

CABLINE®-UM

Part No. Plug: 20877-0**T-0#, Receptacle: 20879-0**E-0#

Product Specification

Qualification Test Report No. TR-18067 (Receptacle: 20879-0**E-01)
 TR-18088 (Receptacle: 20879-0**E-02)

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1. Scope

This Product Specification defines the test conditions and the performances of the CABLINE-UM Connector , a wire-to-board connector of 0.4mm contact pitch.

2. Product Name and Parts No.

2.1 Product Name

CABLINE-UM

2.2 Parts No.

Plug: 20877-0**T-0#

Receptacle: 20879-0**E-0#

3. Rating

3.1 Applicable Cable

Micro Coax ...AWG#[44, 42, 40, 38, 36]

Discrete ...AWG#[36, 34]

3.2 Operating Conditions

Amperage : 0.1A AC/DC [AWG#44] (per contact/Up to 40 contacts)
0.24A AC/DC [AWG#42] (per contact/Up to 40 contacts)
0.3A AC/DC [AWG#40] (per contact/Up to 40 contacts)
0.5A AC/DC [AWG#38] (per contact/Up to 19 contacts)
0.8A AC/DC [AWG#36] (per contact/Up to 11 contacts)
1.0A AC/DC [AWG#34] (per contact/Up to 10 contacts)

Voltage : 100V AC (per contact)

Operating Temperature : 233~358K(-40°C~+85°C)¥

(Containing temperature rise by current)

Operating Humidity : 85% max

3.3 Storage Conditions

Storage temperature: 248 to 333K(-25°C to 60°C)

Storage humidity: 85% max. (Non-condensing)

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 G.

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

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

Relative humidity: 45 to75% R.H.

4.1. Electrical Performance

1. Contact resistance

Reference standard: MIL-STD-202G, Method 307

Test conditions: Solder the receptacle connector to the test board and mate the plug connector together, then measure the contact resistance as shown in Fig.1 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.

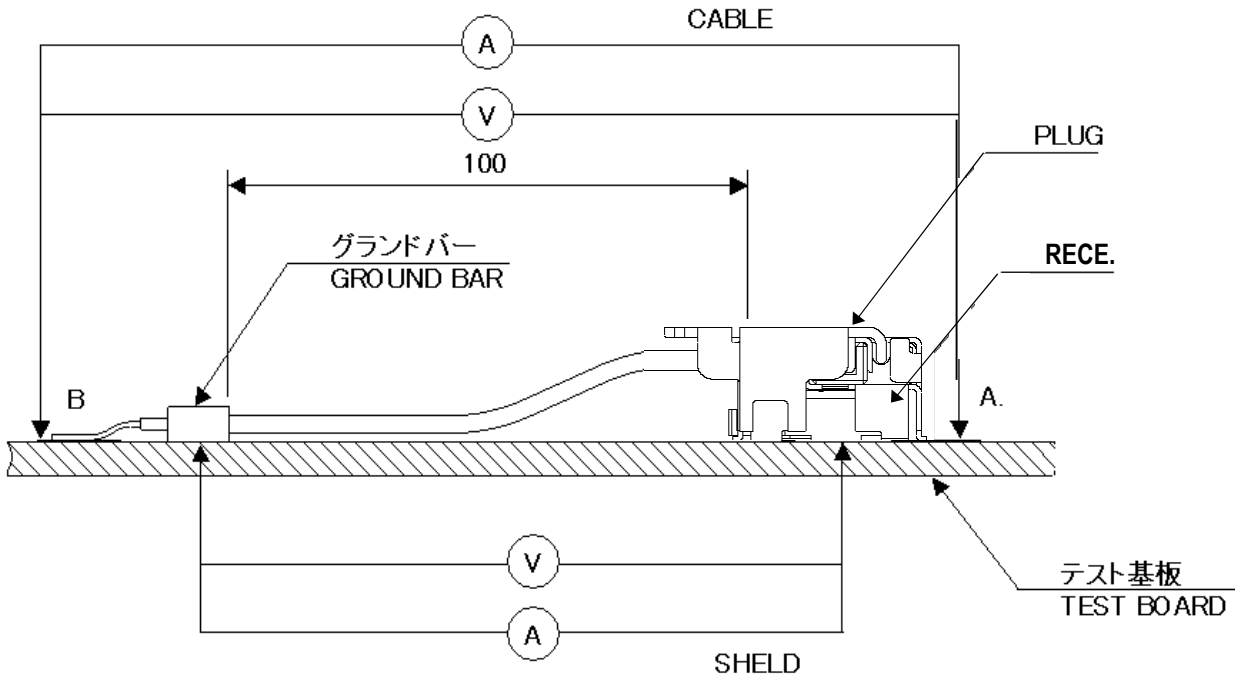


Fig.1

Pass criteria:	Contact	Initial contains the following conductor resistance of a cable 100mm.
	Initial : 180 mΩMAX.(AWG#34) 275 mΩMAX.(AWG#36) 360 mΩMAX.(AWG#38) 600 mΩMAX.(AWG#40) 700 mΩMAX.(AWG#42) 1080 mΩMAX.(AWG#44) After testing : ΔR 40mΩ MAX.	100mΩMAX.(AWG#34) 195mΩMAX. (AWG#36) 280mΩMAX. (AWG#38) 520mΩMAX. (AWG#40) 620mΩMAX. (AWG#42) 1000mΩMAX.(AWG#44)
	Ground Shell	
	Initial : 50 mΩ MAX. After testing : ΔR40mΩ MAX.	

