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**DESIGN OBJECTIVES**  
**108-60007**  
**METRIC INTERCONNECT SYSTEM (MIS) C-S II CONNECTOR**

**1. SCOPE:**

**1.1 Contents**

This specification covers performance, tests and quality requirements for the crimp-snap Metric Interconnection System. The crimp-snap connector system is terminated using standard crimp technology. Terminated contacts are snapped into receptacle cavities on 2.50mm centerlines. This system is available in 2 through 14 positions and terminated to 22 to 30 AWG tin-plated wire per UL style 1007. The crimp-snap connector style mates with 0.64mm square posts contained in a header assembly. This system provides a reliable interconnection between wires and printed circuit board traces. This 2.5 MIS C-S II system consists of the following part.

Description	Drawing Number
Receptacle Housing	92009
Receptacle Contact	292034
Header Ass'y	292035, 292056

**1.2 Qualification**

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

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LTR	REVISION RECORD	APP	DATE				
				PAGE 1 OF 11	TITLE METRIC INTERCONNECT SYSTEM (MIS) C-S II CONNECTOR		

2. **APPLICATION DOCUMENTS:**

The following documents form a part of this specification to the extent specified herein. 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 **AMP Documents**

- A. 109-1: General Requirements for Test Specifications
- B. 109 series: Test Specification as indicated in Figure 1 (Comply with MIL-STD-202, MIL-STD-1344 and ETA RS-364)
- C. Corporate Bulletin 401-76: Cross-reference between AMP Test Specifications and Military or Commercial Documents.
- D. 114- 58000 : Application Specification
- E. 501- : 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. Contact:
  - Receptacle contact: Phosphor Bronze, bright tin plating
  - Post Contact: Brass, bright tin-lead over copper plating
- B. Housing:
  - Receptacle Housing: 66 Nylon (UL94V-0)
  - Post Header Housing: 66 Nylon (UL94V-0)

3.3 **Rating**

- A. Voltage: 250 VAC & DC
- B. Operating Temperature: -25 to 105°C
- C. Current: AWG#22 --- 3A  
AWG#24 --- 3A  
AWG#26 --- 3A  
AWG#28 --- 2A  
AWG#30 --- 2A

3.3.1 Applicable wires (Note: for compatibility of the wires for termination, the wires must be evaluated respectively, by the manufacturers, brand, tradenames and product catalog numbers)

- A. Wire Size: #30AWG - #22AWG (0.06mm<sup>2</sup>/0.30mm<sup>2</sup>)
- B. Insulation Diameter: 1.00mm/1.9mm

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### 3.3.2 Applicable Printed Circuit Board

- A. Board Thickness: 1.0mm/1.6mm
- B. Hole Diameter: 0.92mm/1.02mm

### 3.4 Performance and Test Description

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

### 3.5 Test Requirements and Procedures Summary

Para	Test Items	Requirements	Procedures
3.5.1	Confirmation of Product	Product shall be conforming to the requirements of applicable product drawing and Application Specification.	Visually, inspected per applicable quality inspection plan.
<b>Electrical Requirements</b>			
3.5.2	Termination Resistance (Low Level)	10m ohms max. (initial) 20m ohms max (final)	Subject mated contacts assembled in housing to closed circuit current of 10mA max at open circuit voltage of 50mV max Fig 3 AMP Spec 109-6-4
3.5.3	Dielectric Strength	No creeping discharge nor flashover shall occur. Current leakage: 5 mA Max.	1 k VAC for 1 minute. Test between adjacent circuits of mated. AMP Spec 109-29-1
3.5.4	Insulation Resistance	1000 M ohms min.	Impressed voltage 500 V DC Test between adjacent circuits of mated. AMP Spec 109-28-4
3.5.5	Temperature Rising	30°C maximum temperature rise at specified current.	Measure temperature rising by energized current. AMP Spec 109-45-1
<b>Physical Requirements</b>			
3.5.6	Vibration	No discontinuities greater than 1 microsecond. See Note (a)	Subject mated connectors to 10-55-10 Hz traversed in 1 minute at 0.06 inch total excursion. 2 hours in each of 3 mutually perpendicular planes. AMP Spec 109-21-1

