

# CABLINE®-UMF

Part No. Plug:21102-0\*\*E-2# Receptacle:20879-0\*\*E-0#

## Product Specification

Qualification Test Report No.

TR-26009 (PLUG:21102-0\*\*E-2#, RECEPTACLE:20879-0\*\*E-02)

0	S26058	2026/02/25	T.Ono	M.Nakamura	H.Ikari
Rev.	ECN	Date	Prepared by	Checked by	Approved by

## 1. Scope

This product specification defines the test conditions and the performances of the CABLINE-UMF Connector , a shield FPC-to-board connector of 0.4mm contact pitch.

## 2. Product Name and Parts No.

### 2.1 Product Name

CABLINE-UMF

### 2.2 Parts No.

Plug: 21102-0\*\*E-2#

### 2.3 Applicable RECE. Connector

Receptacle: 20879-0\*\*E-0#

## 3. Rating

### 3.1 Operating Conditions

Amperage: 0.5A AC/DC (per contact pin) \* Available up to 31 Pin

0.3A AC/DC (per contact pin) \* Available for all Pin

Voltage: 100V AC (per contact pin)

Operating temperature: 233 to 378K(-40°C to 105°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

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.

4.1. Electrical Performance

1. Contact resistance	
Reference standard:	MIL-STD-202-307
Test conditions:	Solder the receptacle connector to the test board and mate the plug connector together, then apply 20mV MAX. DC open circuit voltage and 10mA MAX. DC closed circuit current. Measure the contact resistance of signal and GROUND at the section shown in Fig.1 by the four terminal methods.
<p>Contact Resistance = <math>R_{AB}</math> - (FPC 40mm Conductor Resistance) - (Test Board Conductor Resistance)</p> <p>Fig.1</p>	
Pass criteria:	<p>Signal Contact Initial: 60 mΩ MAX. After testing: <math>\Delta R</math> 40 mΩ MAX.</p> <p>GROUND Initial: 50 mΩ MAX. After testing: <math>\Delta R</math> 40 mΩ MAX.</p>

2. Insulation resistance	
Reference standard:	MIL-STD-202-302
Test conditions:	Mate the plug and receptacle connector together, and then apply DC 250 V between the neighboring contacts and between contacts and shell.
Pass criteria:	Initial: 1000 MΩ MIN. After testing: 500 MΩ MIN.

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

4. Temperature rising	
Reference standard:	-
Test conditions:	Mate the plug and receptacle connector together, and apply rating current per contact. Measure delta T over ambient.
Pass criteria:	Over ambient $\Delta T$ 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 $25 \pm 3$ mm/min. along the mating axis.
Pass criteria:	<p>Mating force</p> <p>40 P Initial: 40.0 N MAX.    30cycles: 40.0 N MAX.</p> <p>70 P Initial: 58.0 N MAX.    30cycles: 58.0 N MAX.</p> <p>Unmating force</p> <p>40 P Initial: 4.0 N MIN.    30cycles: 4.0 N MIN.</p> <p>70 P Initial: 7.0 N MIN.    30cycles: 7.0 N MIN.</p>

### 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 $25 \pm 3$ mm/min. along the mating axis.
Pass criteria:	Contact resistance: Shall meet 4.1.1

### 3. Conn. Lock (Applicable Plug Part No.: 21102-0\*\*E-21)

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.

### 4. Vibration

Reference standard:	MIL-STD-202-201
Test conditions:	<p>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.</p> <p>Frequency: 10 Hz → 55 Hz → 10 Hz/approx. 1min.</p> <p>Directions: 3 mutually perpendicular directions.</p> <p>Total Amplitude: 1.52 mm</p> <p>Sweep Duration: 2 hours for each direction, a total of 6 hours.</p>
Pass criteria:	<p>Contact Resistance: Shall meet 4.1.1.</p> <p>Electrical discontinuity: No electrical discontinuity greater than <math>1 \mu\text{s}</math> shall occur.</p> <p>Appearance: No abnormality adversely affecting the performance shall occur.</p>

<b>5. Shock</b>	
Reference standard:	MIL-STD-202-213, Test 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 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.

### 4.3. Environmental Performance

<b>1. Thermal shock</b>	
Reference standard:	-
Test conditions:	Solder the receptacle connector to the test board, then mate plug connector, and expose them to the following environment. Temperature: 218K(-55 $^{\circ}$ C),30min. $\rightarrow$ 358K(105 $^{\circ}$ C),30min. Transition time: 5min. MAX. Cycle: 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 adversely affecting the performance shall occur.

