



Test Report Product Validation

Braganca-Paulista Electrical Components Test Laboratory
RUA AMPERE 304 Dist. Indl I BRAGANCA PAULISTA SAO PAULO BRAZIL 12929-570

Report Title: MQS Socket Housing, 2 POS ASSY
Report Number: RL140637
Revision: O
Date Issued: 12 Nov 2014

Execution: Jesus Preto
Phone: 11 3404-6270

Requestor: Gustavo Bonucci
Phone: 11 3404-6224
Address: gbonucci@te.com

Customer: FIASA
Specifications: FIAT 7-Z8260/05, 9.91320/02
Disposition of Samples: Return to Customer

List of Part Numbers: 284703-1

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Scope/Abstract and Conclusions

Purpose

According to DVP attached.

Summary

Samples met requirements.

1. RESULTS

Test Sequence/Environment	Requirements	Results																																															
Group 1 - Appearance	There shall be no corrosion, discoloration, cracks, etc., which could affect the functionality of the part.	Samples met requirements.																																															
Group 1 - Mating/unmating cycles into/from connector	-	Mate and remove connectors fully at least 10 times. Mate connectors once as a preparation to future test sequences.																																															
Group 1 - Contact resistance	$\leq 10 \text{ m}\Omega$	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th colspan="3">Contact resistance (mΩ)</th> </tr> <tr> <th rowspan="2">Sample</th> <th colspan="2">Way</th> </tr> <tr> <th>1</th> <th>2</th> </tr> </thead> <tbody> <tr><td>1</td><td>2,76</td><td>2,89</td></tr> <tr><td>2</td><td>2,89</td><td>2,57</td></tr> <tr><td>3</td><td>2,48</td><td>2,53</td></tr> <tr><td>4</td><td>2,74</td><td>2,83</td></tr> <tr><td>5</td><td>2,95</td><td>3,00</td></tr> <tr><td>6</td><td>2,55</td><td>3,14</td></tr> <tr><td>7</td><td>3,10</td><td>2,79</td></tr> <tr><td>8</td><td>2,96</td><td>2,92</td></tr> <tr><td>9</td><td>3,05</td><td>3,10</td></tr> <tr><td>10</td><td>3,14</td><td>3,31</td></tr> <tr> <td>Min.</td> <td>2,48</td> <td>2,53</td> </tr> <tr> <td>Aver.</td> <td>2,86</td> <td>2,91</td> </tr> <tr> <td>Max.</td> <td>3,14</td> <td>3,31</td> </tr> </tbody> </table> <p>Sample met requirements.</p>	Contact resistance (mΩ)			Sample	Way		1	2	1	2,76	2,89	2	2,89	2,57	3	2,48	2,53	4	2,74	2,83	5	2,95	3,00	6	2,55	3,14	7	3,10	2,79	8	2,96	2,92	9	3,05	3,10	10	3,14	3,31	Min.	2,48	2,53	Aver.	2,86	2,91	Max.	3,14	3,31
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Group 1 - Mechanical shock	no absence of electric contact (resistance $> 7\Omega$ for a time $> 1\text{ms}$) over the whole test	Sample met requirements. For more details please see Qualpas' test report Nr. 085_Tyco_Vibra_Choq.																																															
Group 1 - Resistance to vibrations	No absence of electric contact (resistance $> 7\Omega$ for a time $> 1\text{ms}$) over the whole test. No fretting corrosion evidence at 10x to 40x magnification.	Sample met requirements. For more details please see Qualpas' test report Nr. 085_Tyco_Vibra_Choq.																																															

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Group 2 - Mating/unmating cycles into/from connector	-	Mate and remove connectors fully at least 10 times. Mate connectors once as a preparation to future test sequences.																																															

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Group 2 - Heat ageing	-	After 504 hours of exposure in 100°C, no visual appearance alteration.																																															
Group 2 - Thermal shock	No absence of electric contact (resistance > 7Ω for a time > 1ms) over the whole test.	Sample met requirements. For more details please see Qualpas' test report Nr. 086_Tyco_Thermal_Shock.																																															
Group 2 - Temperature and humidity cycles	Visual appearance and Contact resistance $\leq 10 \text{ m}\Omega$.	After 10 cycles, no visual appearance alteration or contact resistance $\geq 10 \text{ m}\Omega$ during the test. Samples met requirements.																																															

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Group 2 - Appearance	There shall be no corrosion, discoloration, cracks, etc., which could affect the functionality of the part.	Samples met requirements.																																															
Group 3 - Appearance	There shall be no corrosion, discoloration, cracks, etc., which could affect the functionality of the part.	Samples met requirements.																																															
Group 3 - Mating/unmating cycles into/from connector	-	Mate and remove connectors fully at least 10 times. Mate connectors once as a preparation to future test sequences.																																															

