New Mini CT Hybrid Drawer Connector

1. Scope:

1.1 Contents:

This specification covers the requirements for product performance, test methods and quality assurance provisions of Tyco Mini CT Hybrid Drawer Connector, 1.5mm Pitch, Lead Free Version.

Applicable product description and part numbers are as shown in Fig.1.

Product Part No.	Description	
1981536-1	Receptacle Assembly, 1.5mm Pitch Mini CT SF Hybrid Drawer Connector, Lead Free	
1981537-1	Plug Assembly, 1.5mm Pitch Mini CT SF Hybrid Drawer Connector, Lead Free	
1981378-1	Receptacle Crimp Contact (#16-20) for Drawer Connector	Gold Version
1981379-1	Receptacle GND Contact (#16-20) for Drawer Connector	Gold Version
1981377-2	Plug Crimp Contact (#16-20) for Drawer Connector	Gold Version
1-1981378-1	Receptacle Crimp Contact (#16-20) for Drawer Connector	Tin Version
1-1981379-1	Receptacle GND Contact (#16-20) for Drawer Connector	Tin Version
1-1981377-2	Plug Crimp Contact (#16-20) for Drawer Connector	Tin Version

Fig. 1

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 this specification and the product drawing, the product drawing shall take precedence.

In the event of conflict between the requirements this specification and referenced documents, this specification shall take precedence.

タイコ エレクトロニクス アンプ株式会社（〒213-8535 川崎市高津区久本 3-5-8）
Tyco Electronics AMP K.K. (3-5-8 Hisamoto Takatsu-ku Kawasaki, 213-8535)

2.1 AMP Specifications:

A. 109-5000 Test Specification, General Requirements for Test Methods

B. 114-5182 Application Specification

C. 501-78005 Qualification Test Report

2.2 Commercial Standards and Specifications:

A. MIL-STD-202: Test Methods for Electronic and Electrical Component Parts.

B. IEC: International Electrotechnical Commission

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:

3.2.1 Plug Assembly

A. Signal Contact

Material:	Phosphor Bronze
Finish (Mini CT post area):	Tin plating over Nickel under plating
Finish (Drawer mating area):	Gold plating over Nickel under plating

B. Power Contact

Material:	Brass
Finish (Gold Version)	Gold (mating area), Tin (crimp area) over Nickel under plating
Finish (Tin Version)	Pre-plated Tin

C. Housing

Material:	Glass-filled PBT UL94V-0

3.2.2 Receptacle Assembly

A. Signal Contact

Material: Brass

Finish (Mini CT post area): Tin plating over Nickel under plating

Finish (Drawer mating area): Gold plating over Nickel under plating

B. Power Contact

Material: Phosphor Bronze

Finish (Gold Version): Gold (mating area), Tin (crimp area) over Nickel under plating

Finish (Tin Version): Pre-plated Tin

C. Housing

Material: Glass-filled PBT UL94V-0

3.3 Ratings:

A. Voltage Rating (Signal): 50 V(AC/DC)

Voltage Rating (Power): 250 VAC

B. Current Rating (Signal): 1A Max

Current Rating (Power): AWG #16 (1.25 mm^2): 12.5 A (With GND Contact)

14A (Without GND Contact)

AWG #18 (0.85 mm^2): 10 A (With GND Contact)

AWG #20 (0.5 mm^2): 7 A (With GND Contact)

C. Temperature Rating: -30°C to +105°C

The upper limit of the temperature includes the temperature rising resulted by the energized electrical current.

3.4 Performance Requirements and Test Descriptions:

The product shall be designed to meet the electrical, mechanical and environmental performance requirements specified in Fig.2.

All tests shall be performed in the room temperature unless otherwise specified.

