
Connector, Power Lock, Series 2

1. SCOPE

1.1. Content

This specification covers performance, tests and quality requirements for TE Connectivity (TE) Series 2 Power Lock connectors. These connectors consist of an assembled insulating housing and electrical contacts and are intended to provide connect/disconnect capabilities for commercial power handling applications. They are designed to accommodate 10 through 6 AWG wire sizes.

1.2. Qualification

When tests are performed on subject product line, procedures specified in 109 Series Test 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. TE Documents

- 109-1: General Requirements for Test Specifications
- 109 Series: Test Specifications as indicated in Figure 1
- 114-6032: Application Specification
- 501-295: Qualification 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

- Contact: Copper, silver plating
- Housing: Polycarbonate

3.3. Ratings

- Voltage: 600 volts AC
- Current: See Figure 5 for applicable current carrying capability.
 - 53.44 amperes for single position with 6 AWG wire
 - 43.06 amperes for single position with 8 AWG wire.
 - 36.42 amperes for single position with 10 AWG wire.
- Temperature: -55 to 85°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 Test Specification 109-1.

3.5. Test Requirements and Procedures Summary

Test Description	Requirement	Procedure								
Examination of product.	Meets requirements of product drawing and AMP Spec 114-6032.	Visual, dimensional and functional per applicable quality inspection plan.								
ELECTRICAL										
Termination resistance.	2.5 milliohms maximum.	TE 109-25. Measure potential drop of mated contacts assembled in housing using 1 ampere. See Figure 3.								
Insulation resistance.	1000 megohms minimum.	TE Spec 109-28-4. Test between adjacent contacts of mated samples ganged together.								
Dielectric withstanding voltage.	1500 volts AC at sea level.	TE Spec 109-29-1. Test between adjacent contacts of mated samples ganged together and a metal plate. See Figure 4.								
Temperature rise vs current.	30°C maximum temperature rise at specified current.	TE Spec 109-45-1. Measure temperature rise vs current. See Figures 5 and 6.								
MECHANICAL										
Crimp tensile.	<table border="1" style="display: inline-table; border-collapse: collapse;"> <thead> <tr> <th>Wire size AWG</th> <th>Crimp Tensile Pounds Minimum</th> </tr> </thead> <tbody> <tr> <td>10</td> <td>80</td> </tr> <tr> <td>8</td> <td>90</td> </tr> <tr> <td>6</td> <td>100</td> </tr> </tbody> </table>	Wire size AWG	Crimp Tensile Pounds Minimum	10	80	8	90	6	100	TE Spec 109-16. Determine crimp tensile at maximum rate of 1 inch per minute. Remove contacts from housing prior to test.
Wire size AWG	Crimp Tensile Pounds Minimum									
10	80									
8	90									
6	100									
Vibration, sinusoidal.	No discontinuities of 1 microsecond or longer duration. See Note.	TE Spec 109-21-1. Subject mated samples to 10-55-10 Hz traversed in 1 minute at .06 inch total excursion. 2 hours in each of 2 mutually perpendicular planes. See Figure 7.								
Physical shock.	No discontinuities of 1 microsecond or longer duration. See Note.	TE Spec 109-26-1. Subject mated samples to 75 G's half-sine shock pulses of 6 milliseconds duration. 1 shock in each direction applied along 3 mutually perpendicular planes, 6 total shocks. See Figure 7.								

Figure 1 (continued)

Test Description	Requirement	Procedure
Durability.	See Note.	TE Spec 109-27. Mate and unmate samples for 20 cycles at maximum rate of 300 cycles per hour.
Contact retention.	40 pounds minimum.	TE Spec 109-30. Apply axial load to crimped contacts by gripping wire and hold for 1 minute.
Mating force.	12.6 pounds maximum initial per position.	TE Spec 109-42, Condition A. Measure force necessary to mate samples at maximum rate of .5 inch per minute.
Unmating force.	7.9 pounds minimum per position.	TE Spec 109-42, Condition A. Measure force necessary to unmate samples at maximum rate of .5 inch per minute.

