250 Flag Positive Lock-EX (12mm) 2P with lock

1. Scope :

This specification covers general requirements for performance characteristics and test methods of 2 Pos. “250” Series Positive Lock Connectors of the part numbers shown in Para. 2

2. Product Part Numbers and Descriptions :

Product Part Number	Descriptions
1743221 - ☐	**“250” Series, Positive Lock Flag Receptacle Contact**
1743165 - ☐	**250 2-Position Positive Lock Housing**
1649376 - ☐	**PCF-112D1M - 2A, 2B(Relay)**

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 :

Housing shall be molded 6/6 NYLON resin, conforming to UL Flame Retardant Grade of 94V-2 / 94V-O

4.3 Customer Tab : (P/N ; 1649376-x) Relay

Customer tab shall be made of 70% copper, 30% zinc brass with or without tin-plating, conforming to JIS H 3100, C2600p- ½H.

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 formed 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 lowers in housing cavity, hook on rolling arches to secure

6. Applicable Wires and Temperature Rating :

6.1 The wires of the sizes, conforming to Table 2, shall be used for terminating contacts.

Contact P/N Wires	1743221-1
Wire Size (㎟)	0.75-3.37
Insulation Diameter (㎜)	2.8-4.1

Table 2

6.2 Temperature Rating :

Temperature rating shall be within the range of -40℃ and +120℃, including environmental temperature where the connector is used, and the temperature rising resulted from the energized current loaded.

7. Performance Requirements and Test Methods: (Part 1)

<table>
<tr><th>Test Item
Paragraph No.</th><th colspan="5">Performance Requirements</th><th>Test Method</th></tr>
<tr><td>Appearance :
(Confirmation of Product)
(Para. 7.1.1)</td><td colspan="5">No defective abnormalities such as cracks, breakage, damages, loose of parts, rust and fusion that are detrimental to connector functions, shall be present.</td><td>Visually and tactually inspect parts for appearance in accordance with applicable Q.I.P. (Quality Inspection Procedure) for presence of stated defects.</td></tr>
<tr><td rowspan="11">Crimp Tensile Strength :
(Para. 7.1.2)</td><td colspan="2">Wire Size</td><td colspan="2">Tensile Strength</td><td rowspan="11">Contacts crimped with wires of specified size shown in Table 6, are subject to the test by applying an axial pull-off load to crimped wire on tensile testing machine after being fastened on the head. The head is operated to travel with the speed at a rate of 100mm a minute. Crimp tensile strength is determined when the wire is broken or is pulled off form the wire crimp. For this test, insulation crimp is excluded.</td></tr>
<tr><td>㎟</td><td>(AWG)</td><td>N</td><td>(lbs.)</td></tr>
<tr><td>0.3</td><td>(#22)</td><td>49.0</td><td>(11.02)</td></tr>
<tr><td>0.5</td><td>(#20)</td><td>78.4</td><td>(17.64)</td></tr>
<tr><td>0.75</td><td>(#18)</td><td>117.6</td><td>(26.46)</td></tr>
<tr><td>1.25</td><td>(#16)</td><td>205.8</td><td>(46.30)</td></tr>
<tr><td>2.0</td><td>(#14)</td><td>313.6</td><td>(70.54)</td></tr>
<tr><td>3.0</td><td>(#12)</td><td>411.6</td><td>(92.59)</td></tr>
<tr><td>5.0</td><td>(#10)</td><td>490.0</td><td>(110.23)</td></tr>
<tr><td colspan="3">Minimum value, required</td></tr>
<tr><td>Contact Retention Force :
(Para. 7.1.3)</td><td colspan="5">6.0 kg (13.23 lbs.) Min.</td><td>Fasten contact-loaded connector assembly onto head of tensile testing machine, and apply an axial pull off load to wire end of loaded contact, by operating the head to travel with the speed at a rate of 100mm a minute. Contact retention force is determined when the contact is dislodged from housing. For this test, wire of 0.75 ㎟(#18) or greater shall be used.</td></tr>
<tr><td rowspan="3">Mated/Locked Contact Retention Force :
(Para. 7.1.4)</td><td colspan="4">8.0 kg (17.64 lbs.)Min.</td><td>Initially</td><td rowspan="3">Contact crimped on an approx. 100mm-long, 1.25 ㎟(#16) or greater wire and loaded in housing, is mated with the counterpart tab contact. Sample connector is fastened on the head of tensile testing machine so that the mated tab is pulled by operating the head to travel with the speed at a rate of 100mm a minute. Mated/locked contact retention force is determined when locking device disengages locking, or is broken by the load.</td></tr>
<tr><td colspan="4">7.0 kg (15.43 lbs.)Min.</td><td>Finally</td></tr>
<tr><td colspan="5">* Measure only 1P among 2P.</td></tr>
</table>

