

**AMP 2.0mm Pitch HPI
High Performance Interconnect
Wire-To-Board System**

1. SCOPE**1.1. CONTENTS**

This specification covers the performance, tests and quality requirements for the AMP High Performance Interconnect (HPI), 2.0mm Pitch, Crimp Type.

1.2 QUALIFICATION

When tests are performed on the subject product line, the procedures specified in Tyco 109 series specifications shall be used. All inspections shall be performed using the applicable inspection plan and product drawing.

2. APPLICABLE DOCUMENTS AND SPECIFICATIONS

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

2.1. TYCO SPECIFICATIONS

- A. 109-1: General Requirements for Test Specifications
- B. 109 series: Test Specification as indicated in figure 2 (Comply with MIL-STD-202)
- C. Corporate Bulletin 401-76: Cross-reference between AMP test Specifications and Military or Commercial Documents.
- D. 114-57011: Application Specification.
- E. 501-57058: Test Report.

3. REQUIREMENTS**3.1. DESIGN AND CONSTRUCTION**

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

3.2. MATERIALS

- | A. Housing : Thermoplastic, UL94V-0
- | B. Contact : Copper Alloy, Tin Plating on soldertail over Nickel underplating overall.

3.3. RATING

- A. Voltage: 3A, 100 VAC / DC
 1A, 250 VAC / DC
- B. Operating Temperature: -25 to +85°C
- C. Current: AWG #24 — 3.0A
 AWG #26 — 2.0A
 AWG #28 — 1.5A
 AWG #30 — 1.0A

3.3.1 Applicable wires

- A. Wire Size: AWG #30 -- #24 (0.05mm² - 0.22mm²)
- B. Insulation Diameter: 0.9mm - 1.5mm

Note: The compatibility of wires for termination must be evaluated accordingly; by the category from each manufacturer, brand, tradenames and product catalog numbers

3.3.2 Applicable Printed Circuit Board

- A. Board Thickness: 0.8mm - 1.6mm
- B. Hole Diameter: 0.7mm – 0.8mm

3.4. PERFORMANCE AND TEST DESCRIPTION

The product is designed to meet the electrical, mechanical and environmental performance requirements specified in Table 2. All tests are performed at ambient environmental conditions per Tyco Specification 109-1 unless otherwise specified.

3.5. TEST REQUIREMENTS AND PROCEDURES SUMMARY

NO.	TEST ITEM	REQUIREMENT			PROCEDURE	
3.5.1	Conformity of Product physical requirements	Product shall conform to the requirements of applicable Product Drawing and Application Specification			Visually, inspected per applicable quality inspection plan.	
ELECTRICAL REQUIREMENT						
3.5.2.1	Termination Resistance	Initial	10m ohms max.		Subject mated contacts assembled in housing to closed circuit current of 10mA max at open circuit voltage of 20mV max.	
		Final	20m ohms max.			
3.5.2.2	Insulation Resistance	1000M ohms min. (Initial) 500M ohms min (Finial)			Measure by applying test potential between adjacent contacts, and between the contacts and ground in the mated connector assembly. MIL-STD-202, Method 302,Condition B	
3.5.2.3	Dielectric Strength	Connector must withstand test potential of 1000 VAC for 1 min. Current leakage limit to 5.0mA max.			Measure by applying test potential between adjacent contacts, and between the contacts and ground in the mated connector assembly. MIL-STD-202, Method 301	
MECHANICAL REQUIREMENT						
3.5.3.1	Connector Mating/ Unmating Force	Initial And 50th Cycle				Subject terminated connector and header to mate and unmate to measure the force required to engage and disengage by operating at a rate of 25mm a minute.
		Circuit Pos	Inserti on (kgf max)	Extraction (kgf min)		
				Initial	Final	
		2	2.5	0.8	0.6	
		3	3.0	0.8	0.6	
		4	3.5	1.0	0.8	
		5	4.0	1.0	0.8	
		6	4.5	1.2	1.0	
		7	5.0	1.2	1.0	
		8	5.5	1.4	1.2	
		9	6.0	1.4	1.2	
		10	6.5	1.6	1.4	
		11	7.0	1.6	1.4	
		12	7.5	1.8	1.6	
		13	8.0	1.8	1.6	
		14	8.5	2.0	1.8	
		15	9.0	2.0	1.8	
		16	9.5	2.0	1.8	
3.5.3.2	Individual Pin Insertion/ Extraction Force	Insertion Force	Extraction Force		Subject terminated contact and pin to mate and unmate to measure the force required to engage and disengage by operating at a rate of 25mm a minute.	
		0.7kgf max	0.10kgf min (Initial) 0.08kgf min (Final)			

