

DESIGN OBJECTIVES

22/49/50P DOOR TO BODY CONNECTOR, MQS0.64, MCON 1.2CB, MCP2.8K
108-101436

The product described in this document has not been fully tested to ensure conformance to the requirements outlined herein. TE Connectivity makes no representation or warranty, express or implied that the product will comply with these requirements. Further, TE Connectivity reserves the right these requirements based on the results of additional testing and evaluation. Contact TE Connectivity Engineering for further information. If necessary, This document will become the Product Specification at successful completion of testing.

1. Scope:

1.1 Content

This specification covers the requirements for product performance, test methods and quality assurance provisions of 22P/49P/50P Door to Body plug connector.


22P REC PLUG: 2298567-1 Include 2298573-1, 2298574-1
 22P TAB PLUG : 2298566-1 Include 2298573-1, 2298574-1
 49P REC PLUG: 2301238-1 Include 2298002-1, 2301240-1
 49P TAB PLUG: 2301239-1 Include 2298002-1, 2301241-1
 50P REC PLUG: 2297522-1 Include 2298002-1, 2298003-1
 50P TAB PLUG: 2297523-1 Include 2298002-1, 2298003-1
 Other detail information refer to corresponding customer drawing

1.2 Qualification

When tests are performed on the subject product line, the procedures specified in TE Connectivity 109 series specifications shall be used. All inspections shall be performed using the applicable Inspection Plan and Product Drawing.

2. Applicable Documents:

The following documents form a part of this Specification to the extent specified herein. In the event of conflict between the requirements of this Specification and the product drawing shall take precedence. In the event of conflict between the requirements of this specification and the referenced documents, this specification shall take precedence.

				DR T.DONG 09SEP16	 TE Connectivity Shanghai,		
				CHK S.WANG 09SEP16			
				APP I.YIN 09SEP16	NO. 108-101428	REV A	LOC ES
				PAGE	TITLE		
A	PRELIMINARY RELEASE	T.D	09SEP2016	1 of 10	22/50WAY UNSEALED DOOR to BODY CONNECTOR, MQS0.64, MCON 1.2CB, MCP2.8K		
LTR	REVISION RECORD	DR	DATE				

2.1 TE Connectivity Specifications:

- A. 108 SERIES: Test Specification, Requirements for Test Methods.
- B. VW LV 214
- C. USCAR-2 2013

3. Requirements:

3.1 Design and Construction

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

3.2 Materials

Description for material see in product drawing.


3.3 Ratings:

Operating temperature Range : -40°C to + 90°C

3.4 Performance and Test Descriptions

The product is designed to meet the electrical, mechanical and environmental performance requirements specified in paragraph 3.5 All tests are performed at ambient environmental conditions per VW LV214 unless otherwise specified

3.5 Requirements and Procedures Summary

 <p>TE Connectivity Shanghai, China</p>	<p>PAGE</p> <p>2 of 10</p>	<p>NO.</p> <p>108-101436</p>	<p>REV</p> <p>A</p>	<p>LOC</p> <p>ES</p>
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MECHANICAL TEST

Para.	Test items	Requirements	Procedures
3.5.1	Visual inspection	No damage	Acc. DIN EN 60512-1-1
3.5.2	Function of the primary lock	The primary lock must latch audibly and must be checked by pulling it back (max. 10N).	Acc. LV214 2010-03 PG6 E6.2
3.5.3	Function of the secondary lock	The secondary lock must be closable at the end stop. Must not be closeable until all the contacts are properly locked in the housing cavity in the correct position.	Acc. LV214 2010-03 PG6 E6.3
3.5.4	Drop test	Components shall not be displaced from their intended shipping position	Acc. USCAR-2 5.4.8
3.5.5	Actuation forces for secondary lock	Open force $F_o=10N\sim 50N$ Close force $F_s<50N$ Contact not in end position: $F_s NOK>3$ times F_s , (at least $F_s NOK>F_s+50N$)	Acc. LV214 2010-03 PG6 E6.4
3.5.6	Polarizing/Keying	Keying/Polarizing efficiency >3 times the insertion force (equipped housing), but at least 80N	Acc. LV214 2010-03 E7.1 DIN EN 60512-13-5
3.5.7	Retention force of the housing latch/lock	The retention force must $>100N$	Acc. LV214 2010-03 E7.2 DIN EN 60512-15-6



TE Connectivity
Shanghai, China

PAGE

3 of 10

NO.

