

# PRODUCT SPECIFICATION

## 1. SCOPE

### 1.1. Content

This specification covers the performance, tests and quality requirements for the AMPMODU\* mass terminated interconnection system. 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. 114-25015: Connector AMPMODU, Mass Terminated, Application of

### 2.2. Federal Specifications

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

### 2.3. Military Standard

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

\*Trademark of AMP Incorporated.

© COPYRIGHT 1980 BY AMP INCORPORATED, HARRISBURG, PA. ALL INTERNATIONAL RIGHTS RESERVED. AMP INCORPORATED PRODUCTS COVERED BY U.S. AND FOREIGN PATENTS AND/OR PATENTS PENDING.

				DR <i>Fred R. ...</i> 7/12/80 CHK <i>...</i> 7/15/80 APP <i>...</i> 7/15/80		<b>AMP</b>   AMP INCORPORATED Harrisburg, Pa.		
				LOC B	NO A	108-25015		REV B
				NAME /				
B Rev Figure 1 <i>FR</i> 3-16 A Rev Figure 1 <i>FR</i> 1-27 LTR REVISION RECORD APP DATE				SHEET 1 OF 8		CONNECTOR, AMPMODU (MASS TERMINATED) STANDARD PRESSURE		

## 2.4. Military Specifications

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

## 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
- B. Housing: Black, glass filled thermoplastic 94V-0
- C. Cover: Black, glass filled thermoplastic 94V-0

### 3.3. Ratings

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

### 3.4. Performance and Test Description

Connector assemblies 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 114-25015.	Visual, dimensional and functional per applicable inspection plan.														
ELECTRICAL																
Termination Resistance, Rated Current	12 milliohms maximum initial. Wire Size, Test Current <table><tr><td>AWG</td><td>ampere</td></tr><tr><td>30</td><td>1.0</td></tr><tr><td>28</td><td>1.5</td></tr><tr><td>26</td><td>2.0</td></tr><tr><td>24</td><td>3.0</td></tr><tr><td>22</td><td>3.0</td></tr><tr><td>20</td><td>3.0</td></tr></table>	AWG	ampere	30	1.0	28	1.5	26	2.0	24	3.0	22	3.0	20	3.0	Measure potential drop of mated contacts assembled in housing, see Figure 3; AMP Spec 109-25, calculate resistance.
AWG	ampere															
30	1.0															
28	1.5															
26	2.0															
24	3.0															
22	3.0															
20	3.0															

Figure 1 (cont)

<b>AMP</b>		AMP INCORPORATED Harrisburg, Pa.		<b>SHEET</b> <u>2</u> OF <u>8</u>	
LOC <b>B</b>	<b>A</b>	NO <b>108-25015</b>	REV <b>B</b>		
NAME CONNECTOR, AMPMODU MASS TERMINATED STANDARD PRESSURE					

