



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.

MCP-E SEALED ASSEMBLY SERIES

1. SCOPE

1.1. Content

This specification covers the requirements for product performance, test methods and quality assurance provisions of MCP-E SEALED ASSEMBLY SERIES 6.3 2P Plug/CAP Assembly

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

- 114-61242: MCP-E SEALED 6P PLUG ASSEMBLY(INTERFACE DRAWING)
- 936245: Customer Drawing (MCP-E SEALED 4P PLUG ASSEMBLY)
- 936257: Customer Drawing (MCP-E SEALED 6P PLUG ASSEMBLY)
- 936293: Customer Drawing (MCP-E SEALED 4P CAP ASSEMBLY)
- 936294: Customer Drawing (MCP-E SEALED 6P CAP ASS'Y)
- 936303: Customer Drawing (COVER HSG FOR MCP-E SEALED 6P PLUG CONN'R)

3. REQUIREMENTS

3.1. Design and Construction

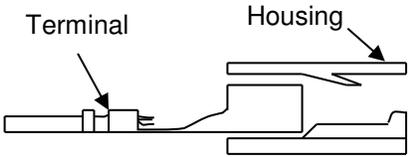
Product shall be of the design, construction, materials and physical dimensions specified on the applicable product drawing.

3.2. Ratings

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

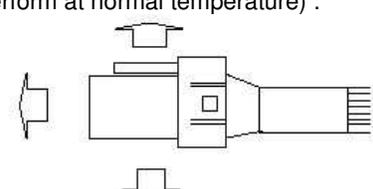
3.3. Test Requirements and Procedures Summary

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

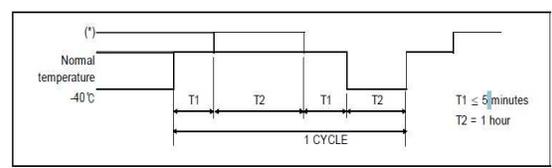
TEST DESCRIPTION	REQUIREMENT	PROCEDURE
Appearance	No crack, damage, distortion are permitted	Using sense of sight and touch.
CONN engage and disengage force	Max 10 kgf and less	Measure force by inserting and disengaging the connector with terminal assembled at constant 50 mm/min speed. However, remove lock part when measuring disengage force.
Reverse insertion between housings	It shall not be incorrectly inserted by applying force of 20kgf.	1) Insert terminal to housing 2) Fix housing of female connector to moving part of measuring instrument in reverse insertion direction. (Reverse insertion: 180 degree rotation on the locking part) 3) Set a measuring instrument to stop at force of 20kgf and insert that. At this moment, monitor resistance of one terminal matched to identify current carrying between terminals. 4) Check the insertion by housing modification of male connector after connector insertion.
Reverse insertion between terminal and housing	5kgf or more	Crimp cable of maximum size on terminal and then insert it into housing by end of insulation barrel in the reserve direction.
Engage force between terminal and housing	Max 1.5kgf or less	As shown in the following figure 4-1, measure the weight while inserting terminal into fixed housing at 50mm/min speed.  <Figure 4-1>
CONN Clip panel engage and retention force	Engage: Max 12kgf or less Retention: Min 15kgf or more	1. Insert clip into the fixed plate that can be furnished with clip at 50mm/min and measure the force at that time. 2. Pull clip at 50mm.min and measure the force when destroyed or disengaged
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.												
		<p style="text-align: right;"><Figure 5-2></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.												
Terminal engage and disengage force (kgf)	Engage	0.3~1.5kgf												
	Disengage	0.15~1.5kgf												
Crimp strength (kgf)	1.25SQ: Min 17kgf or more	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	Max 3mV/A	<p>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).</p> <p style="text-align: center;">1) HARNESS versus UNIT: $VD = V(L3+L4)$</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <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;"><Table5-1></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
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Signal circuit	20 ± 5 mV	10 mA	ECU, Sensor											
Power circuit	13 V	1 A	Other than the above											
Insulation resistance	Min 250 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> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p><Figure 5-6: Between neighboring terminals></p> </div> <div style="text-align: center;"> <p><Figure 5-7: Between neighboring terminal and housing surface></p> </div> </div>												
Leakage current	1 μA or less	Measure it by applying DC 14V between neighboring terminals (figure 5-6).												

