250 P/ Lock (11mm) 2P with Lock Connector

1. Scope

This specification covers general requirements for product performance, test methods and quality assurance provisions of 250 P/Lock (11mm) 2P with Lock.

2. Applicable Product Part Numbers and Descriptions

Product Part Number	Descriptions
1743457 – 1	250 P.LOCK MK-II REC CONT
1743419 – □	250 POWER CON 2P PLUG W/LOCK
1743330 – □	250 POWER CONN 2P HDR ASSY

Table 1

3. Definitions of Terms

The terms used in this specification shall be defined as follows.

3.1 Contact

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

3.2 Housing

A dielectric component member of a connector and an insulating material that forms encapsulement for contact(s).

3.3 Connector

An assembly consisting of housing and wire-crimped contacts formed to make circuit connection.

4. Materials, Used

4.1 Contacts

Contacts shall be fabricated of pre-tinned brass.

4.2 Housing

A. Plug HSG : 6/6 Nylon (UL 94 V-0) or PC/PET (UL94V-0 and GWT 750)
B. HDR HSG : 6/6 Nylon (Glass filled) (UL 94 V-0)

5. Product Design Feature, Construction and Dimensions

5.1 Contact

Product design feature, construction and dimensions of contacts shall be conforming to Applicable customer product drawing(s). Receptacle contact is conformed to accept tab contact when mated in housing, having a function to lock the tab in place when contact is pulled by crimped wire. The tab contact can be unmated with ease, when separating force is applied by pulling on housing.

5.2 Housing

Product design feature, construction and dimensions of contacts shall be conforming to applicable customer product drawing(s). A pair of locking detents that lower in housing cavity, hook on rolling arches to secure

6. Ratings

6.1 Ratings

A. Voltage Rating : 300 V AC/DC
B. Current Rating : Refer to the table 6 in 108-5127
C. Operating Temperature Range : -40℃ and +105℃
(Including environmental temperature rising by energized current load)

6.2 Applicable Wires

Contact P/N Wires	(AWG) #18~#14
Wire Size (㎟)	0.75 ~ 2.0
Insulation Diameter (㎜)	2.8 ~ 3.4

Table 2

6.3 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.

6.4 Test Requirements and Procedures Summary

NO.	6.4.1
Test Items	**Examination of Product**
Requirements	Meets requirements of product drawing and AMP Specification (114-5042, apply to 170327-□) After test, no corrosion influence performance.
Procedures	Visual inspection No physical damage
Electrical Requirements	
NO.	6.4.2
Test Items	**Termination Resistance(Low Level)**
Requirements	3mΩ Max.(Initial) 6mΩ Max.(Final)
Procedures	Subject mated contacts assembled in housing opening circuit at 21V,1A. Take the measurement Test Method AMP Spec.108-5127 of Termination Resistance.
NO.	6.4.3
Test Items	**Insulation Resistance**
Requirements	1000 MΩ Min.
Procedures	Impressed voltage 500V DC. Test between adjacent circuits and between the surface of housing and contact of mated connectors. Test Method AMP Spec.108-5127 of Insulation Resistance
NO.	6.4.4
Test Items	**Temperature Rising**
Requirements	30℃ Max.
Procedures	Measure temperature rising by energized current. Subject measurement must do at the place no influence from convection of air. And contacts thermocouple attach to the contact of center circuit number. Test Method AMP Spec.108-5127 of Thermal Rising
NO.	6.4.5
Test Items	**Dielectric Strength**
Requirements	No abnormalities, such as breakdown and flashover, shall occur, and withstand test potential of 2000V AC for 1 minute.
Procedures	2.0 KV AC for 1 minute. Test between adjacent circuits and between the surface of housing and contact of mated connectors.

