



ELCON Mini cable-to-board power connector system, Two Position, with Pull-Tab

1. INTRODUCTION

1.1 Purpose

Testing was performed on the ELCON Mini two position cable-to-board connector system, using connectors with the optional coding contacts, and cable connectors with Pull-tab to determine its conformance to requirements of Design Objectives 108-19346, Revision H.

1.2 Scope

This report covers the electrical, mechanical, and environmental performance of the cable connector plug (part number 1982299-3) and board connector (part number 1982295-1). Testing was performed at the Engineering Assurance Product Testing Laboratory between 03Jul2014 and 10Oct2014.

1.3. Conclusion

The cable connector plug (part number 1982299-3) and board connector (part number 1982295-1) conformed to the electrical, mechanical, and environmental performance requirements of Design Objectives 108-19346, Revision H.

1.4. Environmental Conditions

Unless otherwise stated. The following environmental conditions prevailed during testing

Temperature: 15 to 35°C
Relative Humidity: 25 to 75%

2. PRODUCT QUALIFICATION AND REQUALIFICATION TEST SEQUENCE

2.1 Sample Description

Test groups 1 to 4 consist of 5 connector pairs, each pair consisting of a cable connector (P/N: 1982299-3) with 2 Timer contacts (P/N: 927837-5) both crimped on a 2.5mm² wire, and a PCB connector (P/N: 1982295-1) soldered on a dedicated test PCB. The tested samples of group 2 & 4 were lubricated.

Test group 5 consists of 5 loose piece PCB connectors (P/N: 1982295-1).

2.2 Test Procedures

IEC 60512-1-1:
Test 1a

Visual examination:

The test samples were visually inspected under a stereomicroscope, at a 10x magnification, with suitable illumination.

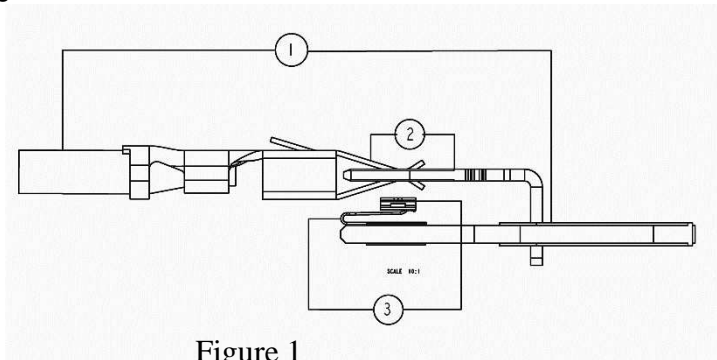
IEC 60512-2-1:
Test 2a

Contact resistance:

The contact resistance was measured with an open circuit voltage of 20mVolt and a maximum current of 100mA DC.

The following resistance values were measured, see also figure 1:
-1 Crimp + Power contact interface connection.

- 2 Power contact interface connection.
- 3 Coding contact interface.



IEC 512-2-4a:	<p>Voltage proof: (Unmated) This measurement was done with a high voltage tester. The test duration was one minute at 750Vrms.</p>
IEC 60512-3-1: Test 3a	<p>Insulation resistance: (Unmated) This measurement was done with a programmable electrometer. The measuring voltage was 100 Volt during one minute.</p>
IEC 60512-9-2: Test 9b	<p>Electrical load and temperature: The samples were placed in an oven with a temperature of 85°C. (70% of the operating temperature). All test samples in series were charged with a current of 26A DC during 1000 hours.</p>
IEC 60512-5-2: Test 5b	<p>Current-temperature derating curve: The test samples were charged with a test current of successively 5, 10, 15 and 20A. The adjusted DC current was maintained for a stabilization period of 1 hour. After stabilisation at each current step, the temperature was measured.</p>
IEC 60512-13-2: Test 13b	<p>Mating / unmating forces: The test samples were mounted on a push-pull tester. During a mechanical operation, at a rate of 25 mm per minute, the mating and unmating forces were measured. Mating/unmating was measured of the connector (without the influence of the latching mechanism), and of the power contacts.</p>
IEC 60512-13-5: Test 13e	<p>Polarization method: In all wrong mating manners, a force of 250N was applied to the connector for 10 seconds. This should not lead to any damages.</p>
IEC 60512-9-1: Test 9a	<p>Mechanical operation: The samples were mated and unmated for 2x25 times at a rate of 500 cycles per hour.</p> <p>Latch activation force: The latch was activated on a push-pull tester and the force at 0.5mm displacement was measured.</p>
IEC 60512-15-1: Test 15a	<p>Contact retention in housing: The contact retention force per contact was measured on a push-pull tester.</p> <p>Coding contact activation:</p>

The cable connector was mated on the PCB connector. During the operation, the connection sequence of the coding contacts and power contacts was checked.

