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.025 JOINT 14P/30 CONNECTOR

1. Scope

1.1 Content

This specification defines the test method for 025 14P/30P Joint connector and terminal.

1.2 Qualification

When testing the named products, the following specified specifications and standards shall be used.

All tests have to be done using the applicable inspection plan and product.

2. Applicable Documents

The following documents, if they are referred inside this document, are part of this specification.

In case of conflict between the requirements of this specification and the product drawing or in conflict between the requirements of this specification and the referenced documents, this specification has precedence

2.1 TE Connectivity Documents

- A. 109-1: General Requirements for Test specifications.
- B. Customer Drawings
 - 2005496 Joint 14P
 - 2005499 Joint 30P
- C. 114-61030 Application spec for 025 Terminal

3. Requirements

No.	Items	Characteristics			Measuring method
1	Appearance	No harmful crack, rust, burr, damage, deformation, discoloration etc.			4.1
2	Reverse insertion between terminal and housing	2.4kgf or more			4.2
3	Engage force between terminal and housing	0.8kgf or less			4.3
4	Terminal retention force	6kgf or more at secondary locking condition			4.4
5	Voltage drop	Division	Initial	After endurance	4.5
		025	10 mV/A or less	20 mV/A or less	
6	Insulation resistance	Division	Initial	After endurance	4.6
		Non-waterproof	100MΩ or more	100MΩ or more	
7	Leakage current	Division	Initial	After endurance	4.7
		Non-waterproof	1 μA or less	1μA or less	
8	High voltage test	There shall be no insulation break.			4.8
9	Temperature rise	Division	After endurance		4.9
		General Connector	40°C or less		
10	Instant short circuit	There shall be no 10μs or more instant short circuit.			4.10
11	Clip engage force	6kgf or less			4.11
12	Clip retention force	11kgf or more			4.12
13	Overcurrent cycle test	See Requirement No: 3.1 / 3.5 / 3.9			4.13
14	Cold temperature test	See Requirement No: 3.1 / 3.5 / 3.6 / 3.7 / 3.9			4.14
15	Cold and hot temperature shock test	See Requirement No: 3.1 / 3.5			4.15
16	High temperature test	See Requirement No: 3.1 / 3.5			4.16
17	Temperature Humidity test	See Requirement No: 3.1 / 3.5 / 3.6 / 3.7 /			4.17
18	Dust test	See Requirement No: 3.5			4.18
19	Ozone test	See Requirement No: 3.1 / 3.5			4.19
20	Sulfur gas test	See Requirement No: 3.1 / 3.5			4.20
21	Complex environment endurance test	See Requirement No: 3.1 / 3.5 / 3.9 / 3.10			4.21

< Table 1 >

4. Requirements Measuring Method

4.1 Appearance

By sense of sight and touch.

4.2 Reverse insertion between terminal and housing

Crimp cable of maximum size on terminal and then, insert it into housing by the end of insulation barrel in the reverse direction.

4.3 Engage force between terminal and housing

As shown in the following figure, measure the weight while inserting terminal into fixed housing at 50mm/min speed.

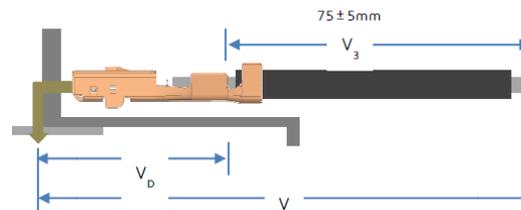
4.4 Terminal retention force

Fix the housing after inserting crimped terminals. Extend one line of cable in axial direction at a speed of 50mm/min at a position 50~100mm away from crimped part, and measure weight when terminal is disengaged from the housing.

