

Floating Spring Probe Connector

“The product may not perform according to the product specification if precautions have not been taken in the application to provide mechanical stability of the connector in relation to its mating parts”.

1. SCOPE .

1.1 Content.

This specification covers performance, test and quality requirements for a Floating Spring Probe Connector. The connector is designed to make a grounding connection between 2 metal grounding plates. The SPC will be assembled in the plastic cover of the phone by using a press-fit collar. Applicable product description and part numbers are as shown in Appendix 1.

1.2 Qualification.

When tests are performed on subject product, procedures specified in this specification shall be used. All inspections shall be performed using applicable inspection plan and product drawing.

2. APPLICABLE DOCUMENTS.

The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, latest edition of the document applies. In the event of conflict between the requirements in this specification and the product drawing, the product drawing shall take precedence. In the event of conflict between requirements of this specification and referenced documents, this specification shall take precedence.

2.1 TE Documents.

501-19168 Test report of "Floating spring probe connector"

2.2 TE Drawings.

C-2173140 Customer drawing of "Floating spring probe connector"
C-2173227 Customer drawing of "Floating spring probe connector"
C-2173352 Customer drawing of "Floating pogo pin"

2.3 Other Documents.

109-5000 Test Specification, General Requirements for Test Methods
IEC 60512 Basic testing procedures and measuring methods for electromechanical components for electronic equipment.
IEC 60068 Basic environmental testing procedures.

3. REQUIREMENTS.

3.1 Design and Construction:

Products shall be of design, construction and physical dimensions as specified on the applicable product drawing.

3.2 Material and Finish:

- A. SPC Body: Copper alloy, post-plated Gold over Nickel
- B. SPC Plunger: Copper alloy, post-plated Gold over Nickel
- C. SPC Spring: Stainless Steel – plain
- D. Housing: PC, color black

3.3 Ratings:

- A. Voltage: 12V max.
- B. Current: 1.5A max per contact.
- C. Operating temperature: -40°C to +85°C
Storage temperature: -40°C to +85°C
- D. Durability: 2000 cycles

3.4 Performance and Test description:

The product is designed to meet electrical, mechanical and environmental performance specified in this paragraph as tested per test sequence specified in par. 3.6.

Unless otherwise specified, all tests are performed at ambient environmental conditions per IEC specification 60068-1 clause 5.3. and are performed with connectors in mated conditions.

Test Pad Finish: Au-finish

VISUAL			
Par.	Test Title	Performance / Severity Requirements	Procedure
3.4.1	Examination of product	Meets requirements of product drawing and applicable instructions on customer drawing, and application specification.	Visual, dimensional and functional per applicable inspection plan. In acc. with IEC 60512-1-1 Magnification 10x

ELECTRICAL			
3.4.2	Termination resistance	Max. open voltage 20mV. Max. current 100 mA DC. All contacts to be measured. <u>Requirement:</u> Initial: 30 mΩ max. ΔR: 40 mΩ max.	In acc. with IEC 60512-2-1 Measuring points shall be as indicated in figure 1, Ref. par. 3.5.
3.4.3	Insulation resistance	Test voltage 500VDC Duration 1 minute Measure between contacts <u>Requirement:</u> 100 MΩ min.	In acc. with IEC 60512-3-1
3.4.4	Dielectric Strength	<u>Requirement:</u> 500 VDC.	In acc with IEC 60512-4-1
MECHANICAL			
Par.	Test Title	Performance / Severity Requirements	Procedure
3.4.5	Contact normal force (Per contact)	Normal force shall be measured in 2 cycles per spring probe: 1. at contact position Dim C <u>Min. Requirement:</u> See Table 1. 2. at contact position Dim B <u>Max. Requirement:</u> See Table 1.	Normal force test equipment (force / deflection curve of downward stroke only) (See Figure 1 par. 3.5)
3.4.6	Mechanical Operation	Mating and un-mating of spring probe with counter part to contact position Dim B. Mating cycles: 2000, Rate: 500 cycles/hour. Speed: 2mm/s, <u>Requirement:</u> No mechanical damage	In acc. with IEC 60512-9-1 (See Figure 1 par. 3.5)
3.4.7	Mechanical Shock	Connector to be mounted in test-frame, contact position at Dim C. 30g, 6ms, 3.4m/s half sine pulse 6 successive shocks in 3 mutually perpendicular axis <u>Requirement:</u> No mechanical damage Discontinuity <1us	In acc. with IEC 60512-6-3 (See Figure 1 par. 3.5)
3.4.8	Vibration Random	Connector to be mounted in test-frame, contact position at Dim C. Frequency 5 – 500Hz, 0.01 g ² /Hz, 100 min at X-Y-Z axis, Total 300 min for 3 axis. <u>Requirement:</u> No mechanical damage Discontinuity <1us	In acc. with IEC 60512-6-5 (See Figure 1 par. 3.5)

