

**2.0 mm DC JACK DYNAMO CONNECTOR**

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## 1. SCOPE

### 1.1 Content

This specification covers performance, test and quality requirements for a Tyco Electronics\* 2,0 mm compressive DC connector. The connector is designed to be used with 2,0 mm DC plugs connections for mobile telephone systems.

### 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 extend specified herein. Unless otherwise specified, the 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 the referenced documents, this specification shall take precedence.

### 2.1 Tyco Electronics Documents

501-19138 Qualification Test Report part no 1551042  
501-19159 Qualification Test Report part no 1551657  
501-19169 Qualification Test Report part no 2173188/1551042 (PdNi plating release)

### 2.2 Tyco Electronics Drawings

CR-1551042 Dynamo DC JACK compressive 2,0mm CONNECTOR  
CR-1551657 Dynamo DC JACK compressive 2,0mm CONNECTOR CHAMFERED, BIO RESIN  
CR-2173578 Dynamo DC JACK compressive 2,0mm CONNECTOR, CHAMFERED  
CR-2173188 Dynamo DC JACK compressive 2,0mm CONNECTOR  
C-1551548 Dynamo DC JACK compressive 2,0mm CONNECTOR

### 2.3 Other Documents

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 Materials and Finish

A Contacts: Copper alloy, post plated with selective gold, (selective nickel-palladium), nickel  
B Housing: (Bio) resin

**3.3 Ratings**

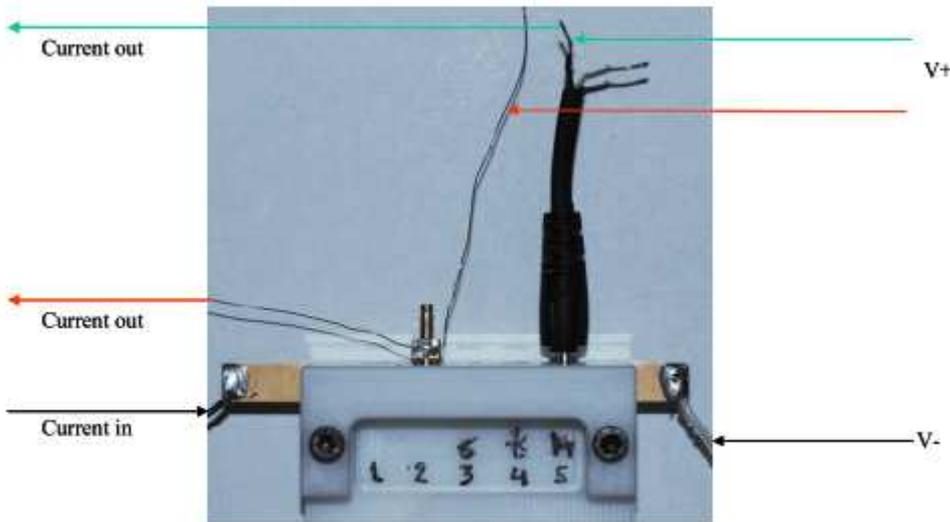
- A Voltage : 30V DC max.
- B Current : 2A DC max.
- C Contact Resistance: 60 mΩ max.
- D Durability: 6000 cycles

**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 §3.6. Unless otherwise specified, all tests are performed at ambient environmental conditions per IEC specification 68-1 clause 5.3 and are performed with connectors in mated conditions.

Visual requirements			
Para	Test Description	Performance Requirements or Severity	Procedures
3.4.1	Visual Examination	In acc. with IEC 60512-1-1 Magnification 10x	Meets requirements of product drawing. No defects that could impair normal operation.

Electrical requirements			
Para	Test Description	Performance or severity	Requirement
3.4.2	Contact Resistance IEC 60512-2-1	Mate connector with dry circuit (20mV, 100mA Max.) See fig.1	60 mΩ Max.
3.4.3	Insulation Resistance IEC 60512-3-1	Unmated connector with 500 VDC between adjacent contacts for 1 min.	1000 MΩ Min.
3.4.4	Dielectric Strength IEC 60512-4-1	Unmated connector with 400 VAC between adjacent contact for 1 minute	No flash over or breakdown.
3.4.5	Temperature rise IEC 60512-5-1- 5a	Measured at maximum rated current 2A with series all contacts.	Maximum temperature rise 30°C.



