



# TEST REPORT

PRODUCT ENGINEERING LABORATORY	RL. <b>140208</b>	REVISION: <b>1</b>
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Material / Parts description: <b>HSG 6 POS. MT</b> <b>HSG 6 POS. MT</b> <b>HSG 8 POS. MT</b>	PN: <b>493486-2</b> <b>493576-2</b> <b>493487-2</b>	REVISION: <b>C</b> <b>C</b> <b>B</b>
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Requester: GEBTIL OLIVEIRA JR.	Dept: EPA
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Customer: <b>FIAT</b>	Supplier: <b>TE CONNECTIVITY</b>
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Confidentiality:	Distribution:
<input type="checkbox"/> 1- CONFIDENTIAL <input type="checkbox"/> 2- TE RESTRICTED <input checked="" type="checkbox"/> 3- ADDRESSED CUSTOMER <input type="checkbox"/>	<input checked="" type="checkbox"/> REQUESTER <input checked="" type="checkbox"/> DMTEC <input type="checkbox"/> <input type="checkbox"/>

Purpose: 1 - VALIDATION TEST	History:  VALIDATION TEST ACCORDING TO TEST PLAN ATTACHED.
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Test(s) Made :  ACCORDING TO TEST PLAN ATTACHED.	Specification (s):  SPEC. FIAT 9.91320/02 AND 7.Z8260 REVISION 2005.
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Conclusion:

Please see individual tests results.

Apr 30, 2014  
Date

**\*Signature on file**  
Executed by  
DIOGO BIASETTO ROJAS  
TEST ENGINEER

**\*Signature on file**  
Responsible  
PAULO S. ALMEIDA  
LABORATORY COORDINATOR

**Accomplished tests according to Test Plan attached:**

**Results:**

**MECHANICAL TESTS (ITEM 3.3 SPEC. FIAT 7-Z8260):**

<b>1 - TEST GROUP A</b> .....	pg. 04	Approved.
1.1 - Visual inspection (item 7.1.1 spec. 7-Z8260).....	pg. 04	Approved.
1.2 - Terminal mating load to connector (item 7.3.5 spec. 7-Z8260).....	pg. 04	Approved.
1.3 - Connector mating load (item 7.4.2 spec. 7-Z8260).....	pg. 06	Reapproved.
1.4 - Connector pull-out load (item 7.4.5 spec. 7-Z8260).....	pg. 07	Approved.
1.5 - Effectiveness of connector polarization (item 7.4.6 spec. 7-Z8260).....	pg. 08	Approved.
1.6 - Connector pull-off load (item 7.4.4 spec. 7-Z8260).....	pg. 08	Reapproved.
1.7 - Terminal pull-off load from connector (item 7.3.6 spec. 7-Z8260).....	pg. 09	Approved.
1.8 - Visual inspection (item 7.1.1 spec. 7-Z8260).....	pg. 10	Approved.

**MECHANICAL, ELECTRICAL AND ENVIRONMENTAL TESTS (ITEM 3.9 SPEC. FIAT 7-Z8260):**

<b>2 - TEST GROUP A</b> .....	pg. 10	Approved.
2.1 - Visual inspection (item 7.1.1 spec. 7-Z8260).....	pg. 10	Approved.
2.2 - Mating/Unmating cycles into/from connector (item 7.4.1 spec. 7-Z8260).....	pg. 10	Approved.
2.3 - Contact resistance (item 7.2.3 spec. 7-Z8260).....	pg. 11	Approved.
2.4 - Mechanical shock (item 7.10.2 spec. 7-Z8260).....	pg. 13	Approved.
2.5 - Vibration (item 7.10.1 spec. 7-Z8260).....	pg. 13	Approved.
2.6 - Contact resistance (item 7.2.3 spec. 7-Z8260).....	pg. 13	Approved.
2.7 - Visual inspection (item 7.1.1 spec. 7-Z8260).....	pg. 14	Approved.
<b>3 - TEST GROUP B</b> .....	pg. 15	Approved.
3.1 - Visual inspection (item 7.1.1 spec. 7-Z8260).....	pg. 15	Approved.
3.2 - Mating/Unmating cycles into/from connector (item 7.4.1 spec. 7-Z8260).....	pg. 15	Approved.
3.3 - Contact resistance (item 7.2.3 spec. 7-Z8260).....	pg. 15	Approved.
3.4 - Heat aging (item 7.9.1 spec. 7-Z8260).....	pg. 16	Approved.
3.5 - Thermal shock (item 7.9.2 spec. 7-Z8260).....	pg. 17	Approved.
3.6 - Temperature and humidity cycles (item 7.9.3 spec. 7-Z8260).....	pg. 17	Approved.
3.7 - Contact resistance (item 7.2.3 spec. 7-Z8260).....	pg. 18	Approved.
3.8 - Visual inspection (item 7.1.1 spec. 7-Z8260).....	pg. 19	Approved.
<b>4 - TEST GROUP C</b> .....	pg. 19	Approved.
4.1 - Visual inspection (item 7.1.1 spec. 7-Z8260).....	pg. 19	Approved.
4.2 - Mating/Unmating cycles into/from connector (item 7.4.1 spec. 7-Z8260).....	pg. 19	Approved.
4.3 - Contact resistance (item 7.2.3 spec. 7-Z8260).....	pg. 20	Approved.
4.4 - Heavy duty (item 7.2.6 spec. 7-Z8260).....	pg. 21	Approved.
4.5 - Contact resistance (item 7.2.3 spec. 7-Z8260).....	pg. 21	Approved.
4.6 - Visual inspection (item 7.1.1 spec. 7-Z8260).....	pg. 23	Approved.

### 1 General

#### 1.1 Samples Identification

50 HSG 6 POS. MT PN: 493486-2.

50 HSG 6 POS. MT PN: 493576-2.

50 HSG 8 POS. MT PN: 493487-2.

50 Counterpart PN: 1897097-1.

120 terminal 0,50mm<sup>2</sup> wire gauge PN: 964263-2.