2. Insulation resistance

Reference standard: MIL-STD-202 G, Method 302

Test conditions: Mate the plug and receptacle connector together, and then apply DC 250 V between the inner contact and the ground contact.

Pass criteria: Initial: 1000 MΩ MIN. After testing: 500 MΩ MIN.

4.1. Electrical Performance

3. Dielectric withstanding voltage	
Reference standard:	MIL-STD-202 G, Method 301
Test conditions:	Mate the receptacle and plug connector together, then apply AC 250V(rms) between the neighboring contacts for a minute.
Pass criteria:	No creeping discharge, flashover, no insulator breakdown shall occur.

4. Temperature rising	
Reference standard:	-
Test conditions:	Mate the plug and receptacle connector together and then apply rating current per contact.
Pass criteria:	Over ambient ΔT_{30} °C MAX.

4.2. Mechanical Performance

1. Mating force and Un-mating force	
Reference standard:	-
Test conditions:	Solder the receptacle connector to the test board, then place the board and plug on push-on/pull-off machine, measure of initial and mating/unmating 30 cycles at a speed 25 ± 3 mm/min. along the mating axis.
Pass criteria:	Mating force 30 P Initial: 34.0 N MAX. 30cycles: 34.0 N MAX. 40 P Initial: 40.0 N MAX. 30cycles: 40.0 N MAX. Unmating force 30 P Initial: 3.0 N MIN. 30cycles: 3.0 N MIN. 40 P Initial: 4.0 N MIN. 30cycles: 4.0 N MIN.

2. Durability	
Reference standard:	-
Test conditions:	Solder the receptacle connector to the test board, then place the board and plug on the push-on/pull-off machine, and repeat mating and unmating 30cycles at a speed 25 ± 3 mm/min. along the mating axis.
Pass criteria:	Contact resistance: Shall meet 4.1.1

3. Contact retention force	
Reference standard:	-
Test conditions:	Place the connector on the push-on/pull-off machine, then apply force on the contact head and push the contact along the direction opposite to the contact insertion at a speed of 25 ± 3 mm/min. Measure the force when the contact dislodges the connector.
Pass criteria:	Receptacle contact retention force: 0.2N MIN.

4.2. Mechanical Performance**4. Conn. Lock (Applicable Plug Part No.: 20877-0**E-01)**

Reference standard: -

Test conditions: Mate, and place them on the push-on/pull-off machine, then apply 10N (1.02kgf) force on the connector along the mating axis.

Pass criteria: The lock does not damage and cancel.

5. Cable retention force

Reference standard: -

Test conditions: Place the plug connector on the push-on/pull-off machine and then apply force on the cable along the direction at a speed $25\pm 3\text{mm/min}$. Measure the force when the cable dislodges the plug connector.

Pass criteria: 30P: 14.70 N MIN. 40P: 19.60 N MIN.

6. Vibration

Reference standard: MIL-STD-202 G, Method 201

Test conditions: Solder the receptacle connector to the test board, then mate plug connector, 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. 1min.
Directions: 3 mutually perpendicular direction.
Total Amplitude: 1.52mm
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 $1\mu\text{s}$ shall occur.
Appearance: No abnormality**7. Shock**

Reference standard: MIL-STD-202 G, Method 213, Condition A.

Test conditions: Solder the receptacle connector to the test board, then mate plug connector, and place them on the shock machine. Then apply the following shock.
MAX.G: 50G
Duration: 11msec
Wave Form: Half Sinusoidal
Directions: 6 mutually perpendicular direction
Cycle: 3 cycles about each directionPass criteria: Contact resistance: Shall meet 4.1.1.
Electrical discontinuity: No electrical discontinuity greater than $1\mu\text{s}$ shall occur.
Appearance: No abnormality

4.3. Environmental Performance**1. Thermal shock**

Reference standard: MIL-STD-202 G, Method 107, Condition A.

Test conditions: Solder the receptacle connector to the test board, then mate plug connector, and expose them to the following environment.
 Temperature: 218K(-55°C),30min.→358K(85°C),30min.
 Transition time: 5min. MAX.
 No. of cycles: 5 cycles

Pass criteria: Contact resistance: Shall meet 4.1.1.
 Insulation resistance: Shall meet 4.1.2.
 Dielectric withstanding voltage: Shall meet 4.1.3.
 Appearance: No abnormality

2. High temperature life

Reference standard: MIL-STD-202 G, Method 108, Condition B.

