



## Product Specification Bulb Holder Connector

### 1. Scope

#### 1.1 Contents.

This specification covers the requirements for product performance, test methods and quality assurance provisions of a Bulb Holder Connector. The applicable product descriptions and part number are as follows:

Part Number	Descriptions
368287 368288 368289	.090 Series Receptacle Contact
828904 828905 368299	Wire Seal for .090
936184	.090 Sealed 2P Plug Assembly For Bulb Holder
936187	.090 Sealed 3P Plug Assembly For Bulb Holder
936178	Wedge Type Lamp Holder Assembly
936180	Bulb Holder 2P Assembly
936263	Amber Bulb Holder 2P Assembly
936182	Bulb Holder 3P Assembly

### 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 Reference Specifications :

- A. 109-5000 Test Specification, General Requirements for Test Methods
- B. ES 91500 HMC Specification
- C. EDS-T-5712 DWMC Specification

#### 2.2 Definition of Terms :

##### 2.3.1 Contact :

An electrically conductive metallic member, used independently or as a component of a connector assembly to form circuit connection by contacting.

##### 2.3.2 Housing :

A dielectric component member of a connector made of insulating material that encapsulate contacts in its contact cavities. In this product line, cap housing that encapsulates tab contacts, and plug housing that encapsulates receptacle contacts are available.

##### 2.3.3 Wire Seal :



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Attached to wire side of receptacle contact, this wire seal is purposed for water-proofing.

### 2.3.4 Connector :

Connector is an assembly of housing and crimped wire contacts with wire seal loaded in all contact positions, and further equipped with double lock plate. In this product line, bulb housing assembled with tab contact and plug housing assembled with both receptacle contact and seal ring are available.

## 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 & Finish

#### A. Contact

Description	P/N	Material	Finish
REC.	368287	CuNiSi Alloy	Pre-tinned
	368288	CuNiSi Alloy	Pre-tinned
	368289	CuNiSi Alloy	Pre-tinned

B. Housing and Double Lock Plate : Molded Polybutylene-terephthalate (PBT)  
Conforming to UL 94 V-2

#### C. Accessories and Hardware :

Wire Seal : Silicon

Seal Ring : Silicon

### 3.3 Ratings:

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

(Ambient Temperature+Temperature Rise due to energized current)

#### 3.3.1 Applicable Wires :

Part No.		Applicable Wire Conductor Size (mm <sup>2</sup> )	Insulation Diameter (mm)
Contact	Wire Seal		
368287	828904	0.3 ~ 0.5SQ	1.2 ~ 2.1
368288	828905	0.85 ~ 1.25	2.2 ~ 3.0
368289	368299	2.0SQ	2.6 ~ 3.3

### 3.4 Performance and Test Descriptions :

The product is designed to meet the electrical, mechanical and environmental performance requirements specified in para. 3.5. All tests are performed at ambient temperature unless otherwise specified.



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### 3.5 Test Requirements and Procedures Summary :

Para.	Test items	Requirements	Procedures
3.5.1	Confirmation of Product	Product shall be conforming to the requirements of applicable product drawing	Visually, Dimensionally and Functionally inspected per applicable inspection plan.
3.5.2	Termination Resistance	3m $\Omega$ max. (Initial) 10m $\Omega$ max. (Final)	Measure by applying closed circuit current of 50 mA max. at open circuit voltage of 50 mA max. to the mated contact test circuit in housing.
3.5.3	Insulation Resistance	100 M $\Omega$ min. (Initial)	Measure by applying Test potential between the adjacent contacts, and between the contacts and ground in the mated connectors.
3.5.4	Dielectric Strength	Connector must withstand test potential of 1.0k VAC for 1 minute. No physical damage shall be evident after the test.	Measure by applying Test potential between the adjacent contacts, and between the contacts and ground in the mated connectors.
3.5.5	Current Leakage	1 $\mu$ A max.(Initial) 100 $\mu$ A max.(Final)	Measure by applying Test potential between the adjacent contacts, and between the contacts and ground in the mated connectors.
3.5.6	Watertight Sealing	49 kPa(4.9mN/mm <sup>2</sup> )min (initial) 29.4 kPa(2.9mN/mm <sup>2</sup> )min. (Final)	Blow compressed air into mated pair of connectors through a small hole. For this test, wire ends are sealed with solder and adhesive masking. Place the connectors in 30 cm deep water, and must withstand the air pressure of 9.8 kPa (1mN/mm <sup>2</sup> ) for 30 seconds. Increase pressure at a rate of 9.8kPa (1mN/mm <sup>2</sup> )each time until air leakage takes place.
3.5.7	Temperature Rising	50 °C max. Must meet the specified requirements after testing in the sequence specified in	Subject mated connectors with all the contacts series wired, to be energized with the current of the intensity obtained by Fig. 5. Measure temperature rising in a draft-free chamber after temperature becomes stabilized.



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Para.	Test items	Requirements	Procedures		
3.5.8	Connector Mating Force	10kgf max.	Measure the force required to mate connector using locking latch by operating at 100mm approx. a minute, with the locking mechanism of housing set in effect.		
3.5.9	Connector Unmating Force	10kgf max.	Measure the force required to mate connector using locking latch by operating at 100mm a minute, without the locking mechanism of housing set in effect.		
3.5.10	Crimp Tensile Strength	Wire Size		Apply an axial pull-off load to crimped wire of contact secured on the tester, at a rate of 100mm (4.0") a minute	
					Crimp Tensile
		mm <sup>2</sup>	(AWG)		N Min.
		0.2	(#24)		68.6
		0.3	(#22)		78.5
		0.5	(#20)		88.3
		0.85	(#18)	127	
		1.25	(#16)	177	
3.5.11	Contact Retention Force	Contact shall not dislodge a distance greater than 10 kgf min.	Apply an axial load to 0.85 mm <sup>2</sup> , 100mm long crimped contact on housing. Measure the force required to dislodge the contact from housing. AMP Spec. 109-30		
3.5.12	Housing Locking Force	10 kgf	Fix mated pair of connectors on testing machine, and apply an axial separating force to one of them. Measure the force required to separate the connectors, with or without breakage of locking leg.		
3.5.13	Current Cycling	Must meet the specified requirements after testing in the sequence specified	Subject mated contact to test current of the intensity obtained by Fig. 6. Applied for 300 cycles intermittently 45 minutes ON, 15 minutes OFF to the series wired contacts.		



