

3M™ CP2 Press-Fit Headers and Sockets, 2 mm

**A-Style CP2 Connectors
CP2-SA110-G1-KR Right Angle Socket Connectors
mated to
CP2-HA110-GA1-KR Header Connectors**

Product Specification 78-5102-0083-1

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1. Scope

This document summarizes test methods, test conditions and product performance requirements for the 3M CP2 Right Angle Sockets, CP2-SA110-G1-KR. Listings of materials, finishes, test conditions, and test standards are included in this specification. In the event of conflict between this specification and any documents listed below, the listed documentation supersedes this specification.

2. 3M Documents

Technical Data Sheets for 3M CP2 Right Angle Sockets		Technical Data Sheets for 3M CP2 Press-Fit Headers	
TS-2264	AB-Type	TS-2263	AB-Type
TS-2266	A-Type	TS-2265	A-Type
TS-2267	B-Type	TS-2268	B-Type
TS-2269	C-Type	TS-2270	C-Type

3. Performance and Test Description

Unless otherwise specified, all tests shall be performed on 3M CP2 Right Angle Sockets, CP2-SA110-G1-KR, mated to 3M CP2 Press-Fit Headers, CP2-HA110-GA1-KR, at ambient environmental conditions per EIA-364. Unless otherwise specified, all values and limits are typical of those obtained by qualification testing of the subject product. All specifications are subject to revision and change without notice from 3M.

4. Requirements Overview

4.1 Ratings

Dielectric withstanding voltage: 750 VAC_{RMS} at sea level
Current: 1.0 Amperes at 70°C, all contacts powered
Temperature: -55°C to +125°C
Insulation resistance: >1 x10¹⁰Ω at 100 VDC
Mating/Unmating Cycles: 200

4.2 Materials

Socket
Insulation: Glass Filled Liquid Crystal Polymer (LCP)
Contact: Copper Alloy
Flammability: UL94V-0
Header
Insulation: Glass Filled Polybutylene Terephthalate (PBT)
Pin Contact: Copper Alloy
Flammability: UL94V-0

4.3 Finishes

Plating: (socket and header)
Nickel: 50 - 80 μ inches, ASTM B689-97, Type II
Gold - Contact: 30 μ inches minimum, ASTM B488-01, Type I, Grade C
Tin Option: Matte Sn, 100 - 200 μ inches, ASTM B545-97, Class B

4.5 Regulatory Compliance

See the Regulatory Information Appendix (RIA) in the "RoHS compliance" section of www.3Mconnectors.com for compliance information. See customer drawings for regulatory specifics on each connector.

5. Electrical

Description or parameter	Values & limits	Units	Requirement or conditions	Test Standard or method
Voltage Proof	750	VAC _{RMS}	Measured between adjacent and opposing contacts. No disruptive discharge during 1 minute duration. Sea level with 70% relative humidity.	IEC 60512-2, Test 4a, Method B
Current-Carrying Capacity	1.0	Amperes	All lines driven at 70°C	IEC 60512-3, Test 5b
Contact Resistance	<20	Milliohms	20 milliohm maximum ΔR contact resistance per mated interface throughout testing.	IEC 60512-2, Test 2a
Insulation Resistance	>1 x10 ¹⁰	Ohms	Measured between adjacent and opposing contacts. 100 VDC for 1 minute duration.	IEC 60512-2, Test 3a, Method A

6. Mechanical

Description or parameter	Values & limits	Units	Requirement or conditions	Test Standard or method
Mechanical Operation	200	Mating cycles	Cycled at a rate of 10 mm/sec maximum, 30 second rest between unmates	IEC 60512-9-1, Test 9a
Engaging Forces	0.75 max	Newtons per contact	Rate of engagement: 10 mm/s max	IEC 60512-7, Test 13a
Separating Forces	0.15 min	Newtons per contact	Rate of separation: 10 mm/s max	IEC 60512-7, Test 13a
Mating Contact Retention Force in Housing	5	Newtons per contact	The force shall be applied axially to the contact, once in the mating direction.	IEC 60512-8, Test 15a
Unmating Contact Retention Force in Housing	10	Newtons per contact	The force shall be applied axially to the contact, once in the unmating direction.	IEC 60512-8, Test 15a
Press-in Force (Mounting)	≤ 204	Newtons	Female terminations: 6 tail contacts pressed in via holes; Male terminations: 6 tail contacts pressed in via holes; Speed 25mm/min~50mm/min	IEC 60352-5 5.2.2.2, IEC 60352-5 5.3.2.1.1
Push-out Force	13.5 to 204	Newtons	Female terminations: 6 tail contacts pulled from via holes; Male terminations: 6 tail contacts pulled from via holes; Speed <12mm/min	IEC 60352-5 5.2.2.3
Transverse Static Load on Printed Board	100	Newtons	The connectors shall be unmated and mounted on a printed board.	IEC 60512-5, Test 8a
Vibration (Sinusoidal)	1 max	μs	10 Hz to 500 Hz, 0.35 mm amplitude or 50 m/s ² acceleration, 10 sweeps in each direction for 2 hours in each axis.	IEC 60512-4, Test 6d
Physical Shock	1 max	μs	Acceleration of 500 m/s ² , duration of impact 11 ms, 5 shocks in two axis, in 3 axis, half-sine wave shocks	IEC 60512-4, Test 6c
Polarizing Method	100	Newtons	The connectors shall be mounted on a printed board and backplane with the force applied anywhere on the modules.	IEC 60512-7, Test 13e

