

NUMBER <b>GS-12-1404</b>	TYPE <b>PRODUCT SPECIFICATION</b>	<b>Amphenol FCI</b>	
TITLE  0.4mm pitch Board to Board Connector		PAGE <b>1 of 8</b>	REVISION <b>E</b>
		AUTHORIZED BY <b>Sanford Lu</b>	DATE <b>2024.04.22</b>
		CLASSIFICATION <b>UNRESTRICTED</b>	

### 1.0 Objective

This specification is intended to cover the performance and evaluation conditions for 0.4mm pitch Board to Board connector.

### 2.0 Applicant production

TITLE
0.4mm pitch Board to Board Receptacle connector "10142890 and 10164227 Series"
0.4mm pitch Board to Board Plug connector "10142886 and 10164228 Series"

### 3.0 Materials and Finish

Shape details are each referring to the drawings.

Part name	Material	Finish	Note
Receptacle Housing	Glass filled LCP	—	UL94V-0, Color : Black
Receptacle Contact	Copper Alloy	Au Plating (Nickel underplate overall)	-
Plug Housing	Glass filled LCP	—	UL94V-0, Color : Black
Plug Contact	Copper Alloy	Au Plating (Nickel underplate overall)	—
Emboss tape	PET	—	JIS C 0806 Conformity
Cover tape	Polyester	—	JIS C 0806 Conformity
Reel (for packaging)	Polystyrene	—	JIS C 0806 Conformity

### 4.0 Recommendation PCB pattern

Refer to each drawings.

NUMBER <b>GS-12-1404</b>	TYPE <b>PRODUCT SPECIFICATION</b>	<b>Amphenol FCI</b>	
TITLE  0.4mm pitch Board to Board Connector		PAGE <b>2 of 8</b>	REVISION <b>E</b>
		AUTHORIZED BY <b>Sanford Lu</b>	DATE <b>2024.04.22</b>
		CLASSIFICATION <b>UNRESTRICTED</b>	

## 5.0 Operating requirements

5.1 Rating voltage : AC/DC 30V

5.2 Rating current : AC/DC 0.3A on all contacts simultaneously

5.3 Operating temperature range : -40°C ~ +125°C  
(Including temperature rise caused by application of current.)

### 5.4 Performance of various

Unless otherwise specified, when tested the ambient conditions in accordance with IEC 60068 as described

below and evaluated with the sequence listed in Table 1, the connector shall meet the requirements.

Temperature : 15 ~ 35°C  
Relative humidity : 25 ~ 85%Rh.  
Atmospheric pressure : 86 ~ 106kpa

NUMBER <b>GS-12-1404</b>	TYPE <b>PRODUCT SPECIFICATION</b>	<b>Amphenol FCI</b>	
TITLE  0.4mm pitch Board to Board Connector		PAGE <b>3 of 8</b>	REVISION <b>E</b>
		AUTHORIZED BY <b>Sanford Lu</b>	DATE <b>2024.04.22</b>
		CLASSIFICATION <b>UNRESTRICTED</b>	

	Para.	Requirements	Condition
Electrical Requirements	L.L.C.R	Initial : 90 mΩ Max. Final : 90 mΩ Max.	6.1.
	Insuration Resistance	Initial : 50MΩMin. (@ DC100V) Final : 50MΩMin. (@ DC100V)	6.2.
	Dielectric Withstanding Voltage	No evidence of arc-over or insulation breakdown. (Current leakage : 2mA Max.)	6.3.
	Temperature Rise	The temperature rise shall not exceed 30°C (Current applied: 0.3A on all contacts simultaneously)	6.4
Environmental Requirements	Damp Heat (Steady State)	No evidence of cracking, swelling or other damage. L.L.C.R Final : 90 mΩ Max., Insulation resistance Final : 25MΩ Min.	6.5
	Thermal Shock	No evidence of cracking, swelling or other damage. L.L.C.R Final : 90 mΩ Max.	6.6
	SO <sub>2</sub> Gas	No evidence of cracking, swelling or other damage. L.L.C.R Final : 180 mΩ Max.	6.7
Mechanical Requirements	Vibration (Low Frequency)	No evidence of physical or mechanical damage, or disassociation of parts, and no electrical discontinuity greater than 1μsec. shall occur. L.L.C.R Final : 90 mΩ Max.	6.8
	Physical Shock		6.9
	Mating Force	0.9N (90 gramf) Maximum per contact.	6.10
	Un-mating Force	0.1N (10 gramf) Minimum per contact.	6.11
	Durability	There shall be no defect which spoils a function. L.L.C.R. Final : 90 mΩ Max.	6.12
	Resistance to Reflow Soldering Heat	There shall be no defect which spoils a function.	6.13
	Solderability	Solder wetting area shall be 95% minimum.	6.14