Figure 1

<b>AMP</b>	AMP SHANGHAI LTD NO.668 GUI PING ROAD SHANGHAI CHINA TEL: 64850602 FAX: 64850728	PAGE <b>3</b>	NO  108-60007	REV  C	LOC  ES

Para	Test Items	Requirements	Procedures
3.5.7	Physical Shock	No discontinuities greater than 1 microsecond See Note (a)	Subject mated connectors to 50 G's half sine shock pulses of 11 milliseconds duration applies along 3 mutually perpendicular planes, 18 total shocks. AMP Spec 109-26-1
3.5.8	Hammering Shocks	Termination Resistance (Low Level) 20m ohms max (final) No evidence of abnormalities	Subject mated connector to under 10000 cycles of repeated hammering shocks DC 10 V, 1 mA applied. During the test, the circuit shall be monitored for fluctuation of electrical resistance as shown in Fig 4
3.5.9	Connector Mating Force	<p style="text-align: center;"><b>Initial</b></p> <p>a. For P/N 292035</p> <p>2Pos 30.38N (3.1kgf)max 3Pos 34.30N (3.5kgf)max 4Pos 38.22N (3.9kgf)max 5Pos 42.14N (4.3kgf)max 6Pos 46.06N (4.6kgf)max 7Pos 49.98N (5.1kgf)max 8Pos 53.90N (5.5kgf)max 9Pos 57.82N (5.9kgf)max 10Pos 61.74N (6.3kgf)max 11Pos 65.66N (6.7kgf)max 12Pos 69.58N (7.1kgf)max 13Pos 73.50N (7.5kgf)max 14Pos 77.42N (7.9kgf)max</p> <p>b. For 292056</p> <p>2Pos 37.24N (3.8kgf)max 3Pos 40.18N (4.1kgf)max 4Pos 43.12N (4.4kgf)max 5Pos 46.06N (4.7kgf)max 6Pos 49.98N (5.1kgf)max 7Pos 53.90N (5.5kgf)max 8Pos 57.82N (5.9kgf)max</p>	Measure force necessary to mate connector assemblies with detent latches to header using free floating fixtures at rate of 0.5 inch per minute. AMP Spec 109-42 Condition A.

Figure 1 (continue)

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Para	Test Items	Requirements	Procedures
3.5.9	Connector Mating Force	<p style="text-align: center;"><u>After 50 cycles</u></p> <p>a. For P/N 292035</p> <p>2Pos 29.40N (3.0kgf)max  3Pos 32.34N (3.3kgf)max  4Pos 35.28N (3.6kgf)max  5Pos 38.22N (3.9kgf)max  6Pos 41.16N (4.2kgf)max  7Pos 44.10N (4.5kgf)max  8Pos 47.04N (4.8kgf)max  9Pos 49.98N (5.1kgf)max  10Pos 52.92N (5.4kgf)max  11Pos 55.86N (5.7kgf)max  12Pos 58.80N (6.0kgf)max  13Pos 61.74N (6.3kgf)max  14Pos 64.68N (6.6kgf)max</p> <p>b. For P/N 292056</p> <p>2Pos 33.32N (3.4kgf)max  3Pos 36.26N (3.7kgf)max  4Pos 39.20N (4.0kgf)max  5Pos 42.14N (4.3kgf)max  6Pos 45.08N (4.6kgf)max  7Pos 48.02N (4.9kgf)max  8Pos 50.96N (5.2kgf)max</p>	
3.5.10	Connector Unmating Force	<p style="text-align: center;"><u>Initial</u></p> <p>2Pos 8.82N (0.9kgf)min  3Pos 8.82N (0.9kgf)min  4Pos 9.80N (1.0kgf)min  5Pos 9.80N (1.0kgf)min  6Pos 11.76N (1.2kgf)min  7Pos 11.76N (1.2kgf)min  8Pos 13.72N (1.4kgf)min  9Pos 13.72N (1.4kgf)min  10Pos 15.68N (1.6kgf)min  11Pos 15.68N (1.6kgf)min  12Pos 17.64N (1.8kgf)min  13Pos 17.64N (1.8kgf)min  14Pos 19.60N (2.0kgf)min</p>	Measure force necessary to unmate connector assemblies with detent latches from header at rate of 0.5 inch per minute. AMP Spec 109-42 Condition A

