Product Specification

108-60030

AMP Mini CT High Current Hybrid Drawer Connector 1.5 mm Pitch, Lead Free Version

1. Scope:

1.1 Contents:

This specification covers the requirements for product performance, test methods and quality assurance provisions of AMP Mini CT High Current Hybrid Drawer Connector, Lead Free Version. Applicable product description and part numbers are as shown in Fig.1.

Product Part No.	Description
x-292237-x	Plug Assembly, 1.5mm Pitch Mini CT High Current Hybrid Drawer Connector. (Lead Free)
x-292238-x	Receptacle Assembly, 1.5mm Pitch Mini CT High Current Hybrid Drawer Connector. (Lead Free)
x-179316-x	Receptacle Crimp Contact (#16-20) for Drawer Connector
x-179317-x	Receptacle Crimp Contact (#20-24) for Drawer Connector
x-316458-x	Receptacle GND Contact (#16-20) for Drawer Connector
x-179321-x	Plug Crimp Contact (#16-20) for Drawer Connector
x-179322-x	Plug Crimp Contact (#20-24) for Drawer Connector
84696-1	"S" Size Power Tab Dynamic Contact.
84695-1	"M" Size Power Receptacle Dynamic Contact.
179955-2	"S" Size Power Receptacle Dynamic Contact. (Strip)
179956-2	"M" Size Power Receptacle Dynamic Contact. Au 0.38μm (Strip)
179956-3	"M" Size Power Receptacle Dynamic Contact. Au 0.76μm (Strip)
316040-2	"S" Size Power Receptacle Dynamic Contact. (L/P)
316041-2	"M" Size Power Receptacle Dynamic Contact. (L/P)

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A	REVISED D20070828223657_416721	C.Z	29AUG '07

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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.

2.1 AMP Specifications:

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

B. 114-51009 Application Specification

C. 501-51024 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 Comission

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 underplating	
Finish (Drawer mating area):	i)	Gold plating over Nickel underplating
	ii)	Gold over Palladium-Nickel over Nickel underplating

B. Power Contact

I) MIC (Multi-Interlock Connector) Contact

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

II) Dynamic Contact

Material:	Copper Alloy
Finish:	Gold plating (mating area) over Nickel underplating

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 underplating
Finish (Drawer mating area):	i) Gold plating over Nickel underplating
	ii) Gold over Palladium-Nickel over Nickel underplating

B. Power Contact

I) MIC

Material:	Phosphor Bronze
Finish (Gold Version)	Gold plating (mating area)
	Tin plating (crimp area) over Nickel underplating
Finish (Tin Version)	Pre-plated Tin

II) Dynamic Contact

Material:	Copper Alloy
Finish:	Gold plating (mating area) over Nickel underplating

C. Housing

Material: Glass-filled PBT UL94V-0

3.3 Ratings:

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

Voltage Rating (MIC): 250 VAC

Voltage Rating (Dynamic): 630 VAC/DC

B. Current Rating (Signal): 1A Max

Current Rating (MIC):

Wire Size	AWG				
	#16	#18	#20	#22	#24
Current	12 A	10 A	7 A	5 A	4 A

Current Rating (Dynamic)

Wire Size	AWG			
	#10	#12	#14	#16
Current	30 A	25 A	19 A	16 A

C. Temperature Rating: -30℃ to +105℃

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) MIC Line: 6 mΩ Max. (Initial) 10 mΩ Max. (Final) Dynamic Line: 2 mΩ Max. (Initial & Final)	Signal/MIC Line: Subject mated connectors to 20 mV Max. open circuit at 10 mA Dynamic Line: Subject mated connectors to 50 mV Max. open circuit at 50 mA. Refer Fig. 4
3.5.3	Dielectric withstanding voltage	No creeping discharge or flashover shall occur. Current leakage: Signal Line: 5mA Max. MIC Line: 1 mA Max. Dynamic Line: 1 mA Max.	Signal Line: 500 VAC for 1 minute MIC Line: 1.8 kVAC for 1 minute Dynamic Line: 3 kVAC for 1 minute Test between adjacent circuits of mated connectors. MIL STD 202 TEST Method 301 IEC 512-2 TEST 4A

