

# PRODUCT SPECIFICATION

## 1. SCOPE

### 1.1. Content

This specification covers the performance, tests and quality requirements for the AMPMODU\* mass terminated, high pressure, interconnection system connector. This preloaded insulation displacement connector consists of AMPMODU receptacles crimped to wire and is intended to mate with .025 square posts.

### 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.

## 2. APPLICABLE 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 Specifications

- A. 109-1: General Requirements for Test Specifications
- B. 109 Series: Test Specifications as indicated in Figure 1. (Comply with MIL-STD-202, MIL-STD-1344 and EIA RS-364)
- C. 114-25017: Connector, AMPMODU, Mass Terminated, High Pressure, Application of

### 2.2. Military Standard

MIL-STD-105: Sampling Procedures and Tables for Inspection by Attributes

### 2.3. Military Specifications

- A. MIL-G-45204: Gold Plating, Electrodeposited
- B. MIL-I-45208: Inspection System Requirements
- C. MIL-M-19887: Molded Plastic, Polyimide Resin, Glass Fiber Filled
- D. MIL-M-20693: Molded Plastic Polyimide
- E. MIL-T-10727: Tin Plating, Electrodeposited

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				DR <i>Fred Reinhardt 3/23/83</i>		<b>AMP</b>   AMP INCORPORATED Harrisburg, Pa.		
				CHK <i>David Miller 3/23/83</i>				
A	Revise per	<i>FR</i>	<i>5/3/86</i>	APP <i>E. J. Lopinski 3/24/83</i>		LOC <b>B</b>	NO <b>A</b>	REV <b>A</b>
	ECN AR-1076					<b>108-25018</b>		
0	Release per	<i>FR</i>	<i>3/25/83</i>	NAME CONNECTOR, INTERCONNECTION SYSTEM, HIGH PRESSURE, MASS TERMINATED, AMPMODU				
	ECN 4929-7			SHEET 1 OF 9				
LTR	REVISION RECORD	APP	DATE					

2.4. Federal Specifications

- A. QQ-B-750: Phosphor Bronze
- B. QQ-N-290: Nickel Plating, Electrodeposited

3. REQUIREMENTS

3.1. Design and Construction

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

3.2. Materials

- A. Terminal: Copper alloy, tin or gold over nickel plated
- B. Housing: Black, glass filled thermoplastic, UL 94V-0
- C. Cover: Black, thermoplastic, UL 94V-0

3.3. Ratings

- A. Current: 3 amperes maximum
- B. Operating Temperature: -65° to 105° C

3.4. Performance and Test Description

Connectors shall be designed to meet the electrical, mechanical and environmental performance requirements specified in Figure 1.

3.5. Test Requirements and Procedures Summary

Test Description	Requirement	Procedure																					
Examination of Product	Meets requirements of product drawing and AMP Spec 114-25017.	Visual, dimensional and functional per applicable inspection plan.																					
<b>ELECTRICAL</b>																							
Termination Resistance, Specified Current	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Wire Size, AWG</th> <th>Test Current, ampere</th> <th>Resistance, milliohms maximum initial</th> </tr> </thead> <tbody> <tr><td>30</td><td>1.0</td><td>12</td></tr> <tr><td>28</td><td>1.5</td><td>12</td></tr> <tr><td>26</td><td>2.0</td><td>12</td></tr> <tr><td>24</td><td>3.0</td><td>12</td></tr> <tr><td>22</td><td>3.0</td><td>12</td></tr> <tr><td>20</td><td>3.0</td><td>12</td></tr> </tbody> </table>	Wire Size, AWG	Test Current, ampere	Resistance, milliohms maximum initial	30	1.0	12	28	1.5	12	26	2.0	12	24	3.0	12	22	3.0	12	20	3.0	12	Measure potential drop of mated contacts assembled in housing, see Figure 3; AMP Spec 109-25, calculate resistance.
Wire Size, AWG	Test Current, ampere	Resistance, milliohms maximum initial																					
30	1.0	12																					
28	1.5	12																					
26	2.0	12																					
24	3.0	12																					
22	3.0	12																					
20	3.0	12																					

Figure 1 (cont)

<b>AMP</b>		AMP INCORPORATED Harrisburg, Pa.	SHEET 2 OF 9
LOC <b>B</b>	NO <b>A</b>	108-25018	REV <b>A</b>
NAME CONNECTOR, INTERCONNECTION SYSTEM, HIGH PRESSURE, MASS TERMINATED, AMPMODU			

