NUMBER: 108-5532

SECURITY CLASSIFICATION: Customer Release

Product Specification

108-5532

Fan Motor I/O Connector

1. Scope :

1.1 Contents

This specification covers the requirements for product performance, test methods and quality assurance provisions of Fan Motor I/O Connector.
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 of this specification and the product drawing, the product drawing shall take precedence. In the event of conflict between the requirements of this specification and the referenced documents, this specification shall take precedence.

2.1 AMP Specifications :

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

B. 114-5175 Application Specification

C. 501--5202 Test Report :

2.2 Commercial Standards and Specifications :

A. MIL-STD-202

LTR	REVISION RECORD	DR	CHK	DATE
A	REVISED	J.S	N.Y	02DEC 05
01	Revised FJ00-5517-96			20 DEC 96
0	Released FJ00-5225-96			4 OCT 96

DR. 14 Oct '96 M. Yamasaki

CHK. 14 OCT 96 M. Shinde

APP. 15 OCT 96

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J	A	108-5532	A

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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. Rec Contact, Tab Contact (Crimp Type)

Pre-Tin High Conductivity Copper Alloy (Tin PL 0.8 µmmin.)

B. Housing

6.5 mm Pitch Plug Hsg
6/6 Nylon (UL 94 V-0)
Tracking Index : 600 V min.

C. Tab Assy :

6.5 mm Pitch

Hsg : 6/6 Nylon (Glass Filled) UL 94 V-0 Tracking Index : 175~250 V

Tab Cont : Brass Tin PL
(Tin PL 0.8 µmmin.)

3.3 Ratings :

A. Voltage Rating : 300 V AC

B. Current Rating : See Fig. 2

C. Temperature Rating : −30 °C to 105 °C (Include temperature rising by energized current)

D. Minimum Rating : 1 mV, 1 µA Minimum

3.4 Performance Requirements and Test Descriptions :

The product shall be designed to meet the electrical, mechanical and environmental performance requirements specified in Fig. 3. All tests shall be performed in the room temperature unless otherwise specified.

Unit : A

Contact / Wire Size / Pos.	Rec. Contact : 177915-2			Rec. Contact : 177914-2		
	AWG #16	AWG #18	AWG #20	AWG #22	AWG #24	AWG #26
3	7	7	6	4	3	2

Fig. 2

3.5 Test Requirements and Procedures Summary :

Para.	Test Items	Requirements	Procedures
3.5.1	Examination of Product	Meets requirements of product drawing and AMP Specification (114-5175) After test, no corrosion influence performance.	Visual inspection No physical damage
		Electrical Requirements	
3.5.2	Termination Resistance (Low Level)	10 mΩ Max. (Initial) 20 mΩ Max. (Final)	Subject mated contacts assembled in housing to 20 mV Max. open circuit at 10 mA. Take the resistance of the wire only away from measurement Fig. 8. AMP Spec. 109-5311-1
3.5.3	Insulation Resistance	1000 MΩ Min. (Initial) 500 MΩ Min. (Final)	Impressed voltage 500 V DC. Test between adjacent circuits and between the surface of housing and contact of mated connectors. AMP Spec. 109-5302 MIL-STD-202, Method 302 Condition B
3.5.4	Dielectric withstanding Voltage	No creeping discharge nor flashover shall occur. Current leakage : 5 mA Max.	2.2 kVAC for 1 minute. Test between adjacent circuits and between the surface of housing and contact of mated connectors.
3.5.5	Temperature Rising	30 °C Max. under loaded specified current.	Measure temperature rising by energized current. Subject measurement must do at the place of no influence from convection of air. And contacts assembled in housing all of circuits. The thermocouple attache to the contact of center circuit number. Fig. 2, 8 AMP Spec. 109-5310

Fig. 3 (To be Continued)

