

## BK22 Series

# 0.4mm Pitch, 0.7mm Stacking Height, 15A Rated Current, Power/Signal Hybrid FPC-to-Board Connector



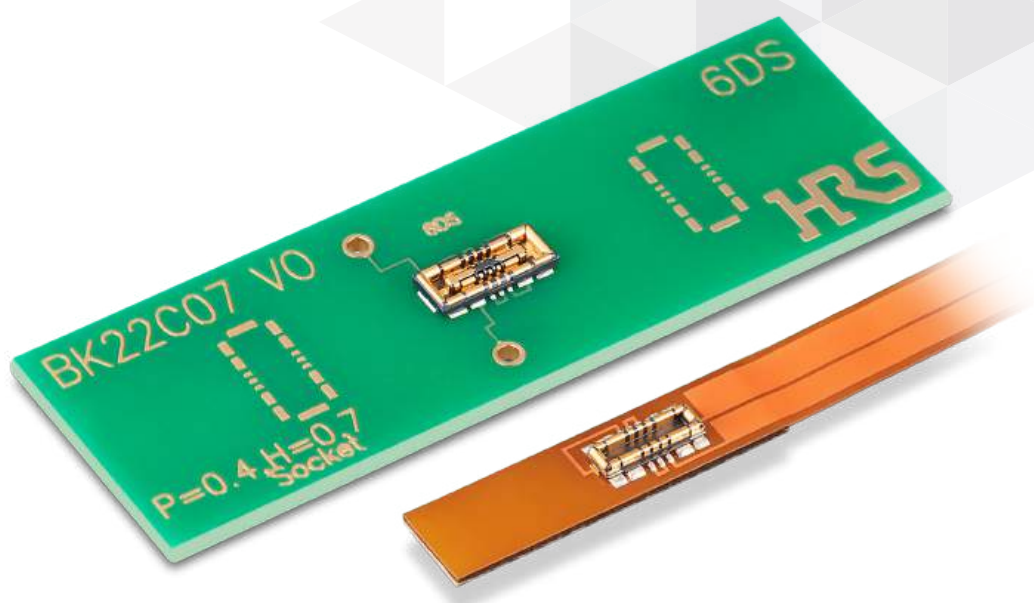
High-Current



Full Armored



Compact

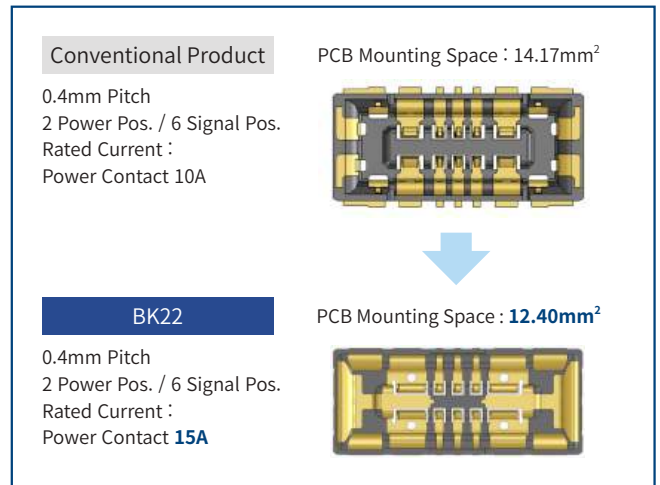


Product Page  
<https://www.hirose.com/en/product/series/BK22>

## Features

### 1. Space-saving Design with 15A Rated Current

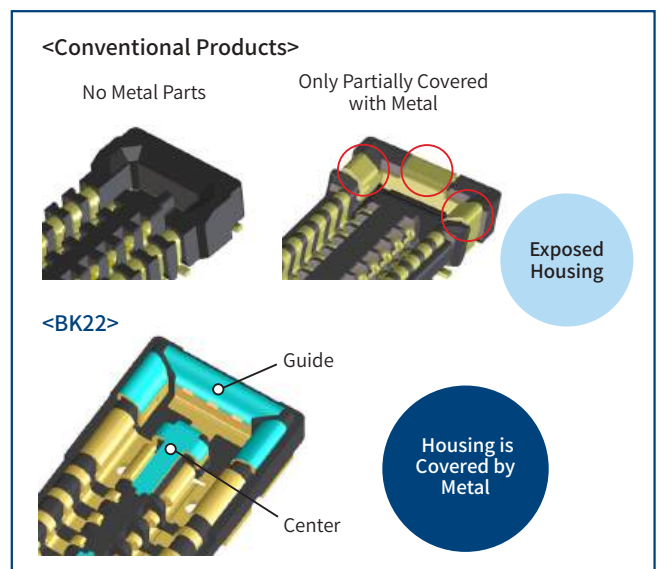
The power contact supports 15A per position and the signal contact supports 0.3A per position for high power supply capability. Additionally, the BK22 has a space-saving design that minimizes connector size.



**Increase the Rated Current from 10A to 15A While Achieving Space Reduction (14.3% Decrease in PCB Mounting Space)**

### 2. Robust Design

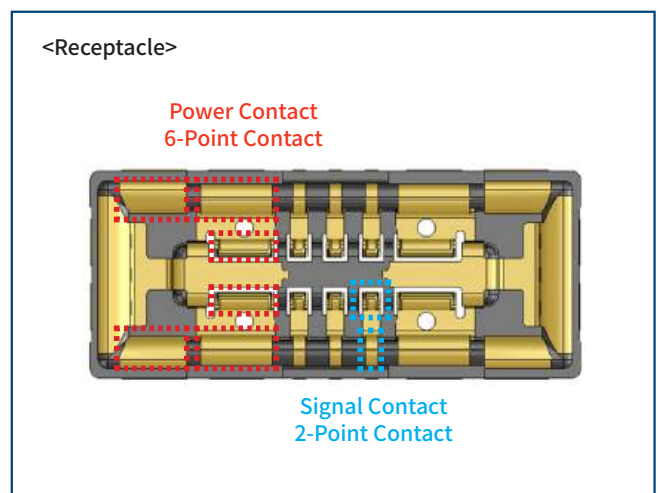
