PRODUCT SPECIFICATION

1. SCOPE

1.1. Content

This specification covers the performance requirements for the Ultra-Fast Plus Fully Insulated FASTON* receptacle terminals. These terminals consist of a FASTON receptacle body enclosed in a fully insulated housing. They mate with FASTON tabs which are on devices used in home entertainment centers, business machines, copying equipment, computer peripheral, appliance and other commercial equipment.

1.2. Qualification

When tests are performed on the subject product line, the procedures specified in AMP 109 series specifications and applicable commercial standards 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. 114-2075: Terminal, FASTON, Ultra-Fast Plus Fully Insulated
D. 501-62: Test Report

2.2. Commercial Standard

A. UL 310: Electrical Quick-Connect Terminals, Standard for
B. NEMA DC 2: Residential Controls Quick Connect Terminals

*Trademark of AMP Incorporated.

LTR	REVISION RECORD	APP	DATE
B	Revised per ECN AF-6455	fk	1/5/90
A	Revise per ECN AF-5352	fk	4/13/88
O	Release per ECN AF-5112	fk	1/18/88

DR Paul Rudnicki 1/13/88
CHK Kurt A. Rudnicki 1/15/88
APP Terry L. Shultz 1/15/88

AMP | AMP INCORPORATED Harrisburg, Pa. 17105

NO 108-2044 | REV B | LOC B

PAGE 1 OF 9

TITLE: TERMINAL, RECEPTACLE, FASTON, ULTRA-FAST PLUS FULLY INSULATED

K

3. REQUIREMENTS

3.1. Design and Construction

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

3.2. Materials

A. Receptacle body: Brass, tin plated
B. Housing: Nylon, UL 94V-2
C. Tabs (for test purposes): Brass, temper 2 CDA 260 complies with NEMA DC-2
D. Wire (for test purpose): Complies with UL 310 Para 7.3., 600 v rating and NEMA DC 2

3.3. Ratings

A. Voltage: 600
B. Operating Temperature: 105°C maximum

3.4. Performance and Test Description

Terminals 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 114-2075.	Visual, dimensional and functional per applicable inspection procedure.
ELECTRICAL		
Dielectric Withstand, Test Condition A	No breakdown or flashover when 3400 vac is applied for 1 minute.	Test wired terminals in number 12 lead shot after coating end with insulating material; AMP Spec 109-29-1 and UL 310, 600 v rating.
Dielectric Withstand, Test Condition C	No breakdown or flashover at rear of terminal when 3000 vac is applied for 1 minute.	Test on a flat metal plate, see Figure 5; AMP Spec 109-29-1 and UL 310, 600 v rating.

Figure 1 (cont)

Test Description	Requirement	Procedure
Dielectric Withstand, Receptacle, Tab Entry Portion	Terminal Size / Applied Voltage, vac: 250 — 1000; 187 — 1000; 110 — 600. No breakdown or flashover when voltage is applied for 1 minute.	Test wired terminals on a flat metal plate, see Figure 6; AMP Spec 109-29-1.
Heating (Temperature Rise)	See Figure 3 .	Stabilize at specified current and measure T-rise, see Figures 4 and 8; UL 310
Heat Cycling (Current Cycling)	T-rise, ΔT-rise and voltage drop see Figure 3. 24 and 500 cycles.	Subject samples to 500 current cycles, 45 minutes on and 15 minutes off, see Figures 4 and 8; UL 310 and NEMA DC-2.
MECHANICAL		
Pull Out (Crimp Wire Tensile)	Wire Size, AWG / Tensile, pounds minimum: 22 — (10) Note; 20 — (16) (a); 18 — 20; 16 — 30; 14 — 60	Apply a direct and gradual pull at a rate of 1 inch/minute, 1 minute hold at specified load; UL 310, AMP Spec 109-16.
Pull Out (Insulation Crimp Tensile) (b)	Terminal Size / Tensile, pounds minimum *: 250 — 3; 187 — 3; 110 — 1. *Conductor crimp open.	Apply a direct and gradual pull to failure at a rate of 1 inch/minute; AMP Spec 109-16.
Secureness of Insulation (Unassembled)	No separation of the insulation from the terminal body.	Subject unwired terminals to a 3 pound pull between the insulation and terminal for 1 minute; UL 310 and AMP Spec 109-30.
Secureness of Insulation (Assembled)	No separation of the insulation from the terminal body.	Subject wired terminals to a 6 pound pull between the insulation and terminal for 1 minute; UL 310 and AMP Spec 109-30.

