



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.

FUEL PUMP 6P PLUG ASSEMBLY

1. SCOPE

1.1. Content

This specification covers the requirements for product performance, test methods and quality assurance provisions of Fuel Pump 6P Plug 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

- 936159: Customer Drawing (FUEL PUMP 6P CONN'R ASSY)

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

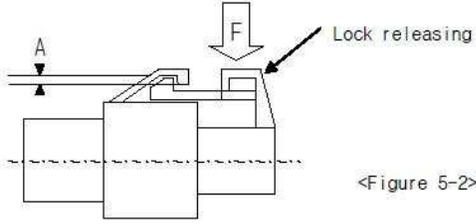
Voltage	Temperature	Humidity
12V DC	25±5°C	60±20%

3.3. Test Requirements and Procedures Summary

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

3.3.1 EDS-T-5712

TEST DESCRIPTION	REQUIREMENT	PROCEDURE
Appearance	No crack, damage, distortion are permitted	Using sense of sight and touch.
CONN engage and disengage force	Min 10kgf	Measure force by 3 times inserting and disengaging the connector with terminal assembled at constant 20~200 mm/min speed.

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.												
Strength of HSG lock	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 20~200mm/min. Then measure weight when lock structure is disengaged or destroyed.												
HSG lock releasing force	Max 5kgf	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. 												
Terminal retention force	Min 10kgf	Fix the housing after inserting crimped terminals. Extend one line of cable in axial direction at a speed of 20~200mm/min at a position 50~100mm away from crimped part, and measure weight when terminal is disengaged from the housing.												
Crimp strength	0.85SQ: Min 13kgf	Fix the crimped terminal and draw the cable at a position 50~100mm away from crimped part in axial direction at 20~200mm/min speed. Then measure the weight when cable is cut or disengage from the crimped part.												
Voltage drop	Max 3mV/A	Measure the circuit voltage drop (V) by sending voltage and current described in the table -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 border="1" data-bbox="808 1203 1382 1329"> <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>	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 100 MΩ	Measure resistance between neighbor terminals and between terminal and housing surface with DC 500V insulation resistance gauge with connector combined.												
Leakage current	Max 100 μA	Measure it by applying DC 13V between neighboring terminals.												
High voltage test	There shall be no insulation break	Apply AC 1000V voltage of normal frequency 1 minute between neighboring terminals, and between housing surfaces of terminal, with connector combined.												
Temperature rise	General Connector Max 30 °C	Apply basic current 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.												
Sealing test (for waterproof connector)	Min 1.0kg/cm ²	Put the combined connector in water and supply 10Kpa (0.1kg/cm ²) to connector for 30 seconds. Then increase it by 10Kpa (0.1kg/cm ²) until 200Kpa (2kg/cm ²) is reached or until air bubbles rise on the connector & wire seal.												

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	Max 6mV/A											
Connector engage and disengage endurance test	Voltage Drop	Max 6mV/A		Make the combined connectors engage and disengage at a constant speed of 20~200mm/min. Perform it 30 times.									
Mechanical shock test	Appearance	No crack, damage, distortion are permitted		Perform to below test condition after make combine connectors. - Test Conditions 1) Frequency: 20~200Hz 2) Direction: Up & Down 3) Acceleration: 44m/s ² 4) Time: 8hours									
	Voltage Drop	Max 6mV/A											
	Instant Short Circuit	Max 10 μ s											
Overcurrent cycle test	Appearance	No crack, damage, distortion are permitted		Apply to following current 1000 cycles for the connector with electrodes in series at 60°C of ambient temperature.									
	Voltage Drop	Max 6mV/A	Condition A		<table border="1"> <tr> <td>Current application condition A</td> <td>Applied current</td> <td>2 times of basic current</td> </tr> <tr> <td></td> <td>Current application time</td> <td>1 minute - ON, 9 minutes - OFF</td> </tr> </table>	Current application condition A	Applied current	2 times of basic current		Current application time	1 minute - ON, 9 minutes - OFF		
			Current application condition A			Applied current	2 times of basic current						
		Current application time	1 minute - ON, 9 minutes - OFF										
Temperature Rise	Max 50 °C	Condition A	<table border="1"> <tr> <td>Current application condition B</td> <td>Applied current</td> <td>5 times of basic current</td> </tr> <tr> <td></td> <td>Current application time</td> <td>10 seconds - ON, 590 seconds - OFF</td> </tr> </table>	Current application condition B	Applied current	5 times of basic current		Current application time	10 seconds - ON, 590 seconds - OFF				
		Current application condition B		Applied current	5 times of basic current								
	Current application time	10 seconds - ON, 590 seconds - OFF											
Condition B													
Cold temperature test	Appearance	No crack, damage, distortion are permitted		Leave it in temperature chamber of -40°C for 120 hours. Make connector engaged and disengaged 5 times immediately.									
	Voltage Drop	Max 6mV/A											
Cold and hot temperature shock test	Appearance	No crack, damage, distortion are permitted		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									
	Voltage Drop	Max 6mV/A											
	Sealing	Min 0.5kg/cm ²											
				<p>< Figure 6- 2 : Test pattern ></p> <table border="1"> <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>< Table 6- 1 ></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											
Freezing test	Appearance	No crack, damage, distortion are permitted		Make the combined connectors, freeze at -30 °C after soak in boiling water (100 °C) for 60 minutes.									
	Voltage Drop	Max 6mV/A											
	Current Leakage	Waterproof connector Max 100 μ A											