IEC 60512-17-1

Cable pull in five directions:

The connector was fixed and in five directions (up-down-right-left-straight) a load of 60 Newton during 10 sec. was applied on the cable with point of action at 200 mm.

IEC 60512-17-3

Latch retention force:

The Latch retention force was measured on the tensile tester. The cable connector was mated on the PCB connector and fixed on the base of the tensile tester and the cable was fixed on the load cell. An axial load of 100 Newton was applied on the cable.

IEC 60512-6-4:
Test 6d**Vibration:**

The samples were mounted on a vibration table. The frequency from 10-500-10 Hz was traversed with one octave per minute. Below the cross-over frequency the samples were vibrated with an amplitude of 0.75 mm, above that frequency with an acceleration of 10g. The duration was 60 minutes in each of the three mutually perpendicular directions. The samples were provided with a circuit to detect interruptions of continuity longer than 1 micro-second.

IEC 60512-6-3:
Test 6c**Shock test:**

Acceleration 50g, half sine wave pulses of 11msec. 12 shocks in each of three mutually perpendicular directions were executed. The samples were provided with a circuit to detect interruptions of continuity longer than 1 micro-second.

IEC 60512-11-4:
Test 11e**Rapid change of temperature:**

The samples were subjected to a rapid change of temperature test with the following parameters:

One cycle consists of:

Upper temperature : 90°C for 30 minutes.
Lower temperature : -40°C for 30 minutes.
Condition : mated.
Number of cycles : 5

IEC 60512-11-1:

Climatic sequence:

The samples were subjected to the following tests:

Dry heat : 90°C, 16 hours.
Damp heat cyclic: 25°C/ 55°C, RH 93%, 24 hours, 1 cycle.
Cold : -40°C, 2 hours.
Damp heat cyclic: 25°C/ 55°C, RH 93%, 24 hours, 5 cycles.
Condition : mated.

IEC 60512-11-3:
Test 11c**Damp heat, steady state:**

The samples were subjected to a damp heat steady state test under the following conditions:

Temperature : 40°C.
Rel. humidity : 95%.
Condition : mated.
Duration : 56 days.

IEC 60068-2-60:
Test Ke method 4

Mixed flowing gas corrosion test:

The test samples were placed in a climatic chamber under the following conditions:

- Temperature : 25°C.
- Relative humidity: 75%.
- H2S concentration : 10 ppb.
- NO2 concentration : 200 ppb.
- Cl2 concentration : 10 ppb.
- SO2 concentration : 200 ppb.
- Condition : mated
- Duration : 10 days.

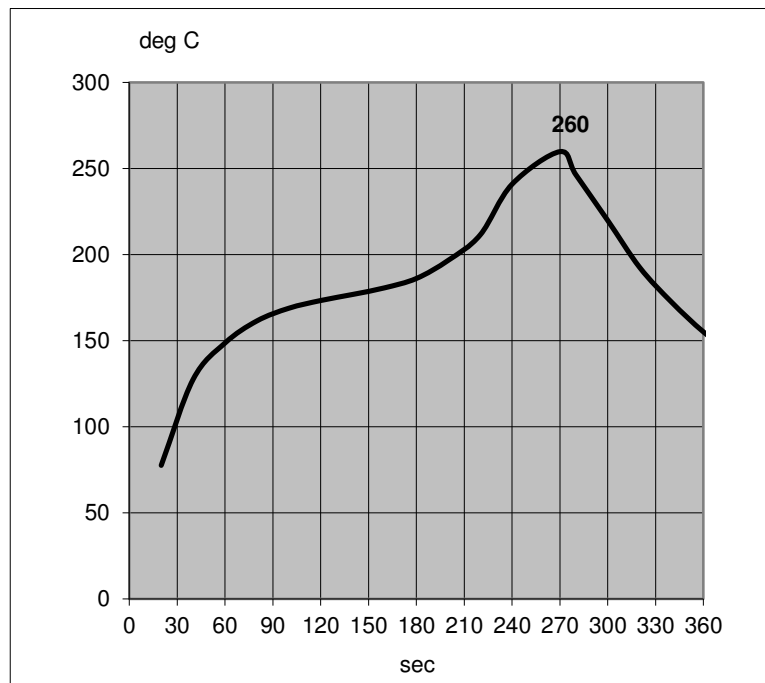
Tyco 109-201:
§3 Method C

Resistance to soldering heat:

Samples were subjected to an IR reflow soldering curve, under the following conditions:

- Average ramp rate: 3°C per second maximum
- Preheat temperature (minimum): 150°C
- Preheat temperature (maximum): 200°C
- Preheat time: 60 to 180 seconds
- Ramp to peak: 3°C per second maximum
- Time over liquidus (217°C): 60 to 150 seconds
- Peak temperature: 260 +0°-5°C
- Time within 5°C of peak: 20 to 40 seconds
- Ramp - cool down: 6°C per second maximum
- Time 25°C to peak: 8 minutes maximum

The samples were shielded from direct impingement of the infrared radiation.



