

Connector, AMPLIMITE* HDP-20, Economy, Crimp Snap-In**1. SCOPE****1.1. Content**

This specification covers performance, tests and quality requirements for AMPLIMITE* HDP-20 economy crimp snap-in cable connectors. This assembly consists of a two piece plastic housing which has integral plastic retention times and two metal shells which secure the housing components.

1.2. Qualification

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

2. APPLICABLE DOCUMENTS

The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, latest edition of the document applies. In the event of conflict between requirements of this specification and product drawing, product drawing shall take precedence. In the event of conflict between requirements of this specification and 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. 114-40030: Application Specification
- E. 501-321: Test Report

3. REQUIREMENTS**3.1. Design and Construction**

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

3.2. Materials

- A. Contact:
 - (1) Pin: Brass
 - (2) Socket: Phosphor bronze
- B. Hardware:
 - (1) Ferrules: Steel
 - (2) Shields: Steel
- C. Housing: Thermoplastic, glass filled, UL94V-0



3.3. Ratings

- A. Voltage: 250 vac
 B. Current: Fully loaded and energized connectors, see Figure 4
 (1) 2.4 amperes with 20 AWG
 (2) 2.0 amperes with 22 AWG
 (3) 1.7 amperes with 24 AWG
 C. Temperature: -55 to 105°C

3.4. Performance and Test Description

Product is designed to meet electrical, mechanical and environmental performance requirements specified in Figure 1. Unless otherwise specified, all tests shall be performed at ambient environmental conditions per AMP Specification 109-1.

3.5. Test Requirements and Procedures Summary

3.5. Test Requirements and Procedures

| Test Description | Requirement | Procedure | | | | | | | | |
|----------------------------------|---|--|---------------------------------|----|----|----|----|----|---|---|
| Examination of product. | Meets requirements of product drawing and AMP Spec 114-40030. | Visual, dimensional and functional per applicable quality inspection plan. | | | | | | | | |
| ELECTRICAL | | | | | | | | | | |
| Termination resistance. | 15 milliohms maximum. | AMP 109-6-1. Subject mated contacts assembled in housing to 50 mv maximum open circuit at 100 ma maximum. See Figure 3. | | | | | | | | |
| Insulation resistance. | 5000 megohms minimum initial. 500 megohms minimum final. | AMP Spec 109-28-4. Test between adjacent contacts of unmated samples. | | | | | | | | |
| Dielectric withstanding voltage. | 1000 vac at sea level. | AMP Spec 109-29-1. Test between adjacent contacts of unmated samples. | | | | | | | | |
| Temperature rise vs current. | 30°C maximum temperature rise at specified current. | AMP Spec 109-45-1. Measure temperature rise vs current. See Figure 4. | | | | | | | | |
| MECHANICAL | | | | | | | | | | |
| Crimp tensile. | <table><tr><th>Wire Size AWG</th><th>Crimp Tensile Pounds Minimum</th></tr><tr><td>20</td><td>20</td></tr><tr><td>22</td><td>12</td></tr><tr><td>24</td><td>8</td></tr></table> | Wire Size AWG | Crimp Tensile Pounds Minimum | 20 | 20 | 22 | 12 | 24 | 8 | AMP Spec 109-16. Determine crimp tensile at maximum rate of 1 inch per minute. |
| Wire Size AWG | Crimp Tensile Pounds Minimum | | | | | | | | | |
| 20 | 20 | | | | | | | | | |
| 22 | 12 | | | | | | | | | |
| 24 | 8 | | | | | | | | | |
| Vibration, random. | No discontinuities of 1 microsecond or longer duration. See Note. | AMP Spec 109-21-5, Condition C. Subject mated samples to 9.26 G's rms. 20 minutes in each of 3 mutually perpendicular planes. See Figure 5. | | | | | | | | |