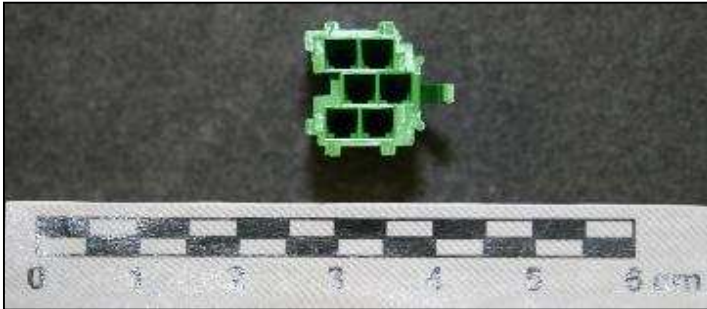


Photo 1 - HSG 6 POS. MT PN: 493486-2

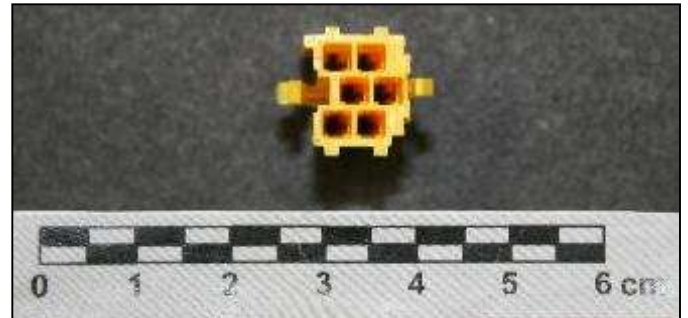


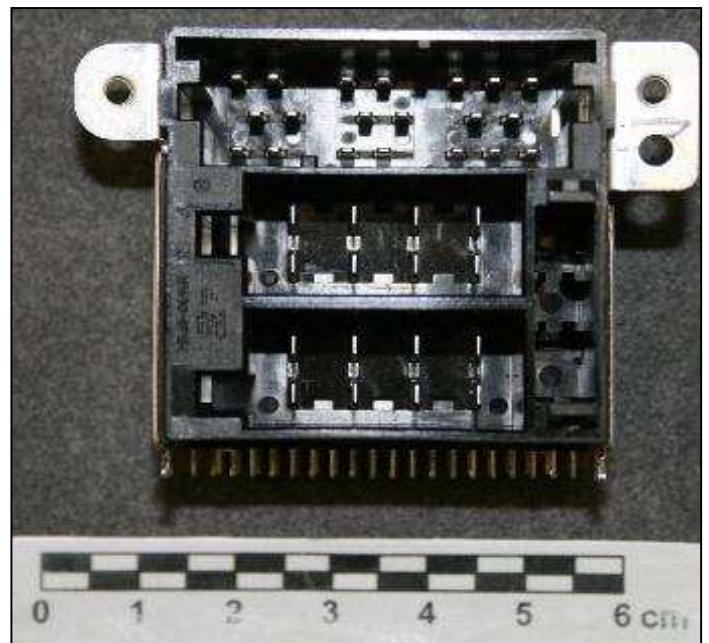
Photo 2 - HSG 6 POS. MT PN: 493576-2



Photo 3 - HSG 8 POS. MT PN: 493487-2



Photo 4 - Counterpart PN:1897097-1



**Tests execution:**

Performed by TE lab technicians at Bragança Paulista Electrical Components Test Laboratory facilities unless otherwise stated.

**MECHANICAL TESTS ON TERMINAL (ITEM 3.3 SPEC. FIAT 7-Z8260):**

**1 - TEST GROUP A :**

**Test sequence:**

- 1.1 - Visual inspection (item 7.1.1 spec. 7-Z8260);
- 1.2 - Terminal mating load to connector (item 7.3.5 spec. 7-Z8260);
- 1.3 - Connector mating load (item 7.4.2 spec. 7-Z8260);
- 1.4 - Connector pull-out load (item 7.4.5 spec. 7-Z8260);
- 1.5 - Effectiveness of connector polarization (item 7.4.6 spec. 7-Z8260);
- 1.6 - Connector pull-off load (item 7.4.4 spec. 7-Z8260);
- 1.7 - Terminal pull-off load from connector (item 7.3.6 spec. 7-Z8260);
- 1.8 - Visual inspection (item 7.1.1 spec. 7-Z8260).

**1.1 - Visual inspection (item 7.1.1 spec. 7-Z8260):**

*Samples:*

Samples number 31 to 70.

*Equipments:*

Visual Inspection.

*Procedure:*

Carry out a detailed visual inspection to identify any technological defect or material flaw, as cracking, stains, etc. Have pictures or video recording taken for specimen under test (see pictures at samples identification on page 3).

*Requirements:*

Product shall be conforming to the requirements of applicable product drawing and application specification.

*Results:*

All samples met the requirements.

**1.2 - Terminal mating load to connector (item 7.3.5 spec. 7-Z8260):**

*Samples:*

Samples number 31 to 45.

*Equipment:*

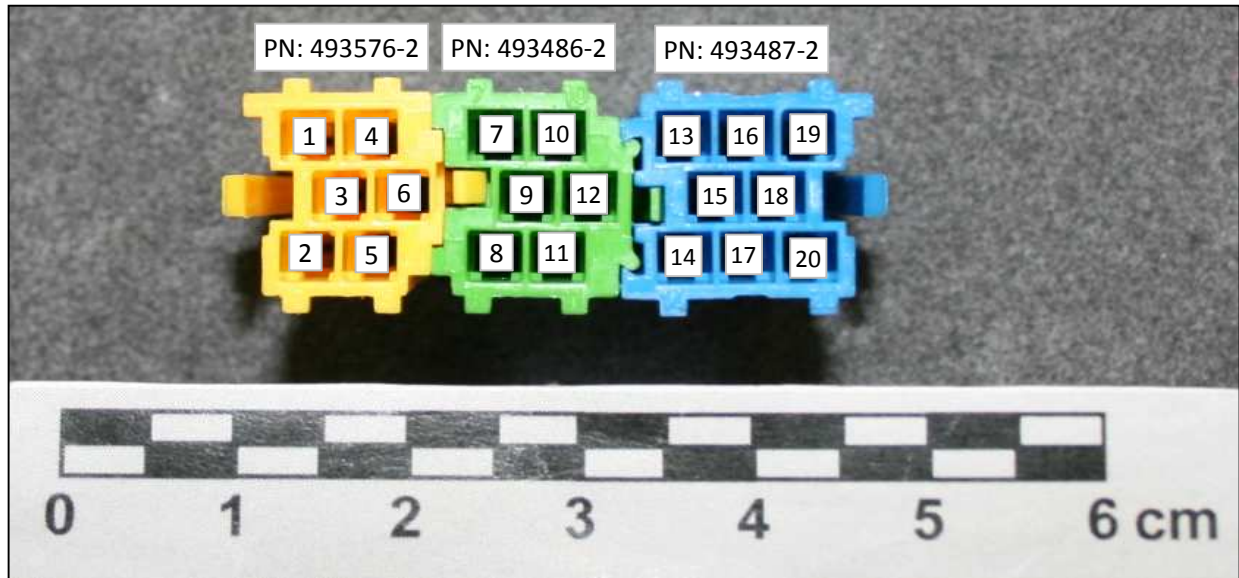
Imada Digital dynamometer, model DPS 11R, ref. TE 92-339017-076.

*Procedure:*

Measure mating force from terminal to housing, with a 50mm/min speed.

*Requirements:*

Mating force  $\geq 15\text{N}$ .