The fully armored design guide and center portion prevent housing damage due to misalignment when mating.



**Fully Armored Design**

### 3. High Contact Reliability

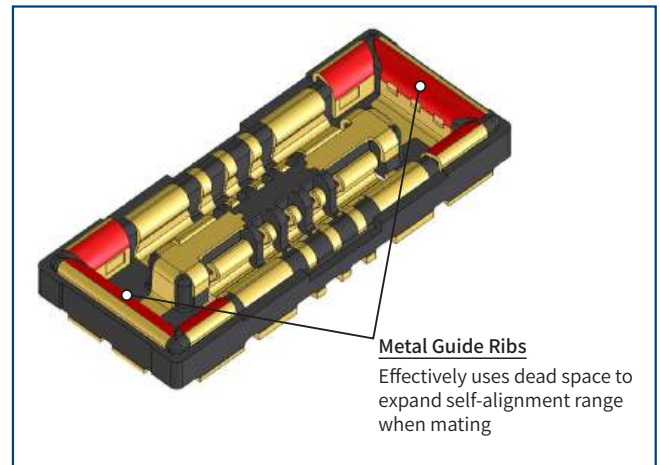
Multi-point contact design with 6-point power contacts and 2-point signal contacts for stable connection.



**Multi-point Contact**

## 4. Superior Mating Operability

Wide self-alignment range with metal guides offers enhanced mating operation.  
(0.47mm in pitch direction, 0.405mm in width direction)  
Furthermore, a clear tactile click generated by the unique locking contact design secures completed mating.



## 5. Halogen-Free

All materials and substances used to produce this product comply with Halogen-Free standards.

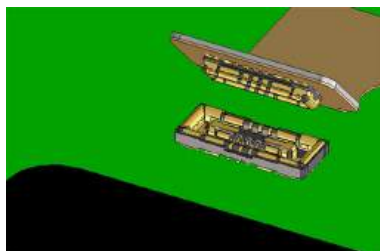
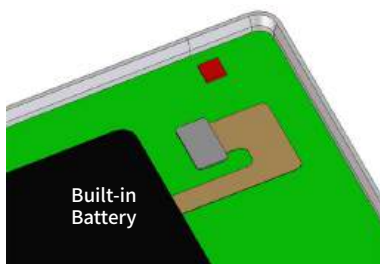
\*As defined by IEC 61249-2-21

Br : 900ppm max., Cl : 900ppm max., Br+Cl : 1,500ppm max.