Figure 1 (cont)

| Test Description | Requirement | Procedure | | | | | | | | | | | | | | | | | | | | |
|-------------------------------|--|--|---------|-------------------------------|--|------|-----------|------|---------|---|---|----|-----|---|----|----|-----|---|----|----|-----|--|
| Physical shock. | No discontinuities of 1 microsecond or longer duration. See Note. | AMP Spec 109-26-1, except 30 G's. Subject mated samples to 30 G's half-sine shock pulses of 11 milliseconds duration. 3 shocks in each direction applied along 3 mutually perpendicular planes, 18 total shocks. See Figure 5. | | | | | | | | | | | | | | | | | | | | |
| Durability. | See Note. | AMP Spec 109-27. Mate and unmate samples for 25 cycles at maximum rate of 200 cycles per hour. | | | | | | | | | | | | | | | | | | | | |
| Contact retention. | Contacts shall not dislodge from connector housing. | AMP Spec 109-30. Apply axial load of 8 pounds to contacts in each direction and hold for 10 seconds. | | | | | | | | | | | | | | | | | | | | |
| Contact insertion force. | 3 pounds maximum per contact. | AMP Spec 109-41. Measure force necessary to insert contact into housing. | | | | | | | | | | | | | | | | | | | | |
| Mating force. | <table><thead><tr><th colspan="2"></th><th colspan="2">Pounds Maximum Ground Indents</th></tr><tr><th>Size</th><th>Positions</th><th>With</th><th>Without</th></tr></thead><tbody><tr><td>1</td><td>9</td><td>30</td><td>2.8</td></tr><tr><td>2</td><td>15</td><td>33</td><td>4.7</td></tr><tr><td>3</td><td>25</td><td>37</td><td>7.8</td></tr></tbody></table> | | | Pounds Maximum Ground Indents | | Size | Positions | With | Without | 1 | 9 | 30 | 2.8 | 2 | 15 | 33 | 4.7 | 3 | 25 | 37 | 7.8 | AMP Spec 109-42, Condition A. Measure force necessary to mate samples at maximum rate of 0.2 inch per minute. |
| | | Pounds Maximum Ground Indents | | | | | | | | | | | | | | | | | | | | |
| Size | Positions | With | Without | | | | | | | | | | | | | | | | | | | |
| 1 | 9 | 30 | 2.8 | | | | | | | | | | | | | | | | | | | |
| 2 | 15 | 33 | 4.7 | | | | | | | | | | | | | | | | | | | |
| 3 | 25 | 37 | 7.8 | | | | | | | | | | | | | | | | | | | |
| Unmating force. | <table><thead><tr><th colspan="2"></th><th colspan="2">Pounds Maximum Ground Indents</th></tr><tr><th>Size</th><th>Positions</th><th>With</th><th>Without</th></tr></thead><tbody><tr><td>1</td><td>9</td><td>30</td><td>2.8</td></tr><tr><td>2</td><td>15</td><td>33</td><td>4.7</td></tr><tr><td>3</td><td>25</td><td>37</td><td>7.8</td></tr></tbody></table> | | | Pounds Maximum Ground Indents | | Size | Positions | With | Without | 1 | 9 | 30 | 2.8 | 2 | 15 | 33 | 4.7 | 3 | 25 | 37 | 7.8 | AMP Spec 109-42, Condition A. Measure force necessary to unmate samples at maximum rate of 1 inch per minute. |
| | | Pounds Maximum Ground Indents | | | | | | | | | | | | | | | | | | | | |
| Size | Positions | With | Without | | | | | | | | | | | | | | | | | | | |
| 1 | 9 | 30 | 2.8 | | | | | | | | | | | | | | | | | | | |
| 2 | 15 | 33 | 4.7 | | | | | | | | | | | | | | | | | | | |
| 3 | 25 | 37 | 7.8 | | | | | | | | | | | | | | | | | | | |
| ENVIRONMENTAL | | | | | | | | | | | | | | | | | | | | | | |
| Thermal shock. | See Note. | AMP Spec 109-22. Subject unmated samples to 5 cycles between -55 and 105°C. | | | | | | | | | | | | | | | | | | | | |
| Humidity-temperature cycling. | See Note. | AMP Spec 109-23-3, Condition B. Subject unmated samples to 10 cycles between 25 and 65°C at 95% RH. | | | | | | | | | | | | | | | | | | | | |
| Temperature life. | See Note. | AMP Spec 109-43. Subject mated samples to temperature life at 105°C for 500 hours. | | | | | | | | | | | | | | | | | | | | |

