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[Molex Connector Corporation](#)
[5042811100](#)

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 PRODUCT SPECIFICATION	LANGUAGE
	JAPANESE ENGLISH

【1. 適用範囲 SCOPE】

本仕様書は、0.3 mm ピッチ FPC用 Non-ZIF コネクタ について規定する。

This product specification covers the performance requirements for 0.3mm PITCH FPC NON-ZIF CONNECTOR.

【2. 製品名称及び型番 PRODUCT NAME AND PART NUMBER】

製品名称 Product Name	製品型番 Part Number
ハウジング アッセンブリ Housing Assembly (Right Angle Type)	5 0 4 2 8 1 - * * 0 9
5 0 4 2 8 1 - * * 0 9 テーピング梱包品 Embossed Tape Package For 504281-**09	5 0 4 2 8 1 - * * 0 0

* * : 極数 (図面参照) CIRCUITS (Refer to the drawing)

【3. 定格 RATINGS】

項 目 Item	規 格 Standard	
最大許容電圧 Rated Voltage (MAXIMUM)	50V	[AC(実効値 rms)/DC]
最大許容電流 Rated Current (MAXIMUM)	0.3A	
使用温度範囲 ^{*1} Operating Temperature Range	-40°C ~ +85°C ^{*2 *3}	
保管条件 Storage Condition	温度 Temperature	-10°C ~ +50°C
	湿度 Humidity	85%R.H.以下 (但し結露しないこと) 85%R.H. MAX. (No Condensation)
	期間 Terms	出荷後6ヶ月 (未開封の場合) For 6 months after shipping (unopened package)

*1 : 基板実装後の無通電状態は、使用温度範囲が適用されます。

Non-operating connectors after reflow must follow the operating temperature range condition.

*2 : 通電による温度上昇分を含む。

This includes the terminal temperature rise generated by conducting electricity.

*3 : 適合FPCも本使用温度範囲を満足すること。

Applicable FPC must also meet the specified temperature range.

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REVISE ON PC ONLY					TITLE:				
A	新規作成 RELEASED J2013-1530 '13/06/14 S.KUROSE				0.3 mm PITCH FPC CONN. Non-ZIF HGT=1.0MM (RIGHT ANGLE TYPE) PRODUCT SPECIFICATION 製品仕様書				
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	DESIGN CONTROL J		STATUS		S.KUROSE	H.IIJIMA	K.MORIKAWA	2012/10/12	
DOCUMENT NUMBER PS 504281 001								FILE NAME	SHEET

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【 4 . 性能 PERFORMANCE 】

4 - 1 . 電氣的性能 Electrical Performance

項目 Item	条件 Test Condition	規格 Requirement
4-1-1 接 触 抵 抗 Contact Resistance	適合するFPCを嵌合させ、開放電圧20mV以下、短絡電流10mA以下にて測定する。 (JIS C5402 5.4) Mate applicable FPC, measure contact resistance by dry circuit, 10mA DC MAXIMUM. Open circuit voltage is 20 mV MAXIMUM. (JIS C5402 5.4)	奇数端子 Odd terminal 80 milliohm MAXIMUM 偶数端子 Even terminal 60 milliohm MAXIMUM
4-1-2 絶 縁 抵 抗 Insulation Resistance	適合するFPCを嵌合させ、隣接するターミナル間及びターミナル、アース間に、DC250Vを印加し測定する。 (JIS C5402 5.2/MIL-STD-202 試験法 302) Mate applicable FPC and apply 250V DC between adjacent terminals or terminal and ground. (JIS C5402 5.1/MIL-STD-202 Method 302)	50 Megaohm MINIMUM
4-1-3 耐 電 圧 Dielectric Strength	適合FPCを嵌合させ、隣接するターミナル間及びターミナル、アース間に、AC250V(実効値)を1分間印加する。感度電流2mA (JIS C5402 5.1/MIL-STD-202 試験法 301) Mate applicable FPC and apply 250V(rms) AC between adjacent terminals or terminal and ground. Trip current is set at 2mA. (JIS C5402 5.1/MIL-STD-202 Method 301)	異常なきこと No Breakdown

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4-2. 機械的性能 Mechanical Performance

