

PRODUCT SPECIFICATION

1. SCOPE

1.1. Content

This specification covers the performance, test and quality requirements for the AMPLIMITE* HDP-22 subminiature D connectors with removable F crimp contacts for 22 thru 28 AWG. The assembly consists of a two piece plastic housing which has integral plastic retention tines and two metal shells which secure the housing components.

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 Documents

- 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. Corporate Bulletin 401-76: Cross-reference between AMP Test Specifications and Military or Commercial Documents
- D. 114-10001 : Application Specification
- E. 501-156 : Test Report
- F. 27280: Gage Pin, Engagement Test, Socket Contact

3. REQUIREMENTS

3.1. Design and Construction

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

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Product Code: 5889

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		APP <i>David M. Helton</i> 8/22/91		NO 108-1268	REV 0
0	Release per ECN BD-5403	<i>FR</i>	8/23 90	TITLE CONNECTOR, AMPLIMITE HDP-22, SUBMINIATURE D CONNECTOR, WITH REMOVABLE F CRIMP CONTACTS	
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3.2. Material

- A. Contact:
 - (1) Pin: Brass
 - (2) Socket: Phosphor bronze
- B. Housing: Thermoplastic, glass filled, UL 94V-0

3.3. Ratings

- A. Voltage: 250 vac
- B. Current: Fully loaded and energized connectors
 - (1) 22 AWG, 1.9 amperes
 - (2) 26 AWG, 1.1 amperes
 - (3) 28 AWG, .95 amperes
- C. Temperature: -55° to 105°C

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 temperature unless otherwise specified.

3.5. Test Requirements and Procedures Summary

Test Description	Requirement	Procedure												
Examination of Product	Meets requirements of product drawing and AMP Spec 114-10001.	Visual, dimensional and functional per applicable quality inspection plan.												
ELECTRICAL														
Termination Resistance, Specified Current	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Wire Size AWG</th> <th>Test current ampere</th> <th>Resistance maximum milliohms</th> </tr> </thead> <tbody> <tr> <td>22</td> <td>1.9</td> <td>15</td> </tr> <tr> <td>26</td> <td>1.1</td> <td>15</td> </tr> <tr> <td>28</td> <td>.95</td> <td>15</td> </tr> </tbody> </table>	Wire Size AWG	Test current ampere	Resistance maximum milliohms	22	1.9	15	26	1.1	15	28	.95	15	Measure potential drop of mated contacts assembled in housing, see Figure 4; AMP Spec 109-25, calculate resistance.
Wire Size AWG	Test current ampere	Resistance maximum milliohms												
22	1.9	15												
26	1.1	15												
28	.95	15												
Termination Resistance, Dry Circuit	15 milliohms maximum	Subject mated contacts assembled in housing to 50 mv open circuit at 100 ma maximum, see Figure 4; AMP Spec 109-6-1.												
Dielectric Withstanding Voltage	1.0 kvac dielectric withstanding voltage, one minute hold. 1.0 milliampere maximum leakage current.	Test between adjacent contacts of unmated connector assemblies; AMP Spec 109-29-1.												
Insulation Resistance	5000 megohms minimum initial. 500 megohms minimum final.	Test between adjacent contacts of unmated connector assembly; AMP Spec 109-28-4												

Figure 1 (cont)