Fig.2. (To be continued)

<table>
<tr><th>Para.</th><th>Test items</th><th>Requirements</th><th>Procedures</th></tr>
<tr><td>3.5.4</td><td>Insulation Resistance</td><td>Signal/MIC Line:
500 MΩ Min. (Initial)
100 MΩ Min. (Final)
Dynamic Line:
1000 MΩ Min.</td><td>Impressed voltage 500VDC for 1 minute.
Test between adjacent circuits of mated connectors.
MIL STD 202 TEST Method 302
Condition A</td></tr>
<tr><td>3.5.5</td><td>Temperature Rising vs. Current</td><td>30°C Max. under loaded rating current</td><td>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.
Refer Fig. 4</td></tr>
<tr><td colspan="4">Mechanical Requirements</td></tr>
<tr><td>3.5.6</td><td>Crimp Tensile Strength (Power contacts only)</td><td>MIC Contact
<table><tr><th colspan="2">Wire Size</th><th>Crimp Tensile</th></tr><tr><th>mm^2</th><th>(AWG)</th><th>N (kgf) Min.</th></tr><tr><td>0.2</td><td>#24</td><td>19.6 (2.0)</td></tr><tr><td>0.3</td><td>#22</td><td>34.3 (3.5)</td></tr><tr><td>0.5</td><td>#20</td><td>45.1 (4.6)</td></tr><tr><td>0.85</td><td>#18</td><td>98.0 (10.0)</td></tr><tr><td>1.25</td><td>#16</td><td>186.2 (19.0)</td></tr></table>
Dynamic Contacts
<table><tr><th colspan="2">Wire Size</th><th>Crimp Tensile</th></tr><tr><th>mm^2</th><th>(AWG)</th><th>N (kgf) Min.</th></tr><tr><td>1.309</td><td>#16</td><td>186.2 (19)</td></tr><tr><td>2.081</td><td>#14</td><td>245.0 (25)</td></tr><tr><td>3.309</td><td>#12</td><td>313.6 (32)</td></tr><tr><td>5.262</td><td>#10</td><td>401.8 (41)</td></tr></table></td><td>Apply an axial pull-off load to crimped wire, with the contact secured to the tester.
Operation Speed: 100 mm/min</td></tr>
<tr><td>3.5.7</td><td>Contact-housing Insertion Force (Power contacts only)</td><td>14.7 N (1.5 kgf) Max. per contact</td><td>Measure force required to insert contact into housing.</td></tr>
<tr><td>3.5.8</td><td>Contact Retention Force</td><td>Signal Contact:
Receptacle: 14.7N (1.5kgf)
Tab: 7.84N (0.8kgf)
Power Contact:
49.1 N (5.0 kgf) Min.</td><td>Measure contact retention force.
Operation Speed: 100 mm/min.</td></tr>
</table>

Fig. 2 (To be continued)