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3.5.14	Resistance to Cold	Must meet the specified requirements after testing	Expose mated pair of connectors under the cold atmosphere at $-50 \pm 5^\circ\text{C}$ for 120 hours. Recondition in the room temperature before the subsequence measurement.			
Para.	Test items	Requirements	Procedures			
3.5.15	Thermal Shock	Must meet the specified requirements after testing	Expose mated connectors under temperature at $-40^\circ\text{C}$ to $120^\circ\text{C}$ for 400 hours.			
3.5.16	Dust Bombardment	Must meet the specified requirements after testing	Subject mated connectors to ejection Of Port 1 and cement or Kanto loam dust powder dispersed by compressed air blowing at a rate of 1.5kg per 10 seconds at every other 15 minutes for the total of 1 hour.			
3.5.17	Water sprinkle	Must meet the specified requirements after testing in the sequence specified in Fig. 9. Current leakage : $100 \mu\text{A}$ max.	Suspend mated connector in a closed chamber. Subject it to heat at $120 \pm 3^\circ\text{C}$ for 40 minutes followed by sprinkling of water at room temperature for 20 minutes. Marking this a cycles, repeat for 48 cycles per. JIS D 0203. SI Energize the contacts with 12 VDC, and monitor the circuits for current leakage. Connected 2 meter lead wires are drawn out of the chamber for measurement			
3.5.18	Resistance to Oil	Must meet the specified requirements after testing in the sequence specified in	Immerse mated connectors into oils the following in the specified sequence:			
			No	Oil Names	Temperature	Duration
			1	Engine Oil (SEA 10w)	$50 \pm 2^\circ\text{C}$	60 min.
			2	Kerosene Linse	Room Temp	5 min.
			3	Motor Gasoline's	Room Temp	60 min.
4	Drying w/o Powered Ventilation	Room Temp	AS Req'd			



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3.5.19	Salt Spray	Must meet the specified requirements after testing	Suspend mated connector in a closed chamber. Subject it to heat at 35°C for 40 minutes followed by sprinkling of 5% salt-water at room temperature for 96 minutes.
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Para.	Test items	Requirements	Procedures
3.5.20	Resistance to Ozon	Must meet the specified requirements after testing in the sequence specified in Fig. 9.	Suspend mated connector in a closed container, and expose in ozon atmosphere of $50 \pm 5$ ppm concentration per JIS K 6301, Para. 16, at $40 \pm 2$ °C for 24 hours. After the duration, recondition in the room temperature, before subsequent measurement. Record cracking condition of tested rubber surfaces, according to JIS K 6301, Para. 16. 6.
3.4.21	Industrial Gas (SO <sub>2</sub> )	Must meet the specified requirements after testing	90~95% RH, $40 \pm 3$ °C, 10ppm SO <sub>2</sub> for 24hrs
3.5.22	Compound Environmental Testing (Optionally performed by customer's requirements)	Must meet the requirements after testing in the sequence specified in	Subject mated connectors, with all the loaded contacts series-wired as shown in to $44\text{m/s}^2$ (4.5G) vibration to reciprocate between 20-200 Hz one cycle every 3 minutes for 100 hours each to three axial directions. Measure termination resistance (low level) at completion of each axis vibration cycle. During vibration, apply test current of the intensity obtain by Table 1, for 45 minutes ON, and 15 minutes OFF for 300 cycles, in the heat cycle test condition to reciprocate between $80 \pm 3$ °C, $-30 \pm 3$ °C, in 80~95% R.H. atmosphere.



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### 4. Product Qualification and Requalification Testing :

Test of Examination	Sample Groups								
	1	2	3	4	5	6	7	8	9
	Test Sequence								
Examination of Product	1,5,7	1	1	1	1,8,12	1	1	1	1
Connector Mating Force	3			2,10					
Connector Unmating Force	4			4,11					
Crimp Retention Force		2							
Contact Retention Force			2						
Housing Locking Force		3							
Termination Resistance	2			3,7,9	2,5,7,10	2,5,7	2,4,7	2,5	2,4
Insulation Resistance					4	3,8			
Dielectric Strength	6			6	11				
Current Leakage					3		5		
Watertight Sealing						9		6	
Temperature Rising				5					
Current Cycling							3		
Resistance to Cold				8					
Thermal Shock							6		
Dust Bombardment						6			
Water Sprinkle								3	
Resistance to Oil						4			
Salt spray					6				
Resistance to Ozon								4	
Industrial Gas(SO <sub>2</sub> )					9				
Compound Environmental Testing									3

(a) The numbers in the columns indicate the sequence in which the tests are performed.

### 5. Requirements:

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	86.7~107 Kpa (650~800 mmHg)



6. Revision History

Current Revision	New Revision	Changes	Reason for Change	EC No.
-	O	-	-	FC00-0077-03
O	A	Add pages (only for system)	System error	-
A	A1	-	LOCAL DOC TYPE Updated	-

7. SPECIFICATION APPROVAL

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