2.2 Test Sequence

Test group 1

- Visual examination
- Contact resistance
- Current derating curve
- Electrical load and temperature
- Contact resistance
- Mating/unmating force (no latch)
- Polarization strength
- Latch activation
- Latch retention force
- Cable pull in 5 directions
- Contact retention in housing
- Coding contact captivation
- Visual examination

Test group 4

- Visual examination
- Contact resistance
- Insulation resistance
- Voltage proof
- Rapid change of temperature
- Contact resistance
- Insulation resistance
- Voltage proof
- Climatic sequence
- Contact resistance
- Insulation resistance
- Voltage proof
- Damp heat steady state
- Contact resistance
- Insulation resistance
- Voltage proof
- Visual examination

Test group 2

- Visual examination
- Contact resistance
- Mechanical operation (25 cycles)
- Contact resistance
- Mixed flowing gas corrosion
- Contact resistance
- Mechanical operation (25 cycles)
- Contact resistance
- Visual examination

Test group 5

- Visual examination
- Resistance to soldering heat
- Visual examination

Test group 3

- Visual examination
- Contact resistance
- Vibration
- Shock
- Contact resistance
- Visual examination

Test group 6

- Visual examination
- Short circuit capacity
- Visual examination
(Test executed by the customer)

2.3 Equipment Used

Equipment	Producer	Type	Series Nb	Cal. Due
Micro-ohmmeter	Keithley	580	374687	01-10.
MultiMeter/DAS	Keithley	2700	1074936	01-10.
Switching Module	Keithley	7708	1072905	01-10.
Electrometer	Keithley	6517A	1068400	01-10.
Tensile tester	MTS	400M	165811-20	09-08
Load cell	MTS	50N	1979	09-08
Load cell	MTS	500N	2239	09-08
High voltage tester	Sefelec	PR-12-NN	264	11-09.
Current source	Delta	SM30-100D	0-4826	
Climatic chamber	CTS	C-20/200	067045	11-10.
Climatic chamber	CTS	TSS-70/130	98170	01-10.
Corrosion chamber	Weiss	SB111-500	239/18093	02-10.
Oven	Heraeus	UT6060	9102050	01-10.
Infrared system	Dima	SMRO-0252	972127	02-10.

2.4 Summary of Test Results:

Measured Results

REQUIREMENTS

Note: Termination resistance 1 values below are excl. bulk resistance of wire (approx: 0.22mΩ) and the values in the tables (§ Results) are incl. the bulk resistance.

Test group 1: (Electrical load and temperature)

<ul style="list-style-type: none"> ●Contact resistance: Crimp+power contact interface (1) <ul style="list-style-type: none"> Initial: max: 0.61mΩ. Final: max: 0.76mΩ. 	<ul style="list-style-type: none"> Max: 0.8mΩ. Max: 0.8mΩ. 	<ul style="list-style-type: none"> OK OK
<ul style="list-style-type: none"> ●Contact resistance: Power contact interface (2) <ul style="list-style-type: none"> Initial: max: 0.24mΩ. Final: max: 0.29mΩ. 	<ul style="list-style-type: none"> Max: 0.3mΩ. Max: 0.3mΩ. 	<ul style="list-style-type: none"> OK OK
<ul style="list-style-type: none"> ●Contact resistance: Coding contact interface (3) <ul style="list-style-type: none"> Initial: max: 8.14mΩ. Final: ΔRmax: 2.20mΩ. 	<ul style="list-style-type: none"> Max: 15mΩ. ΔRmax: 5mΩ. 	<ul style="list-style-type: none"> OK OK
<ul style="list-style-type: none"> ●Derating curve <ul style="list-style-type: none"> I = 20A & T(amb) =65°C: Tmax = 109°C. I = 15A & T(amb) =85°C: Tmax = 109°C. 	<ul style="list-style-type: none"> I=20A & T(amb) =65°C. I=15A & T(amb) =85°C. 	
For the derating curve see page 11.		
<ul style="list-style-type: none"> ●Mating forces <ul style="list-style-type: none"> Initial: Connector max: 33.8N. Power contact max: 14.9N. 	<ul style="list-style-type: none"> Max: 40N. Max: 15N. 	<ul style="list-style-type: none"> OK OK
<ul style="list-style-type: none"> ●Unmating forces <ul style="list-style-type: none"> Initial: Connector between 24.3-25.4 N. Power contact min: 7.2N. 	<ul style="list-style-type: none"> Between 10-30N. Min: 2N. 	<ul style="list-style-type: none"> OK OK
<ul style="list-style-type: none"> ●Polarization strength <ul style="list-style-type: none"> The cable connector was not mated during the applied force of 250N. 	<ul style="list-style-type: none"> Cable connector shall not mate during the applied force of 250N during 10 sec. 	<ul style="list-style-type: none"> OK
<ul style="list-style-type: none"> ●Latch activation <ul style="list-style-type: none"> Initial: max: 19.6N. 	<ul style="list-style-type: none"> Max: 20N. 	<ul style="list-style-type: none"> OK
<ul style="list-style-type: none"> ●Latch retention force <ul style="list-style-type: none"> Initial: No functional damage was observed and the latch stayed in place. 	<ul style="list-style-type: none"> Min: 100N. 	<ul style="list-style-type: none"> OK
<ul style="list-style-type: none"> ●Contact retention in housing force (per contact) <ul style="list-style-type: none"> Initial: min: 102N. 	<ul style="list-style-type: none"> Min: 50N. 	<ul style="list-style-type: none"> OK