## Applications

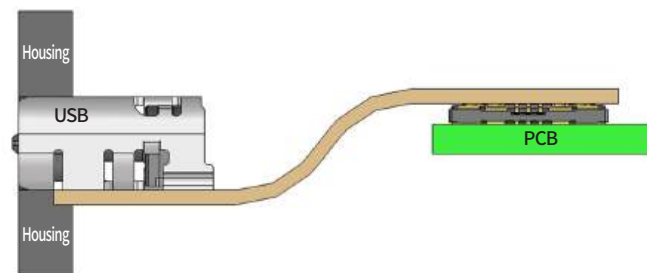
Devices that require low-profile, compact design such as smartphones, wearable terminals and tablet PCs.

### ● Battery Connection



- Space-saving
- High Current Capacity

### ● USB Connection



- Compatible with USB Power Delivery
- Easy to Replace USB Connector
- No Need for Main Board Height Alignment\*

\* By using an FPC to connect the USB to the PCB, the USB can be placed anywhere within the design of the end product.

Product Specifications

|               |                                              |                                |              |
|---------------|----------------------------------------------|--------------------------------|--------------|
| Rated Current | Signal Contact : 0.3A<br>Power Contact : 15A | Operating Temperature (Note 1) | -55 to +85°C |
|               |                                              | Storage Temperature (Note 2)   | -10 to +60°C |
| Rated Voltage | 50V AC/DC                                    |                                |              |

| Items                 | Specifications                                                                                                                                             | Conditions                                                                                                     |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| Contact Resistance    | Signal Contact : 30mΩ Max.<br>Power Contact : 5mΩ Max.                                                                                                     | Measured at 20mV AC, 1kHz, 1mA                                                                                 |
| Insulation Resistance | 50MΩ Min.                                                                                                                                                  | Measured at 100V DC                                                                                            |
| Withstanding Voltage  | No flashover or insulation breakdown                                                                                                                       | 150V AC for 1 min.                                                                                             |
| Mating Durability     | Contact Resistance : Signal Contact : 30mΩ Max.<br>Power Contact : 5mΩ Max.<br>No damage, crack or looseness of parts                                      | 10 mating cycles                                                                                               |
| Vibration Resistance  | No electrical discontinuity of 1μs or more<br>No damage, crack or looseness of parts                                                                       | Frequency : 10 to 55Hz, single amplitude 0.75mm,<br>10 cycles in each of 3 axis directions for 5 minutes/cycle |
| Shock Resistance      | No electrical discontinuity of 1μs or more<br>No damage, crack or looseness of parts                                                                       | Acceleration : 490m/s <sup>2</sup> , duration of pulse : 11ms<br>at 3 times for 3 directions.                  |
| Humidity Resistance   | Contact Resistance : Signal Contact : 30mΩ Max.<br>Power Contact : 5mΩ Max.<br>Insulation Resistance : 25MΩ Min.<br>No damage, crack or looseness of parts | 96 hours at temperature of 40±2°C and<br>humidity range from 90 to 95%                                         |
| Temperature Cycle     | Contact Resistance : Signal Contact : 30mΩ Max.<br>Power Contact : 5mΩ Max.<br>Insulation Resistance : 50MΩ Min.<br>No damage, crack or looseness of parts | -55°C for 30min. → +85°C for 30 min. for 5 Cycles<br>(Stabilizing Time In Chamber : Within 2 to 3 min.)        |

Note 1 : Includes temperature rise caused by current flow.  
Note 2 : The term "storage" refers to long-term-storage of unused items before they are mounted on the PCB.  
Operating temperature range applies to the product in a temporary storage state  
such as non-powered after mounting on the PCB during transportation, etc.