3.5 Test Requirements and Procedures Summary:

Para.	Test Items	Requirements	Procedures
3.5.1	Examination of product	Product shall be confirming to the requirements of applicable product drawing and applicable Specification	Visually, dimensionally and functionally inspected per applicable quality inspection plan
		Electrical Requirements	
3.5.2	Termination Resistance (Low Level)	Signal Line: 30 mΩ Max. (Initial) 40 mΩ Max. (Final) Power Line: 6 mΩ Max. (Initial) 10 mΩ Max. (Final)	Subject mated connectors to 20 mV Max open circuit at 10 mA Refer Fig. 4
3.5.3	Dielectric withstanding voltage	No creeping discharge or flashover shall occur. Current leakage: Signal Line 5mA Max. Power Line 1mA Max.	Signal Line: 500 VAC for 1 minute. Power Line: 1.8 kVAC for 1 minute. Test between adjacent circuits of mated connectors. MIL STD 202 TEST Method 301 IEC 512-2 TEST 4A
3.5.4	Insulation Resistance	500 MΩ Min. (Initial) 100 MΩ Min. (Final)	Impressed voltage 500VDC for 1 minute. Test between adjacent circuits of mated connectors. MIL STD 202 TEST Method 302 Condition B
3.5.5	Temperature Rising vs. Current	30°C Max. under loaded rating current	Contacts series-wired, apply test current of loaded rating current to the circuit, and measure the temperature rising by probing on soldered areas of contacts, after the temperature becomes stabilized deduct ambient temperature from the measured value
		Mechanical Requirements	
3.5.6	Crimp Tensile Strength (Power contacts only)	Wire Size: mm^2 / AWG; Crimp Tensile (Min.): N / kgf 0.5 / #20 / 45.1 / 4.6 0.85 / #18 / 98.0 / 10.0 1.25 / #16 / 186.2 / 19.0	Apply an axial pull-off load to a crimp wire, with the contact secured to the tester. Operation Speed: 100mm/min.
3.5.7	Contact-housing Insertion Force (Power contacts only)	14.7N (1.5kgf) Max. per contact	Measure force required to insert contact into housing.
3.5.8	Contact Retention Force	Signal Contact: Receptacle: 14.7N (1.5kgf) Min. Tab: 5.88 N (0.6kgf) Min. Power Contact: 35.2 N (3.6 kgf) Min.	Measure contact retention force. Operation Speed: 100 mm/min.
3.5.9	Connector Mating force	Pos. size (Power /Signal) / Initial / After Durability 4/14 / 41.2N (4.2kgf) Max. / 62.8N (6.4kgf) Max.	Operation speed: 100mm/min. Measure the force required to mated connectors

Fig.2 (To be continued)