<ul style="list-style-type: none"> ●Cable pull in 5 directions Initial: No functional damage was observed and the latch staid in place. 	No functional damage and latch should be in place.	OK
<ul style="list-style-type: none"> ●Coding contact activation Initial: First power contacts were activated. 		OK
<ul style="list-style-type: none"> ●Visual examination No functional damage was observed. <p>For all measuring results see page 10-11.</p>		OK
Test group 2:(Mech. Operation & Corrosion)		
<ul style="list-style-type: none"> ●Contact resistance: Crimp+power contact interface (1) Initial: max: 0.60mΩ. Mechanical Operation: max: 0.57mΩ. Corrosion: max: 0.60mΩ. Mechanical Operation (final): max: 0.61mΩ. 	Max: 0.8mΩ.	OK
<ul style="list-style-type: none"> ●Contact resistance: Power contact interface (2) Initial: max: 0.24mΩ. Mechanical Operation: max: 0.22mΩ. Corrosion: max: 0.23mΩ. Mechanical Operation (final): max: 0.23mΩ. 	Max: 0.3mΩ.	OK
<ul style="list-style-type: none"> ●Contact resistance: Coding contact interface (3) Initial: max: 4.80mΩ. Mechanical Operation: ΔRmax: 0.35mΩ. Corrosion: ΔRmax: 1.22mΩ. Mechanical Operation (final): ΔRmax: 1.60mΩ. 	Max: 15mΩ.	OK
<ul style="list-style-type: none"> ●Visual examination No functional damage was observed. <p>For all measuring results see on page 12 -13.</p>		OK
Test group 3: (Vibration and Shock)		
<ul style="list-style-type: none"> Contact resistance: Crimp+power contact interface (1) Initial: max: 0.63mΩ. Vibration and Shock (final): max: 0.60mΩ. 	Max: 0.8mΩ. Max: 0.8mΩ.	OK OK
<ul style="list-style-type: none"> ●Contact resistance: Power contact interface (2) Initial: max: 0.25mΩ. Vibration and Shock (final): max: 0.24mΩ. 	Max: 0.3mΩ. Max: 0.3mΩ.	OK OK
<ul style="list-style-type: none"> ●Contact resistance: Coding contact interface (3) Initial: max: 9.00mΩ. Vibration and Shock (final): ΔRmax: 0.95mΩ. 	Max: 15mΩ. ΔRmax: 5mΩ.	OK OK
<ul style="list-style-type: none"> ●Vibration and Shock tests No discontinuities >1 microsecond were detected. 	No discontinuities >1 microsecond	OK
<ul style="list-style-type: none"> ●Visual examination No functional damage was observed. <p>For all measuring results see on page 13.</p>		OK
Test group 4: (Climatic tests)		
<ul style="list-style-type: none"> Contact resistance: Crimp+power contact interface (1) Initial: max: 0.60mΩ. Rapid change of temperature max: 0.59mΩ. Climatic sequence max: 0.61mΩ. Damp heat steady state (final) max: 0.67mΩ. 	Max: 0.8mΩ.	OK
<ul style="list-style-type: none"> ●Contact resistance: Power contact interface (2) Initial: max: 0.26mΩ. Rapid change of temperature max: 0.24mΩ. Climatic sequence max: 0.23mΩ. Damp heat steady state (final) max: 0.26mΩ. 	Max: 0.3mΩ.	OK
<ul style="list-style-type: none"> ●Contact resistance: Coding contact interface (3) Initial: max: 7.92mΩ. Rapid change of temperature ΔRmax: 0.92mΩ. 	Max: 15mΩ.	OK

