



187 Series Connectors

1. SCOPE:

1.1 Contents

This specification covers the requirements for product performance, test methods and quality assurance provisions of 187 Series Connectors.

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 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 Commercial Standards and Specifications

- | | | |
|----|------------|---|
| A. | JASO D605 | : Automotive Multi-Pole Connectors |
| B. | JASO D7101 | : Test Methods for Molded Plastic Parts |
| C. | JIS C3406 | : Low-Voltage Wires and Cables for Automobiles |
| D. | JIS D0203 | : Method of Moisture, Rain and Spray Test for Automobile Parts |
| E. | JIS D0204 | : Method of High and Low Temperature Test for Automobile Parts |
| F. | JIS D1601 | : Vibration Testing Method for Automobile Parts |
| G. | JIS R5210 | : Portland cement |
| H. | JIS C0023 | : Basic Environmental Testing Procedures Parts Tests-Test Ka: Salt mist |

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. Contact: Pre-tinned brass or pre-tinned phosphor bronze
- B. Housing : PBT Molding Compound

3.3 Ratings

- A. Temperature: -30°C to 105°C
(Ambient Temperature + Temperature rising by Energized Loading)

3.4 Performance and Test Descriptions:

The product is designed to meet the electrical, mechanical and environmental performance requirements specified in in Figure 1. All tests are performed at ambient temperature, unless otherwise specified.

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 and Application Specification.	Visually, dimensionally and functionally inspected per applicable quality inspection plan.
3.5.2	Termination Resistance(Low Level)	3m Ω Max. (Initial) 10m Ω Max. (Final)	Subject mated contacts assembled in housing to closed circuit current of 10Ma Max.at open circuit voltage of 20Mv Max. Fig.2
3.5.3	Termination Resistance(Specified Current)	3m V/A Max. (Initial) 10m V/A Max. (Final)	Measure initial millivolt drop of contact test circuit in mated connectors, Fig.2.
3.5.4	Insulation Resistance	100 M Ω Min. (Final)	Impressed voltage 500V DC. Test between adjacent circuits of mated connectors. Fig. 3
3.5.5	Dielectric Strength	No creeping discharge nor flashover shall occur.	1kVAC for 1 minute. Test between adjacent circuits of mated connectors. Fig. 3
3.5.6	Current Leakage	3mA Max.	12 V DC 60°C Humidity 90~95% 1 Hr Fig.4
3.5.7	Current Cycling	10m Ω Max. (Final) No ignition is allowed during the test.	Applied Current: $I \times kd$ Fig.5,6. 45 minutes "ON", 15minutes "OFF" 300 cycles.50% current to be applied to contacts excepting 4 positions in the center area of connector.
3.5.8	Temperature Rising	60°CMax. under loaded specified current.	Measure temperature rising by energized current. Applied Current: $I \times kd$ Fig.5,6
3.5.9	Handling Ergonomics	No abnormalities allowed in manual mating/unmating handling.	Manually operated.

Fig. 1(To be continued)

Para.	Test Items	Requirements				Procedures
3.5.10	Crimp Tensile Strength	Wire Size		Crimp Tensile (Min.)		Apply an axial pull-off load to crimped wire of contact secured on the tester. Operation speed : 100mm/min.
		mm ²	(AWG)	N	(kgf)	
		0.3	#22	78.5	8	
		0.5	#20	88.3	9	
		0.85	#18	127	13	
		1.25	#16	177	18	
		2.0	#14	265	27	
3.0	#12	294	30			
3.5.11	Contact Retention Force with Spencer	98N Min.				Apply an axial pull-off load to crimped wire. Operation speed : 100mm/min.
3.5.12	Contact Mating Force	14.7N Max. per contact				Operation of speed : 100mm/min Measure the force required to mate
3.5.13	Connector Mating Force	8 Pos. 98N Max.				Operation speed : 100mm/min Measure the force required to mate connectors.
3.5.14	Connector Unmating Force	8 Pos. 78.5N Max.				Operation speed : 100mm/min Measure the force required to unmate connectors without locking device set in effect.
3.5.15	Connector Locking Strength	98.1N Min.				Measure housing locking strength. Operation Speed : 100mm/min
3.5.16	Contact Retention Force (Secondary Lock)	98.1N Min.				Measure contact retention force with secondary lock set it effect. Operation Speed : 100mm/min.
3.5.17	Durability (Repeat Mate/Unmating)	10m Ω Max. (Final)				Operation Speed : 100mm/min. No. of Cycles : 30 cycles.
3.5.18	Resistance to "Kojiri"	10m Ω Max. (Final)				Repeat 30 cycles "Kojiri" mating and unmating test conditioning by hand.
3.5.19	Vibration (High frequency)	No electrical discontinuity greater than 1 μ sec. shall occur. 10m Ω Max. (final)				Vibration frequency : 20-200 Hz/1min Accelerated velocity : 44m/s ² Vibration direction: X,Y & Z Directions Duration: X & Z Directions:2 hours Y Directions:4 hours
3.5.20	Temperature Life (Heat Aging)	10m Ω Max (Final)				120°C Duration:120 hours.
3.5.21	Resistance to Cold	10m Ω Max (Final)				-50 \pm 5°C,120 hours.
3.5.22	Thermal Shock	10m Ω Max (Final)				-30°C/ 2 hours 80°C/ 2 hours Making this a cycle, repeat 5 cycles.