Figure 1 (continue)

Para	Test Items	Requirements	Procedures
3.5.10	Connector Unmating Force	<b>After 50 cycles</b> 2Pos 6.86N (0.7kgf)min 3Pos 6.86N (0.7kgf)min 4Pos 7.84N (0.8kgf)min 5Pos 7.84N (0.8kgf)min 6Pos 9.80N (1.0kgf)min 7Pos 9.80N (1.0kgf)min 8Pos 11.76N (1.2kgf)min 9Pos 11.76N (1.2kgf)min 10Pos 12.74N (1.3kgf)min 11Pos 12.74N (1.3kgf)min 12Pos 13.72N (1.4kgf)min 13Pos 14.70N (1.5kgf)min 14Pos 15.68N (1.6kgf)min	
3.5.11	Post Retention Force	22.54N (2.3kgf)min	Apply axial load of 2.3kgf by pushing on the post. Measure post retention force. AMP Spec 109-30
3.5.12	Solderability	Wet Solder Coverage: 95% min	Solder Temperature: 245±5°C Immersion Duration: 3± 1/2 second AMP Spec 109-11-1
3.5.13	Crimp Tensile	AWG30 - 0.5kgf min AWG28 - 1.0kgf min AWG26 - 2.0kgf min AWG24 - 3.0kgf min AWG22 - 5.0kgf min	Apply an axial pull-off load to terminate wire of contact. AMP Spec 109-16
3.5.14	Contact Retention Force	14.7N (1.5kgf)min	Apply axial load of 2 kgf by pulling on terminated contact. AMP Spec 109-30
		<b>Environmental Requirements</b>	
3.5.15	Resistance to Soldering Heat	No physical damage shall occur. See Note (a)	Test connector on PCB. Solder Temperature: 260±5°C Immersion Duration: 10± 1 second AMP Spec 109-63-2
3.5.16	Thermal Shock	20 milliohms maximum final termination resistance, dry circuit See Note (a)	Subject mated connector assemblies on 25 cycles AMP Spec 109-22, -55°C & 85°C

Figure 1 (continue)

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Para	Test Items	Requirements	Procedures
3.5.17	Humidity, Steady State	Insulation resistance (final) 500 M ohms min. Termination resistance 20 M ohms max (final) See Note (a)	Mated connector, 90-95% R.H., 40°C 240 hours AMP Spec 109-23-2 Method II
3.5.18	Salt Spray	20 m ohms max (final)	Subject mated to 5± 1% salt concentration for 48 hours AMP Spec 109-24 Class B
3.5.19	Industrial Gas (SO2)	20 m ohms max (final)	SO2 Gas: 3± 1 ppm, 95% R.H. 40± 2°C, 96 hours
3.5.20	Ammonia	20 m ohms max (final)	28% ammonia solution placed in a desiccator for 40 min.
3.5.21	Temperature Life (Heat Aging)	20 milliohms maximum final termination resistance, dry circuit. See Note (a)	Subject mated connector assemblies to temperature life at 85 °C±2°C for 250 hours. AMP Spec 109-43
3.5.22	Resistance to cold	20 m ohms max (final)	-25°C ± 3°C, 48 hours AMP Spec 109-5108-2 Condition B
3.5.23	Durability (Repeated mate/unmating)	20 m ohms max (final) No evidence of undue plating wear.	No of cycles: 50 cycles AMP Spec 109-27
3.5.24	Humidity - Temperature Cycling	20 milliohms maximum final termination resistance, dry circuit. See Note (a)	Subject mated connector assemblies to 10 humidity-temperature cycles between 25 and 65°C at 95% R.H. AMP Spec 109-23 Method III. Condition B, with cold shock at -10°C, less step 7b.

a) Shall remain mated and show no evidence of damage, cracking or chipping.