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Test Description	Requirement	Procedure																								
Temperature Rise vs Current	Maximum temperature rise at specified current, 30°C. Reference Para 3.3.B at a max. ambient of 70°C.	Measure temperature rise vs current; AMP Spec 109-45-1.																								
MECHANICAL																										
Vibration Random	No discontinuities greater than 1 microsecond. See note (a).	Subject mated connectors to 20 G rms with 100 ma. current applied AMP Spec 109-21-5, test level F. See Figure 3, 20 minutes each axis																								
Physical Shock	No discontinuities greater than 1 microsecond. See note (a).	Subject mated connector to 50 G's half-sine shock pulses of 11 milliseconds duration; 3 shocks in each direction applied along the 3 mutually perpendicular planes total 18 shocks, see Figure 3; AMP Spec 109-26-1.																								
Mating Force	See note (b). <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Size</th> <th>Number of Positions</th> <th>W/O Grd.</th> <th>With Grd. Indents</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>15</td> <td>5.6</td> <td>33</td> </tr> <tr> <td>2</td> <td>26</td> <td>9.8</td> <td>38</td> </tr> <tr> <td>3</td> <td>44</td> <td>16.5</td> <td>46</td> </tr> <tr> <td>4</td> <td>62</td> <td>23.3</td> <td>52</td> </tr> <tr> <td>5</td> <td>78</td> <td>29.3</td> <td>58</td> </tr> </tbody> </table> <p>pounds maximum.</p>	Size	Number of Positions	W/O Grd.	With Grd. Indents	1	15	5.6	33	2	26	9.8	38	3	44	16.5	46	4	62	23.3	52	5	78	29.3	58	Measure force necessary to mate connector assembly incorporated free floating fixtures at a rate of 1 inch/minute; AMP Spec 109-42, cond A.
Size	Number of Positions	W/O Grd.	With Grd. Indents																							
1	15	5.6	33																							
2	26	9.8	38																							
3	44	16.5	46																							
4	62	23.3	52																							
5	78	29.3	58																							
Unmating Force	See note (b). <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Size</th> <th>Number of Positions</th> <th>W/O Grd.</th> <th>With Grd. Indents</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>15</td> <td>5.6</td> <td>33</td> </tr> <tr> <td>2</td> <td>26</td> <td>9.8</td> <td>38</td> </tr> <tr> <td>3</td> <td>44</td> <td>16.5</td> <td>46</td> </tr> <tr> <td>4</td> <td>62</td> <td>23.3</td> <td>52</td> </tr> <tr> <td>5</td> <td>78</td> <td>29.3</td> <td>58</td> </tr> </tbody> </table> <p>pounds maximum.</p>	Size	Number of Positions	W/O Grd.	With Grd. Indents	1	15	5.6	33	2	26	9.8	38	3	44	16.5	46	4	62	23.3	52	5	78	29.3	58	Measure force necessary to unmate connector assembly at a rate of 1 inch/minute; AMP Spec 109-42, cond A.
Size	Number of Positions	W/O Grd.	With Grd. Indents																							
1	15	5.6	33																							
2	26	9.8	38																							
3	44	16.5	46																							
4	62	23.3	52																							
5	78	29.3	58																							
Contact Insertion Force	3 pounds maximum per contact.	Measure force to insert contact into housing; AMP Spec 109-41.																								

Figure 1 (cont)

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Test Description	Requirement	Procedure										
Contact Retention	Contacts shall not dislodge from the connector housing.	Apply axial load of 5 pounds to contacts, AMP Spec 109-30.										
Contact Engaging Force	8 ounces maximum per contact.	Measure force using gage A, as indicated in Figure 5; AMP Spec 109-35, engagement depth .200.										
Contact Separating Force	0.75 ounces minimum per contact.	Size 2 times using gage A, as indicated in Figure 5, insert gage B and measure force to separate; AMP Spec 109-35, separation depth .200.										
Crimp Tensile	<table border="0"> <tr> <td>Wire Size, <u>AWG</u></td> <td>Crimp Tensile pounds <u>minimum</u></td> </tr> <tr> <td>22</td> <td>12</td> </tr> <tr> <td>24</td> <td>8</td> </tr> <tr> <td>26</td> <td>4.5</td> </tr> <tr> <td>28</td> <td>2.7</td> </tr> </table>	Wire Size, <u>AWG</u>	Crimp Tensile pounds <u>minimum</u>	22	12	24	8	26	4.5	28	2.7	Determine crimp tensile at a rate of 1 inch/minute; AMP Spec 109-16.
Wire Size, <u>AWG</u>	Crimp Tensile pounds <u>minimum</u>											
22	12											
24	8											
26	4.5											
28	2.7											
Durability	See note (a).	Mate and unmate connector assemblies for number of cycles indicated at a maximum rate of 200 cycles/hour; AMP Spec 109-27. Plating <table border="0"> <tr> <td><u>microinches</u></td> <td><u>Cycles</u></td> </tr> <tr> <td>Gold Flash</td> <td>100</td> </tr> <tr> <td>30 Gold</td> <td>500</td> </tr> </table>	<u>microinches</u>	<u>Cycles</u>	Gold Flash	100	30 Gold	500				
<u>microinches</u>	<u>Cycles</u>											
Gold Flash	100											
30 Gold	500											

