MQS 3P SLD

1. SCOPE

1.1. Content

This specification covers the requirements for product performance, test methods and quality assurance provisions of MQS 3P SLD

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

- 368312 : Customer Drawing (MQS, PIN HEADER ASS'Y 3POS)
- 936287 : Customer Drawing (MQS, PIN HEADER ASS'Y 6POS)
- 1743156 : Customer Drawing (MQS, PIN HEADER ASS'Y 6POS (V-Type))
- 936459 : Customer Drawing (CONN'R COVER HSG FOR MQS HEADER, SWS, 3POS)

3. REQUIREMENTS

3.1. Design and Construction

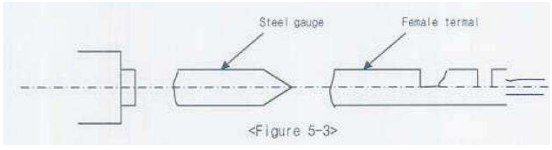
Product shall be of the design, construction, materials and physical dimensions specified on the applicable product drawing.

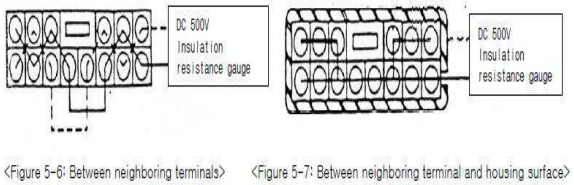
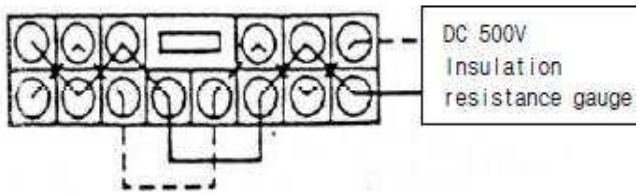
3.2. Ratings

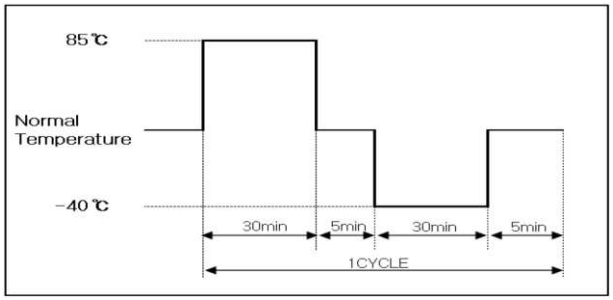
Voltage	Temperature	Humidity
12V DC	25±5℃	60±20%

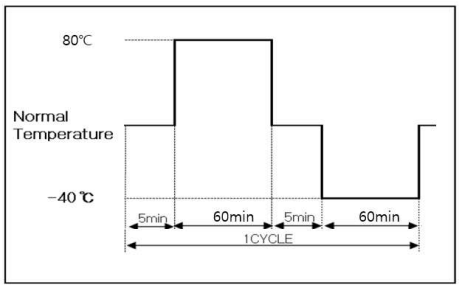
3.3. Test Requirements and Procedures Summary