Para.	Test Items	Requirements		Procedures
		Mechanical Requirements		
3.5.6	Vibration (Low Frequency)	No electrical discontinuity greater than 1 μsec. shall occur. 20 mΩ Max. (Final)		Subject mated connectors to 10-55-10 Hz traversed in 1 minute at 1.52 mm amplitude 2 hours each of 3 mutually perpendicular planes. 100 mA applied. Fig. 9 AMP Spec. 109-5201 MIL-STD-202, Method 201A
3.5.7	Shock	No electrical discontinuity greater than 1 μ sec. shall occur. 20 mΩ Max. (Final)		Mated Conn. (50 G) Waveform : Halfsign Curve Duration : 11 m sec. Number of Drops : 3 drops each to normal and reversed directions of X, Y and Z axes, totally 18 drops AMP Spec. 109-5208 See Fig. 9 MIL-STD-202, Method 213 Condition A
3.5.8	Connector Mating/Unmating Force		High-Pressure Type	Operation Speed : 100 mm/min. Measure the force required to mate/unmateconnectors. However, It is measure without HSG Lock
		Mating Force	29.4 N Max. (3.0 kg Max.)	
		Unmating Force	5.88 N Min. (0.6 kg Min.)	
3.5.9	Contact Insertion Force	6.86 N (0.7 kgf) Max. per contact		Measure the force required to insert contact into housing. AMP Spec. 109-5211
3.5.10	Contact Retention Force	41.16 N (4.2 kgf) Min.		Apply an axial pull-off load to crimped wire. Use the wire of AWG #16 or AWG #18 Operation Speed : 100 mm / min. AMP Spec. 109-5212
3.5.11	Contact Mate/Unmating Force		High-Pressure Type	Measured by gage tab (Fig. 10) and operation speed 100 mm/min AMP Spec. 109-5206
		Mate	9.8 N (1000 g) Max. (1st~25th)	
		Unmating	0.58 N (60 g) Min. (1st) 0.39 N (40 g) Min. (25th)	

Fig.3 (to be continued)

Para.	Test Items	Requirements			Procedures
3.5.12	Crimp Tensile Strength	Wire Size		Crimp Tensil (min.)	Apply an axial pull-off load to crimped wire of contact secured on the tester, Operation Speed : 100 mm/min. Subject take insulation barrel away. AMP Spec. 109-5205
		mm^2	(AWG)	N (kgf)	
		0.14	26	19.6 (2)	
		0.22	24	29.4 (3)	
		0.31	22	49.0 (5)	
		0.51	20	58.8 (6)	
		0.76	18	68.6 (7)	
		1.27	16	78.4 (8)	
3.5.13	Durability (Repeated Mate/Unmating)			High-Pressure Type	No. of Cycles : 25 cycles
		Mating		29.4 N Max. (3.0 kg Max.)	
		Unmating		5.88 N Min. (0.6 kg Min.)	
3.5.14	Housing Locking Strength	44.1 N (4.5 kgf) Min.			Measure connector locking strength. Operation Speed : 100 mm/min. AMP Spec. 109-5210
3.5.15	Post Retention Force	9.8 N (1.0 kgf) Min.			Measure post retention force. Operation Speed : 100 mm/min
	Environmental Requirements				
3.5.16	Thermal Shock	20 mΩ Max. (Final)			Mated connector −55 °C/30 min., 85 °C/30 min. Making this a cycle, repeat 25 cycles. AMP Spec. 109-5103 Condition A MIL-STD-202 Method 107-1 Condition A-1 The measurement is held after being left indoor for 3 hours.
3.5.17	Humidity-Temperature Cycling	Dielectric withstanding voltage 2.2 kV AC 1 minute. Insulation resistance (final) 500 MΩ Min. Termination resistance 20 mΩ Max. (Final)			Mated connector, 25~65 °C, 80~98 % R. H. 10 cycles Cold shock −10 °C (not) performed AMP Spec. 109-5106 MIL-STD-202, Method 106 Condition D The measurement is held after being left indoor for 3 hours.