Test Sequence/Environment	Requirements	Results																																															
Group 3 - Contact resistance	$\leq 10 \text{ m}\Omega$	<table border="1" data-bbox="858 405 1235 1055"> <thead> <tr> <th colspan="3" data-bbox="858 405 1235 443">Contact resistance (mΩ)</th> </tr> <tr> <th data-bbox="858 443 1031 495" rowspan="2">Sample</th> <th colspan="2" data-bbox="1031 443 1235 481">Way</th> </tr> <tr> <th data-bbox="1031 481 1134 519">1</th> <th data-bbox="1134 481 1235 519">2</th> </tr> </thead> <tbody> <tr><td data-bbox="858 519 1031 560">21</td><td data-bbox="1031 519 1134 560">2,56</td><td data-bbox="1134 519 1235 560">2,33</td></tr> <tr><td data-bbox="858 560 1031 600">22</td><td data-bbox="1031 560 1134 600">3,33</td><td data-bbox="1134 560 1235 600">3,12</td></tr> <tr><td data-bbox="858 600 1031 640">23</td><td data-bbox="1031 600 1134 640">2,81</td><td data-bbox="1134 600 1235 640">2,84</td></tr> <tr><td data-bbox="858 640 1031 680">24</td><td data-bbox="1031 640 1134 680">2,37</td><td data-bbox="1134 640 1235 680">2,72</td></tr> <tr><td data-bbox="858 680 1031 721">25</td><td data-bbox="1031 680 1134 721">2,31</td><td data-bbox="1134 680 1235 721">3,57</td></tr> <tr><td data-bbox="858 721 1031 761">26</td><td data-bbox="1031 721 1134 761">2,66</td><td data-bbox="1134 721 1235 761">2,62</td></tr> <tr><td data-bbox="858 761 1031 801">27</td><td data-bbox="1031 761 1134 801">2,91</td><td data-bbox="1134 761 1235 801">3,24</td></tr> <tr><td data-bbox="858 801 1031 842">28</td><td data-bbox="1031 801 1134 842">2,77</td><td data-bbox="1134 801 1235 842">3,02</td></tr> <tr><td data-bbox="858 842 1031 882">29</td><td data-bbox="1031 842 1134 882">2,23</td><td data-bbox="1134 842 1235 882">2,51</td></tr> <tr><td data-bbox="858 882 1031 922">30</td><td data-bbox="1031 882 1134 922">2,92</td><td data-bbox="1134 882 1235 922">2,75</td></tr> <tr><td data-bbox="858 922 1031 963">Min.</td><td data-bbox="1031 922 1134 963">2,23</td><td data-bbox="1134 922 1235 963">2,33</td></tr> <tr><td data-bbox="858 963 1031 1003">Aver.</td><td data-bbox="1031 963 1134 1003">2,68</td><td data-bbox="1134 963 1235 1003">2,87</td></tr> <tr><td data-bbox="858 1003 1031 1043">Max.</td><td data-bbox="1031 1003 1134 1043">3,33</td><td data-bbox="1134 1003 1235 1043">3,57</td></tr> </tbody> </table> <p data-bbox="858 1084 1177 1115">Samples met requirements.</p>	Contact resistance (mΩ)			Sample	Way		1	2	21	2,56	2,33	22	3,33	3,12	23	2,81	2,84	24	2,37	2,72	25	2,31	3,57	26	2,66	2,62	27	2,91	3,24	28	2,77	3,02	29	2,23	2,51	30	2,92	2,75	Min.	2,23	2,33	Aver.	2,68	2,87	Max.	3,33	3,57
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Group 3 - Heavy duty	Visual appearance.	<p data-bbox="858 1151 1286 1211">After 5 cycles, no visual appearance. Samples met requirements.</p>																																															

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Group 4 - Appearance	There shall be no corrosion, discoloration, cracks, etc., which could affect the functionality of the part.	Samples met requirements.																																															
Group 4 - Mating/unmating cycles into/from connector	-	Mate and remove connectors fully at least 10 times. Mate connectors once as a preparation to future test sequences.																																															

Test Sequence/Environment	Requirements	Results																																																												
Group 4 - Terminal mating load to connector	-	<p>Tab Terminal</p> <table border="1" data-bbox="858 461 1235 871"> <thead> <tr> <th colspan="3">Terminal mating load [N]</th> </tr> <tr> <th>Sample</th> <th>Way 1</th> <th>Way 2</th> </tr> </thead> <tbody> <tr><td>31</td><td>14,0</td><td>10,5</td></tr> <tr><td>32</td><td>15,5</td><td>14,5</td></tr> <tr><td>33</td><td>14,0</td><td>15,0</td></tr> <tr><td>34</td><td>9,0</td><td>11,0</td></tr> <tr><td>35</td><td>18,0</td><td>13,5</td></tr> <tr><td>Min</td><td>9,0</td><td>10,5</td></tr> <tr><td>Aver</td><td>14,1</td><td>12,9</td></tr> <tr><td>Max</td><td>18,0</td><td>15,0</td></tr> </tbody> </table> <p>REC Terminal</p> <table border="1" data-bbox="858 960 1235 1370"> <thead> <tr> <th colspan="3">Terminal mating load [N]</th> </tr> <tr> <th>Sample</th> <th>Way 1</th> <th>Way 2</th> </tr> </thead> <tbody> <tr><td>31</td><td>12,5</td><td>10,5</td></tr> <tr><td>32</td><td>13,0</td><td>16,0</td></tr> <tr><td>33</td><td>13,0</td><td>12,5</td></tr> <tr><td>34</td><td>14,5</td><td>12,0</td></tr> <tr><td>35</td><td>11,5</td><td>14,0</td></tr> <tr><td>Min</td><td>11,50</td><td>10,50</td></tr> <tr><td>Aver</td><td>12,90</td><td>13,00</td></tr> <tr><td>Max</td><td>14,50</td><td>16,00</td></tr> </tbody> </table>	Terminal mating load [N]			Sample	Way 1	Way 2	31	14,0	10,5	32	15,5	14,5	33	14,0	15,0	34	9,0	11,0	35	18,0	13,5	Min	9,0	10,5	Aver	14,1	12,9	Max	18,0	15,0	Terminal mating load [N]			Sample	Way 1	Way 2	31	12,5	10,5	32	13,0	16,0	33	13,0	12,5	34	14,5	12,0	35	11,5	14,0	Min	11,50	10,50	Aver	12,90	13,00	Max	14,50	16,00
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Test Sequence/Environment	Requirements	Results	
Group 4 - Connector mating load	≤ 75 N	Sample	Conector Mating Load [N]
		36	48,5
		37	42,5
		38	51,0
		39	56,0
		40	49,0
		41	47,5
		42	53,5
		43	51,5
		44	48,0
		45	46,5
		Min	42,5
		Aver	49,4
		Max	56,0
		Samples met requirements.	
Group 4 - Connector pull-out load	> 80 N	Sample	Connector pull-out load [N]
		36	179,5
		37	183,0
		38	180,0
		39	190,5
		40	183,5
		41	199,5
		42	191,0
		43	189,0
		44	193,5
		45	190,0
		Min	179,5
		Aver	188,0
		Max	199,5
		Samples met requirements.	