ENVIRONMENTAL

Thermal Shock	See note (a).	Subject unmated connectors to 5 cycles between -55° and 105°C; AMP Spec 109-22
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Figure 1 (cont)

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Test Description	Requirement	Procedure
Humidity-Temperature Cycling	See note (a).	Subject unmated connectors to 10 humidity-temperature cycles between 25° and 65°C at 95% RH; AMP Spec 109-23-4, cond. B.
Industrial Mixed Flowing Gas	See note (a).	Precondition connectors to 10 durability cycles. Subject mated connectors to environmental class III for 20 days; AMP Spec 109-85-3.
Temperature Life	See note (a).	Subject mated connectors to temperature life at 105°C for 500 hours duration; AMP Spec 109-43.

- (a) Shall meet visual requirements, show no physical damage, and shall meet requirements of additional tests as specified in the Test Sequence in Figure 2
- (b) Grounding indents are on plugs.

Figure 1 (end)

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3.6. Product Qualification and Requalification Tests and Sequence

Test or Examination	Test Groups (a)							
	1	2	3	4	5	6	7	8
	Test Sequence (b)							
Examination of Product	1,10	1,6	1,6	1,6	1,6	1,10	1,5	1,7
Termination Resistance, Specified Current	8			5	5			
Termination Resistance, Dry Circuit	3,7	2,5	2,5	2,4	2,4		2,4	
Dielectric Withstanding Voltage						4,8		
Insulation Resistance						3,7		
Temperature Rise vs Current				3				
Vibration	5							
Physical Shock	6							
Mating Force	2							2,5
Unmating Force	9							3,6
Contact Insertion Force						2		
Contact Retention						9		
Contact Engaging Force							2	
Contact Separating Force							3	
Crimp Tensile							4	
Durability	4	3	3					4
Thermal Shock						5		
Humidity-Temperature Cycle			4			6		
Industrial Mixed Flowing Gas					3			
Temperature Life		4						

(a) See Para 4.1.A

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

Figure 2

LOCATION OF MONITORS
(CLOSEST TO SHELL AS POSSIBLE)