Climatic sequence	$\Delta R_{max}: 2.16m\Omega$.		
Damp heat steady state (final)	$\Delta R_{max}: 0.79m\Omega$.	$\Delta R_{max}: 5m\Omega$.	OK
● Insulation resistance (power and coding contacts)			
Initial:	min: $2.6T\Omega$.	Min.: $5G\Omega$.	OK
Rapid change of temperature	min: $3.0T\Omega$.		
Climatic sequence	min: $6.5G\Omega$.		
Damp heat steady state (final)	min: $0.21T\Omega$.	Min.: $1G\Omega$.	OK
● Voltage proof (power and coding contacts)			
Initial: No break-down or flash-over was observed.		No break-down or flash-over.	OK
Rapid change of temperature: No break-down or flash-over was observed.		No break-down or flash-over.	OK
Climatic sequence: No break-down or flash-over was observed.		No break-down or flash-over.	OK
Final: No break-down or flash-over was observed.		No break-down or flash-over.	OK
● Visual examination			
No functional damage was observed.			OK
For all measuring results see on page 14-16.			
Test group 5: (Resistance to soldering heat)			
● Resistance to soldering heat		No cracks, functional deformation or melting.	OK

2.5 Results:

Test group 1

All values represented in milli-Ohms.						
Column	Group	Lot	Test			
-1:-	1	1-5	Initial, Power contact interface + Crimp			
-2:-	1	1-5	Initial, Power contact interface			
-3:-	1	1-5	Initial, Coding contact interface (excl. bulk)			
-4:-	1	1-5	Final, Power contact interface + Crimp			
-5:-	1	1-5	Final, Power contact interface			
-6:-	1	1-5	Final, Coding contact interface (excl. bulk)			
1	-1-	-2-	-3-	-4-	-5-	-6-
	0.83	0.24	5.98	0.96	0.29	4.87
2	0.81	0.24	6.41	0.93	0.23	5.01
3	0.75	0.23	8.14	0.84	0.23	5.94
4	0.77	0.23	5.85	0.88	0.25	6.48
5	0.75	0.23	4.81	0.86	0.21	4.96
6	0.80	0.23	4.48	0.88	0.24	4.92
7	0.78	0.20	5.46	0.98	0.26	5.36
8	0.77	0.24	4.55	0.94	0.24	5.90
9	0.72	0.22	7.46	0.88	0.25	5.67
10	0.79	0.24	8.00	0.89	0.22	6.20
Max.	0.83	0.24	8.14	0.98	0.29	6.48
Min.	0.72	0.20	4.48	0.84	0.21	4.87
Mean	0.78	0.23	6.11	0.91	0.24	5.53

-Mating/unmating force connector and no latch:

All values represented in Newton.				
Column	Group	Operation		Test
-1:-	1	Mating		Initial
-2:-	1	Unmating		Initial
Sample	-1-	-2-		
1	31.89	24.61		
2	33.42	24.49		
3	30.54	24.27		
4	33.80	25.43		
5	31.08	24.93		
Max.	33.80	25.43		
Min.	30.54	24.27		
Mean.	32.15	24.74		

-Mating/unmating force loose piece power contacts:

All values represented in Newton.			
Column	Group	Operation	Test
-1-:	1	Mating	Initial
-2-:	1	Unmating	Initial
Sample	-1-	-2-	
1	11.26	9.06	
2	14.04	7.20	
3	12.05	8.84	
4	14.92	7.41	
5	13.77	8.56	
Max.	14.92	9.06	
Min.	11.26	7.20	
Mean.	13.21	8.21	

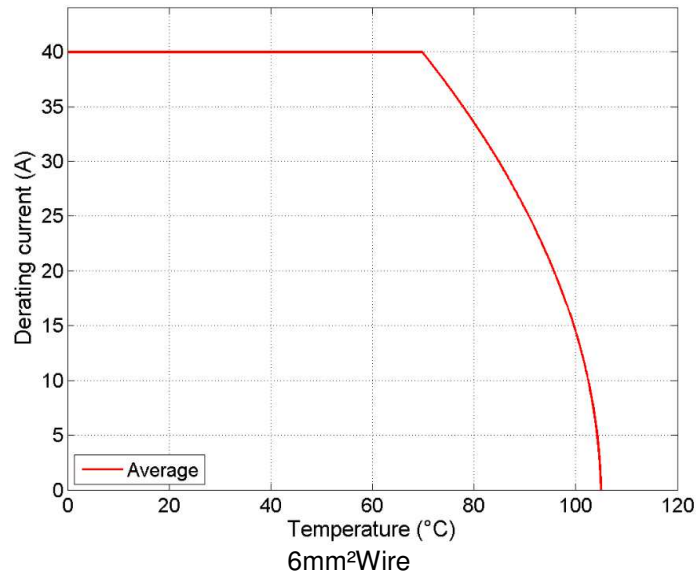
-Latch activation force:

All values represented in Newton.				
Column	Group	Displacement	[mm]	Test
-1-:	1	Point 1:	0.5	Initial
Sample	-1-			
1	19.56			
2	18.13			
3	17.09			
4	18.76			
5	18.76			
Max.	19.56			
Min.	17.09			
Mean.	18.46			

-Contact retention in housing:

All values represented in Newton.			
Column	Group	Lot	Test
-1-:	1	1-5	Contact retention force
Sample	-1-		
1	107		
2	102		
3	111		
4	113		
5	108		
Max.	113		
Min.	102		
Mean.	108		

-Derating curve:



Test group 2

All values represented in milli-Ohms.						
Column.	Group	Lot	Test			
-1-	2	1-5	Initial, Power contact interface + Crimp			
-2-	2	1-5	Initial, Power contact interface			
-3-	2	1-5	Initial, Coding contact interface (excl. bulk)			
-4-	2	1-5	After 25 Mechanical operations, Power contact interface + Crimp			
-5-	2	1-5	After 25 Mechanical operations, Power contact interface			
-6-	2	1-5	After 25 Mechanical operations, Coding contact interface (excl. bulk)			
	-1-	-2-	-3-	-4-	-5-	-6-
1	0.79	0.23	4.51	0.78	0.20	4.75
2	0.77	0.22	4.80	0.76	0.21	4.59
3	0.80	0.24	3.99	0.77	0.22	4.22
4	0.79	0.22	4.62	0.76	0.21	4.73
5	0.82	0.22	4.06	0.78	0.21	4.22
6	0.81	0.22	4.11	0.73	0.22	4.46
7	0.79	0.22	4.46	0.79	0.19	4.75
8	0.79	0.23	4.04	0.77	0.21	3.96
9	0.79	0.22	4.52	0.77	0.20	4.20
10	0.78	0.24	4.66	0.77	0.22	4.31
Max.	0.82	0.24	4.80	0.79	0.22	4.75
Min.	0.77	0.22	3.99	0.73	0.19	3.96
Mean	0.79	0.23	4.38	0.77	0.21	4.42

All values represented in milli-Ohms.						
Column.	Group	Lot	Test			
-1-:	2	1-5	Initial, Power contact interface + Crimp			
-2-:	2	1-5	Initial, Power contact interface			
-3-:	2	1-5	Initial, Coding contact interface (excl. bulk)			
-4-:	2	1-5	After Corrosion mixed flowing gas, Power contact interface + Crimp			
-5-:	2	1-5	After Corrosion mixed flowing gas, Power contact interface			
-6-:	2	1-5	After Corrosion mixed flowing gas, Coding contact interface (excl. bulk)			
	-1-	-2-	-3-	-4-	-5-	-6-
1	0.79	0.23	4.51	0.80	0.22	4.32
2	0.77	0.22	4.80	0.75	0.19	5.06
3	0.80	0.24	3.99	0.79	0.20	4.59
4	0.79	0.22	4.62	0.79	0.23	4.89
5	0.82	0.22	4.06	0.80	0.19	4.08
6	0.81	0.22	4.11	0.81	0.23	5.33
7	0.79	0.22	4.46	0.82	0.21	4.19
8	0.79	0.23	4.04	0.78	0.21	4.46
9	0.79	0.22	4.52	0.78	0.23	3.90
10	0.78	0.24	4.66	0.79	0.20	4.34
Max.	0.82	0.24	4.80	0.82	0.23	5.33
Min.	0.77	0.22	3.99	0.75	0.19	3.90
Mean	0.79	0.23	4.38	0.79	0.21	4.52