Test Description	Requirement	Procedure																					
Termination Resistance, Dry Circuit (Low Level)	12 milliohms maximum.	Subject mated contacts assembled in housing to 50 mv open circuit at 100 ma maximum, see Figure 3; AMP Spec 109-6, cond A.																					
Crimp Resistance	<p>Resistance, milliohms maximum</p> <table border="1"> <thead> <tr> <th>Wire Size, AWG</th> <th>Test Current, amperes</th> <th>initial</th> </tr> </thead> <tbody> <tr> <td>30</td> <td>1.0</td> <td>7.0</td> </tr> <tr> <td>28</td> <td>1.5</td> <td>7.0</td> </tr> <tr> <td>26</td> <td>2.0</td> <td>5.0</td> </tr> <tr> <td>24</td> <td>3.0</td> <td>4.0</td> </tr> <tr> <td>22</td> <td>3.0</td> <td>3.0</td> </tr> <tr> <td>20</td> <td>3.0</td> <td>3.0</td> </tr> </tbody> </table> <p><math>\Delta R = 2</math> milliohms maximum.</p>	Wire Size, AWG	Test Current, amperes	initial	30	1.0	7.0	28	1.5	7.0	26	2.0	5.0	24	3.0	4.0	22	3.0	3.0	20	3.0	3.0	Measure potential drop of crimp as indicated in Figure 3, after temperature of wire has stabilized to current indicated; AMP Spec 109-25, calculate crimp resistance.
Wire Size, AWG	Test Current, amperes	initial																					
30	1.0	7.0																					
28	1.5	7.0																					
26	2.0	5.0																					
24	3.0	4.0																					
22	3.0	3.0																					
20	3.0	3.0																					
Dielectric Withstanding Voltage	<table border="1"> <thead> <tr> <th>Test Voltage AC (rms)</th> <th>Altitude Feet</th> </tr> </thead> <tbody> <tr> <td>.100 &amp; .125</td> <td>Sea Level</td> </tr> <tr> <td>750</td> <td>50,000</td> </tr> <tr> <td>300</td> <td>70,000</td> </tr> <tr> <td>275</td> <td></td> </tr> </tbody> </table> <p>No breakdown or flashover.</p>	Test Voltage AC (rms)	Altitude Feet	.100 & .125	Sea Level	750	50,000	300	70,000	275		Test between adjacent contacts of mated connector assemblies; AMP Spec 109-29-1.											
Test Voltage AC (rms)	Altitude Feet																						
.100 & .125	Sea Level																						
750	50,000																						
300	70,000																						
275																							
Insulation Resistance	5000 megohms minimum initial.	Test between adjacent contacts of mated connector assembly; AMP Spec 109-28-4.																					
Current Cycling	Termination resistance, see Figure 3.	Subject mated contacts to 50 cycles at 125% specified current for 30 minutes "ON" - 15 minutes "OFF"; AMP Spec 109-51, cond B, test method 3.																					

Figure 1 (cont)

SHEET <u>3</u> OF <u>9</u>	<b>AMP</b>		AMP INCORPORATED Harrisburg, Pa.	
	LOC <b>B</b>	NO <b>A</b>	108-25018	
REV <b>A</b>				
NAME CONNECTOR, INTERCONNECTION SYSTEM, HIGH PRESSURE, MASS TERMINATED, AMPMODU				

Test Description	Requirement	Procedure
<b>MECHANICAL</b>		
Vibration (a)	No discontinuities greater than 1 microsecond.	Subject mated connectors to 15 G's, 10-2000 Hz with 100 ma current applied; AMP Spec 109-21-3, cond C.
Physical Shock (a)	No discontinuities greater than 1 microsecond.	Subject mated connector to 100 G's sawtooth in 6 milliseconds; 3 shocks in each direction applied along 3 mutually perpendicular planes total 18 shocks; AMP Spec 109-26-9, cond I.
Mating Force	26 ounces maximum initial.	Measure force necessary to mate connector, during third mating, a distance of .070 from point of initial contact, incorporating free floating fixtures at a rate of 0.5 inch/minute; AMP Spec 109-42, cond A. Calculate force per contact.
Unmating Force	5.0 ounces minimum final.	Measure force necessary to unmate connector, after third mating, at a rate of 0.5 inch/minute; AMP Spec 109-42, cond A, calculate force per contact.
Contact Retention	5 pounds minimum per contact.	Apply axial load of 5 pounds to crimped contacts; AMP Spec 109-30.
Contact Engaging Force	26 ounces maximum per contact.	Measure force to engage during third engagement, using gage 1, as indicated in Figure 4; AMP Spec 109-35, engagement depth .070 inches.

