GLOW PLUG 1P Connector

1. SCOPE

1.1. Content

This specification covers the requirements for product performance, test methods and quality assurance provisions of GLOW PLUG 1P Connector.

1.2. Qualification

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

1.3. Qualification Test Results

Successful qualification testing on the subject product line has not been completed. The Qualification Test Report number will be issued upon successful qualification testing.

2. APPLICABLE DOCUMENTS AND FORMS

The following documents and forms constitute a part of this specification to the extent specified herein. Unless otherwise indicated, the latest edition of the document applies.

2.1. TE Documents

- 1743550: Customer Drawing (GLOW PLUG 1P CONN'R)

3. REQUIREMENTS

3.1. Design and Construction

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

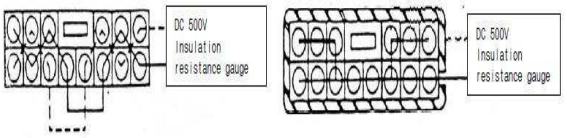
3.2. Ratings

Voltage	Temperature	Humidity
12V DC	25±5℃	60±20%

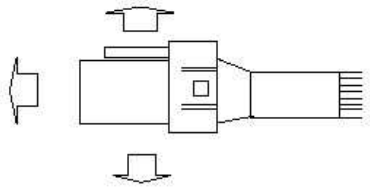
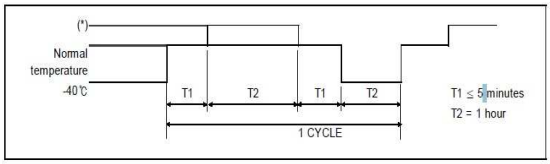
3.3. Test Requirements and Procedures Summary

Unless otherwise specified, all tests shall be performed at ambient environmental conditions.

TEST DESCRIPTION	REQUIREMENT	PROCEDURE
Appearance	No crack, damage, distortion are permitted	Using sense of sight and touch.

<table>
<tr><td>CONN engage and disengage force</td><td colspan="2">Max 10 kgf and less</td><td>Measure force by inserting and disengaging the connector with terminal assembled at constant 50 mm/min speed. However, remove lock part when measuring disengage force.</td></tr>
<tr><td>Voltage Drop</td><td colspan="2">090~312 Max 3mV/A
040~070 Max 5mV/A</td><td>Measure the circuit voltage drop (V) by sending voltage and current described in the table
5-1 with terminal combined on the connector.
Then calculate a voltage drop (VD) in terminal
by subtracting cable resistance (L) from the circuit voltage drop (V).
1)HARNESS versus UNIT:VD =V(L3+L4)
<table><tr><td>Application</td><td>Open voltage</td><td>Short circuit current</td><td>Division</td></tr><tr><td>Signal circuit</td><td>20 ± 5 mV</td><td>10 mA</td><td>ECU, Sensor</td></tr><tr><td>Power circuit</td><td>13 V</td><td>1 A</td><td>Other than the above</td></tr></table><Table5-1></td></tr>
<tr><td>Insulation resistance</td><td colspan="2">Min 250 MΩ</td><td>Measure resistance between neighbor terminals (figure 5-6), and between terminal and housing surface (figure 5-7) with DC 500V insulation resistance gauge with connector combined.
 
<Figure 5-6: Between neighboring terminals> <Figure 5-7: Between neighboring terminal and housing surface></td></tr>
<tr><td>Leakage current</td><td colspan="2">Max 100 μA</td><td>Measure it by applying DC 14V between neighboring terminals</td></tr>
<tr><td>High voltage test</td><td colspan="2">No allowed insulation breakdown</td><td>Measured by applying test potential of 1000 V AC between the adjacent contact between the contact and housing.</td></tr>
<tr><td>Sealing test</td><td colspan="2">1.0 kgf/㎠ or more</td><td>Put the combined connector in warter as shown in the figure 13 and supply 10Kpa(0.1kg/cm3) to connector for 30 seconds. Then increase it by 10Kpa(0.1kg/ cm3) until 200Kpa(2kg/ cm3) is reached and maximum value shall be specified in the test report for reference. (30 seconds/step)
(Use a wire of which the pressure does not leak at the end)</td></tr>
<tr><td rowspan="2">Twisting Test
- Connector Engage and Disengage Endurance Test</td><td>Appearance</td><td>No crack, damage, distortion are permitted</td><td rowspan="2">Apply 8kgf force on the end part of combined connector 10 times each in the (front, rear, left, right) directions perpendicular to axial direction.