Para.	Test Items	Requirements		Procedures
3.5.10	Connector Unmating Force	Pos. size (Power/Signal)	Initial/After Durability Min.	Apply an axial pull-off load to a crimp wire, with the contact secured to the tester. Operation Speed: 100mm/min.
		4/14	6.6N (0.67kgf)	
3.5.11	Panel Retention Force	98N(10kgf) Min.		Measure panel retention force using panel of nominal cut-out dimension as specified in the Tyco Customer Drawing. Loading is made from the direction opposite to connector insertion direction.
3.5.12	Durability(Repeated Mate/Unmating)	Signal Line: 40mΩ Max.(Final) Power Line: 10mΩ Max.(Final)		Operation Speed: 100mm/min. No. of Cycles: Gold Version: 3,000cycles Tin Version: 30cycles
3.5.13	Vibration (Low Frequency)	No electrical discontinuity greater than 1 μ sec. Shall occur.		Subject mated connectors to 10-55-10 Hz traversed in 1 minute at 1.52mm amplitude 2 hours each of 3 mutually perpendicular planes. MIL-STD-202 TEST Method 201 Condition A Mounting: Fig. 5
3.5.14	Physical Shock	No electrical discontinuity greater than 1 μ sec. Shall occur. Signal Line: 40mΩ Max.(Final) Power Line: 10mΩ Max.(Final)		Accelerated Velocity: 490mm/s^2(50G) Waveform: half sine shock pulse Duration: 11m sec Number of Shock: 3 shocks in each direction applied along the X, Y and Z axes, totally 18 shocks. MIL-STD-202 TEST Method 213 Condition A IEC 68-2-27, Test Ea Mounting: Fig.5
3.5.15	Hammering Shocks	No electrical discontinuity greater than 1 μ sec. Shall occur. Signal Line: 40mΩ Max.(Final) Power Line: 10mΩ Max.(Final)		Subject mated connectors to 10,000 cycles of hammering shocks in set up as shown in Fig.6, with test current of 1mA at DC 10V applied to circuits as shown Fig.7 During the test, the circuit shall be monitored for fluctuation of electrical resistance.
Environmental Requirements				
3.5.16	Thermal Shock	Signal Line: 40mΩ Max.(Final) Power Line: 10mΩ Max.(Final)		Subject mated connectors to -55°C/30min., +85 °C/30min. This being 1 cycle repeat for a total of 25 cycles. MIL-STD-202 TEST Method 107
3.5.17	Humidity-Temperature Cycling	Insulation resistance 100 MΩ Min. (Final) Termination resistance Signal Line: 40 mΩ Max. (Final) Power Line: 10 mΩ Max. (Final)		Subject mated connector to 25-65°C, 90-95 %R.H., 10 cycles. With cold shock –10 °C. Re-condition in room temperature for 3hrs before subsequent measurement. MIL-STD-202 TEST Method 106 IEC 68-2-38, Test Z/AD.

Fig.2 (To be continued)

Para.	Test Items	Requirements	Procedures
3.5.18	Salt Spray	Signal Line: 40mΩ Max.(Final) Power Line: 10mΩ Max.(Final)	Subject mated connectors to 5±1% salt concentration for 48 hours. After test, rinse the samples with water and recondition the room temperature for 1 hour before subsequent measurements MIL-STD-202 TEST Method 101, Condition B. IEC 68-2-11, Test Ka.
3.5.19	Temperature Life (Heat Aging)	Signal Line: 40mΩ Max.(Final) Power Line: 10mΩ Max.(Final)	Subject mated connector to 85±2°C, 500 hours. MIL-STD-202 TEST Method 108.

Fig.2 (End)

4. Product Qualification Test Sequence

Test of examination	Test group											
	A	B	C	D	E	F	G	H	I	J	K	L
	Test sequence (a)											
Examination of connector	1,4,8	1,3	1,3	1,4	1,7	1,3	1,5	1,5	1,5	1,5	1,5	1,5
Termination resistance (Low level)	2,5				2,6		2,4	2,4	2,4	2,4	2,4	2,4
Dielectric withstanding voltage	7											
Insulation resistance	6											
Temperature Rise		2										
Crimp Tensile Strength			2									
Contact Insertion Force				2								
Contact Retention Force				3								
Connector Mating/Unmaiting Force					3,5							
Panel Retention force						2						
Durability					4							
Vibration							3					
Physical shock								3				
Hammering Shock									3			
Thermal shock										3		
Moisture resistance	3											
Salt Spray											3	
Temperature Life												3

NOTE
(a) Numbers indicate sequence in which tests are performed.