Test Sequence/Environment	Requirements	Results																												
Group 4 - Effectiveness of connector polarization	No damage shall occur which might impair following mating and functionality.	<table border="1" data-bbox="858 405 1236 571"> <thead> <tr> <th>Sample</th> <th>Polarization</th> </tr> </thead> <tbody> <tr> <td>46</td> <td>Ok</td> </tr> <tr> <td>47</td> <td>Ok</td> </tr> <tr> <td>48</td> <td>Ok</td> </tr> </tbody> </table> <p data-bbox="858 600 1492 689">No damage occurred which might impair following mating and functionality. Samples met requirements.</p>	Sample	Polarization	46	Ok	47	Ok	48	Ok																				
Sample	Polarization																													
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48	Ok																													
Group 4 - Connector pull-off load	≤ 100 N	<table border="1" data-bbox="858 757 1359 1366"> <thead> <tr> <th>Sample</th> <th>Connector Extraction Force without lock [N]</th> </tr> </thead> <tbody> <tr><td>36</td><td>17,5</td></tr> <tr><td>37</td><td>18,0</td></tr> <tr><td>38</td><td>14,0</td></tr> <tr><td>39</td><td>11,5</td></tr> <tr><td>40</td><td>13,5</td></tr> <tr><td>41</td><td>17,0</td></tr> <tr><td>42</td><td>19,0</td></tr> <tr><td>43</td><td>13,5</td></tr> <tr><td>44</td><td>16,5</td></tr> <tr><td>45</td><td>14,5</td></tr> <tr><td>Min</td><td>11,5</td></tr> <tr><td>Aver</td><td>15,5</td></tr> <tr><td>Max</td><td>19,0</td></tr> </tbody> </table> <p data-bbox="858 1395 1177 1429">Samples met requirements.</p>	Sample	Connector Extraction Force without lock [N]	36	17,5	37	18,0	38	14,0	39	11,5	40	13,5	41	17,0	42	19,0	43	13,5	44	16,5	45	14,5	Min	11,5	Aver	15,5	Max	19,0
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Test Sequence/Environment	Requirements	Results		
Group 4 - Terminal pull-off load from connector	> 30 N	Sample	Pull-off load from connector [N]	
			Way 1	Way 2
		31	124	134,5
		32	122,5	137,5
		33	131,5	126,5
		34	123,5	134
		35	124,5	127,5
		36	127,0	132,0
		37	128,5	146,0
		38	125,5	131,0
		39	129,5	146,0
		40	148,0	136,0
		41	140,0	152,0
		42	138,5	136,0
		43	131,5	144,5
		44	128,0	144,0
		45	127,5	128,5
		Min	125,5	128,5
		Aver	132,4	139,6
		Max	148,0	152,0
Samples met requirements.				

Test Sequence/Environment	Requirements	Results	
		Sample	Secondary lock unmating force [N]
Group 4 - Mechanical tests on secondary lock	Check unmating of secondary lock.	56	75,0
		57	76,5
		58	63,5
		59	73,0
		60	85,0
		61	79,5
		62	73,0
		63	54,0
		64	78,5
		65	69,5
		Min	54,0
		Aver	70,9
		Max	79,5
Group 4 - Appearance	There shall be no corrosion, discoloration, cracks, etc., which could affect the functionality of the part.	Samples met requirements.	
Group 5 - Appearance	There shall be no corrosion, discoloration, cracks, etc., which could affect the functionality of the part.	Samples met requirements.	
Group 5 - Mating/unmating cycles into/from connector	-	Mate and remove connectors fully at least 10 times. Mate connectors once as a preparation to future test sequences.	