Materials / Finish

| Item               | Component      | Material     | Finish                               | Remarks |
|--------------------|----------------|--------------|--------------------------------------|---------|
| Plug<br>Receptacle | Insulator      | LCP          | Black                                | UL94V-0 |
|                    | Signal Contact | Copper Alloy | Gold Plated over Nickel Underplating | -       |
|                    | Power Contact  | Copper Alloy | Gold Plated over Nickel Underplating | -       |

Materials / Finish

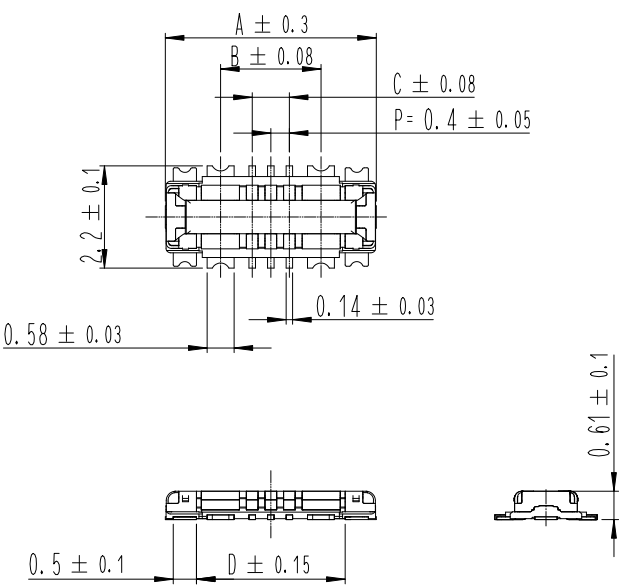
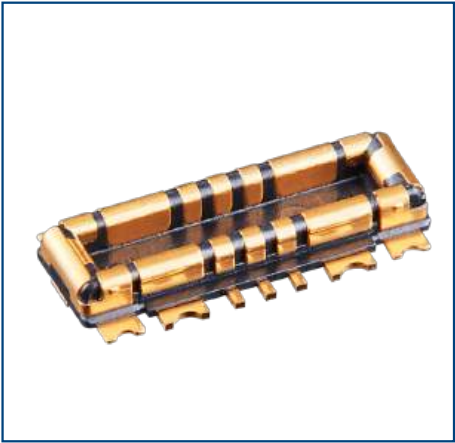
Refer to the chart below when determining the product specifications from the product number.  
Please select from the product numbers listed in this catalog when placing orders.

● Plug/Receptacle

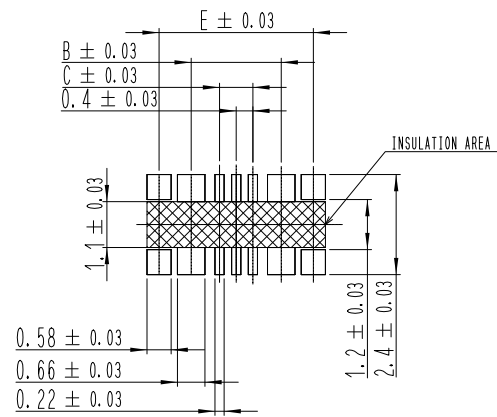
**BK22C   07   -   4   DP   2   -   0.4   V   (800)**  
①   ②   ③   ④   ⑤   ⑥   ⑦   ⑧

|                             |                                                    |                            |                                                                                                                                                    |
|-----------------------------|----------------------------------------------------|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| ① Series Name               | BK22                                               | ⑤ Number of Power Contacts | 2pos.                                                                                                                                              |
| ② Stacking Height           | 0.7mm                                              | ⑥ Contact Pitch            | 0.4mm                                                                                                                                              |
| ③ Number of Signal Contacts | 4, 6pos.                                           | ⑦ Terminal Type            | V : Straight SMT                                                                                                                                   |
| ④ Connector Type            | DP : Double-row Plug<br>DS : Double-row Receptacle | ⑧ Packaging                | (800) : Standard, Embossed Tape Packaging<br>(20,000pcs per reel)<br>(895) : Embossed tape packaging (1,000pcs per reel)<br>(For trial production) |

