

AP-10

Part No. Plug: 3531-0001-00T

Receptacle: 3927-0001-00T

Product Specification

Qualification Test Report No. TR-25060

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Rev.	ECN	Date	Prepared by	Checked by	Approved by

1. Scope

This product specification defines the test conditions and the performances of the Power terminal, board-to-board.

2. Product Name and Parts No.

2.1 Product Name

AP-10

2.2 Parts No.

Plug: 3531-0001-00T

Receptacle: 3927-0001-00T

3. Rating

3.1 Operating Conditions

Amperage: DC 30A

Component Temperature (Energization) : 233~358K(-40°C to 85°C)

(BY CURRENT TEMPERATURE RISING OF TERMINAL IS $\triangle 45.0^{\circ}\text{C}$ MAX.)

Operating humidity: 85% MAX.

3.2 Storage Conditions

Storage temperature: 288~308K(15°C to 35°C)

Operating humidity: 85% MAX. (Non-condensing)

*Keeping the production in the above conditions, we asked to use them within 1 year after delivery.

4. Test and Performance

Test Condition

This initial test is equal to it's at shipping condition and unless otherwise specified, all tests and measurements shall be performed under the following conditions in accordance with MIL-STD-202.

Temperature: 288K to 308K (15°C to 35°C)

Pressure: 866hPa to 1066hPa (650mmHg to 800mmHg)

Relative humidity: 45 to 75%R.H.

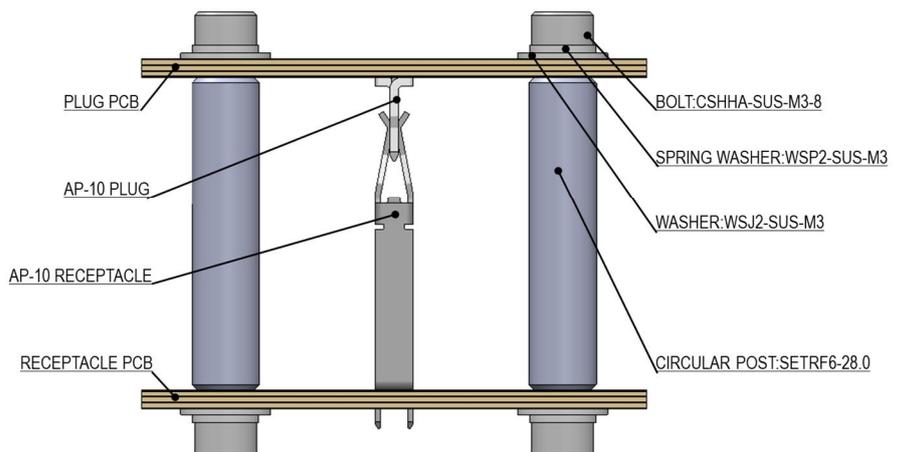
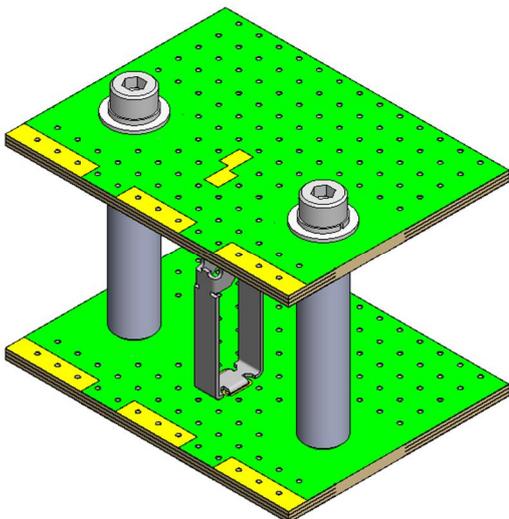
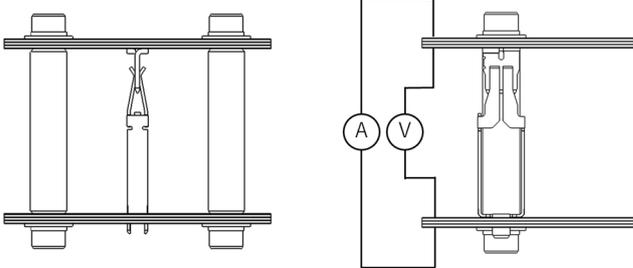


Fig.1 Mating test sample (Assembly with stainless JIG)

4.1. Electrical Performance

1. Contact Resistance	
Reference Standard:	MIL-STD-202, Method 307
Test Conditions:	Solder the receptacle terminal to the test board and mate the plug terminal together, then measure the contact resistance by the four terminal methods. Apply the low level condition of 20mV MAX. DC for the open circuit voltage and 10mA MAX. DC for the closed circuit current in accordance with MIL-STD-202 G, Method 307.
	