項目 Item	条件 Test Condition	参考値 Reference
4-2-1	FPC挿抜力 FPC Insertion and Withdrawal Force 適合するFPCを25±3mm/minの速さで挿入、抜去を行う。 Insert and Withdrawal FPC at the speed rate of 25+3/-3mm per a minute.	第 7 項参照 Refer to paragraph 7

4-3. その他 Environmental Performance and Others

項目 Item	条件 Test Condition	規格 Requirement	
4-3-1	無通電状態にて、1分間に10回以下の速さで、FPCの挿入、抜去を10回繰り返す。 Insert and Withdrawal to 10 cycles at the speed rate of less than 10 cycles per minute.	接 触 抵 抗 Contact Resistance	奇数端子 Odd terminal 100 milliohm MAXIMUM 偶数端子 Even terminal 80 milliohm MAXIMUM
4-3-2	適合するFPCを嵌合させ、最大許容電流を通電し、コネクタ端子の温度上昇分を測定する。 (UL 498) Mate applicable FPC and measure the temperature rise of contact when the maximum rated current is passed. (UL498)	温 度 上 昇 Temperature Rise	30°C以下 30°C MAXIMUM

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項目 Item	条件 Test Condition	規格 Requirement	
4-3-3 耐振動性 Vibration	DC1mA通電状態にて、嵌合軸を含む互いに垂直な3方向に掃引割合10~55~10Hz/分、全振幅1.5mmの振動を各2時間加える。 (JIS C60068-2-6/MIL-STD-202試験法201) Mate applicable FPC and subject to the following vibration conditions, for 2 hours in each of 3 mutually perpendicular axes, passing DC 1mA during the test. Amplitude : 1.5 mm Frequency : 10-55-10 Hz (JIS C60068-2-6/MIL-STD-202, Method 201)	外 観 Appearance	異常なきこと No Damage
		接 触 抵 抗 Contact Resistance	奇数端子 Odd terminal 100 milliohm MAXIMUM 偶数端子 Even terminal 80 milliohm MAXIMUM
		瞬 断 Discontinuity	1.0 microsecond MAXIMUM
4-3-4 耐衝撃性 Mechanical Shock	DC1mA通電状態にて、嵌合軸を含む互いに垂直な6方向に、490m/s ² {50G}の衝撃を作用時間11millisecondで各3回加える。 (JIS C C60068-2-27/MIL-STD-202 試験法213) Mate applicable FPC and subject to the following shock conditions. 3 times of shocks shall be applied for each 6 directions along 3 mutually perpendicular axes, passing DC1mA current during the test. The total number of shocks is 18. Pulse shape : Half-sine Amplitude : 490m/s ² {=50G} Duration : 11 milliseconds (JIS C60068-2-27/MIL-STD-202, Method213)	外 観 Appearance	異常なきこと No Damage
		接 触 抵 抗 Contact Resistance	奇数端子 Odd terminal 100 milliohm MAXIMUM 偶数端子 Even terminal 80 milliohm MAXIMUM
		瞬 断 Discontinuity	1.0 microsecond MAXIMUM

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項目 Item		条件 Test Condition	規格 Requirement	
4-3-5	耐熱性 Heat Resistance	適合するFPCを嵌合させ、85±2°Cの雰囲気中に96時間放置後取り出し、1~2時間室温に放置する。 (JIS C60068-2-2/MIL-STD-202 試験法108) Mate applicable FPC and expose to +85+2/-2 degree C for 96 hours. Upon completion of exposure period, the test specimens shall be conditioned at ambient room conditions for 1 to 2 hours, after which the specified measurements shall be performed. (JIS C60068-2-2/MIL-STD-202 Method 108)	外 観 Appearance	異状なきこと No Damage
			接 触 抵 抗 Contact Resistance	奇数端子 Odd terminal 100 milliohm MAXIMUM 偶数端子 Even terminal 80 milliohm MAXIMUM
4-3-6	耐寒性 Cold Resistance	適合するFPCを嵌合させ、-40±3°Cの雰囲気中に96時間放置後取り出し、1~2時間室温に放置する。 (JIS C60068-2-1) Mate applicable FPC and expose to -40+3/-3 degree C for 96 hours. Upon completion of exposure period, the test specimens shall be conditioned at ambient room conditions for 1 to 2 hours, after which the specified measurements shall be performed. (JIS C60068-2-1)	外 観 Appearance	異状なきこと No Damage
			接 触 抵 抗 Contact Resistance	奇数端子 Odd terminal 100 milliohm MAXIMUM 偶数端子 Even terminal 80 milliohm MAXIMUM