ENVIRONMENTAL

Thermal shock.	See Note.	TE Spec 109-22. Subject mated samples to 5 cycles between -55 and 85°C.
Humidity-temperature cycling.	See Note.	TE Spec 109-23-3, Condition B. Subject mated samples to 10 cycles between 25 and 65°C at 95% RH. Preconditioning prior to test, 24 hour drying.
Temperature life.	See Note.	TE Spec 109-43. Subject mated samples to temperature life at 85°C for 96 hours.
Mixed flowing gas.	See Note.	TE 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
	Test Sequence (b)		
Examination of product	1,11	1,9	1,8
Termination resistance	3,7	2,7	
Insulation resistance			2,6
Dielectric withstanding voltage			3,7
Temperature rise vs current		3,8	
Crimp tensile	10		
Vibration	5	6(c)	
Physical shock	6		
Durability	4		
Contact retention	9		
Mating force	2		
Unmating force	8		
Thermal shock			4
Humidity-temperature cycling			5
Temperature life		5	
Mixed flowing gas		4(d)	

NOTE

- (a) See paragraph 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 Test Specification 109-151.
- (d) Precondition samples with 5 manual 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 groups 1 and 3 shall each consist of 15 pair connector assemblies with 6 AWG wire. Test group 2 shall consist of 30 pair connector assemblies with 6 AWG wire and 24 pair connector assemblies with 10 AWG wire.

B. Test Sequence

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

4.2. Requalification Testing

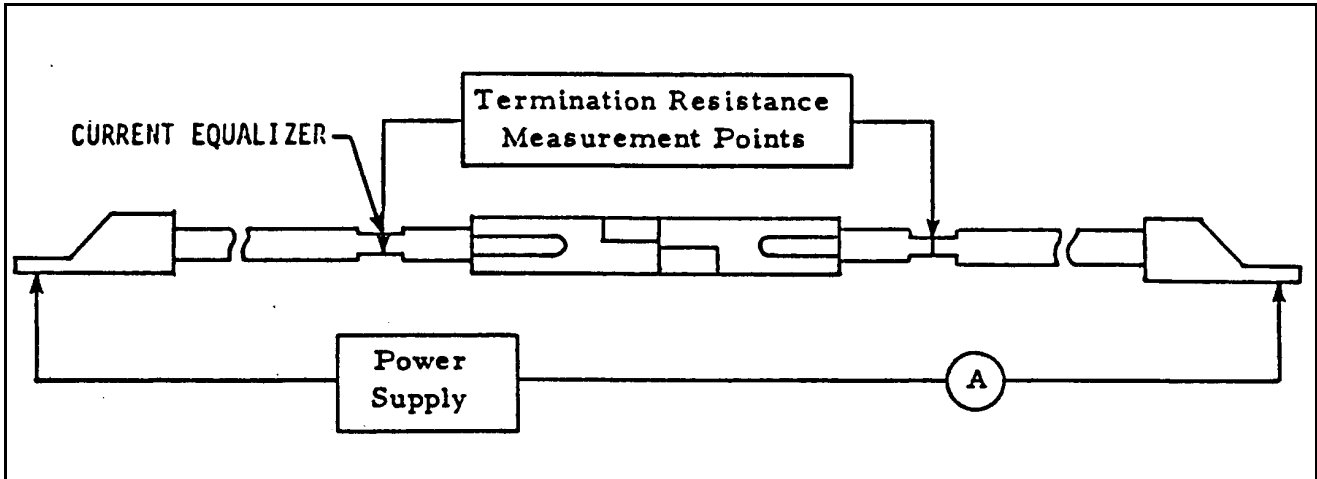
If changes significantly affecting form, fit or function are made to product or manufacturing process, product assurance shall coordinate requalification testing, consisting of all or part of original testing sequence as determined by development/product, quality and reliability engineering.

