



## Hall Sensor 4P Connector

### 1. Scope

#### 1.1 Content

This specification covers the requirements for product performance, test methods and quality assurance provisions of HALL SENSOR 4P Connector.

### 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 Specifications

### 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 Material

- A. Receptacle Contact :  
Pre Tin High Electronic Conductivity Copper Alloy  
(Tin Plating 0.8  $\mu\text{m}$  min )
- B. Header Housing : 6/6 NYLON (UL 94V-0)
- C. Plug Housing : 6/6 NYLON (UL 94V-0)
- D. Header Assembly :
  - (1) Header Housing : 6/6 NYLON (UL 94V-0)
  - (2) Tab Contact : Post Tin Plated Brass ( Tin PL 1.0  $\mu\text{m}$  min)

#### 3.3 Ratings :

- A. Voltage Rating : 250 VAC
- B. Current Rating : Refer to Fig. 1 for maximum allowable current to be applied.
- C. Temperature: -30°C to 105°C



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- D. Minimum Rating : 1mV, 1  $\mu$ A Minimum
- E. Applicable P.C.B : Thickness 1.6mm  
Diameter of Thru Hole  
For Tine : 1.8  $\pm$  0.1mm (Punched Hole)  
1.95  $\pm$  0.1mm (Drilled Hole)

Wire Size	Maximum Allowable Current(A)
	3.96 mm Pitch
AWG 16	9
AWG 18	7
AWG 20	6
AWG 22	4
AWG 24	3
AWG 26	2

Fig.1

### 3.4 Performance Requirement 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	Meets requirements of product drawing and AMP Specification 114-5175. After test, no corrosion influence performance.	Visual inspection No Physical damage
<b>Electrical Requirements</b>			
3.5.2	Termination Resistance (Low Level)	10 m $\Omega$ Max. (Initial) 20 m $\Omega$ Max. (Final)	Subject mated contacts assembled in housing to 20mV Max open circuit at 10mA. Take the resistance of the wire only away from measurement. Fig. 6 AMP Spec. 109-5311-1
3.5.3	Insulation Resistance	1000 M $\Omega$ Min. (Initial) 500 M $\Omega$ Min. (Final)	Impressed voltage 500 VDC. Test between adjacent circuits and between the surface of housing and contact of mated connectors. AMP Spec. 109-5302
3.5.4	Dielectric withstanding Voltage	No creeping discharge nor flashover shall occur. Current leakage: 5mA Max.	2.2 kVAC for 1 minute. (4.1mm Pitch) Test between adjacent circuits and between the surface of housing and contact of mated connectors.



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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 attach to the contact of center circuits number Fig. 1,6 AMP Spec. 109-5310
<b>Mechanical Requirements</b>					
3.5.6	Crimp Tensile Strength	Wire Size		Crimp Tensile N (kgf) Min.	Apply an axial pull-off load to crimped wire of contact secured on the tester, Operation Speed : 100mm/min AMP Spec.109-5205
		mm2	AWG		
		0.14	26	19.6(2)	
		0.22	24	29.4(3)	
		0.31	22	49.0(5)	
		0.51	20	58.8(6)	
0.87	18	68.6(7)			
		1.27	16	78.4(8)	
3.5.7	Post Retention Force	9.8 N (1.0 kgf) Min.			Measure post retention force. Operation Speed : 100mm/min.
3.5.8	Contact Retention Force	41.16 N (4.2 kgf) Min. per contact			Apply an axial pull-off load to crimped wire. Use the wire of AWG #16 or #18. Operation Speed : 100 mm/min. AMP Spec. 109-5210
3.5.9	Contact Insertion Force	8.82 N (0.9 kgf) Max. per contact			Measure the force required to insert contact into housing AMP Spec. 109-5211
3.5.10	Connector Mating /Unmating Force		Normal Type	High Pressure Type & FG	Operation Speed : 100 mm/min. Measure the force required to mate/unmate connectors. However, it is measure without HSG Lock.
		Mating Force	( 6.86 X Pos.) N Max. (0.7 X Pos.) Kg Max.	(13.72 X Pos.) N Max. (1.4 X Pos) Kg Max	
		Unmating Force	(1.47 X Pos.) N Min. (0.15 X Pos) Kg Min.	(1.96 X Pos.) N Min. (0.2 X Pos.) Kg Min.	
3.5.11	Durability (Repeated Mate/Unmating)		Normal Type	High Pressure Type & FG	No. of Cycles : 25 cycles
		Mating Force	(6.86 X Pos.) N Max. (0.7 X Pos.) Kg Max.	(13.72 X Pos.) N Max. (1.4 X Pos.) N Max.	
		Unmating Force	(1.47 X Pos.) N Max. (0.15 X Pos.) Kg Min.	(1.96 X Pos.) N Min. (0.2 X Pos.) Kg Min.	
3.5.12	Housing Locking Strength	44.1 N (4.5 Kgf) Min.			Measure connector locking strength.