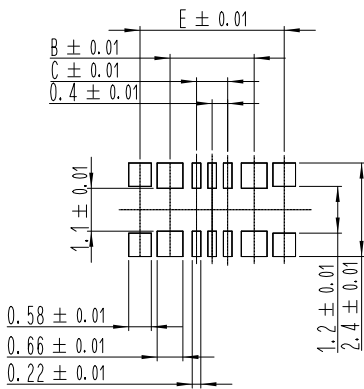
Plug



● Recommended PCB Layout



● Recommended Metal Mask Dimensions  
(Mask Thickness : 0.08mm)

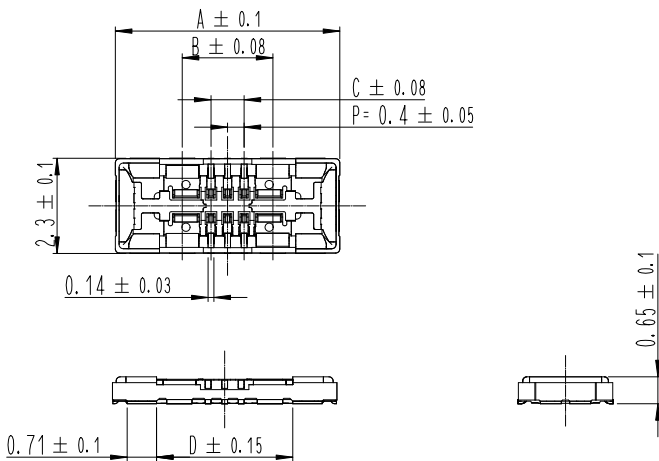


Unit : mm

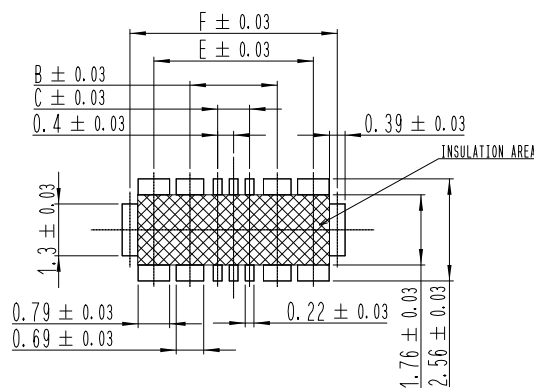
| Part No.                | HRS No.          | No. of Pos.    |               | A    | B    | C   | D   | E   | Purchase Unit      |                   |
|-------------------------|------------------|----------------|---------------|------|------|-----|-----|-----|--------------------|-------------------|
|                         |                  | Signal Contact | Power Contact |      |      |     |     |     | ## : 00            | ## : 95           |
| BK22C07-4DP/2-0.4V(8##) | CL0480-0815-0-## | 4              | 2             | 4.14 | 1.76 | 0.4 | 2.8 | 3.3 | 20,000pcs per reel | 1,000pcs per reel |
| BK22C07-6DP/2-0.4V(8##) | CL0480-0887-0-## | 6              | 2             | 4.54 | 2.16 | 0.8 | 3.2 | 3.7 |                    |                   |

Note : This connector has no polarity.

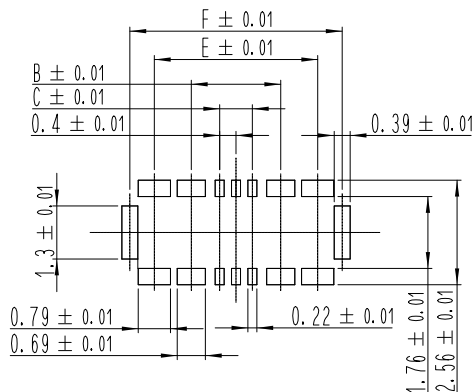
Receptacle



Recommended PCB Layout



Recommended Metal Mask Dimensions  
(Mask Thickness : 0.08mm)



