



1. INTRODUCTION

1.1 Purpose

Testing was performed on TE Connectivity (TE) Power Tap Connector series to determine its conformance to the requirement of Product Specification 108-11030.

1.2 Scope

This report covers the electrical, mechanical, and environmental performance of TE Connectivity (TE) Power Tap Connector series. Qualification Test was performed at TE China Engineering Center Testing Laboratory.

1.3 Conclusion

TE Connectivity (TE) Power Tap Connector series conformed to the electrical, mechanical, and environmental performance requirements of Product Specification 108-11030.

1.4 Test Specimens

The specimens were representative of normal production lots, Specimens identified with the following part numbers were used for test.

TE Part Number	Description
5055557-4	Power Tap 10P STD Connector, .300 pitch, high-profile
5055558-3	Power Tap 10P STD Connector, .300 pitch
1-5055323-0	Power Tap 10P STD Connector, .125 pitch
5055323-9	Power Tap 6P STD Connector, .125 pitch
5055673-1 (5055558-7)	Power Tap 10P STD Connector, .300 pitch
5055324-1	Power Tap 6P 16mm SH Connector, .125 pitch
468211-1/-2	PCB 468211-1/-2
2204551-1/2/3	Press Tooling drawing for 5055324-1
Test Hardware	screw 2204893-7 M3*0.5, 2204893-5 #6-32, nut/washer, and others.

Figure 1

1.5 Environmental Conditions

Unless otherwise stated. The following environmental conditions prevailed during testing

Temperature: 25 ± 10 °C

Relative Humidity: 50 ± 25% RH

1.6 Product Qualification and Requalification Test Sequence

Test or Examination	Test Group								
	1	2	3	4	5	6	7	8	9
	Test sequence								
Examination of product	1	1	1	1	1	1			
Contact resistance, specified current	4,7,9,11	3,5,7,9							
LLCR, dry circuit				3,8	2,4	2,4			
Current cycling		6							
Temperature rise vs current	5	10	2	4,9					
Vibration	8								
Board insertion force	2								
Board extraction force	12								
Torque	3,10	2,8		2					
Thermal shock		4							
Humidity-temperature cycling	6			5					
Salt Spray Test					3				
Max Flowing Gas						3			
Temperature life				6					

NOTE

- (a) CR shall be measured at specified current as below:
1. Power Tap STD 6P Connector: 50A
 2. Power Tap STD 10P Connector: 60A
 3. Power Tap HC 4P Connector: 50A
 4. Power Tap HC 6P Connector: 65A
 5. Power Tap 16mm SH 6P conn: 50A

2. SUMMARY OF TESTING

2.1 Initial Examination of Product

All specimens submitted for testing were representative of normal production lots. A Certificate of Conformance (C of C) was issued by Product Assurance. Specimens were visually examined and no evidence of physical damage detrimental to product performance was observed.

2.2 Low Lever Contact Resistance

Contact resistance measurements for TE Connectivity (TE) Power Tap Connector series meet product specification, as below table.

Description	LLCR Spec. initial state (mΩ)	Test Record initial state (mΩ)	LLCR Spec. final state (mΩ)	Test Record final state (mΩ)
Power Tap 6P/10P/4P connector	0.5 mΩ (STD 6P/HC 4P) 0.4 mΩ (STD 10P/HC 6P)	0.31 mΩ	0.5mΩ	0.38 mΩ
Power Tap 16mm SH connector	0.5 mΩ	0.26 mΩ	0.5mΩ	0.32 mΩ

Figure 2. Power Tap Connector LLCR Specification and Test Record.

2.3 Contact Resistance at Rated Current

Contact resistance measurements for TE Connectivity (TE) Power Tap Connector series meet product specification, as below table.

Description	CR Spec. (mΩ)	CR Test Record (mΩ)
Power Tap 6P/10P/4P connector	0.5 mΩ (STD 6P/HC 4P) 0.4 mΩ (STD 10P/HC 6P)	0.27 mΩ
Power Tap 16mm SH connector	0.5 mΩ	0.24 mΩ

Figure 3. Power Tap Connector Contact Resistance Specification and Test Record.

2.4 Current cycling

No evidence of physical damage was visible to the test samples, after 250 cycles of cycling the current on and off at the current of 31.25 amperes. The cycling current represents 125% of the specified current.

2.5 Withstanding Voltage

No dielectric breakdown or flashover occurred

2.6 Temperature Rise vs. Current

Rated current energized at specific current in accordance with Product Specification. The temperature rise vs current test curve, please refer to Product Specification.

2.7 Vibration Test

No discontinuities were detected during vibration testing. Following vibration test. No cracks, breaks, or loose parts on the specimens were visible.

2.8 Mechanical Shock

No discontinuities were detected during mechanical shock testing. Following mechanical shock testing, no cracks, breaks, or loose parts on the specimens were visible.

2.9 Torque Test

No evidence of physical damage was visible after the required torque was applied to the power tap screw terminal for the required hold time.

Power Tap 16mm SH connector 5055324-1, press force test record: 1.20N.m.

2.10 PCB Pressing Force

All mating force measurements meet product specification.

Power Tap 16mm SH connector 5055324-1, press force test record: 500N max.

2.11 PCB Extraction Force

All un-mating force measurements meet product specification.