108-101436

REV

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Para.	Test items	Requirements	Procedures
3.5.8	Connector-Connector mating force	The mating force must < 150N	Deviation to LV214 2010-03 PG7 E7.4
3.5.9	Determination of the contact insertion forces	The insertion force must be measured and documented.	Acc. LV214 2010-03 E8.1
3.5.10	Contact removal force from the housing, primary lock only	Primary lock test F prim > 40N for MQS0.64; F prim > 40N for MCON1.2CB; F prim > 80N for MCP2.8K	Acc. LV214 2010-03 E8.2.1 (without 1mm displacement)
3.5.11	Contact removal force from the housing, secondary lock only	F prim > 40N for MQS0.64 F prim > 40N for MCON1.2CB F prim > 80N for MCP2.8K	Acc. LV214 2010-03 E8.2.2

ENVIRONMENTAL TEST

3.5.12	Current excess temperature with housing	The value must correspond to the manufacturer's specification	Measurement setup in principle like LV214 E14.0 Acc. DIN EN 60512-5-1																																																								
3.5.13	Derating with housing	Acc. LV214 PG13 E13.2	Acc. LV214 PG 13 E13.2																																																								
3.5.14	Contact resistance	Acc. LV214 Table D.1 for different contact size and conductor cross section <table border="1" style="font-size: small;"> <thead> <tr> <th>Conductor cross-section in mm²/contact size in mm</th> <th>0,13</th> <th>0,22</th> <th>0,35</th> <th>0,5</th> <th>0,75</th> <th>1,0</th> </tr> </thead> <tbody> <tr> <td>0,63</td> <td>30</td> <td>30</td> <td>15</td> <td>15</td> <td>15</td> <td>-</td> </tr> <tr> <td>1,2</td> <td>20</td> <td>20</td> <td>15</td> <td>15</td> <td>15</td> <td>15</td> </tr> <tr> <td>1,5</td> <td>-</td> <td>15</td> <td>15</td> <td>15</td> <td>15</td> <td>15</td> </tr> <tr> <td>2,8</td> <td>-</td> <td>15</td> <td>15</td> <td>15</td> <td>15</td> <td>10</td> </tr> <tr> <td>4,8-6,3</td> <td>-</td> <td>10</td> <td>10</td> <td>8</td> <td>8</td> <td>8</td> </tr> <tr> <td>8</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>9,5-12</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> </tr> </tbody> </table>	Conductor cross-section in mm ² /contact size in mm	0,13	0,22	0,35	0,5	0,75	1,0	0,63	30	30	15	15	15	-	1,2	20	20	15	15	15	15	1,5	-	15	15	15	15	15	2,8	-	15	15	15	15	10	4,8-6,3	-	10	10	8	8	8	8	-	-	-	-	-	-	9,5-12	-	-	-	-	-	-	Acc. DIN EN 60512-2-1
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9,5-12	-	-	-	-	-	-																																																					
3.5.15	Contact resistance continuous during dynamic load, sinusoidal with test current (100mA)	No function-relevant damage must occur Circuit interruption monitoring takes place during the test. Permissible circuit interruption < 1000ns. The circuit considered interrupted when the contact resistance exceeds 7 Ω. Interruptions are not permissible.	Acc. LV214 PG 17 E14.0 DIN EN 60068-2-6 Measurement frequency: 1 measured value per min Severity: see below table <table border="1" style="font-size: x-small;"> <thead> <tr> <th>Severity</th> <th>TC (temperature cycle)</th> <th>Random vibration with TC</th> <th>Sine wave with TC</th> <th>No. of shocks</th> </tr> </thead> <tbody> <tr> <td rowspan="6">1) "Body" unsealed</td> <td>0 min/20 °C</td> <td rowspan="6">8 h per axis RMS value of acceleration 19,7 m/s²</td> <td rowspan="6">No sine wave</td> <td rowspan="6">A = 30 g T = 6 ms sinusoidal half-wave No. of shocks: 6 000</td> </tr> <tr> <td>60 min/-40 °C</td> </tr> <tr> <td>150 min/-40 °C</td> </tr> <tr> <td>300 min/105 °C</td> </tr> <tr> <td>420 min/105 °C</td> </tr> <tr> <td>480 min/20 °C</td> </tr> <tr> <td></td> <td></td> <td>Hz</td> <td>(m/s²)/Hz</td> <td></td> </tr> <tr> <td></td> <td></td> <td>10</td> <td>10</td> <td></td> </tr> <tr> <td></td> <td></td> <td>55</td> <td>3,25</td> <td></td> </tr> <tr> <td></td> <td></td> <td>180</td> <td>0,125</td> <td></td> </tr> <tr> <td></td> <td></td> <td>300</td> <td>0,125</td> <td></td> </tr> <tr> <td></td> <td></td> <td>360</td> <td>0,07</td> <td></td> </tr> <tr> <td></td> <td></td> <td>1 000</td> <td>0,07</td> <td></td> </tr> </tbody> </table> Sweep speed: 1 oct./min	Severity	TC (temperature cycle)	Random vibration with TC	Sine wave with TC	No. of shocks	1) "Body" unsealed	0 min/20 °C	8 h per axis RMS value of acceleration 19,7 m/s ²	No sine wave	A = 30 g T = 6 ms sinusoidal half-wave No. of shocks: 6 000	60 min/-40 °C	150 min/-40 °C	300 min/105 °C	420 min/105 °C	480 min/20 °C			Hz	(m/s ²)/Hz				10	10				55	3,25				180	0,125				300	0,125				360	0,07				1 000	0,07							
