



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 & JPT HYBRID CONNECTOR

1. SCOPE

1.1. Content

This specification covers the requirements for product performance, test methods and quality assurance provisions of MQS & JPT HYBRID CONNECTOR SERIES

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

- 368255: Customer Drawing (BOSCH 121P HEADER ASSEMBLY)
- 368290: Customer Drawing (ASS'Y CONNECTOR FOR JPT&MQS 81Pos.)
- 368291: Customer Drawing (COVER HOUSING FOR 81 Pos.)
- 368448: Customer Drawing (COVER HSG FOR JPT & MQS ASS'Y 81Pos. C TYPE)
- 936290: Customer Drawing (COVER HSG FOR JPT & MQS ASS'Y 81Pos. D TYPE)
- 368297: Customer Drawing (RETAINER HOUSING FOR MQS 76Pos.)
- 368293: Customer Drawing (MQS REC HOUSING TYPE A)
- 368294: Customer Drawing (MQS REC HOUSING TYPE B)

3. REQUIREMENTS

3.1. Design and Construction

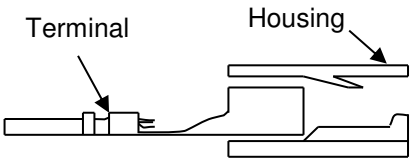
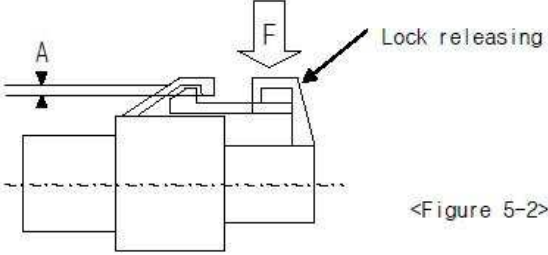
Product shall be of the design, construction, materials and physical dimensions specified on the applicable product drawing.

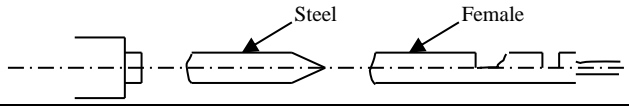
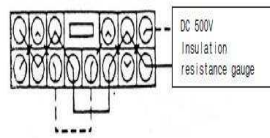
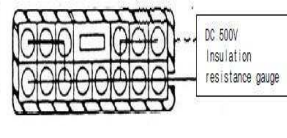
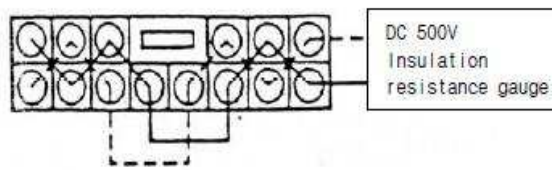
3.2. Ratings

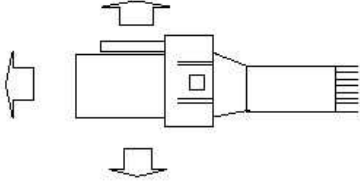
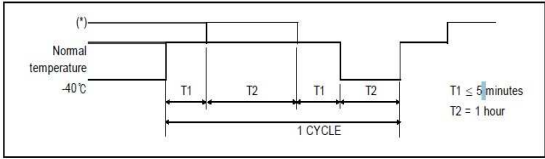
Voltage	Temperature	Humidity
12V DC	25±5°C	65±20%

3.3. Test Requirements and Procedures Summary

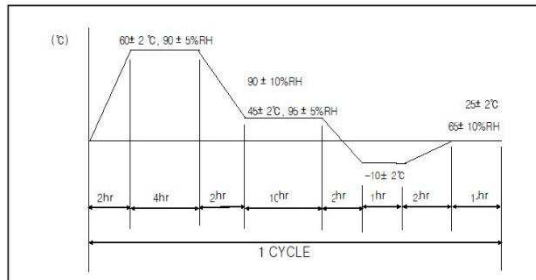
Unless otherwise specified, all tests shall be performed at ambient environmental conditions.

TEST DESCRIPTION	REQUIREMENT	PROCEDURE
Appearance	No crack, damage, distortion are permitted	Using sense of sight and touch.
CONN engage and disengage force	Max 18 kgf and less	Measure force by inserting and disengaging the connector with terminal assembled at constant 100 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 30kgf.	Insert the housing with terminal by pushing it in reverse direction with applying 30kgf.
Reverse insertion between terminal and housings	Min 5 kgf	Applied the maximum size wire onto the terminal and insert it by applying a 5 kgf force or hand reversely to the housing.
Engage force between terminal and housing	Max 1.5 kgf	As shown in the following figure 4-1, measure the weight while inserting terminal into fixed housing at 100mm/min speed.  <Figure 4-1>
CONN Clip panel engage and retention force	Engage: Max 5kgf or less Retention: Min 15kgf or more	1. Insert clip into the fixed plate that can be furnished with clip at 100mm/min and measure the force at that time. 2. Pull clip at 100mm/min and measure the force when destroyed or disengaged
Strength of HSG lock	025~040 series : Min 8kgf 050~375 series : Min 10kgf	Combine housing only, fix the one side of housing in completely locked condition, and extend the other side in axial direction at a constant speed of 100mm/min. Then measure weight when lock structure is disengaged or destroyed.
HSG lock releasing force	Max 6 kgf	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>