**Photo 5 - Ways identification**

*Results:*

PN:	Terminal mating load to connector [N]					
	Ways	Sample 31	Sample 32	Sample 33	Sample 34	Sample 35
493576-2	1	4,66	4,46	5,06	4,36	4,08
	2	6,53	5,23	5,73	7,06	4,19
	3	6,38	4,37	4,87	5,00	4,74
	4	4,60	4,06	4,51	4,87	5,28
	5	6,20	4,70	5,08	5,09	4,63
	6	6,46	4,66	5,98	4,84	6,36
PN:	Ways	Sample 36	Sample 37	Sample 38	Sample 39	Sample 40
493486-2	7	5,03	7,24	4,40	6,25	5,27
	8	4,61	4,86	6,24	5,01	5,46
	9	5,73	4,29	4,32	6,14	5,10
	10	4,18	5,54	5,34	5,31	4,57
	11	5,88	5,90	5,90	6,10	7,17
12	4,53	4,94	4,87	5,45	4,34	
PN:	Ways	Sample 41	Sample 42	Sample 43	Sample 44	Sample 45
493487-2	13	5,23	5,20	6,45	5,23	5,72
	14	7,86	5,48	4,57	4,11	4,69
	15	4,63	3,99	4,61	5,84	5,05
	16	4,93	5,28	3,48	4,66	4,37
	17	4,98	4,82	5,72	4,80	6,80
	18	3,80	5,85	5,39	6,47	6,31
	19	4,82	5,84	6,81	6,05	6,50
20	3,59	7,22	6,86	5,54	4,66	
Minimum		3,59	3,99	3,48	4,11	4,08
Average		5,23	5,20	5,31	5,41	5,26
Maximum		7,86	7,24	6,86	7,06	7,17

*Conclusion:*

All samples met the requirements.



### 1.3 - Connector mating load (item 7.4.2 spec. 7-Z8260):

*Samples:*

Samples number 46 to 55.

*Equipment:*

Universal tensile strength machine VERSATEST with digital dynamometer Mecmesin AFG 2500N, ref. TE 92-339017-090.

*Procedure:*

Measure mating force from connector to counterpart, with a 50mm/min speed.

*Requirements:*

Mating load  $\leq 75\text{N}$ .

*Results:*

Sample	Mating load [N]
46	114,0
47	120,5
48	131,0
49	148,5
50	134,5
51	112,5
52	132,0
53	144,0
54	123,5
55	119,5
<b>Minimum</b>	112,5
<b>Average</b>	128,0
<b>Maximum</b>	148,5



**Photo 6 - Connector mating load**

*Conclusion:*

Samples didn't meet the requirements.

### 1.4 - Connector pull-out load (item 7.4.5 spec. 7-Z8260):

*Samples:*

Samples number 61 to 70.

*Equipment:*

Universal tensile strength machine VERSATEST with digital dynamometer Mecmesin AFG 2500N, ref. TE 92-339017-090.

*Procedure:*

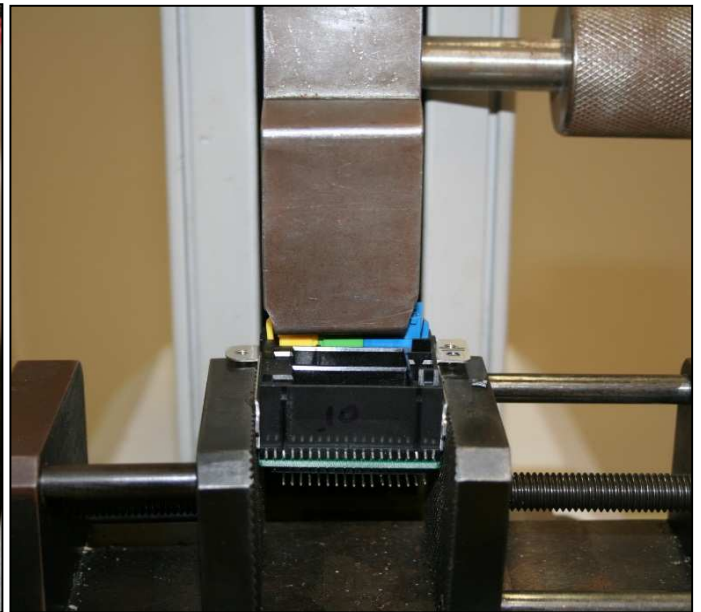
Measure unmating force from connector (without terminals) to counterpart, with a 50mm/min speed.

*Requirements:*

Pull-out load  $\geq$  100N.



**Photo 7** - Connector pull-out load



**Photo 8** - Connector pull-out load

*Results:*

Sample	Pull-out load [N]
61	121,5
62	127,0
63	129,5
64	122,5
65	119,0
66	123,0
67	124,5
68	128,0
69	127,5
70	118,3
<b>Minimum</b>	118,3
<b>Average</b>	124,1
<b>Maximum</b>	129,5

*Conclusion:*

All samples met the requirements.

### 1.5 - Effectiveness of connector polarization (item 7.4.6 spec. 7-Z8260):

*Samples:*

Samples number 56 to 60.

*Equipment:*

Universal tensile strength machine VERSATEST with digital dynamometer Mecmesin AFG 2500N, ref. TE 92-339017-090.

*Procedure:*

Apply a mating load (in wrong position) at a constant speed of  $50 \pm 10$  mm/min until achieving 150N.

*Requirements:*

No electrical contact must occur and both plastics and terminals must be free from damages.

*Results:*

Samples didn't show electrical contact, and both plastics and terminals kept without damage.

*Conclusion:*

All samples met the requirements.

### 1.6 - Connector pull-off load (item 7.4.4 spec. 7-Z8260):

*Samples:*

Samples number 46 to 55.

*Equipment:*

Universal tensile strength machine VERSATEST with digital dynamometer Mecmesin AFG 2500N, ref. TE 92-339017-090.

*Procedure:*

Procure at least 10 connector pairs with all terminals as test specimen;  
Measure unmating force from connector to counterpart, with a 50mm/min speed.

*Requirements:*

Pull-off load  $\leq 100$ N.

*Results:*

Sample	Pull-off load [N]
46	140,5
47	129,0
48	105,0
49	111,0
50	123,5
51	117,5
52	121,5
53	122,0
54	123,5
55	124,0
<b>Minimum</b>	105,0
<b>Average</b>	121,8
<b>Maximum</b>	140,5

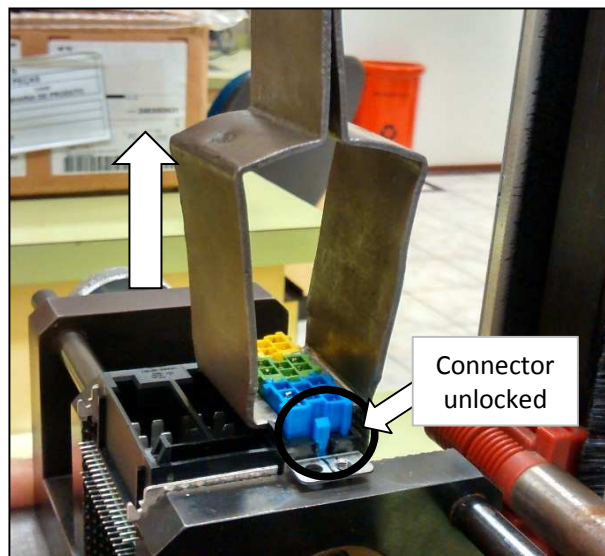


Photo 9 - Connector pull-off load without primary lock

*Conclusion:*

Samples didn't meet the requirements.



### 1.7 - Terminal pull-off load from connector (item 7.3.6 spec. 7-Z8260):

*Samples:*

Samples number 31 to 45.

*Equipment:*

Universal tensile strength machine VERSATEST with digital dynamometer Mecmesin AFG 2500N, ref. TE 92-339017-090.

*Procedure:*

Measure unmating force from terminal to connector, with a 50mm/min speed.

*Requirements:*

Terminal pull-off load  $\geq$  50N.

