PRODUCT CATALOG

HIROSE ELECTRIC CO.,LTD.

BM50 Series

0.35mm Pitch, 0.6mm Stacking Height, 15A Rated Current, Power/Signal Hybrid FPC-to-Board Connector

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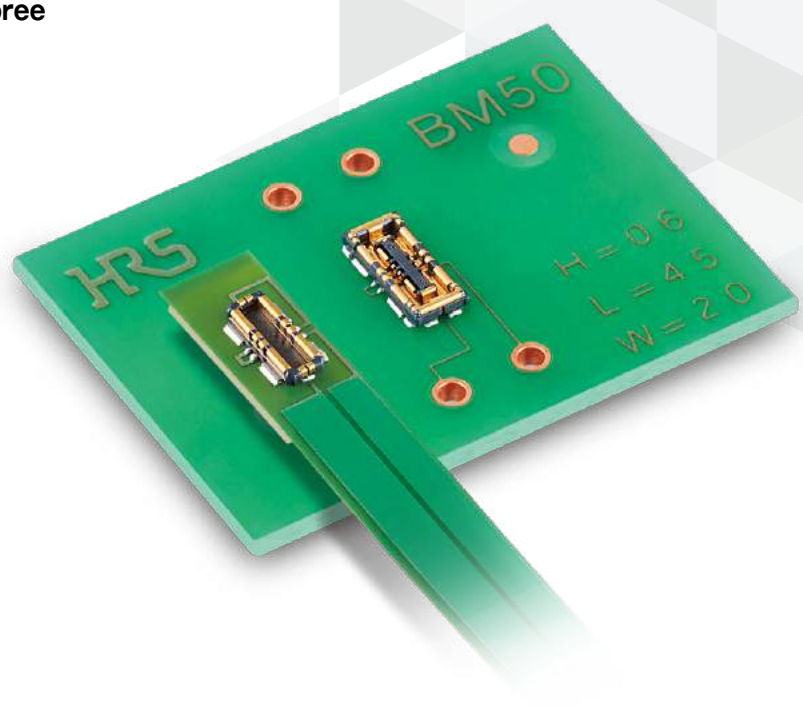
CES INNOVATION AWARDS 2022 HONOREE

This product was selected as a **CES Innovation Awards Honoree**

High-Current

Compact

Full Armored



NEW

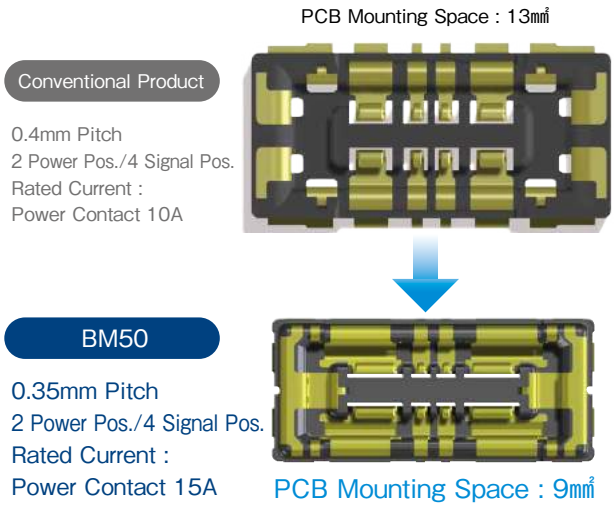
The CES Innovation Awards are based upon descriptive materials submitted to the judges.
CTA did not verify the accuracy of any submission or of any claims made and did not test the item to which the award was given.

Mar. 2022

Features

1. Space-saving Design with 15A Rated Current

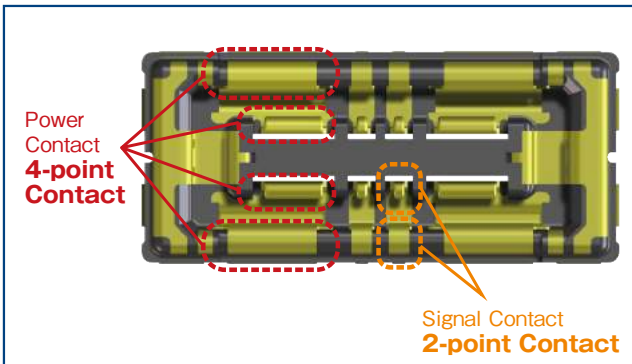
The power contact supports 15A per position and the signal contact supports 0.3A per position for high power supply capability.
Additionally, the BM50U has a space-saving design that minimizes connector size.