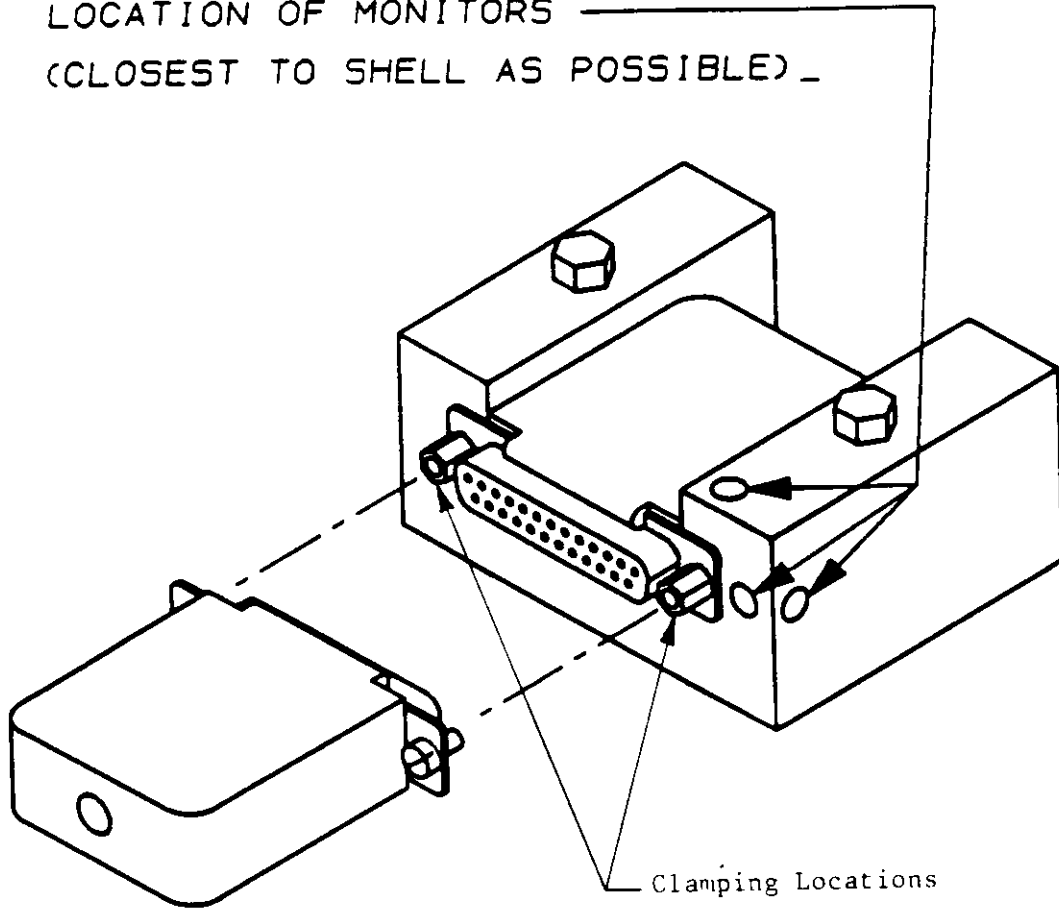


Figure 4
Mounting and Clamping Locations
for Vibration and Physical Shock

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4. QUALITY ASSURANCE PROVISIONS

4.1. Qualification Testing

A. Sample Selection

Connector housings and contacts shall be prepared in accordance with applicable Instruction Sheets. They shall be selected at random from current production. Test groups 1,2,3 and 5 shall each consist of 3 mated pairs with contacts of gold flash and 30 microinch gold in the contact area, crimped to 26 AWG wire. Test group 4 shall consist of 3 mated pairs each of largest size plug/receptacle connectors with gold flash contacts crimped on 22, 26 and 28 AWG wire. Test group 6 shall consist of connectors with gold flash contacts crimped on 26 AWG wire (loaded during testing). Test group 7 shall consist of 25 pairs of contacts crimped to each of 22, 24, 26 and 28 AWG wire sizes, without housings. Test group 8 shall consist of 5 mated pairs of each housing size 26, 44, 62 and 78 positions, loaded with gold flash contacts crimped to 26 AWG wire. Hardware clamps shall be used for all group 1 connectors. Connectors for vibration and physical shock shall be secured using screwlocks and male screws. Test group 2 thru 6 shall use cable clamps on all connectors. No hardware will be required for group 7. Test group 8 cable clamps are optional.

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 the product or to the manufacturing process, product assurance shall coordinate requalification testing, consisting of all or part of the original testing sequence as determined by development/product, quality, and reliability engineering.

4.3. Acceptance

Acceptance is based on verification that the product meets the requirements of Figure 1. 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. Testing to confirm corrective action is required before resubmittal.

4.4. Quality Conformance Inspection

The applicable AMP quality 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.

