MCP 9.5mm 1P Plug Housing

1. SCOPE

1.1. Content

This specification covers the requirements for product performance, test methods and quality assurance provisions of MCP 9.5mm 1P Plug Housing

1.2. Qualification

When tests are performed on the subject product line, procedures specified in Figure 1 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

- 114-61094: INTERFACE DRAWING FOR 9.5mm 1P PLUG
- 2005400: Customer Drawing (9.5mm 1P PLUG)

3. REQUIREMENTS

3.1. Design and Construction

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

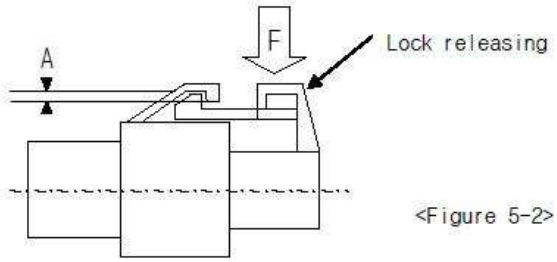
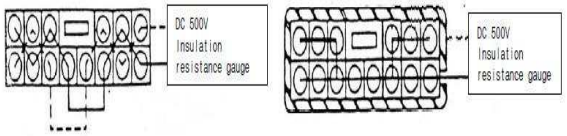
3.2. Ratings

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

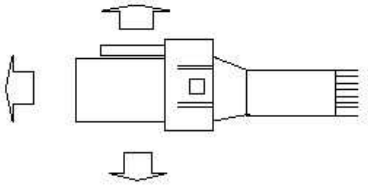
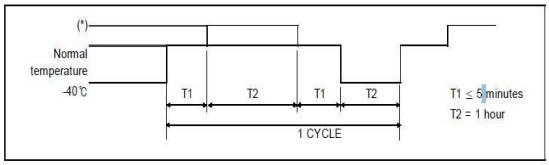
3.3. Test Requirements and Procedures Summary

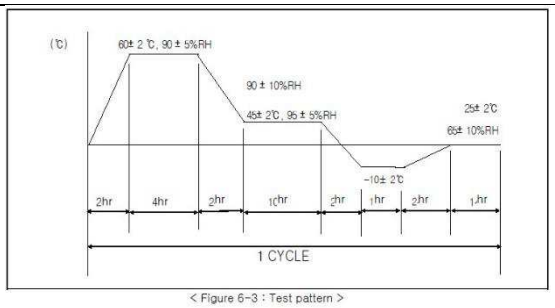
Unless otherwise specified, all tests shall be performed at ambient environmental conditions.

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

CONN engage and disengage force	Max 10 kgf and less	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.
Reverse insertion between housings	It shall not be incorrectly inserted by applying force of 20kgf.	Insert the housing with terminal by pushing it in reverse direction with applying 20kgf.
Contact to HSG Inverse Force	Min 1.5kgf	Crimp cable of maximum size on terminal and then insert it into housing by end of insulation barrel in the reserve direction.
Strength of HSG lock	Min 10kgf or less	Combine housing only, fix the one side of housing in completely locked condition, and extend the other side in axial direction and 30 angle direction at a constant speed of 50mm/min. Then measure weight when lock structure is disengaged or destroyed.
HSG lock releasing force	Max 6kgf	Apply force (F) to lock releasing part, and measure weight on the point of A=0. However, cut connector and then perform test at the section in order to secure visibility.  <Figure 5-2>
Terminal retention force	Min 14kgf	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.
Voltage Drop	Max 3mV/A	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) Application / Open voltage / Short circuit current / Division Signal circuit / 20 ± 5 mV / 10 mA / ECU, Sensor Power circuit / 13 V / 1 A / Other than the above <Table5-1>
Insulation resistance	Min 100 MΩ	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>

<table>
<tr><td>High voltage test</td><td colspan="3">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 rowspan="2">Twisting Test
- Connector Engage and Disengage Endurance Test</td><td>Appearance</td><td colspan="2">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="3">Max 10mV/A</td></tr>
<tr><td rowspan="5">Cold temperature test</td><td>Appearance</td><td colspan="2">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 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) :
 
