Mini Multilock Connector

1. SCOPE:

1.1. Contents

This specification covers the requirements for product performance, test methods and quality assurance provisions of Mini Multilock 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. TE Specifications:

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

B. 114-5193 : Application Specification.
Crimping Door Mirror Series, Tab and Receptacle Contacts

C. 501-5175 : Test Report:

2.2. Commercial Standards and Specifications.

JIS C3406 : Low-Voltage Cables for Automotive Use

3. REQUIREMENTS:

3.1. Design and Construction:

Product shall be of the design, construction and physical dimensions specified in the applicable product drawing.

3.2. Materials:

A. Contact:
Pre tin Brass and Pre tin Phosphor Bronze

B. Housing:
Polybuthylene-terephthalate Molding

3.3. Ratings:

Temperature Rating : -40℃ to 105℃

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	Meets requirements of product drawing and TE Specification 114-5193.	Visual inspection No physical damage
	Electrical Requirements		
3.5.2	Termination Resistance (Low Level)	10mΩ Max.(Initial) 20mΩ Max.(Final)	Subject mated contacts assembled in housing to closed circuit of 10mA Max. at open circuit voltage of 20mV Max. Fig.3 TE Spec. 109-5311-1
3.5.3	Insulation Resistance	100MΩ Min.(Initial) 100MΩ Min.(Final)	Impressed voltage 500VDC, Test between adjacent circuits of mated connectors. TE Spec.109-5302
3.5.4	Dielectric Withstanding Voltage	No creeping discharge nor flashover shall occur.	1.0kVAC for 1 minute. Test between adjacent circuits of mated connectors. TE Spec. 109-5301
3.5.5	Current Leakage	0.1mA Max.(Initial) 1.0mA Max.(Final)	12V DC 60℃,90~95% R.H. 1Hour TE Spec.109-5312 Fig.4
3.5.6	Over current Loading	No ignition is allowed during the test.	25A Rated current 1 minutes “ON”.
3.5.7	Current Cycling	20mΩ Max.(Final) No ignition is allowed during the test.	45 minutes “ON” 15 minutes “OFF” 100 cycles. TE Spec.109-5308 See Fig.7
3.5.8	Temperature Rising	60℃ Max. under loaded specified current.	Measure temperature rising by energized current. Test current: 5A Max. TE Spec.109-5310 Method
	Physical Requirements		
3.5.9	Handling Ergonomics	No abnormalities allowed in manual mating/unmating handling.	Manually operated
3.5.10	Crimp Tensile Strength	Wire Size (mm^2) / (AWG) / Crimp Tensile (N) Min. 0.3 / (#22) / 59 0.5 / (#20) / 88	Apply an axial pull-off load to crimped wire of contact secured on the tester. Operation speed: 100mm/min TE Spec. 109-5205 Condition
3.5.11	Contact Mating Force	0.98~6.86N	Head operating speed: 100mm/min. Measure the force required to mate contacts. TE Spec.109-5214

Fig.2(To be continued)

Para.	Test Items	Requirements	Procedures
3.5.12	Contact Unmating force	0.98~6.86N	Head operating speed: 100mm/min. Measure the force required to unmate contacts.
3.5.13	Connector Locking Strength	73.5N Min.	Measure connector locking strength. Operation Speed: 100mm/min. TE Spec.109-5210
3.5.14	Contact Retention Force	34.3N Min.	Apply an axial pull-off load to crimped wire. Operation Speed: 100 mm/min. TE Spec.109-5212
3.5.15	Connector Mating Force	7 Pos. 49N Max.	Operation Speed: 100 mm/min. Measure the force required to mate connectors. TE Spec.109-5206 Condition
3.5.16	Connector Unmating Force	7 Pos. 9.81~39.2N	Operation Speed: 100 mm/min. Measure the force required to unmate connectors. TE Spec.109-5206 Condition
3.5.17	Durability (Repeated Mate/Unmating)	20mΩ Max. (Final)	Operation Speed: 100 mm/min. No.of Cycles:30 Cycles. TE Spec.109-5213
3.5.18	Resistance to “Kojiri”	20mΩ Max. (Final)	Manually repeat mating and unmating by “Kojiri” motions for 30 cycles. TE Spec.109-5215
3.5.19	Vibration + Current Cycle	No electrical discontinuity greater than 1μ sec. shall occur. 20mΩ Max. (Final)	Vibration Frequency:20~200Hz Accelerated Velocity:44m/s^2 Vibration Direction: X,Y,&Z Axes Duration:100hours X Axis,50Hours each Y & Z Axes Test Current:45min ON,15min OFF 4.4A DC See Fig.6 & 7. 45min.ON,15min.OFF
3.5.20	Vibration (High Frequency)	No electrical discontinuity greater than 1μ sec. Shall occur. 20mΩ Max. (Final)	Vibration Frequency:20~200Hz Accelerated Velocity:44m/s^2 Vibration Direction:4 hours: X Axis, 2 hours each: Y & Z Axes TE Spec.109-5202 Fig.6.