Test Sequence/Environment	Requirements	Results																																												
Group 5 - Insulation resistance	$\geq 100 \text{ M}\Omega$	<table border="1" style="width: 100%;"> <thead> <tr> <th>Sample</th> <th>Insulation Resistance between Way 1 and 2 (Ω)</th> </tr> </thead> <tbody> <tr><td>94</td><td>> 50 G</td></tr> <tr><td>95</td><td>> 50 G</td></tr> <tr><td>96</td><td>> 50 G</td></tr> <tr><td>97</td><td>> 50 G</td></tr> <tr><td>98</td><td>> 50 G</td></tr> <tr><td>99</td><td>> 50 G</td></tr> <tr><td>100</td><td>> 50 G</td></tr> <tr><td>101</td><td>> 50 G</td></tr> <tr><td>102</td><td>> 50 G</td></tr> <tr><td>103</td><td>> 50 G</td></tr> </tbody> </table> <table border="1" style="width: 100%;"> <thead> <tr> <th>Sample</th> <th>Insulations Resistance between terminals and carcass (Ω)</th> </tr> </thead> <tbody> <tr><td>94</td><td>> 50 G</td></tr> <tr><td>95</td><td>> 50 G</td></tr> <tr><td>96</td><td>> 50 G</td></tr> <tr><td>97</td><td>> 50 G</td></tr> <tr><td>98</td><td>> 50 G</td></tr> <tr><td>99</td><td>> 50 G</td></tr> <tr><td>100</td><td>> 50 G</td></tr> <tr><td>101</td><td>> 50 G</td></tr> <tr><td>102</td><td>> 50 G</td></tr> <tr><td>103</td><td>> 50 G</td></tr> </tbody> </table> <p>Samples met requirements.</p>	Sample	Insulation Resistance between Way 1 and 2 (Ω)	94	> 50 G	95	> 50 G	96	> 50 G	97	> 50 G	98	> 50 G	99	> 50 G	100	> 50 G	101	> 50 G	102	> 50 G	103	> 50 G	Sample	Insulations Resistance between terminals and carcass (Ω)	94	> 50 G	95	> 50 G	96	> 50 G	97	> 50 G	98	> 50 G	99	> 50 G	100	> 50 G	101	> 50 G	102	> 50 G	103	> 50 G
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Group 5 - Heat ageing	-	After 504 hours of exposure in 100°C, no visual appearance alteration.																																												
Group 5 - Thermal shock	No absence of electric contact (resistance > 7 Ω for a time > 1ms) over the whole test.	Sample met requirements. For more details please see Qualpas' test report Nr.086_Tyco_Thermal_Shock.																																												
Group 5 - Temperature and humidity cycles	Visual appearance and Contact resistance $\leq 10 \text{ m}\Omega$.	After 10 cycles, no visual appearance alteration or contact resistance $\geq 10 \text{ m}\Omega$ during the test. Samples met requirements.																																												