Test Description	Requirement	Procedure																								
Termination Resistance, Dry Circuit (low level)	12 milliohms maximum initial.	Subject mated contacts assembled in housing to 50 mv open circuit at 100 ma maximum, see Figure 3; AMP Spec 109-6, cond A.																								
Dielectric Withstanding Voltage	Test Voltage ac rms Altitude .100 & .125 CL      Feet 750      Sea Level 300      50,000 275      70,000 No breakdown or flashover.	Test between adjacent contacts of mated connector assemblies; AMP Spec 109-29-1.																								
Insulation Resistance	5000 megohms minimum initial.	Test between adjacent contacts of mated connector assembly; AMP Spec 109-28-4.																								
Current Cycling	Crimp resistance, see Figure 3. $\Delta R = 2$ milliohms maximum.	Subject mated contacts to 50 cycles at 125% rated current for 30 minutes "ON" - 15 minutes "OFF"; AMP Spec 109-51, cond B; test method 3.																								
Crimp Resistance	Resistance, milliohms Wire Test      maximum Size, Current,      initial AWG      amperes 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 $\Delta R = 2$ milliohms maximum.	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.																								
MECHANICAL																										
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.																								
Figure 1 (cont)		<table><tr><td colspan="2">SHEET</td><td colspan="2">AMP</td><td colspan="2">AMP INCORPORATED Harrisburg, Pa.</td></tr><tr><td colspan="2">3 OF 8</td><td>LOC</td><td>NO</td><td colspan="2">REV</td></tr><tr><td colspan="2"></td><td>B</td><td>A</td><td colspan="2">108-25015 B</td></tr><tr><td colspan="2"></td><td colspan="4">NAME CONNECTOR, AMPMODU MASS TERMINATED STANDARD PRESSURE</td></tr></table>	SHEET		AMP		AMP INCORPORATED Harrisburg, Pa.		3 OF 8		LOC	NO	REV				B	A	108-25015 B				NAME CONNECTOR, AMPMODU MASS TERMINATED STANDARD PRESSURE			
SHEET		AMP		AMP INCORPORATED Harrisburg, Pa.																						
3 OF 8		LOC	NO	REV																						
		B	A	108-25015 B																						
		NAME CONNECTOR, AMPMODU MASS TERMINATED STANDARD PRESSURE																								

Test Description	Requirement	Procedure
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 the 3 mutually perpendicular planes total 18 shocks; AMP Spec 109-26-9, cond I.
Mating Force	9.0 ounces maximum initial.	Measure force necessary to mate connector, a distance of .070 inch 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. Measure force after third mating.
Unmating Force	1.5 ounces minimum final.	Measure force necessary to unmate connector assembly, 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	9.0 ounces maximum per contact.	Measure force to engage using gage 1, as indicated in Figure 4, AMP Spec 109-35, engagement depth .070 inch; measure force after third mating.
Contact Separating Force	1.5 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 inch.

Figure 1 (cont)

<b>AMP</b>		AMP INCORPORATED Harrisburg, Pa.		<b>SHEET</b> 4 OF 8	
LOC <b>B</b>	<b>A</b>	NO <b>108-25015</b>	REV <b>B</b>		
NAME CONNECTOR, AMPMODU MASS TERMINATED STANDARD PRESSURE					

Test Description	Requirement	Procedure																														
Crimp Tensile (b)	<table> <tr> <th>Slot Number &amp; Color I. D.</th><th>Wire Size, AWG</th><th>Tensile, pounds minimum</th></tr> <tr> <td></td><td>30</td><td>2.0</td></tr> <tr> <td>1</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>2</td><td>24</td><td>7.0</td></tr> <tr> <td>White</td><td>22</td><td>6.0</td></tr> <tr> <td></td><td>22</td><td>4.5</td></tr> <tr> <td>3</td><td>20</td><td>9.5</td></tr> <tr> <td>Green</td><td></td><td></td></tr> </table>	Slot Number & Color I. D.	Wire Size, AWG	Tensile, pounds minimum		30	2.0	1	28	3.0	Yellow	26	3.5		26	2.5	2	24	7.0	White	22	6.0		22	4.5	3	20	9.5	Green			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																														
1	28	3.0																														
Yellow	26	3.5																														
	26	2.5																														
2	24	7.0																														
White	22	6.0																														
	22	4.5																														
3	20	9.5																														
Green																																
Durability	Mating-unmating; 12 milliohms maximum resistance, dry circuit.	Mate and unmate connector assemblies for 200 cycles; AMP Spec 109-27.																														
ENVIRONMENTAL																																
Thermal Shock (a)	Dielectric withstanding voltage; 12 milliohms maximum termination resistance, dry circuit. $\Delta R = 2$ milliohms maximum.	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, and cold shock at -10° C, less step 7b.																														
Corrosion, Salt Spray	Termination resistance, dry circuit and rated current.	Subject mated connectors to 5% salt concentration for 48 hours; AMP Spec 109-24, cond B.																														
Corrosion, Industrial Gas	Termination resistance, dry circuit and rated current.	Subject mated connectors to 1% solution, 24 hours; AMP Spec 109-37, method 2.																														