Table 3 (Part 1, to be continued)

7. Performance Requirements and Test Methods: (Part 2, continued from sheet No. 3)

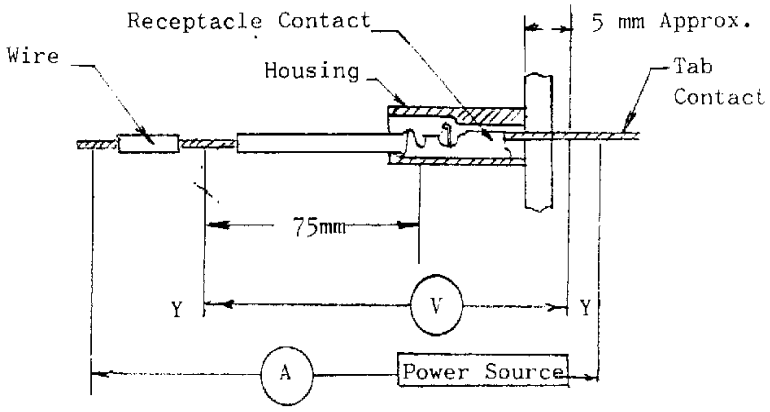
<table>
<tr><th>Test Item
Paragraph No.</th><th colspan="4">Performance Requirements</th><th>Test Method</th></tr>
<tr><td rowspan="3">Connector Insertion and Extraction Force (Para. 7.1.5)</td><td></td><td colspan="3">Requirements
N (lbs.)</td><td rowspan="3">Fasten contact loaded connector and counterpart tab contact on tensile testing machine in the manner that they mate and unmate as the head is operated. Apply axial load to push in and pull off the part by operating the head to travel with the speed at a rate of 100mm a minute. For this test, housing locking device is set no being in effect when extraction</td></tr>
<tr><td>Inser-tion Force</td><td>2-Pos</td><td>11.0 kg</td><td>Max.</td></tr>
<tr><td>Extrac-tion Force</td><td>2-pos</td><td>3.0 kg</td><td>Min.</td></tr>
<tr><td rowspan="3">Termination Resistance : (Para. 7.1.6)</td><td>Initial</td><td colspan="3">3 m(Max.)</td><td rowspan="2">Contact loaded and mated connector assembly is tested by applying test current of 1A(DC) flowing the circuit including mated area. After temperature rising of the energized circuit becomes stabilized, measure millivolt drop by probing at the points 75mm apart from wire crimp and on mated tab contact. (Section Y – Y' in Fig. 1) Termination resistance is calculated after deducting the resistance of the crimped wire of 75mm in length.</td></tr>
<tr><td>Final</td><td colspan="3">6 m(Max.)</td></tr>
<tr><td colspan="5"> 

Fig. 1</td></tr>
</table>

Table 3 (Part 2, to be continued)