Test Sequence/Environment	Requirements	Results																																															
Group 5 - Resistance to dip test	- dispersion current < 5 mA - no water residuals in connector	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 20%;">Sample</th> <th style="width: 80%;">Dispersion current [A]</th> </tr> </thead> <tbody> <tr><td>94</td><td>0</td></tr> <tr><td>95</td><td>0</td></tr> <tr><td>96</td><td>0</td></tr> <tr><td>97</td><td>0</td></tr> <tr><td>98</td><td>0</td></tr> <tr><td>99</td><td>0</td></tr> <tr><td>100</td><td>0</td></tr> <tr><td>101</td><td>0</td></tr> <tr><td>102</td><td>0</td></tr> <tr><td>103</td><td>0</td></tr> </tbody> </table> <p style="margin-top: 10px;">No water residuals inside connectors. Samples met requirements.</p>			Sample	Dispersion current [A]	94	0	95	0	96	0	97	0	98	0	99	0	100	0	101	0	102	0	103	0																							
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Group 5 - Resistance to high pressure jets	No water residuals inside the connection.	Sample met requirements. For more details please see Qualpas' test report Nr.098_Tyco_Resistance_to_high_pressure_jets.																																															
Group 5 - Terminal pull-off load from connector	> 30 N	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="3" style="text-align: center;">Terminal Extraction force [N]</th> </tr> <tr> <th style="width: 20%;">Sample</th> <th style="width: 40%;">Way 1</th> <th style="width: 40%;">Way 2</th> </tr> </thead> <tbody> <tr><td>94</td><td>96,0</td><td>128,0</td></tr> <tr><td>95</td><td>98,0</td><td>118,5</td></tr> <tr><td>96</td><td>102,0</td><td>99,5</td></tr> <tr><td>97</td><td>119,5</td><td>123,0</td></tr> <tr><td>98</td><td>101,5</td><td>97,0</td></tr> <tr><td>99</td><td>99,5</td><td>98,0</td></tr> <tr><td>100</td><td>109,0</td><td>115,0</td></tr> <tr><td>101</td><td>98,5</td><td>101,0</td></tr> <tr><td>102</td><td>120,5</td><td>116,5</td></tr> <tr><td>103</td><td>107,0</td><td>98,5</td></tr> <tr><td>Min</td><td>96,0</td><td>97,0</td></tr> <tr><td>Aver</td><td>105,1</td><td>109,5</td></tr> <tr><td>Max</td><td>120,5</td><td>128,0</td></tr> </tbody> </table> <p style="margin-top: 10px;">Samples met requirements.</p>			Terminal Extraction force [N]			Sample	Way 1	Way 2	94	96,0	128,0	95	98,0	118,5	96	102,0	99,5	97	119,5	123,0	98	101,5	97,0	99	99,5	98,0	100	109,0	115,0	101	98,5	101,0	102	120,5	116,5	103	107,0	98,5	Min	96,0	97,0	Aver	105,1	109,5	Max	120,5	128,0
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Test Sequence/Environment	Requirements	Results																												
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Group 6 - Appearance	There shall be no corrosion, discoloration, cracks, etc., which could affect the functionality of the part.	Samples met requirements.																												
Group 6 - Mating/unmating cycles into/from connector	-	Mate and remove connectors fully at least 10 times. Mate connectors once as a preparation to future test sequences.																												
Group 6 - Insulation resistance	$\geq 100 \text{ M}\Omega$	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 20%;">Sample</th> <th style="width: 80%;">Insulation Resistance between Way 1 and 2 (Ω)</th> </tr> </thead> <tbody> <tr><td>104</td><td>> 50 G</td></tr> <tr><td>105</td><td>> 50 G</td></tr> <tr><td>106</td><td>> 50 G</td></tr> <tr><td>107</td><td>> 50 G</td></tr> <tr><td>108</td><td>> 50 G</td></tr> <tr><td>109</td><td>> 50 G</td></tr> </tbody> </table> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 20%;">Sample</th> <th style="width: 80%;">Insulations Resistance between terminals and carcass (Ω)</th> </tr> </thead> <tbody> <tr><td>104</td><td>> 50 G</td></tr> <tr><td>105</td><td>> 50 G</td></tr> <tr><td>106</td><td>> 50 G</td></tr> <tr><td>107</td><td>> 50 G</td></tr> <tr><td>108</td><td>> 50 G</td></tr> <tr><td>109</td><td>> 50 G</td></tr> </tbody> </table> <p>Samples met requirements.</p>	Sample	Insulation Resistance between Way 1 and 2 (Ω)	104	> 50 G	105	> 50 G	106	> 50 G	107	> 50 G	108	> 50 G	109	> 50 G	Sample	Insulations Resistance between terminals and carcass (Ω)	104	> 50 G	105	> 50 G	106	> 50 G	107	> 50 G	108	> 50 G	109	> 50 G
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Test Sequence/Environment	Requirements	Results																																			
Group 6 - Contact resistance	$\leq 10 \text{ m}\Omega$	<table border="1"> <thead> <tr> <th colspan="3">Contact resistance (mΩ)</th> </tr> <tr> <th rowspan="2">Sample</th> <th colspan="2">Way</th> </tr> <tr> <th>1</th> <th>2</th> </tr> </thead> <tbody> <tr><td>104</td><td>6,30</td><td>6,64</td></tr> <tr><td>105</td><td>6,70</td><td>7,76</td></tr> <tr><td>106</td><td>6,25</td><td>6,18</td></tr> <tr><td>107</td><td>2,66</td><td>2,90</td></tr> <tr><td>108</td><td>3,47</td><td>3,56</td></tr> <tr><td>109</td><td>2,63</td><td>4,44</td></tr> <tr><td>Min.</td><td>2,63</td><td>2,90</td></tr> <tr><td>Aver.</td><td>4,67</td><td>5,24</td></tr> <tr><td>Max.</td><td>6,70</td><td>7,76</td></tr> </tbody> </table> <p>Samples met requirements.</p>	Contact resistance (mΩ)			Sample	Way		1	2	104	6,30	6,64	105	6,70	7,76	106	6,25	6,18	107	2,66	2,90	108	3,47	3,56	109	2,63	4,44	Min.	2,63	2,90	Aver.	4,67	5,24	Max.	6,70	7,76
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Group 6 - Resistance to corrosion	No distortion or cracking on connector body.	After one week cycle, no distortion or cracking on connector body. Samples met requirements.																																			
Group 6 - Contact resistance	$\leq 10 \text{ m}\Omega$	<table border="1"> <thead> <tr> <th colspan="3">Contact resistance (mΩ)</th> </tr> <tr> <th rowspan="2">Sample</th> <th colspan="2">Way</th> </tr> <tr> <th>1</th> <th>2</th> </tr> </thead> <tbody> <tr><td>104</td><td>5,88</td><td>5,86</td></tr> <tr><td>105</td><td>6,74</td><td>6,60</td></tr> <tr><td>106</td><td>6,38</td><td>6,27</td></tr> <tr><td>107</td><td>2,95</td><td>3,20</td></tr> <tr><td>108</td><td>3,12</td><td>2,75</td></tr> <tr><td>109</td><td>7,94</td><td>7,95</td></tr> <tr><td>Min.</td><td>2,95</td><td>2,75</td></tr> <tr><td>Aver.</td><td>5,50</td><td>5,43</td></tr> <tr><td>Max.</td><td>7,94</td><td>7,95</td></tr> </tbody> </table> <p>Samples met requirements.</p>	Contact resistance (mΩ)			Sample	Way		1	2	104	5,88	5,86	105	6,74	6,60	106	6,38	6,27	107	2,95	3,20	108	3,12	2,75	109	7,94	7,95	Min.	2,95	2,75	Aver.	5,50	5,43	Max.	7,94	7,95
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Test Sequence/Environment	Requirements	Results		
Group 6 - Insulation resistance	$\geq 100 \text{ M}\Omega$	Sample	Insulation Resistance between Way 1 and 2 (Ω)	
			104	> 50 G
		105	141,2 M	
		106	103,3 M	
		107	132,2 M	
		108	1,6 G	
		109	115,3 M	
		Sample	Insulations Resistance between terminals and carcass (Ω)	
			104	> 50 G
			105	> 50 G
			106	> 50 G
			107	> 50 G
			108	> 50 G
			109	> 50 G
Samples met requirements.				