Fig. 1(To be continued)

Para.	Test Items	Requirements	Procedures
3.5.23	Humidity Steady State	Termination resistance 10m Ω Max (Final)	Mated / unmated Connector, 90-95% R.H. 60°C, 96 hours
3.5.24	Salt Spray	10m Ω Max (Final)	Subject mated connectors to 5% salt spray exposure for 192 hours with 1 hour suspension in a halfway. Measurement shall be made after 1 hour drying after rinsing by tap water, after completion of exposure, per JIS C5028.
3.5.25	Dust Bombardment	10m Ω Max (Final)	Subject mated connectors to 90-minute cement blow, dispersed by compressed air at a rate of 1.5 kg per 10 seconds in intervals of 15 minutes. Cement to be conforming to JIS R5210, Portland Cement.
3.5.26	Icing	10m Ω Max (Final)	Immerse in boiling water for 1 hour, freeze at -30°C
3.5.27	Industrial Gas (SO ₂)	10m Ω max (Final)	SO ₂ Gas : 10 ppm, 95% R.H., Room temperature for 24 hours.
3.5.28	Resistance to Oil	10m Ω max (Final)	Immerse mated connectors in oil. 50 \pm 5°C See Fig.8

Fig. 1(End)

3.6 Product Qualification Test Sequence

Test or Examination	Test Group						
	1	2	3	4	5	6	7
	Test Sequence (a)						
Confirmation of Product	1	1	1	1	1	1	1,16,22
Termination Resistance (Rated Current)	4			4,12,15,18,22,25	3,6,9,12,16	3,6,9	3,9,12,15,19
Termination Resistance (Low Level)	3			3,11,14,17,21,24	2,5,8,11,15	2,5,8	2,8,11,14,18
Dielectric Strength				7			6,20
Insulation Resistance				6			5
Current Leakage				5,19	13		4,21
Temperature Rising				23			
Current Cycling				20			
Vibration (High Frequency)						7	
Connector Mating Force				2			
Connector Unmating Force				8			
Contact Retention Force				28			
Contact Retention Force (Secondary Lock)			3			12	
Contact Mating Force	2		2				
Contact Unmating Force	5						
Crimp Tensile Strength		2					
Durability (Repeated Mate/Unmating)							7
Housing Locking Strength				27		11	
Resistance to "Kojiri"				10		4	
Handling Ergonomics	6			9,26		10	23
Thermal Shock					14		
Humidity (Steady State)					10		
Salt Spray							10
Industrial Gas (SO ₂)							17
Temperature Life (Heat Aging)					4		
Resistance to Cold					7		
Icing				16			
Resistance to Oil							13
Dust Bombardment				13			

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

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

Prod. P/N*	Description
316441	.187 SERIES CONNECTOR, 8Pos. PLUG HOUSING MK-I I ASSEMBLY

Appendix 1

*Note : Part number is consisted from listed base number and 1 digit numeric prefix and suffix with dash. Refer to catalog or customer drawing for specific part numbers for each base number. When prefix is zero, zero and dash are omitted.