4.5 Voltage Drop

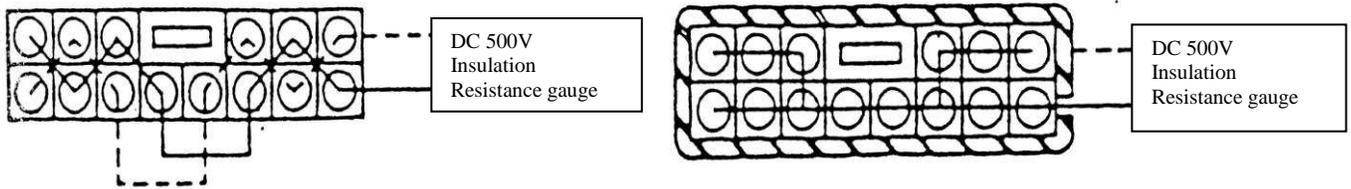
Measure the circuit voltage drop (V) by sending voltage and current described condition with terminal combined on the connector. Then calculate a voltage drop (V_D) in terminal by subtracting cable resistance (V_3) from the circuit voltage drop (V).

$$V_D = V - (V_3), \text{ Open Voltage: } 20 \pm 5 \text{ mV, Short circuit current: } 10 \text{ mA}$$



4.6 Insulation resistance

Measure resistance between neighbor terminals (figure 4-1), and between terminal and housing surface (figure 4-2) with DC 500V insulation resistance gauge with connector combined.



<Fig. 4-1: Between neighboring terminals>

<Fig. 4-2: Between neighboring terminal and housing surface>

4.7 Leakage current

Measure it by applying DC 14V between neighboring terminals (figure 4-1).

4.8 High voltage test

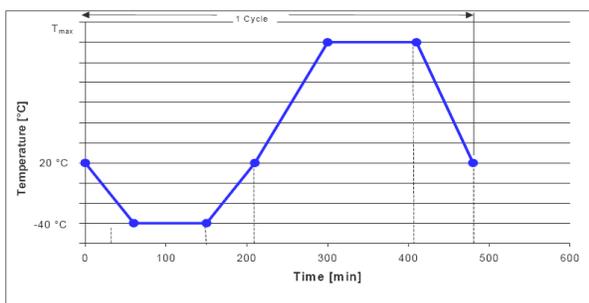
Apply AC 1000V voltage of normal frequency for 1 minute between neighboring terminals (figure 4-1), and between housing surfaces of terminal (figure 4-2), with connector combined.

4.9 Temperature rise

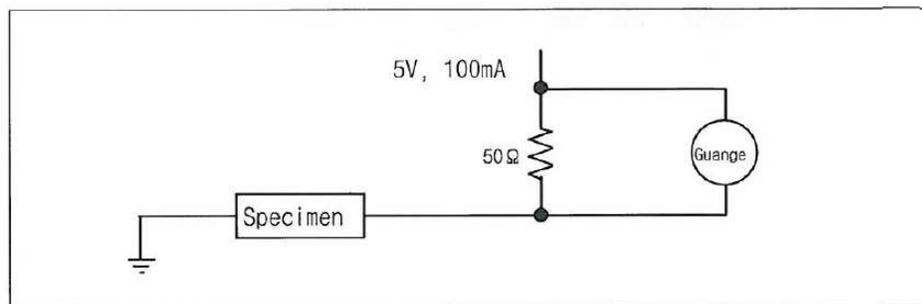
Apply basic current ($I=I_0 \times K$) of clause 5.3 to the connector with electrodes in series in the room free from wind (normal temperature). And measure a temperature of crimped part after reaching saturation temperature. Then calculate a temperature of crimped part by subtracting ambient temperature from the temperature.

4.10 Instant short circuit

It is instant short circuit, when 3.5V or less voltage continues for $10\mu s$ or more in gauge by applying 1mA, 5V open voltage. Figure 4-3 is an example of measured circuit.



Duration (Min)	Temperature (°C)
0	20
60	-40
150	-40
210	20
300	80
410	80
480	20



<Fig. 4-3>

4.11 Clip engage force

Measure the weight while inserting clip into fixed retainer cover housing at 50mm/min speed.

