |

Figure 1 (Cont.)

| Item No    | Test Description                         | Requirement  | Procedure  |
|------------|--|--|--|
| MECHANICAL |  |  |  |
| 3.5.11     | Connector Mating Force                   | 70N Max  | Operation Speed: 100mm/min<br>Measure the force required to mate connectors  |
| 3.5.12     | Connector Unmating Force                 | 70N Max  | Operation Speed: 100mm/min<br>Measure the force required to unmate connectors (without housing lock)   |
| 3.5.13     | Connector Locking Strength               | 100N Min   | Operation Speed: 100mm/min<br>Apply an axial pull off load to one of the mated housing, measure locking strength   |
| 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 (Latch Only)     | 30N Min  | Operation Speed: 100mm/min<br>Apply an axial pull-off load to crimped wire   |
| 3.5.16     | Contact Retention Force (Secondary Lock) | 100N Min   | Operation Speed: 100mm/min<br>Measure contact retention force with secondary lock set in   |
| 3.5.17     | Resistance to "Kojiri"                   | Satisfy requirements of test item on the "3.6 sequence"                              | Repeat mating-unmating by hand in up-down and right-left directions for 10 cycles  |
| 3.5.18     | Solderability (Reflow Soldering)         | Fillet shall be formed around the contact  | Test connector on PCB (FR4, Thickness 1.6mm)<br><br><Sn-Ag-Cu Solder Paste><br>Pre-Heat: 180±10°C, 60~120sec<br>Soldering: 217°C, 40±5sec<br>Peak Temperature: 235°C, 10sec<br><br>Temperature measured at contact / peg |
| 3.5.19     | Handling Ergonomics                      | No abnormalities allowed in manual mating/unmating handling                          | Manually operated  |
| 3.5.20     | Retention Force of Tab                   | 20N Min  | Measure the retention force between housing and tab contact<br>Operation speed: 100mm/min  |
| 3.5.21     | Resistance to Soldering Heat             | No cracks, deformation, discoloration that are problematic in function shall appear. | TEC-109-201 Test Method B, Condition B<br>Solder Temperature: 260°C<br>20~40sec within 5°C of peak   |

Figure 1 (Cont.)

| Item No       | Test Description                  | Requirement   | Procedure   |
|---------------|-----------------------------------|---|---|
| ENVIRONMENTAL |                                   |   |   |
| 3.5.22        | Thermal Shock                     | Satisfy requirements of test item on the "3.6 sequence"   | Mated connector<br>-40°C/30min, 100°C/30min<br>Making this a cycle, repeat 1000 cycles<br>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"<br>Current Leakage: 3mA Max                                   | Mated connector<br>90~95% R.H., 60±5°C, 96hrs,<br>14V applied<br>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<br>SO <sub>2</sub> Gas: 25ppm, 75% R.H.<br>25°C, 96hrs  |
| 3.5.25        | Temperature Life (Heat Aging)     | Satisfy requirements of test item on the "3.6 sequence"   | Mated connector<br>120°C, 120hrs  |
| 3.5.26        | Resistance to Cold                | Satisfy requirements of test item on the "3.6 sequence"   | Mated connector<br>-40°C, 120hrs  |
| 3.5.27        | Humidity Temperature Cycling      | Satisfy requirements of test item on the "3.6 sequence"   | Mated connector<br>Condition Figure 7<br>Making this condition a cycle<br>Repeat 10 cycles<br>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"   | Mated connector<br>Subject JIS R 5210 cement blow of 1.5kg per 10sec in 15min intervals for 8 cycles with mating/unmating per 2 cycles  |
| 3.5.29        | Compound Environment Resistance   | Satisfy requirements of test item on the "3.6 sequence"<br>No electrical discontinuity greater than 1µsec shall occur | Temperature: 80°C<br>Vibration Frequency:<br>20→200→20Hz/3min (Log)<br>Acceleration: 44.1m/s <sup>2</sup><br>Vibration Direction: X, Y, Z<br>Duration: 300hrs<br>Test Current Figure 10<br>Mounting Figure 6<br>Monitor resistance variation and after this test check if instant cutoff occurs for an hour on "Vibration (High Frequency)" |
| 3.5.30        | Condensation                      | Satisfy requirements of test item on the "3.6 sequence"   | 0°C/10min, 80°C/90~95%/30min<br>Making this a cycle, repeat 48 cycles<br>Monitor current leakage during the test  |

Figure 1 (end)