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Para.	Test items	Requirements	Procedures										
3.5.16	Contact resistance continuous during dynamic load, broad-band random vibration with test current (100mA)	No function-relevant damage must occur Circuit interruption monitoring takes place during the test. Permissible circuit interruption <1000ns. The circuit considered interrupted when the contact resistance exceeds 7 Ω. Interruptions are not permissible.	Acc. LV214 PG 17 E14.0 DIN EN 60068-2-64 Measurement frequency: 1 measured value per min Severity: see below table <table border="1"> <thead> <tr> <th>Severity</th> <th>TC (temperature cycle)</th> <th>Random vibration with TC</th> <th>Sine wave with TC</th> <th>No. of shocks</th> </tr> </thead> <tbody> <tr> <td>1) "Body" unsealed</td> <td>0 min/20 °C 60 min/-40 °C 150 min/-40 °C 300 min/105 °C 420 min/105 °C 480 min/20 °C</td> <td>8 h per axis RMS value of acceleration 19,7 m/s² Hz (m/s²)/Hz 10 10 55 3,25 180 0,125 300 0,125 360 0,07 1 000 0,07</td> <td>No sine wave</td> <td>A = 30 g T = 6 ms sinusoidal half-wave No. of shocks: 6 000</td> </tr> </tbody> </table>	Severity	TC (temperature cycle)	Random vibration with TC	Sine wave with TC	No. of shocks	1) "Body" unsealed	0 min/20 °C 60 min/-40 °C 150 min/-40 °C 300 min/105 °C 420 min/105 °C 480 min/20 °C	8 h per axis RMS value of acceleration 19,7 m/s ² Hz (m/s ²)/Hz 10 10 55 3,25 180 0,125 300 0,125 360 0,07 1 000 0,07	No sine wave	A = 30 g T = 6 ms sinusoidal half-wave No. of shocks: 6 000
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3.5.17	Contact resistance continuous during endurance shock test with test current (100mA)	No function-relevant damage must occur Circuit interruption monitoring takes place during the test. Permissible circuit interruption <1000ns. The circuit considered interrupted when the contact resistance exceeds 7 Ω. Interruptions are not permissible.	Acc. LV214 PG 17 E14.0 DIN EN 60068-2-27 Severity: see below table <table border="1"> <thead> <tr> <th>Severity</th> <th>TC (temperature cycle)</th> <th>Random vibration with TC</th> <th>Sine wave with TC</th> <th>No. of shocks</th> </tr> </thead> <tbody> <tr> <td>1) "Body" unsealed</td> <td>0 min/20 °C 60 min/-40 °C 150 min/-40 °C 300 min/105 °C 420 min/105 °C 480 min/20 °C</td> <td>8 h per axis RMS value of acceleration 19,7 m/s² Hz (m/s²)/Hz 10 10 55 3,25 180 0,125 300 0,125 360 0,07 1 000 0,07</td> <td>No sine wave</td> <td>A = 30 g T = 6 ms sinusoidal half-wave No. of shocks: 6 000</td> </tr> </tbody> </table>	Severity	TC (temperature cycle)	Random vibration with TC	Sine wave with TC	No. of shocks	1) "Body" unsealed	0 min/20 °C 60 min/-40 °C 150 min/-40 °C 300 min/105 °C 420 min/105 °C 480 min/20 °C	8 h per axis RMS value of acceleration 19,7 m/s ² Hz (m/s ²)/Hz 10 10 55 3,25 180 0,125 300 0,125 360 0,07 1 000 0,07	No sine wave	A = 30 g T = 6 ms sinusoidal half-wave No. of shocks: 6 000
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3.5.18	Insulation resistance		Acc. DIN EN 60512-3-1										
3.5.19	Resonance frequency of the contact assembly	The vibration response of the housing must also be recorded and documented as a graph together with the excitation profile in the test report	Acc. DIN EN 60068-2-6 Dynamic load, sinusoidal Sweep speed: 1oct./min a=10m/s ² f=5Hz-2000Hz-5Hz										
3.5.20	Aging in dry heat (120h, 130°C)		Acc. DIN EN 60068-2-2 Test B Duration: 120h Temperature: 130°C										
3.5.21	Humid heat, constant		Acc. DIN EN 60068-2-30 Duration: 10days Temperature: 40°C Relative humidity: 95% After this test, the insulation resistance must be measured at the earliest after 30min and at the latest after 60min										
3.5.22	Low temperature aging		Acc. DIN EN 60068-2-1 Duration: 48h Temperature: -40°C										