4.12 Clip retention force

Fix the retainer cover housing after inserting clip and measure weight when clip is disengaged from the retainer cover housing (direction: up/down, left/right, front/rear).

4.13 Overcurrent cycle test

Terminal assembled connector apply the following current 1000 cycles for the connector with electrodes in series at 60°C of ambient temperature

Current application condition A	Applied current	2 times of basic current
	Current application time	1 minute - ON, 9 minutes - OFF
Current application condition B	Applied current	5 times of basic current
	Current application time	10 seconds - ON, 590 seconds - OFF

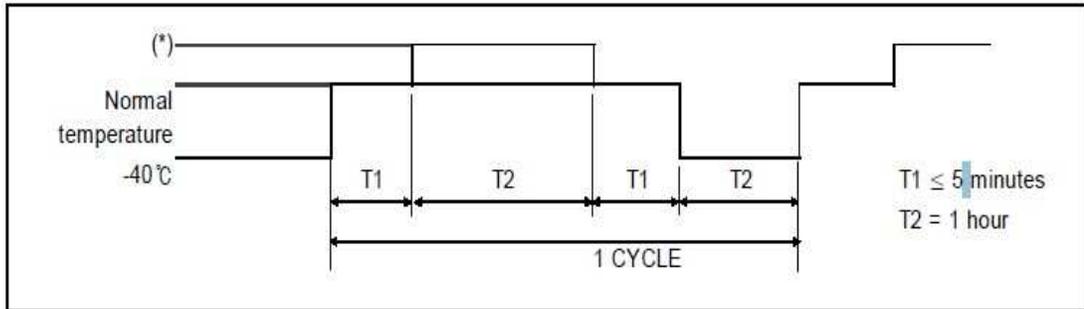
4.14 Cold temperature test

Leave connector with terminal assembled in temperature chamber of -40°C for 120 hours and estimate below items for each sample dividing two groups.

- A. Estimate voltage drop and leakage current assembled connector
- B. Leave connector for 2 hours, and then drop it onto the concrete surface from 1.0m height 3times.

4.15 Cold and hot temperature shock test.

Terminal assembled connector leave it in combined state at -40°C for 2hours, and perform 200 cycles according of the method specified in figure 4-4 and high temperature apply 80°C. Then leave it at room temperature for 2 hours or more.



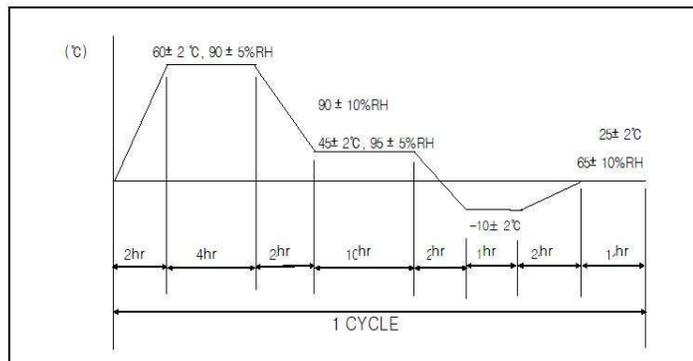
<Fig. 4-4: Test pattern>

4.16 High temperature test

Terminal assembled connector leave it in combined state at the temperature chamber (80°C) for 300 hours. Then pick it out and leave it until it returns to normal temperature.

4.17 Temperature Humidity test

Terminal assembled connector leave it at 25°C ambient temperature and 65% relative humidity for 25 hours. And perform 5 cycles of the method specified in figure 4-5. Then pick connector out of chamber and dry it for 2 hours or more.



<Fig. 4-5>

4.18 Dust test

Terminal assembled connector diffuse 1.5kg Portland cement (JIS R5210) with fan (or others) for 10 seconds per 15 minutes while maintaining 150mm distance from wall in the closed container of 900~1200mm length, width and height, with connector combined. After 1 hour, measure it.