3.4.9	Vibration Sinusoidal	Connector to be mounted in test-frame, contact position at Dim C. Frequency 10 – 150Hz, 5.1g acceleration, Sweep rate at 1 octave/minute, 90 min at X-Y-Z axis, Total 270 min for 3 axis. <u>Requirement:</u> No mechanical damage Discontinuity <1us	In acc. with IEC 60512-6-4 (See Figure 1 par. 3.5)
ENVIRONMENTAL			
Par.	Test Title	Performance / Severity Requirements	Procedure
3.4.10	Rapid change of temperature	Connector to be mounted in test-frame, contact position at Dim B. -40/85°C, 10min / 10min, Transition time: <300 sec. Number of cycles: 640 Recovery time: 1 hour <u>Requirement:</u> Termination resistance as per par. 3.4.2	In acc. with IEC 60512-11-4 (See Figure 1 par. 3.5)
3.4.11	Dry heat	Connector to be mounted in test-frame, contact position at Dim B. Temperature: 85°C Duration: 500 hrs. Recovery time: 1 hour <u>Requirement:</u> Termination resistance as per par. 3.4.2	In acc. with IEC 60512-11-9 (See Figure 1 par. 3.5)
3.4.12	Cold	Connector to be mounted in test-frame, contact position at Dim B. Temperature –40°C Duration 500hrs. Recovery time: 1hr <u>Requirement:</u> Termination resistance as per par. 3.4.2	In acc. with IEC 60512-11-10 (See Figure 1 par. 3.5)
3.4.13	Damp/heat steady state	Connector to be mounted in test-frame, contact position at Dim B. 85°C / RH 85% 1000hrs <u>Requirement:</u> Termination resistance as per par. 3.4.2	In acc. with IEC 60512-11-12 (See Figure 1 par. 3.5)
3.4.14	Salt Mist	Connector to be mounted in test-frame, contact position at Dim C. Temperature 35±2°C, 100% RH Salt mist: 5±1% salt solution Duration 2 hrs, after each period store parts in climate chamber at 40°C / 93% RH for 22 hrs. Total 3 cycles <u>Requirement:</u> No mechanical damage Termination resistance as per par. 3.4.2	In acc. with IEC 60512-11-6 (See Figure 1 par. 3.5)

3.4.15	Ammonia gas test	Contacts in undeflected state. Exposure to ammonia gas according to ASTM B858 or ISO 6957 25°C; 24hrs Requirement : Termination resistance as per par. 3.4.2	In acc. With ASTM B858 or ISO 6957
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3.5 Mechanical tests

Test frames for Mechanical Operation, Mechanical Shock and Vibration tests shall provide mechanical stability of the connector in relation to its mating parts.

- Contact normal force (3.4.5) shall be measured at C distance (minimum deflection) and B distance (maximum deflection) (see Figure 1)
- Mechanical Operation test (3.4.6) shall be carried out over distance Dim D. (see Figure 1)
- Mechanical Shock test (3.4.7) shall be carried out at C distance (minimum deflection). (see Figure 1)
- Vibration test (3.4.8 / 3.4.9) shall be carried out at C distance (minimum deflection). (see Figure 1)

During Vibration testing, an electrical circuit is checking that no electrical contact interruptions occur that exceed the requirement.