Figure 1 (cont)

SHEET <u>5</u> OF <u>8</u>	<b>AMP</b>		AMP INCORPORATED Harrisburg, Pa.	
	LOC <b>B</b>	A	NO <b>108-25015</b>	REV <b>B</b>
NAME CONNECTOR, AMPMODU MASS TERMINATED STANDARD PRESSURE				

Test Description	Requirement	Procedure
Temperature Life (a)	Meet termination resistance, dry circuit and rated current. 12 milliohms maximum.	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, Rated Current (c)	4, 13	5, 12, 17, 20	3, 6	
Termination Resistance, Dry Circuit (c)	3, 8, 12	4, 11, 16, 19	2, 5	
Dielectric Withstanding Voltage	7	7, 14		
Insulation Resistance		6, 13		
Current Cycling				3
Crimp Resistance				2, 4
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.

Figure 2

<b>AMP</b>		AMP INCORPORATED Harrisburg, Pa.		<b>SHEET</b>	
				<b>6 OF 8</b>	
OC B	NO A	108-25015		REV B	
NAME CONNECTOR, AMPMODU MASS TERMINATED STANDARD PRESSURE					

#### 4. QUALITY ASSURANCE PROVISIONS

##### 4.1. Qualification Testing

###### A. Sample Section

Connector housings and contacts shall be prepared in accordance with applicable Instruction Sheets. They shall be selected at random from current production. Test groups 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 114-25015.

###### B. Test Sequence

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

##### 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.

##### 4.3. Quality Assurance Requirements

Product manufacture shall be controlled by an inspection system at least equivalent to the requirements of MIL-I-45208 to assure the delivered product to be within 1.0 AQL when inspected in accordance with MIL-STD-105, Normal Sampling, Inspection Level II.

SHEET <u>7 OF 8</u>	<b>AMP</b>   AMP INCORPORATED Harrisburg, Pa.		
	LOC <b>B</b>	NO <b>A</b>	REV <b>B</b>
NAME CONNECTOR, AMPMODU MASS TERMINATED STANDARD PRESSURE			