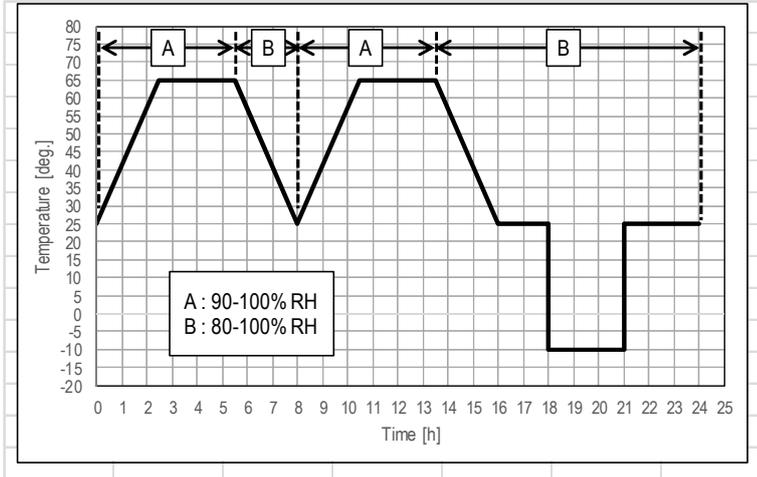
<b>2. High temperature life</b>	
Reference standard:	-
Test conditions:	Solder the receptacle connector to the test board, then mate plug connector, and expose them to the following environment. Temperature: 358 $\pm$ 2K (105 $\pm$ 2 $^{\circ}$ C) Duration: 250 hours
Pass criteria:	Contact resistance: Shall meet 4.1.1. Contact retention force: Shall meet 4.2.3. Appearance: No abnormality adversely affecting the performance shall occur.

<b>3. Humidity (Steady state)</b>	
Reference standard:	MIL-STD-202-103, Test 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 $\pm$ 2K (40 $\pm$ 2 $^{\circ}$ 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 adversely affecting the performance shall occur.

4. Humidity (Cycling)

Reference standard: MIL-STD-202-106.

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[80]~100%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 adversely affecting the performance shall occur.

5. Saltwater spray

Reference standard: MIL-STD-202-101, Test condition B.

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)  
 Saltwater density: 5±1% [by weight]  
 Duration: 48 hours

Pass criteria: Contact resistance: Shall meet 4.1.1.  
 Appearance: No abnormality adversely affecting the performance shall occur.

6. H<sub>2</sub>S 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<sub>2</sub>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. Solderability	
Reference standard:	-
Test conditions:	Immerse the contact soldering part to flux of RMA or R type for 5 to 10 seconds, then dip the part into the solder bath of 518±5K (245±5°C) for 5±0.5seconds.
Pass criteria:	More than 95% of the dipped surface shall be evenly wet.

2. Resistance to soldering heat	
Reference standard:	-
Test conditions:	Reflow temperature: See Fig.2. Cycle: 2
<p>IR Reflow Condition</p> <ul style="list-style-type: none"> <li>•Reflow Part</li> <li>Peak: 260°C</li> <li>255°C: 30s</li> <li>217°C: 60~150s</li> <li>•Pre-Heat Part</li> <li>150~200°C: 60~120s</li> </ul> <p>Temperature</p> <p>Time</p> <p>Time 25°C to Peak 8minutes. MAX.</p> <p>3°C/s MAX</p> <p>6°C/s MAX</p> <p>260°C MAX.</p> <p>255°C (30s)</p> <p>217°C (60~150s)</p> <p>200°C</p> <p>150°C</p> <p>25°C</p> <p>60~120s</p>	
Pass criteria:	No deformation nor defect adversely affecting the performance occur.

Fig.2

**4.5 Test Sequence and Specimen Quantity**

Details of the Testing Groups A to L are indicated in test report.

**Table.1 Test Sequence and Sample Quantity**

No.	Test Item	Testing Groups												
		A	B	C	D	E	F	G	H	I	J	K	L	
4.1 Electrical Performance	1	Contact resistance	2,6		1,3,5	1,5	1,3	1,5	1,5,7	1,3	1,3			
	2	Insulation resistance				2,6		2,6	2,8					
	3	Dielectric withstanding voltage				3,7		3,7	3,9					
	4	Temperature rising												1
4.2 Mechanical Performance	1	Mating force	1,5											
		Unmating force	3,7											
	2	Durability	4						4 <small>(10cycles)</small>					
	3	Conn. Lock		1										
	4	Vibration			2									
5	Shock			4										
4.3 Environmental Performance	1	Thermal shock				4								
	2	High temperature life					2							
	3	Humidity (Steady State)						4						
	4	Humidity (Cycling)							6					
	5	Saltwater spray								2				
	6	H <sub>2</sub> S gas									2			
4.4 Others	1	Solder ability										1		
	2	Soldering heat resistance											1	
		Specimen quantity	5 pcs.	5 pcs.	5 pcs.	10 pcs.	10 pcs.	5 pcs.						

※Numbers indicate test sequences.

**5. Recommended Metal Mask**

Refer to drawing for the recommended metal mask thickness and opening dimension.

**6. Precautions for Handling FPC Connectors**

Refer to instruction manual : HIM-25007 for the handling of CABLINE-UMF.