*Results:*

PN:	Terminal pull-off load from connector [N]					
	Ways	Sample 31	Sample 32	Sample 33	Sample 34	Sample 35
493576-2	1	105,0	96,0	109,5	111,0	112,0
	2	105,5	111,5	114,0	110,5	113,5
	3	113,5	115,5	95,5	112,5	112,0
	4	84,5	93,0	108,5	93,5	110,0
	5	106,0	118,5	111,0	111,5	111,0
	6	112,5	107,0	87,5	119,0	115,5
PN:	Ways	Sample 36	Sample 37	Sample 38	Sample 39	Sample 40
493486-2	7	111,5	113,5	106,0	118,0	113,0
	8	107,5	108,5	114,5	115,0	109,5
	9	108,5	113,0	116,5	106,5	111,0
	10	111,0	113,0	115,5	120,0	107,0
	11	102,5	82,0	113,0	118,0	110,5
	12	82,0	91,5	91,0	110,0	111,5
PN:	Ways	Sample 41	Sample 42	Sample 43	Sample 44	Sample 45
493487-2	13	116,0	119,5	102,5	95,5	116,0
	14	115,5	111,5	110,0	111,5	116,0
	15	112,5	98,5	117,5	96,0	119,0
	16	109,0	116,0	114,5	117,5	120,0
	17	114,5	108,5	116,5	91,0	113,5
	18	97,5	109,5	93,0	93,5	96,5
	19	109,5	114,5	116,5	116,0	108,0
	20	111,0	113,0	115,5	115,0	107,5
<b>Minimum</b>		82,0	82,0	87,5	91,0	96,5
<b>Average</b>		106,8	107,7	108,4	109,1	111,7
<b>Maximum</b>		116,0	119,5	117,5	120,0	120,0

*Conclusion:*

All samples met the requirements.

**1.8 - Visual inspection (item 7.1.1 spec. 7-Z8260):**

*Samples:*

Samples number 31 to 70.

*Equipments:*

Visual inspection.

*Procedure:*

Perform a further detailed inspection of specimen at test completion.

*Requirements:*

Report possible changes as swelling, corrosion signs, "fretting corrosion" signs, changes in color, deformation, cracking, etc.

*Conclusion.*

All samples met the requirements.

**MECHANICAL, ELECTRICAL AND ENVIRONMENTAL TESTS (ITEM 3.9 SPEC. FIAT 7-Z8260):**

**2 - TEST GROUP A :**

- 2.1 - Visual inspection (item 7.1.1 spec. 7-Z8260);
- 2.2 - Mating/Unmating cycles into/from connector (item 7.4.1 spec. 7-Z8260);
- 2.3 - Contact resistance (item 7.2.3 spec. 7-Z8260);
- 2.4 - Mechanical shock (item 7.10.2 spec. 7-Z8260);
- 2.5 - Vibration (item 7.10.1 spec. 7-Z8260);
- 2.6 - Contact resistance (item 7.2.3 spec. 7-Z8260);
- 2.7 - Visual inspection (item 7.1.1 spec. 7-Z8260).

**2.1 - Visual inspection (item 7.1.1 spec. 7-Z8260):**

*Samples:*

Samples number 11 to 20.

*Equipments:*

Visual inspection.

*Procedure:*

Carry out a detailed visual inspection to identify any technological defect or material flaw, as cracking, stains, etc. Have pictures or video recording taken for specimen under test (see pictures at samples identification on page 3).

*Requirements:*

Product shall be conforming to the requirements of applicable product drawing and application specification.

*Results:*

All samples met the requirements.

**2.2 - Mating/Unmating cycles into/from connector (item 7.4.1 spec. 7-Z8260):**

*Samples:*

Samples number 11 to 20.

*Equipment:*

Test performed manually.

*Procedure:*

Mate and remove connectors fully at least 10 times.

*Requirements:*

Only a preparation to future test sequences.

**2.3 - Contact resistance (item 7.2.3 spec. 7-Z8260):**

*Samples:*

Samples number 11 to 20.

*Equipment:*

Digital multimeter Agilent, model 34401A, ref. Tyco 92-339033-031.

Digital power supply Agilent, model E3633A, ref. Tyco 93-339036-020.

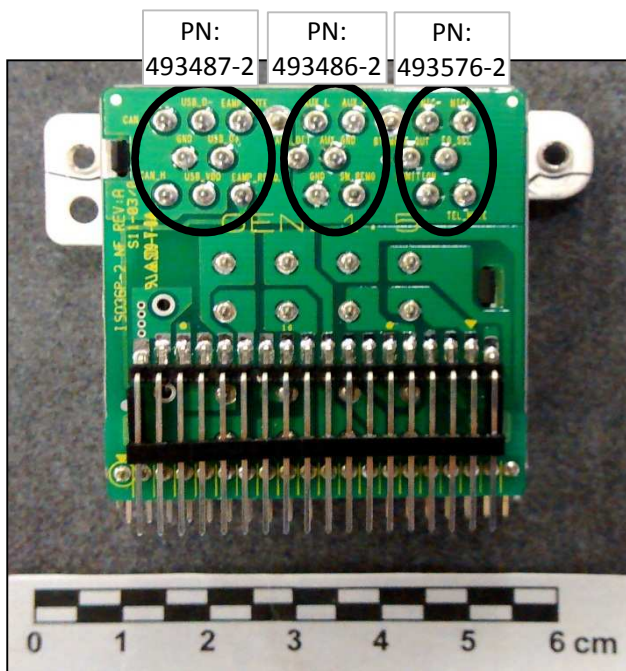
*Procedure:*

-Apply a current load of 100mA to the terminals;

-Measure and record the voltage drop of each circuit individually from PCB (see photo below) until sense lead attached to 75mm after crimp, discount 75mm of cable.

*Requirements:*

Contact resistance  $\leq 10\text{m}\Omega$ .



**Photo 8 - All voltage drop measurements points**

*Results*

Please see results at next page.

Initial contact resistance:

Way	Contact resistance [mΩ]									
	Sample 11	Sample 12	Sample 13	Sample 14	Sample 15	Sample 16	Sample 17	Sample 18	Sample 19	Sample 20
1	1,508	1,913	1,793	1,628	1,533	1,718	2,368	1,873	1,738	1,973
2	1,523	1,748	1,543	1,578	1,388	1,733	1,763	2,183	2,003	1,758
3	1,523	1,803	1,503	1,793	1,528	1,948	1,888	1,543	1,918	2,028
4	1,383	1,833	1,753	1,518	1,498	1,548	1,908	2,433	2,658	1,758
5	1,873	1,743	1,588	1,643	1,743	2,268	1,878	2,128	2,123	2,198
6	1,763	1,738	1,628	1,773	1,553	2,293	2,133	1,988	2,338	2,193
7	1,608	1,553	1,943	1,918	1,518	2,293	2,318	1,543	2,073	2,128
8	1,758	1,828	1,588	1,893	1,608	2,063	2,023	1,793	2,318	2,503
9	1,553	1,768	1,473	1,798	1,808	1,763	1,773	1,728	1,738	2,028
10	1,573	1,988	1,548	1,668	1,963	2,083	2,213	1,843	2,483	2,058
11	1,623	1,588	1,563	1,573	1,633	3,198	2,003	1,898	1,413	1,358
12	1,643	1,598	1,463	1,668	1,783	2,438	2,523	1,808	2,608	1,778
13	2,078	1,893	1,843	2,013	1,728	2,328	2,178	2,538	2,093	2,433
14	1,783	1,923	1,558	2,103	1,598	2,633	2,588	2,258	2,443	2,183
15	1,683	2,098	1,758	1,948	1,913	2,573	1,833	1,798	2,193	0,823
16	2,203	1,718	1,753	1,708	1,848	2,113	2,338	2,323	2,423	2,023
17	1,743	1,888	2,053	1,638	2,218	2,178	2,238	2,293	2,523	1,823
18	1,683	1,633	1,523	1,703	1,993	2,018	2,093	1,983	3,273	2,413
19	1,798	1,878	1,808	2,088	1,833	1,783	2,448	2,023	2,308	2,238
20	1,833	1,718	1,818	1,743	1,643	2,318	1,978	2,203	2,128	1,963