Para.	Test Items	Requirements		Procedures
3.5.9	Connector Mating Force	Pos. size (Power/ Signal)	Initial & After Durability N (kgf) Min.	Operation Speed: 100 mm/min Measure the force required to mate and unmate connectors.
		4/10	43.1 (4.4)	
		6/10	56.8 (5.8)	
		6/20	66.6 (6.8)	
3.5.10	Connector Unmating Force	Pos. size (Power/ Signal)	Initial & After Durability N (kgf) Min.	Operation Speed: 100 mm/min Measure the force required to mate and unmate connectors.
		4/10	7.8 (0.8)	
		6/10	10.8 (1.1)	
		6/20	11.8 (1.2)	
3.5.11	Durability (Repeated Mate/Unmating)	Signal Line 40 mΩ Max. (Final) MIC Line: 10 mΩ Max. (Final) Dynamic Line: 2 mΩ Max. (Final)		Operation Speed: 100mm/min. No. of Cycles: Gold Version: 1000cycles Pre-tin Version: 25 cycles.
3.5.12	Vibration (Low Frequency)	No electrical discontinuity greater than 1 μ sec. Shall occur. Signal Line: 40 mΩ Max. (Final) MIC Line: 10 mΩ Max. (Final) Dynamic Line: 2 mΩ Max. (Final)		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 IEC 68-2-6 Mounting: Fig. 5
3.5.13	Physical Shock	No electrical discontinuity greater than 1 μ sec. Shall occur. Signal Line: 40 mΩ Max. (Final) MIC Line: 10 mΩ Max. (Final) Dynamic Line: 2 mΩ Max. (Final)		Accelerated Velocity: 490 mm/s^2 (50G) Waveform: halfsine shock pulse Duration: 11 m sec Number of shocks: 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

Fig. 2 (To be continued)

Para.	Test Items	Requirements	Procedures
3.5.14	Hammering Shocks	No electrical discontinuity greater than 1 μ sec. Shall occur. Signal Line: 40 mΩ Max. (Final) MIC Line: 10 mΩ Max. (Final) Dynamic Line: 2 mΩ Max. (Final)	Subject mated connectors to 10,000 cycles of hammering shocks in set up as shown in Fig. 6, with test current of 1 mA at DC 10 V applied to circuits as shown in Fig. 7 During the test, the circuit shall be monitored for fluctuation of electrical resistance.
Environmental Requirements			
3.5.15	Thermal Shock	Signal Line: 40 mΩ Max. (Final) MIC Line: 10 mΩ Max. (Final) Dynamic Line: 2 mΩ 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
3.5.16	Humidity-Temperature Cycling	Insulation resistance 100 MΩ Min. (Final) Termination resistance Signal Line: 40 mΩ Max. (Final) MIC Line: 10 mΩ Max. (Final) Dynamic Line: 2 mΩ Max. (Final)	Subject mated connector to 25-65°C, 90-95 %R.H., 10 cycles. Re-condition in room temperature for 3hrs before subsequent measurement. MIL-STD-202 TEST Method 106 IEC 68-2-38, Test Db.
3.5.17	Salt Spray	Signal Line: 40 mΩ Max. (Final) MIC Line: 10 mΩ Max. (Final) Dynamic Line: 2 mΩ 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.
3.5.18	Temperature Life (Heat Aging)	Signal Line: 40 mΩ Max. (Final) MIC Line: 10 mΩ Max. (Final) Dynamic Line: 2 mΩ 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											
	1	2	3	4	5	6	7	8	9	10	11	12
	Test Sequence(a)											
Examination of Product	1,4,8	1, 3	1, 3	1, 3	1, 3	1, 6	1, 5	1, 5	1, 5	1, 5	1, 5	1, 5
Termination Resistance (Low Level)	2, 5					2, 5	2, 4	2, 4	2, 4	2, 4	2, 4	2, 4
Dielectric withstanding voltage	7											
Insulation Resistance	6											
Temperature Rising vs. Current		2										
Crimp Tensile Strength			2									
Contact-housing Insertion Force				2								
Contact Retention Force					2							
Connector Mating/Unmating Force (1th/25th cycle)						3						
Durability Cycling						4						
Vibration (Low Frequency)							3					
Physical Shock								3				
Hammering Shocks									3			
Thermal Shock										3		
Humidity-Temperature Cycling	3											
Salt Spray											3	
Temperature Life (Heat Aging)												3

(a) Numbers indicated sequence in which tests are performed.