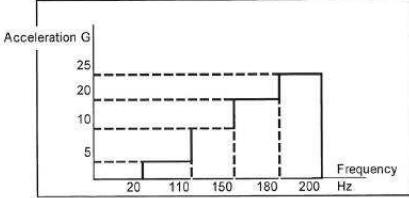
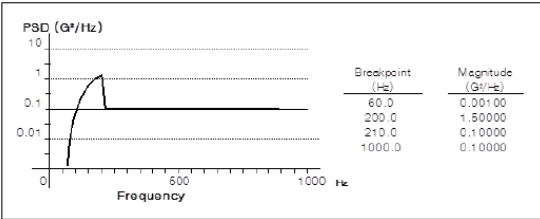
Terminal retention force	025 series : Min 6kgf 070~312 series : Min 10kgf		Fix the housing after inserting crimped terminals. Extend one line of cable in axial direction at a speed of 50mm/min at a position 50~100mm away from crimped part, and measure weight when terminal is disengaged from the housing.												
Terminal engage and disengage force (kgf)	Engage	025 series : 0.1~0.5kgf 110~187 series : 0.3~1.5kgf	As shown in figure 4-3, engage and disengage male terminal or steel gauge into or from female terminal at 100 mm/min speed. 												
	Disengage	025 series : 0.1~0.5kgf 110~187 series : 0.15~1.5kgf													
Crimp strength (kgf)	0.5 SQ : Min 9kgf 0.85 SQ : Min 13kgf		Fix the crimped terminal and draw the cable at a position 50~100 mm away from crimped part in axial direction at 100 mm/min speed. Then measure the weight when cable is cut or disengaged from the crimped part												
Voltage Drop	025 series : Max 10 mV/A 090~375series: Max 3 mV/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="828 882 1404 1008"> <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> <Table5-1>	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	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>												
Leakage current	Max 10 μA		Measure it by applying DC 14V between neighboring terminals (figure 5-6).  <Figure 5-6: Between neighboring terminals>												
High voltage test	No allowed Insulation breakdown		Measured by applying test potential of 1000 V AC between the adjacent contact between the contact and housing.												
Temperature Rise	Max 30°C		After the electrode reaches saturation temperature by supplying current to the connected connector, measure the temperature of the terminal compression.												

Twisting Test	Appearance	No crack, damage, distortion are permitted	Apply 8kgf force on the end part of combined connector 10 times each in the (front, rear, left, right) directions perpendicular to axial direction.				
	Voltage Drop	025 series : Max 20mV/A 030~375series: Max 10 mV/A					
Connector Engage and Disengage Endurance Test	Appearance	No crack, damage, distortion are permitted	Make combine connectors engage and disengage at 100mm/min. Perform it 50 times. (Do not use locking device)				
	Voltage Drop	025 series : Max 20mV/A 30~375series: Max 10 mV/A					
Over Current Cycle Test	Appearance	No crack, damage, distortion are permitted	Engage and disengage connector with terminal assembled 10 times with hands, and apply the following current 1000 cycles for the connector with electrodes in series at 60°C of ambient temperature.				
	Voltage Drop	025 series : Max 20mV/A 030~375series: Max 10 mV/A					
	Temperature Rise	Max 40°C					
Cold temperature test	Appearance	No crack,damage, distortion are permitted	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 & Temperature rise test perform at normal temperature) :  <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. (ENG ROOM : 120°C, ENG ROOM except : 80°C) 				
	Voltage Drop	025 series : Max 20mV/A 030~375series: Max 10 mV/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. <table border="1" data-bbox="812 1612 1367 1728"> <tr> <td>High Temperature</td> <td>Connector Using Part</td> </tr> <tr> <td>80°C</td> <td>Unsealed Connector</td> </tr> </table>	High Temperature	Connector Using Part	80°C	Unsealed Connector
	High Temperature	Connector Using Part					
80°C	Unsealed Connector						
Voltage Drop	025 series : Max 20mV/A 030~375series: Max 10 mV/A						
SOLDERING TEST	Not less than 95% applied.		Immerse the terminal post end of the connector in a 250±5 °C lead precipitator for 5 seconds.				