Fig. 3 (To be Continued)

Para.	Test Items	Requirements	Procedures
3.5.18	Salt Spray	20 mΩ Max. (Final) No corrosion influence performance	Subject mated connectors to 5±1 % salt concentration for 48 hours : MIL-STD-202, Method 101 Condition B The measurement is held after remove the salt and dry up at indoor.
3.5.19	Heat Aging	20 mΩ Max. (Final)	Mated Conn. 105±2 °C Duration :96 hr AMP Spec. 109-5104-3 Condition A The Measurement is held after being left indoor for 3 hours.
3.5.20	Resistance to Cold	20 mΩ Max. (Final)	Mated connector −30 °C±2 °C, 96 hours AMP Spec. 109-5108-3 Condition D
3.5.21	H_2S	20 mΩ Max. (Final) No corrosion influence performance	Mated connector 3±1 ppm, 40±2 °C 96 hours
3.5.22	NH_3 Gas	20 mΩ Max. (Final) No corrosion influence performance	Mated conn. is put into atomsphere that rated 25mℓ/ℓ of 3% NH_3 for 7hr.
3.5.23	Solderability	Wet Solder Coverage : 95 % Min.	Eutectic solder Solder Temperature : 230±5℃ Immersion Duration : 3±0.5sec. Lead Free solder (Sn-Ag-Cu) Solder Temperature : 240±5℃ Immersion Duration : 3±0.5sec. MIL-STD-202 Method 208
3.5.24	Resistance to Soldering Heat	No physical damage shall occur.	Test connector on PCB. Solder Temperature : 260±5 °C Immersion Duration : 10±0.5 sec. AMP Spec. 109-5204 MIL-STD-202 Condition B

Fig. 3 (End)

* Product must be without rust, corrosion transformation, crack and discoloration.

3.6 Product Qualification Test Sequence

Test or Examination	Test Group								
	1	2	3	4	5	6	7	8	9
	Test Sequence (a)								
Examination of Product	1, 3	1, 4	1, 3	1	1, 3	1, 4	1, 7	1, 7	1, 4
Termination Resistance (Low Level)							2, 4, 6	3, 6	2, 5
Dielectric withstanding Voltage						3			
Insulation Resistance						2			
Temperature Rising					2				
Vibration (Low Frequency)							5		
Physical Shock							3		
Connector Mating Force								2	
Connector Unmating Force								4	
Contact Insertion Force				2					
Contact Mating Force		2							
Contact Unmating Force		3							
Crimp Tensile strength	2								
Durability (Repeated Mating/Unmating)								5	
Housing Panel Retention Force									
Housing Locking Strength			2						
Post Retention Force									
Solderability									
NH_3									
Humidity-Temperature Cycling									
H_2S									
Resistance to Soldering Heat									
Thermal Shock									3
Salt Spray									
Resistance to Cold									
Contact Retention Force						5			

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

Fig. 5 (1/2)

Test or Examination	Test Group								
	10	11	12	13	14	15	16	17	18
	Test Sequence (a)								
Examination of Product	1, 4, 8	1, 4	1, 4	1, 4	1, 4	1, 4	1, 3	1, 3	1, 3
Termination Resistance (Low Level)	2, 5	2, 5	2, 5	2, 5	2, 5	2, 5			
Dielectric withstanding Voltage	7								
Insulation Resistance	6								
Temperature Rising									
Vibration (Low Frequency)									
Physical Shock									
Connector Mating Force									
Connector Unmating Force									
Contact Insertion Force									
Contact Mating Force									
Contact Unmating Force									
Crimp Tensile strength									
Durability (Repeated Mating/Unmating)									
Housing Panel Retention Force									
Housing Locking Strength									
Post Retention Force							2		
Solderability								2	
NH_3						3			
Humidity-Temperature Cycling	3								
H_2S					3				
Resistance to Soldering Heat									2
Thermal Shock									
Salt Spray		3							
Heat Aging			3						
Resistance to Cold				3					
Contact Retention Force									

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

Fig. 5 (2/2)

4. Quality Assurance Provisions :

4.1 Test Conditions :

Unless otherwise specified, all the test shall be performed in any combination of the following test conditions.