Fig.3

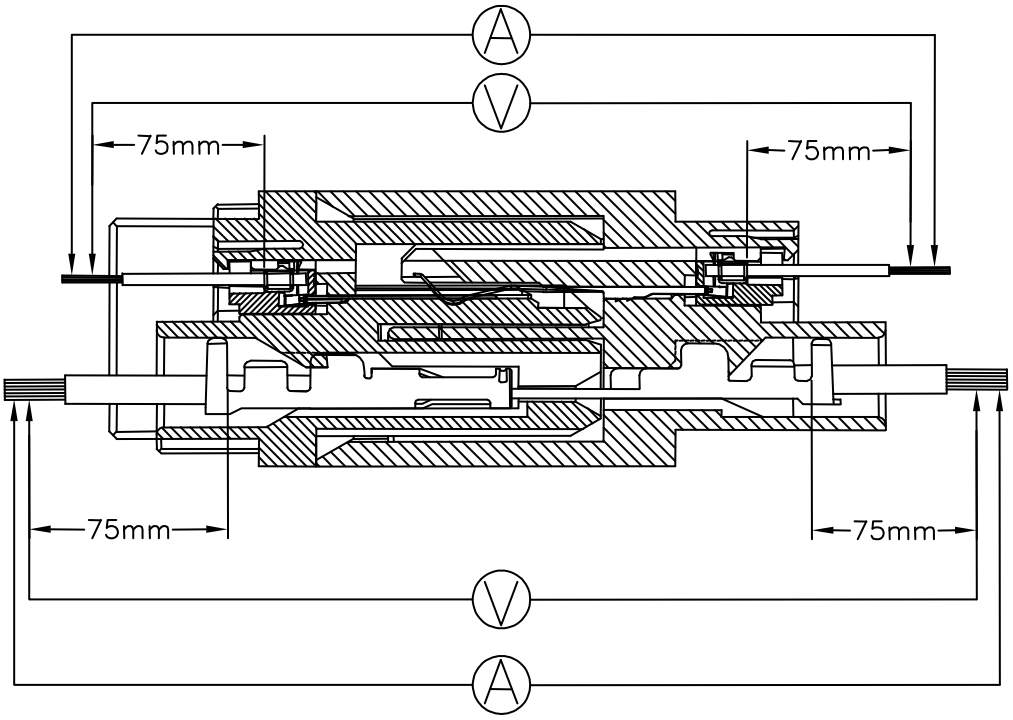

Fig.4 : Termination Resistance Measurement Method

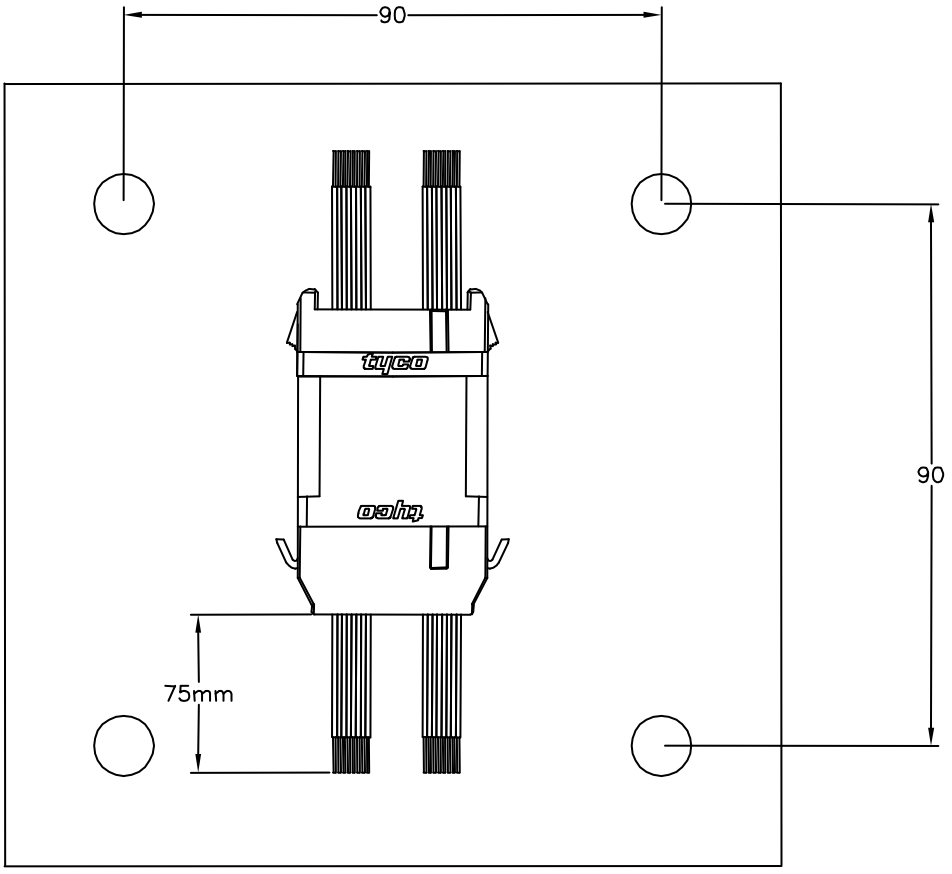

Fig.5 : Vibration/Physical Shock Mounting Method