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

The applicable 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.



NOTE

- (a) Current equalizers shall be soldered onto wire at termination resistance probe points.
- (b) Equalizers shall be located .5 inch back from wire receiving end of each contact.
- (c) An equal wire length (EWL), equal to the distance between voltage probe points, shall be measured for resistance.
- (d) Termination resistance equals millivolt drop divided by test current less EWL resistance.

Figure 3
Termination Resistance Measurement Points

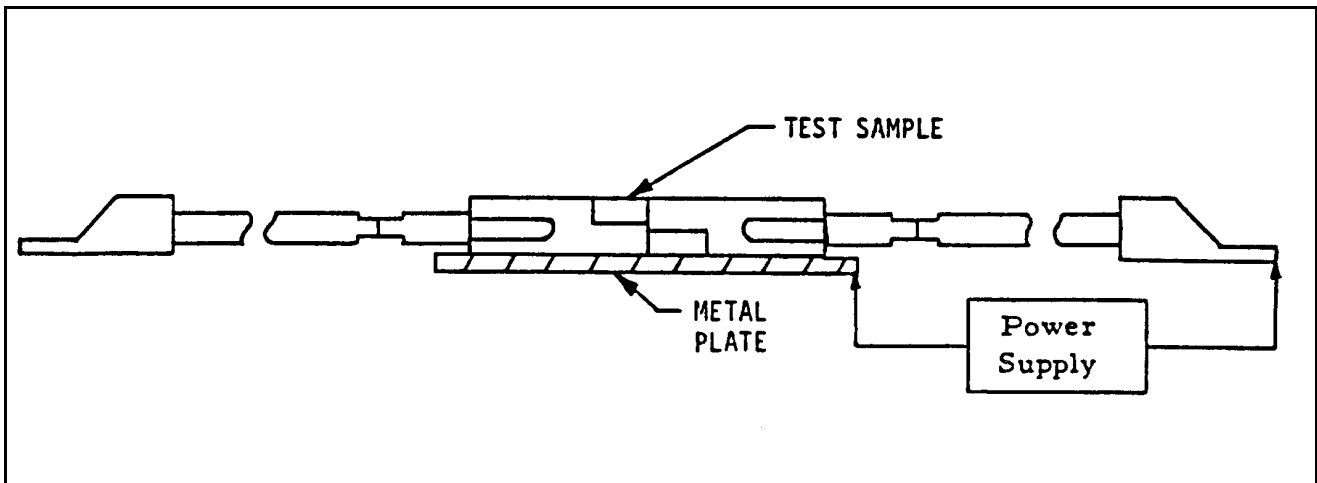


Figure 4
Dielectric Withstanding Voltage Test Fixture

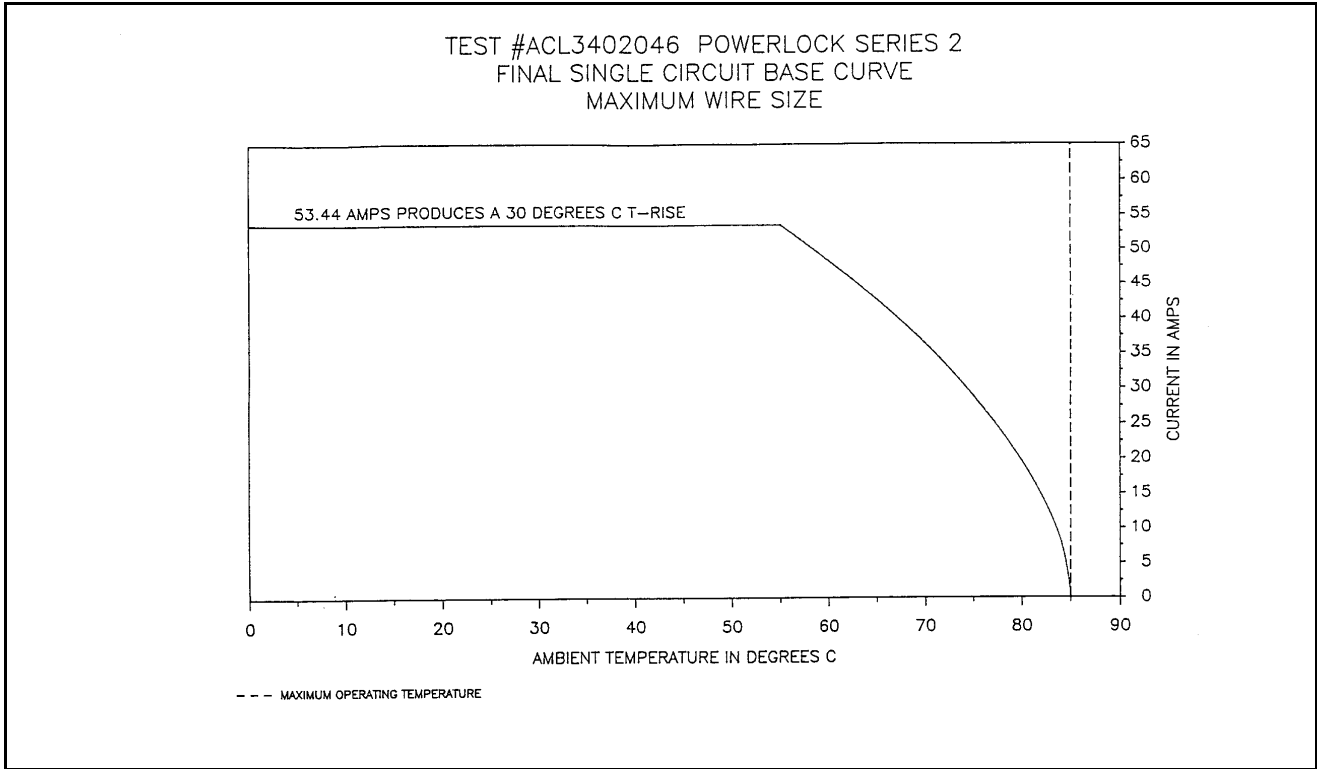


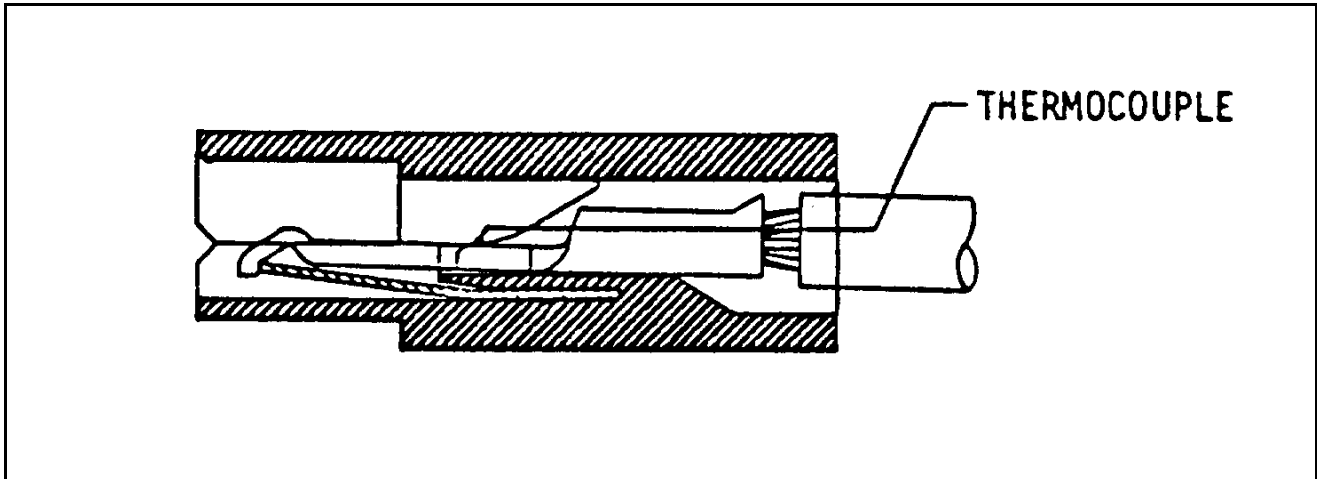
Figure 5A
Current Carrying Capability

Percent Connector Loading	Wire Size AWG		
	6	8	10
Single Contact	1.0000	0.8058	0.6815
X X X X	0.9590	0.7727	0.6536
X X	0.9803	0.7899	0.6681
X X X	0.9514	0.7666	0.6484
X X X X	0.9345	0.7530	0.6369
X X X X X	0.9205	0.7417	0.6273
X X X X X X	0.9108	0.7339	0.6207
X X X X X X X	0.9023	0.7271	0.6149
X X X X X X X X	0.8959	0.7219	0.6105

NOTE