Temperature :	15~35 °C
Relative Humidity :	45~75 %
Atmospheric Pressure :	86.6~106.6 Kpa

Fig. 6

4.2 Tests :

4.2.1 Test Specimens :

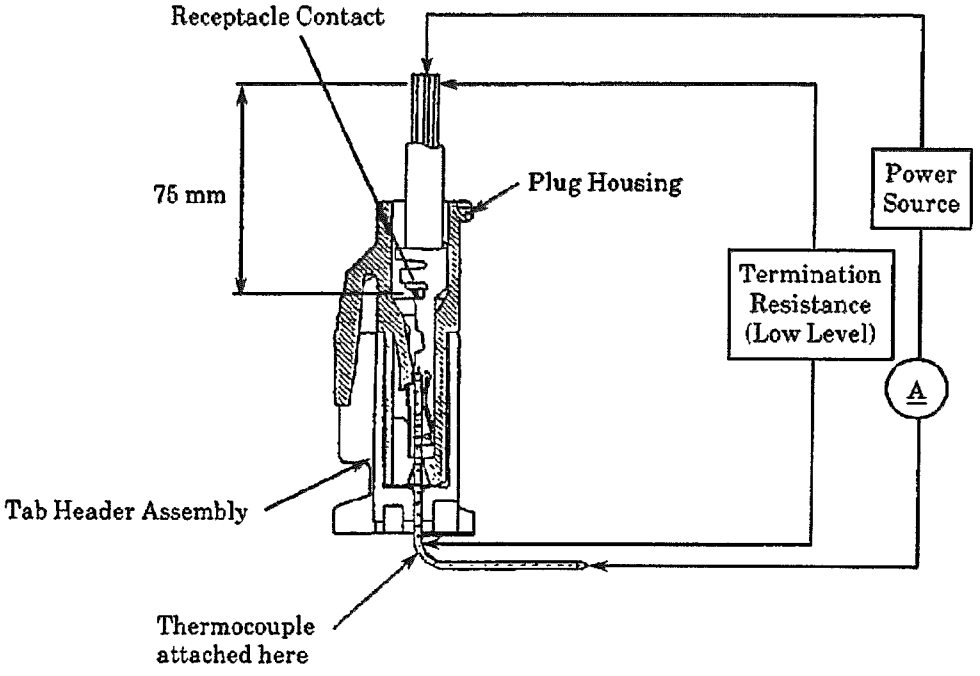
The test specimens to be employed for the tests shall be conforming to the requirements specified in the applicable product drawings. The crimped contacts shall be prepared in accordance with the requirements of applicable application Specification, 114-5175, Crimping of AMP Power Double Lock Contacts on the wires specified in Fig. 7 of this specification.

4.2.2 Applicable Wires :

The wires to be used for crimping the samples for performance testing shall be conforming to the requirements specified in Fig. 7.

Calculated Cross-sectional Area (mm^2)	AWG	Diameter of a Conductor (mm)	Number of Conductors	Insulation Outer Diameter (mm)
0.14	26	0.16	7	1.30
0.22	24	0.16	11	1.5
0.31	22	0.18	12	2.0
0.51	20	0.18	20	2.6
0.76	18	0.18	30	2.8
1.27	16	0.18	50	3.1

Fig. 7



* Take the resistance of 75 mm wire only away

Fig. 8 Termination Resistance (Low Level) and Temperature Rising Vs. Current Measuring Methods