			<p><Figure 5-6: Between neighboring terminals></p>	
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.	
Twisting Test - Connector Engage and Disengage Endurance 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.	
	Max 10mV/A		Make combine connectors engage and disengage at 100mm/min. Perform it 50 times. (Do not use locking device)	
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) :	
	Voltage Drop	Max 10mV/A		
	Insulation Resistance	Sealed CONN'R :		Between terminals
		Min 100 MΩ		housing surface
	Current Leakage	Max 100 μA		
	Temperature Rise	Max 40°C		
Sealing	Min 0.5kgf/cm ²			
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°C, Non-Sealed : 80°C)	
	Voltage Drop	Max 10mV/A		
	Sealing	Min 0.5kgf/cm ²		
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 10mV/A		
	Sealing	Min 0.5kgf/cm ²		
	Appearance	No crack, damage,	Engage and disengage connector with terminal assembled 10	



<Figure 6-1>



High Temperature	Connector Using Part
120°C	Waterproof Connector

Temperature Humidity Test		distortion are permitted		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	Max 10mV/A			
	Insulation Resistance	Min 100 MΩ	Between terminals		
			housing surface		
	Current Leakage	Max 100 μA			
	Sealing	Min 0.5kgf/cm ²			
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	Max 10mV/A			
	Sealing	Min 0.5kgf/cm ²			
Waterproof Test	Appearance	No crack, damage, distortion are permitted		Make combined connectors engaged and disengaged 10 times with hands, and leave it in combined state at 120 °C ambient temperature 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 from the waterproof pipe with water spray hole or water discharge hole and rotate waterproof pipe 23 times per minute around the axis.	
	Insulation Resistance	Min 100 MΩ	Between terminals		
			housing surface		
	Current Leakage	Max 100 μA			
Sealing	Min 0.5kgf/cm ²				
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. <p>A. Immerse connector in combined state for 2 hours in mixed oil of 50± 2°C ENG oil (SAE10W) or equivalent oil and</p> <p>B. Immerse connector in combined state for 1 hour in car gasoline (JIS K2202) at normal temperature, and then pick it out.</p> <p>C. Immerse connector in combined state for 1 hour in brake liquid (pure product) at normal temperature, and then pick it out.</p> <p>D. Immerse connector in combined state for 1 hour in 100% washer liquid (pure product) at normal temperature, and then pick it out.</p> <p>E. Immerse connector in combined state for 1 hour in 50% LLC (Long life coolant) at normal temperature, and then pick it out.</p>	
	Voltage Drop	Max 10mV/A			
	Sealing	Min 0.5kgf/cm ²			
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	

	Voltage Drop	Max 10mV/A	<table border="1"> <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>	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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Instant short circuit	Max 10 μ s	<p>2) Random Wave Test</p> <table border="1"> <tr> <td>Division</td> <td>Condition</td> </tr> <tr> <td>Ambient temperature/humidity</td> <td>Refer to figure 4-8, 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>24 CYCLE (45 minutes-ON, 15 minutes-OFF)</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>8 hours for X, Y, Z each</td> </tr> <tr> <td>Connector attaching method</td> <td>Test mode D, E, F</td> </tr> </table>	Division	Condition	Ambient temperature/humidity	Refer to figure 4-8, 90~95%	Applied current	Basic current (Connector electrodes in series.)	Current application cycle	24 CYCLE (45 minutes-ON, 15 minutes-OFF)	Vibration acceleration	Follow figure 6-8	Frequency	20Hz ~ 200Hz (sweep time: 3 minutes or less)	Vibration time	8 hours for X, Y, Z each	Connector attaching method	Test mode D, E, F
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3.4. Applied Part No List

TE Part no	Description
936254-2	MCP-E SLD 4P PLUG ASSY BLK
936257-2	MCP-E SLD 6P PLUG ASSY BLK
936293-2	MCP-E SLD 4P CAP ASSY BLK
936294-2	MCP-E SLD 6P CAP ASSY BLK
936294-3	MCP-E SLD 6P CAP ASSY GRY
936303-2	COVER FOR MCP-E SLD 6P PLUG