Contact resistance[mΩ]	
Minimum	0,823
Average	1,9181
Maximum	3,273

Conclusion:

Samples approved.

## 2.4 - Mechanical shock (item 7.10.2 spec. 7-Z8260):

Test performed at Magneti Marelli, please see test report nr. LTC/P&D - DFI004/14 attached.

### *Samples:*

Samples number 11 to 20.

### *Equipment:*

Please see Magneti Marelli test report attached.

### *Procedure:*

Please see Magneti Marelli test report attached.

### *Requirements:*

No absence of electric contact (resistance  $> 7\Omega$  for a time  $> 1\mu\text{s}$ ) over the whole test.

### *Results*

Samples approved.

## 2.5 - Vibration (item 7.10.1 spec. 7-Z8260):

Test performed at Magneti Marelli, please see test report nr. LTC/P&D - DFI004/14 attached.

### *Samples:*

Samples number 11 to 20.

### *Equipment:*

Please see Magneti Marelli test report attached.

### *Procedure:*

Please see Magneti Marelli test report attached.

### *Requirements:*

No absence of electric contact (resistance  $> 7\Omega$  for a time  $> 1\mu\text{s}$ ) over the whole test.

### *Results*

Samples approved.

## 2.6 - Contact resistance (item 7.2.3 spec. 7-Z8260):

### *Samples:*

Samples number 11 to 20.

### *Equipment:*

Digital multimeter Agilent, model 34401A, ref. Tyco 92-339033-031.

Digital power supply Agilent, model E3633A, ref. Tyco 93-339036-020.

### *Procedure:*

-Apply a current load of 100mA to the terminals;

-Measure and record the voltage drop of each circuit individually from PCB until sense lead attached to 75mm after crimp, discount 75mm of cable.

### *Requirements:*

Contact resistance  $\leq 10\text{m}\Omega$ .



*Results:*

*Final Contact resistance:*

Way	Contact resistance [mΩ]									
	Sample 11	Sample 12	Sample 13	Sample 14	Sample 15	Sample 16	Sample 17	Sample 18	Sample 19	Sample 20
1	3,978	2,148	3,438	3,683	3,273	3,543	2,508	4,118	5,048	4,253
2	3,238	2,348	3,483	2,998	2,138	2,223	4,798	2,178	4,023	3,463
3	3,363	3,818	2,823	2,473	2,873	2,743	3,658	4,023	2,873	2,828
4	2,703	2,938	4,343	2,078	2,803	2,753	3,663	3,123	4,818	3,418
5	3,953	3,138	3,908	2,758	3,073	2,403	3,438	2,273	3,768	3,238
6	2,753	5,133	4,128	3,288	5,048	3,083	3,798	4,523	5,553	3,568
7	2,628	3,558	4,333	3,398	3,493	4,388	4,258	2,683	3,583	2,808
8	2,623	4,533	3,408	2,948	2,423	4,163	4,783	1,853	2,758	3,723
9	2,548	3,148	2,948	3,568	3,793	2,933	3,813	2,493	3,383	3,078
10	2,518	3,363	2,938	3,018	4,763	4,393	2,303	2,828	2,903	3,913
11	3,483	3,008	4,983	2,683	3,813	4,163	4,358	4,408	4,088	4,793
12	3,353	3,713	2,553	4,668	3,708	4,528	4,433	2,963	3,558	4,958
13	4,318	5,013	2,988	3,228	4,763	2,588	4,413	4,523	2,323	3,123
14	3,058	3,053	2,943	4,408	3,103	3,728	3,413	3,098	2,318	4,263
15	3,783	3,628	3,918	2,818	3,933	4,023	3,788	4,288	1,853	3,488
16	5,818	4,648	4,583	3,543	4,378	3,168	2,938	2,973	2,553	3,768
17	2,558	3,333	2,983	2,338	3,073	2,288	3,148	5,303	3,573	2,773
18	4,348	3,268	2,488	2,938	3,483	3,298	3,323	3,203	3,473	2,873
19	2,363	3,003	3,768	4,378	3,873	2,478	3,008	4,963	2,763	4,438
20	2,268	2,523	3,218	2,428	2,878	3,983	2,943	2,538	2,548	4,138

Contact resistance[mΩ]	
Minimum	1,85
Average	3,44
Maximum	5,82

*Conclusion:*

Samples approved.

**2.7 - Visual inspection (item 7.1.1 spec. 7-Z8260):**

*Samples:*

Samples number 11 to 20.

*Equipments:*

Visual inspection.

*Procedure:*

Carry out a detailed visual inspection to identify any technological defect or material flaw, as cracking, stains, etc. Have pictures or video recording taken for specimen under test (see pictures at samples identification on page 3).

*Requirements:*

Product shall be conforming to the requirements of applicable product drawing and application specification.

*Results:*

All samples met the requirements.

### 3- TEST GROUP B :

- 3.1 - Visual inspection (item 7.1.1 spec. 7-Z8260);
- 3.2 - Mating/Unmating cycles into/from connector (item 7.4.1 spec. 7-Z8260);
- 3.3 - Contact resistance (item 7.2.3 spec. 7-Z8260);
- 3.4 - Heat aging (item 7.9.1 spec. 7-Z8260);
- 3.5 - Thermal shock (item 7.9.2 spec. 7-Z8260);
- 3.6 - Temperature and humidity cycles (item 7.9.3 spec. 7-Z8260);
- 3.7 - Contact resistance (item 7.2.3 spec. 7-Z8260);
- 3.8 - Visual inspection (item 7.1.1 spec. 7-Z8260).

#### 3.1 - Visual inspection (item 7.1.1 spec. 7-Z8260):

*Samples:*

Samples number 1 to 10.

*Equipments:*

Visual inspection.

*Procedure:*

Carry out a detailed visual inspection to identify any technological defect or material flaw, as cracking, stains, etc. Have pictures or video recording taken for specimen under test (see pictures at samples identification on page 3).

*Requirements:*

Product shall be conforming to the requirements of applicable product drawing and application specification.

*Results:*

All samples met the requirements.

#### 3.2 - Mating/Unmating cycles into/from connector (item 7.4.1 spec. 7-Z8260):

*Samples:*

Samples number 1 to 10.

