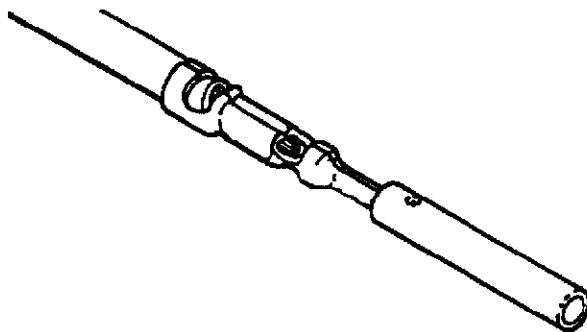


ECU 1 mm Round Contact System

1. SCOPE

1.1. Content

This specification covers performance, tests and quality requirements for the AMP* ECU 1 mm contact system comprised of a 1 mm round male terminal which mates to a dual beam hooded female socket.



1.2. Qualification

When tests are performed on the subject product line, procedures specified in Figure 1 shall be used. All inspections shall be performed using the applicable inspection plan and product drawing.

1.3. Qualification Test Results

Successful qualification testing on the subject product line was completed in Oct98. The Qualification Test Report number for this testing is 501-454. This documentation is on file at and available from Engineering Practices and Standards (EPS).

2. APPLICABLE DOCUMENTS

The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, the latest edition of the document applies. 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
- C. 109-197: AMP Test Specifications vs EIA and IEC Test Methods
- D. 501-454: Qualification Test Report

2.2. Customer Documents

- A. USCAR 1995
- B. SAE/USCAR-2

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

Materials used in the construction of this product shall be as specified on the applicable product drawing.

3.3. Ratings

- A. Current: See Figure 5 for applicable current carrying capability
- C. Temperature: -40 to 125°C (Temperature Class 3)
- D. Applicable wire range:

Wire Description	Product Part Number
	776235-X
Wire Size (mm ²)(conductor area)	.54 mm - .83 mm (20 - 18 AWG)
Insulation Thickness (mm ²)	.305 mm - .406 mm

Figure 1

3.4. Performance and Test Description

Product is designed to meet the electrical and mechanical 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

Test Description	Requirement	Procedure
Examination of product.	Meets requirements of product drawing.	Visual, dimensional and functional per applicable quality inspection plan.
ELECTRICAL		
Termination resistance.	20 milliohms maximum final.	AMP Spec 109-6-6 and USCAR 6.3.2. Subject samples to 20 mv maximum open circuit at 100 ma maximum. See Figure 4.
Temperature rise vs current.	20°C maximum temperature rise at specified current, final.	USCAR 6.3.3. Measure temperature rise vs current. See Figure 5.

Figure 2 (cont)

Test Description	Requirement	Procedure
Current cycling.	Shall not exceed 20°C temperature rise and 4 milliohms maximum with 10 amperes applied on 18 AWG samples. Shall not exceed 20°C temperature rise and 4 milliohms maximum with 8.5 amperes applied on 20 AWG samples. See Note.	USCAR 6.3.4. Subject mated terminals to 1008 hours of 45 minutes ON and 15 minutes OFF at established current level. Measure temperature rise once per week, 30 minutes into the ON cycle, and at the conclusion of the test. See Figure 4.
MECHANICAL		
Durability.	See Note.	AMP Spec 109-27 and USCAR. Manually mate and unmate samples for 10 cycles.
Engaging force.	3.34 Newtons [12 oz] maximum.	USCAR 6.2.1. Secure terminated socket contact in drill chuck and header assembly in vise. Vise shall be attached to a free floating table and both table and drill chuck installed in an Instron test machine. Record force necessary to engage and separate a pair of contacts at a rate not to exceed 50.0 ± 10 mm [1.969 ± 0.304 in] per minute. The pin shall penetrate the socket 6.35 mm [0.25 in] beyond the leading edge of the sleeve. See Figure 6.
Separating force.	0.556 Newton [2 oz] minimum.	USCAR 6.2.1. Secure terminated socket contact in drill chuck and header assembly in vise. Vise shall be attached to a free floating table and both table and drill chuck installed in an Instron test machine. Record force necessary to engage and separate a pair of contacts at a rate not to exceed 50.0 ± 10 mm [1.969 ± 0.304 in] per minute. The pin shall penetrate the socket 6.35 mm [0.25 in] beyond the leading edge of the sleeve. See Figure 6.
Terminal bend, crimp.	USCAR 5.2.2. Terminal shall not fracture or bend more than 30 degrees. 9 Newtons [2.02 lb] force at Location 1. 22 Newtons [4.94 lb] force at Location 2.	USCAR 6.2.2., Figure 6.2.2.1 (Style B)
Insulation crimp bend.	Insulation crimp shall withstand bending without losing grip on the insulated wire.	Crimp the terminal to approximately 152.4 mm [6 in] of wire. Secure the crimped terminal at the conductor crimp with a fixture or vise. Grip the wire approximately 152.4 mm [6 in] from the insulation crimp and subject the crimp to 5 random right angle bends by pulling on the insulated wire with a minimum force of 10 Newtons [2.25 lb].