Figure 1 (cont)

Test Description	Requirement	Procedure
Engagement-Disengagement (Engaging-Separating)	See Figure 2.	Engage and disengage terminals and tabs 6 times; UL 310 and NEMA DC 2.
Flex, Insulation Crimp	Wire insulation shall not disengage from the insulation crimp.	Subject wire to four 90° flexures in any direction to the terminal plane, grip wire, see Figure 7.
ENVIRONMENTAL		
Heat Age, 136°C	Meet dielectric withstand, test condition A; secureness of insulation assembled and unassembled.	Subject wired terminals to 136°C for 7 days; UL 310.
Heat Age/Humidity	Meet dielectric withstand, test condition A; insulation crimp tensile.	Subject unwired terminals to 100°C for 7 days; followed by 85% RH at 30°C for 24 hours; UL 310.

(a) These values are less than the maximum withdrawal force given for engagement and disengagement test, see Figure 2.
(b) One wire application only.

Figure 1 (end)

Tab Size Plain Brass	Terminal Plating	Force, pounds					
		1st Insertion	1st Withdrawal			6th Withdrawal	
		Indv., maximum	Indv., maximum	Average, minimum	Indv., minimum	Average, minimum	Indv., minimum
.250		17	17	5	3	4	3
.187	Tin	15	20	5	3	3	2
.110		12	14	3	2	2	1

Figure 2

Engagement and Disengagement Forces

Wire Size AWG	Test Current amperes(c)		Total Voltage Drop, (d) millivolts maximum				Temperature Rise	
	.110	others	24 cycles		500 cycles		(a) Heating	(b) Cycling
			.250	all others	.250	all others		
22	4	6	10	14	14	18	20°C maximum	65°C maximum
20	6	8	11	15	15	19		
18	8	14	13	17	17	21		
16	10	20	15	19	19	23		
14		30	20	21	26	25		

(a) Current is 1/2 of that shown for all wire sizes.
(b) ΔT-rise between 24 and 500 cycles shall not exceed 15°C on any conductor.
(c) Alternating current to be used for T-Rise measurements, dc current to be used for voltage drop measurement.
(d) Total Voltage Drop = Crimp + Friction - EWL (equivalent wire length).

Figure 3

3.6. Terminal Tests and Sequences

Test or Examination	Test Group (a)												
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Test Sequence (b)												
Examination of Product	1	1	1	1	1	1	1	1	1	1	1	1	1
Dielectric Withstand, Test Condition A		2	3	3(c)									
Dielectric Withstand, Test Condition C					2								
Dielectric Withstand, Tab Receptacle Entry Position						2							
Heating (T-rise)	2(d)												
Heat Cycling (Current Cycle)	3(d)												
Pull Out (Crimp Tensile)		4											
Pull Out (Insulation Crimp Tensile)												2	
Secureness of Insulation (Unassembled)							2		3				
Secureness of Insulation (Assembled)								2		3	3(c)		
Engagement & Disengagement													2
Flex Insulation Crimp		3											
Heat Age, 136°C			2						2	2			
Heat Age, Humidity				2							2		

Figure 4 (cont)

(a) See Para 4.1.A.
(b) Number indicates sequence in which tests are performed.
(c) Uncrimped terminals and wires in test groups 4 and 11 shall be conditioned in the environments indicated. After conditioning each sample is crimped to appropriate wire and the electrical or mechanical test is performed.
(d) Temperature rise and voltage drop measurements during current cycling are to be collected simultaneously. Prepare samples in accordance with Figure 8. Use #30 AWG iron constantan wire thermocouple pressure fitted between contact and insulation as shown. (Welded arrangement optional.) Fit must be sufficient to produce good thermal contact, void of free movement between thermocouple and contact. Thermocouple leads must have strain relief suitable to protect interface.

