

**Product specification**  
**108-60023**  
**Hybrid SF Drawer Connector, Lead Free Version**

1. Scope:

1.1 Contents:

This specification covers the requirements for product performance, test methods and quality assurance provisions of Hybrid SF Drawer Connector, Lead Free Version.

The applicable product description and part numbers are as shown in Appendix 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.

2.1 AMP Specifications:

- A. 109-5000 Test Specification, General Requirements for Test Methods
- B. 114-5182 Application Specification
- C. 108-60016 CT Connector Product Specification
- D. 501-5217 Test Report (8 Pos., 9 Pos.)
- 501-5403 Test Report (10 Pos.)

2.2 Commercial Standard and Specifications:

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

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<b>O</b>	<b>Released FB00-0040-03</b>	<b>J.J</b>	<b>04APR 03</b>	<b>DR</b>	J. JIANG	<b>tyco</b> <i>Electronics</i>	Tyco Electronics AMP Shanghai Ltd		
				<b>CHK</b>	S. YAO				
				<b>APP</b>	T. SASAKI	<b>NO</b>	108-60023	<b>REV</b>	<b>LOC</b>
				<b>LTR</b>	<b>REVISION RECORD</b>	<b>DR</b>	<b>DATE</b>	<b>PAGE</b>	<b>TITLE</b>
				1 of 7	<b>Hybrid SF Drawer Connector, Lead Free Version</b>				

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:


- A. DC Contact: Copper Alloy  
 (Signal Line) Finish: Mating Side: Gold plating over Nickel underplating  
 CT Conn. Side: Tin plating over Nickel underplating
- B. AC Contact: Copper Alloy  
 (Power Line) Finish: Gold Plating Version  
 Mating Area: Gold plating over Nickel underplating  
 Crimp Area: Tin plating over Nickel underplating  
 Tin plating Version: Tin plating all over
- C. GND Contact: Copper Alloy  
 (Ground Line) Finish: Gold Plating Version  
 Mating Area: Gold plating over Nickel underplating  
 Crimp Area: Tin plating over Nickel underplating  
 Tin plating Version: Tin plating all over
- D. Housing: Thermoplastic UL94V-0

3.3 Ratings:

- A. Voltage Rating: A-1 DC Contact: 30 VAC  
 A-2 AC · GND Contact: 250 VAC
- B. Current Rating : B-1 DC Contact: 2A  
 B-2 AC · GND Contact: Refer to Fig. 1
- C. Temperature Rating: -30°C to +105°C (Including temperature rising by energised current)

Wire		Current Rating
(mm <sup>2</sup> )	AWG	
1.25	# 16	12 A
0.85	# 18	10 A
0.5	# 20	7 A

Fig. 1

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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 application specification	Visual inspection No physical damage			
<b>Electrical Requirements</b>						
3.5.2	Termination Resistance (Low Level)	DC Signal Line: 30 mΩ Max. (Initial) 40 mΩ Max. (Final) AC Power Line: 6 mΩ Max. (Initial) 10 mΩ Max. (Final) GND Ground Line: 6 mΩ Max. (Initial) 10 mΩ Max. (Final)	Subject mated contacts assembled in housing to closed circuit current of 10 mA Max. at open circuit voltage of 20 mV Max. Fig. 4 AMP Spec. 109-5311-1			
3.5.3	Insulation Resistance	1000 MΩ Min. (Initial) 100 MΩ Min. (Final)	Impressed voltage 500 VDC. Test between adjacent circuits of mated connectors. AMP Spec. 109-5302			
3.5.4	Dielectric Strength	No creeping discharge nor flashover shall occur. Current leakage: 1.0 mA Max.	Signal Line: 1 k VAC for 1 minute. Power Line: 1.8 k VAC for 1 minute. Test between adjacent circuits of mated connectors. AMP Spec. 109-5301			
3.5.5	Temperature Rising vs. Current	30 °C Max. under loaded specified current	Measure temperature rising by energised current. AMP Spec. 109-5310 Method 2			
3.5.6	Crimp Tensile Strength	Wire Size	Apply an axial pull-off load to crimped wire of contact secured on the tester, Operation Speed: 100 mm/min. AMP Spec. 109-5205 Condition B			
		Crimp Tensile (min)				
		mm <sup>2</sup>		(AWG)	N	(kgf)
		0.5		# 20	45.1	(4.6)
0.85	# 18	98.0	(10.0)			
1.25	# 16	186.2	(19.0)			

Fig. 2 (To be continued)