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. Then pick connector out of chamber and dry it for 2 hours or more.
	Voltage Drop	025 series : Max 20mV/A 030~375series: Max 10 mV/A	
	Current Leakage	Unsealed CONN'R: Max 1 mA	
Dust Test	Appearance	No crack, damage, distortion are permitted	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.
	Voltage Drop	025 series : Max 20mV/A 030~375series: Max 10 mV/A	
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°C ENG oil (SAE10W) or equivalent oil and B. Immerge connector in combined state for 1 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	025 series : Max 20mV/A 030~375series: Max 10 mV/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	025 series : Max 20mV/A 030~375series: Max 10 mV/A	
Salt Water Test	Appearance	No crack, damage, distortion are permitted	Engage and disengage connector with terminal assembled 10 times with hands, and put it in 35°C 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.
	Voltage Drop	025 series : Max 20mV/A 030~375series: Max 10 mV/A	



Sulfur (SO ₂) 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	025 series : Max 20mV/A 030~375series: Max 10 mV/A																																
Complex environment endurance 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 in the temperature chamber of 120°C or 80°C (follows table 7) for 48 hours.</p> <p>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.</p> <p>1) Wave Test A</p> <table border="1"> <thead> <tr> <th>Division</th> <th>Condition</th> </tr> </thead> <tbody> <tr> <td>Ambient temperature/humidity</td> <td>80°C, 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> </tbody> </table> <p>2) Wave Test B</p> <table border="1"> <thead> <tr> <th>Division</th> <th>Condition</th> </tr> </thead> <tbody> <tr> <td>Ambient temperature/humidity</td> <td>80°C, 90~95%</td> </tr> <tr> <td>Applied current</td> <td>5V , 1mA Continuous</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> </tbody> </table>	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	Division	Condition	Ambient temperature/humidity	80°C, 90~95%	Applied current	5V , 1mA Continuous	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
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Crimp Tensile Strength	0.5SQ	Min 9kgf																																
		0.85SQ	Min 13.0kgf																															
Voltage Drop	025 series : Max 20mV/A 030~375series: Max 10 mV/A																																	

	Temperature Rise	Max 40°C	3) Wave Test C <table border="1"> <thead> <tr> <th>Division</th> <th>Condition</th> </tr> </thead> <tbody> <tr> <td>Ambient temperature</td> <td>120°C</td> </tr> <tr> <td>Applied current</td> <td>5V, 1mA Continuous</td> </tr> <tr> <td>Vibration acceleration</td> <td>Follow figure 6-8</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> </tbody> </table>  <p>(Figure 6-8)</p>	Division	Condition	Ambient temperature	120°C	Applied current	5V, 1mA Continuous	Vibration acceleration	Follow figure 6-8	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
	Division	Condition															
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Applied current	5V, 1mA Continuous																
Vibration acceleration	Follow figure 6-8																
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																
Instant short circuit	Max 10 μ s	4) Random Wave Test <table border="1"> <thead> <tr> <th>Division</th> <th>Condition</th> </tr> </thead> <tbody> <tr> <td>Ambient temperature</td> <td>Room temperature</td> </tr> <tr> <td>Applied current</td> <td>5V, 1mA Continuous</td> </tr> <tr> <td>Vibration acceleration</td> <td>Follow figure 6-9</td> </tr> <tr> <td>Vibration time</td> <td>8 hours for X, Y, Z each</td> </tr> <tr> <td>Connector attaching method</td> <td>Test mode D, E, F</td> </tr> </tbody> </table>  <p>(Figure 6-9)</p>	Division	Condition	Ambient temperature	Room temperature	Applied current	5V, 1mA Continuous	Vibration acceleration	Follow figure 6-9	Vibration time	8 hours for X, Y, Z each	Connector attaching method	Test mode D, E, F			
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Ambient temperature	Room temperature																
Applied current	5V, 1mA Continuous																
Vibration acceleration	Follow figure 6-9																
Vibration time	8 hours for X, Y, Z each																
Connector attaching method	Test mode D, E, F																

3.4. Applied Part No List

TE Part no	Description
368255-2	BOSCH 121P HEADER ASSEMBLY
368255-3	BOSCH 121P HEADER ASSEMBLY
1-368255-2	BOSCH 121P HEADER ASSEMBLY
1-368255-3	BOSCH 121P HEADER ASSEMBLY
1-368255-5	BOSCH 121P HEADER ASSEMBLY
368290-1	ASS'Y CONNECTOR FOR JPT&MQS 81 POS.

9-368290-1	ASS'Y CONNECTOR FOR JPT&MQS 81 POS.
368293-1	MQS REC HOUSING TYPE A
9-368293-1	MQS REC HOUSING TYPE A (CHINA ONLY)
368294-1	MQS REC HOUSING TYPE B
9-368294-1	MQS REC HOUSING TYPE B (CHINA ONLY)
368297-1	RETAINER HOUSING FOR MQS 76 POS.
9-368297-1	RETAINER HOUSING FOR MQS 76 POS. (CHINA ONLY)
936290-1	COVER HSG FOR JPT & MQS ASSY 81 POS (D TYPE)
368291-1	COVER HOUSING FOR 81 POS.
368448-1	COVER HSG FOR JPT & MQS ASSY 81 POS.