Fig 3. to be continued

Mechanical Requirements				
NO.	6.4.6			
Test Items	**Vibration(Low Frequency)**			
Requirements	No electrical discontinuity greater than 1μsec. shall occur. 6 mΩ Max.			
Procedures	Subject mated connectors to 10-55-10Hz traversed in 1 minute at 1.5mm amplitude 2hours each of 3 mutually perpendicular planes. Test Method AMP Spec.108-5127 of vibration			
NO.	6.4.7			
Test Items	**Physical Shock**			
Requirements	No electrical discontinuity greater than 1μsec. shall occur. 6mΩ Max.			
Procedures	Mated Conn.(50G) Waveform: Half sine Curve Duration: 11m 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			
NO.	6.4.8			
Test Items	**Connector Mating/ Un-mating Force**			
Requirement	Performance Requirements			
	Insertion Force	2-Pos	8.0 kg	Max.
	Extraction Force	2-Pos	3.0 kg	Min.
Procedures	Operation Speed: 100 mm/min. Measure the force required to mate/unmate connectors. However, no being in effect when extraction			
NO.	6.4.9			
Test Items	**Contact Insertion Force**			
Requirements	2.50 kgf Max. per contact			
Procedures	Measure the force required to insert contact into housing after humidity. AMP Spec. 109-5211			
NO.	6.4.10			
Test Items	**Contact Retention Force**			
Requirements	6.0 kg (13.23 lbs.) Min.			
Procedures	Apply an axial pull-off load to crimped wire. Use the wire of 0.75 ㎟(AWG #18) or greater Operation Speed: 100 mm/min. AMP Spec. 109-5210			

Fig 3. to be continued

NO.	6.4.11		
Test Items	**Mated/ Locked Contact Retention Force**		
Requirements	8.0 kg (17.64 lbs.) Min.		Initially
	7.0 kg (15.43 lbs.) Min		Finally
	* Measure only 1P among 2P.		
Procedures	Measured by gage tab which is pulled by operating the speed at 100 mm/min. Contact crimped on an approx. 100mm-long, 0.89 ㎟(#18) or greater wire AMP Spec. 109-5210		
NO.	6.4.12		
Test Items	**Crimp Tensile Strength**		
Requirements	Wire Size		Tensile Strength
	㎟	(AWG)	N (kgf)
	2.0	14	274.4 (28)
	1.25	16	205.8 (21)
	0.89	18	117.6 (12)
Procedures	Apply an axial pull-off load to crimped wire of contact secured on the tester, Operation Speed:100mm/min. Subject take insulation barrel away. Test Method AMP Spec.108-5127 of Crimp Tensile Strength		
NO.	6.4.13		
Test Items	**Durability (Repeated Mating/Unmating)**		
Requirements	6 mΩ Max.		
			Normal Force
	Mating		8 kgf Max.
	Unmating		2 kgf Max.
Procedures	No. of Cycle: 5 cycles		
NO.	6.4.14		
Test Items	**Housing Locking Strength**		
Requirements	2 Kgf Max.		
Procedures	Measure connector locking strength without receptacle contact Operation Speed: 100 mm/min. AMP Spec.109-5210		
NO.	6.4.15		
Test Items	**Tab Retention Force**		
Requirements	5 Kgf Min.		
Procedures	Measure post retention force Operating Speed: 100 mm/min.		

Fig 3. to be continued

NO.	6.4.16
Test Items	**Thermal Shock**
Requirements	6mΩ Max.
Procedures	Test Method AMP Spec.108-5127 of Thermal Shock
NO.	6.4.17
Test Items	**Humidity**
Requirements	Dielectric withstanding voltage 2.0 kV AC 1Min. Insulation resistance 100MΩ Min. Termination resistance 6mΩ Max.
Procedures	Mated connector, 25~65℃,80~98% Duration: 96 hours Cold shock -10℃(not) performed Test Method AMP Spec.108-5127 of Thermal Shock
NO.	6.4.18
Test Items	**Salt Spray**
Requirements	6mΩ Max.
Procedures	Sample connector is subject to be tested in accordance with Test Method 101 of MIL-STD 202 by exposing under salt spray of the following conditions Concentration 5% Duration 96hours After test conditioning, sample shall be rinsed by tab water and tested for termination resistance per Connector Extraction Force and Mated/locked contact retention force Mated/Locked Contact Retention Force
NO.	6.4.19
Test Items	**Heat Aging**
Requirements	6mΩ Max.
Procedures	Mated Conn. 105±2℃ Duration: 96hr AMP Spec. 109-5108-3 Condition A The Measurement is held after being left indoor for 3 hours.
NO.	6.4.20
Test Items	**Resistance to Cold**
Requirements	6mΩ Max.
Procedures	Mated Conn. -30℃±2℃, 96 hours AMP Spec. 109-5104-3 Condition D
NO.	6.4.21
Test Items	**H2S**
Requirements	6mΩ Max. No corrosion influence performance
Procedures	Mated Conn. 3±1ppm, 40±2℃, 96 hours