Test Sequence/Environment	Requirements	Results																																	
Group 6 - Dielectric stiffness	No current loss is admitted between cavities or between cavity and outer metal sheet.	<table border="1" data-bbox="858 409 1361 730"> <thead> <tr> <th>Sample</th> <th>Dielectric stiffness between Way 1 and 2</th> </tr> </thead> <tbody> <tr><td>104</td><td>No current loss</td></tr> <tr><td>105</td><td>No current loss</td></tr> <tr><td>106</td><td>No current loss</td></tr> <tr><td>107</td><td>No current loss</td></tr> <tr><td>108</td><td>No current loss</td></tr> <tr><td>109</td><td>No current loss</td></tr> </tbody> </table> <table border="1" data-bbox="858 763 1361 1084"> <thead> <tr> <th>Sample</th> <th>Dielectric stiffness between terminals and carcass</th> </tr> </thead> <tbody> <tr><td>104</td><td>No current loss</td></tr> <tr><td>105</td><td>No current loss</td></tr> <tr><td>106</td><td>No current loss</td></tr> <tr><td>107</td><td>No current loss</td></tr> <tr><td>108</td><td>No current loss</td></tr> <tr><td>109</td><td>No current loss</td></tr> </tbody> </table> <p data-bbox="858 1122 1177 1149">Samples met requirements.</p>	Sample	Dielectric stiffness between Way 1 and 2	104	No current loss	105	No current loss	106	No current loss	107	No current loss	108	No current loss	109	No current loss	Sample	Dielectric stiffness between terminals and carcass	104	No current loss	105	No current loss	106	No current loss	107	No current loss	108	No current loss	109	No current loss					
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Group 6 - Terminal pull-off load from connector	> 30 N	<table border="1" data-bbox="858 1193 1235 1637"> <thead> <tr> <th colspan="3">Terminal Extraction force [N]</th> </tr> <tr> <th>Sample</th> <th>Way 1</th> <th>Way 2</th> </tr> </thead> <tbody> <tr><td>104</td><td>96,78</td><td>88,68</td></tr> <tr><td>105</td><td>93,51</td><td>91,01</td></tr> <tr><td>106</td><td>88,91</td><td>92,44</td></tr> <tr><td>107</td><td>125,27</td><td>111,05</td></tr> <tr><td>108</td><td>92,64</td><td>94,11</td></tr> <tr><td>109</td><td>88,72</td><td>81,32</td></tr> <tr><td>Min</td><td>88,72</td><td>81,32</td></tr> <tr><td>Aver</td><td>97,64</td><td>93,10</td></tr> <tr><td>Max</td><td>125,27</td><td>111,05</td></tr> </tbody> </table> <p data-bbox="858 1671 1177 1697">Samples met requirements.</p>	Terminal Extraction force [N]			Sample	Way 1	Way 2	104	96,78	88,68	105	93,51	91,01	106	88,91	92,44	107	125,27	111,05	108	92,64	94,11	109	88,72	81,32	Min	88,72	81,32	Aver	97,64	93,10	Max	125,27	111,05
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Group 6 – Appearance	There shall be no corrosion, discoloration, cracks, etc., which could affect the functionality of the part.	Samples met requirements.																																	

Test Sequence/Environment	Requirements	Results																																										
Group 7 - Appearance	There shall be no corrosion, discoloration, cracks, etc., which could affect the functionality of the part.	Samples met requirements.																																										
Group 7 - Mating/unmating cycles into/from connector	-	Mate and remove connectors fully at least 10 times. Mate connectors once as a preparation to future test sequences.																																										
Group 7 - Insulation resistance	≥100 MΩ	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 20%;">Sample</th> <th style="width: 80%;">Insulation Resistance between Way 1 and 2 (GΩ)</th> </tr> </thead> <tbody> <tr><td>116</td><td>> 50 G</td></tr> <tr><td>117</td><td>> 50 G</td></tr> <tr><td>118</td><td>> 50 G</td></tr> <tr><td>119</td><td>> 50 G</td></tr> <tr><td>120</td><td>> 50 G</td></tr> <tr><td>121</td><td>> 50 G</td></tr> <tr><td>122</td><td>> 50 G</td></tr> <tr><td>123</td><td>> 50 G</td></tr> <tr><td>124</td><td>> 50 G</td></tr> <tr><td>125</td><td>> 50 G</td></tr> <tr><td>126</td><td>> 50 G</td></tr> <tr><td>127</td><td>> 50 G</td></tr> <tr><td>128</td><td>> 50 G</td></tr> <tr><td>129</td><td>> 50 G</td></tr> <tr><td>130</td><td>> 50 G</td></tr> <tr><td>131</td><td>> 50 G</td></tr> <tr><td>132</td><td>> 50 G</td></tr> <tr><td>133</td><td>> 50 G</td></tr> <tr><td>134</td><td>> 50 G</td></tr> <tr><td>135</td><td>> 50 G</td></tr> </tbody> </table>	Sample	Insulation Resistance between Way 1 and 2 (GΩ)	116	> 50 G	117	> 50 G	118	> 50 G	119	> 50 G	120	> 50 G	121	> 50 G	122	> 50 G	123	> 50 G	124	> 50 G	125	> 50 G	126	> 50 G	127	> 50 G	128	> 50 G	129	> 50 G	130	> 50 G	131	> 50 G	132	> 50 G	133	> 50 G	134	> 50 G	135	> 50 G
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Test Sequence/Environment	Requirements	Results	
Group 7 - Insulation resistance	≥100 MΩ	Sample	Insulations Resistance between terminals and carcass (GΩ)
		116	> 50 G
		117	> 50 G
		118	> 50 G
		119	> 50 G
		120	> 50 G
		121	> 50 G
		122	> 50 G
		123	> 50 G
		124	> 50 G
		125	> 50 G
		126	> 50 G
		127	> 50 G
		128	> 50 G
		129	> 50 G
		130	> 50 G
		131	> 50 G
		132	> 50 G
		133	> 50 G
		134	> 50 G
135	> 50 G		
Samples met requirements.			