NUMBER <b>GS-12-1404</b>	TYPE <b>PRODUCT SPECIFICATION</b>	<b>Amphenol FCI</b>	
TITLE  0.4mm pitch Board to Board Connector		PAGE <b>4 of 8</b>	REVISION <b>E</b>
		AUTHORIZED BY <b>Sanford Lu</b>	DATE <b>2024.04.22</b>
		CLASSIFICATION <b>UNRESTRICTED</b>	

## 6. Test method

### 6.1. Low Level Contact Resistance

The contact resistance shall not be exceed 90 mΩ before test when measured under the following conditions. The contact resistance of after test shall be specified by each requirement.

- (a) Method of connection : See Fig 1.
- (b) Test current : 1mA AC
- (c) Open circuit voltage : 20mV AC

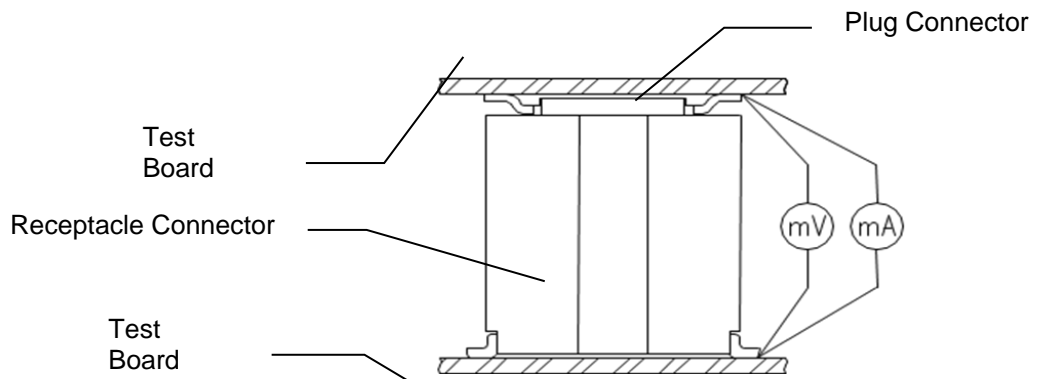


Fig.1 Test method of contact resistance

### 6.2. Insulation Resistance

The insulation resistance of the unmated connector shall be not less than 50 MΩ before test when measured. The following details shall apply.

- (a) Test Voltage : 100 V DC for 1 minute
- (b) Special Preparation : The connector shall not be mounted on PCB.
- (c) Points of Measurement : Between adjacent terminal

### 6.3. Dielectric Withstanding Voltage

There shall be no evidence of arc-over or insulation breakdown when the unmated connector is tested. The following details shall apply.

- (a) Test Voltage : 100 V AC for 1 minute
- (b) Special Preparation : The connector shall not be mounted on PCB.
- (c) Points of Measurement : Between adjacent terminal

### 6.4. Temperature Rise

The temperature rise shall not exceed 30°C when measured using thermocouple under the following conditions in accordance with EIA-364-70:

- a) Current applied: 0.3A DC on all contacts simultaneously;
- b) Special preparation: The connector shall be connected in series.
- c) Points of measurement: At a terminal located at or near the middle of the connector.