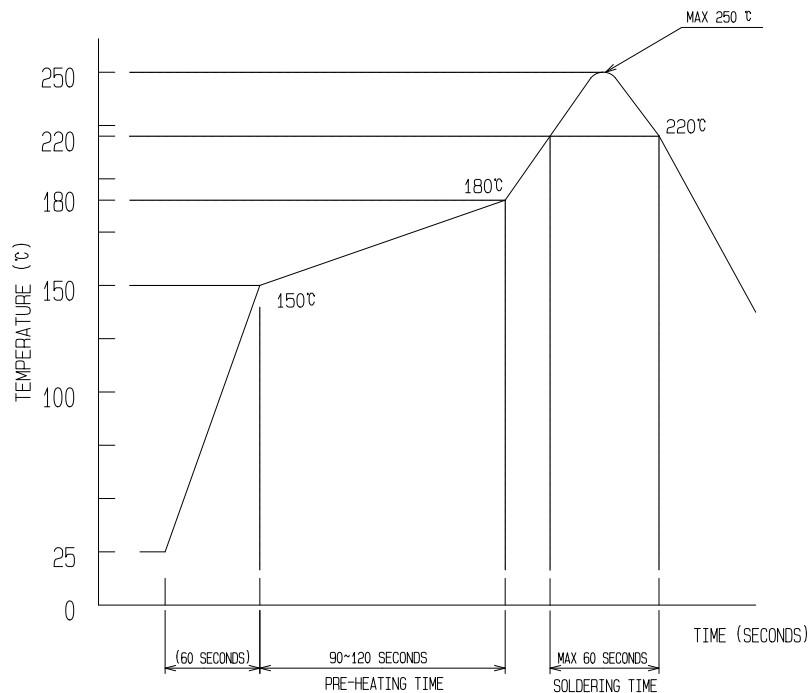
Unit : mm

| Part No.                | HRS No.          | No. of Pos.    |               | A   | B    | C   | D    | E   | F   | Purchase Unit      |                   |
|-------------------------|------------------|----------------|---------------|-----|------|-----|------|-----|-----|--------------------|-------------------|
|                         |                  | Signal Contact | Power Contact |     |      |     |      |     |     | ## : 00            | ## : 95           |
| BK22C07-4DS/2-0.4V(8##) | CL0480-0816-0-## | 4              | 2             | 5.0 | 1.79 | 0.4 | 2.89 | 3.6 | 4.8 | 20,000pcs per reel | 1,000pcs per reel |
| BK22C07-6DS/2-0.4V(8##) | CL0480-0888-0-## | 6              | 2             | 5.4 | 2.19 | 0.8 | 3.29 | 4.0 | 5.2 |                    |                   |

Note : This connector has no polarity.

## Usage Precautions

Recommended Solder Temperature Profile



## [Conditions]

1. Peak Temperature : Maximum of 250°C
2. Heated Section : 220°C Min., within 60 seconds
3. Preheated Section : 150 to 180°C, 90 to 120 seconds
4. Number of Reflow Cycles : Maximum of 2 cycles

Note 1 : The temperature is the surface temperature of the PCB in the vicinity of the connector lead part.

Note 2 : When using nitrogen reflow process, please mount the product with an oxygen concentration of 1,000[ppm] or more.

Please contact a Hirose Electric representative if the concentration is below 1,000[ppm]

## Recommended Manual Soldering Conditions

Soldering iron temperature: 340±10°C  
Soldering time : within 3 seconds

## Recommended Metal Mask Thickness and Open Area to PCB Pattern Area Ratio

Thickness : 0.08mm  
Aperture ratio : 100% on the Receptacle side, 100% on the Plug side

## PCB Warpage

A maximum of 0.02mm at the center of the connector with reference to both ends of the connector.

## Cleaning

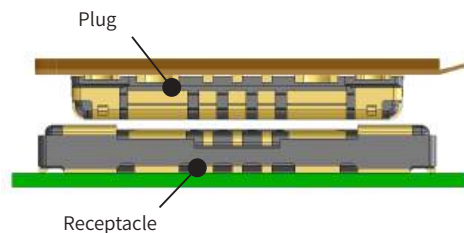
Not recommended. If this product is cleaned, please evaluate the performance before using it.  
Cleaning may cause a change in the mating/unmating properties as well as environmental resistance.