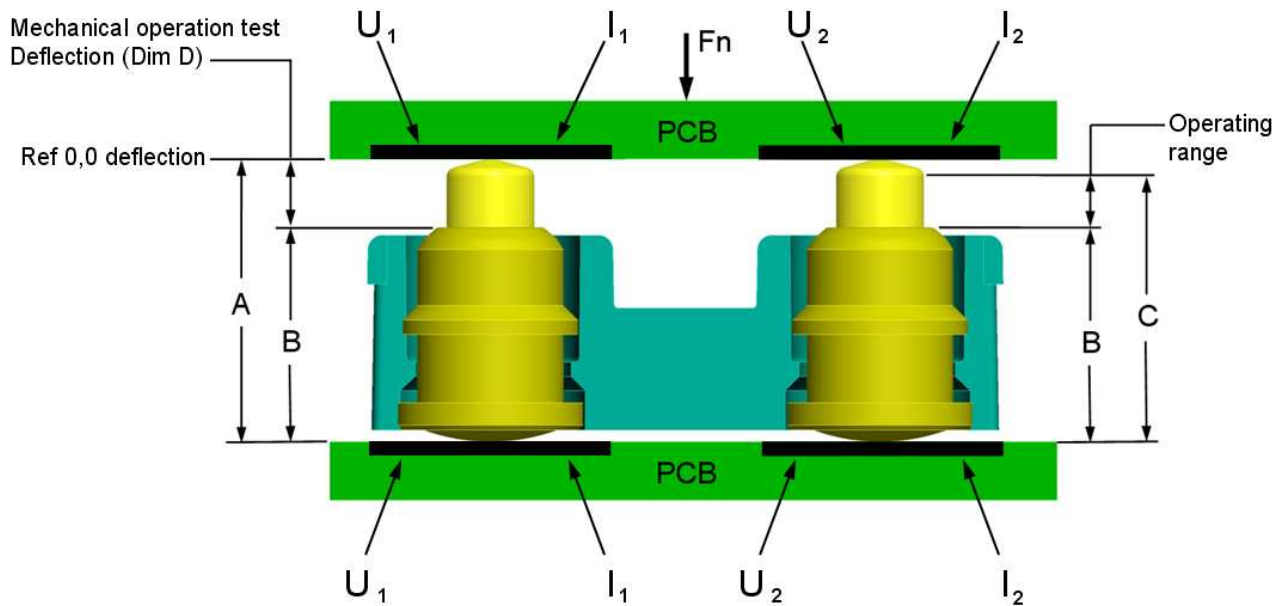


Figure 1

P/N	Dim A	Dim B	Dim C	Dim D	Min. Deflection	Min. Force	Max. Deflection	Max. Force
2173140-1	2.90	2.25	2.70	0.65	0.20	0.30N	0.65	1.6N
2173227-2	3.40	2.50	3.20	0.90	0.20	0.60N	0.90	2.0N
2173352-1	3.40	2.50	3.20	0.90	0.20	0.60N	0.90	2.0N

Table 1

3.6 Product Qualification and Regualification Test Sequence.

Test or examination	TEST - GROUP (a)				
	1	2	3	4	5
	TEST - SEQUENCE (b)				
Examination of product	1, 3	1, 3, 6	1, 15	1, 7	1, 6, 11
Termination resistance			2, 6, 8, 10, 12		2, 8
Insulation resistance			3, 13	2, 5	3, 9
Dielectric strength			4, 14	3, 6	4, 10
Contact normal force	2				
Mechanical Operation					5
Mechanical Shock		2			
Vibration Random		4			
Vibration Sinusoidal		5			
Rapid change of temperature			5		
Dry heat			7		
Cold			9		
Damp / heat steady state				4	
Salt Mist			11		
Ammonia Gas test					7

(a) See par. 4.1.A.

(b) Numbers indicate sequence in which tests are performed.

Sample description	Number of samples in test groups				
	1	2	3	4	5
Floating SPC	10	10	10	10	10

4. **QUALITY ASSURANCE PROVISIONS.**

4.1 **Qualification testing.**

A. Sample selection

Samples shall be prepared in accordance with applicable instructions and shall be selected at random from current production.

B. Test sequence

Qualification inspection shall be verified by testing samples as specified in par. 3.6.

4.2 **Requalification testing.**

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

4.3 **Acceptance.**

Acceptance is based upon verification that product meets requirements of par. 3.4. Failures attributed to equipment, test set-up, applied customer components or operator deficiencies shall not disqualify the product. When product failure occurs, corrective action shall be taken and samples resubmitted for requalification. Testing to confirm corrective action is required before resubmittal.

4.4 **Quality conformance inspection.**

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