Figure 2 (cont)

Test Description	Requirement	Procedure
Crimp tensile, termination strength.	(\bar{x} average) - (3 X standard deviation) = 115.68 Newtons [26 lb] minimum for 18 AWG wire and 88.98 Newtons [20 lb] minimum for 20 AWG wire.	Secure the terminal in a fixture and grip the wire approximately 152.4 mm [6 in] from the terminal. Pull the wire at a rate of 25 ± 10 mm [1 ± .394 in] per minute.
Sleeve retention.	Average minus (5.5 X Standard Deviation) shall be greater than 80.09 Newtons [18 lb].	Mount contacts in fixture PN 92-660420-000 as shown in Figure 7. Record force at point where applied load/distance curve first peaks (i.e. force crests then begins to reduce in value). This is considered to be the point where the sleeve begins to slip. Apply load at a rate of 25.4 mm [1 in] per minute.

NOTE *Shall meet visual requirements, show no physical damage, and meet requirements of additional tests as specified in the Product Qualification and Requalification Test Sequence shown in Figure 2.*

Figure 2 (end)

3.6. Product Qualification and Requalification Test Sequence

Test or Examination	Test Group (a)					
	1	2	3	4	5	6
	Test Sequence (b)					
Examination of product	1,8	1,3	1,3	1,3	1,3	1,3
Termination resistance	3,6					
Temperature rise vs current	4,7					
Current cycling	5					
Durability	2					
Engaging/separating force		2				
Terminal bend, crimp			2			
Insulation crimp bend				2		
Crimp tensile, termination strength					2	
Sleeve retention						2

NOTE (a) *See Para 4.1.A.*
 (b) *Numbers indicate sequence in which tests are performed.*

Figure 3

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 30 terminals crimped to 18 AWG, 30 terminals crimped to 20 AWG, and 60 male terminals. Test group 2 shall consist of 100 terminals. Test groups 3, 4 and 5 shall each consist of 30 terminals crimped to 18AWG and 30 terminals crimped to 20 AWG. Test group 6 shall consist of 30 terminated contacts made up of similar quantities from any 3 dies/molds.

B. Test Sequence

Qualification inspection shall be verified by testing samples as specified in Figure 3.

4.2. Requalification Testing

If changes significantly affecting form, fit or function are made to the product or 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. If 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 shall 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.