Figure 1 (cont)

| Test Description | Requirement | Procedure |
|--------------------|-------------|--|
| Mixed flowing gas. | See Note. | AMP Spec 109-85-2. Subject mated samples to environmental class II for 14 days. |

NOTE

Shall meet visual requirements, show no physical damage and shall meet requirements of additional tests as specified in Test Sequence in Figure 2.

Figure 1 (end)

3.6. Product Qualification and Requalification Test Sequence

| Test or Examination | Test Group (a) | | | |
|---------------------------------|-------------------|------|------|-----|
| | 1 | 2 | 3 | 4 |
| | Test Sequence (b) | | | |
| Examination of product | 1,9 | 1,9 | 1,10 | 1,3 |
| Termination resistance | 3,7 | 2,7 | | |
| Insulation resistance | | | 3,7 | |
| Dielectric withstanding voltage | | | 4,8 | |
| Temperature rise vs current | | 3,8 | | |
| Crimp tensile | | | | 2 |
| Vibration | 5 | 6(c) | | |
| Physical shock | 6 | | | |
| Durability | 4 | | | |
| Contact retention | | | 9 | |
| Contact insertion force | | | 2 | |
| Mating force | 2 | | | |
| Unmating force | 8 | | | |
| Thermal shock | | | 5 | |
| Humidity-temperature cycling | | | 6 | |
| Temperature life | | 5 | | |
| Mixed flowing gas | | 4(d) | | |

NOTE

- (a) See Para 4.1.A.
- (b) Numbers indicate sequence in which tests are performed.
- (c) Discontinuities shall not be measured. Energize at 18°C level for 100% loadings per AMP Specification 109-151.
- (d) Precondition samples with 10 cycles durability.

Figure 2

4. QUALITY ASSURANCE PROVISIONS**4.1. Qualification Testing****A. Sample Selection**

Samples shall be prepared in accordance with applicable Instruction Sheets and shall be selected at random from current production. Test group 1 shall consist of 5 each of size 1 plugs and receptacles, and size 3 plugs and receptacles. Test group 2 shall consist of 2 each of size 2 plugs and receptacles. Test group 3 shall consist of 3 each of size 3 plugs and receptacles. Test group 4 shall consist of 90 socket contacts and 90 pin contacts.

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. Failures 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.

