.050 Inch Centerline FFC Cable Connector

1. SCOPE

1.1. Content

This specification covers performance, tests and quality requirements for TE Connectivity (TE) contacts and connectors used with Flexible Flat Conductor (FFC) cable on .050 inch centerline.

1.2. Qualification

| When tests are performed on subject product line, procedures specified in TE 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: Test Specification (General Requirements for Test Specifications)
- 109 Series: Test Specifications as indicated in Figure 1
| - 114-16008: Application Specification (Flexible Flat Cable (FFC) Connectors for 1.27 mm (.050 in.)
| Centerline Cable)
| - 501-281: Qualification Test Report (.050 Inch Centerline FFC Cable Connector)

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: Phosphor bronze
- Housing: Glass filled thermoplastic

3.3. Ratings

- Voltage: 100 volts AC
- Current: Signal application only, 1.5 amperes maximum single circuit
- 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 Test Specification 109-1.

| Indicates Change

3.5. Test Requirements and Procedures Summary

Test Description	Requirement	Procedure
Examination of product.	Meets requirements of product drawing and Application Specification 114-16008.	Visual, dimensional and functional per applicable quality inspection plan.
	ELECTRICAL	
Termination resistance.	25 milliohms maximum.	TE Spec 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. 1000 megohms minimum final.	TE Spec 109-28-6. Test between adjacent contacts of mated connector assemblies at 250 volts DC maximum.
Dielectric withstanding voltage.	300 volts AC at sea level.	TE Spec 109-29-1. Test between adjacent contacts of mated connector assemblies.
	MECHANICAL	
Solderability.	Solderable area shall have minimum of 95% solder coverage.	TE Spec 109-11-1. Subject contacts to solderability.
Vibration, sinusoidal.	No discontinuities of 1 microsecond or longer duration. See Note.	TE Spec 109-21-3. Subject mated connectors to 15 G's between 10-2000-10 Hz traversed in 20 minutes. Four hours in each of 3 mutually perpendicular planes. See Figure 4.
Physical shock.	No discontinuities of 1 microsecond or longer duration. See Note.	TE Spec 109-26-9. Subject mated connectors to 100 G's sawtooth shock pulses of 6 milliseconds duration. Three shocks in each direction applied along 3 mutually perpendicular planes, 18 total shocks. See Figure 4.
Durability.	See Note.	TE Spec 109-27. Mate and unmate connector assemblies for 100 cycles for 30 µinch gold plating at maximum rate of 150 cycles per hour.
Contact retention in housing.	2 pounds minimum per contact. No damage to contacts.	TE Spec 109-30, except grip cable. Apply axial load to contacts.
Mating force.	8 ounces maximum per contact.	TE Spec 109-42, Condition A. Measure force necessary to mate connector assemblies a distance of .280 inch from point of initial contact at maximum rate of .5 inch per minute.

Figure 1 (continued)

Test Description	Requirement	Procedure
Unmating force.	1 ounce minimum per contact.	TE Spec 109-42, Condition A. Measure force necessary to unmate connector assemblies at rate maximum of .5 inch per minute.
ENVIRONMENTAL		
Thermal shock.	See Note.	TE Spec 109-22. Subject mated connectors to 25 cycles between -55 and 105°C.
Humidity-temperature cycling.	See Note.	TE Spec 109-23-4, Condition B. Subject mated connectors to 10 cycles between 25 and 65°C at 95% RH.
Temperature life.	See Note.	TE Spec 109-43. Subject mated connectors to temperature life at 105°C for 500 hours.
Mixed flowing gas.	See Note.	TE Spec 109-85-3. Subject mated connectors to environmental class III for 20 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	5	6
	Test Sequence (b)					
Examination of product	1,9	1,5	1,5	1,8	1,3	1,3
Termination resistance	3,7	2,4	2,4			
Insulation resistance				2,6		
Dielectric withstanding voltage				3,7		
Solderability						2(d)
Vibration, sinusoidal	5					
Physical shock	6					
Durability	4					
Contact retention in housing					2	
Mating force	2					
Unmating force	8					
Thermal shock				4		
Humidity-temperature cycling				5(c)		
Temperature life		3(c)				
Mixed flowing gas			3(c)			

NOTE

(a) See paragraph 4.1.A.
(b) Numbers indicate sequence in which tests are performed.
(c) Precondition samples with 10 cycles durability.
(d) Applies to solder tab contacts only.