## Notes

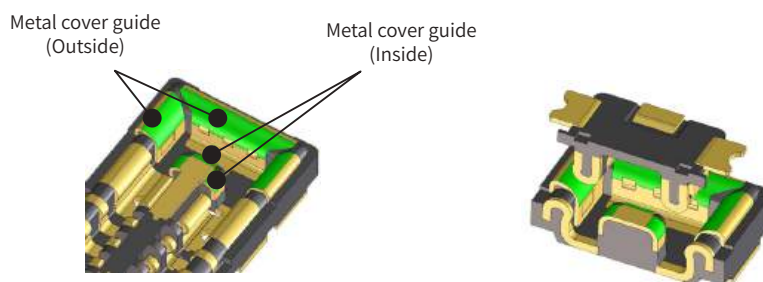
- Insertion or removal prior to board mounting may result in contact deformation.
  - Avoid supporting the PCB only with the connectors. Support it by other means such as bolts, screws, posts, etc.
  - Avoid excessive prying during mating/unmating as it may result in damage.
  - Do not apply flux which will cause solder wicking during manual soldering.
  - This product may have slight color differences due to production lot variability, but this does not have any effect on the performance.
  - Please refer to the next page for mating/unmating precautions.
  - It is advised to secure the mated connectors to the board with housings and cushioning materials because the product can disengage from FPC routing, dropping or other impact.
  - Do not use the connector outside of the specifications (i.e., rated current, rated voltage, PCB design and operating environment, etc.). Such usage could lead to material outgassing, ignition, or short-circuit, etc. Refer to the specifications and guidelines for board pattern dimensions, board cautions, and connector treatment.
- Please contact Hirose if connector usage in conditions other than those described in the specifications and the guidelines is being considered.

## Connector Handling Precautions

### 【Connector Mating Precautions】



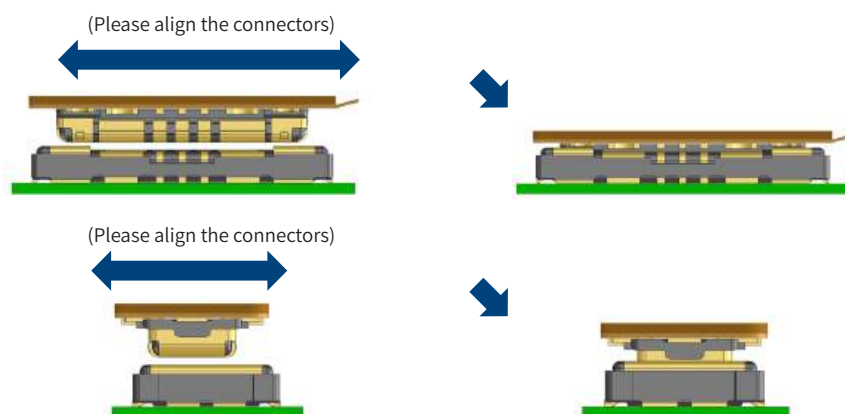
1. Locate the guides and align the connectors to the appropriate mating position.  
The connector has guide ribs on the receptacle for proper mating alignment.  
Align the connectors with the guide ribs.



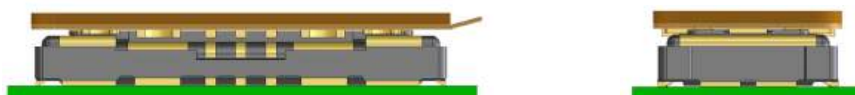
2. When the connector comes to the appropriate position, the connector will lower into place as indicated by the change in mated height.



3. When the connectors has lowered into place, the connector pair will be parallel to each other and cannot be moved back and forth or left and right.  
Please complete mating from this state by applying force.