Fig.2 Contact Resistance	
Pass Criteria:	Initial: 1.0 mΩ max. After testing: 1.0 mΩ max.

2. Temperature rising	
Reference Standard:	-
Test Conditions:	Mate the plug and receptacle terminal together and then apply rating current.
Pass Criteria:	Temperature rising $\triangle T_{45}$ °C max.

4.2. Mechanical Performance

1. Mating force and Unmating force	
Reference standard:	-
Test conditions:	Solder the receptacle terminal to the test board, then place the board and plug on push-on/pull-off machine, measure of initial and mating/un-mating at a speed 25 ± 3 mm/minutes along the mating axis.
Pass criteria:	Initial:30 N MAX. 10cycles:30 N MAX.

2.Durability	
Reference standard:	-
Test conditions:	Solder the receptacle terminal to the test board, then place the board and plug on the push-on/pull-off machine, and repeat mating and un-mating at a speed 25 ± 3 mm/minutes. along the mating axis.
Pass criteria:	Contact Resistance: Shall meet 4.1.1.

3. Vibration	
Reference standard:	MIL-STD-202G, Method 201A
Test conditions:	Solder the plug and receptacle terminal to the test board, then mate plug terminal, and place them on the vibrator. Then apply the following vibration. During the testing, run 100mA DC to check electrical discontinuity. Frequency: 10Hz→55Hz→10Hz/approx. 1 minute Directions: 3 mutually perpendicular direction. Total Amplitude: 1.52 mm Sweep duration: 2 hours for each direction, a total of 6 hours.
Pass criteria:	Contact Resistance: Shall meet 4.1.1. Electrical discontinuity: No electrical discontinuity greater than $1\mu s$ shall occur. Appearance: No abnormality adversely affecting the performance shall occur.

4. Shock	
Reference standard:	MIL-STD-202G, Method 213B
Test conditions:	Solder the plug and receptacle connector to the test board, then mate plug connector, and place them on the shock machine. Then apply the following shock. MAX.G: 490 m/s ² (50G) Duration: 11 msec. Wave Form: Half Sinusoidal Directions, cycle: 6mutually perpendicular direction, 3 cycles about each direction
Pass criteria:	Contact Resistance: Shall meet 4.1.1. Electrical discontinuity: No electrical discontinuity greater than $1\mu s$ shall occur. Appearance: No abnormality adversely affecting the performance shall occur.

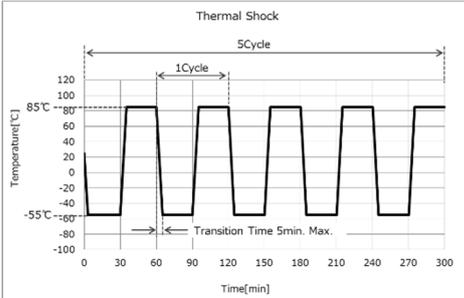
5. Electrode fastness test	
Reference standard:	IEC60068-2-21
Test conditions:	Push the receptacle soldered to the test board from the four directions. Load : 10 N Retention time : 10 sec. Directions : Four directions horizontal to the test board, one time each direction
Pass criteria:	No abnormality adversely affecting the performance shall not occur.

4.3. Environmental Performance

1.High temperature life	
Reference standard:	MIL-STD-202G, Method 108A, Test condition A
Test conditions:	Solder the receptacle terminal to the test board, then mate the plug terminal. After installing the mating sample and expose them to the following environmental conditions. Temperature:358±2K (85±2°C) Duration: 96 hours
Pass criteria:	Contact Resistance: Shall meet 4.1.1. Appearance: No abnormality adversely affecting the performance shall occur.