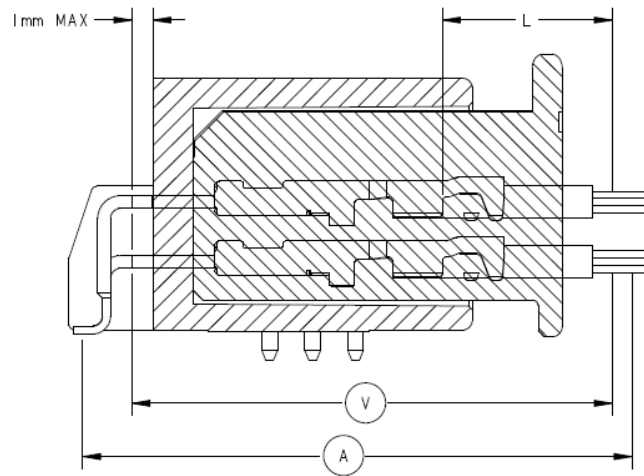
## 3.6. Product Qualification and Requalification Test Sequence

| Test or Examination | Test Group                                 |    |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |
|---------------------|--|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|-----|-----|-----|
|                     | 1  | 2  | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  | 13  | 14   | 15  | 16  |     |
|                     | Test Sequence (a)                          |    |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |
| 3.5.1               | Confirmation of Product                    | 1  | 1,5 | 1,6 | 1,4 | 1,5 | 1,5 | 1,6 | 1,5 | 1,6 | 1,4 | 1,5 | 1,6 | 1,7  | 1,4 | 1,3 | 1,3 |
| 3.5.2               | Termination Resistance (Low Level)         | 2  | 2,6 | 2,7 |     | 2,6 | 2,6 | 2,7 | 2,6 | 2,7 |     | 2,6 | 2,7 | 2,8  |     |     |     |
| 3.5.3               | Termination Resistance (Specified Current) | 3  | 3,7 | 3,8 |     | 3,7 | 3,7 | 3,8 | 3,7 | 3,8 |     | 3,7 | 3,8 | 3,9  |     |     |     |
| 3.5.4               | Dielectric Withstanding Voltage            | 7  |     |     |     |     |     | 10  |     |     |     | 9   |     |      |     |     |     |
| 3.5.5               | Insulation Resistance                      | 6  |     |     |     |     |     | 9   |     |     |     | 8   |     |      |     | 5   |     |
| 3.5.6               | Current Leakage                            |    |     |     |     |     |     | 5   |     |     |     |     |     |      |     | 3   |     |
| 3.5.7               | Temperature Rise                           | 4  |     |     |     |     |     |     |     | 4,9 |     |     |     | 4,10 |     |     |     |
| 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                     | 8  |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |
| 3.5.12              | Connector Unmating Force                   | 9  |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |
| 3.5.13              | Connector Locking Strength                 | 10 |     |     |     |     | 9   | 11  |     | 11  | 5   | 11  |     |      |     |     |     |
| 3.5.14              | Contact Insertion Force                    | 11 |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |
| 3.5.15              | Contact Retention Force (Latch Lock)       | 12 |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |
| 3.5.16              | Contact Retention Force (Secondary Lock)   | 13 |     |     |     |     | 10  | 12  |     | 12  | 6   | 12  |     |      |     |     |     |
| 3.5.17              | Resistance to "Kojiri"                     |    |     |     |     | 4   |     |     |     |     |     |     |     |      |     |     |     |
| 3.5.18              | Solderability (Reflow Soldering)           |    |     |     |     |     |     |     |     |     |     |     |     |      |     |     | 2   |
| 3.5.19              | Handling Ergonomics                        | 5  |     |     |     |     | 8   |     |     | 10  | 3   | 10  |     |      |     |     |     |
| 3.5.20              | Retention Force of Tab                     | 14 |     |     |     |     |     |     |     |     |     |     |     |      |     | 4   |     |
| 3.5.21              | Resistance to Soldering Heat               |    |     |     |     |     |     |     |     |     |     |     |     |      |     | 2   |     |
| 3.5.22              | Thermal Shock                              |    |     |     |     |     | 4   |     |     |     |     |     |     |      |     |     |     |
| 3.5.23              | Humidity (Steady State)                    |    |     |     |     |     |     | 4   |     |     |     |     |     |      |     |     |     |
| 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               |    |     |     |     |     |     |     |     |     |     | 4   |     |      |     |     |     |
| 3.5.28              | Dust Bombardment                           |    |     |     |     |     |     |     |     |     |     |     | 5   |      |     |     |     |
| 3.5.29              | Compound Environment Resistance            |    |     |     |     |     |     |     |     |     |     |     |     | 5    |     |     |     |
| 3.5.30              | Condensation                               |    |     |     |     |     |     |     |     |     |     |     |     |      |     | 2   |     |