Fig.3

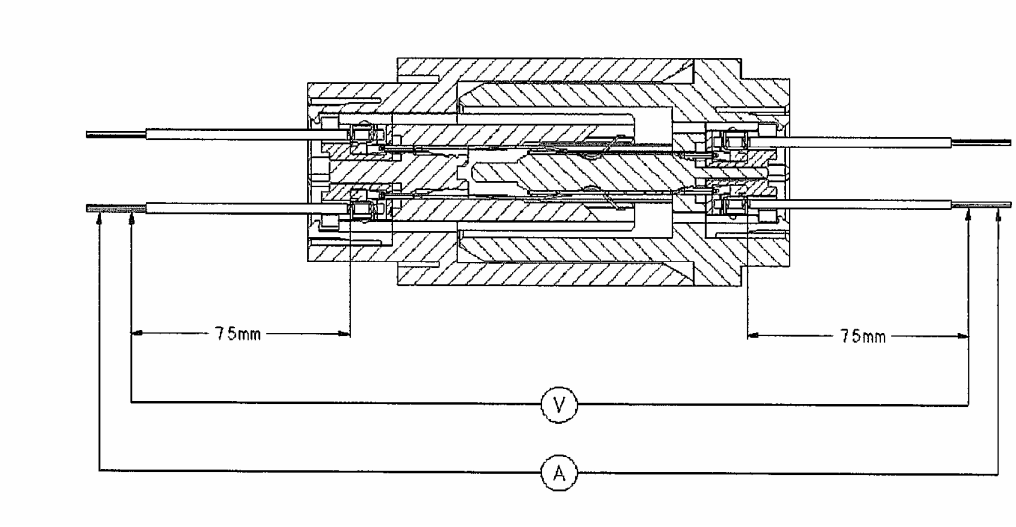

Fig. 4a: Signal Line Termination Resistance Measurement Method

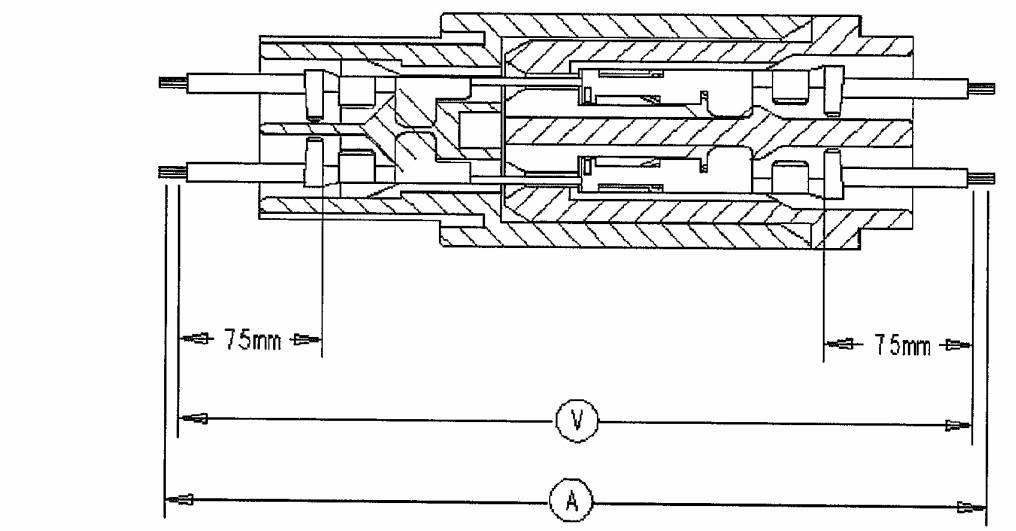

Fig. 4b: MIC/Dynamic Line Termination Resistance Measurement Method