Dust test	Appearance	No crack, damage, distortion are permitted	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, Engage and disengage connector with terminal assembled 3 times with hands. And measure it.
	Voltage Drop	Max 6mV/A	
Waterproof test	Appearance	No crack, damage, distortion are permitted	Leave it in combined state at 120°C 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.
	Voltage Drop	Max 6mV/A	
	Current Leakage	Waterproof connector Max 100 μ A	
Oil and liquid test	Appearance	No crack, damage, distortion are permitted	<p>Perform test each sample with connector combined.</p> <p>A. Immerse connector in combined state for 2 hours in mixed oil of 50\pm 2°C ENG oil (SAE10W) or equivalent oil and</p> <p>B. Immerse connector in combined state for 1 hour in car gasoline 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 6mV/A	
Ozone test	Appearance	No crack, damage, distortion are permitted	Expose it in combined state to ozone of 38 \pm 2°C 50 \pm 5pphm for 100 hours.
	Voltage Drop	Max 6mV/A	
	Sealing	Min 0.5kgf/cm ²	
Salt water test	Appearance	No crack, damage, distortion are permitted	Make the combined connectors, Apply an DC 13V and perform 96 hours (4 cycles) according of the conditions for temperature 35 \pm 2°C and Chlorine concentration 5 \pm 1%.
	Voltage Drop	Max 6mV/A	
Sulfur (SO ₂) gas test	Appearance	No crack, damage, distortion are permitted	Expose it in combined state to sulfur gas of 40 \pm 2°C, density 10ppm, humidity 90~95%, for 24 hours. Then pick connector out of chamber and dry it for room temperature.
	Voltage Drop	Max 6mV/A	
Mechanical shock test	Instant short circuit	Max 10 μ S	Apply 1960, 3920, 5880, 9822m/s ² shock in each direction assembled male and female samples. Perform test in current application condition of DC13V open voltage and 10mA short circuit current.

Complex environment endurance test	Appearance	No crack, damage, distortion are permitted	Make the combined connectors, Perform below test conditions after apply an DC 13V and short circuit current $1 \pm 0.1A$. - Test Conditions 1) Temperature: $-40^{\circ}C \sim 90^{\circ}C$ 2) Humidity: 80~90% 3) Frequency: 11.7~200Hz Time: 20 minutes / cycle (11.7~200~11.7Hz) Vibration acceleration: 2.2G (21.57m/s ²) Direction: Verticality 4) Continuous load for 10sec or more: On 45min, Off 15min Continuous load for 5~10sec: On 30sec, Off 30sec Continuous load for 5sec or less : On 5sec, Off 5sec 5) 1 Cycle 16 hours: $90^{\circ}C$ 2 hours: $90 \sim -40^{\circ}C$ 2 hours: $-40^{\circ}C$ 4 hours: $-40 \sim 90^{\circ}C$ 6) Cycle times: 15 cycle (350 hours)
	Insulation resistance	DC 500V Min 100M Ω	
	Voltage Drop	Max 10mV/A	
	Temperature Rise	General Connector Max $50^{\circ}C$	
	Instant Short Circuit	Max 10 μ S	

3.4 Applied Part No List

TE Part no	Description
936159-1	FUEL PUMP 6P PLUG ASSY