



## 6P On-Board Diagnostics Connector (OBDII), With MQS 0.64(CB) Contact system.

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Rev	REVISION RECORD	APP	DATE	PAGE 1 OF 12	Title 6P OBDII SEALED CONNECTOR		

### CONTENTS;



**1. SCOPE**

- 1.1 Content
- 1.2 Qualification

**2. APPLICABLE DOCUMENTS**

- 2.1 TE Connectivity (TE) Documents
- 2.2 Commercial Standards and Specifications

**3. REQUIREMENTS**

- 3.1 Design and Construction
- 3.2 Materials
- 3.3 Ratings
- 3.4 Performance and Test Description
- 3.5 Requirements and Procedures

**4. QUALITY ASSURANCE PROVISIONS**

- 4.1 Qualification Testing
- 4.2 Requalification Testing
- 4.3 Acceptance
- 4.4 Quality Conformance Inspection



## 1 SCOPE

### 1.1 Contents

This specification covers the requirements for product performance, test methods and quality assurance provisions of 6P OBDII connector.

Applicable product description and part numbers are as shown in Appendix 1.

### 1.2 Qualification

When tests are performed, the following specified specifications and standards shall be used. All inspections shall be performed using the applicable inspection plan and product drawing

## 2 APPLICABLE DOCUMENTS

The following documents are part of this specification to the extent specified herein. In the events of conflict between the requirements of this specification and the product drawing or of conflict between the requirements of this specification and the referenced documents, this specification shall take precedence.

### 2.1 TE Connectivity (TE) Documents

**A** 109-1: Test Specification, General Requirements for Test Methods

**B** Product specification

**108-18030** MQS (Micro Quadlock System) Contacts

**C** Application specification

**114-18021** MQS (Micro Quadlock System) Contacts

**D** Customer Drawing

#### Part Details:

Description	PN
6P Receptacle Connector	2327727
Dust Cover	2327728



## 2.2 Commercial Standards and Specifications

### A ISO 19689: 2016

Motorcycles and Mopeds — Communication between vehicle and external equipment for Diagnostic connector and related electrical circuits, specification and use.

### B ISO 8092-2: 2005

Road vehicles -- Connections for on-board electrical wiring harnesses  
Part 2: Definitions, test methods and general performance requirements

### C ISO 15031-3: 2004

Road vehicles -- Communication between vehicle and external equipment for emissions- related diagnostics -- Part 3: Diagnostic connector and related electrical circuits, specification and use

## 3 REQUIREMENTS

### 3.1 Design and Construction

This product shall be in production regarding the design, component and physical dimensions specified non the applicable product drawing.

### 3.2 Material

Details are shown in the drawings

### 3.3 Ratings:

#### A Voltage Rating

12 V DC

#### B Current carrying capability

See derating curves in product specifications of the contact systems.

#### C Temperature Rating

-40°C to 85°C (The temperature rise by energizing is contained.)

#### D Degree of protection

IPX4 & IPX7

#### E Durability

200x times mating and Unmating

### 3.3 Performance Requirements and Test Descriptions

The product shall be designed to meet the electrical, mechanical and environmental performance requirements specified in table 2. All tests shall be performed in the room temperature, unless otherwise specified.



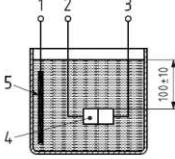
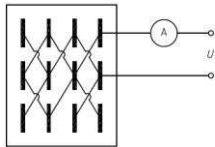
**3.5 Test Requirements and Procedures Summary:**

Para.	Test Items	Requirements	Procedures
3.5.1	Confirmation of Product	Meets requirements of product drawing and TE Specification.	Visually, dimensionally and functionally inspected per applicable quality inspection plan
<b>Mechanical Requirements</b>			
3.5.2	Durability Test	200 mating cycles	According to ISO 19689 5.7.1 Take unused samples and perform mating/un-mating cycles
3.5.3	Contact retention	$\geq 60$ N (With Secondary Lock)	According to ISO 19689 5.7.4(b) The contacts shall have all locking devices effective. Apply the force and hold it for 10 +2S. Operation Speed: 25-100mm/min.
3.5.4	Connector Mating (with locking latch)	Max. 75 N	According to ISO 19689 5.7.4(c) Perform connection and disconnection as specified by the connector manufacturer at a constant speed between 25 mm/min and 100 mm/min. Note the speed applied in the test report. Subject the connector to 10 connections and disconnection. Measure the force necessary at – first connection; – first disconnection; – 10th disconnection.
3.5.5	Connector Un-mating (without Lock)	Max. 75 N	According to ISO 19689 5.7.4(c) Perform connection and disconnection as specified by the connector manufacturer at a constant speed between 25 mm/min and 100 mm/min. Note the speed applied in the test report. Subject the connector to 10 connections and disconnection. Measure the force necessary at – first connection; – first disconnection; – 10th disconnection.
3.5.6	Connector Polarization	Min 150 N	Polarization features shall prevent mis-mating of connectors when a force of 150 N is applied According to ISO 19689 - 5.7.4(d)