Fig.2(To be continued)

Para.	Test Items	Requirements	Procedures
3.5.21	Thermal Shock	20mΩ Max. (Final)	-30℃/120min.,80℃/120min. Making this a cycle, repeat 5cycles. TE Spec.109-5103
3.5.22	Resistance to Cold	20mΩ Max. (Final)	-50±5℃, 120 hours TE Spec.109-5108
3.5.23	Temperature Life (Heat Aging)	20mΩ Max. (Final)	120℃, Duration:120 hours TE Spec. 109-5104 Condition
3.5.24	Humidity, Steady State	Insulation resistance(Final) 100mΩ Min. Termination resistance 20Ω Max. (Final) Current Leakage: 1mA Max.	Mated Connector, 90~95% R.H.60℃ 96 hours TE Spec,109-5105
3.5.25	Dust Bombardment	20mΩ Max. (Final)	Subject JIS R5210 cement blow of 1.5kg per 10 seconds in 15minutes intervals for 60 minutes. TE Spec. 109-5110
3.5.26	Resistance to Oil	20mΩ Max. (Final)	Immerse mated connectors in oil. 50℃ for 2 hours.
3.5.27	Resistance to Solvent	20mΩ Max. (Final)	Immerse in solvent 50±2℃ for 2 hours. TE Spec. 109-5114
3.5.28	Resistance to Ozon	20mΩ Max. (Final)	40±2℃,JIS K 6301 Ozon 50±2ppm.24 hours. TE Spec. 109-5115
3.5.29	Water Splash	20mΩ Max. (Final) Current Leakage: 1mA Max.	Expose mated connectors under 80±3℃ for 40 minutes, splash Water For 20 minutes. 48 cycles, Test Voltage:12V TE Spec. 109-5109 Condition:JIS D 0203,S1
3.5.30	Watertight Sealing	40 kPa Min. (Initial) 29.4 kPa Min. (Final)	Blow compressed air at 9.8 kPa Into mated conn. through a small hole. Increase pressure by 9.8 kPa graduation until air leaks. TE Spec. 109-5111
3.5.31	Salt Spray	20mΩ Max. (Final)	Subject mated connectors to 5±1% salt concentration for 35±5℃ hours : 96 hours.
3.5.32	SO_2	20mΩ Max. (Final)	Mated connector SO_2 Gas: 10ppm 90~95R.H. 40℃ 24 hours.
3.5.33	Icing	20mΩ Max. (Final)	Mated connector Immerse boiling water for 60 minutes freeze at -30±3℃

Fig.2 (End)