Figure 1 (cont)

<b>AMP</b>		AMP INCORPORATED Harrisburg, Pa.	SHEET <u>4</u> OF <u>9</u>
LOC <b>B</b>	NO <b>A</b>	<b>108-25018</b>	REV <b>A</b>
NAME CONNECTOR, INTERCONNECTION SYSTEM, HIGH PRESSURE, MASS TERMINATED, AMPMODU			

Test Description	Requirement	Procedure																											
Contact Separating Force	5.0 ounces minimum per contact.	Size 3 times using gage 1, as indicated in Figure 4, insert gage 2 and measure force to separate; AMP Spec 109-35, separation depth .070 inches.																											
Crimp Tensile (b)	<table border="1"> <thead> <tr> <th>Slot Number &amp; Color I.D.</th> <th>Wire Size, AWG</th> <th>Tensile, pounds minimum</th> </tr> </thead> <tbody> <tr> <td></td> <td>30</td> <td>2.0</td> </tr> <tr> <td>4</td> <td>28</td> <td>3.0</td> </tr> <tr> <td>Yellow</td> <td>26</td> <td>3.5</td> </tr> <tr> <td></td> <td>26</td> <td>2.5</td> </tr> <tr> <td>5</td> <td>24</td> <td>7.0</td> </tr> <tr> <td>White</td> <td>22</td> <td>6.0</td> </tr> <tr> <td>6</td> <td>22</td> <td>4.5</td> </tr> <tr> <td>Green</td> <td>20</td> <td>9.5</td> </tr> </tbody> </table>	Slot Number & Color I.D.	Wire Size, AWG	Tensile, pounds minimum		30	2.0	4	28	3.0	Yellow	26	3.5		26	2.5	5	24	7.0	White	22	6.0	6	22	4.5	Green	20	9.5	Determine crimp tensile at a rate of 1 inch/minute; AMP Spec 109-16.
Slot Number & Color I.D.	Wire Size, AWG	Tensile, pounds minimum																											
	30	2.0																											
4	28	3.0																											
Yellow	26	3.5																											
	26	2.5																											
5	24	7.0																											
White	22	6.0																											
6	22	4.5																											
Green	20	9.5																											
Durability	Mating-unmating; 12 milliohms maximum termination resistance, dry circuit.	Mate and unmate connector assemblies for 50 cycles; AMP Spec 109-27.																											
<b>ENVIRONMENTAL</b>																													
Thermal Shock (a)	Dielectric withstanding voltage; 12 milliohms maximum termination resistance, dry circuit.	Subject mated connectors to 5 cycles between -65° and 105° C; AMP Spec 109-22.																											
Temperature-Humidity Cycling	1000 megohms final insulation resistance, 12 milliohms maximum termination resistance, dry circuit; dielectric withstanding voltage.	Subject mated connectors to 10 temperature-humidity cycles between 25° and 65° C at 95% RH; AMP Spec 109-23, method III, cond B, with cold shock at -10° C, less step 7b.																											
Corrosion, Salt Spray	12 milliohms maximum termination resistance, dry circuit and specified current.	Subject mated connectors to 5% salt concentration for 48 hours; AMP Spec 109-24, cond B.																											

Figure 1 (cont)

SHEET 5 OF 9	<b>AMP</b>		AMP INCORPORATED Harrisburg, Pa.	
	LOC <b>B</b>	A	NO <b>108-25018</b>	REV <b>A</b>
NAME CONNECTOR, INTERCONNECTION SYSTEM, HIGH PRESSURE, MASS TERMINATED, AMPMODU				

Test Description	Requirement	Procedure
Corrosion, Industrial Gas	12 milliohms maximum termination resistance, dry circuit and specified current.	Subject mated connectors to 1% solution, 24 hours; AMP Spec 109-37, method 2.
Temperature Life (a)	12 milliohms maximum termination resistance, dry circuit and specified current.	Subject mated connectors to temperature life, AMP Spec 109-43, test level 9, test duration I.