Para.	Test items	Requirements	Procedures			
3.5.23	Removal and insertion at -20°C	It must be possible to open and re-close the connector even at -20°C Any latch elements present must not break off or crack upon actuation	Acc. LV214 2010-03 PG20 B 20.4			
3.5.24	Aging in dry heat(48h,80°C)	No function-relevant damage must occur Circuit interruption monitoring takes place during the test. Permissible circuit interruption <1000ns. The circuit considered interrupted when the contact resistance exceeds 7 Ω . Interruptions are not permissible.	Acc. DIN EN 60068-2-2 Test B Duration: 48h Temperature: 80°C			
3.5.25	Long-term aging in dry heat		Acc. DIN EN 60068-2-2 Test B Duration: 1000h Temperature: 130°C Subsequent aging: 48h at RT			
3.5.26	Functional test	Connection of the connector housings until complete latching. Open of the lock and complete disconnection of the connector housing	Acc. LV214 2010-03 E21.1			
3.5.27	Temperature shock		Acc. DIN EN 60068-2-14 Duration: 144cycles Temperature: -40°C/90°C 15min respectively Acclimatization period: max.10s			
3.5.28	Degree of protection test	The insulation resistance must >100M Ω	Acc. ISO 20653 IP X4K Water pressure/temperature: 4bar/RT Duration: 10min. (Connector mount on door)			
 TE Connectivity Shanghai, China			PAGE	NO.	REV	LOC
			6 of 10	108-101436	A	ES