NUMBER <b>GS-12-1404</b>	TYPE <b>PRODUCT SPECIFICATION</b>	<b>Amphenol FCI</b>	
TITLE  0.4mm pitch Board to Board Connector		PAGE <b>5 of 8</b>	REVISION <b>E</b>
		AUTHORIZED BY <b>Sanford Lu</b>	DATE <b>2024.04.22</b>
		CLASSIFICATION <b>UNRESTRICTED</b>	

#### 6.5. Damp Heat (Steady State)

There shall be no evidence of cracking, swelling or other damage which would be detrimental to the Function of the connector after the mated connector is exposed to a high humidity ambience in accordance with IEC 60068-2-78.

The contact resistance shall not exceed 90 mΩ, and insulation resistance shall be not less than 25 MΩ.

The following details shall apply.

- (a) Ambient Temperature: 40 ± 2 °C
- (b) Relative Humidity : 90 to 95 %
- (c) Duration : 96 hours

#### 6.6. Thermal Shock

There shall be no evidence of cracking, swelling or other damage which would be detrimental to the function of the connector after the mated connector is exposed to alternate cycles of extreme high and low temperature in accordance with IEC 60068-2-14. The contact resistance shall not exceed 90 mΩ.

The following details shall apply.

- (a) Temperature Range : -55±3 °C for 30 minutes followed by +85±3 °C for 30 minutes.
- (b) Number of Cycle : 5 cycles

#### 6.7. SO<sub>2</sub> Gas

There shall be no evidence of cracking, swelling or oxidation which would be detrimental to the function of the connector. The contact resistance shall not exceed 180 mΩ after test. The following details shall apply.

- (a) SO<sub>2</sub> Gas : 25 ppm
- (b) Ambient Temperature: 25±2 °C
- (c) Relative Humidity : 75 %
- (d) Duration : 96 hours

#### 6.8. Vibration

There shall be no evidence of physical or mechanical damage, or disassociation of parts, and no evidence of discontinuity greater than 1 microsecond when the mated connector is subjected to mechanical vibration.

The contact resistance shall not exceed 90 mΩ after the test. The test shall be in accordance with IEC 60068-2-6. The following details shall apply.

- (a) Frequency : 10Hz - 55Hz - 10Hz / approx 5 min.
- (b) Single Amplitude : 0.75 mm
- (c) Test Current : 0.1 A
- (d) Duration : 10 cycles for 3 directions.

NUMBER <b>GS-12-1404</b>	TYPE <b>PRODUCT SPECIFICATION</b>	<b>Amphenol FCI</b>	
TITLE  0.4mm pitch Board to Board Connector		PAGE <b>6 of 8</b>	REVISION <b>E</b>
		AUTHORIZED BY <b>Sanford Lu</b>	DATE <b>2024.04.22</b>
		CLASSIFICATION <b>UNRESTRICTED</b>	

#### 6.9. Shock

There shall be no evidence of physical or mechanical damage, or disassociation of parts, and no evidence of discontinuity greater than 1 microsecond when the mated connector is subjected to mechanical shock. The contact resistance shall not exceed 90 mΩ after the test. The test shall be in accordance with IEC 60068-2-27. The following details shall apply.

- (a) Test condition : 490 m/s<sup>2</sup> (50 G), 11 ms, half sin wave
- (b) Number of Shock : 6 shocks along each of three orthogonal axes. (18 total)
- (c) Test Current : 0.1 A

#### 6.10. Mating Force

EIA-364-13

- (a) Operating speed ----- 25 mm/minute
- (b) No lubrication and utilize free-floating fixture.
- (c) Number of connectors ----- 5 mated pair

#### 6.11. Un-mating Force

EIA-364-13

- (a) Operating speed ----- 25 mm/minute
- (b) No lubrication and utilize free-floating fixture.
- (c) Number of connectors ----- 5 mated pair

#### 6.12. Durability

After 30 mating cycles, contact resistance shall not exceed 90 mΩ. The following details shall apply.

- (a) Test speed : 10 mm/min.

#### 6.13. Solder Heat Resistance (IR Reflow)

There shall be no defect which spoils a function under the following conditions. The test shall be in accordance with IEC 60068-2-58. The following details shall apply.