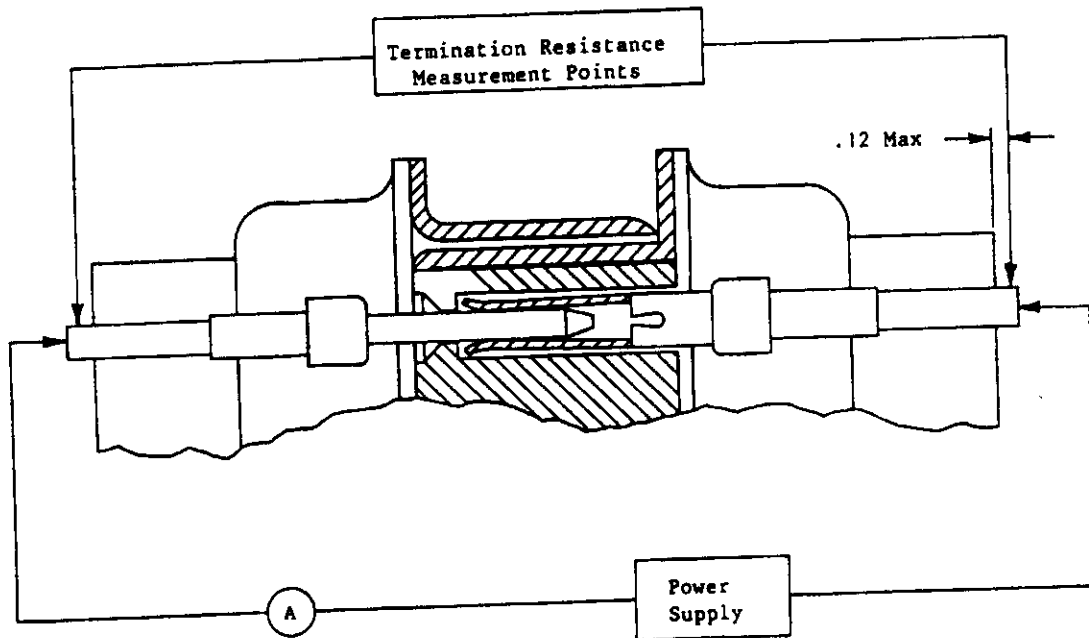


Figure 3
Termination Resistance Measurement Points

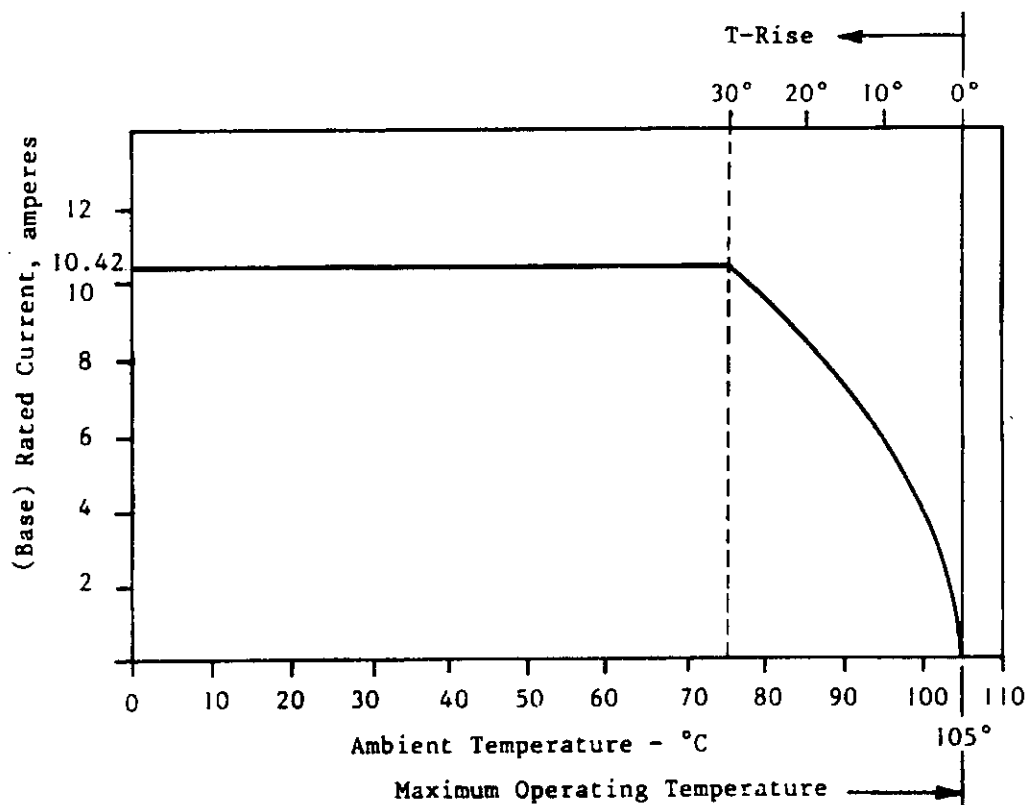


Figure 4A
Current Carrying Capability

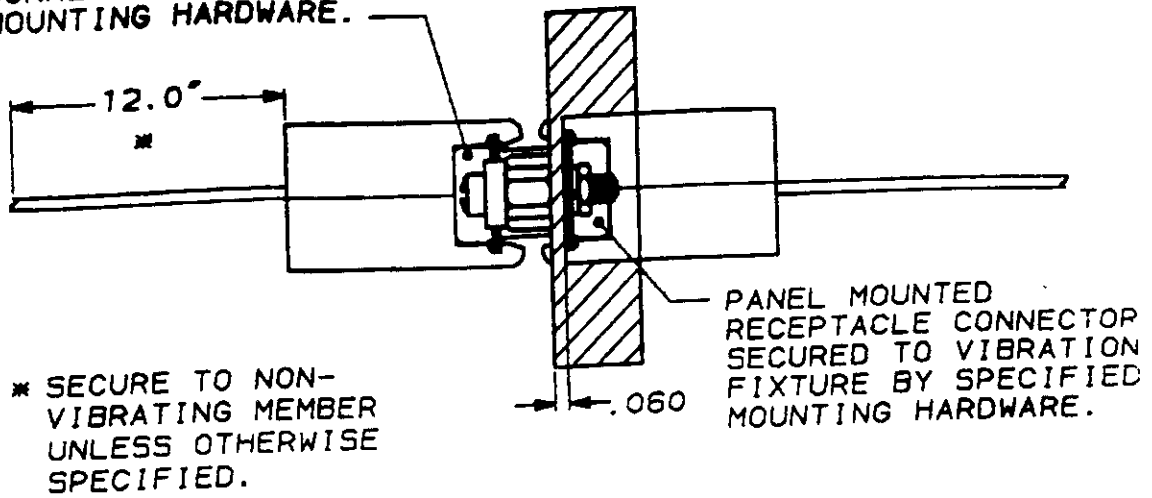
| Percent Connector Loading | Wire Size AWG | | |
|---------------------------------|---------------|------|------|
| | 20 | 22 | 24 |
| Single Contact | .795 | .647 | .536 |
| 26 | .491 | .400 | .342 |
| 50 | .341 | .277 | .229 |
| 76 | .273 | .222 | .184 |
| 100 | .236 | .192 | .159 |

NOTE

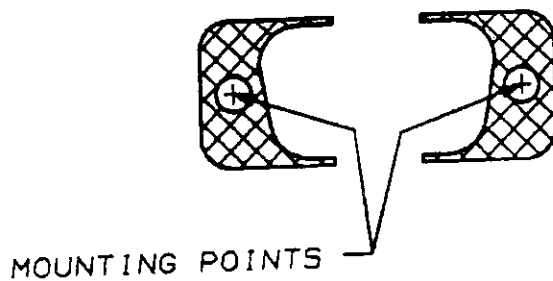
To determine acceptable current carrying capacity for percentage connector loading and wire gage indicated, use Multiplication Factor (F) from above chart and multiply it times Base Rated Current for a single circuit at maximum ambient operating temperature as shown in Figure 4A.

Figure 4B
Current Rating

PLUG CONNECTOR FULLY MATED
AND FASTENED TO MATING
CONNECTOR BY SPECIFIED
MOUNTING HARDWARE.



NOTE: RECEPTACLE CONNECTOR TO BE MOUNTED ON VIBRATION FIXTURE UNLESS OTHERWISE SPECIFIED.



| SHELL SIZE | FIXTURE NUMBER |
|------------|----------------|
| 1 | |
| 2 | |
| 3 | 468165 |
| 4 | |
| 5 | 458166 |

VIBRATION LEVEL IS
APPLIED TO THE SPECIFIED CONNECTOR
MOUNTING AREA (X) OF THE
VIBRATION FIXTURE.

Figure 5
Vibration & Physical Shock Mounting Fixture