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項目 Item		条件 Test Condition	規格 Requirement	
4-3-7	耐湿性 Condensation Test	適合するFPCを嵌合させ、40±2°C、相対湿度90～95%RHの雰囲気中に96時間放置後取り出し、1～2時間室温に放置する。 (JIS C60068-2-78/MIL-STD-202 試験法103) Mate applicable FPC and expose to 40+2/-2 degree C, relative humidity 90 to 95% for 96 hours. Upon completion of exposure period, the test specimens shall be conditioned at ambient room conditions for 1 to 2 hours, after which the specified measurements shall be performed. (JIS C60068-2-78/MIL-STD-202 Method 103)	外 観 Appearance	異常なきこと No Damage
			接 触 抵 抗 Contact Resistance	奇数端子 Odd terminal 100 milliohm MAXIMUM 偶数端子 Even terminal 80 milliohm MAXIMUM
			耐 電 圧 Dielectric Strength	4-1-3項 満足のこと Must meet the requirement 4-1-3
			絶 縁 抵 抗 Insulation Resistance	20 Megaohm MINIMUM
4-3-8	温度サイクル Temperature Cycling	適合するFPCを嵌合させ、-55±3°Cに30分、+85±2°Cに30分、これを1サイクルとし、5サイクル繰り返す。但し、温度移行時間は、5分以内とする。試験後1～2時間室温に放置する。 (JIS C60068-2-14) Mate applicable FPC and subject the following conditions for 5 cycles. Upon completion of the exposure period, the test specimens shall be conditioned at ambient room conditions for 1 to 2 hours, after which the specified measurements shall be performed. 1cycle a) -55+3/-3 degree C 30 minutes b) +85+2/-2 degree C 30 minutes (Transit time shall be with in 5 minutes) (JIS C60068-2-14)	外 観 Appearance	異常なきこと No Damage
			接 触 抵 抗 Contact Resistance	奇数端子 Odd terminal 100 milliohm MAXIMUM 偶数端子 Even terminal 80 milliohm MAXIMUM

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項目 Item		条件 Test Condition	規格 Requirement	
4-3-9	塩水噴霧 Salt Spray	適合するFPCを嵌合させ、35±2℃にて、重量比5±1%の塩水を48時間噴霧し、試験後常温で水洗いした後、室温で乾燥させる。 (JIS C60068-2-11/MIL-STD-202 試験法101) Mate applicable FPC and expose to the following salt mist conditions. Upon completion of exposure period, salt deposits shall be removed by a gentle wash or dip in running water, after which the specified measurements shall be performed. NaCl solution : 5+1/-1% by weight Spray time : 48 hours Ambient temperature : 35+2/-2 degree C (JIS C60068-2-11/MIL-STD-202 Method 101)	接触抵抗 Contact Resistance	奇数端子 Odd terminal 100 milliohm MAXIMUM 偶数端子 Even terminal 80 milliohm MAXIMUM
4-3-10	亜硫酸ガス SO ₂ Gas	適合するFPCを嵌合させ、40±2℃、50±5ppmの亜硫酸ガス中に24時間放置する。 Mate applicable FPC expose to 50+5/-5ppm SO ₂ gas at 40+2/-2 degree C for 24 hours.	接触抵抗 Contact Resistance	奇数端子 Odd terminal 100 milliohm MAXIMUM 偶数端子 Even terminal 80 milliohm MAXIMUM
4-3-11	半田付け性 Solderability	端子先端より0.2mmの位置まで245±3℃の半田に3±0.5秒浸す。 Dip 0.2mm from the tip of the solder tails into the molten solder which is held at 245+3/-3 degree C for 3±0.5 seconds.	濡れ性 Solder Wetting	浸漬面積の95%以上 At least 95% of immersed area must show no voids, pin holes