Figure 4 (end)

4. QUALITY ASSURANCE PROVISIONS

4.1. Qualification Inspection

A. Sample Selection

Terminals and tabs shall be prepared in accordance with applicable Instruction Sheets. They shall be selected at random from current production. Test Groups 5, 6, 7, 9, and 13 shall consist of 20 samples of each terminal type per group. Test Groups 1, 2, 3, 4, and 12 shall consist of 20 samples of each wire size and terminal type per group. Test groups 8, 10 and 11 shall consist of 20 samples of each terminal type per group on the minimum wire size for the intended range of wires. All samples to be terminated shall be crimped to appropriate tin plated test conductors.

B. Test Sequence

Qualification inspection shall be verified by testing samples as specified in Figure 4.

C. Acceptance

(1) Test results from development on pre-qualification samples will be used to determine upper and lower one-sided statistical tolerance limits for 99% reliability at 95% confidence, as follows. Let X bar and s denote the sample average and standard deviation, respectively, of the test data. Let k denote the normal distribution one-sided tolerance factor for 95% confidence and 99% reliability. The value of k varies with sample size. Values of k are given in various tables, for example, NBS Handbook 91, Factors for One-Sided Tolerance Limits for Normal Distribution. Suitability of the normal distribution for representing the data shall be verified with normal probability plots, goodness of fit tests, etc.

Then the upper one-sided tolerance limit for 99% reliability at 95% confidence is given by X bar + ks. The interpretation of this tolerance limit is as follows: based on the test data, and assuming a normal distribution for the test data, we can be 95% confident that 99% of the population of values represented by the sample data will not exceed X bar + ks. For any test parameter for which there is specified an upper requirement which is not to be exceeded, satisfactory performance of the product is achieved when the value of X bar + ks does not exceed the requirement value.

The lower one-sided tolerance limit for 95% confidence and 99% reliability is given by X bar - ks. This has a similar interpretation and corresponding application to lower requirement values.

(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.

4.3. Certification

This product has been listed under the listing program of Underwriters Laboratories Inc., Electrical File Number E 66717 and Certified by Canadian Standards Association File Number LR 49710.