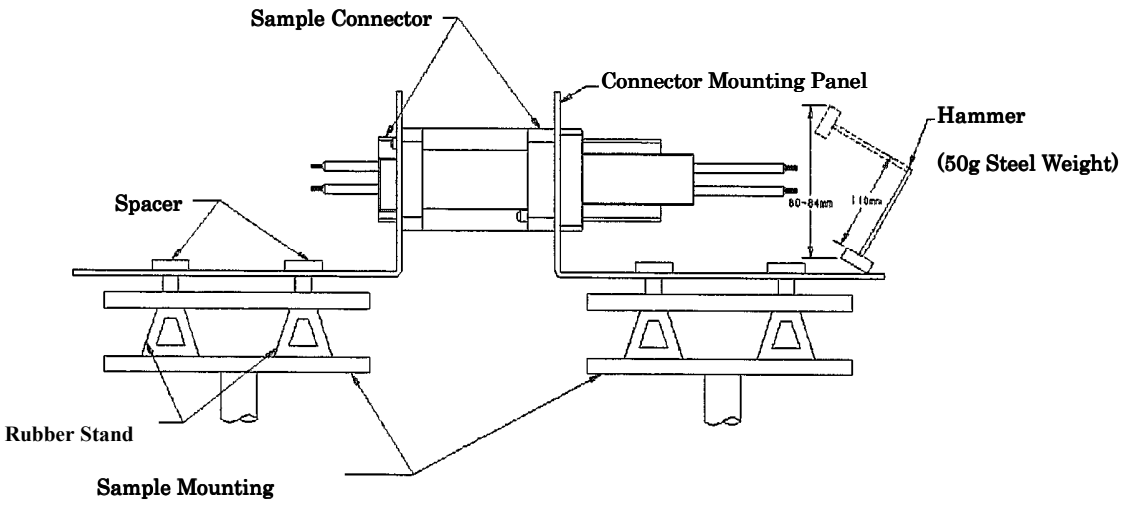

Fig.6 Hammering Shock Test

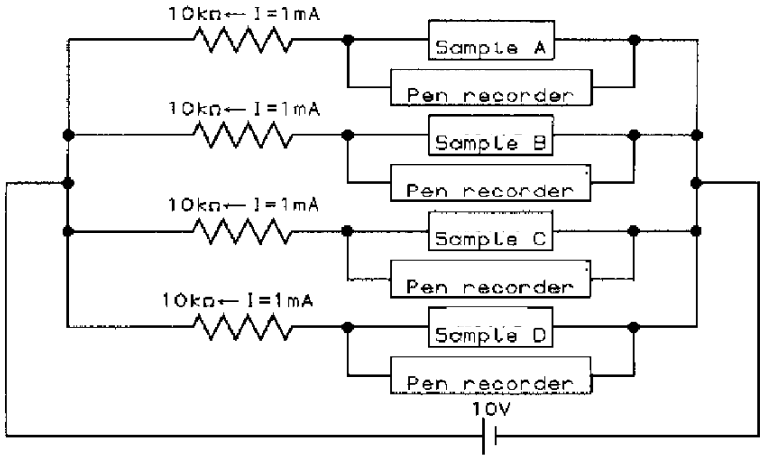

Fig.7 Electrical Resistance Fluctuation Monitoring Circuit