Power Tap 16mm SH connector 5055324-1, extraction force test record: 120N min.

2.12 Thermal Shock

No evidence of physical damage was visible as the result of thermal shock testing

2.13 Humidity/temperature cycling

No evidence of physical damage was visible as the result of humidity/temperature cycling.

2.14 Temperature life

No evidence of physical damage was visible as the result of temperature life testing.

2.15 Mixed Flowing Gas Test

No evidence of physical damage was visible as the result of exposure to the pollutants of mixed flowing gas

2.16 Salt Spray Test

No evidence of physical damage was visible as the result of exposure to the pollutants of salt spray test.

2.17 Final Examination of Product – All Test Groups

Specimens were visually examined and no evidence of physical damage detrimental was observed.

3 TEST METHODS

3.1 Initial Examination of Product

A Certificate of Conformance was issued stating that all specimens in the test package were produced, inspected, and accepted as conforming to product drawing requirements, and manufactured using the same core manufacturing processes and technologies as production parts.

3.2 Low Level Contact Resistance

Low level contact resistance measurements were made with four terminal measuring technique. The test current was maintained at 100 milliamperes maximum with a 20 millivolt maximum open circuit voltage, in accordance with EIA-364-27

3.3 Contact Resistance at Rated Current

Specimens were subjected to contact resistance testing in accordance with product Specification 108-11030. And EIA –364-06. Specimens were energized at rated current and resistance measurements were recorded.

3.3 Current cycling

Subject mated contacts to 250 cycles at 31.25 amperes for 15 minutes ON and 15 minutes OFF, in accordance with TE Spec 109-51.

3.4 Withstanding Voltage

A test potential of 2500 volts DC was applied between the adjacent power contacts of mated specimens. This potential was applied for 1 minute and then returned to zero. In accordance with EIA–364-20B Condition I.

3.5 Temperature Rise vs. Current

Stabilize at a single current level until 3 readings at 5 minute intervals are within 1^oC. Test with single energized contact and with all adjacent power contacts energized. In accordance with EIA-364-70, Method 1.

3.6 Vibration

Mated specimens were subjected to a random vibration test, specified by a random vibration spectrum with excitation frequency bounds of 20 and 2000 Hz. The spectrum remained flat at 0.06 G²/Hz from 20Hz to upper bound frequency of 500Hz. The root-mean square amplitude of excitation was 9.26 GRMS. The specimens were subjected to this test time of 120 minutes in each of three mutually perpendicular planes. Specimens were monitored for discontinuities of microsecond or greater using an energizing current of 100 milliamperes. In accordance with EIA–364-28 Condition V.

3.7 Mechanical Shock

Mated specimens were subjected to a mechanical shock test having a half – sine waveform of 50 gravity units (g peak) and duration of 11 milliseconds. Three shocks in each direction were applied along the 3 mutually perpendicular planes for a total of 18 shocks. Specimens were monitored for discontinuities of one microsecond or greater using a current of 100 milliamperes DC. In accordance with EIA–364-27B Method A.

3.8 Torque Test

Specimens were Applied the rated torque to tap screw terminal, hold 15 seconds and release.
Power Tap 6/10P STD: 1.02N.m (9 ibf.inch) max
Power Tap 4/6P HC: 1.02N.m (9 ibf.inch) max
Power Tap 16mm SH: 1.20N.m max

3.9 PCB Press Force

The force required to mate individual specimens was measured using a tensile/compression device with a free floating fixture and a rate of travel of 12.7 mm per minute, in accordance with EIA-364-13B.

3.10 PCB Extraction Force

The force required to the individual assembly specimens between housing and contact, was measured using a tensile/compression device with a free floating fixture and a rate of travel of 12.7 mm per minute in accordance with EIA-364-13B.

3.11 Thermal Shock

Mated specimens were subjected to 36 cycles of thermal shock with each cycle consisting of 30 minute dwells at -40° and 105°C. The transition between temperatures was less than 1 minute. In accordance with EIA-364-32C.

3.12 Humidity-temperature Cycling

Mated specimens were exposed to 10 cycles of humidity-temperature cycling. Each cycle lasted 24 hours and consisted of cycling the temperature between 25 and 65°C at 80 to 100 %RH. In accordance with EIA-364-31B Method III.

3.13 Temperature Life

Mated specimens were exposed to a temperature of 105°C for 504 hours (21 days). In accordance with EIA-364-17B Method A.

3.14 Mixed Flowing Gas Test

Specimens were exposed for 14 days to a mixed flowing gas Class IIA exposure. Class IIA exposure is defined as a temperature of 30±1°C and a relative humidity of 70 ±2% with the pollutants of Cl₂ at 10 ±3 ppb, NO₂ at 200±50 ppb, H₂S at 10±5 ppb and SO₂ at 100±20 ppb, in accordance with EIA-364-65, class IIA. ½ subject samples mated for 336 hours (14days); ½ subject samples unmated 168 hours (7days), and then mated for final 168 hours (7days). In accordance with EIA-364-65 Class IIA.

3.15 Salt Spray Test

Mated specimens were exposed for 48 hours to a 5% solution salt spray, at 35 +1/-2°C, In accordance with EIA-364-26.

2.17 Final Examination of Product

Specimens were visually examined for evidence of physical damage detrimental to produce performance.