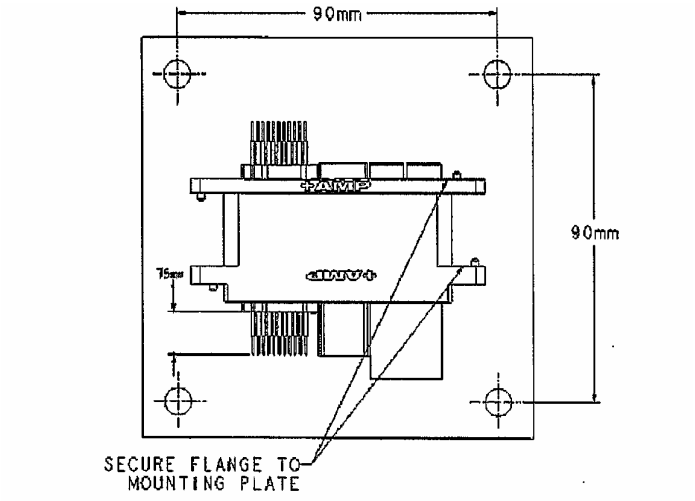

Fig. 5: Vibration/Physical Shock Mounting Method

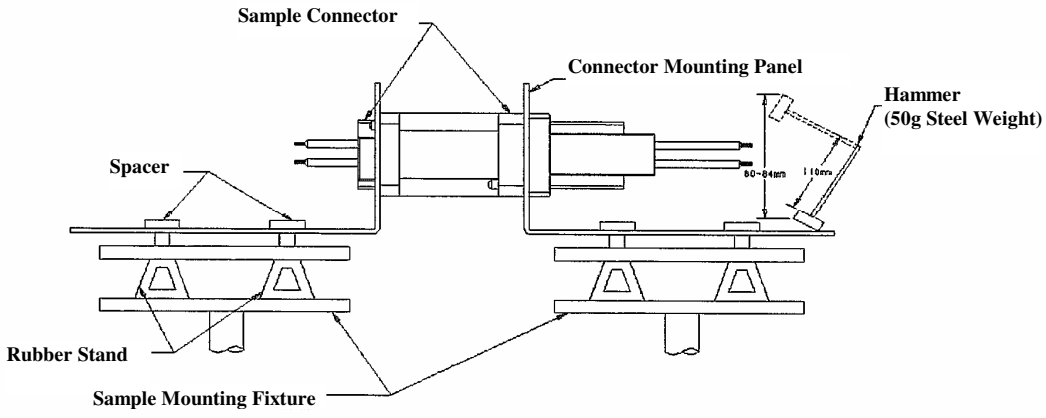

Fig. 6 Hammering Shock Test

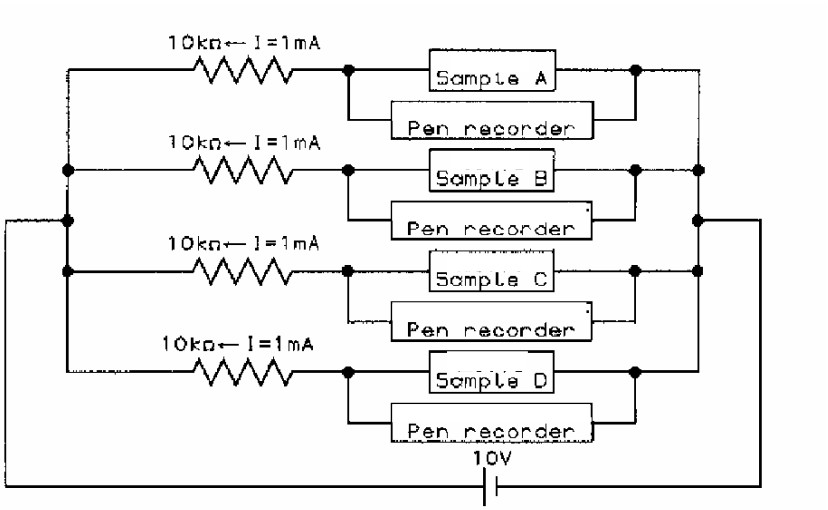

Fig. 7: Electrical Resistance Fluctuation Monitoring Circuit