Figure 1 (end)

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3.6 Product Qualification and Requalification Test (a)

Test of Examination	Test Group						
	1	2	3	4	5	6	7
	Test Sequence (b)						
Examination of Product	1,11	1,9	1,10	1,9	1,7	1,6	1,3
Termination Resistance Specified Current							
Termination resistance dry circuit	3,10	2,7	4,6	2,4,6,8	2,4,6	2,4	
Dielectric Withstanding Voltage			9,3				
Insulation Resistance			8,2				
Temperature Rise vs Curret		3,8					
Current Cycling							
Voltage Standing Wave Radio							
Permeability							
Corona							
Vibration	8	(c)6					
Physical Shock	9						
Mating Force	2,6						
Unmating Force	4,7						
Contact Insertion Force							
Contact Retention					9		
Crimp Tensile				10			
Durability	5						
Housing Panel Retention							
Housing Lock Strength							
Solderability						2	
Thermal Shock			5				
Humidity - Temperature Cycling		4	7				
Humidity, Steady State				5			
Temperature Life		5					
Hammering Shocks					3		
Post Retention Force					8		
Resistance to Soldering Heat						5	
Salt Spray					5		
Industrial Gas (SO2)				7			
Ammonia						3	
Resistance to Cold				3			

Figure 2

- (a) See paragraph 4.2
- (b) Numbers indicate sequence in which tests are performed
- (c) Discontinuities shall not be measured



#### 4. QUALITY ASSURANCE PROVISIONS

##### 4.1 Qualification Testing

###### A. Sample Selection

Connector assemblies shall be prepared in accordance with applicable specification and shall be selected at random from current production. All test groups shall consist of six (6) connector assemblies (four 2 position and two 14 position). Two 2 position shall consist of contacts terminated with the AWG#22 wire while the other two shall consist of contacts terminated with the AWG#30 wire. The two 14 position connector assemblies shall be each of AWG#22 and #30. Each wire shall consist of solid, stranded and perfused or overcoated wire in accordance with UL style 1007. Stranded wire shall be composed of 7 strands. All wire shall be terminated accordance with AMP Specifications 114-58000.

###### B. Test Sequence

Qualification inspection shall be verified by testing samples as specified in figure 2.

##### 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 development/product, quality and reliability engineering.

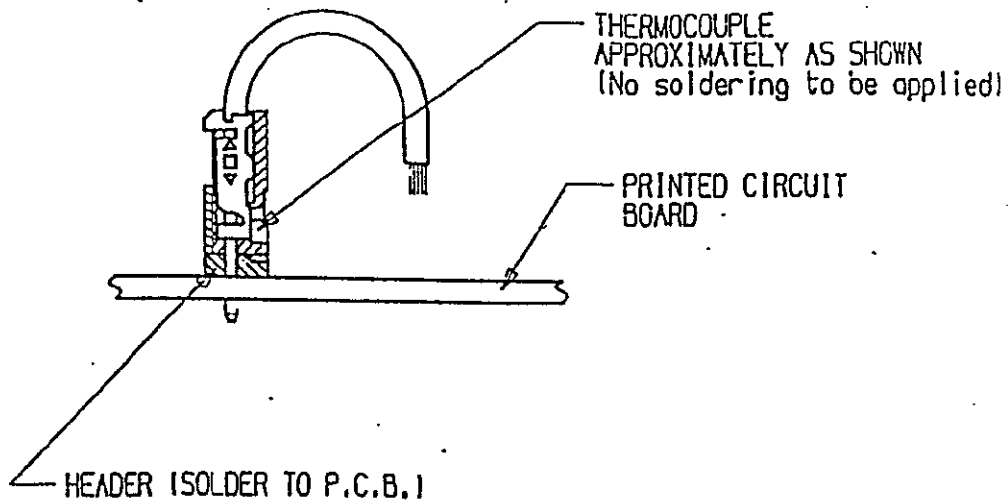
##### 4.3 Acceptance

Acceptance is based on verification that product meets requirements of Figure 1. Failure 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 resubmittal.

##### 4.4 Quality Conformance Inspection

Applicable AMP 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.