To determine acceptable current carrying capacity for connector configuration 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 5A.

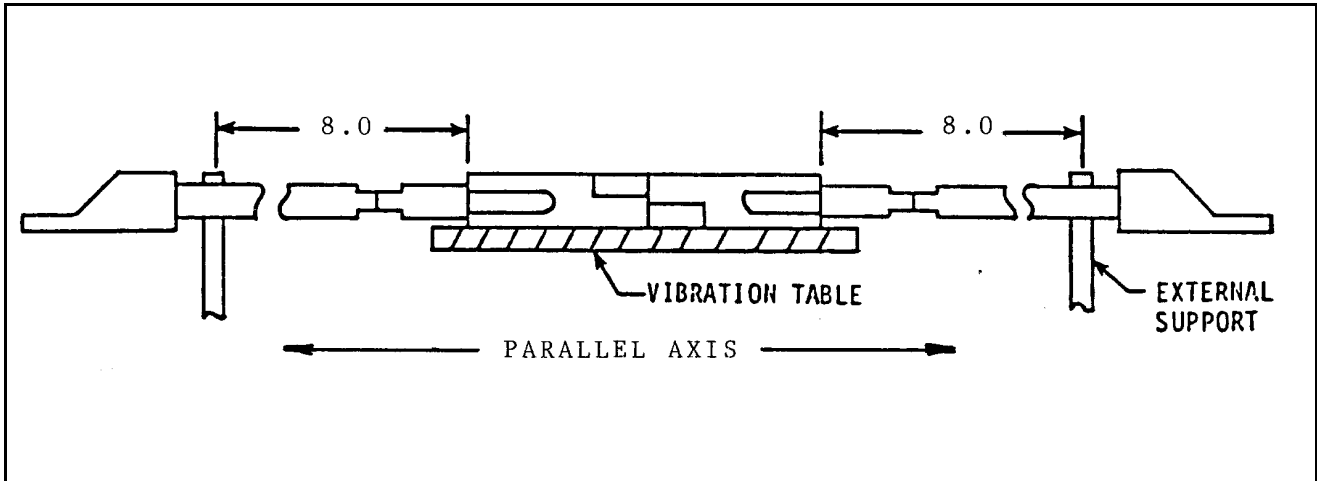
Figure 5B
Current Rating



NOTE

- (a) Thermocouples shall be welded to contacts near intersection of tongue and barrel as shown.
- (b) Thermocouple shall exit housing by running down side of wire barrel.

Figure 6
Thermocouple Mounting



NOTE

- (a) Connector shall be rigidly clamped to vibration table.
- (b) Clamp wire a minimum of 8 inches from connector on external supports providing sufficient slack in wire to preclude resonance.

Figure 7
Vibration & Physical Shock Mounting Fixture