7. Performance Requirements and Test Methods: (Part 3, continued from sheet No. 4)

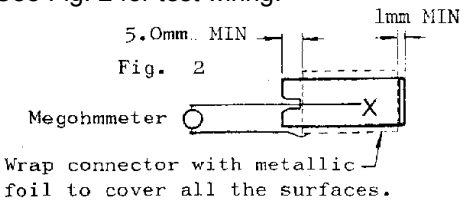
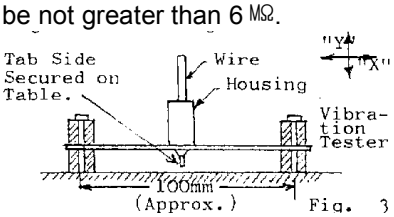
Test Item Paragraph No.	Performance Requirements	Test Method
Insulation Resistance : (Para. 7.1.7)	1,000 MΩ (Min.)	Sample connector is subject to test in accordance with Test Condition "B" Test Method 302 of MIL-STD-202 by applying test potential of 500V DC ±10% between contact and the ground. See Fig. 2 for test wiring.  Fig. 2
Dielectric Strength : (Para. 7.1.8)	No abnormalities, such as break-down and flashover, shall occur, and withstand test potential of 2000v AC for 1 minute.	Sample connector is subject to be tested in accordance with Test Method 301 of MIL-STD-202, by applying test potential of 2000V AC (RMS) for 1 Minute, between contact and the ground. After the duration, inspect visually for evidence of insulation break-down and flashover on the housing surfaces.
Temperature Rising: (Para. 7.1.9)	30℃ (Max.)	Contact-loaded connector is subject to be tested by applying test current of specified intensity as shown in Table 5. Measurement is done after temperature rising of connector be comes stabilized, by probing on wire crimp of contact with the use of thermocouple.
Vibration (Low Frequency) (Para. 7.1.10)	No electrical discontinuity greater than 1 microsecond shall occur during vibration. Termination resistance after conditioning shall be not greater than 6 MΩ.  Fig. 3	Contact-loaded and series wired connector shall be tested in accordance with Test Method 201 of MIL-STD-202. Vibration shall be sweeping to reciprocate between 10-55-10 Hz. Changing a cycle a minute, in amplitude of 1.5 mm both sides, applied 2 hours each for two axial directions, 4 hours in total. After conditioning, measure for termination resistance. See Fig. 3 for test method.

Table 3 (Part 3, to be continued)

7. Performance Requirements and Test Methods: (Part 4, continued from sheet No. 5)

<table>
<tr><th>Test Item
Paragraph No.</th><th>Performance Requirements</th><th>Test Method</th></tr>
<tr><td rowspan="4">Humidity;
(Para. 7.111)</td><td colspan="2">After conditioning.</td><td rowspan="4">Sample connector is subject to be tested in accordance with Test Method 106. of MIL-STD-202, by exposing under test atmosphere for 96 hours.

<u>Test conditions :</u>

Temperature : 40℃
Humidity : 90 - 95 %

After test conditioning, sample connector shall be tested for termination resistance per Para. 7.1.6,
Insulation resistance per Para. 7.1.7
And dielectric strength pre Para. 7.1.8.</td></tr>
<tr><td>Termination Resistance :</td><td>6 MΩ, (Max.)</td></tr>
<tr><td>Insulation Resistance :</td><td>100 MΩ, (Min.)</td></tr>
<tr><td colspan="2">Dielectric strength :

No abnormalities of electrical break-down and flashover shall be evident at test potential of 2000V AC for 1 minute.</td></tr>
<tr><td rowspan="7">Thermal Shock:
(Para. 7.1.12)</td><td colspan="2">After conditioning.</td><td colspan="2">Contact-loaded and mated connector assembly is subject to be tested in accordance with Test Condition A, Test Method 107 of MIL-STD-202, by the following sequence of temperature changing for 5 cycles.</td></tr>
<tr><td>Termination Resistance</td><td>6 MΩ (Max.)</td><td rowspan="6" colspan="2"><table><tr><th>Se-quence</th><th>Test Conditions</th></tr><tr><td>1.</td><td>105 ±C, for 30 minutes</td></tr><tr><td>2.</td><td>Room Temperature for 5 minutes</td></tr><tr><td>3.</td><td>-40 ±50℃, for 30 minutes</td></tr><tr><td>4.</td><td>Room Temperature for 5 minutes</td></tr></table></td></tr>
<tr><td colspan="2"></td></tr>
<tr><td colspan="2"></td></tr>
<tr><td colspan="2"></td></tr>
<tr><td colspan="2"></td></tr>
<tr><td colspan="2">After conditioning, sample connector shall be tested for termination resistance per Para. 7.1.6.</td></tr>
<tr><td rowspan="4">Salt Spray:
(Para. 7.1.13)</td><td colspan="2">After conditioning.</td><td colspan="2" rowspan="4">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 : 96 hours