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

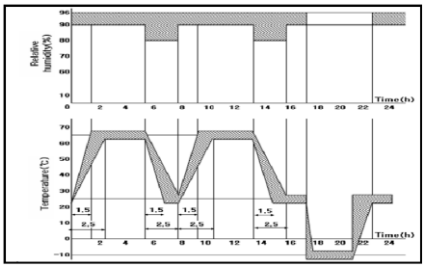
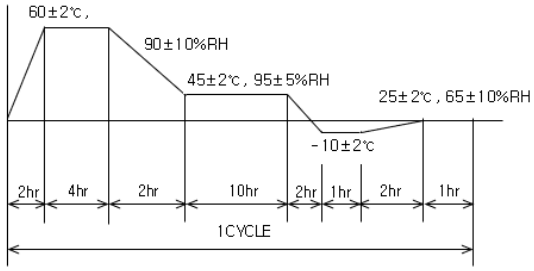
TEST DESCRIPTION	REQUIREMENT	PROCEDURE
Appearance	No crack, damage, distortion are permitted	Using sense of sight and touch.
CONN engage and disengage force	Max 7.6 kgf and less / Only 3P (368312) Max. 10kgf and less	Measure force by inserting and disengaging the connector with terminal assembled at constant 50 mm/min speed. However, remove lock part when measuring disengage force. (Only 3P (368312) 100 mm/min Speed)
Reverse insertion between housings	It shall not be incorrectly inserted	Insert the housing with terminal by pushing it in reverse direction with applying 10kgf. (Only 3P (368312) 30kgf)
Reverse insertion between terminal and HSG	Min. 1.5kgf / Only 3P (368312) It shall not be incorrectly inserted	Crimp cable of maximum size on terminal and then insert it into housing by end of insulation barrel in the reserve direction. (Only 3P insert hand or 5kgf)
Insertion force between terminal and HSG	Max. 1.5kgf	Insert terminal into fixed HSG at 50mm/min speed (Only 3P (368312) 100 mm/min Speed)
Strength of HSG lock	1~3P : Min. 2kgf 4P ~ : Min. 4kgf Only 3P (368312) : Min. 8kgf	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. (Only 3P (368312) axial direction at a constant speed of 100 mm/min Speed and lock structure is no disengaged or destroyed.)
Terminal retention force	Min. 6kgf	Fix the housing after inserting crimped terminals. Extend one line of cable in axial direction at a speed of 100mm/min at a position 50~100mm away from crimped part, and measure weight when terminal is disengaged from the housing.
Engage and disengage force of terminal - Only 3P (368312)	Engage: 0.1~0.5kgf Disengage: 0.1~0.5kgf	As shown in figure 5-3, engage and disengage male terminal or steel gauge into or from female terminal at 100mm/min speed  <Figure 5-3>
Crimp strength - Only 3P (368312)	0.5SQ: Min 9kgf	Fix the crimped terminal and draw the cable at a position 50~100mm away from crimped part in axial direction at 100mm/min speed. Then measure the weight when cable is cut or disengage from the crimped part.
Voltage Drop	Max 30mΩ / Only 3P (368312) : Max. 10mV/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).

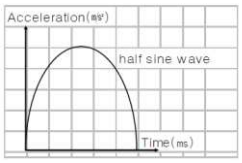
<table>
<tr><td></td><td></td><td>1)HARNESS versus UNIT:VD =V-(L3+L4)
<table><tr><td>Application</td><td>Open voltage</td><td>Short circuit current</td><td>Division</td></tr><tr><td>Signal circuit</td><td>20 ± 5 mV</td><td>10 mA</td><td>ECU, Sensor</td></tr></table>
<Table5-1></td></tr>
<tr><td>Insulation resistance</td><td>Min. 100 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 - Only 3P (368312)</td><td>10 μA or less</td><td>Measure it by applying DC 13V between neighboring terminals (figure 5-6).
 
<Figure 5-6: Between neighboring terminals></td></tr>
<tr><td>High voltage test</td><td>No allowed
Insulation breakdown</td><td>Measured by applying test potential of 500 V AC for 1 minutes between the adjacent contact between the contact and housing.
(Only 3P (368312) 1000 V AC for 1 minutes)</td></tr>
<tr><td>Temperature rise - Only 3P (368312)</td><td>Max. 30℃</td><td>Apply basic current (I=I0*K) of clause 4.3 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.</td></tr>
<tr><td>Twisting Test
- Connector Engage and Disengage Endurance Test</td><td>Appearance: No crack, damage, distortion are permitted
Max 20mV/A</td><td>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>Connector Solderablity</td><td>Satisfied an appearance qualify and be soldered on lead area more than 95%</td><td>1) Sn/Pb conditions
- Solder temperature : 230 +/-5℃
- Immersionperiod : 3 +/-0.5sec
2) Pb free conditions
- Solder temperature : 245 +/-5℃
- Immersionperiod : 3 +/-0.5sec</td></tr>
<tr><td>Overcurrent cycle test - Only 3P (368312)</td><td>Appearance: No crack, damage, distortion are permitted
Voltage Drop: Max. 20mV/A, Condition A(8.8A)
Temperature Rise: Max. 40℃, Condition A(8.8A)</td><td>Engage and disengage connector with terminal assembled 10 times with hands, and apply to following current 1000 cycles for the connector with electrodes in series at 60℃ of ambient temperature.
<table><tr><td rowspan="2">Current application condition A</td><td>Applied current</td><td>2 times of basic current</td></tr><tr><td>Current application time</td><td>1 minute - ON, 9 minutes - OFF</td></tr></table></td></tr>
</table>