**Electrical Requirement**

Para.	Test Items	Requirements	Procedures
3.5.7	Contact Resistance(1A) (Specified current)	Less than 30 m $\Omega$ at initial mating.	According to ISO 19689 5.7.3 A

			Resistance cable-to-cable per contact pair: 30 mΩ at initial mating when tested with a constant current source of 1 A in accordance with ISO 8092-2:2005, 4.8.1.3
3.5.8	Contact resistance (100 mA) (Low Current)	Less than 100 mΩ at initial mating.	According to ISO 19689 5.7.3 B  Recommended connection resistance at low current: 100 mΩ at initial mating when tested with a constant current source of 100 μA in accordance with ISO 8092-2:2005, 4.8.1.2.
3.5.9	Insulation Resistance	≥100 MΩ	According to ISO 8092-2:2005,  <b>Test</b>  Measure the insulation resistance at a relative humidity of 45 % to 75 % by applying 500 V dc between all contacts connected together and a metal foil surrounding the housing. For safety reasons, connect the metal foil to earth. In addition, apply the voltage with a different test sample to every two adjacent contacts. For particular applications, the test voltage may be reduced to 100 V dc if agreed between manufacturer and user. Note the voltage applied in the test report. Record the insulation resistance when a stable reading is obtained.  <b>Requirements</b>  The insulation resistance, measured according to 4.12.1, shall be at least 100 MΩ. Before insulation-resistance measurements are taken following temperature/humidity cycling, unsealed connectors and splash-proof connectors shall remain for 3 h at an environmental temperature of (23 ± 5) °C and a relative humidity of 45 % to 75 %. Sealed connectors shall have readings taken within 1 h.
			According to ISO 8092-2:2005, 4.9.1.1.2  <b>Sealed connectors</b>  Immediately following preconditioning, immerse the test sample (mated sealed connectors) in deionized water with 5 % NaCl (m/m), to which 0,1 g/litre wetting agent has been added. The liquid temperature shall be (23 ± 5) °C. Include a dye so that the ingress of liquid into the test sample can be visually checked after the

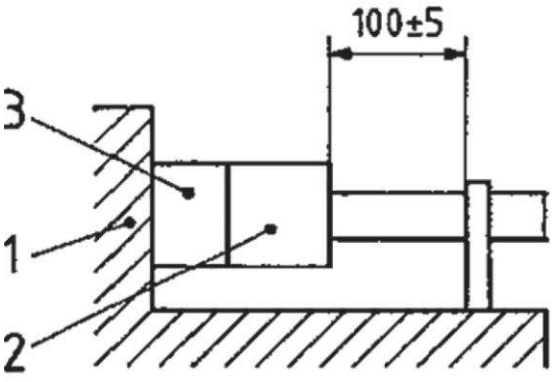
3.5.10	Water Tightness Test	Leakage current $\leq 50 \mu A$ at 48V	<p>electrical test. Immerse the test sample as shown in Figure 8 for a period of 1 h. Take leakage current measurements of the test sample immersed in the liquid. Take the measurement between each contact and the electrode. Using a different test sample, take the measurement between every two adjacent contacts. See the example shown in Figure 9.</p>  <p>Key 1, 2, 3 measuring point 4 test sample 5 electrode</p> <p>Figure 8 — Water tightness test</p>  <p>Figure 9 — Example of leakage current measurements between adjacent contacts</p> <p>According to ISO 8092-2:2005, 4.9.1.1.3</p> <p><b>Splash-proof connectors</b></p> <p>Immediately following preconditioning, submit the test sample (mated splash-proof connectors) to splash-proof test IPX4, as specified in ISO 20653. Apply the smallest tube arc. Other equipment may be used provided that its use leads to the same end results. In case of a dispute between user and supplier, the test according to ISO 20653 IPX4 shall be decisive. It is recommended that a dye be added to the water to distinguish between water ingress and condensation.</p>
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**ENVIRONMENTAL EXPOSURE**