*Equipment:*

Test performed manually.

*Procedure:*

Mate and remove connectors fully at least 10 times.

*Requirements:*

Only a preparation to future test sequences.

#### 3.3 - Contact resistance (item 7.2.3 spec. 7-Z8260):

*Samples:*

Samples number 1 to 10.

*Equipment:*

Digital multimeter Agilent, model 34401A, ref. Tyco 92-339033-031.

Digital power supply Agilent, model E3633A, ref. Tyco 93-339036-020.

*Procedure:*

-Apply a current load of 100mA to the terminals;

-Measure and record the voltage drop of each circuit individually from PCB until sense lead attached to 75mm after crimp, discount 75mm of cable.

*Requirements:*

Contact resistance  $\leq 10\text{m}\Omega$ .

Results:

Initial Contact resistance:

Way	Contact resistance [mΩ]									
	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6	Sample 7	Sample 8	Sample 9	Sample 10
1	1,798	1,853	1,933	1,438	1,633	1,613	1,953	1,593	1,463	1,868
2	2,208	1,743	1,868	1,398	1,728	1,753	1,913	1,838	1,743	2,318
3	2,318	1,788	1,718	1,863	1,803	1,948	1,598	1,593	1,868	1,688
4	1,773	2,293	2,528	1,948	1,883	1,423	2,178	1,623	1,593	2,378
5	1,768	3,088	1,733	1,678	1,603	1,458	1,408	1,658	1,638	1,733
6	2,043	2,118	2,173	1,883	1,698	1,758	2,028	1,433	1,593	1,888
7	1,483	1,713	1,633	1,868	1,633	1,528	1,718	1,623	1,458	1,713
8	1,693	1,423	1,598	1,593	1,483	1,588	1,693	2,063	1,613	1,888
9	1,858	2,248	1,598	1,758	1,678	1,678	1,553	1,613	1,723	1,808
10	1,518	1,968	1,848	1,613	1,768	2,048	1,778	1,633	1,938	1,733
11	1,493	1,643	1,823	1,668	1,518	2,078	1,653	1,498	1,743	2,458
12	1,553	1,953	1,618	1,658	1,918	1,378	2,203	1,643	1,668	1,488
13	2,113	2,508	1,558	1,543	1,723	1,518	1,903	2,053	1,643	2,143
14	1,768	1,943	1,428	1,568	1,613	2,133	1,658	1,643	1,698	2,208
15	1,958	1,443	1,708	1,683	1,773	1,648	1,823	1,688	1,953	1,753
16	1,593	1,953	1,758	1,778	1,593	1,988	2,173	1,648	2,073	2,018
17	1,743	1,933	1,668	1,613	1,758	2,318	1,783	2,198	1,488	2,033
18	2,073	2,293	1,718	1,518	1,563	1,463	2,103	1,853	1,728	1,738
19	1,828	2,018	1,968	1,398	1,593	1,833	2,173	1,613	1,778	2,328
20	2,843	2,918	2,293	1,873	1,708	1,828	1,813	1,938	1,863	1,933

Contact resistance[mΩ]	
Minimum	1,38
Average	1,81
Maximum	3,09

Conclusion:

Samples approved.

### 3.4 - Heat aging (item 7.9.1 spec. 7-Z8260):

Samples:

Samples number 1 to 10.

Equipment:

Fanem 320E oven, nr. 92-339032-010.

Procedure:

Place connectors under test into environmental chamber for 504 hours with a temperature of 85 degrees.

Requirements:

Not applied.

Results

Not applied.

### 3.5 - Thermal shock (item 7.9.2 spec. 7-Z8260):

*Samples:*

Samples number 1 to 10.

*Equipment:*

Test performed at CTI (Renato Archer Technology and Information Center). Please see CTI's test report nr. RT 035E 2k14\_045 attached.

*Procedure:*

Perform 100 thermal shock cycles as described below:

30 minutes at 85°C

30 minutes at -40°C

Transition time < 10 seconds.

*Requirements:*

No absence of electric contact (resistance > 7Ω for a time > 1μs) over the whole test.

*Results*

Samles didn't show contact losses.

*Conclusion:*

All samples met the requirements.

### 3.6 - Temperature and humidity cycles (item 7.9.3 spec. 7-Z8260):

*Samples:*

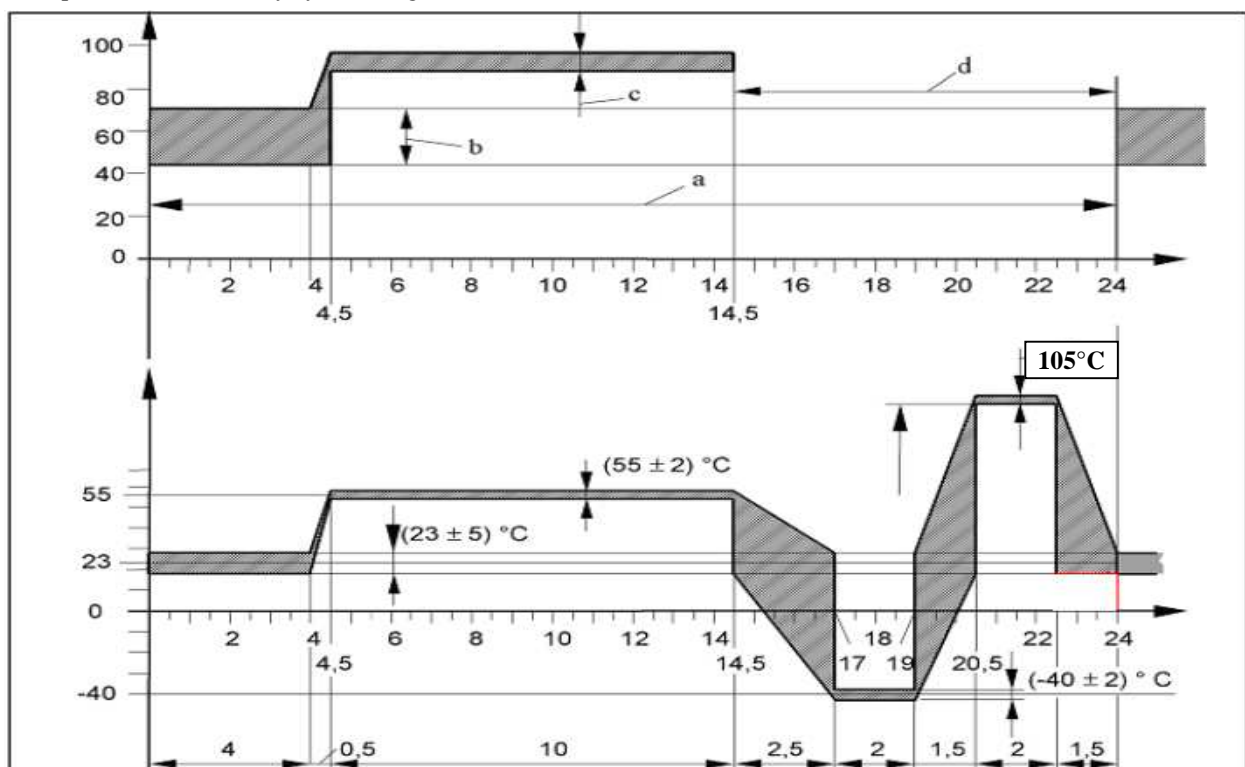
Samples number 1 to 10.