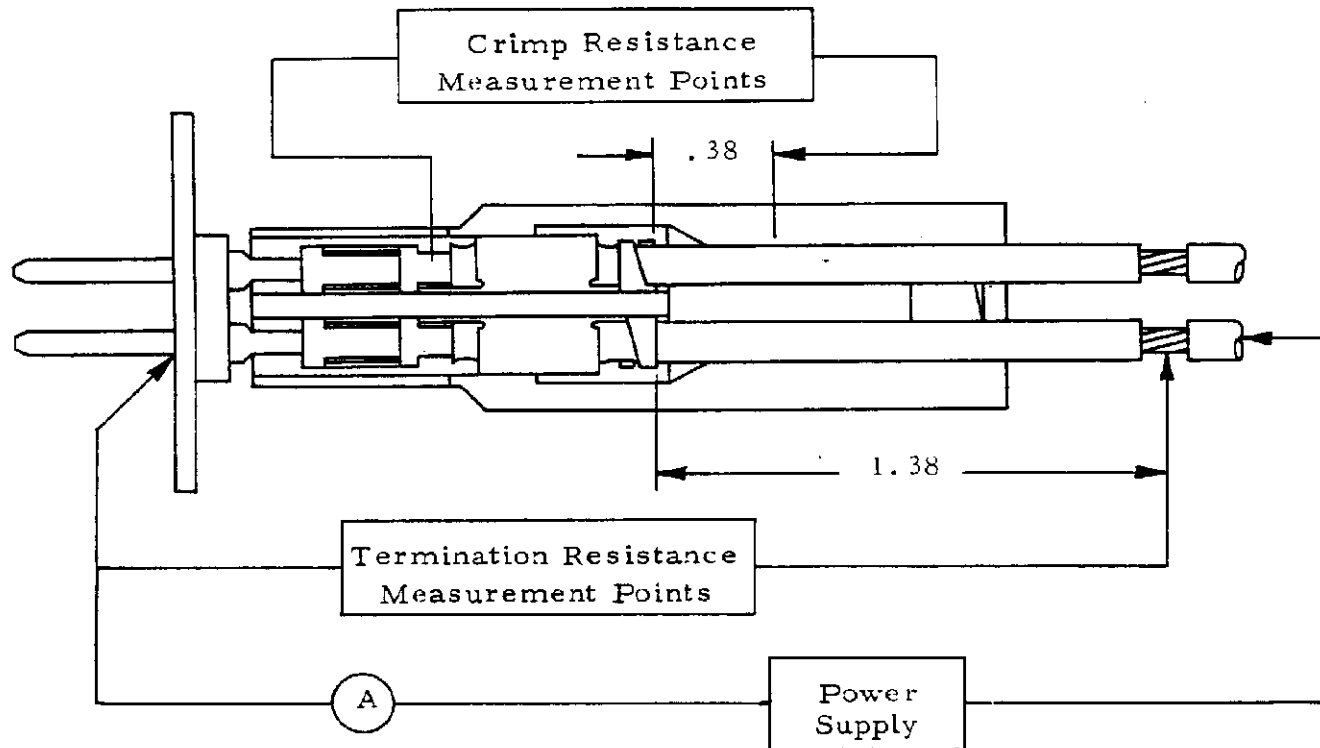
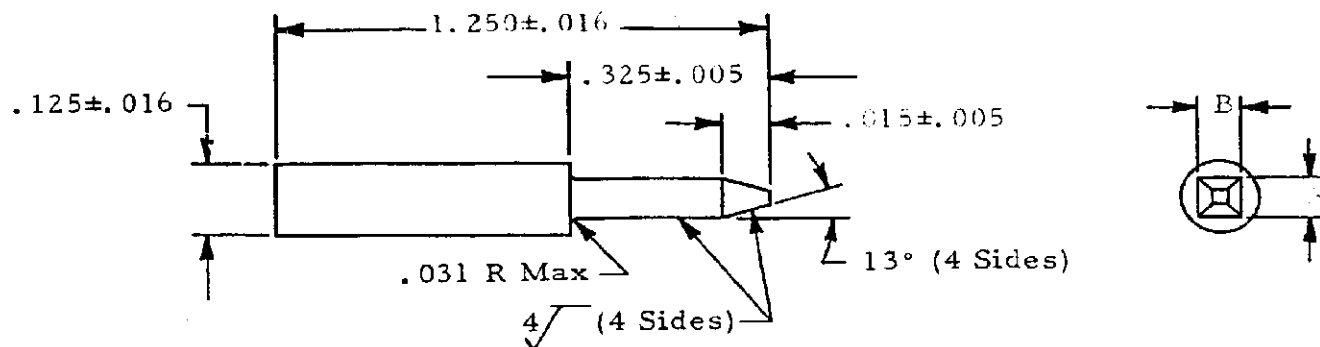


Figure 3  
Resistance and Temperature Measurement Points



- 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.

Gage	A	B
1	.0260 $^{+.0000}_{-.0001}$	.0260 $^{+.0000}_{-.0001}$
2	.0240 $^{+.0001}_{-.0000}$	.0240 $^{+.0001}_{-.0000}$

Figure 4  
Engaging and Separating Gages

<b>AMP</b>		AMP INCORPORATED Harrisburg, Pa.		<b>SHEET</b> 8 OF 8	
LOC B	A	NO 108-25015	REV B		
NAME CONNECTOR, AMPMODU MASS TERMINATED STANDARD PRESSURE					