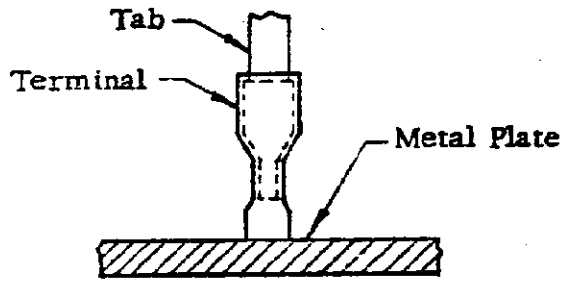

Figure 5

Metal Plate Test Fixture
Dielectric Condition C

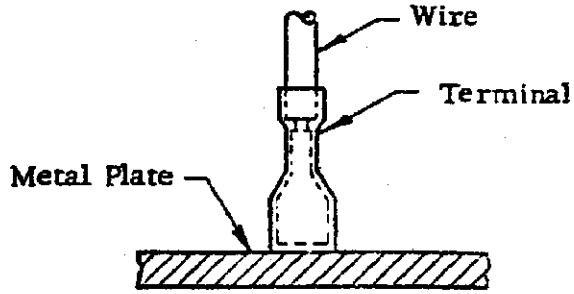

Figure 6

Receptacle, Tab Entry Portion

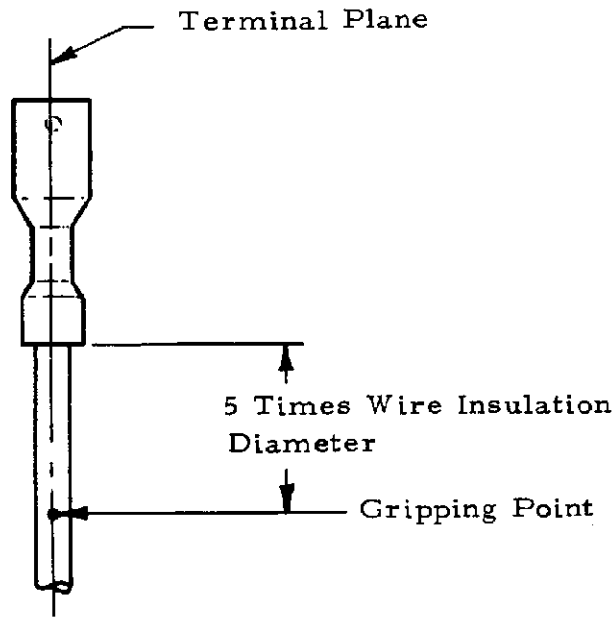

Figure 7

Flex, Insulation Crimp

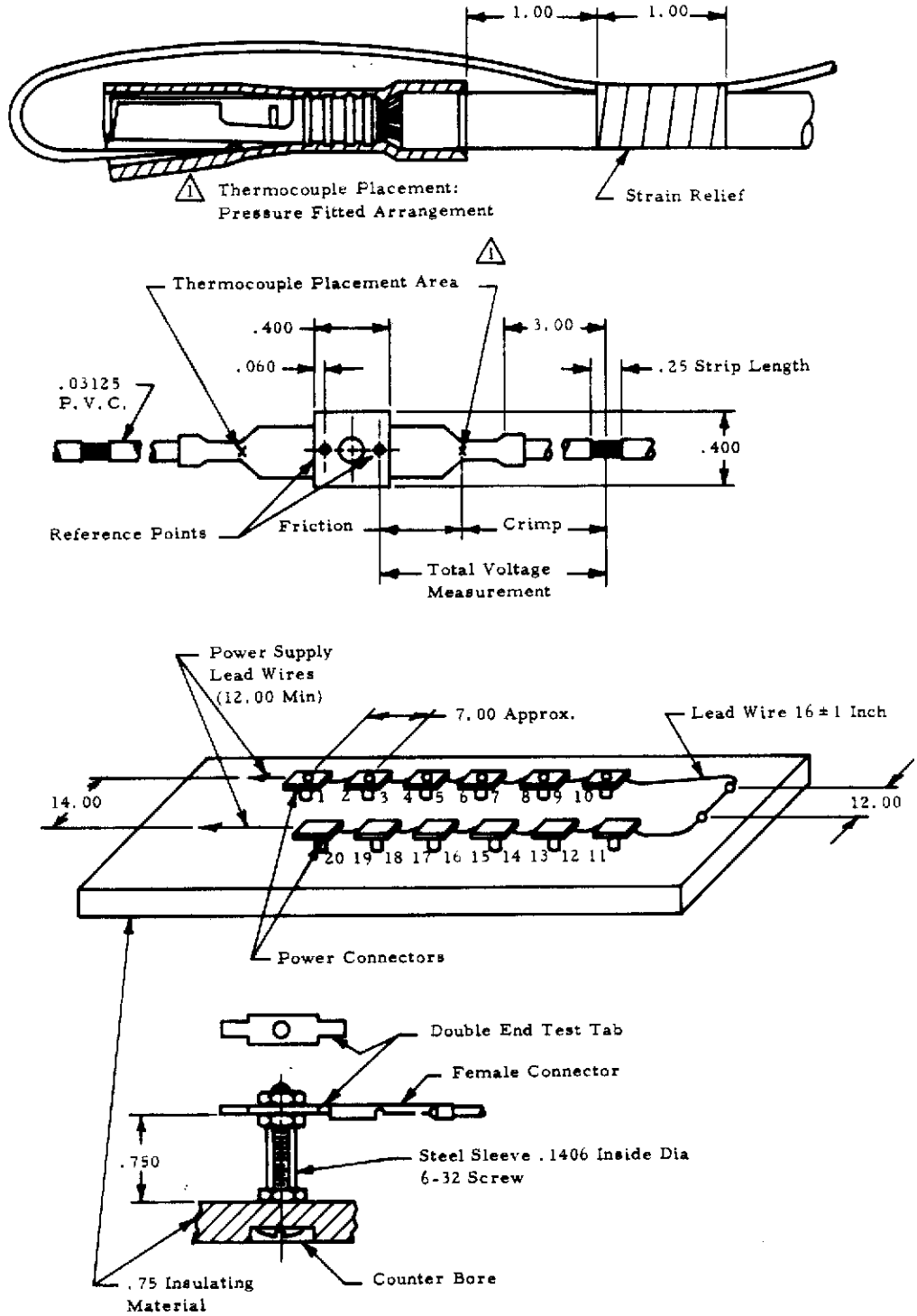

Figure 8

Voltage Drop and Temperature Measurement Points