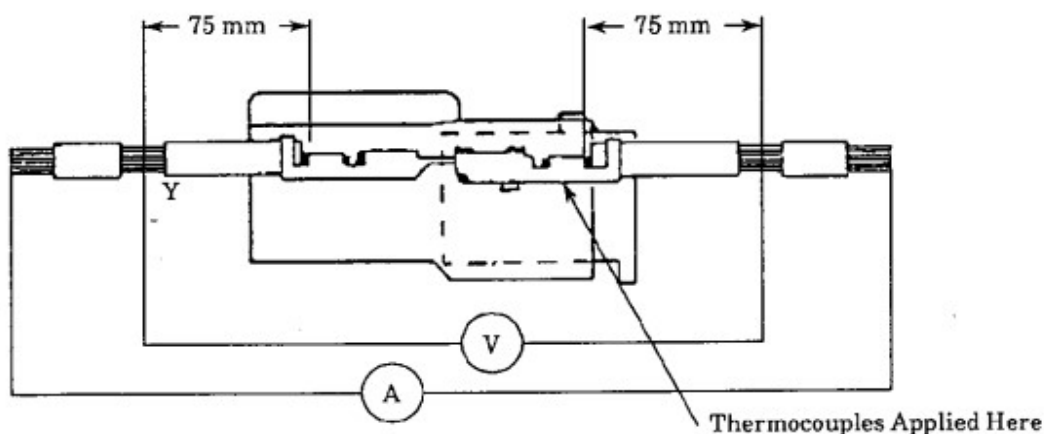


Fig.2

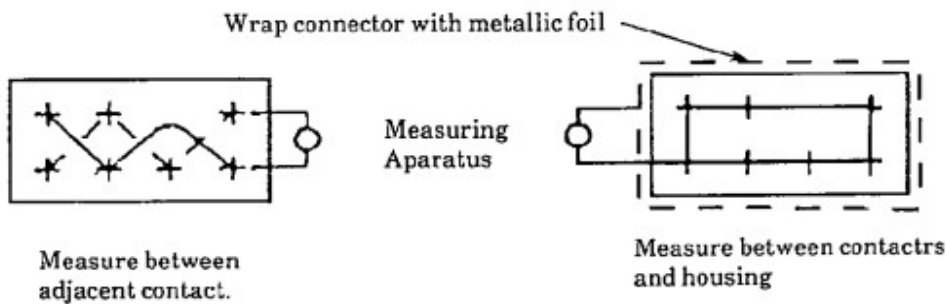


Fig.3

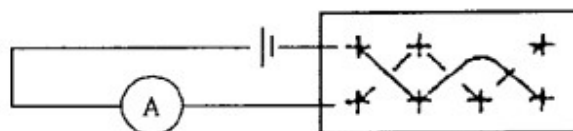


Fig.4

Wire Size	I (Amperes)
0.3 mm ²	8.0 Dc.
0.5 mm ²	11.0 Dc.
0.85 mm ²	15.0 Dc.
1.25 mm ²	19.0 Dc.
2 mm ²	25.0 Dc.
3 mm ²	34.0 Dc.

Fig.5

Number of Positions	kd (Reduction Coefficient)
1	1
2-3	0.75
4-5	0.6
6-8	0.55
9-12	0.5
13 and over	0.4

Fig.6

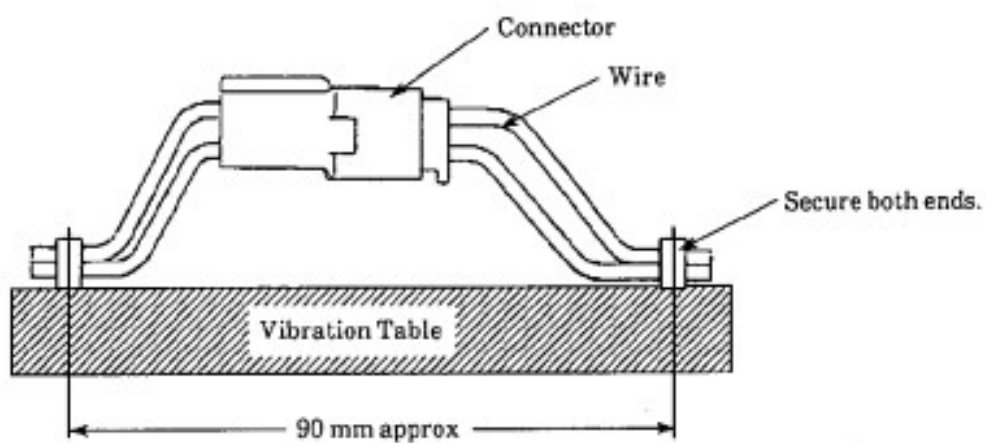


Fig.7

Test Step	Oil Name	Duration
1	Torque Converter Oil	1 hour
2	Transmission Oil	1 hour
3	Engine Oil	1 hour
4	Clutch Oil	1 hour
5	Brake Oil	1 hour

Fig.8

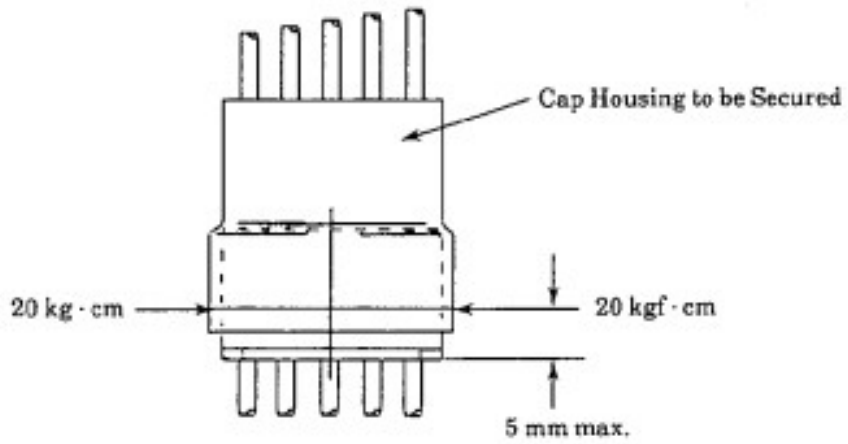


Fig.9