<Figure 6-1></td></tr>
<tr><td>Voltage Drop</td><td colspan="2">Max 10mV/A</td></tr>
<tr><td rowspan="2">Insulation Resistance</td><td rowspan="2">Non-Sealed CONN'R : Min 100 MΩ</td><td>Between terminals</td></tr>
<tr><td>housing surface</td></tr>
<tr><td>Current Leakage</td><td colspan="2">Max 1mA</td></tr>
<tr><td>Temperature Rise</td><td colspan="2">Max 60℃</td></tr>
<tr><td rowspan="2">Cold and hot temperature shock test</td><td>Appearance</td><td colspan="2">No crack, damage, distortion are permitted</td><td rowspan="2">Engage and disengage Connector with terminal assembled 10 times with hands, this repeats 200 CYCLE by below test condition. (Sealed : 120℃, Non-Sealed : 80℃)
 
</td></tr>
<tr><td>Voltage Drop</td><td colspan="2">Max 10mV/A</td></tr>
<tr><td rowspan="2">High temperature test</td><td>Appearance</td><td colspan="2">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 combined state at the temperature chamber of the table 6-1 for 300 hours. Then pick it out and leave it until it returns to normal temperature.
<table><tr><td>High temperature(*)</td><td>Connector using part</td></tr><tr><td>80℃</td><td>Non-waterproof connector</td></tr></table></td></tr>
<tr><td>Voltage Drop</td><td colspan="2">Max 10mV/A</td></tr>
<tr><td rowspan="2">Temperature Humidity Test</td><td>Appearance</td><td colspan="2">No crack, damage, distortion are permitted</td><td rowspan="2">Engage and disengage connector with terminal assembled 10 times with hands, and leave
it at 25℃ ambient temperature and 65% relative humidity for 25 hours. And perform 5
cycles of the method specified in figure 6-3</td></tr>
<tr><td>Voltage Drop</td><td colspan="2">Max 10mV/A</td></tr>
</table>

	Insulation Resistance	Min 100 MΩ	housing surface	 < Figure 6-3 : Test pattern >
Dust Test	Voltage Drop	Max 10mV/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 b hands, and leave it in combined state at 120 ℃ ambient tempera for 40 minutes and then spray water of normal temperature for 2 minutes according to S2 of JIS D0203. Repeat 48 cycles of this. * JIS D0203 S2 condition: attach specimen at 400mm distance f the waterproof pipe with water spray hole or water discharge hol and rotate waterproof pipe 23 times per minute around the axis.
	Insulation Resistance	Min 100 MΩ	housing surface	
	Current Leakage	Max 1 μA		
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 10mV/A		
Ozone Test	Appearance	No crack, damage, distortion are permitted		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.
	Voltage Drop	Max 10mV/A		
Sulfur (SO2) gas test	Appearance	No crack, damage, distortion are permitted		Engage and disengage connector with terminal assembled 10 times with hands, and expose it in combined state to sulfur gas of 40±3℃, density 10ppm, humidity 90~95%, for 24 hours. Then pick connector out of chamber and dry it for 2 hours or more.
	Voltage Drop	Max 10mV/A		

<table>
<tr>
<td rowspan="6">Complex environment endurance test</td>
<td>Appearance</td>
<td colspan="2">No crack, damage, distortion are permitted</td>
<td rowspan="6">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.
<table>
<tr><th>Division</th><th>Condition</th></tr>
<tr><td>Ambient temperature/humidity</td><td>80℃, 90~95%</td></tr>
<tr><td>Applied current</td><td>Basic current (Connector electrodes in series.)</td></tr>
<tr><td>Current application cycle</td><td>120 CYCLE (45 minutes-ON, 15 minutes-OFF)</td></tr>
<tr><td>Vibration acceleration</td><td>4.4g</td></tr>
<tr><td>Frequency</td><td>20Hz ~ 200Hz (sweep time: 3 minutes or less)</td></tr>
<tr><td>Vibration time</td><td>40 hours for X, Y, Z each</td></tr>
<tr><td>Connector attaching method</td><td>Test mode A, B, C</td></tr>
</table>
</td>
</tr>
<tr>
<td rowspan="2">Crimp Tensile Strength</td>
<td>8.0SQ</td>
<td>Min 50kgf</td>
</tr>
<tr>
<td>10.0SQ</td>
<td>Min 52kgf</td>
</tr>
<tr>
<td>Voltage Drop</td>
<td colspan="2">Max 10mV/A</td>
</tr>
<tr>
<td>Temperature Rise</td>
<td colspan="2">Max 60℃</td>
</tr>
<tr>
<td>Instant short circuit</td>
<td colspan="2">Max 10㎲</td>
</tr>
</table>

3.4. Applied Part No List

TE Part no	Description
2005400-1	MCP 9.5mm 1P Plug Hosing NAT
2005400-2	MCP 9.5mm 1P Plug Hosing BLK
2005400-3	MCP 9.5mm 1P Plug Hosing Gray