Para.	Test Items	Requirements	Procedures
3.5.11	Thermal Cycling	Perform the test in accordance with ISO 8092-2:2005, 4.22.1 with the following modifications. - Cycles:1000 times	According to ISO 19686 5.7.5A Subject the mated samples to 1000 thermal shock cycles, each consisting of - 30 min at a temperature of $-40 \text{ }^\circ\text{C} \pm 2 \text{ }^\circ\text{C}$ , - 10 S max. transition time, - 30 min at the highest value $100 \pm 2 \text{ }^\circ\text{C}$ , - 10 s max. transition time.
			According to ISO 19689 5.7.5 B

<p>3.5.12</p>	<p>Temperature/ humidity cycling</p>	<p>Mechanical and electrical features ensured after testing.</p> <p>- Cycles:15 times</p>	<p>NOTE Hatched areas indicate allowed temperature/humidity tolerance.</p> <p>Key</p> <ul style="list-style-type: none"> <li>a One cycle.</li> <li>b (45 to 75) %.</li> <li>c (95 to 99) %.</li> <li>d Uncontrolled humidity.</li> <li>e Test temperature (see Table 3).</li> <li>t time in hours</li> <li>T temperature in °C</li> <li>Y relative humidity in test room</li> </ul> <p>Figure 10 — Temperature/humidity cycling</p>
<p>3.5.13</p>	<p>Mechanical shock</p>	<p>Apply three shocks at 50 g in each of the three mutually perpendicular axes of the connector</p>	<p>According to ISO 19689 5.7.5 C</p> <p>Key</p> <ul style="list-style-type: none"> <li>1 test bench</li> <li>2 test sample</li> <li>3 fixed connector</li> </ul>



3.5.14	Vibration	No damages and connectivity problem	 <p><b>Key</b></p> <ul style="list-style-type: none"> <li>1 test bench</li> <li>2 test sample</li> <li>3 fixed connector</li> </ul> <p>According to ISO 19689 5.7.5 D Sinusoidal (1,5 ± 0,15) mm amplitude by 15 g for 2 h in each of the three mutually perpendicular axes at room temperature</p> <table border="1" data-bbox="912 981 1460 1310"> <thead> <tr> <th>Frequency(Hz)</th> <th>Acceleration(m/s<sup>2</sup>)</th> </tr> </thead> <tbody> <tr> <td>100</td> <td>35</td> </tr> <tr> <td>200</td> <td>150</td> </tr> <tr> <td>215</td> <td>150</td> </tr> <tr> <td>220</td> <td>100</td> </tr> <tr> <td>400</td> <td>100</td> </tr> </tbody> </table>	Frequency(Hz)	Acceleration(m/s <sup>2</sup> )	100	35	200	150	215	150	220	100	400	100
Frequency(Hz)	Acceleration(m/s <sup>2</sup> )														
100	35														
200	150														
215	150														
220	100														
400	100														
3.5.15	IPX7	Water shall not penetrate in a quantity causing harmful effects if the enclosure is immersed in water temporarily under specified temperature and time conditions.	<p>According to ISO 20653 Immersion deep: 1m. Duration:30 min. Temperature difference between test sample and water ≤5K</p>												