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項目 Item	条件 Test Condition	規格 Requirement
4-3-12 半田耐熱性 Resistance to Soldering- Heat	<p><赤外線リフロー時> <Reflow by Infrared Reflow Machine> 下部条件にてリフローを2回行う。 The product was reflowed two times.</p> <p style="text-align: center;"><u>赤外線リフロー条件</u> <u>INFRARED REFLOW CONDITION</u></p> <p style="text-align: center;">250+5/-10℃ (ピーク温度) 250+5/-10 degree C (Peak temperature)</p> <p style="text-align: center;"><u>温度条件グラフ</u> <u>TEMPERATURE CONDITION GRAPH</u> 半田接合部の基板表面にて測定 (Temperature is measured)</p> <p>注記：本リフロー条件に関しては、温度プロファイル、半田ペースト、大気、N₂リフロー、基板などにより条件が異なりますので事前に実装評価(リフロー評価)を必ず実施願います。実装条件によっては、製品性能に影響を及ぼす場合がございます。 NOTE: Please investigate the mounting condition (reflow soldering condition) on your own devices beforehand. The mounting conditions may change due to the soldering temperature, soldering paste, air reflow machine, Nitrogen reflow machine, and the type of printed circuit board. The different mounting conditions may have an influence on the product's performance.</p>	<p>外 観 Appearance</p> <p>端子ガタ 割れ等 異状無きこと No damage after twice reflow</p>

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項目 Item		条件 Test Condition	規格 Requirement	
4-3-12	半田耐熱性 Resistance to Soldering- Heat	<p><手半田時 > <Reflow by Manual Soldering iron> 端子先端より0.2mmの位置まで、350±10°Cの半田ゴテにて5秒加熱する。但し、異常な加圧のないこと。 Using a soldering iron (350±10 degree C for 5 seconds) heat up the area 0.2mm from the tip of the solder tails. However, do not apply excessive pressure to either the terminals</p>	外 観 Appearance	端子ガタ 割れ等 異状無きこと No damage

() : 参考規格

: Reference Standard

* 各項目の評価サンプルは、製品図面に記載されている推奨基板レイアウト、推奨メタルマスクにて実装しています。リフロー条件は4-3-12項に示す推奨温度プロファイルにて実装しております。半田ペーストは、無鉛半田 (Sn-3Ag-0.5Cu) を使用しております。

The evaluation samples of each specification test are reflowed according to the recommended Print Circuit Board layout and the recommended metal mask thickness specified in the sales drawing. The reflow conditions followed are specified in the reflow profile of 4-3-12. Lead free solder (Sn-3Ag-0.5Cu) was used as the soldering paste.

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【5. 外観形状、寸法及び材質 PRODUCT SHAPE, DIMENSIONS AND MATERIALS】

図面参照 Refer to the drawing.

【6. 環境指令への適合 COMPLIANCE WITH ENVIRONMENTAL DIRECTIVE】

ELV及びRoHS適合品 ELV and RoHS compliant

【7. FPC挿抜力 FPC INSERTION / WITHDRAWAL FORCE】

ソフトニッケルめっきFPC（厚み0.3mm）を使用した時の値

This test data in case of used the soft nickel type FPC. (t=0.3mm)

挿入力/抜去力の10回目は新しいFPCを使用した時の値

This test data in case of used the New FPC 10th of insertion / withdrawal force.

極数 No. of CIRCUIT	単位 UNIT	挿入力（最大値） Insertion Force (MAX.)		抜去力（最小値） Withdrawal Force (MIN.)	
		初回 1st	10回目 10 th	初回 1st	10回目 10 th
11	N {kgf}	8.72 {0.889}	8.72 {0.889}	2.09 {0.213}	2.09 {0.213}
13	N {kgf}	10.31 {1.051}	10.31 {1.051}	2.47 {0.252}	2.47 {0.252}
17	N {kgf}	13.48 {1.374}	13.48 {1.374}	3.23 {0.330}	3.23 {0.330}
19	N {kgf}	15.06 {1.535}	15.06 {1.535}	3.61 {0.368}	3.61 {0.368}

上表に示すFPC挿抜力は、ソフトニッケルめっき（厚み0.3mm）を使用した値であり、FPCの仕様がFPC挿抜力に影響を与える為、上表に示すFPC挿抜力の仕様を満たさない場合がございます。

FPC insertion / withdrawal force which shows above is based on using soft nickel plating (thickness : 0.3mm).