2.Low Temperature Life	
Reference standard:	JIS C 60068-2-1
Test conditions:	Solder the receptacle terminal to the test board, then mate the plug terminal. After installing the mating sample and expose them to the following environmental conditions. Temperature:233±2K (-40±2°C) Duration: 48 hours
Pass criteria:	Contact Resistance: Shall meet 4.1.1. Appearance: No abnormality adversely affecting the performance shall occur.

3.High Temperature and humidity	
Reference standard:	MIL-STD-202, Method 103, Test condition B
Test conditions:	Solder the receptacle terminal to the test board, then mate the plug terminal. After installing the mating sample and expose them to the following environmental conditions. Temperature:313±2K (40±2°C) Humidity:90~95%RH Duration:96 時間
Pass criteria:	Contact Resistance: Shall meet 4.1.1. Appearance: No abnormality adversely affecting the performance shall occur.

4. Temperature cycling	
Reference standard:	MIL-STD-202, Method 107G, Test condition A
Test conditions:	Solder the receptacle terminal to the test board, then mate the plug terminal. After installing the mating sample and expose them to the following environmental conditions. Temperature: 218K (-55°C), 30 minutes→358K (85°C), 30 minutes Transition time: 5 minutes max. No. of cycles: 5 cycles
	
	Fig.3 Temperature cycling _ Temperature condition
Pass criteria:	Contact Resistance: Shall meet 4.1.1. Appearance: No abnormality adversely affecting the performance shall occur.

4.3. Environmental Performance

5. Temperature and humidity cycling	
Reference standard:	MIL-STD-202G, Method 106G,
Test conditions:	Solder the receptacle terminal to the test board, then mate the plug terminal. After installing the mating sample and expose them to the following environmental conditions. During the a to g, run rated Amperage in every 15 minutes. Duration: 10 cycles (24 hours×10=240 hours), See Fig.4
Fig.4 Temperature and humidity cycling _ Temperature condition	
Pass criteria:	Contact Resistance: Shall meet 4.1.1. Appearance: No abnormality adversely affecting the performance shall occur.

6. H ₂ S Gas	
Reference standard:	JIS C 60068-2-43, JIS C 60068-2-46
Test conditions:	Solder the receptacle terminal to the test board, then mate plug terminal, and expose them to the following environment in accordance. Temperature: 313K (40°C) Humidity: 80%RH Gas (H ₂ S): 3ppm Duration: 48 hours
Pass criteria:	Contact Resistance: Shall meet 4.1.1. Appearance: No abnormality adversely affecting the performance shall occur.

4.4. Others

1. Solder ability	
Reference standard:	MIL-STD-202, Method 208.
Test conditions:	Dip the solder tine of the terminal in the solder bath at 518±5K (245±5°C) for 5±0.5seconds after immersing the tine in the flux of RMA or R type for 5 to 10 seconds in accordance with MIL-STD-202, Method 208.
Pass criteria:	More than 95% of the dipped surface shall be evenly wet.
2. Soldering Heat Resistance (Soldering iron)	
Reference standard:	-
Test conditions:	Tip temperature 390°C or higher. After soldering each terminal for 3 s and 2 times, leave it at room temperature for 30 minutes.
Pass criteria:	No abnormality adversely affecting the performance shall not occur.

4.5 Test Sequence and Specimen Quantity

Table 1 Test Sequence and Sample Quantity

試験項目	Testing Groups													
	A	B	C	D	E	F	G	H	J	K	L	M	N	P
Contact resistance	2,5		1,3	1,3		1,3	1,3	1,3	1,3	1,3	1,3	1,3		
Temperature rising		1												
Mating Force/Unmating Force	1,4													
Durability	3													
Vibration			2											
Shock				2										
Electrode fastness test					1									
High Temperature Life						2								
Low Temperature Life							2							
High Temperature and humidity								2						
Temperature cycling									2					
Temperature and humidity cycling										2				
H ₂ S Gas											2			
Solder ability													1	
Soldering Heat Resistance (Soldering iron)														1
Specimen Quantity	5 pcs	5 pcs	5 pcs	5 pcs	5 pcs	5 pcs	5 pcs	5 pcs	5 pcs	5 pcs	5 pcs	5 pcs	5 pcs	5 pcs

※Numbers indicate sequence in which tests are performed.