Increase the Rated Current from 10A to 15A
While Achieving Space Reduction
(30% Decrease in PCB Mounting Space)

2. High Contact Reliability

Multi-point contact design with 4-point power contact and 2-point signal contact for stable connection.



3. Compact with High Extraction Force

The original lock design ensures high extraction force and prevents unmating due to impact.

4. Halogen-free

No chlorine or bromine exceeding the standard values are used in this connector.
In accordance with IEC 61249-2-21
Br : 900ppm max., Cl : 900ppm max.,
Br+Cl : 1500ppm max.

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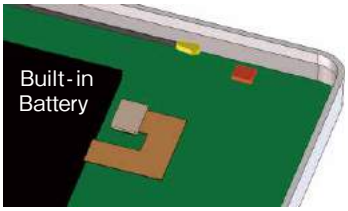
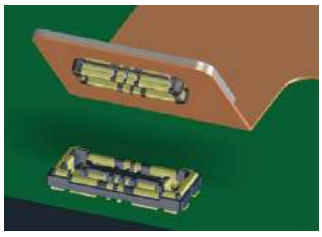
Applications

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

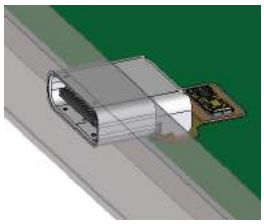
●Battery Connection



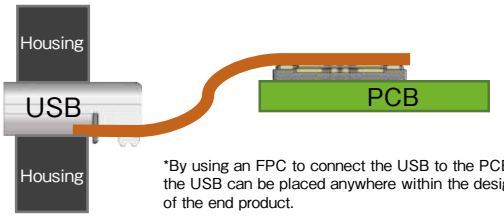


-Space-saving
-High Current Capacity

●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 Power Contact : 15A	Operating Temperature (Note 1)	-55 to +85℃
		Operating Humidity Range (Note 2)	90% RH Max.
Rated Voltage	60V AC/DC	Storage Temperature (Note 3)	-10 to +60℃
		Storage Humidity Range (Note 2)(Note 3)	90% RH Max.

Item	Specifications	Conditions
Contact Resistance	Signal Contact 30mΩ, Power Contact 5mΩ	Measured at 20mV AC, 1kHz, and 1mA
Insulation Resistance	1000MΩ Min.	Measured at 100V DC
Withstanding Voltage	No flashover or dielectric breakdown	150V AC for 1 min.
Mating Durability	Contact Resistance : Signal Contact 30mΩ Power Contact 5mΩ	10 cycles
Vibration Resistance	No electrical discontinuity of 1μs or more.	Frequency : 10 to 55Hz, half amplitude of 0.75mm, 10 cycles in each of 3 axis directions for 5 minutes/cycle
Humidity Resistance	Contact Resistance : Signal Contact 30mΩ Power Contact 5mΩ Insulation Resistance : 1000MΩ Min.	Left for 96 hours at a temperature of 40 ± 2℃ and a humidity range from 90 to 95%
Temperature Cycle	Contact Resistance : Signal Contact 30mΩ Power Contact 5mΩ Insulation Resistance : 1000MΩ Min.	-55℃ for 30 minutes → 85 for 30 minutes, 5 cycles (Tank transfer time: within 2 to 3 min.)
Solder Heat Resistance	No dissolution or resin melting that will affect performance.	Reflow : At recommended temperature profile Hand solder : Solder iron temperature of 350℃ for 3 seconds max.

Note 1 : Includes temperature rise caused by current flow.
Note 2 : Use without condensation.
Note 3 : Storage refers to long-term storage of unused items before they are mounted on the PCB.
Operating temperature and humidity range apply when the product is not powered after PCB mounting and when temporarily stored during transportation.

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Material/Finish

Part	Component	Material	Finish	UL Standard
Header Receptacle	Insulator	LCP	Black	UL94V-0
	Signal Contact	Copper Alloy	Gold Plated	-
	Power Contact	Copper Alloy	Gold Plated	-

Product Number Structure

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.