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					Operation Speed : 100 mm/min. AMP Spec. 109-5210
3.5.13	Vibration (Low Frequency)	No electrical discontinuity greater than 1 $\mu$ sec. shall occur. 20 m $\Omega$ Max.(Final)			Subject mated connectors to 10-55-10Hz traversed in 1 minute at 1.52mm amplitude 2 hours each of 3 mutually perpendicular planes. 100mA applied. Fig.6 AMP Spec. 109-5201
3.5.14	Physical Shock	No electrical discontinuity greater than 1 $\mu$ sec. shall occur. Final 20 m $\Omega$ Max.			Mated Conn. (50G) Waveform : Half sine 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
3.5.15	Contact Mate/Unmating Force		Normal Type	High Pressure Type & FG	Measured by gauge tab (Fig.7) operation Speed : 100 mm/min. AMP Spec. 109-5206
		Mating Force	6.86 N (700 g) Max. (1st ~25th)	13.72 N (1400g) Max. (1st ~25th)	
		Unmating Force	0.34 N (35 g) Min. (1st) 0.25 N (25g) Min. (25th)	0.58 N (60g) Min. (1st ) 0.39 N (40g) Min.(25th)	
<b>Environmental Requirements</b>					
3.5.16	Solderability	Wet Solder coverage: 90 % Min.			Solder Temperature : 230 $\pm$ 5 $^{\circ}$ C Immersion Duration : 3 $\pm$ 0.5 seconds
3.5.17	Resistance to Cold	20 m $\Omega$ Max. (Final)			Mated connector -30 $^{\circ}$ C $\pm$ 2 $^{\circ}$ C, 96 hours AMP Spec. 109-5108-3 Condition D But temperature shall be applicable to the above.
3.5.18	Thermal Shock	20 m $\Omega$ Max. (Final)			Mated connector -55 $^{\circ}$ C/30 min. 85 $^{\circ}$ C/30min. Making this a cycle, repeat 25 cycles. AMP Spec. 109-5103 Condition A The measurement is held after being left indoor for 3 hours.
3.5.19	Humidity-Temperature Cycling	Dielectric withstanding voltage 2.2Kv AC 1 minute. Insulation resistance(final) 500 M $\Omega$ Min. Termination resistance 20 m $\Omega$ Max. (Final)			Mated connector, 25~65 $^{\circ}$ C, 80 ~ 98% R.H. 10 cycles Cold shock -10 $^{\circ}$ C (not) performed AMP Spec. 109-5106 The measurement is held after being left indoor for 3 hours.



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3.5.20	Salt Spray	20 mΩ Max. (Final) No corrosion influence performance	Subject mated connector to 5%±1% salt concentration for 48 hours. The measurement is held after remove the salt and dry up at indoor.
3.5.21	Heat Aging	20 mΩ Max. (Final)	Mated connector 105°C ± 2°C, 96 hours AMP Spec. 109-5108 condition A
3.5.22	H <sub>2</sub> S	20 mΩ Max. (Final ) No corrosion influence performance	Mated connector 3±1 ppm, 40 ± 2°C 96 hours

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

Fig. 2



3.6 Product Qualification and Test Sequence

Test Examination	Test Group																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
	Test Sequence (a)																		
Examination of Product	1,3	1,4	1,3	1	1,3	1,4	1,7	1,7	1,4	1,4	1,4	1,4	1,4	1,4	1,4	1,3	1,3	1,3	1,3
Termination Resistance (Low Level)							2,4,6	3,6	2,5	2,5	2,5	2,5	2,5	2,5	2,4				
Dielectric withstanding Voltage						3				7									
Insulation Resistance						2				6									
Temperature Rising					2														
Vibration (Low Frequency)							5												
Physical Shock							3												
Connector Mating Force								2											
Connector Unmating Force								4											
Connector Locking Strength			2																
Contact Insertion Force				2															
Contact Retention Force						5													
Contact Mating Force		2																	
Contact Unmating Force		3																	
Crimp Tensile Strength	2																		
Durability(Repeated Mate/Unmating)								5											
Post Retention Force																2			
Solderability																		2	
Humidity-Temperature Cycling										3									
Thermal Shock									3										
Salt Spray											3								
Temperature Life (Heat Aging)												3							
Resistance to Cold													3						
H2S															3				