*Equipment:*

Test performed at CTI (Renato Archer Technology and Information Center). Please see CTI's test report nr. RT 035E 2k14\_044 attached.

*Procedure:*

Perform 10 temperature and humidity cycles as figure below:



*Requirements:*

No absence of electric contact (resistance  $> 7\Omega$  for a time  $> 1\mu s$ ) over the whole test.

*Results*

All samples met the requirements.

*Conclusion:*

All samples met the requirements.

**3.7 - Contact resistance (item 7.2.3 spec. 7-Z8260):**

*Samples:*

Samples number 1 to 10.

*Equipment:*

Digital multimeter Agilent, model 34401A, ref. Tyco 92-339033-031.

Digital power supply Agilent, model E3633A, ref. Tyco 93-339036-020.

*Procedure:*

-Apply a current load of 100mA to the terminals;

-Measure and record the voltage drop of each circuit individually from PCB until sense lead attached to 75mm after crimp, discount 75mm of cable.

*Requirements:*

Contact resistance  $\leq 10m\Omega$ .

*Results:*

*Final Contact resistance:*

Way	Contact resistance [mΩ]									
	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6	Sample 7	Sample 8	Sample 9	Sample 10
1	5,173	3,503	4,458	2,643	3,673	5,283	2,138	6,083	2,988	5,328
2	4,848	2,543	4,673	2,013	4,088	3,188	2,953	3,328	2,938	4,573
3	3,938	3,168	2,958	4,748	2,988	5,003	2,803	2,738	2,868	2,428
4	3,933	4,988	5,153	3,963	3,723	2,108	4,308	2,388	2,353	4,808
5	2,933	4,288	4,463	3,183	3,058	4,193	2,613	2,433	4,433	2,338
6	4,493	4,068	4,978	2,963	3,813	3,663	3,378	2,913	4,233	3,648
7	5,573	5,008	2,128	5,408	3,293	2,948	3,043	2,218	4,893	3,883
8	2,948	3,133	2,928	4,678	2,278	3,638	6,163	3,068	2,908	3,603
9	4,938	4,468	2,878	3,193	5,318	3,468	5,943	5,043	3,928	3,088
10	3,128	2,508	3,608	4,933	3,788	3,328	4,338	3,458	2,568	2,628
11	2,123	3,008	2,688	5,563	2,493	2,928	4,038	2,548	2,558	4,318
12	4,553	4,153	4,553	4,308	4,273	1,863	5,178	3,258	5,728	4,018
13	3,143	4,808	2,048	3,213	3,823	1,843	3,588	3,893	1,853	4,413
14	5,798	4,083	2,123	2,533	4,713	2,793	3,903	2,773	2,668	4,478
15	3,943	2,878	2,248	4,288	4,608	2,673	3,998	3,263	3,088	3,683
16	3,798	5,153	2,818	4,453	3,178	3,073	4,853	3,078	4,403	3,823
17	2,558	3,578	3,148	4,388	3,723	2,973	3,678	4,133	2,913	4,638
18	3,498	5,053	2,718	3,238	4,478	2,073	5,613	3,788	4,453	3,033
19	2,763	3,603	3,368	4,978	4,438	2,753	5,678	2,458	5,118	4,023
20	4,228	2,598	2,683	4,533	3,708	5,563	4,138	2,283	3,578	3,223



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Contact resistance[mΩ]	
Minimum	1,84
Average	3,68
Maximum	6,16

*Conclusion:*

All samples met the requirements.

**3.8 - Visual inspection (item 7.1.1 spec. 7-Z8260):**

*Samples:*

Samples number 1 to 10.

*Equipments:*

Visual inspection.

*Procedure:*

Carry out a detailed visual inspection to identify any technological defect or material flaw, as cracking, stains, etc. Have pictures or video recording taken for specimen under test (see pictures at samples identification on page 3).

*Requirements:*

Product shall be conforming to the requirements of applicable product drawing and application specification.

*Results:*

All samples met the requirements.

**4 - TEST GROUP C :**

- 4.1 - Visual inspection (item 7.1.1 spec. 7-Z8260);
- 4.2 - Mating/Unmating cycles into/from connector (item 7.4.1 spec. 7-Z8260);
- 4.3 - Contact resistance (item 7.2.3 spec. 7-Z8260);
- 4.4 - Heavy duty (item 7.2.6 spec. 7-Z8260);
- 4.5 - Contact resistance (item 7.2.3 spec. 7-Z8260);
- 4.6 - Visual inspection (item 7.1.1 spec. 7-Z8260).

**4.1 - Visual inspection (item 7.1.1 spec. 7-Z8260):**

*Samples:*

Samples number 21 to 30.

*Equipments:*

Visual inspection.

*Procedure:*

Carry out a detailed visual inspection to identify any technological defect or material flaw, as cracking, stains, etc. Have pictures or video recording taken for specimen under test (see pictures at samples identification on page 3).

*Requirements:*

Product shall be conforming to the requirements of applicable product drawing and application specification.

*Results:*

All samples met the requirements.

**4.2 - Mating/Unmating cycles into/from connector (item 7.4.1 spec. 7-Z8260):**

*Samples:*

Samples number 21 to 30.

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LABORATORY

RL.

## 140208

*Equipment:*

Test performed manually.

*Procedure:*

Mate and remove connectors fully at least 10 times.

*Requirements:*

Only a preparation to future test sequences.

**4.3 - Contact resistance (item 7.2.3 spec. 7-Z8260):**

*Samples:*

Samples number 21 to 30.

*Equipment:*

Digital multimeter Agilent, model 34401A, ref. Tyco 92-339033-031.

Digital power supply Agilent, model E3633A, ref. Tyco 93-339036-020.

*Procedure:*

-Apply a current load of 100mA to the terminals;

-Measure and record the voltage drop of each circuit individually from PCB until sense lead attached to 75mm after crimp, discount 75mm of cable.

*Requirements:*

Contact resistance  $\leq 10\text{m}\Omega$ .