Fig 3. to be continued

NO.	6.4.22
Test Items	**NH3 Gas**
Requirements	6mΩ Max. No corrosion influence performance
Procedures	Mated Conn. is put into atmosphere that rated 25ml/1 of 3% NH3 for 7hours
NO.	6.4.23
Test Items	**Solderability**
Requirements	Wet Solder Coverage: 90% Min.
Procedures	Solder Temperature: 230±5℃ Immersion Duration: 3±0.5 seconds
NO.	6.4.24
Test Items	**Resistance to Soldering Heat**
Requirements	No physical shall occur.
Procedures	Test connector on PCB. Solder Temperature: 260±5℃ sec. Immersion Duration: 10±0.5sec. AMP Spec. 109-5204

Fig 3. end

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

6.5 Product Qualification and Test Sequence

Test of Examination	Test Group (a)								
	1	2	3	4	5	6	7	8	9
	Test Sequence (a)								
Confirmation of Product	1,3	1,3	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 Strength						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					
Mated/Locked Contact Retention		2							
Crimp Tensile strength	2								
Durability (Repeated Mating/Unmating)								5	
Housing Locking Strength			2						
Tab Retention Force									
Solderability									
Humidity-Temperature Cycling									
Resistance to Soldering Heat									
Thermal Shock									3
Salt Spray									
Resistance to Cold									
Contact Retention Force						5			
Heat Aging									

Fig. 4

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

6.6 Product Qualification Test Sequence

Test of Examination	Test Group								
	10	11	12	13	14	15	16	17	18
	Test Sequence (a)								
Confirmation of Product	1,4	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 Strength	7								
Insulation Resistance	6								
Temperature rising									
Vibration(Low Frequency)									
Physical Shock									
Connector Mating Force									
Connector Unmating Force									
Contact Insertion Force									
Mated/Locked Contact Retention									
Crimp Tensile strength									
Durability (Repeated Mating/Unmating)									
Housing Panel Retention Force									
Housing Locking Strength									
Post Retention Force							2		
Solderability								2	
NH3						3			
Humidity-Temperature Cycling	3								
H2S					3				
Resistance to Soldering Heat									2
Thermal Shock									
Salt Spray		3							
Resistance to Cold				3					
Contact Retention Force									
Heat Aging			3						

Fig. 5

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

7. Quality Assurance Provisions

7.1 Test Conditions

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

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

Fig. 6

7.2 Tests

7.2.1 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, 114-5042, Positive Lock Receptacle Contact.

8. Mating Tab (Relay) shape

Tab contact used for mating with “250” Series Positive Lock Receptacle Contact must be of the shape specified in Fig. 7

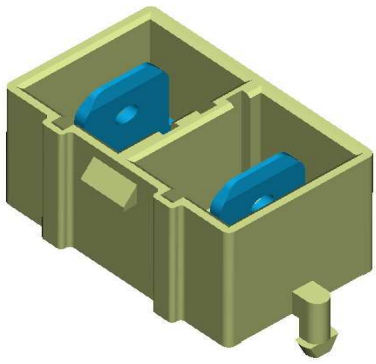

Fig. 7

(Note)

1. Use 70/30 brass. Conforming to C2600P-1/2 hard of JIS H3100 for tab fabrication.

2. Plain metal must be used.

3. This tab design is applicable to the purpose of performance testing of tab. For the practical production purpose, refer to the following customer drawings prepared for recommendable tab design.