7. Physical

Description or parameter	Values & limits	Units	Requirement or conditions	Test standard or method
Visual	na	na	No defects such as deformation, blisters, damage, cracks, etc.	IEC 60512, Test 1a
Plating thickness Nickel Gold Tin	50-80 30 100-200	μ inches	Thickness measurements: once per reel	ASTM B568
Plating Integrity (Porosity)	0	Pores	Gold coverage on significant surfaces (critical areas).	ASTM B735-95 or B799-95
Plating Integrity (Solderability & Adhesion)	na	na	Solderability: lead-free dip test, Adhesion: bend test	ASTM B545-98
Flammability	≤10	seconds	One unmated specimen; Arrangement according to IEC61076-4-101, Sec. 5.1.5. After removal of flame, burning time ≤ 10 seconds.	IEC 60512-9, Test 20a

8. Environmental

Description or parameter	Values & limits	Units	Requirement or conditions	Test Standard or method
Rapid Change of Temperature	No damage	na	-55°C to 125°C, five cycles at 30 minute dwells, 3 minute temperature ramps, 2 hour recovery time	IEC 60068-2-14, Test Na
Dry Heat	>1 x10 ⁹	Ohms	125°C unloaded: Duration 16 hr, Recovery 2h; Test Voltage 100VDC; 5 contacts per specimen; Test insulation resistance and high temperature.	IEC 60068-2-2 Test B, IEC60512-3a
Damp Heat (Cyclic)	No damage	na	40°C, Variant 1, 24 h; Visual examination of unmated connectors.	IEC 60068-2-30 Test Db
Damp Heat (Steady State)	No damage	na	Wiring according IEC 61076-4-101, Section 5.1.4; Unloaded; Polarizing voltage 60VDC, 21days; 40±2°C, 93(-3)/(+2)%RH; Visual Examination	IEC 60068-2-3 Test Ca
Electrical Load and Temperature Resistance	>1 x10 ⁹	Ohms	Ambient temperature 70°C, Electrical load 1A; Wire gauge = 0.12mm ² ; All contacts loaded; Duration 1000hr; Recovery 2hr; Test Insulation resistance at 10h, 1000h at 70°C; Monitor the temperature in the center of specimens	IEC60512-9b
Mold Growth	0 Rating	na	Test 8 different mold types; 28days; Record the rate of mold growth; Visual examination.	IEC 60068-2-10 Test J
Corrosion Industrial Atmosphere	5 max	MilliOhms	H ₂ S: 100± 20ppb, SO ₂ : 500±100ppb, 25±1°C, 75±3%RH, 4 days. 5 milliohm maximum ΔR contact resistance.	IEC60512-11-7, Method 1, IEC60352-5 5.2.4.4

9. Test Sequence		TEST FLOW									
P Group		A Group		B Group		C Group		D Group		E Group	
Test Description	No. Samples	Test Description	No. Samples	Test Description	No. Samples	Test Description	No. Samples	Test Description	No. Samples	Test Description	No. Samples
General Examination of Dimensions	20	Engaging & Separation Forces	4	Gauge Retention Force	4	Damp Heat, Steady State	4	Mechanical Operation	4	Robustness of Terminations	4
Polarizing Method		Contact Retention in Housing		Mechanical Operation		Insulation Resistance		Electrical Load & Temperature Resistance		Contact Retention in Housing	
Low Level Contact Resistance		Vibration		Low Level Contact Resistance		Low Level Contact Resistance		Low Level Contact Resistance		Mold Growth	
Insulation Resistance		Low Level Contact Resistance		Insulation Resistance		Engaging & Separation Forces		Insulation Resistance		Insulation Resistance	
Voltage Proof		Shock		Voltage Proof		Visual Examination		Voltage Proof		Flammability	
		Low Level Contact Resistance		Corrosion Industrial Atmosphere				Visual Examination			
		Rapid Change of Temperature		Low Level Contact Resistance							
	Insulation Resistance	Mechanical Operation									
	Voltage Proof	Low Level Contact Resistance									
	Visual Examination	Insulation Resistance									
	Dry heat - Climatic Sequence	Insulation Resistance									
	Damp Heat Cyclic (first cycle)	Voltage Proof									
	Cold	Gauge Retention Force									
	Low Air Pressure (Voltage Proof)	Static Load, Transverse									
	Damp Heat Cyclic (remaining cycles)										
	Insulation Resistance										
	Low Level Contact Resistance										
	Voltage Proof										
	Engaging & Separation Forces										
	Visual Examination										

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