●Header/Receptacle

BM 50U - 4 DP / 2 - 0.35 V (51)
❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽

❶ Series Name	BM	❺ No. of Power Contacts	2pos.
❷ Series No.	50U	❻ Contact Pitch	0.35mm
❸ No. of Signal Contacts	4pos.	❼ Terminal Design	V : Straight SMT
❹ Connector Type	DP : Header DS : Receptacle	❽ Plating Specifications and Packaging	(51) : Gold Plating Thickness 0.05 μm Embossed Packaging (20,000pcs per reel) (53) : Gold Plating Thickness 0.05 μm Embossed Packaging (1,000pcs per reel)

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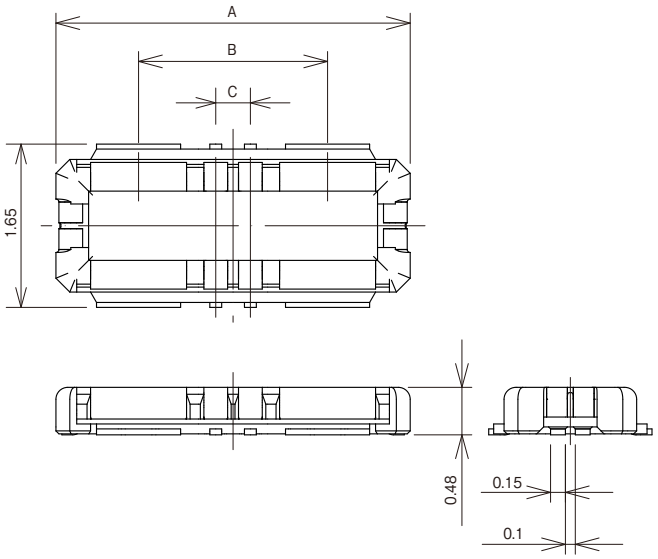
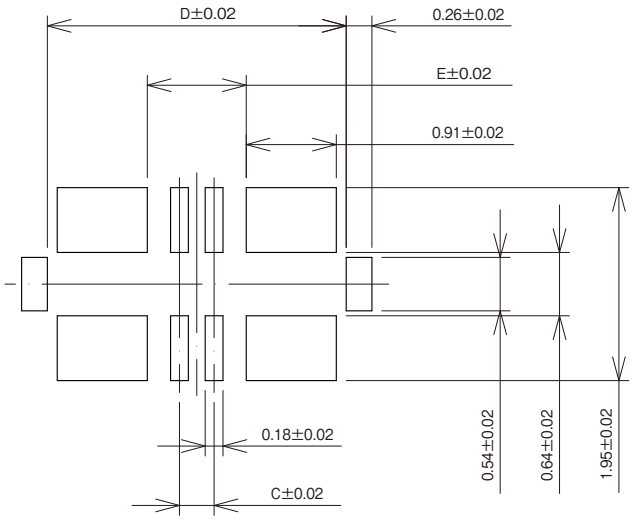
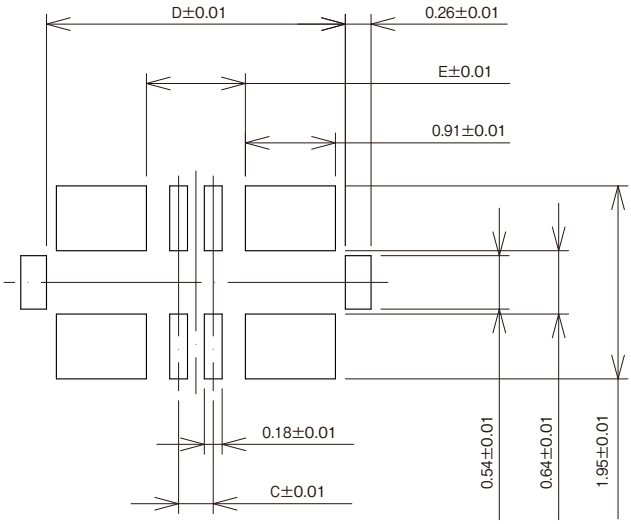
Header



●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 (##):(51)	Purchase Unit (##):(53)
		Signal Contact	Power Contact							
BM50U-4DP/2-0.35V(##)	CL0480-0670-0-##	4	2	3.58	1.91	0.35	3.02	1.00	20,000pcs per reel	1,000pcs per reel

Note : This connector has no polarity.