Make combine connectors engage and disengage at 100mm/min. Perform it 50 times.
(Do not use locking device)</td></tr>
<tr><td colspan="2">Max 6mV/A</td></tr>
<tr><td rowspan="2">Cold temperature test</td><td>Appearance</td><td>No crack, damage, distortion are permitted</td><td rowspan="2">Engage and disengage connector with terminal assembled 10 times with hands, and leave it
in temperature chamber of -40℃ for 120 hours. Make connector engaged and disengaged 5 times immediately, and drop it onto the concrete surface from 1m height 3 times in the direction of figure 6-1. (Voltage drop & Temperature rise test perform at normal temperature) :</td></tr>
<tr><td>Current Leakage</td><td>Max 100 μA</td></tr>
</table>

			 <Figure 6-1>
Cold and hot temperature shock test	Appearance	No crack, damage, distortion are permitted	Engage and disengage Connector with terminal assembled 10 times with hands, this repeats 200 CYCLE by below test condition. (Sealed : 120℃, Non-Sealed : 80℃) 
	Voltage Drop	Max 6mV/A	
High temperature test	Appearance	No crack, damage, distortion are permitted	Engage and disengage connector with terminal assembled 10 times with hands, and leave it in combined state at the temperature chamber with 120℃ for 300 hours. Then pick it out and leave it until it returns to normal temperature.
	Voltage Drop	Max 6mV/A	
Dust Test	Voltage Drop	Max 6mV/A	Engage and disengage connector with terminal assembled 10 times with hands, and 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.
Waterproof Test	Appearance	No crack, damage, distortion are permitted	Make combined connectors engaged and disengaged 10 times by hanc and leave it in combined state at 120 ℃ ambient temperature for 40 minutes and then spray water of normal temperature for 20 minutes according to S2 of JIS D0203. Repeat 48 cycles of this. * JIS D0203 S2 condition: attach specimen at 400mm distance from th waterproof pipe with water spray hole or water discharge hole, and rota waterproof pipe 23 times per minute around the axis.
	Voltage Drop	Max 6mV/A	
	Current Leakage	Max 100 ㎂	
Oil and liquid test	Appearance	No crack, damage, distortion are permitted	Engage and disengage connector with terminal assembled 10 times with hands, and perform test each sample with connector combined. A. Immerge connector in combined state for 2 hours in mixed oil of 50± 2℃ ENG oil (SAE10W) or equivalent oil and B. Immerge connector in combined state for1 hour in car gasoline (JIS K2202) at normal temperature, and then pick it out. C. Immerge connector in combined state for 1 hour in brake liquid (pure product) at normal temperature, and then pick it out. D. Immerge connector in combined state for 1 hour in 100% washer liquid (pure product) at normal temperature, and then pick it out. E. Immerge connector in combined state for 1 hour in 50% LLC (Long life coolant) at normal temperature, and then pick it out.
	Voltage Drop	Max 6mV/A	

<table>
<tr><td rowspan="2">Ozone Test</td><td>Appearance</td><td>No crack, damage, distortion are permitted</td><td rowspan="2">Engage and disengage Connector with terminal assembled 10 times with hands, and samples keep at 40℃ and 50±5pphm Ozone for 100hour. Then pick connector out of chamber and dry it for 2hours or more.</td></tr>
<tr><td>Voltage Drop</td><td>Max 6mV/A</td></tr>
<tr><td rowspan="2">Salt water test</td><td>Appearance</td><td>No crack, damage, distortion are permitted</td><td rowspan="2">Engage and disengage connector with terminal assembled 10 times with hands, and pout it in 35℃ temperature regulation chamber, spray 5% salty water for 24 hours according to JIS Z2371, and, maintain room temperature without spray for 1 hour, Then repeat this four times. Then pick connector out of chamber and dry it at room temperature for 2 hours or more.</td></tr>
<tr><td>Voltage Drop</td><td>Max 6mV/A</td></tr>
<tr><td rowspan="5">Complex environment endurance test</td><td>Appearance</td><td>No crack, damage, distortion are permitted</td><td rowspan="5">Engage and disengage connector with terminal assembled 10 times with hands, and leave it in combined state in the temperature chamber of 120℃ or 80℃ (follows table 7) for 48 hours.
And then perform the following vibration test. Then measure instant short circuit according to the method of clause 4.16 for 4 hours for X, Y, Z each.</td></tr>
<tr><td>Voltage Drop</td><td>Max 6mV/A</td></tr>
<tr><td>Insulation Resistance</td><td>DV 500V</td><td>Min 100MΩ</td></tr>
<tr><td>Temperature Rise</td><td colspan="2">Max 50℃</td></tr>
<tr><td>Instant short circuit</td><td colspan="2">Max 10μs</td></tr>
</table>

Division	Condition	
	Sine test	Random test
Ambient temperature/humidity	120℃	
Applied current	Basic current (Connector electrodes in series.)	
Current application cycle	120 CYCLE (45 minutes-ON, 15 minutes-OFF)	24 CYCLE (45 minutes-ON, 15 minutes-OFF)
Vibration acceleration	Table	Table
Frequency	20Hz ~ 200Hz (sweep time: 3 minutes or less)	
Vibration time	40 hours for X, Y, Z each	8 hours for X, Y, Z each
Connector attaching method	Test mode A, B, C	Test mode D, E, F