3.6 Product Qualification Test and Sequences

SAMPLE QUANTITIES					
Test or examination	TEST GROUP(MECHANICAL TESTS)				
	1	2	3	4	5
	PG6			PG7	PG8
3.5.1 Visual inspection	1	1,3	1	1,5	1,5
3.5.2 Function of the primary lock	2				
3.5.3 Function of the secondary lock	3				
3.5.4 Drop test		2			
3.5.5 Actuation forces for secondary lock			2		
3.5.6 Polarizing/Keying				2	
3.5.7 Retention force of the housing latch/lock				3	
3.5.8 Connector-Connector mating force				4	
3.5.9 Determination of the contact insertion forces					2
3.5.10 Contact removal force from the housing, primary lock only					3
3.5.11 Contact removal force from the housing, secondary lock only					4

SAMPLE QUANTITIES								
Test or examination	TEST GROUP(ENVIRONMENTAL TEST)							
	6	7	8	9	10			
	PG13	PG17	PG20	PG21	PG23			
3.5.1 Visual inspection	1,4	1,4,6,8	1,6,9,12	1,8	1,4,7			
3.5.3 Drop test				6				
3.5.9 Contact removal force from the housing, primary lock only								
3.5.10 Contact removal force from the housing, secondary lock only				7				
3.5.12 Current excess temperature with housing	2							
3.5.13 Derating with housing	3							
3.5.14 Contact resistance		2,9		2,4				
3.5.15 Contact resistance continuous during dynamic load, sinusoidal with test current(100mA)		3						
3.5.16 Contact resistance continuous during dynamic load, broadband random vibration with test current(100mA)		5						
3.5.17 Contact resistance continuous during endurance shock test with test current (100mA)		7						
3.5.18 Insulation resistance			2,5		3,8			
3.5.19 Resonance frequency of the contact assembly		10						
3.5.20 Aging in dry heat(120h, 130°C)			3					
3.5.21 Humid heat, constant			4					

3.5.22 Low temperature aging			7					
3.5.23 Removal and insertion at -20°C			8					
3.5.24 Aging in dry heat(48h,80°C)			10					
3.5.25 Long-term aging in dry heat				3				
3.5.26 Functional test			11	5				
3.5.27 Temperature shock					5			
3.5.28 Degree of protection test					2,6			

 TE Connectivity Shanghai, China	PAGE	NO.	REV	LOC
	9 of 10	108-101436	A	ES

4. QUALIFICATION TEST

4.1 Sample selection

Samples shall be prepared in accordance with applicable specification.

4.2 Test sequence

Qualification test shall be conducted as sequence specified in 3.6.


4.3 Requalification test

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

5. APPENDIX

Appendix A

No.	PG	Chemical agent	Description	Application			Aging temp. °C
				Dousing	Rubbing in	Spraying	48 h
1	22 A	Cold-cleaning agent/cockpit cleaning agent	Commercially available			x	50
2	22 A	Penetrating oil	Commercially available			x	50
3	22 A	Undiluted washer fluid anti-freeze	Commercially available	x			50
4	22 A	Isopropanol	Commercially available	x			RT
5	22 A	Grease	High melting point grease		x		50
6	22 B	Brake fluid	DOT 4/DOT 5	x			50
7	22 B	FAM test fuel (gasoline/premium)	Commercially available	x			RT
8	22 B	Diesel	DIN EN 590	x			RT
8	22 B	Biodiesel	DIN EN 14214	x			RT
8	22 B	Diesel additive AdBlue	DIN 70070	x			RT
9	22 B	Engine oil 5W-30	Fully synthetic	x			50
10	22 B	Power steering fluid	According to requirement	x			50
10	22 B	Automatic transmission fluid	Fully synthetic	x			50
11	22 B	Radiator antifreeze	Stable to -40 °C	x			50
12	22 B	Battery fluid: Relevant only for DUTs that can come into contact with battery fluid	Diluted sulfuric acid; density 1,28 g/ml	x			50
13	22 B	Road salt solution	Mixture PG18C	x			50

	TE Connectivity Shanghai, China	PAGE	NO.	REV	LOC
		10 of 10	108-101436	A	ES