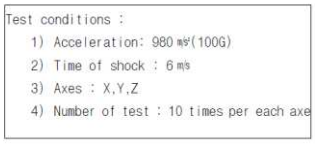
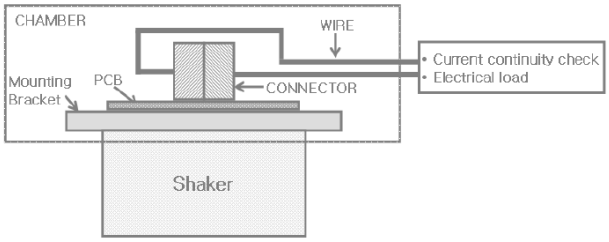
<table>
<tr><td>Cold temperature test - Only 3P (368312)</td><td>Appearance</td><td colspan="2">No crack, damage, distortion are permitted</td><td>Engage and disengage connector with terminal assembled 10 times with hands, and leave it in temperature chamber of -40℃ for 120 hours. Make connector engaged 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 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 10 times by hand, and perform 200 cycles according to the conditionin figure 6-1. Then pick specimen out of chamber and leave at room temperature for 2 hours or more.
 

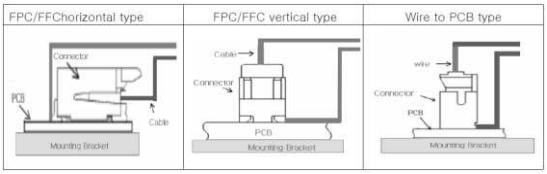
<figure 6-1>
Only 3P (368312) leave it in temperature chamber of -40℃ for 120 hours and perform 200 cycles according to the conditionin figure 6-2 and leave at room temperature for 2 hours or more.
 

<figure 6-2></td></tr>
<tr><td>Voltage Drop</td><td colspan="2">Max. 50mΩ / Only 3P (368312) : Max. 20mV/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 10 times by hand, and leave it in combined state at the temperature chamber of 80℃ for 300 hours. Then pick specimen out of chamber and leave at room temperature for 2 hours or more.</td></tr>
<tr><td>Voltage Drop</td><td colspan="2">Max. 50mΩ / Only 3P (368312) : Max. 20mV/A</td></tr>
<tr><td rowspan="5">High temperature and high humidity test</td><td>Appearance</td><td colspan="2">No crack, damage, distortion are permitted</td><td rowspan="5">Leave assembled connector in chamber of 85±2℃ temperature and 85% humidity for 500 hours with standard voltage after insertion and separation of the connector repeatedly 10 times by hands. Then pick specimen out of the chamber and leave it at room temperature for 2 hours or more.
(Only 3P (368312) is not proceed the test.)</td></tr>
<tr><td>Voltage Drop</td><td colspan="2">Ma.x 50mΩ</td></tr>
<tr><td rowspan="2">Insulation Resistance</td><td rowspan="2">Min. 10MΩ</td><td>Between terminals</td></tr>
<tr><td>housing surface</td></tr>
<tr><td rowspan="2">High voltage</td><td rowspan="2">No allowed Insulation breakdown</td><td>Between terminals</td></tr>
<tr><td>housing surface</td></tr>
</table>

<table>
<tr><td>Dust Test</td><td>Voltage Drop</td><td colspan="2">Max. 50mΩ /
Only 3P (368312) :
Max. 20mV/A</td><td>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.</td></tr>
<tr><td rowspan="2">Sulfur (SO2) gas 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 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.</td></tr>
<tr><td>Voltage Drop</td><td colspan="2">Max. 50mΩ /
Only 3P (368312) :
Max. 20mV/A</td></tr>
<tr><td rowspan="5">Temperature and humidity cycle test</td><td>Appearance</td><td colspan="2">No crack, damage, distortion are permitted</td><td rowspan="5">Engage and disengage connector10 times by hand, and perform 10 cycles according to the condition in figure 6-2. Then pick specimen out of chamber and leave it at room temperature for 2 hours or more
 