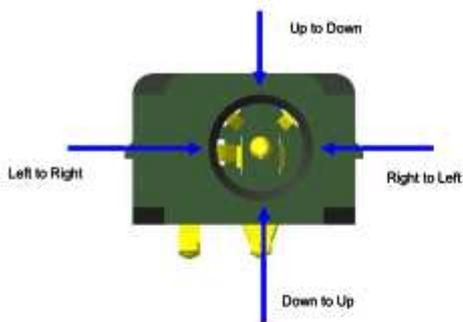
Special adapter with the Dynamo connectors placed in it and with a gold plated strip to measure contact resistance.

Fig.1

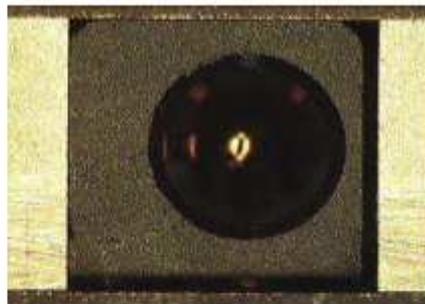
Mechanical requirements			
Para	Test Description	Performance or severity	Requirement
3.4.6	Contact force at normal working range.	Initially mate and unmate each compressive spring with a testpin until housing (fully compressed)	0.8 -1.55 N per terminal
3.4.7	Mating force IEC 60512-13-2-13b	Initially mate and unmate the connectors for 3 times with a normal plug. Mating force is the average of 3 successive matings with a normal plug. Speed 10 mm/min.	15N maximum.
3.4.8	Unmating force IEC 60512-13-2-13b	Unmating force is the average of 3 successive unmatings with a normal plug. Speed 10 mm/min.	≤ 3000 cycles 5N ±1N min > 3000 cycles 3N ±1N min.
3.4.9	Durability IEC60512-9-1-9a	Mate connector 4 - 10 times per minute with a normal plug. 6000 cycles.	Every 1000 cycles: Contact resistance. Mating/unmating force. No defects that could impair normal operation.
3.4.10	Vibration* (random) IEC60068-2-64 IEC	Frequency: 10 - 100 Hz; 3 m2/s3 (0.0132 g2/Hz); 100- 500 Hz; - 3dB/Oct. for: 3 x 60 min (X- Y- and Z-axis) in minimum deflection position.	Discontinuity max 1 μs all contacts in series, contact resistance within specification. No defects that could impair normal operation.
3.4.11	Shock* IEC60068-2-27 Ea	Pulse shape half sine, peak acceleration 50g, pulse 11 ms, 3 shocks in both directions in XYZ axis (18 shocks)	Discontinuity max 1 μs all contacts in series, contact resistance within specification. No defects that could impair normal

			operation.
3.4.12	Bending strength for DC Jack	40N with normal plug. The DC Jack is assembled in simulated phone housing. See fig.2	Contact resistance within specification. No defects that could impair normal operation.
3.4.13	Axial strength	100N with rigid steel plug See fig.2	Contact resistance. No defects that could impair normal operation.
3.4.14	Center pin retention force	Apply an axial pushing force to the head of the centre DC pin; 25N after 6000 cycles durability and 25N initially	No defects that could impair normal operation.

\*: Must be performed in application. Test to be performed by customer.



Schematic overview force



Front view of adapter and connector.



Overview of the adapter used with the rigid steel gauge plug inserted into the connector.