Test Sequence/Environment	Requirements	Results	
Group 7 - Resistance to chemicals	No distortion or cracking on connector body checked with a 10x to 40x magnification.	Samples	Fluid and temperature of exposure.
		116 and 117	Brake fluid as per P.S. 9.55597, grade DOT 3 at 50°C .
		118 and 119	Engine oil to P.S. 9.55535 at 85°C .
		120 and 121	Fuel ASTM C or Unleaded gasoline to FIAT Std. Sh. 55509 at 25°C .
		122 and 123	Antifreeze fluid to P.S. 9.55523 at 100°C .
		124 and 125	Oil for transmission and power steering system to P.S. 9.55550 at 85°C
		126 and 127	Liquid detergent to P.S. 9.55522 at 25°C .
		128 and 129	Diesel fuel as per FIAT Std. Sh. 55520 at 25°C .
		130 and 131	Battery fluid as per type C, FIAT Std. Sh. 55870 at 23°C.

Test Sequence/Environment	Requirements	Results	
Group 7 - Insulation resistance	≥100 MΩ	Sample	Insulation Resistance between Way 1 and 2 (GΩ)
		116	> 50 G
		117	> 50 G
		118	> 50 G
		119	> 50 G
		120	> 50 G
		121	> 50 G
		122	> 50 G
		123	> 50 G
		124	> 50 G
		125	> 50 G
		126	> 50 G
		127	> 50 G
		128	> 50 G
		129	> 50 G
		130	> 50 G
		131	> 50 G
		132	> 50 G
		133	> 50 G
		134	> 50 G
135	> 50 G		

Test Sequence/Environment	Requirements	Results		
Group 7 - Insulation resistance	$\geq 100 \text{ M}\Omega$	Sample	Insulations Resistance between terminals and carcass (G Ω)	
			116	> 50 G
			117	> 50 G
			118	> 50 G
			119	> 50 G
			120	> 50 G
			121	> 50 G
			122	> 50 G
			123	> 50 G
			124	> 50 G
			125	> 50 G
			126	> 50 G
			127	> 50 G
			128	> 50 G
			129	> 50 G
			130	> 50 G
			131	> 50 G
			132	> 50 G
			133	> 50 G
			134	> 50 G
135	> 50 G			
Samples met requirements.				

Test Sequence/Environment	Requirements	Results	
Group 7 - Connector pull-out load	> 80 N	Sample	Connector Extraction Force [N]
		116	155,9
		117	162,3
		118	166,4
		119	173,7
		120	164,0
		121	161,7
		122	132,4
		123	143,5
		124	167,1
		125	163,0
		126	168,7
		127	152,3
		128	179,6
		129	173,2
		130	83,3
		131	94,2
		Min	83,3
		Aver	152,6
		Max	179,6
Samples met requirements.			

Test Sequence/Environment	Requirements	Results																																																															
Group 7 - Terminal pull-off load from connector	> 30 N	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="3" style="background-color: #cccccc;">Terminal pull-off load force [N]</th> </tr> <tr> <th style="background-color: #cccccc;">Sample</th> <th style="background-color: #cccccc;">Way 1</th> <th style="background-color: #cccccc;">Way 2</th> </tr> </thead> <tbody> <tr><td>116</td><td>117,69</td><td>86,05</td></tr> <tr><td>117</td><td>118,00</td><td>99,52</td></tr> <tr><td>118</td><td>117,13</td><td>128,07</td></tr> <tr><td>119</td><td>75,13</td><td>118,87</td></tr> <tr><td>120</td><td>110,57</td><td>107,15</td></tr> <tr><td>121</td><td>127,21</td><td>120,51</td></tr> <tr><td>122</td><td>118,23</td><td>112,19</td></tr> <tr><td>123</td><td>122,39</td><td>116,98</td></tr> <tr><td>124</td><td>111,63</td><td>124,95</td></tr> <tr><td>125</td><td>133,46</td><td>81,53</td></tr> <tr><td>126</td><td>121,46</td><td>114,96</td></tr> <tr><td>127</td><td>88,96</td><td>116,69</td></tr> <tr><td>128</td><td>107,76</td><td>112,39</td></tr> <tr><td>129</td><td>100,50</td><td>107,90</td></tr> <tr><td>130</td><td>126,28</td><td>111,39</td></tr> <tr><td>131</td><td>102,77</td><td>113,00</td></tr> <tr style="background-color: #cccccc;"><td>Min</td><td>75,13</td><td>81,53</td></tr> <tr style="background-color: #cccccc;"><td>Aver</td><td>112,45</td><td>110,76</td></tr> <tr style="background-color: #cccccc;"><td>Max</td><td>133,46</td><td>128,07</td></tr> </tbody> </table> <p>Samples met requirements.</p>	Terminal pull-off load force [N]			Sample	Way 1	Way 2	116	117,69	86,05	117	118,00	99,52	118	117,13	128,07	119	75,13	118,87	120	110,57	107,15	121	127,21	120,51	122	118,23	112,19	123	122,39	116,98	124	111,63	124,95	125	133,46	81,53	126	121,46	114,96	127	88,96	116,69	128	107,76	112,39	129	100,50	107,90	130	126,28	111,39	131	102,77	113,00	Min	75,13	81,53	Aver	112,45	110,76	Max	133,46	128,07
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Group 7 - Appearance	There shall be no corrosion, discoloration, cracks, etc., which could affect the functionality of the part.	Samples met requirements.																																																															

2. SAMPLE & WIRE DESCRIPTION

The Certification of Conformance (C of C), submitted with the test request, stated that the samples have been produced, inspected, and accepted as conforming to product drawing requirements, and made using the same core manufacturing processes and technologies as production parts.