Test conditions: Solder the receptacle connector to the test board, then mate plug connector, and expose them to the following environment.
 Temperature: 358±2K (85±2°C)
 Duration: 250 hours

Pass criteria: Contact resistance: Shall meet 4.1.1.
 Contact retention force: Shall meet 4.2.3.
 Appearance: No abnormality

3. Humidity (Steady state)

Reference standard: MIL-STD-202 G, Method 103, Condition A.

Test conditions: Solder the receptacle connector to the test board, then mate plug connector, and expose them to the following environment.
 Temperature: 313±2K (40±2°C)
 Humidity: 90~95%RH
 Duration: 240 hours

Pass criteria: Contact resistance: Shall meet 4.1.1.
 Insulation resistance: Shall meet 4.1.2.
 Dielectric withstanding voltage: Shall meet 4.1.3.
 Appearance: No abnormality

4.3. Environmental Performance

4. Humidity (Cycling)	
Reference standard:	MIL-STD-202 G, Method 106.
Test conditions:	Solder the receptacle connector to the test board, then mate plug connector, and expose them to the following environment. Temperature: 298[263]~338K (25[-10]~65°C) Humidity: 90~98%RH Duration: 10cycles (240hours)
Pass criteria:	Contact resistance: Shall meet 4.1.1. Insulation resistance: Shall meet 4.1.2. Dielectric withstanding voltage: Shall meet 4.1.3. Appearance: No abnormality

5. Salt water spray	
Reference standard:	-
Test conditions:	Solder the receptacle connector to the test board, then mate plug connector, and expose them to the following environment. Temperature: 308±2K (35±2°C) Salt water density: 5±1% [by weight] Duration: 48 hours
Pass criteria:	Contact resistance: Shall meet 4.1.1. Appearance: No abnormality

6. H₂S gas	
Reference standard:	-
Test conditions:	Solder the receptacle connector to the test board, then mate plug connector, and expose them to the following environment. Temperature: 313±2K (40±2°C) Relative humidity: 80±5%RH Gas: H ₂ S 3±1ppm 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:	-
Test conditions:	Dip the solder tine of the contact in the solder bath at $518 \pm 5K$ ($245 \pm 5^\circ C$) for 5 ± 0.5 seconds after immersing the tine in the flux of RMA or R type for 5 to 10 seconds.
Pass criteria:	More than 95% of the dipped surface shall be evenly wet.

2. Soldering heat resistance	
Reference standard:	-
Test conditions:	Reflow temperature as shown in Fig.2. The number of times of Reflow is within 2.
<div style="border: 1px solid black; padding: 5px; width: fit-content; margin-bottom: 10px;"> IRリフロー条件 (IR Reflow Condition) ・リフロー部 (Reflow Part) ピーク (Peak): $260^\circ C$ $255^\circ C$: 30s $217^\circ C$: 60~150s ・予熱部 (Pre-heat part) $150 \sim 200^\circ C$: 60~120s </div> <p>Temperature vs Time graph details: - Start: $25^\circ C$ - Pre-heat: $150 \sim 200^\circ C$ (60~120s) - Heating rate: $3^\circ C/s$ MAX - Peak: $260^\circ C$ MAX - Soak: $255^\circ C$ (30s) - Cooling rate: $6^\circ C/s$ MAX - Cooling points: $217^\circ C$ (60~150s), $200^\circ C$ - Total time $25^\circ C$ to Peak: 8 minutes MAX. </p>	
Pass criteria:	No abnormality adversely affecting the performance shall not occur.

Fig.2

4.5 Test Sequence and Specimen Quantity

Table 1 Test Sequence and Sample Quantity

Test Item	Group												
	A	B	C	D	E	F	G	H	I	J	K	L	M
Contact Resistance	2,6			1,3,5	1,5	1,3	1,5	1,5,7	1,3	1,3			
Insulation Resistance					2,6		2,6	2,8					
D. W. Voltage					3,7		3,7	3,9					
Temperature rising													1
Mating Force	1,5												
Un-mating Force	3,7												
Durability	4							4 (10cycles)					
Contact Retention Force		1,3											
Conn.Lock			1										
Cable Retention Force	8												
Vibration				2									
Shock				4									
Thermal Shock					4								
High Temperature Life		2				2							
Humidity (Steady State)							4						
Humidity (Cycling)								6					
Salt Water Spray									2				
H2S Gas										2			
Solder ability											1		
Soldering Heat Resistance												1	
Specimen Quantity.	5 pcs.	20 pos.	5 pcs.	5 pcs.	5 pcs.	5 pcs.	5 pcs.	5 pcs.	5 pcs.	5 pcs.	10 pcs.	10 pcs.	5 pcs.

※Numbers indicate sequence in which tests are performed.

5. Recommended Metal Mask

Recommended thickness of METAL MASK : t=0.10

Refer to drawing for the recommended metal mask opening dimension.

6. Precautions for Handling Cable Connectors

Refer to instruction manual : HIM-18033 for the handling of CABLINE-UM.