Fig.2

Environmental requirements			
Para	Test Description	Performance or severity	Requirement
3.4.15	Cold IEC60512-11-10-11j IEC 60068-2-1Ab	-40°C for 96 hours, recovery 2 hours at ambient atmosphere.	
3.4.16	Dry heat IEC60512-6-11-10-11i IEC 60068-2-2Bb	85°C for 96 hours; recovery 2 hours at ambient atmosphere.	Contact resistance 80mΩ max. Insulation resistance. Dielectric strength. No defects that could impair normal operation.
3.4.17	Thermal Shock IEC60512-11-4-11d IEC 60068-2-14 Test Na	25 cycles -40°C / 85°C. Duration 0.5 / 0.5 hour. Maximum change over time 5 minutes; recovery 2 hours at ambient atmosphere.	Contact resistance 80mΩ max. Insulation resistance. Dielectric strength. No defects that could impair normal operation.
3.4.18	Damp Heat Cyclic IEC 60512-11-12 -11m IEC-60068-2-30Db	18 cycles of 24h. rH 90-100%, 25 to 55°C in 3h, then maintain for 9h, then 55 to 25°C in 3h, maintain 9h. Recovery at 25°C rH75% for 2h.	Contact resistance 80mΩ max. Insulation resistance. Dielectric strength. No defects that could impair normal operation.
3.4.19	Salt spray IEC-60512-11-6-11f IEC-60068-2-11 Ka	96 hours continuous spray at 35±2°C, rH 90-95%, 5% NaCl salt mist. Wash parts after test and return to room ambient for 1-2 hours. Mated condition.	Contact resistance 80mΩ max. No defects that could impair normal operation.

### 3.5 Product Qualification and Requalification Test Sequence

#### TEST SEQUENCE

##### **Test group 1**

- 1 Visual Examination
- 2 Contact Resistance
- 3 Insulation Resistance
- 4 Dielectric Strength
- 5 **Cold**
- 6 **Dry Heat**
- 7 Contact Resistance
- 8 Insulation Resistance
- 9 Dielectric Strength
- 10 **Thermal Shock**
- 11 Contact Resistance
- 12 Insulation Resistance
- 13 Dielectric Strength
- 14 **Damp Heat Cyclic**
- 15 Contact Resistance
- 16 Insulation Resistance
- 17 Dielectric Strength
- 18 **Condensing Humidity**
- 19 Contact Resistance
- 20 Insulation Resistance
- 21 Dielectric Strength
- 22 Visual Examination

##### **Test group 2**

- 1 Visual Examination
- 2 Contact Resistance
- 3 Mating / Unmating Forces
- 4 **Durability**
- 5 Mating / Unmating Forces
- 6 Contact Resistance
- 7 Visual Examination
- 8 **Centre DC pin retention force (Ini and 6k)**
- 9 Visual Examination

##### **Test group 3**

- 1 Visual Examination
- 2 Contact Resistance
- 3 **Salt Spray**
- 4 Contact Resistance
- 5 Visual Examination

##### **Test group 4**

- 1 Visual Examination
- 2 Contact Resistance
- 3 **Bending strength for DC jack**
- 4 Contact Resistance
- 5 Visual Examination

##### **Test group 5**

- 1 Visual Examination
- 2 Contact Resistance
- 3 **Axial Strength**
- 4 Contact Resistance
- 5 Visual Examination

##### **Test group 6**

- 1 Visual Examination
- 2 Contact Resistance
- 3 **Temperature rise**
- 4 Contact Resistance
- 5 Visual Examination

##### **Test group 7**

- 1 Visual Examination
- 2 **Normal Force compressive contacts**
- 3 Visual Examination

#### **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.

All test-groups shall consist of a minimum of 5 connectors of which all contacts shall be tested.

###### **B. Test sequence**

Qualification inspection shall be verified by testing samples as specified in table1 par. 3.5.

##### **4.2 Requalification testing**

If changes significantly affecting form, fit or function are made to product or manufacturing process, product assurance shall coordinate re-qualification 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 the performance and test description. 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 re-qualification. Testing to confirm corrective action is required before re-submittal.

##### **4.4 Quality conformance inspection**

Applicable Tyco Electronics 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.