Figure 2


**NOTE**

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



Deduct resistance of wire "L"

Figure 3

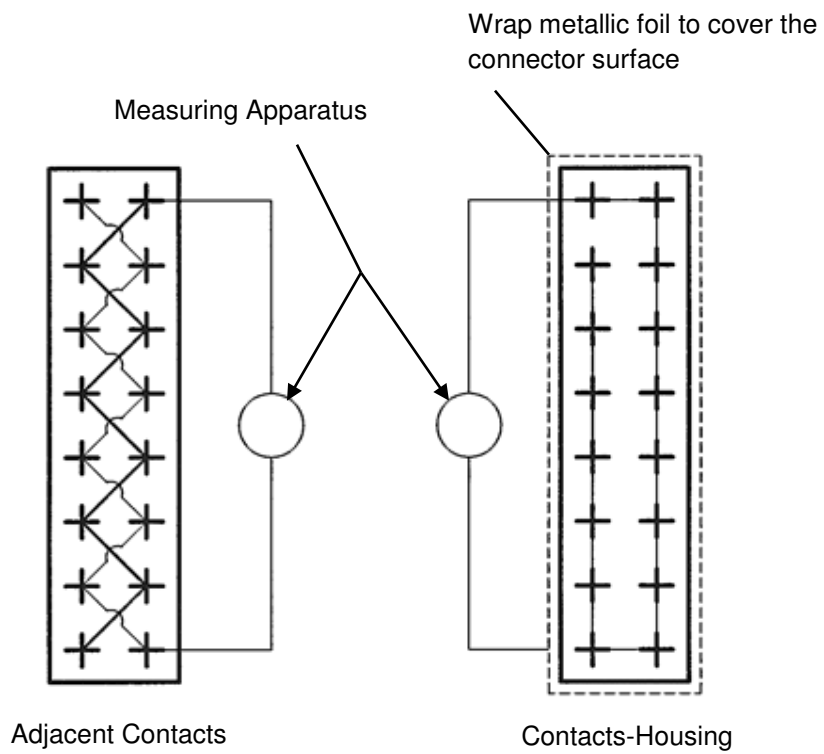


Figure 4

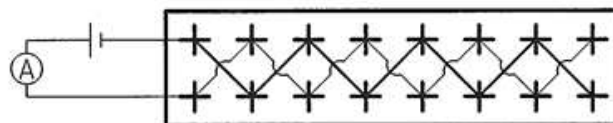


Figure 5

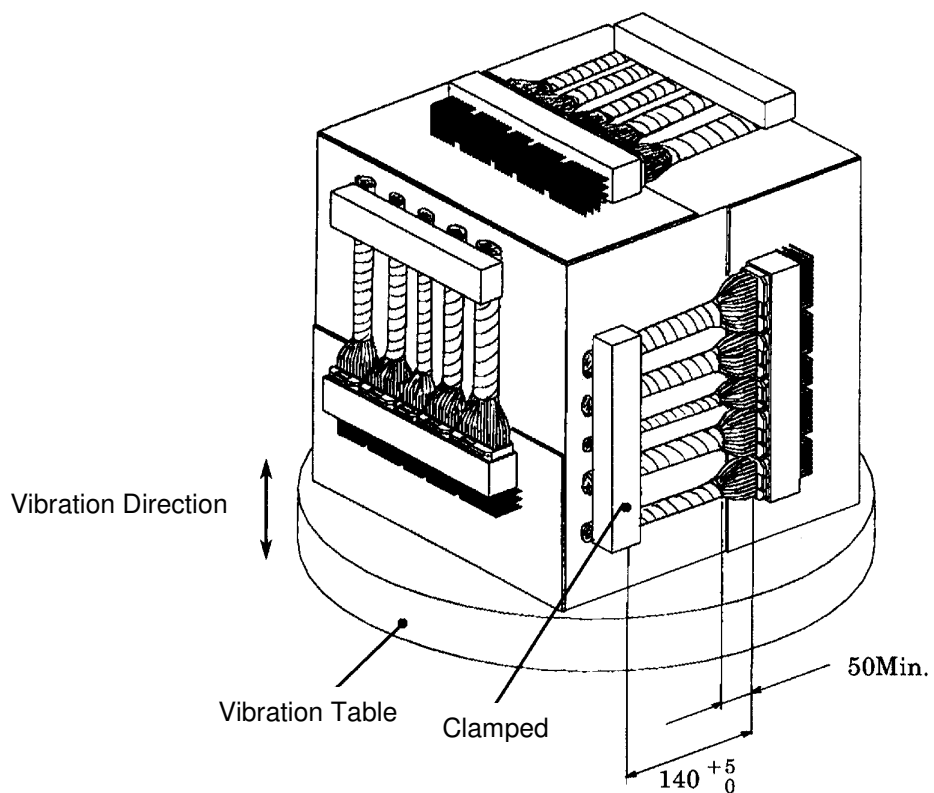


Figure 6

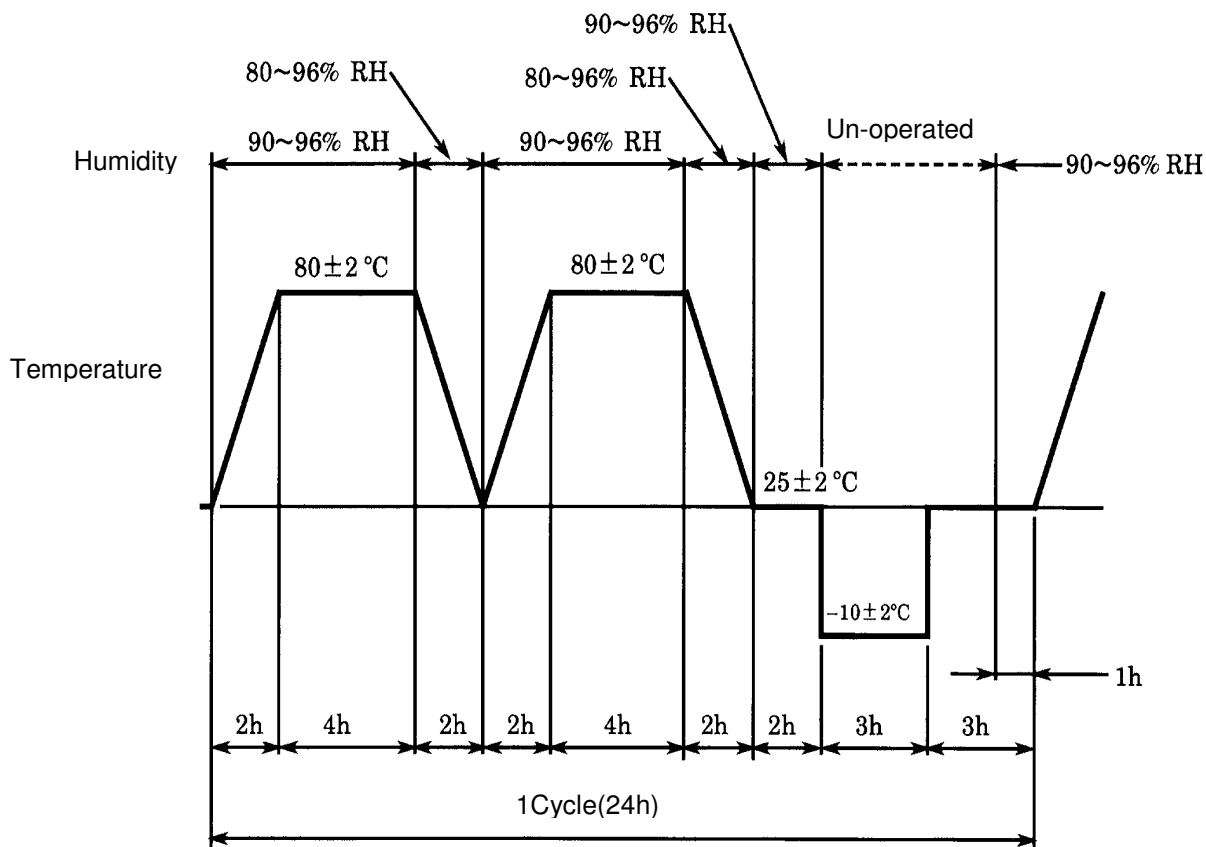


Figure 7



| 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               | 1 sec    |

Figure 8

| 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              |                  |
| 32 POS             | 0.5                          | 2.2              |                  |

Figure 9

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

Figure 10