But, there's a case which FPC insertion / withdrawal force doesn't fulfill the specification shown above, because FPC specification affects the result of FPC insertion / withdrawal force.

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【8. 注記 NOTE】

8-1

本製品の樹脂部に黒点、ウエルド部の線、多少の傷が確認される事がございますが、製品性能には影響ございません。

Although this product may have a small black mark, a weld line or a scratch on the housing, these will not have any influence on the product's performance.

8-2

成形品の色相に多少の違いを生じる場合がございますが、製品性能には影響ございません。

There may be slight differences in the housing coloring, but there will be no influence on the product's performance.

8-3

実装性能（平坦度）は、実装基板の反りの影響を含まないものと致します。基板の反りはコネクタ両端部を基準とし、コネクタ中央部にて Max0.02mm として下さい。

The mounting specification for coplanarity does not include the influence of warpage of the printed circuit board. The warpage of the printed circuit board should be a maximum of 0.02mm if measuring from one connector edge to the other.

8-4

本製品の一般性能確認はリジット基板にて実施しております。フレキシブル基板等の特殊な基板へ実装する場合は、事前に実装確認等を行った上でご使用をお願いします。

The product performance was tested using rigid printed circuit board. In case the product needs to be reflowed onto flexible circuit board, please conduct a reflow test on the flexible circuit board in advance.

8-5

フレキシブル基板に実装する場合は、基板の変形を防止するため、補強板のご使用をお願いします。

Please add a stiffener on the flexible printed circuit (FPC) when you mount the connector onto FPC in order to prevent deformation of the FPC.

8-6

リフロー後、樹脂部、半田付け部に変色が見られることがありますが、製品性能には影響ございません。

Although there might be some discoloration seen on the housing and soldering tail after reflow, this will not influence the product's performance.

8-7

半田実装部の未半田は、端子の脱落、ピン間ショート、端子の座屈、またコネクタの基板からの外れが懸念されます。従って全ての端子テール部に半田付けを行って下さい。

If you leave any soldering area on this product open, there may be the possibility of a missing terminal short circuiting between pins, terminal buckling or the potential for the connector to come off of the printed circuit board. Therefore, please solder all of the terminals on the printed circuit board.

8-8

実装機によってコネクタに負荷が加わると変形、破損する場合がございますので事前にご確認下さい。

If there is accidental contact with the connector while it is going through the reflow machine, there may be deformation or damage caused to the connector. Please check to prevent this.

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REV.	DESCRIPTION	THIS DOCUMENT CONTAINS INFORMATION THAT IS PROPRIETARY TO MOLEX INC. AND SHOULD NOT BE USED WITHOUT WRITTEN PERMISSION	
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8-9
コネクタの性能を損なう恐れがある為、コネクタの洗浄は、行わないで下さい。
Please do not conduct any "washing process" on the connector because it may damage the product's function.

8-10
適合するFPCの導体部は、金めっき（ニッケル下地）品をご使用をお願いします。
Please make sure to use the appropriate FPC which has Gold plating (Nickel under plating) on the contact area.

8-11
量産前にご使用になるFPCとの相性確認を行った上で、ご使用をお願いします。
Please check the compatibility between the connector and the FPC prior to moving to mass production.

8-12
実装後において半田ゴテによる手修正を行う際は、必ず仕様書掲載の条件以内で行って下さい。条件を超えて実施した場合、端子の抜け、接点ギャップの変化、ハウジングの変形、溶融等、破損の原因になります。
When conducting manual repairs using a soldering iron, please follow the soldering conditions shown in the product specification. If the conditions in the product spec are not followed, it may cause the terminals to fall off, a change in the contact gap, a deformation of the housing, melting of the housing, and damage the connector.

8-13
半田ゴテによる手修正を行なう際、過度の半田やフラックスを使用しないで下さい。半田上がりやフラックス上がりにより接触、機能不良に至る場合がございます。
When conducting manual repairs using a soldering iron, please do not use more solder and flux than needed. This may cause solder wicking and flux wicking issues, and it will eventually cause a contact defect and functional issues.