All values represented in milli-Ohms.						
Column.	Group	Lot	Test			
-1-:	2	1-5	Initial, Power contact interface + Crimp			
-2-:	2	1-5	Initial, Power contact interface			
-3-:	2	1-5	Initial, Coding contact interface (excl. bulk)			
-4-:	2	1-5	After 25 Mechanical operations (final), Power contact interface + Crimp			
-5-:	2	1-5	After 25 Mechanical operations (final), Power contact interface			
-6-:	2	1-5	After 25 Mechanical operations (final), Coding contact interface (excl. bulk)			
	-1-	-2-	-3-	-4-	-5-	-6-
1	0.79	0.23	4.51	0.80	0.23	4.06
2	0.77	0.22	4.80	0.77	0.22	4.96
3	0.80	0.24	3.99	0.81	0.22	4.70
4	0.79	0.22	4.62	0.77	0.22	5.04
5	0.82	0.22	4.06	0.81	0.22	5.24
6	0.81	0.22	4.11	0.83	0.22	5.72
7	0.79	0.22	4.46	0.83	0.22	4.58
8	0.79	0.23	4.04	0.79	0.21	4.04
9	0.79	0.22	4.52	0.77	0.22	4.50
10	0.78	0.24	4.66	0.79	0.23	4.47
Max.	0.82	0.24	4.80	0.83	0.23	5.72
Min.	0.77	0.22	3.99	0.77	0.21	4.04
Mean	0.79	0.23	4.38	0.80	0.22	4.73

Test group 3

All values represented in milli-Ohms.						
Column.	Group	Lot	Test			
-1-:	3	1-5	Initial, Power contact interface + Crimp			
-2-:	3	1-5	Initial, Power contact interface			
-3-:	3	1-5	Initial, Coding contact interface (excl. bulk)			
-4-:	3	1-5	After Vibration & Shock, Power Contact interface + Crimp			
-5-:	3	1-5	After Vibration & Shock, Power Contact interface			
-6-:	3	1-5	After Vibration & Shock, Coding Contact interface (excl. bulk)			
	-1-	-2-	-3-	-4-	-5-	-6-
1	0.71	0.23	7.08	0.71	0.22	6.84
2	0.80	0.22	8.08	0.81	0.22	7.25
3	0.71	0.22	7.34	0.70	0.22	6.39
4	0.77	0.23	7.95	0.75	0.22	7.27
5	0.75	0.22	6.83	0.74	0.19	6.57
6	0.77	0.22	6.91	0.78	0.22	6.44
7	0.83	0.19	6.21	0.82	0.19	6.02
8	0.79	0.23	6.71	0.76	0.21	6.25
9	0.77	0.22	8.29	0.75	0.22	8.15
10	0.85	0.25	9.00	0.81	0.24	8.54
Max.	0.85	0.25	9.00	0.82	0.24	8.54
Min.	0.71	0.19	6.21	0.70	0.19	6.02
Mean	0.78	0.22	7.44	0.76	0.21	6.97

Test group 4

All values represented in milli-Ohms.						
Column.	Group	Lot	Test			
-1-:	4	1-5	Initial, Power contact interface + Crimp			
-2-:	4	1-5	Initial, Power contact interface			
-3-:	4	1-5	Initial, Coding contact interface (excl. bulk)			
-4-:	4	1-5	After Rapid change of temperature, Power contact interface + Crimp			
-5-:	4	1-5	After Rapid change of temperature, Power contact interface			
-6-:	4	1-5	After Rapid change of temperature, Coding contact interface (excl. bulk)			
	-1-	-2-	-3-	-4-	-5-	-6-
1	0.78	0.26	6.59	0.78	0.23	6.42
2	0.82	0.26	6.26	0.81	0.24	5.34
3	0.78	0.23	4.51	0.79	0.24	4.08
4	0.76	0.23	3.77	0.74	0.24	3.72
5	0.75	0.24	7.92	0.77	0.20	7.04
6	0.80	0.24	5.62	0.74	0.22	6.27
7	0.80	0.24	6.14	0.80	0.23	5.88
8	0.79	0.23	6.19	0.76	0.23	5.88
9	0.76	0.21	5.29	0.78	0.23	4.83
10	0.75	0.20	4.09	0.74	0.23	4.33
Max.	0.82	0.26	7.92	0.81	0.24	7.04
Min.	0.75	0.20	3.77	0.74	0.20	3.72
Mean	0.78	0.23	5.64	0.77	0.23	5.38