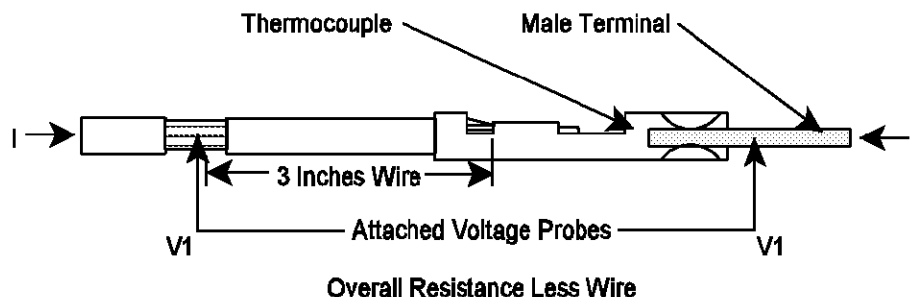


Figure 4
Termination Resistance & Temperature Measurement Points

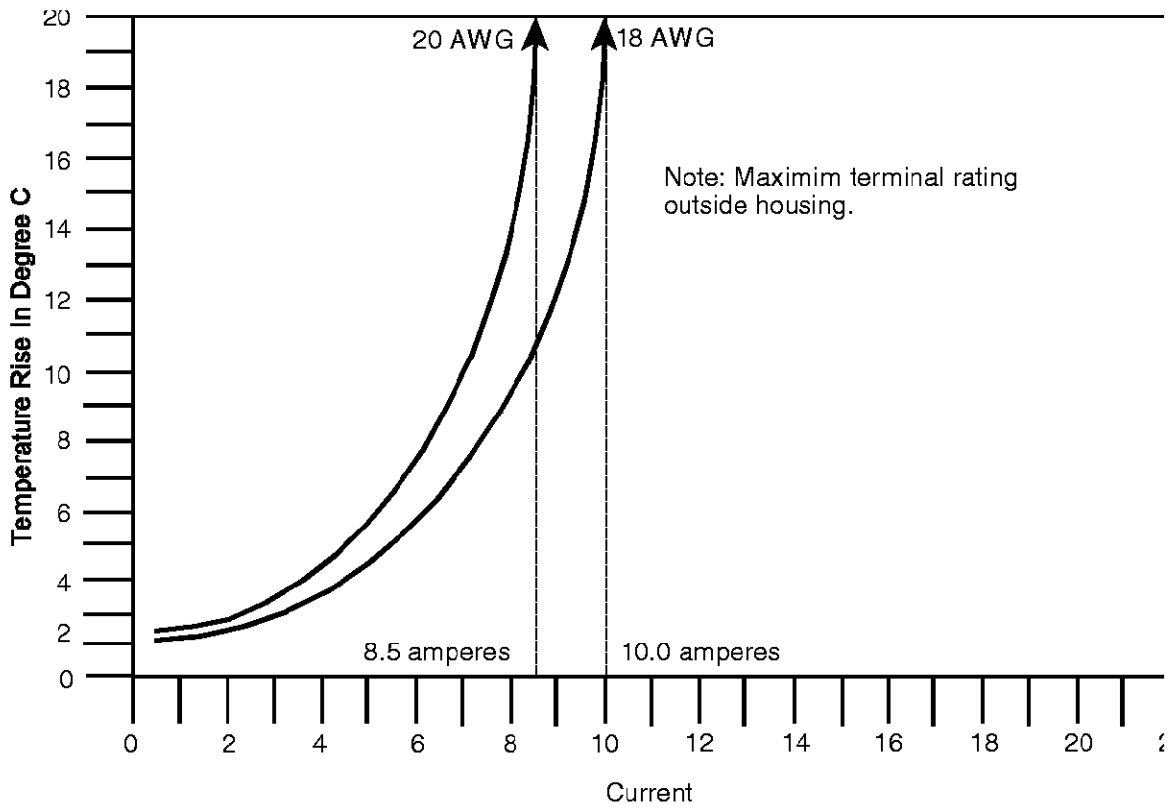


Figure 5