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8-14

FPCを挿入する際は、FPCがハウジングに突き当たるまで確実に挿入して下さい。左右斜めの状態で挿入すると、ピッチずれによるショート不良、又は角がターミナルに引っ掛かり端子の変形やFPC導体めくれに至るケースがございます。尚、本製品は、Non-ZIF機構を有しており、奇数端子、偶数端子の2回の挿入抵抗がございます。

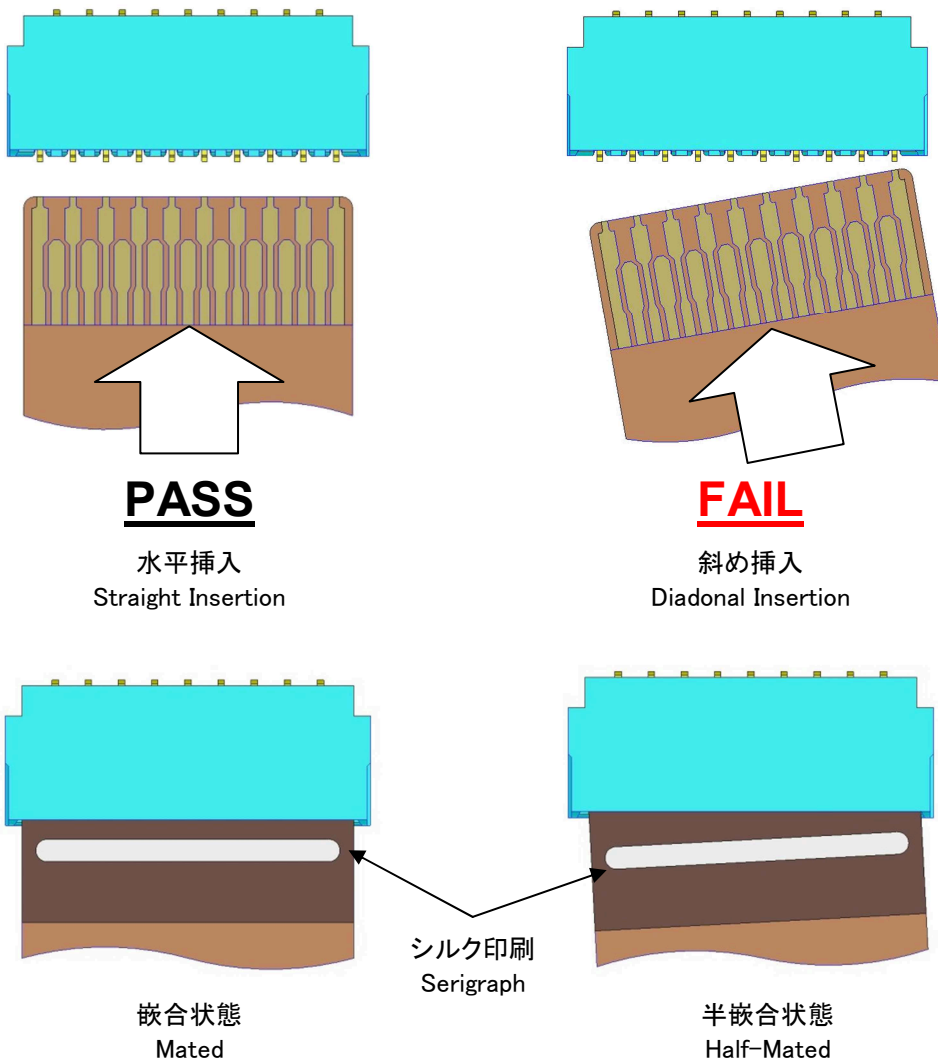
また、FPC補強板にシルク印刷を施すことで、FPC半嵌合に対する防止効果が上がります。

上面接点をご使用の場合は、嵌合時のカバーレイの傾きを確認して頂くことで上記同様の効果が得られます。

When inserting the FPC into the connector, please also ensure that the FPC is completely inserted until the end of the FPC touches the housing. Diagonal insertion of the FPC into the connector can cause a short circuit due to the misaligned pitch. Diagonal insertion can also deform the terminal and/or damage the FPC contact area because the FPC edge may contact the terminal. Because this connector is NON-ZIF, it feels that there are 2 insertion forces by odd terminal and even terminal when inserting the FPC.