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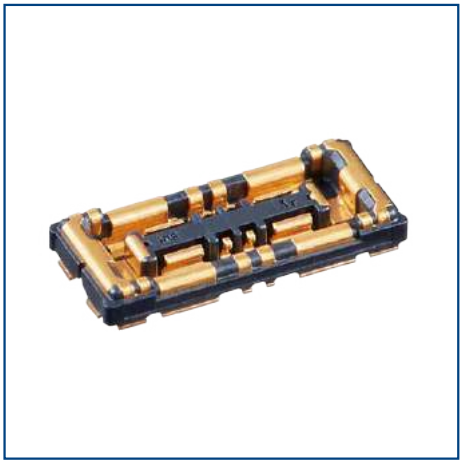
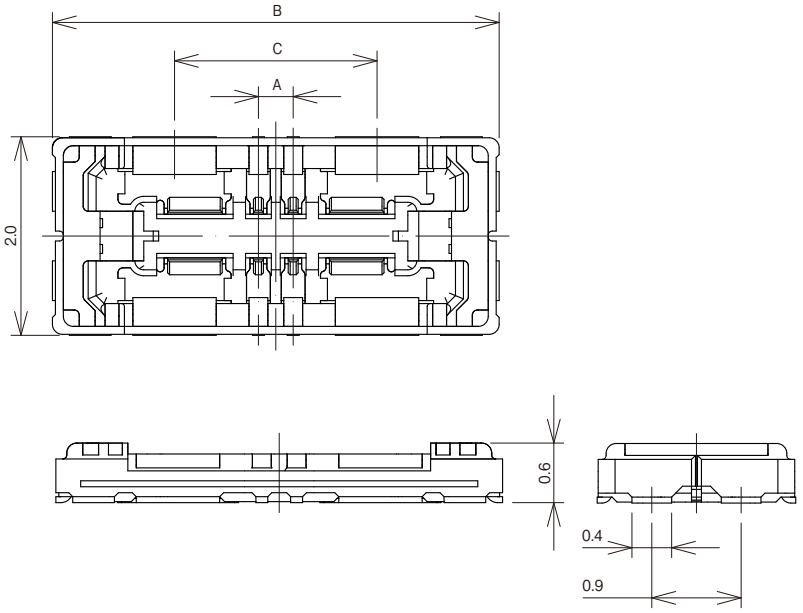
Receptacle





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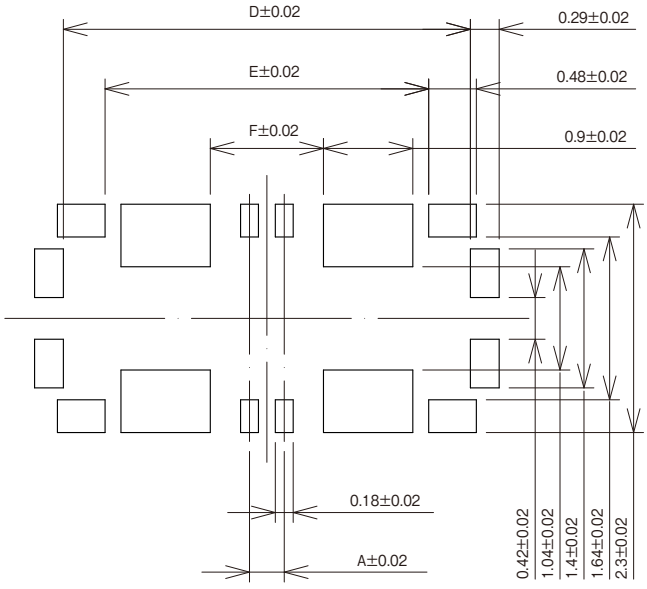