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Para.	Test Items	Requirements	Procedures			
3.5.7	Contact Retention Force	DC Contact: 9.8N (1kgf) Min. AC • GND Contact: 58.8N (6kgf) Min.	Apply an axial pull-off load to crimped wire. Operation Speed: 100 mm/min AMP Spec. 109-5212			
3.5.8	Contact Insertion Force	14.7 N (1.5 kgf) Max. per contact	Measure the force required to insert Power Line contact into housing. AMP Spec. 109-5211			
3.5.9	Connector Mating Force	(Para 3.5.11)		Operation Speed: 100 mm/min. Measure the force required to mated connectors.		
		Pos			Initial N (kgf) Max.	After Durability N (kgf) Max.
		DC	AC GND			
		5	4		44.3 (4.5)	53.2 (5.4)
		5	3		36.0 (3.7)	43.2 (4.4)
7	3	40.4 (4.1)	48.5 (4.9)			
3.5.10	Connector Unmating Force	(Para 3.5.11)		Operation Speed: 100 mm/min. Measure the force required to unmate connectors.		
		Pos.			Initial and after Durability N (kgf) Min.	
		DC	AC GND			
		5	4		8.58 (0.88)	
		5	3		7.11 (0.73)	
7	3	8.19 (0.84)				
3.5.11	Durability (Repeated Mate/Unmating)	DC: 40 mΩ Max. (Final) AC • GND: 10 mΩ Max. (Final)	Operation Speed: 100 mm/min. No of Cycles: Gold Plating Version 3000 cycles No. of Cycles: Tin Plating Version: 50 cycles AMP Spec. 109-5213			
3.5.12	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 hour each of 3 mutually perpendicular planes. 100 mA applied. AMP Spec. 109-5201			
3.5.13	Physical Shock	No electrical discontinuity greater than 1 μ sec. shall occur	Accelerated Velocity: 490 m/s <sup>2</sup> (50G) Waveform: Halfsine Duration: 11 m sec. Velocity Change: 3.4 m/s <sup>2</sup> Number of Drops: 18 Drops AMP Spec. 109-5208			
3.5.14	Thermal Shock	DC: 40 mΩ Max. (Final) AC • GND: 10 mΩ Max. (Final)	-55 °C / 30 min., 85 °C / 30 min. Making this a cycle, repeat 25 cycles. AMP Spec. 109-5103 Condition A			

Fig.2. (End)

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Para.	Test Items	Requirements	Procedures
3.5.15	Humidity- Temperature Cycling	Insulation resistance: 100 MΩ Min. (Final) Termination resistance: DC: 40 mΩ Max. (Final) AC • GND: 10 mΩ Max. (Final)	Mated connector, 25 ~ 65 °C, 95 % R.H. 10 cycles Cold shock -10 °C AMP Spec. 109-5106
3.5.16	Salt Spray	DC: 40 mΩ Max. (Final) AC • GND: 10 mΩ Max. (Final)	Subject mated connectors to 5% salt Concentration for 48 hours: MIL-STD-202, Method 101 AMP Spec. 109-5101 Condition A

Fig. 2 (End)


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3.6 Product Qualification Test Sequence

Test or Examination	Test Group								
	1	2	3	4	5	6	7	8	9
	Test Sequence (a)								
Confirmation of Product	1, 3	1, 4	1, 3	1,5,8	1, 8	1, 4	1, 4	1, 4	1, 5
Termination Resistance (Low Level)					3, 9	2, 5	2, 5	2, 5	2, 6
Dielectric Strength				3, 7					
Insulation Resistance				2, 6					
Temperature Rising vs. Current			2						
Vibration (Low Frequency)									3
Physical Shock									4
Connector Mating Force					2, 6				
Connector Unmating Force					4, 7				
Contact Insertion Force		2							
Contact Retention Force		3							
Contact Tensile Strength	2								
Durability (Repeated Mate/ Unmating)					5				
Thermal Shock						3			
Humidity-Temperature Cycling				4			3		
Salt Spray								3	

(a) Numbers indicate the sequence in which the tests are performed

Fig. 3 (End)

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The applicable product descriptions and part numbers are show in Appendix 1.

Product Part No.	Product Descriptions
x-292190-x	Receptacle Ass'y, Lead Free
x-292192-x	Receptacle Ass'y, Lead Free
x-292187-x	Plug Ass'y, Lead Free
x-292189-x	Plug Ass'y, Lead Free
x-179316-x	Receptacle Contact # 20 ~ 16 AWG
x-179321-x	Plug Tab Contact # 20 ~ 16 AWG
x-316458-x	Receptacle Ground Contact # 20 ~ # 16 AWG

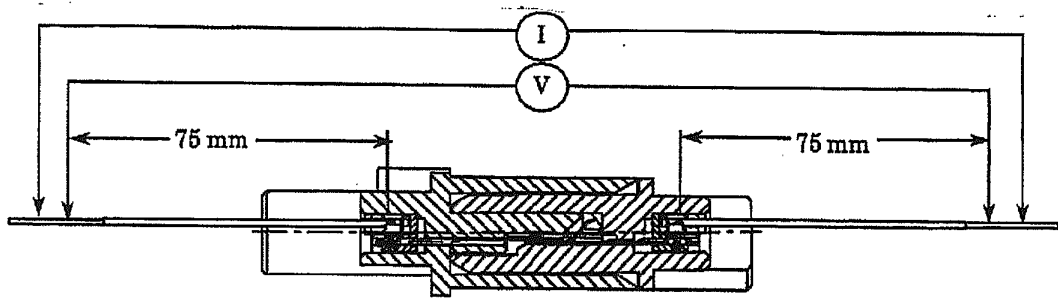


Fig. 4-1 DC Termination Resistance Measuring Points.

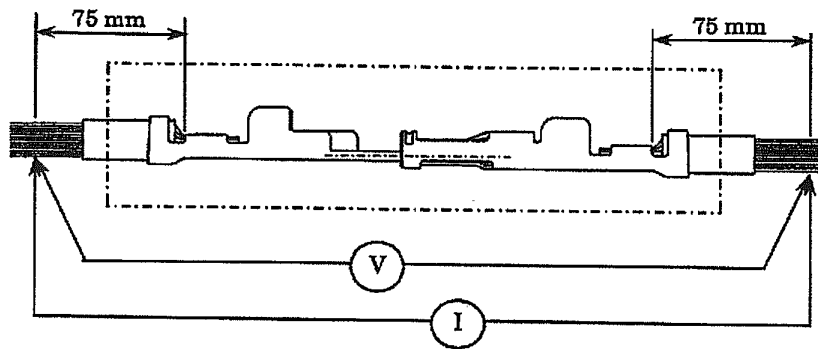


Fig. 4-2 AC · GND Termination Resistance Measuring Points

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