*Results:*

*Initial Contact resistance:*

Way	Contact resistance [mΩ]									
	Sample 21	Sample 22	Sample 23	Sample 24	Sample 25	Sample 26	Sample 27	Sample 28	Sample 29	Sample 30
1	1,648	2,203	1,783	2,273	1,863	1,868	2,118	2,033	1,848	2,058
2	1,698	2,498	1,743	2,113	2,798	2,183	2,123	2,013	1,723	1,848
3	1,533	2,293	2,718	2,098	2,013	2,188	1,563	2,073	1,803	2,123
4	1,568	2,158	2,793	2,278	1,898	1,978	1,783	1,958	1,768	1,993
5	1,973	2,493	2,148	2,253	1,798	2,368	1,773	2,103	2,718	1,758
6	1,568	2,263	1,978	1,938	2,343	2,628	2,343	2,148	2,293	1,968
7	1,773	2,078	2,008	1,998	1,853	2,303	1,723	2,248	2,223	1,988
8	1,368	1,798	1,793	1,973	1,983	1,833	1,688	2,363	2,223	2,488
9	1,558	2,173	2,123	2,128	2,058	2,253	1,983	1,958	1,973	2,163
10	1,663	1,808	2,778	2,133	2,563	2,123	2,033	1,838	1,773	1,998
11	1,723	1,708	2,398	2,513	2,213	2,053	1,558	1,843	1,823	3,418
12	2,128	2,093	2,373	2,163	3,088	2,083	2,178	1,938	1,618	2,103
13	1,653	2,163	2,108	1,993	1,883	2,463	2,513	1,903	2,033	2,818
14	1,608	2,368	1,988	2,313	2,433	2,028	1,893	2,308	2,468	2,153
15	2,658	2,173	2,423	2,318	1,598	2,153	2,148	2,273	1,968	1,768
16	1,708	2,243	2,278	2,028	2,173	2,048	2,348	2,313	1,958	1,533
17	2,028	2,203	2,298	2,123	1,948	3,743	2,138	2,163	2,083	1,993
18	2,113	2,323	2,603	2,203	2,083	2,828	2,478	2,018	2,373	2,323
19	1,778	3,723	2,343	2,258	1,953	3,043	2,233	2,528	2,263	2,838
20	2,278	2,423	1,958	1,733	2,533	2,688	2,403	2,078	2,078	2,153

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RL.

**140208**

Contact resistance[mΩ]	
Minimum	1,37
Average	2,13
Maximum	3,74

*Conclusion:*

All samples met the requirements.

**4.4 - Heavy duty (item 7.2.6 spec. 7-Z8260):**

*Samples:*

Samples number 21 to 30.

*Equipment:*

Freezer Indrel Model Iul 304D, nr. 93-339032-008.

Fanem 320E oven, nr. 92-339032-010.

*Procedure:*

-Soak the samples at 80°C for 5 hours, than move the samples to -40°C for 2 hours.

-Perform this cycle four more times.

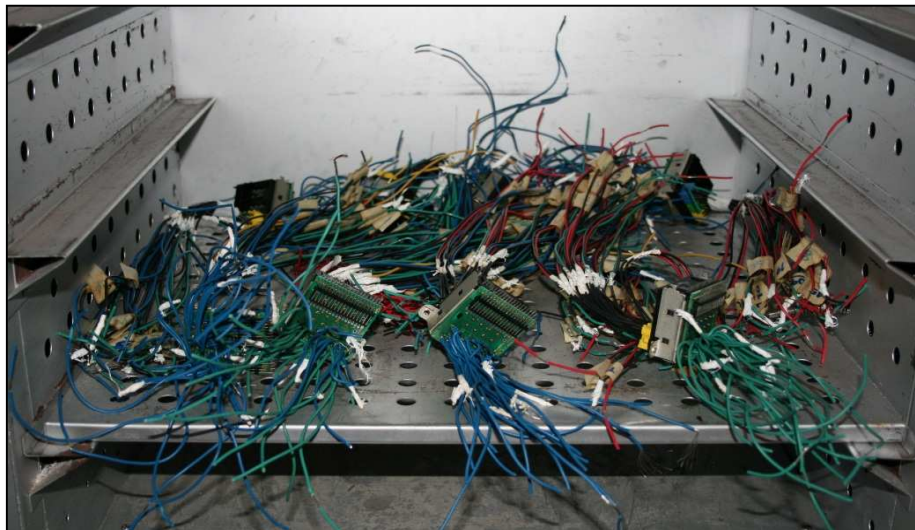
-At the end of 5 cycles, keep specimens at room temperature for at least 24 hours.

*Requirements:*

Contact resistance  $\leq 10\text{m}\Omega$ .

*Results:*

Please see item 4.5.



**Photo 9** - Samples inside the chamber

**4.5 - Contact resistance (item 7.2.3 spec. 7-Z8260):**

*Samples:*

Samples number 21 to 30.

*Equipment:*

Digital multimeter Agilent, model 34401A, ref. Tyco 92-339033-031.

Digital power supply Agilent, model E3633A, ref. Tyco 93-339036-020.

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*Procedure:*

- Apply a current load of 100mA to the terminals;
- Measure and record the voltage drop of each circuit individually from PCB until sense lead attached to 75mm after crimp, discount 75mm of cable.

*Requirements:*

Contact resistance  $\leq 10\text{m}\Omega$ .

*Results:*

*Final Contact resistance:*

Way	Contact resistance [mΩ]									
	Sample 21	Sample 22	Sample 23	Sample 24	Sample 25	Sample 26	Sample 27	Sample 28	Sample 29	Sample 30
1	3,248	4,723	5,658	2,958	5,973	3,783	3,988	5,778	3,363	5,363
2	4,633	4,033	4,713	3,808	3,058	2,353	4,833	6,358	2,323	4,628
3	4,783	5,148	3,578	4,308	3,333	4,668	3,698	2,728	3,758	3,128
4	3,558	5,928	4,998	3,118	4,558	6,508	3,583	6,973	5,718	3,658
5	3,593	4,523	3,588	3,213	3,523	6,503	3,833	3,638	4,428	4,113
6	3,558	4,498	3,523	2,843	4,738	3,008	5,133	5,008	5,753	4,023
7	4,503	3,363	3,348	4,168	4,898	5,358	6,858	3,448	4,318	3,058
8	4,638	4,893	3,338	3,608	3,083	2,043	6,778	4,828	2,593	3,503
9	4,258	2,803	4,928	3,593	3,368	2,833	4,218	3,683	3,473	2,478
10	4,488	3,448	3,893	3,288	3,588	4,698	2,158	4,748	4,708	4,573
11	3,453	2,733	4,888	3,388	3,528	5,423	5,458	3,008	2,788	4,263
12	7,238	3,128	2,648	3,763	3,193	4,108	2,958	4,993	2,118	3,278
13	5,128	3,753	2,803	2,198	2,568	3,613	5,833	2,808	3,173	5,043
14	4,848	3,293	3,523	3,188	3,668	3,498	3,538	3,803	3,613	6,913
15	3,163	4,043	4,903	3,828	2,273	3,298	6,078	5,278	2,723	2,878
16	4,303	3,563	2,853	3,208	7,728	3,488	2,718	5,488	3,178	3,213
17	4,793	3,238	3,598	3,453	3,033	3,783	4,248	3,708	4,173	4,073
18	5,588	3,458	3,843	2,863	4,363	3,398	6,053	4,448	6,163	5,183
19	3,848	4,068	3,493	4,053	6,853	3,673	2,993	5,543	4,493	4,208
20	5,933	3,148	3,308	4,998	4,718	3,933	3,993	5,608	4,808	3,728

Contact resistance[mΩ]	
Minimum	2,04
Average	4,08
Maximum	7,73

*Conclusion:*

All samples met the requirements.

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**4.6 - Visual inspection (item 7.1.1 spec. 7-Z8260):**

*Samples:*

Samples number 21 to 30.

*Equipments:*

Visual inspection.

*Procedure:*

Carry out a detailed visual inspection to identify any technological defect or material flaw, as cracking, stains, etc. Have pictures or video recording taken for specimen under test (see pictures at samples identification on page 3).

*Requirements:*

Product shall be conforming to the requirements of applicable product drawing and application specification.

*Results:*

All samples met the requirements.