After test conditioning, sample shall be linsed by tap water and tested for termination resistance per Para. 7.1.6 and Mated/locked contact retention force per Para. 7.1.4.</td></tr>
<tr><td>Termination Resistance</td><td>6 MΩ (Max.)</td></tr>
<tr><td colspan="2"></td></tr>
<tr><td colspan="2"></td></tr>
</table>

Table 3 (End)

7.2 Test Sequence :

Group / Test Item	Para – graph No.	Test Sequence											
		1	2	3	4	5		6					
Appearance : (Confirmation of Product)	7.1.1					1		1					
Crimp Tensile Strength :	7.1.2	1											
Contact Retention Force	7.1.3		1										
Mated/Locked Contact Retention Force :	7.1.4			1									11
Connector Insertion Force :	7.1.5					2							
Connector Extraction Force :	7.1.5					3							
Termination Resistance :	7.1.6							2	4	6	8	10	
Insulation Resistance :	7.1.7					4	7						
Dielectric Strength :	7.1.8					5	8						
Temperature Rising	7.1.9				1								
Vibration (Low Frequency) :	7.1.10							3					
Humidity :	7.1.11					6			5				
Thermal Shock	7.1.12									7			
Salt Spray :	7.1.13										9		

Table 4

8. Quality Assurance Provisions :

8.1 Test Conditions :

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

Temperature : 15 – 35℃

Relative Humidity : 45 - 75%

Atmospheric Pressure : 86.6 - 106.6 K Pa

8.2 Tests :

8.2.1 Test Specimens :

Test Specimens employed for the tests shall be conforming to the requirements of applicable customer product drawing, and prepared in accordance with 114-5042, AMP Application Specification, Crimping Contacts for “250” Series Positive Lock Connector, by crimping on the wires of specified sizes as shown in Table 5, with the use of AMP specified applicable application tooling-Unless otherwise specified, no sample shall be reused.

8.2.2 Number of Sample :

More than 10 sets of samples shall be prepared for performance evaluation testing per one sample group.

8.2.3 Applicable Wires and Test Current :

Wires of the following sizes and test current shall be used for the tests.

Wire Size ㎟ (AWG)	Composition of Wire				Applicable JIS and JCS Specification	Test Current A (DC)
	Calculated Cross-section of Conductor (㎟)	Number of Strands	Diameter of A Strand(㎜)	Insulation Diameter (㎜)		
0.3 (#22)	0.31	12	0.18	1.5	JCS-246	3
0.5 (#20)	0.51	20	0.18	2.2	JIS-C-3406	5
0.75 #18)	0.76	30	0.18	2.8	JIS-C-3316	7
1.25(#16)	1.27	50	0.18	3.1	JIS-C-3316	12
2.0(#14)	1.96	37	0.26	3.4	JIS-C-3316	15
3.0(#12)	3.3	41	0.32	4.1	JIS-C-3406	20
5.0(#10)	5.22	65	0.32	4.6	JIS-C-3406	25

Table 5

8.2.4 Mating Tab(Relay) shape :

Tab contact used for mating with “250” Series Positive Lock Contacts must be of the shape specified in Fig. 4.

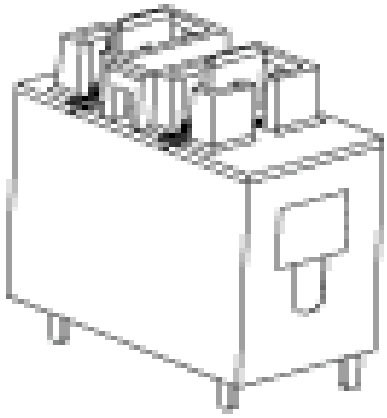


Fig.4

Note :

1) Use 70/30 brass conforming to JIS H 3100, C2600P - ½Hard For tab material.

2) Material shall be plain metal.

3) This tab design is applicable to the tab used for testing product performance, and for the design of actual mating part tab, refer to AMP recommended tab drawing of the following number.

1-Position CP78-26023