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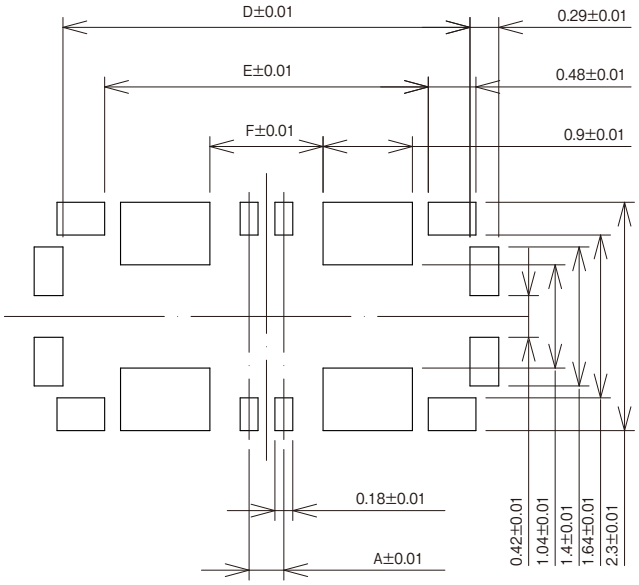


Unit : mm

Part No.	HRS No.	No. of Pos.		A	B	C	D	E	F	Purchase Unit (##):(51)	Purchase Unit (##):(53)
		Signal Contact	Power Contact								
BM50U-4DS/2-0.35V(##)	CL0480-0671-0-##	4	2	0.35	4.50	2.04	4.10	3.26	1.14	20,000pcs per reel	1,000pcs per reel

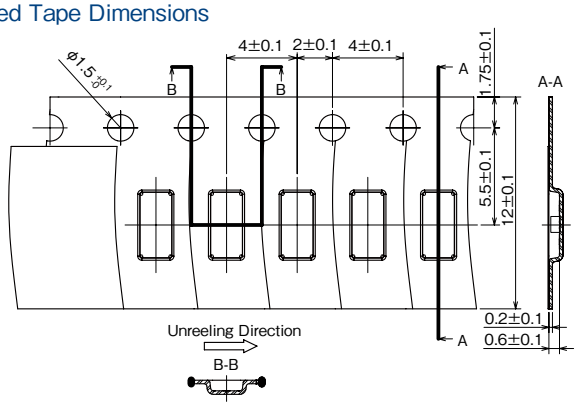
Note : This connector has no polarity.

Packaging Specifications Diagram

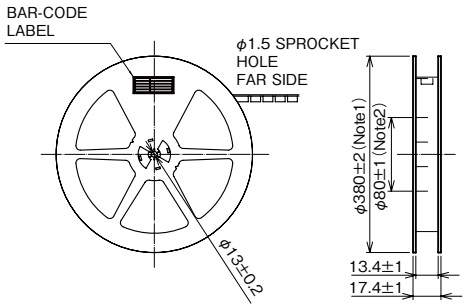
IEC 60286-3, JIS C 0806 Compliant

Header

●Embossed Tape Dimensions



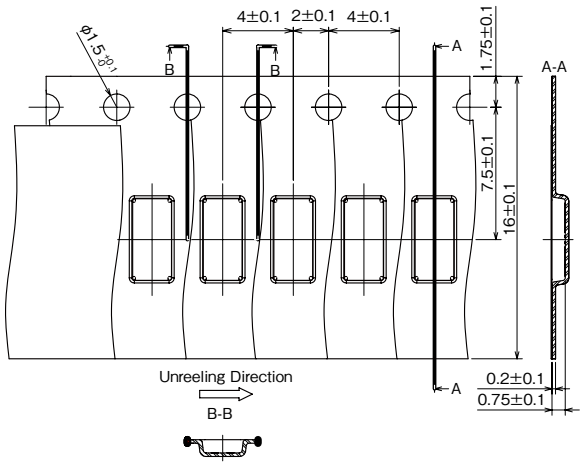
●Reel Dimensions



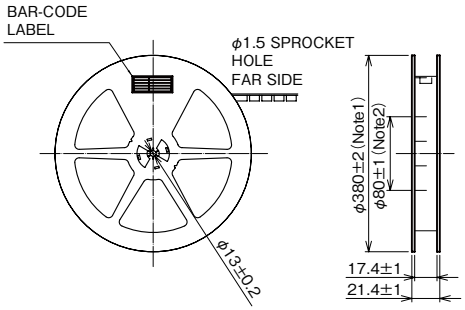
Note1:The (53) specification is ϕ180±2.
Note2:The (53) specification is ϕ60±1.