- (a) Shall remain mated and show no evidence of damage, cracking or chipping.  
(b) Slot number is stamped on terminal.

Figure 1 (end)

### 3.6. Connector Tests and Sequences

Test or Examination	Test Group (a)			
	1	2	3	4
	Test Sequence (b)			
Examination of Product	1	1	1	1
Termination Resistance, Specified Current (c)	4, 13	5, 12, 17, 20	3, 6	
Termination Resistance, Dry Circuit (c)	3, 8, 12	4, 11, 16, 19	2, 5	
Crimp Resistance				2, 4
Dielectric Withstanding Voltage	7	7, 14		
Insulation Resistance		6, 13		
Current Cycling				3
Vibration		8		
Physical Shock		9		
Mating Force	2, 10			
Unmating Force	5, 11			
Contact Retention		21		
Contact Engaging Force		2		
Contact Separating Force		3		
Crimp Tensile				5
Durability	9			
Thermal Shock	6			
Temperature-Humidity Cycling		10		
Corrosion, Salt Spray		15		
Corrosion, Industrial Gas		18		
Temperature Life			4	

(a) See Para 4.1.A.

(b) Numbers indicate sequence in which tests are performed.

(c) Termination resistance equals millivolts divided by test current less resistance of 1 inch of wire.

<b>AMP</b>		AMP INCORPORATED Harrisburg, Pa.		<b>SHEET</b>	
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LOC B	NO A	108-25018		REV A	
NAME CONNECTOR, INTERCONNECTION SYSTEM, HIGH PRESSURE, MASS TERMINATED, AMPMODU					

Figure 2

#### 4. QUALITY ASSURANCE PROVISIONS

##### 4.1. Qualification Testing

###### A. Sample Selection

Current housings and contacts shall be prepared in accordance with applicable Instruction Sheets. They shall be selected at random from current production. Test group 1, 2 and 3 shall consist of two 20 position connectors crimped to a nominal wire size. Test group 4 shall consist of a minimum of 30 contacts crimped to each AWG wire size, 20, 22, 24, 26, 28 and 30. All contacts shall be crimped in accordance with AMP Specification 114-25017.

###### B. Test Sequence

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

###### C. Acceptance

- (1) All samples tested in accordance with this specification shall meet the stated tolerance limit.
- (2) Failures attributed to equipment, test setup, or operator deficiencies shall not disqualify the product. When product failure occurs, corrective action shall be taken and samples resubmitted for qualification.

##### 4.2. Quality Conformance Inspection

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

SHEET 7 OF 9	<b>AMP</b>		AMP INCORPORATED Harrisburg, Pa.	
	LOC B	A	NO 108-25018	REV A
NAME CONNECTOR, INTERCONNECTION SYSTEM, HIGH PRESSURE, MASS TERMINATED, AMPMODU				