4. PRODUCT QUALIFICATION TEST SEQUENCE

Test Items	Test Group								
	1	2	3	4	5	6	7	8	9
	Test Sequence (a)								
Confirmation of Product	1	1	1	1	1,7	1,11	1,11	1,13	1,15
Termination Resistance (Low Level)			3		2,4,6	3,6,8	3,6,8	3,6,8, 10	2,7,9, 14
Dielectric Strength				3					4,12
Insulation Resistance				2					3,11
Current Leakage				4					5,10
Temperature Rising			4						
Current Cycling								9	
Vibration + Current Cycle									
Vibration (High Frequency)								7	
Connector Mating Force			2			2,10	2,10	2,12	
Connector Unmating Force			5			4,9	4,9	4,11	
Connector Locking Strength		2							
Contact Retention Force			6						
Contact Mating Force	2								
Contact Unmating Force	3								
Crimp Tensile Strength	4								
Durability (Repeated Mate/Unmating)									6
Resistance to “Kojiri”							5	5	
Thermal Shock					3				
Humidity(Steady State)					5				8
Industrial SO_2 Gas									13
Temperature Life (Heat Aging)						5			
Resistance to Cold						7			
Watertight Sealing									
Resistance to Oil									
Dust Bombardment							7		
Resistance to Solvent									
Resistance to Ozon									
Water Splash									
Icing									
Salt Spray									

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

Test Items	Test Group							
	10	11	12	13	14	15	16	17
	Test Sequence (a)							
Confirmation of Product	1,11	1,7	1,7	1,6	1,5	1,5	1,5	1,5
Termination Resistance (Low Level)	3,6,8	2,6	2,6	2,5	2,4	2,4	2,4	2,4
Dielectric Strength								
Insulation Resistance		3,5	3,5					
Current Leakage								
Temperature Rising								
Current Cycling					3			
Vibration + Current Cycle	7							
Vibration (High Frequency)								
Connector Mating Force	2,10							
Connector Unmating Force	4,9							
Connector Locking Strength								
Contact Retention Force								
Contact Mating Force								
Contact Unmating Force								
Crimp Tensile Strength								
Durability (Repeated Mate/Unmating)								
Resistance to “Kojiri”	5							
Thermal Shock								
Humidity(Steady State)								
Industrial SO_2 Gas								
Temperature Life (Heat Aging)								
Resistance to Cold								
Watertight Sealing				4				
Resistance to Oil			4					
Dust Bombardment								
Resistance to Solvent		4						
Resistance to Ozon				3				
Water Splash						3		
Icing								3
Salt Spray							3	

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

5. QUALITY ASSURANCE PROVISIONS:

5.1. Test Speciments:

The test specimens to be used for the tests shall be prepared in accordance with 114-5193, Application Specification, Crimping of Door Mirror Series, Tab and Receptacle Contacts.

5.2. Test Conditions:

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

Temperature: 15~35℃
Relative Humidity: 45~75%
Atmospheric Pressure: 86.7~107kpa

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

Prod. P/N	Description
917308	Receptacle Contact (0.3~0.5mm^2)
917309	Tab Contact (0.3~0.5mm^2)
917318	7 Position, Plug Housing Assembly
917319	7 Position, Cap Housing Assembly
2822343	7 Position, Plug Housing Assembly NON-BIS Type
2822344	7 Position, Cap Housing Assembly NON-BIS Type