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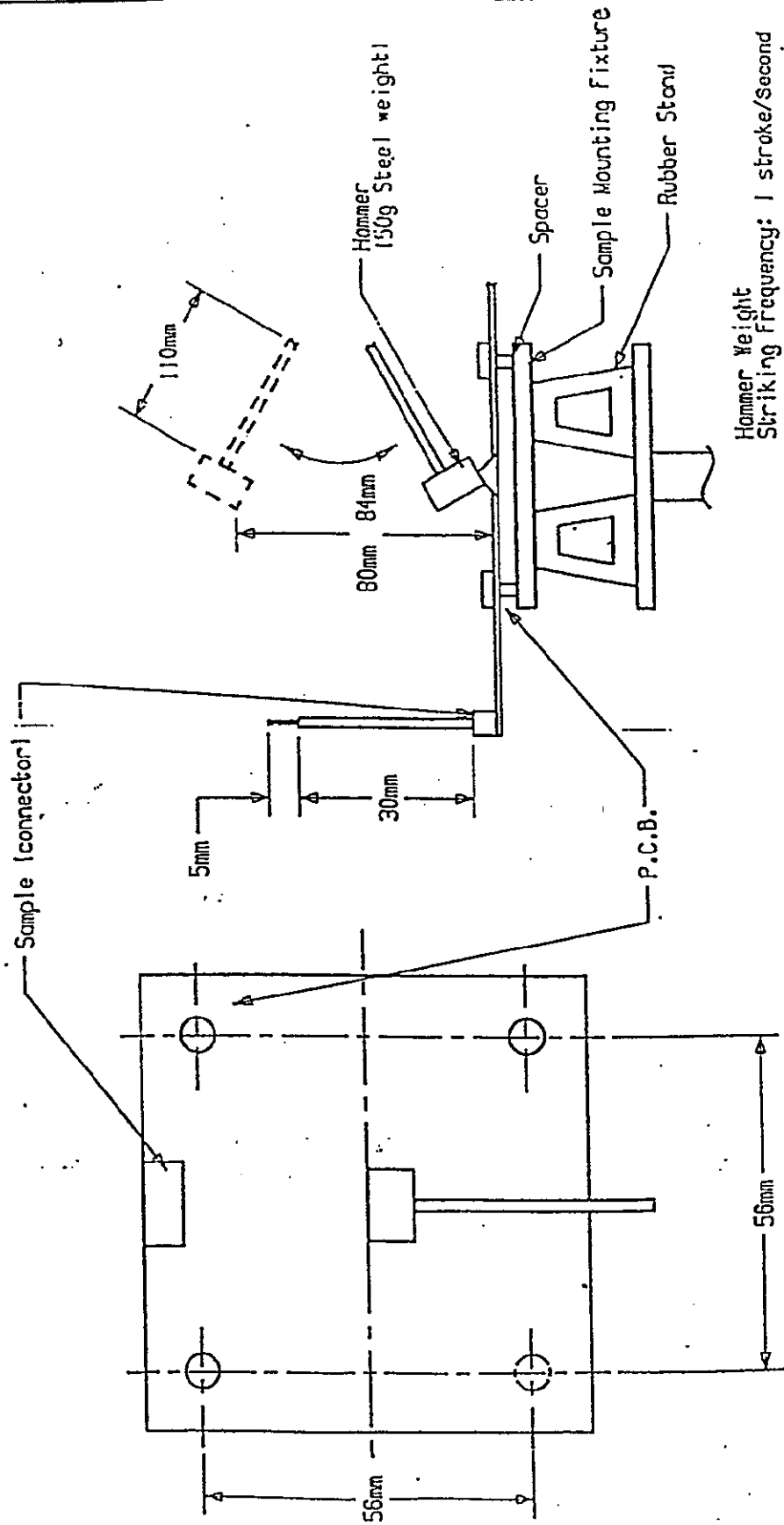


NOTES:

- (1) MEASURE BY 4-WIRE METHOD
- (2) TERMINATION RESISTANCE EQUALS MILLIVOLTS DIVIDED BY TEST CURRENT LESS RESISTANCE OF WIRE.
- (3) AFTER SOLDERING, BOARD AND POSTS SHALL BE CLEANED TO REMOVE ALL FLUX AND CONTAMINANTS.

FIGURE 3  
TEMPERATURE & TERMINATION RESISTANCE MEASUREMENT

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Hammer Weight  
Striking Frequency: 1 stroke/Second

Fig. 4

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