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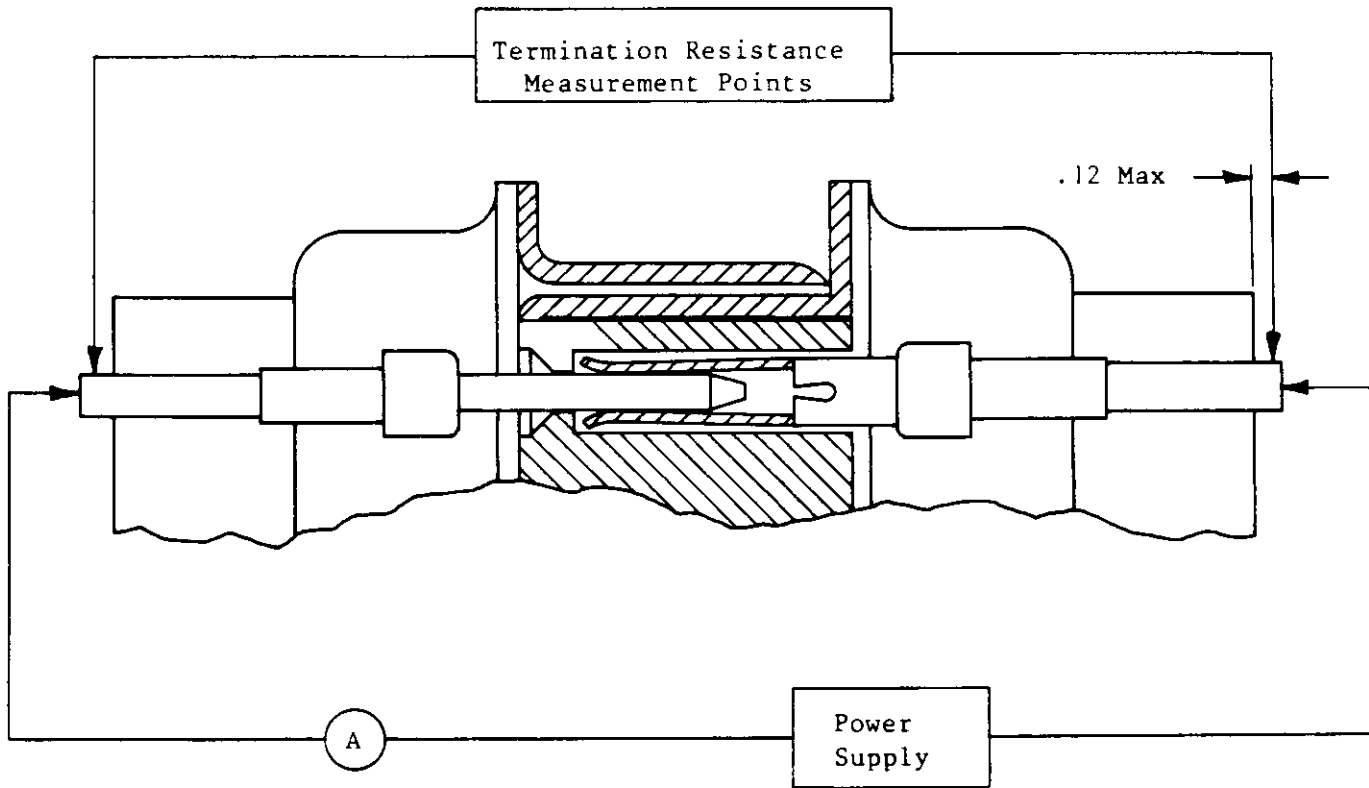
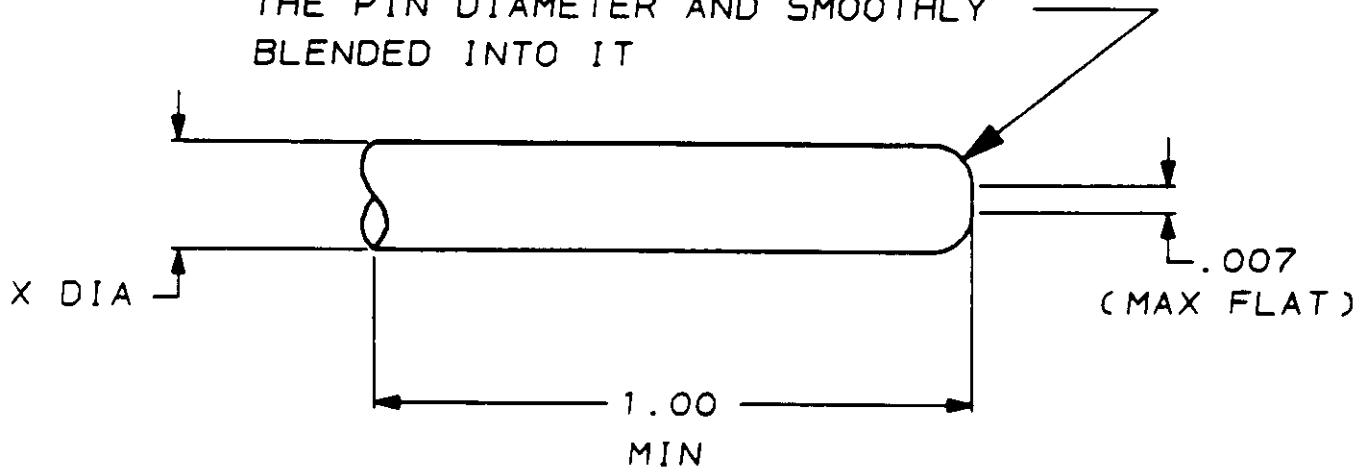