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, 2, 3, 4 and 5 shall each consist of a minimum of 3 cable assemblies with a minimum of 10 contacts of each plating type per cable assembly. Mating contact circuits in each cable assembly shall be randomly selected and identified. Unless otherwise specified, these contacts shall be used for all measurements required in these test groups. Test group 6 shall consist of 6 unterminated solder tabs.

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.

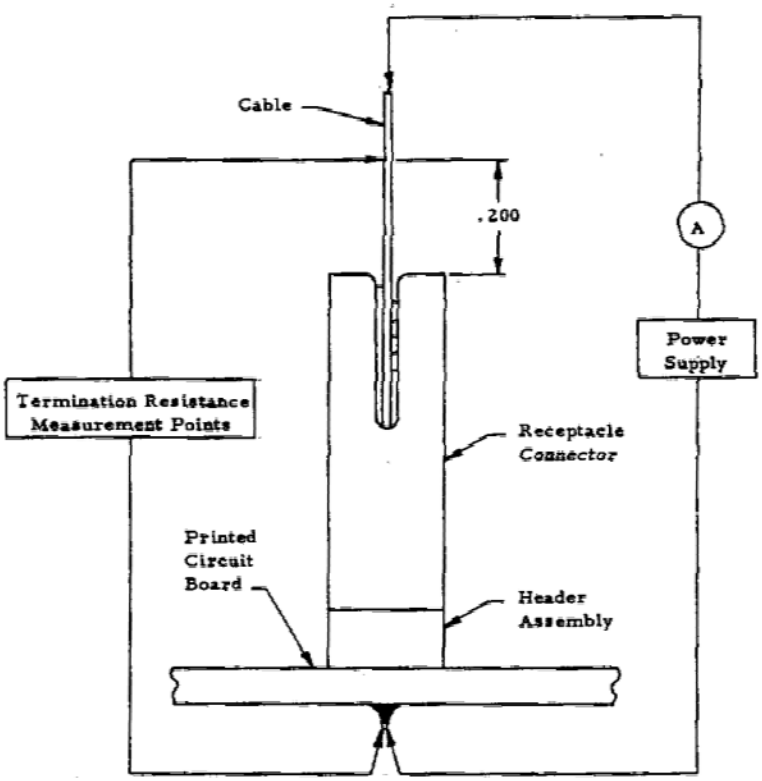

Figure 3
Termination Resistance Measurement Points
(Receptacle Connector to Header Assembly)

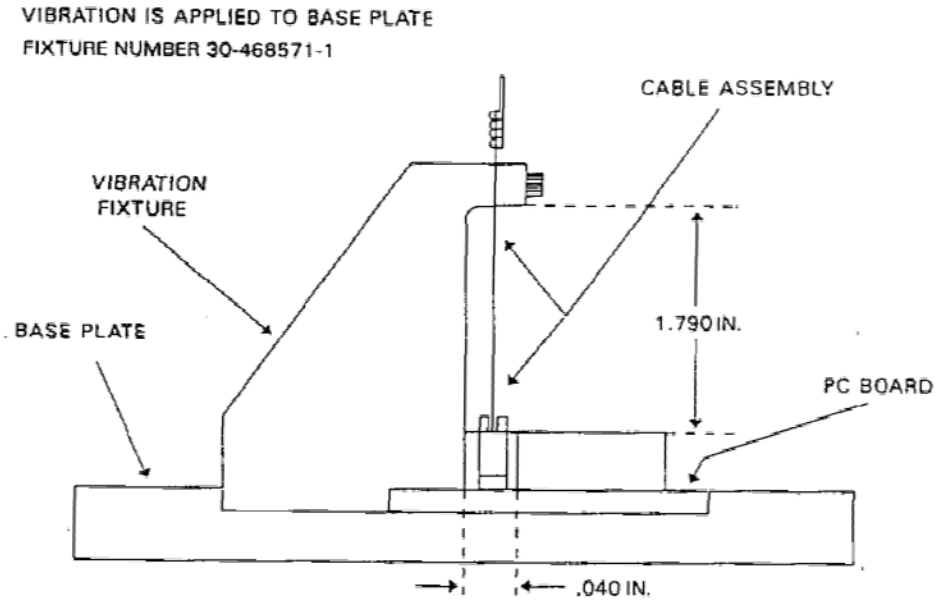

Figure 4
Vibration and Physical Shock Mounting Fixture