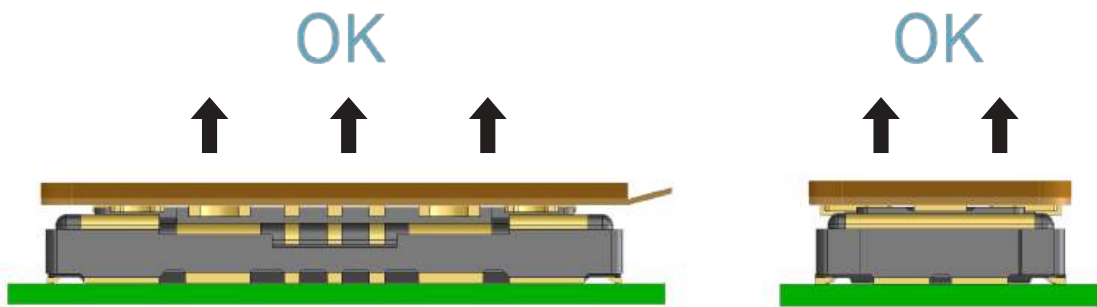


4. Please make sure connectors are mated completely. If one side is floating or the connectors are mated at an angle, please unmate and then redo the mating procedure following the steps described.

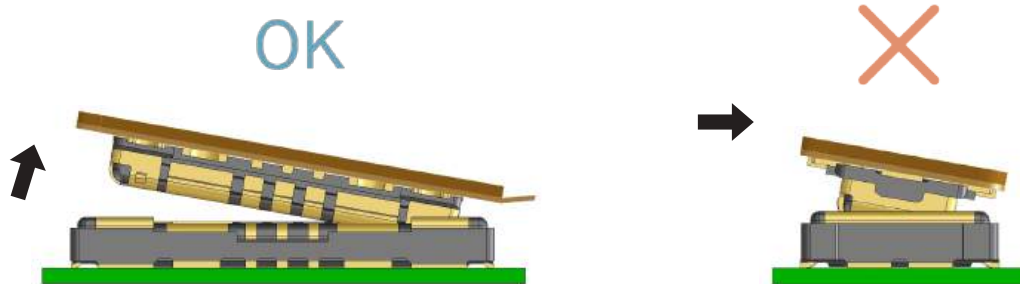


### 【Connector Un-Mating Precautions】

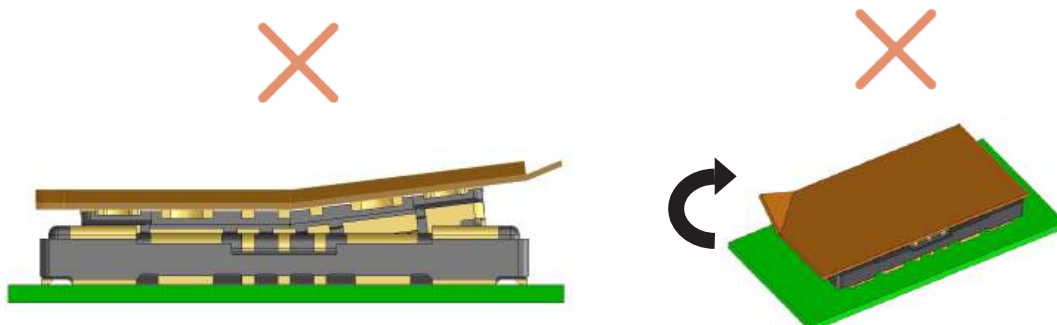
1. It is recommended to remove the connector by pulling perpendicular to the connector mounted surface.  
However, unmating FPC-to-board connectors can become more difficult with higher pin count connectors and thinner FPCs.



2. If it is difficult to remove the connector parallel to the mounting surface, remove it diagonally towards the pitch direction. Do not remove the connector towards the width direction as it may put a large amount of stress on the contacts.



3. If the FPC is not rigid enough, there is a possibility of solder peeling or connector damage.  
Please check the repetitive operation of the FPC planned to be used in advance, such as during the early stage build.  
Please do not remove the FPC by holding one corner and pulling at a diagonal as this will put a great amount of stress on the contacts.



## While Taking into Consideration

Specifications mentioned in this catalog are reference values.

When considering to order or use this product, please review the Drawing and Product Specifications sheets.

Use an appropriate cable when using the connector in combination with cables.

If considering usage of a non- specified cable, please contact your sales representative.

If assembly process is done by jigs & tools which are not identified by Hirose, the warranty of the product may be affected.

If considering usage for below mentioned applications, please contact your sales representative.

In cases where the application will demand a high level of reliability, such as automotive, medical instruments, public infrastructure, aerospace/ defense etc. Hirose must review before assurance of reliability can be given.