



The product described in this document has not been fully tested to ensure conformance to the requirements outlined below. Therefore, TE Connectivity (TE) makes no representation or warranty, express or implied, that the product will comply with these requirements. Further, TE may change these requirements based on the results of additional testing and evaluation. Contact TE Engineering for further details.

### MQS 6P(new)

## 1. SCOPE

### 1.1. Content

This specification covers the requirements for product performance, test methods and quality assurance provisions of MGS 6P(new)

### 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

- 2109233 : CUSTOMER DRAWING FOR MGS 6P PLUG HSG
- 2109234 : CUSTOMER DRAWING FOR MGS 6P RETAINER HSG

## 3. REQUIREMENTS

### 3.1. Design and Construction

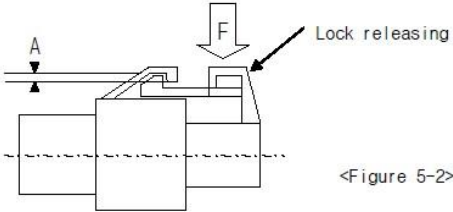
Product shall be of the design, construction, materials and physical dimensions specified on the applicable product drawing.

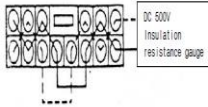
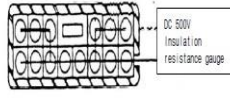
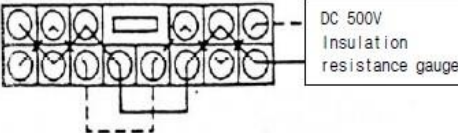
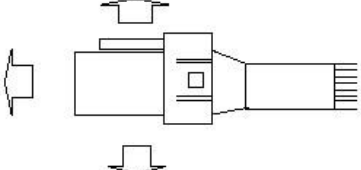
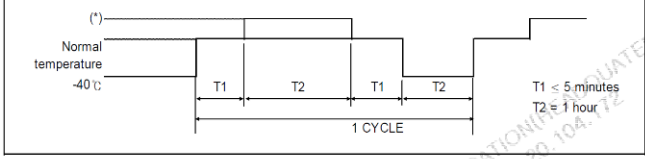
### 3.2. Ratings

Voltage	Temperature	Humidity
12V DC	25±5°C	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.												
Reverse insertion between terminal and HSG	Min. 3kgf	Crimp cable of maximum size on terminal and then insert it into housing by end of insulation barrel in the reserve direction.												
Insertion force between terminal and HSG	Max. 1.5kgf	Insert terminal into fixed HSG at 50mm/min speed												
Strength of HSG lock	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 degree 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.  <p style="text-align: right;">&lt;Figure 5-2&gt;</p>												
Terminal retention force	Min. 6kgf	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. 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). 1) HARNESS versus UNIT: $VD = V - (L3 + L4)$ <table border="1" data-bbox="885 1711 1461 1837"> <thead> <tr> <th>Application</th> <th>Open voltage</th> <th>Short circuit current</th> <th>Division</th> </tr> </thead> <tbody> <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> </tbody> </table> <p style="text-align: center;">&lt;Table5-1&gt;</p>	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
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											