Has prevention effect of FPC half-mated by printed serigraph on Stiffner board.

In case of using upper contact, please confirm inclination of cover film in stead of serigraph.



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8-15

本製品をご使用時に取り付けられた電線・プリント基板の共振や、機器の回転構造や可動部分の動作によりコネクタ嵌合部（接点部）が常に動いてしまう状態でのご使用は避けて下さい。接触部の摺動磨耗等による接触不良の原因となります。従って、機器内で電線・プリント基板を固定し、共振を抑える等の処置をお願い致します。

Please do not use the connector in a condition where the wire, the printed circuit board, or the contact area is experiencing a sympathetic vibration of wires and printed circuit board, and constant movement of devices.

This may cause a defect in the contact due to the contact area being worn down. Therefore, please fix wires and printed circuit board on the chassis, and reduces sympathetic vibration.

8-16

活電状態の電気回路で、挿入、抜去ができることを前提に作られておりません。スパーク等による危険の発生、性能不良につながりますので、活電状態での挿入、抜去はしないで下さい。

This product is not designed for the mating and unmating of the connectors to be performed under the condition of an active electrical circuit. It may cause a spark and product defect if the connectors are mated and unmated in this way.

8-17

コネクタに外力が加わらないようにクリアランスを設けた筐体構造にして下さい。

Please keep enough clearance between connector and chassis of your application in order not to apply pressure on the connector.

8-18

基板実装後に基板を直接積み重ねない様に注意して下さい。

Please do not stack the printed circuit board directly after mounted the connector on it.

8-19

基板実装前後に端子に触らないで下さい。

Please do not touch the terminals before not after reflowing the connector onto the printed circuit board.

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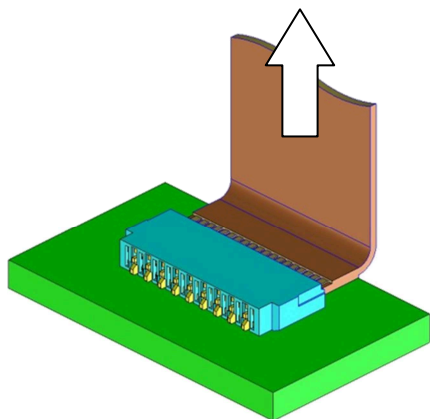
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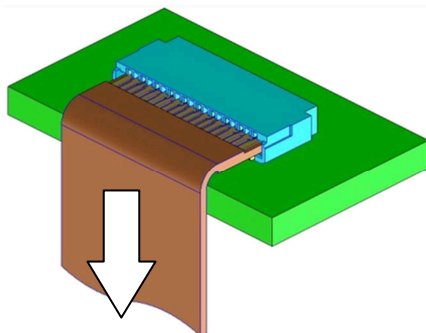
8-20

コネクタにFPCを装着した状態で、FPCに過度の負荷が加わらないようにご注意頂き、御社基板のスペース上、コネクタに負担の掛かる位置への取り付けはしないで下さい。FPCの抜け、断線、破損や接触不良の原因になります。特に、連続的に加わる場合はFPCを固定するようにして下さい。また、基板に対して垂直上下方向の引張荷重、コンタクトピッチ方向のこじり荷重を与えない様にご注意をお願いします。

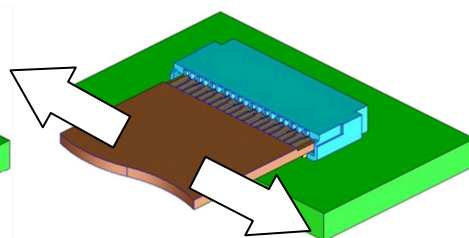
Please pay special attention not to have any pulling force/tension on the FPC when it is inserted into the connector. This can cause; FPC to be come off, cut the traces on the FPC, and/or damage the FPC. Please be especially careful to avoid placing the FPC in a location where it will have a constant force applied on the FPC. If necessary, please fix the FPC directly on the chassis. Also, please avoid pulling the FPC vertically or twisting the FPC back and force horizontally while it is inserted in the connector.



FAIL



FAIL



FAIL

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