NO.	TEST ITEM	REQUIREMENT	PROCEDURE
3.5.3.3	Tensile Strength of Wire Termination	AWG #24—3.0kgf min. AWG #26—2.0kgf min. AWG #28—1.0kgf min. AWG #30—0.8kgf min.	Apply an axial pull-off load to terminated wire of contact. At a rate of 100mm a minute. The load is applied in the axial directions
3.5.3.4	Contact Retention Force	1.5 kgf min. per contact	Apply axial load to terminated contact at a rate of 100mm a minute.
3.5.3.5	Post Retention Force	1.0 kgf min. per contact	Apply axial pull-off load to post contact mounted on housing and measure the force required to dislodge post from housing.
ENVIRONMENTAL REQUIREMEN			
3.5.4.1	Vibration Sinusoidal Low Frequency	No electrical discontinuities greater than 1 microsecond. Termination resistance (low level) shall be met.	Subject mated connectors to 10-55-10 Hz traversed in 1 minute at 1.52mm amplitude 2 hours in each of 3 mutually perpendicular planes. MIL-STD-202, Method 201, Condition A
3.5.4.2	Temperature Life (Heat Aging)	Termination resistance (low level) shall be met.	Subject mated connector assemblies to temperature life at 85°C±2°C for 240hours.
3.5.4.3	Humidity, Steady State	Insulation Resistance (Final) 500 Mohms min. Termination resistance (low level) shall be met. Dielectric Strength shall be met.	Subject mated connectors to steady state humidity at 40°C and 90- 95% R.H for 240hrs MIL-STD-202, Method 103, Condition B.
3.5.4.4	Thermal Shock	Termination resistance (low level) shall be met. Must meet electrical requirement.	Subject mated connector assemblies on 25 cycle -55 °C and +85 °C for 30 minutes each duration at temperature extremes. MIL-STD-202, Method 107, Condition A
3.5.4.5	Salt Spray	Termination resistance (low level) shall be met.	Subject mated/ unmated connectors to 5% salt concentration for 48 hours. MIL-STD-202, Method 101, Condition B
3.5.4.6	Industrial Gas / Sulfurous Acid Gas (SO ₂)	Termination resistance (low level) shall be met.	Subject mated connector to sulfurous acid gas (SO ₂) atmosphere of 3±1 ppm concentration at 40±2°C for 96 hours
3.5.4.7	Solderability	The inspected area of each lead must have 95% solder coverage minimum.	Steam Aging Preconditioning : 1. Intended for nontin and nontin-alloy leadfinishes for 93+3/-5°C 、1hrs. 2. Intended for tin and tin-alloy lead finishes for 93+3/-5°C 、8hrs. <JESD22-B102D, Condition C> Solder pot temperature: 245±5°C, 5sec
3.5.4.8	Resistance to Wave Soldering Heat *-440054-* *-440055-*	No physical damage shall occur.	Solder Temp. : 245±5°C, 5 ±0.5sec.

NO.	TEST ITEM	REQUIREMENT	PROCEDURE
3.5.4.8	Resistance to Wave Soldering Heat 9-440054-1 9-440054-4 8-440054-6 8-440054-7 *-2355933-*	No physical damage shall occur.	Solder Temp. : 260±5℃, 10±0.5sec.
3.5.4.8	Resistance to Reflow Soldering Heat 9-440054-1 9-440054-4 8-440054-6 8-440054-7 *-1775469- *-1775470- *-2355933-*	No physical damage shall occur.	Pre-soak condition, 85℃/85% RH for 168 hours. Pre Heat : 150~180℃, 90±30sec. Heat : 230℃ Min., 30±10sec. Peak Temp. : 260+0/-5℃, 20~40sec. Duration : 3 cycles
3.5.4.9	Durability (Repeated Mate /Unmating)	Termination resistance (low level) shall be met.	Subject connector assembly to 50 cycles of repeated mating /unmating at a rate of 10 cycles a minute.
3.5.4.10	Ammonia	Termination resistance (low level) shall be met.	After 72 hours exposure in ammonia chamber with 25cc of 3% ammonia solution for every liter of chamber capacity
3.5.4.11	Resistance to cold	Termination resistance (low level) shall be met.	Subject mated connectors to cold testing atmosphere at -25℃±3℃ 48 hours. Termination resistance (low level) shall be met.

PART LIST:

2.00mm HPI Connector

PN	Product Type	AWG	PCB Termination Style	Mount Angle	Position Range	Length (X)	Height (Y)	Width (Z)	Mating PN
1735801-1	Contact	24 - 30	N/A	N/A	N/A	N/A	N/A	N/A	440129-x;
440129	Housing	24 - 30	N/A	N/A	2 to 16	4.7 + 2.00 Per Pin Increase	4.50	6.90	440054-x; 440055-x; 1775470-x; 1775469-x;
440054	Header	24 - 30	DIP	Vertical	2 to 16	6.0 + 2.00 Per Pin Increase	6.05	4.70	440129-x
440055	Header	24 - 30	DIP	Right Angle	2 to 16	6.0 + 2.00 Per Pin Increase	4.95	7.70	440129-x
1775470	Header	24 - 30	SMT	Vertical	2 to 16	7.4 + 2.00 Per Pin Increase	6.15	5.40	440129-x
1775469	Header	24 - 30	SMT	Right Angle	2 to 16	7.4 + 2.00 Per Pin Increase	5.50	7.60	440129-x

4. QUALITY ASSURANCE PROVISIONS

4.1 QUALIFICATION TESTING

A. Test Specimens

The test specimens to be used for the performance evaluation testing, shall be prepared in accordance with AMP Application Specification, 114-57011, Termination AMP 2.0mm HPI CRIMP Connector, by using samples selected from the current production at random, and conforming to the requirements of the applicable product drawings.

B. Test Condition

Unless otherwise specified, all tests shall be performed under any combination of the following test conditions:

Temperature : 15 – 30°C
Relative Humidity : 45 – 75%
Atmospheric Pressure : 650 – 800 mmHg

4.2 RE-QUALIFICATION 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 development/product, quality and reliability engineering.

4.3 ACCEPTANCE

Acceptance is based on verification that product meets requirements Spelled in Table 2. Data attributed to equipment; test setup or operator deficiencies shall not disqualify product. When product failure occurs, corrective action shall be taken and samples resubmitted for qualification. Testing to confirm corrective action is required before resubmit.

4.4 QUALITY CONFORMANCE INSPECTION

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