All values represented in milli-Ohms.						
Column.	Group	Lot	Test			
-1-:	4	1-5	Initial, Power contact interface + Crimp			
-2-:	4	1-5	Initial, Power contact interface			
-3-:	4	1-5	Initial, Coding contact interface (excl. bulk)			
-4-:	4	1-5	After Climatic Sequence, Power contact interface + Crimp			
-5-:	4	1-5	After Climatic Sequence, Power contact interface			
-6-:	4	1-5	After Climatic Sequence, Coding contact interface (excl. bulk)			
	-1-	-2-	-3-	-4-	-5-	-6-
1	0.78	0.26	6.59	0.79	0.23	8.75
2	0.82	0.26	6.26	0.83	0.23	6.68
3	0.78	0.23	4.51	0.80	0.22	4.37
4	0.76	0.23	3.77	0.75	0.21	3.75
5	0.75	0.24	7.92	0.82	0.23	8.64
6	0.80	0.24	5.62	0.81	0.19	5.57
7	0.80	0.24	6.14	0.78	0.23	5.18
8	0.79	0.23	6.19	0.77	0.20	4.61
9	0.76	0.21	5.29	0.76	0.23	5.93
10	0.75	0.20	4.09	0.78	0.20	6.02
Max.	0.82	0.26	7.92	0.83	0.23	8.75
Min.	0.75	0.20	3.77	0.75	0.19	3.75
Mean	0.78	0.23	5.64	0.79	0.22	5.95

All values represented in milli-Ohms.						
Column.	Group	Lot	Test			
-1-:	4	1-5	Initial, Power contact interface + Crimp			
-2-:	4	1-5	Initial, Power contact interface			
-3-:	4	1-5	Initial, Coding contact interface (excl. bulk)			
-4-:	4	1-5	After Damp heat steady state, Power contact interface + Crimp			
-5-:	4	1-5	After Damp heat steady state, Power contact interface			
-6-:	4	1-5	After Damp heat steady state, Coding contact interface (excl. bulk)			
	-1-	-2-	-3-	-4-	-5-	-6-
1	0.78	0.26	3.69	0.85	0.20	3.75
2	0.82	0.26	4.21	0.89	0.20	4.98
3	0.78	0.23	3.95	0.76	0.20	3.96
4	0.76	0.23	4.40	0.79	0.25	5.11
5	0.75	0.24	3.98	0.88	0.20	3.88
6	0.80	0.24	5.22	0.76	0.19	5.20
7	0.80	0.24	3.94	0.79	0.26	4.69
8	0.79	0.23	4.35	0.76	0.23	5.14
9	0.76	0.21	4.00	0.78	0.20	4.29
10	0.75	0.20	4.33	0.74	0.24	4.99
Max.	0.82	0.26	5.22	0.89	0.26	5.20
Min.	0.75	0.20	3.69	0.74	0.19	3.75
Mean	0.78	0.23	4.16	0.80	0.21	4.53

-Insulation resistance coding contact:

All values represented in Ohms.				
Column.	Group	Lot	Test	
-1-:	4	C-C	Initial	
-2-:	4	C-C	After rapid change of temperature	
-3-:	4	C-C	After climatic sequence	
-4-:	4	C-C	After Damp heat steady state (final)	
	-1-	-2-	-3-	-4-
1	9.63E+14	5.20E+12	4.03E+10	8.13E+12
2	2.13E+14	3.36E+12	6.10E+10	7.92E+12
3	1.43E+14	3.46E+13	1.27E+10	6.30E+12
4	1.59E+14	3.56E+12	4.51E+10	6.35E+12
5	2.16E+14	3.84E+12	5.32E+10	9.59E+12
6	8.58E+13	4.74E+12	1.07E+11	7.53E+12
7	1.06E+14	4.90E+13	3.92E+10	3.09E+12
8	1.03E+14	5.17E+12	4.67E+10	6.84E+12
9	1.61E+14	6.55E+12	8.16E+10	4.92E+12
10	4.74E+13	3.57E+12	4.60E+10	2.89E+12
Max.	9.63E+14	4.90E+13	1.07E+11	9.59E+12
Min.	4.74E+13	3.36E+12	1.27E+10	2.89E+12
Mean.	2.20E+14	1.20E+13	5.33E+10	6.35E+12

-Insulation resistance Power contact:

All values represented in Ohms.				
Column.	Group	Lot	Test	
-1-:	4	P-C	Initial	
-2-:	4	P-C	After rapid change of temperature	
-3-:	4	P-C	After climatic sequence	
-4-:	4	P-C	After Damp heat steady state (final)	
	-1-	-2-	-3-	-4-
1	6.86E+13	3.46E+12	9.68E+09	1.06E+12
2	2.59E+12	2.97E+12	1.36E+10	9.51E+11
3	1.92E+13	4.01E+12	6.45E+09	6.04E+11
4	1.65E+13	3.88E+12	8.16E+09	7.58E+11
5	1.60E+13	6.98E+12	1.08E+10	2.06E+11
Max.	6.86E+13	6.98E+12	1.36E+10	1.06E+12
Min.	2.59E+12	2.97E+12	6.45E+09	2.06E+11
Mean.	2.46E+13	4.26E+12	9.73E+09	7.16E+11