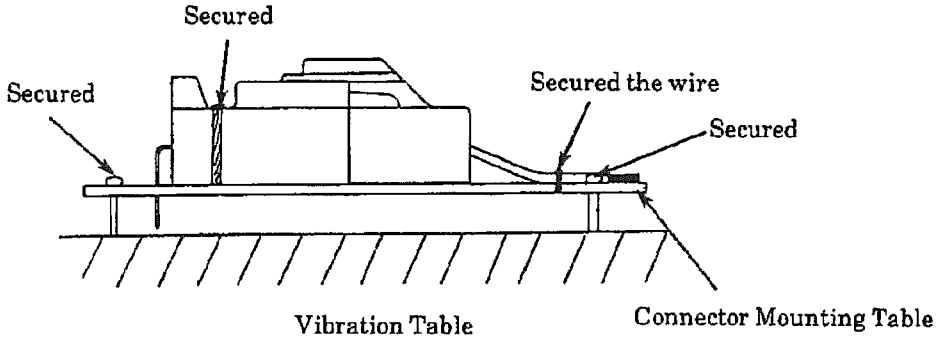
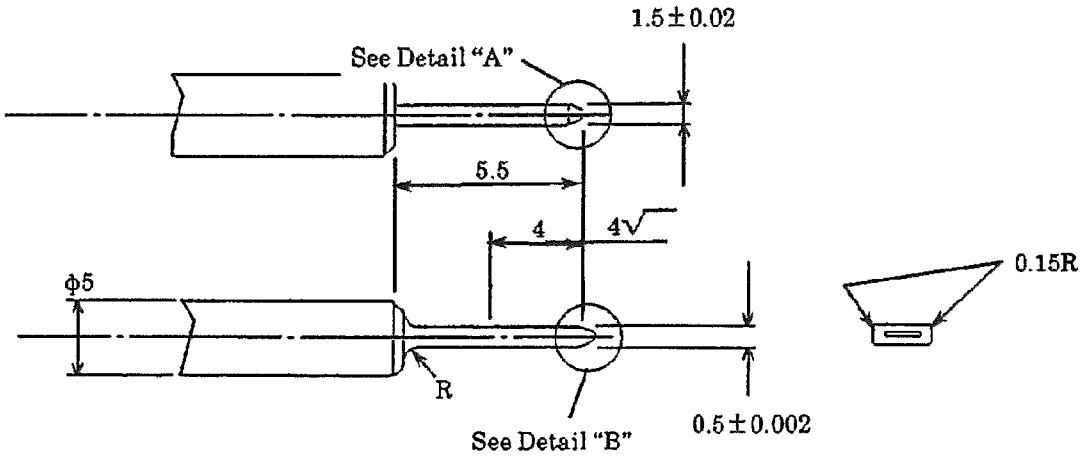
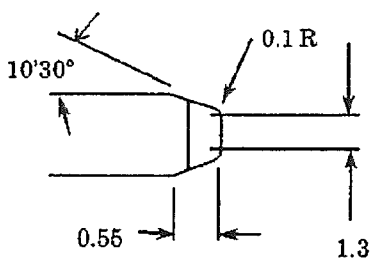
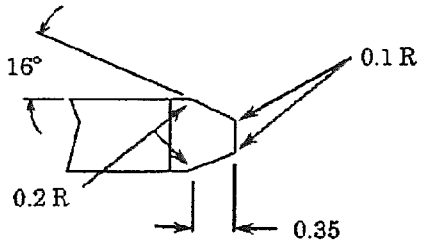


Fig. 9 Connector Mounting Methods of Low Frequency Vibration and Physical Shock Tests





Detail "A"



Detail "B"

Fig. 10 Gage Design for Contact Meting/Unmating Force Tests

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	LOC J	LOC A	NO. 108-5532	REV. A
NAME Fan Motor I/O Connector				

Pos. No.	Name	Remarks	
177915-2	Receptacle Contact	AWG #20~#16	-2 : High Pressure Type
177914-2		AWG #26~#22	
177917-☐	Tab Contact	AWG #20~#16	
177916-☐		AWG #26~#22	
☐-179938-☐	Plug Housing	6.5 mm Pitch	3 Pos.
☐-316240-☐	Tab Assembly	6.5 mm Pitch	3 Pos.

Appendix 1