3.5.16	Chemical Test	<p>Apply the test liquids at the temperatures and for duration according to Table. For each test liquid a new specimen shall be used. After a chemical fluid test, it is permitted to rinse (with inert fluid) and dry the outside of the test sample before continuing the test sequences</p>	<p>According to ISO 8092-2:2005, 4.23.1 and 4.23.2 The resistance to chemical fluids is only required for connectors likely to be exposed to such fluids. For this purpose, a list of chemicals and tests common to automotive use has been established (see Table). The vehicle manufacturer and supplier should choose the fluids and tests depending on the connector application.</p> <table border="1" data-bbox="909 593 1452 884"> <thead> <tr> <th>Chemical fluid</th> <th>Test liquid</th> <th>Liquid temperature °C</th> <th>Duration of immersion min</th> </tr> </thead> <tbody> <tr> <td>Lubrication oil</td> <td>Oil No. 1 according ISO 1817 <sup>a)</sup></td> <td rowspan="3">85 ± 2</td> <td rowspan="3">60</td> </tr> <tr> <td>Automatic transmission fluid</td> <td>According to SAE J311b</td> </tr> <tr> <td>Mineral hydraulic oil</td> <td>According to ISO 7309</td> </tr> <tr> <td>Brake fluid</td> <td>DOT 4 (SAE J 1709)</td> <td rowspan="2">23 ± 5</td> <td rowspan="2">1</td> </tr> <tr> <td>Battery acid</td> <td>37 % sulphuric acid</td> </tr> <tr> <td>Battery alkaline</td> <td>KOH</td> <td>23 ± 5</td> <td>1</td> </tr> <tr> <td>Antifreeze fluid</td> <td>Not yet specified.</td> <td>118 ± 5</td> <td rowspan="4">60</td> </tr> <tr> <td rowspan="4">Window washer fluid</td> <td>Ethyl alcohol 27 ml</td> <td rowspan="4">50 ± 2</td> </tr> <tr> <td>Isopropylen 10 ml</td> </tr> <tr> <td>Ethylen glycol 3 ml</td> </tr> <tr> <td>Water 60 ml</td> </tr> <tr> <td rowspan="2">Fuel</td> <td>Gasoline according ISO 3170</td> <td rowspan="2">23 ± 5</td> </tr> <tr> <td>Diesel according ISO 3170</td> </tr> </tbody> </table> <p><sup>a)</sup> Conforms to ASTM oil No. 1.</p>	Chemical fluid	Test liquid	Liquid temperature °C	Duration of immersion min	Lubrication oil	Oil No. 1 according ISO 1817 <sup>a)</sup>	85 ± 2	60	Automatic transmission fluid	According to SAE J311b	Mineral hydraulic oil	According to ISO 7309	Brake fluid	DOT 4 (SAE J 1709)	23 ± 5	1	Battery acid	37 % sulphuric acid	Battery alkaline	KOH	23 ± 5	1	Antifreeze fluid	Not yet specified.	118 ± 5	60	Window washer fluid	Ethyl alcohol 27 ml	50 ± 2	Isopropylen 10 ml	Ethylen glycol 3 ml	Water 60 ml	Fuel	Gasoline according ISO 3170	23 ± 5	Diesel according ISO 3170
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Table 2

Appendix2 Applicable Part Name and Part Numbers Table

* Part Number	Part Name
2327727	6P RECEPTACLE CONNECTOR
2327728-1/-2	DUST COVER 1 & 2

\*Note: Part numbers are configured with base number on the table, and 1-digit numeric prefix or suffix with dash. Refer to the catalog or customer drawing for specific part numbers for each base numbers. If prefix is "0", zero and dash letters are omitted.



#### 4. QUALITY ASSURANCE PROVISIONS

##### 4.1 Qualification Testing

Sample Selection:

The samples shall be prepared in accordance with product drawings. They shall be selected at random from current production.

Test groups consist of:

**Appendix – 2: Test Procedure Details:**

Test of Examination																		
Batch	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Examination of Product	1,3,6	1,3,5	1,3,5	1,3,5,8,10	1,3,5	1,3,5,7	1,7,12	1,3,5,7	1,3,5,9	1,3,5,7	1,7,12	1,3,5,7	1,3,5,7,9	1,7,12	1,3,5,7	1,7,12	1,3,5,7	1,7
Durability (Repeated Mate/Unmating)	2	2	2	4	2	2	4	2	2	2	4	2	4	4	2	4	2	2
Contact resistance (1A)(Specified Current)							3,6,10				3,6,10			3,6,10		3,6,10		
Contact resistance (100µA)(Low Current)							2,5,9				2,5,9			2,5,9		2,5,9		
Insulation Resistance							11				11			11		11		3,5
Contact Retention			4		8				8					15		15		
Connector Mating	4				6				6					13		13		
Connector UnMating	5				7				7					14		14		6
Connector Polarization or Mis-mating effectiveness		4				6				6								
Splash-Proof Connectors							6				6				6		6	
Thermal cycling				6	4	4	8	4										
Temperature/humidity cycling				7					4	4	8	4	6					
Mechanical shock																8	4	
Vibration														8	4			
Chemical Fluids																		4
IP X7(Additional Test )				2,9									2,8					



#### **4.2 Requalification Testing**

If changes significantly affecting form, fit or function are made to the product or to the manufacturing process, product assurance shall coordinate requalification testing, consisting of all or part of the original testing sequence as determined by development / product, quality and reliability engineering.

#### **4.3 Acceptance**

Acceptance is based on verification that the product meets the requirements of Paragraph 3.5. Failures attributed to equipment, test setup or operator deficiencies shall not disqualify the product. When failure occurs, corrective actions shall be taken, and samples resubmitted for qualification. Testing to confirm corrective actions is required before resubmittal.

#### **4.4 Quality Conformance Inspection**

The applicable quality inspection plan will specify the sampling acceptable quality level to be used. Dimensional and functional requirements shall be in accordance with the applicable product drawing and this specification.