4.19 Ozone test

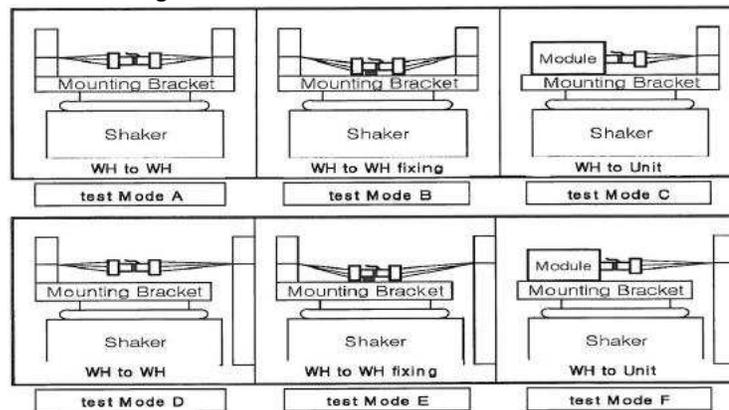
Terminal assembled connector keep at 40°C and 50±5pphm Ozone for 100hour. Then pick connector out of chamber and dry it for 2hours or more.

4.20 Sulfur (SO₂) gas test

Terminal assembled connector expose it in combined state to sulfur gas of 40±3°C, density 10ppm, humidity 90~95%, for 24 hours. Then pick connector out of chamber and dry it for 2 hours or more.

4.21 Complex environment endurance test A (Refer to the attached test process #1)

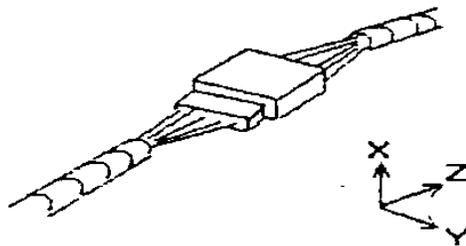
Terminal assembled connector leave it in combined state in the temperature chamber of 80°C for 48 hours. And then perform the following vibration test. Then measure instant short circuit for 4 hours for X, Y, Z each. Follow figure 4-6 for connector attaching method.



<Fig. 4-6 Connector attaching method>

◆ Vibration test

Division	Condition
Ambient temperature/humidity	Refer to figure 4.3, 90~95%
Applied current	Basic current 5.3
Current application cycle	120 Cycles (45 minutes-ON, 15 minutes-OFF)
Vibration acceleration	4.4g
Frequency	20Hz ~ 200Hz (sweep time: 3 minutes or less)
Vibration time	40 hours for X, Y, Z each
Connector attaching method	Test mode A, B, C



<X, Y, Z vibration direction>

■ VIBRATION TEST PROCEDURE

Group 1

During vibration test / check instant shot → Appearance

Group 2

During vibration test / Apply current cycle → Temperature rise test → Voltage drop test

5. Test conditions

5.1 Specimen

Unless there is specific mention, initial sample should use for the test specimen, and test specimen shall be 5EA or more for each cavity. However, if performance is expected to be clearly satisfactory ever by applying load to the same specimen in turn, it is possible to apply multiple test items to the same specimen. In such case, performance shall be satisfied with each item.

5.2 Laboratory condition

Perform each test at designated temperature and humidity. And control humidity at designated absorption ratio for the connector which uses absorbent resin housing.

Temperature: 25 ± 5 °C, Humidity: $60 \pm 20\%$

5.3 Basic current

Basic current value "I" shall be based on the following. ($I = I_0 * K$)

- Current: 4A for 0.22mm^2 and 0.3mm^2 wire, 5A for 0.5mm^2 wire
- Reduction factor (K): 0.4 for 14pin connector and 0.3 for 30pin connector