Insulation resistance	Between terminals	Min. 100 MΩ	<p>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.</p>   <p>&lt;Figure 5-6: Between neighboring terminals&gt; &lt;Figure 5-7: Between neighboring terminal and housing surface&gt;</p>									
	Between housing surface											
Leakage current	10 μA or less		<p>Measure it by applying DC 14V between neighboring terminals (figure 5-6).</p>  <p>&lt;Figure 5-6: Between neighboring terminals&gt;</p>									
High voltage test	No allowed Insulation breakdown		Measured by applying test potential of 1000 V AC for 1 minutes between the adjacent contact between the contact and housing.									
Twisting Test - Connector Engage and Disengage Endurance Test	Appearance	No crack, damage, distortion are permitted	<p>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)</p>									
	Voltage drop	Max. 20mV/A										
Cold temperature test	Appearance	No crack, damage, distortion are permitted	<p>Engage and disengage connector with terminal assembled 10 times with hands, and leave it in temperature chamber of -40°C 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 &amp; Temperature rise test perform at normal temperature) :</p>  <p>&lt;Figure 6-1&gt;</p>									
	Voltage drop	Max. 20mV/A										
	Insulation resistance	Between terminals		Min. 100 MΩ								
		Between housing surface										
	Current leakage	Max. 1 μA										
Temperature rise	Max. 40°C											
Cold and hot temperature shock test	Appearance	No crack, damage, distortion are permitted	<p>Engage and disengage connector with terminal assembled 10 times with hands, and leave it in combined state at -40°C for 2 hours, and perform 200 cycles according of the method specified in the figure 6-2. Then leave it at room temperature for 2 hours or more (*) follows table 6-1)</p>  <p>&lt; Figure 6- 2 : Test pattern &gt;</p> <table border="1" data-bbox="852 1743 1485 1837"> <thead> <tr> <th>Division</th> <th>High temperature (*)</th> <th>Connector using part</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>120 °C</td> <td>waterproof connector</td> </tr> <tr> <td>B</td> <td>80 °C</td> <td>Non- waterproof connector</td> </tr> </tbody> </table> <p>&lt; Table 6- 1 &gt;</p>	Division	High temperature (*)	Connector using part	A	120 °C	waterproof connector	B	80 °C	Non- waterproof connector
	Division	High temperature (*)		Connector using part								
A	120 °C	waterproof connector										
B	80 °C	Non- waterproof connector										
Voltage drop	Max. 20mV/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 of the table 6-1 for 300 hours. Then pick it out and leave it until it returns to normal temperature.	
	Voltage drop	Max. 20mV/A			
Temperature humidity test	Appearance	No crack, damage, distortion are permitted		Engage and disengage connector with terminal assembled 10 times with hands, and leave it at 25°C ambient temperature and 65% relative humidity for 25 hours. And perform 5 cycles of the method specified in figure 6-3	
	Voltage drop	Max. 20mV/A			
	Insulation resistance	Between terminals	Min. 100 MΩ		
		Between housing surface			
Current leakage	Max. 1 μA				
Dust test	Voltage drop	Max 20mV/A			
Waterproof test	Appearance	No crack, damage, distortion are permitted		Make combined connectors engaged and disengaged 10 times by hands, and leave it in combined state at 120 °C (waterproof), 80 °C (non_waterproof) 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 the waterproof pipe with water spray hole or water discharge hole, and rotate waterproof pipe 23 times per minute around the axis(XX).	
	Insulation resistance	Between terminals	Min. 100 MΩ		
		Between 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. Immerse connector in combined state for 2 hours in mixed oil of 50± 2°C ENG oil (SAE10W) or equivalent oil and B. Immerse connector in combined state for 1 hour in car gasoline (JIS K2202) at normal temperature, and then pick it out. C. Immerse connector in combined state for 1 hour in brake liquid (pure product) at normal temperature, and then pick it out. D. Immerse connector in combined state for 1 hour in 100% washer liquid (pure product) at normal temperature, and then pick it out. E. Immerse connector in combined state for 1 hour in 50% LLC (Long life coolant) at normal temperature, and then pick it out.	
	Voltage drop	Max. 20mV/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°C 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 (SO <sub>2</sub> ) 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°C, 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. 20mV/A		
Complex environment endurance 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 in the temperature chamber of 80°C for 48 hours. And then perform the following vibration test. Then measure instant short circuit according to the method of below for 4 hours for X, Y, Z each. Follow figure 6-7 for connector attaching method.
	Crimp tensile strength	0.3SQ	Min. 6kgf	
		0.75SQ	Min. 1kgf	
	Voltage drop	Max. 20mV/A		
	Temperature rise	Max. 40°C		
Instant short circuit	Max 10μs			

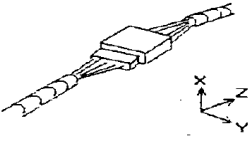
<Figure 6-7 Connector attaching method>

■ Vibration test A (for non-waterproof connector)

Division	Condition
Ambient temperature/humidity	80°C, 90~95%
Applied current	Basic current (Connector electrodes in series.)
Current application cycle	120 CYCLE (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

Breakpoint (Hz)	Magnitude (G²/Hz)
60.0	0.00100
200.0	1.50000
210.0	0.10000
1000.0	0.10000

			 <p>&lt;Figure 6- 8 : X, Y, Z vibration direction&gt;</p>
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3.4. Applied Part No List

TE Part no	Description
2109233-2	MQS 6P PLUG HSG BLACK
2109234-2	MQS 6P RETAINER HSG