2.1. Group / Samples

Group	Part Number	Rev.	Date Code	Sample Description	Quantity Tested
All	284703-1	C2	N/A	MQS SOCKET HOUSING, 2 POS ASSY	90
All	-	-	08/08/14	COUNTER PART	90
All	962886-1	A1	08/08/14	MQS TAB TERMINAL	180
All	962885-1	A1	08/08/14	MQS REC TERMINAL	180

* Information either unavailable or not provided by requestor.

2.2. Wire Information

Group Number	Wire Gage	Overall Diameter	Strand Diameter	Number of Strands
All	0,75mm ²	1,8mm ²	0,23mm	19
6	0,35mm ²	1,3mm ²	0,21mm	12

3. SAMPLE PREPARATION

Sample identification



MQS SOCKET HOUSING, 2 POS ASSY WITH COUNTER PART AND WIRES

4. TEST PROCEDURE

4.1. Appearance

According to Specification Fiat 7-Z8260 REV 2005 item 7.1.1.

4.2. Mating/ unmating cycles

According to Specification Fiat 7-Z8260 REV 2005 item 7.4.1.

4.3. Contact resistance

According to Specification Fiat 7-Z8260 REV 2005 item 7.2.3.

4.4. Mechanical shock

According to Specification Fiat 7-Z8260 REV 2005 item 7.10.2. Test accomplished in Qualpas' laboratory. Please see Qualpas' test report Nr. 085_Tyco_Vibra_Choq.

4.5. Resistance to vibrations

According to Specification Fiat 7-Z8260 REV 2005 item 7.10.1. Test accomplished in Qualpas' laboratory. Please see Qualpas' test report Nr. 085_Tyco_Vibra_Choq.

4.6. Heat ageing

According to Specification Fiat 7-Z8260 REV 2005 item 7.9.1.

4.7. Thermal Shock

According to Specification Fiat 7-Z8260 REV 2005 item 7.9.2. Test accomplished in Qualpas' laboratory. Please see Qualpas' test report Nr. 086_Tyco_Thermal_Shock.

4.8. Temperature and humidity cycles

According to Specification Fiat 7-Z8260 REV 2005 item 7.9.3.

4.9. Heavy duty

According to Specification Fiat 7-Z8260 REV 2005 item 7.2.6.

4.10. Terminal mating load to connector

According to Specification Fiat 7-Z8260 REV 2005 item 7.3.5. Mate each terminal manually until fully engaged.

4.11. Connector mating load

According to Specification Fiat 7-Z8260 REV 2005 item 7.4.2.

4.12. Connector pull-out load

According to Specification Fiat 7-Z8260 REV 2005 item 7.4.5.

4.13. Effectiveness of connector polarization

According to Specification Fiat 7-Z8260 REV 2005 item 7.4.6.

4.14. Connector pull-off load

According to Specification Fiat 7-Z8260 REV 2005 item 7.4.4.

4.15. Terminal pull-off load from connector

According to Specification Fiat 7-Z8260 REV 2005 item 7.3.6.

4.16. Mechanical tests on secondary lock

According to Specification Fiat 7-Z8260 REV 2005 item 7.5.1.

4.17. Insulation resistance

According to Specification Fiat 7-Z8260 REV 2005 item 7.2.1.

4.18. Resistance to dip test

According to Specification Fiat 7-Z8260 REV 2005 item 7.9.4.

4.19. Resistance to high pressure jets

According to Specification Fiat 7-Z8260 REV 2005 item 7.9.5. Test accomplished in Qualpas' laboratory. Please see Qualpas' test report Nr.098_Tyco_Resistance_to_high_pressure_jets.

4.20. Resistance to corrosion

According to Specification Fiat 7-Z8260 REV 2005 item 7.9.6.

4.21. Dielectric stiffness

According to Specification Fiat 7-Z8260 REV 2005 item 7.2.2.

4.22. Resistance to chemicals

According to Specification Fiat 7-Z8260 REV 2005 item 7.9.7. Chemicals Fluids according to TE engineering definition.

5. TEST EQUIPMENT

All equipment containing a calibration number is calibrated and traceable through TE to the National Institute of Standards and Technology (NIST).

Instrument Description	Manufacturer	Model Number	Calibration Number	Purpose
Dielectric Analyzer	Associated Research, Inc.	Hypot 7650	93-339033-001	Insulation resistance and Dielectric Stiffness
Salt Spray Chamber	ACS	EWTC 102	92-339032-009-A	Resistance to corrosion
Dynamometer	Mecmesin	AFG 2500N	92-339017-090	Terminal mating load to connector, Connector mating load, Connector pull-out load, Effectiveness of connector, Polarization connector pull-off load, Terminal pull-off load from connector and Mechanical tests on secondary lock.
Oven	Fanem	320E	93-339032-1231	Heat ageing, Resistance to corrosion and Resistance to chemicals.
DC Power Supply	Agilent	E3641A	93-339033-020	Contact resistance.
Digital Multimeter	Hewlett Packard	34401A	93-339033-024	Contact resistance.
Climatic Chamber	Weiss	WK1 340	92-339032-004	Temperature and humidity cycles.
Freezer	Indrel iult	304D	92-339032-008	Heavy duty.
Oscilloscope	Tektronix Tekscope	THS720	93-339033-019	Mechanical shock, Resistance to vibrations, Thermal Shock, Temperature and humidity cycles.

6. APPROVALS

Approvals are secured electronically through the corporate document repository routing and approval system.

Testing & Report By: Jesus Preto, Laboratory Engineer

Reviewed & Approved By: Paulo Almeida, Laboratory Coordinator