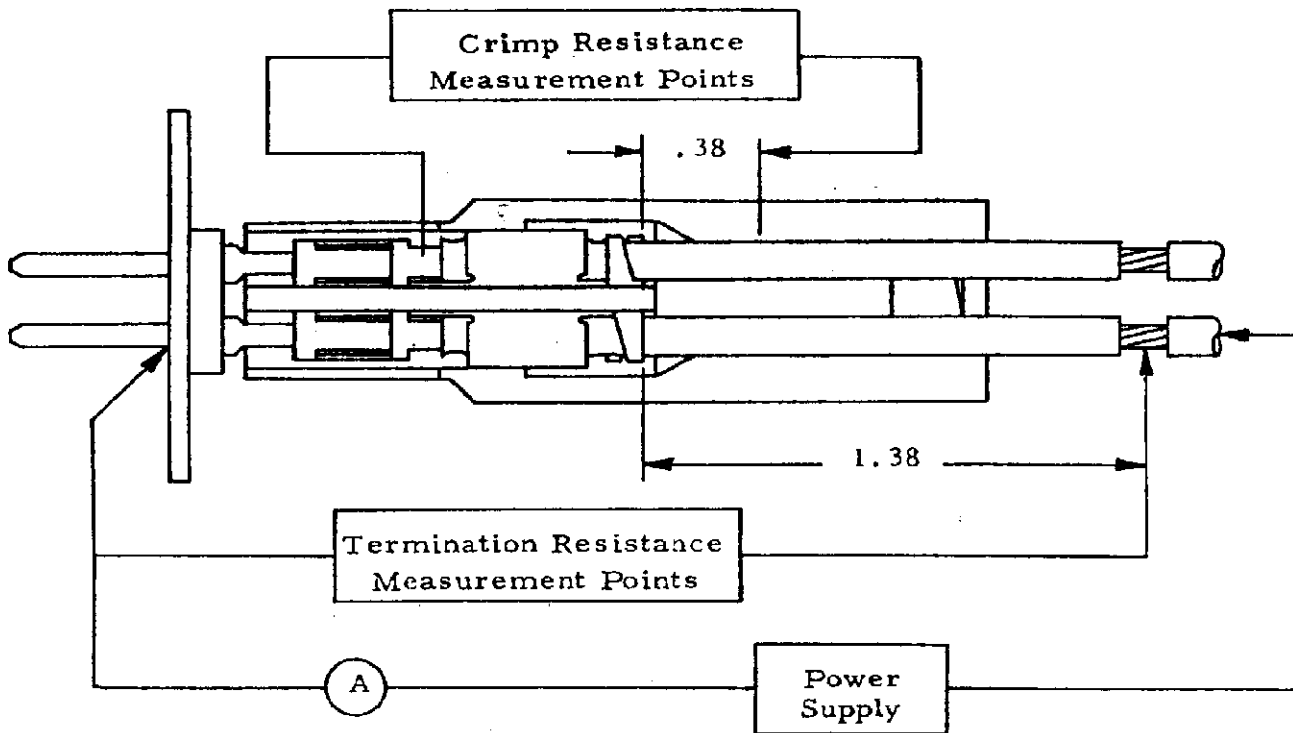
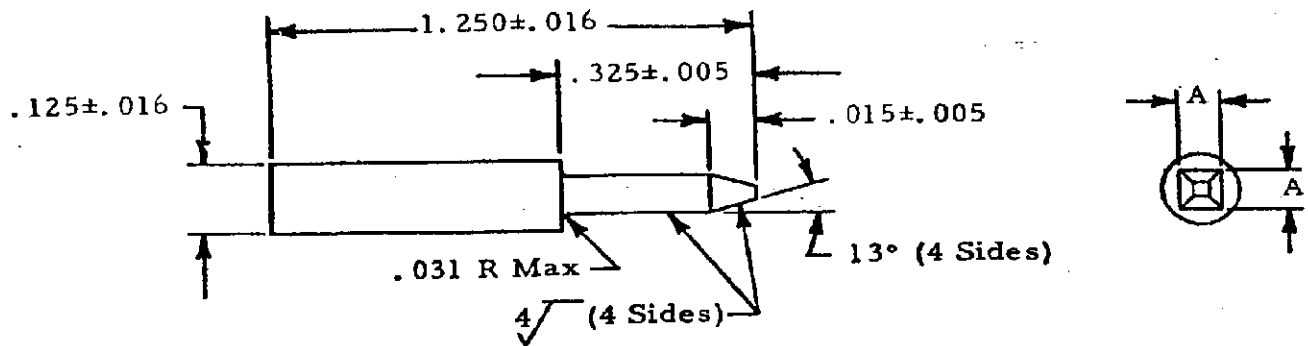


Figure 3  
Resistance Measurement Points

<b>AMP</b>		AMP INCORPORATED Harrisburg, Pa.		<b>SHEET</b>	
				<b>8 OF 9</b>	
LOC <b>B</b>	NO <b>A</b>	<b>108-25018</b>		REV <b>A</b>	
NAME CONNECTOR, INTERCONNECTION SYSTEM, HIGH PRESSURE, MASS TERMINATED, AMPMODU					





Gage	A
1	.0260 +.0000 -.0005
2	.0240 +.0005 -.0000

- Notes: 1. Tolerance:  $\pm .005$  or  $\pm 2^\circ$  as applicable, unless otherwise specified.  
 2. Material: Tool steel, AISI type 02 per AMP Specification 100-15.  
 3. Heat treat: Rockwell C 50-55.  
 4. Gage surface shall be clean of contaminants or lubricants.

Figure 4  
Engaging and Separation Gages

SHEET 9 OF 9	AMP   AMP INCORPORATED Harrisburg, Pa.		
	LOC B	A	NO 108-25018
REV A			
NAME CONNECTOR, INTERCONNECTION SYSTEM, HIGH PRESSURE, MASS TERMINATED, AMPMODU			