- (a) Pre-Heating : 150 to 180 °C, 120±5 seconds
- (b) Soldering : 220 °C Min., 60 seconds Max.
- (c) Peak Temp. : 245 °C, 20 seconds Max. (Peak : 260°C Max.)

Note: Temperature must be measured at contact terminal portion and peak temperature on the upper surface of P.C.B must be less than 260°C

- (d) Solder paste : JIS Z 3282 Sn96.5Ag3.0Cu0.5

#### 6.14. Solderability (IR Reflow)

Actual soldered wetting area shall be 90% minimum. The test shall be in accordance with IEC 60068-2-58. The following details shall apply.

- (a) Pre-Heating : 150 to 180 °C, 60 to 120 seconds
- (b) Soldering : 225 °C Min., 20±5 seconds. (Peak 235 °C Max.)

Note: Temperature must be measured at contact terminal portion and peak temperature on the upper surface of P.C.B must be less than 260°C

NUMBER <b>GS-12-1404</b>	TYPE <b>PRODUCT SPECIFICATION</b>	<b>Amphenol FCI</b>	
TITLE  0.4mm pitch Board to Board Connector		PAGE <b>7 of 8</b>	REVISION <b>E</b>
		AUTHORIZED BY <b>Sanford Lu</b>	DATE <b>2024.04.22</b>
		CLASSIFICATION <b>UNRESTRICTED</b>	

(c) Solder paste : JIS Z 3282 Sn96.5Ag3.0Cu0.5

NUMBER <b>GS-12-1404</b>	TYPE <b>PRODUCT SPECIFICATION</b>	<b>Amphenol FCI</b>							
TITLE  0.4mm pitch Board to Board Connector		PAGE <b>8 of 8</b>				REVISION <b>E</b>			
		AUTHORIZED BY <b>Sanford Lu</b>				DATE <b>2024.04.22</b>			
CLASSIFICATION <b>UNRESTRICTED</b>									

## 7. Test sequence

Test sequence is shown in Table 2.

No.	Item	Test Group								Method
		1	2&3	4	5&6	7	8	9	10	
1	L.L.C.R		1,3,5	1,3	1,3,5	1,7	1,3			6.1.
2	Insulation Resistance	1,4								6.2.
3	Dielectric Withstanding Voltage	2,5								6.3.
4	Temperature Rise								1	6.4.
5	Damp Heat	3	4							6.5.
6	Thermal Shock		2							6.6.
7	SO <sub>2</sub> Gas			2						6.7.
8	Vibration				2					6.8.
9	Shock				4					6.9.
10	Mating force					2,5				6.10.
11	Un-mating force					3,6				6.11.
12	Durability					4				6.12.
13	Solder Heat Resistance						2			6.13.
14	Solderability							1		6.14.
	Sample quantity	3	3	3	3+3	5	3	3	3	

## 8. Notice

Please be sure to look through application specification (GS-20-0508) of relevance in the case of use of this product.

The document may be changed without prior notice.



NUMBER <b>GS-12-1404</b>	TYPE <b>PRODUCT SPECIFICATION</b>	<b>Amphenol FCI</b>	
TITLE  0.4mm pitch Board to Board Connector		PAGE <b>9 of 8</b>	REVISION <b>E</b>
		AUTHORIZED BY <b>Sanford Lu</b>	DATE <b>2024.04.22</b>
		CLASSIFICATION <b>UNRESTRICTED</b>	

**REVISION RECORD**

<b>Rev</b>	<b>Page</b>	<b>Description</b>	<b>EC#</b>	<b>Date</b>
A	ALL	New Release		06.Aug.'18
B	2	Change operating temperature to -40°C ~ 125°C from -35°C ~ 85°C	ELX-J-32656	13.Feb.'19
C	3/6/7	Add mating and un-mating force	ELX-N-40242	21 Apr '21
D	7	Add current rating test, update the test sequence	ELX-N-45918-1	16 Sep. '22
E	2/3/4	After 0.3A add on all contacts simultaneously	ELX-N-51310-1	22 Apr. '24