Figure 5
Resistance Measurement Points

Gage	AMP P/N	X
A	27280-6	+.0000
		.0305
		-.0001
B	27280-5	+.0001
		.0295
		-.0000

SPHERICAL RADII SHALL BE 1/2
THE PIN DIAMETER AND SMOOTHLY
BLENDED INTO IT



1. Gage Material: 100-97
2. Heat Treat to RC 68-70
3. This gage is for contact size 22
4. Pin to comply with MS 3197
5. Finish: 6-10 microinches RMS

Figure 6

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4.4. Acceptance

Acceptance is based on verification that the product meets the requirements of Figure 1. 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. Testing to confirm corrective action is required before resubmittal.

4.5. Quality Conformance Inspection

The applicable AMP quality 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.

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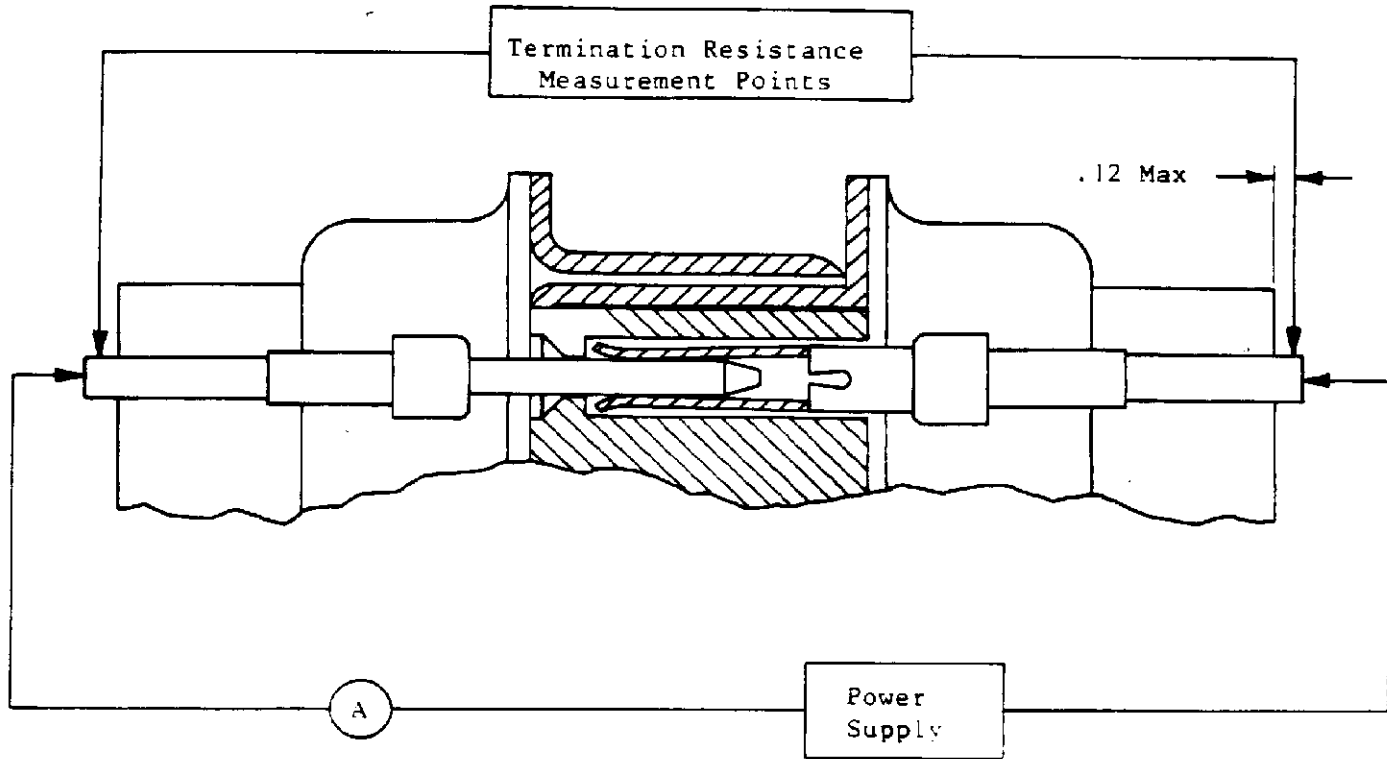
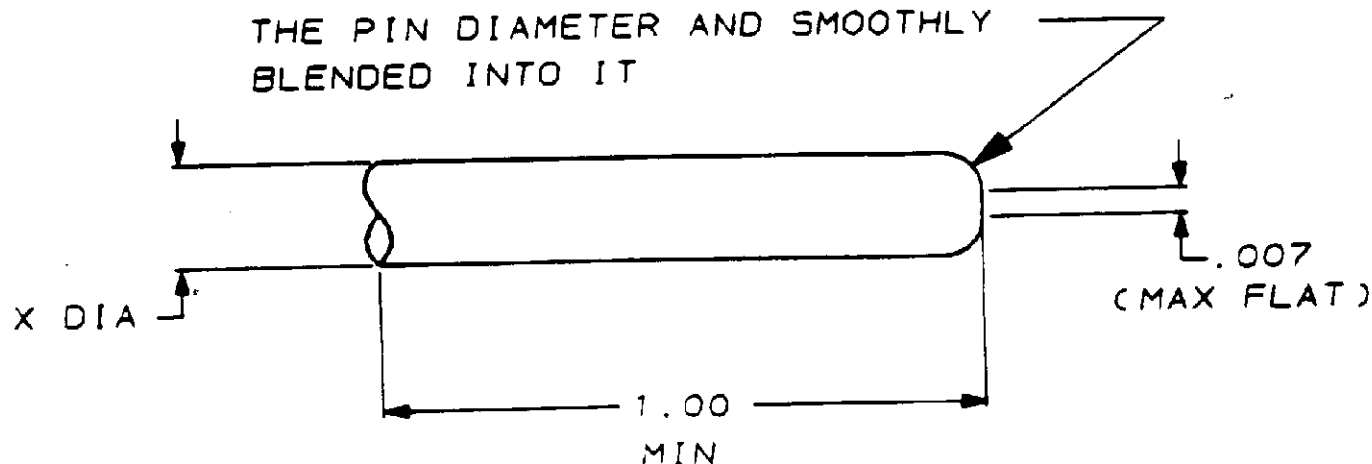


Figure 5
Resistance Measurement Points

Gage	AMP P/N	X
A	27280-6	+.0000
		.0305 -.0001
B	27280-5	+.0001
		.0295 -.0000

SPHERICAL RADIUS SHALL BE 1/2
THE PIN DIAMETER AND SMOOTHLY
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1. Gage Material: 100-97
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Figure 6

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