Fig. 3

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

4. Quality Assurance Provisions :

4.1 Test Conditions :

Unless Otherwise specified, all the tests 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. 4

4.2 Tests :

4.2.1 Test Specimens :

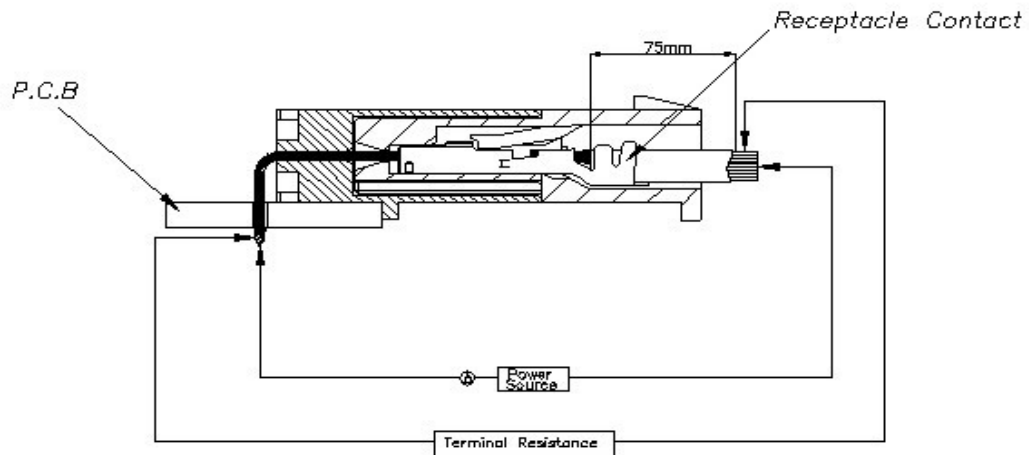
The test specimens to be employed for the tests shall be conforming to the requirements Specified in the applicable product drawing. The crimped contacts shall be prepared in accordance with the requirements of applicable application Specification, 114-5175, Crimping of AMP Power Double Lock Contacts on the wires specified in Fig. 5

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. 5

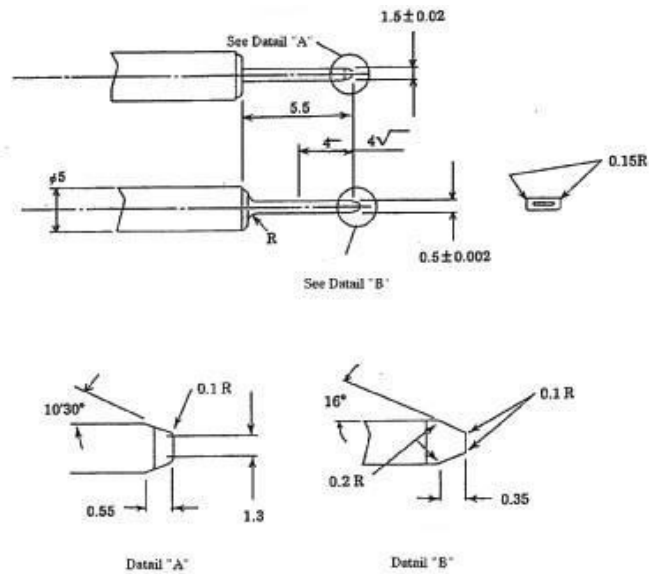
Calculated Cross Sectional Area (mm <sup>2</sup> )	AWG	Diameter of a Conductor (mm)	Number of Conductors	Insulation Outer Diameter(mm)
0.14	26	0.16	7	1.3
0.22	24	0.16	11	1.5
0.31	22	0.18	12	2.0
0.51	20	0.18	20	2.6
0.76	18	0.18	30	2.8
1.27	16	0.18	50	3.1

Fig. 5



Terminal Resistance (Low Level) and Temperature Rising Vs. Current Measuring Methods

Fig.6



Gage Design for Contact Mating/Unmating Force Tests

Fig.7