Temperature Rise Vs Current Curve

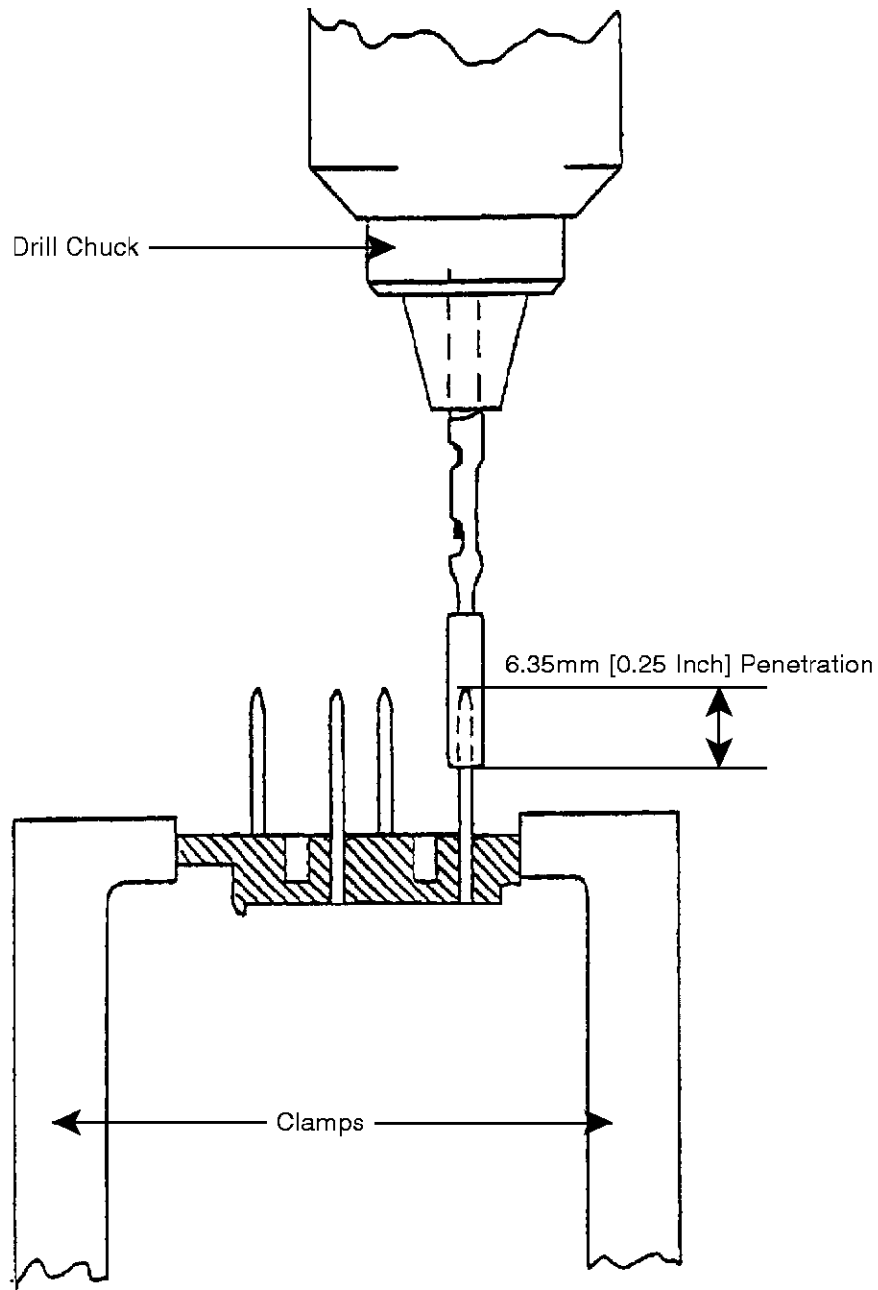


Figure 6
Engaging/Separating Force

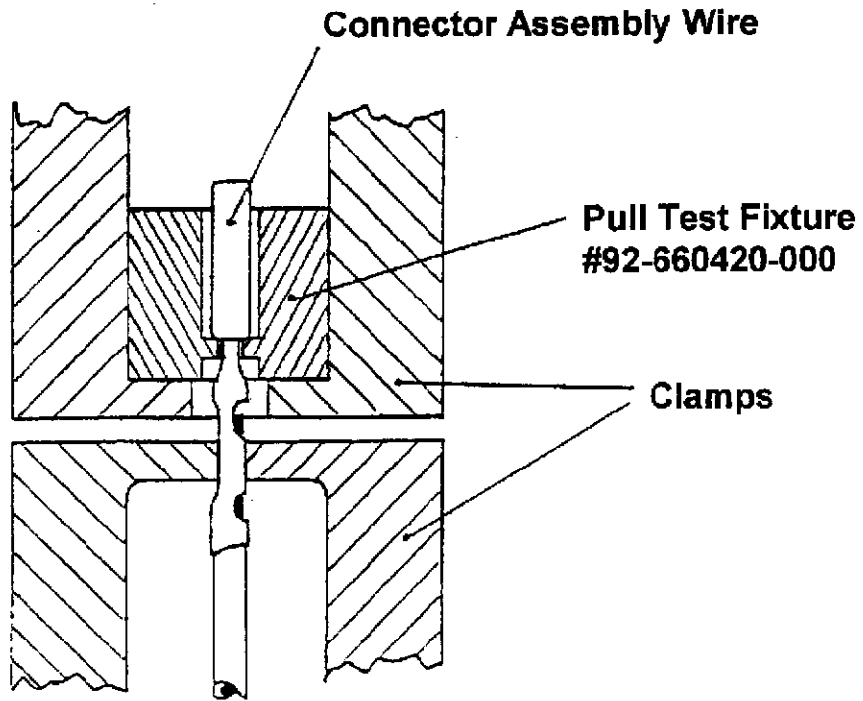


Figure 7
Sleeve Retention