Only 3P (368312) leave at 25℃, humidity 90~95% for 25 hours. And perform 200 cycles according to the conditionin below figure
  </td></tr>
<tr><td>Voltage Drop</td><td colspan="2">Max. 50mΩ /
Only 3P (368312) :
Max. 20mV/A</td></tr>
<tr><td>Insulation Resistance
(3P (368312) is not proceed the test.)</td><td rowspan="2">Min. 10MΩ</td><td>Between terminals</td></tr>
<tr><td>housing surface</td></tr>
<tr><td>Current Leakage</td><td colspan="2">Only 3P (368312)
Max. 1mA</td></tr>
<tr><td rowspan="2">Oil and liquid test - Only 3P (368312)</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 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.</td></tr>
<tr><td>Voltage Drop</td><td colspan="2">Max. 20mV/A</td></tr>
<tr><td rowspan="2">Ozone test - Only 3P (368312)</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 samples keep at 40℃ and 50±5pphm Ozone for 100hour.</td></tr>
<tr><td>Voltage Drop</td><td colspan="2">Max. 10mV/A</td></tr>
</table>

<table>
<tr><td rowspan="3">Shock test</td><td>Appearance</td><td>No crack, damage, distortion are permitted</td><td rowspan="3">Connector shall be mounted in PCB board. After testing connector with half sine wave and following conditions, Connector must meet the requirements of appearance, voltage drop and Instantaneous short.
(Only 3P (368312) is not proceed the test.)
 


</td></tr>
<tr><td>Voltage Drop</td><td>Max. 50mΩ /
Only 3P (368312) : Max. 20mV/A</td></tr>
<tr><td>Instantaneous short</td><td>No allowed Instantaneous short of Max. 10 ㎲</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 10 times by hand, (Only 3P (368312) leave it into chamfer at 120℃ for 48 hours) and then perform the test with the conditions of Complex environment endurance test in combined with vibration tester as following figure. Then measure instant short circuit
 



<table>
<tr><th>Division</th><th>Conditions</th></tr>
<tr><td>Ambient temperature/humidity</td><td>80℃, 90~95%</td></tr>
<tr><td>Applied current</td><td>Basic current(Connect electrodes in series.)</td></tr>
<tr><td>Current application cycle</td><td>120 CYCLE(45minutes-ON, 15minutes-OFF)</td></tr>
<tr><td>Vibration acceleration</td><td>4.4 g</td></tr>
<tr><td>Frequency</td><td>20 Hz ~ 200 Hz (Sweep Time max3 minutes)</td></tr>
<tr><td>Vibration time</td><td>40 hours for , Y, each</td></tr>
</table></td></tr>
<tr><td>Voltage Drop</td><td>Max. 50mΩ</td></tr>
<tr><td>Temperature rise</td><td>Max. 40℃</td></tr>
<tr><td>Crimp strength - Only 3P (368312)</td><td>0.5SQ : Min. 9kgf</td></tr>
<tr><td>Instantaneous short</td><td>No allowed Instantaneous short of Max. 10 ㎲</td></tr>
</table>

3.4. Applied Part No List

TE Part no	Description
1743156-1	MQS, PIN HEADER ASSY 3POS(V-TYPE)_NATURAL
1743156-2	MQS, PIN HEADER ASSY 3POS(V-TYPE)_BLACK
936287-2	MQS, PIN HEADER ASSY 6POS_NATURAL
2-936287-2	MQS, PIN HEADER ASSY 6POS_BLACK
3-936287-4	MQS, PIN HEADER ASSY 6POS_BROWN
368312-1	MQS, PIN HEADER ASSY 3POS_BLACK
368312-2	MQS, PIN HEADER ASSY 3POS_NATURAL
936459-2	CONN'R COVER HSG FOR MQS HEADER, SWS, 3POS_BLACK