Appendix.1

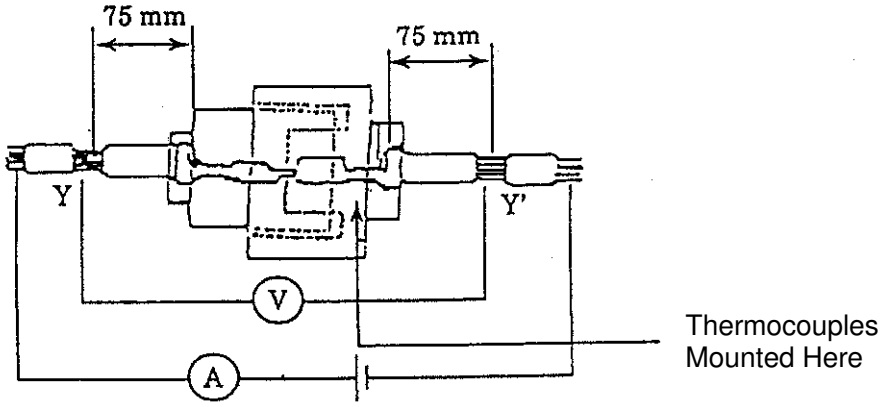

Fig.3

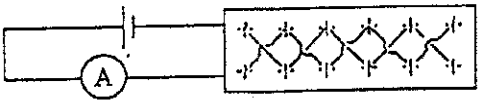

Fig.4

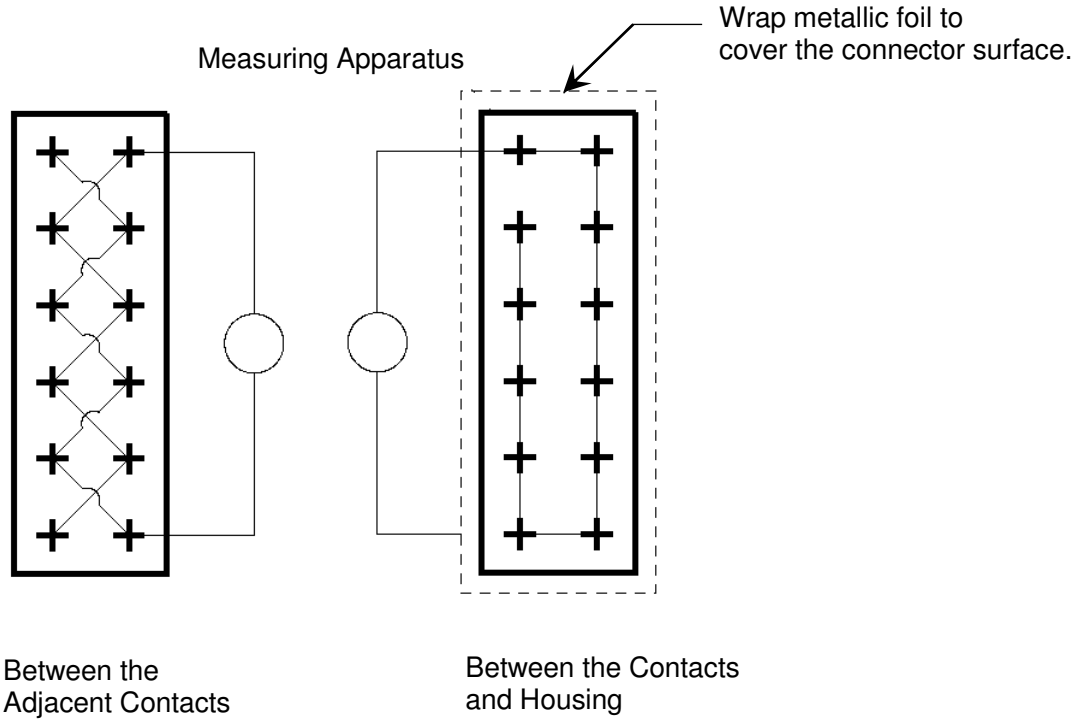

Fig.5

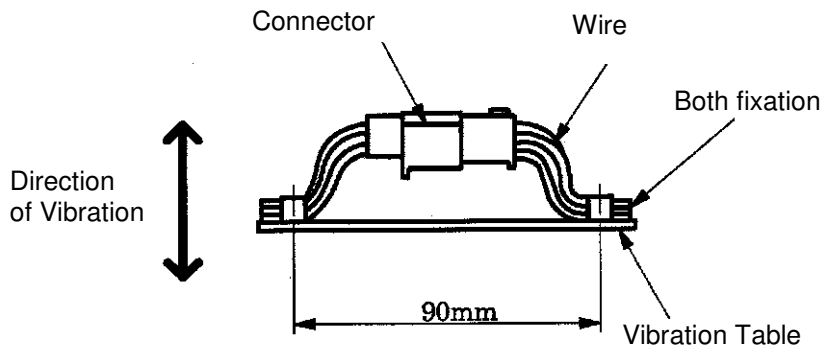

Fig.6

Applied Current : 1 MAX. kd
Reduction Co-efficient (Kd)

Wire Size (mm^2)	Allowable Current Max.(DC A)
0.3	8
0.5	11

Number of Energized Contacts	Reduction Coefficient
1	1
2~3	0.75
4~5	0.6
6~8	0.55
9~12	0.5
13~	0.4

Note: The acceptable maximum current capacity is obtained by the maximum rated current for the wire size applied, multiplied by the reduction co-efficient for the applicable number of loaded contacts.

Fig.7