Receptacle

●Embossed Tape Dimensions



●Reel Dimensions



Note1:The (53) specification is ϕ180±2.
Note2:The (53) specification is ϕ60±1.

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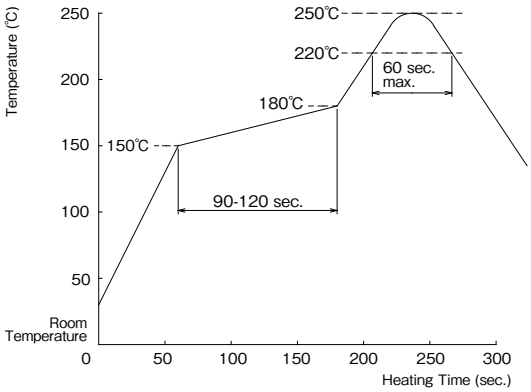
Usage Precautions

Recommended Temperature Profile	 【Conditions】 1. Peak Temperature : 250℃ 2. Heating : 220℃ min. for 60 sec. max. 3. Preheating : 150 to 180℃, 90 to 120 sec. 4. Number of Reflow Cycles : 2 cycles max. Note : Temperature refers to the surface temperature of the board near the connector lead. Reflow mounting in a nitrogen environment is recommended.
Recommended Manual Soldering Conditions	Soldering iron temperature : 340 ± 10℃ ; Soldering time : within 3 seconds
Recommended Metal Mask Thickness and Open Area to PCB Pattern Area Ratio	Thickness : 0.08mm Aperture Ratio : Receptacle Side : 100%, Header Side : 100%
Board Warpage	Max. of 0.02mm at the center in reference to both ends of the connector
Cleaning	Cleaning is not recommended. If you clean this product, please evaluate its performance before using it. (Cleaning may impair the mating/unmating properties and lower resistance to environmental factors.)
Precautions	· Be careful when mating/unmating the connector when it is not mounted on the PCB as it may cause damage/deformation to contacts. · Avoid supporting the PCB only with the connectors. Support it by other means such as bolts, screws, posts, etc. · Excessive prying during unmating/mating may result in damage. · In the case of hand soldering, please do not apply any flux which could cause flux wicking. · This product may have slight color differences due to production lot variability, but this does not affect the performance. · Please refer to the following page for handling precautions when inserting and removing. · Because the product can disengage if dropped (or other impact), or by FPC routing, it is advised to secure the mated connectors to the board with housings and cushioning materials. · Do not use the connector in non-recommended conditions (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.

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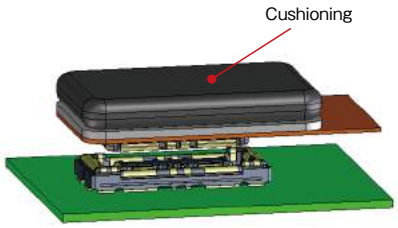
Connector Handling Precautions

【Mating Disengagement Prevention】

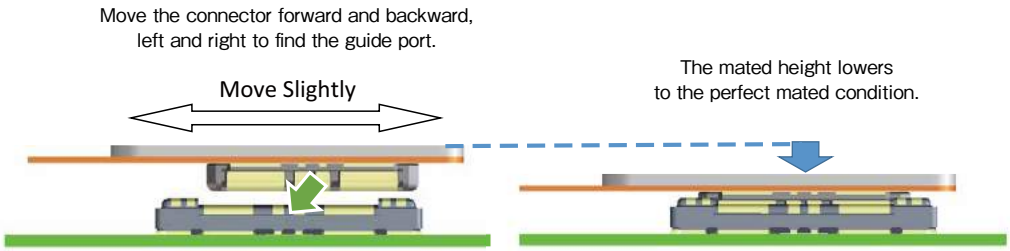
Please use cushioning.
This connector may come off due to impact such as dropping.
Cushioning should be large enough to cover the entire connector.



【Mating Method】

1. Locate the guide port and align.
   This product has a guide rib on the header to ensure proper engagement.
   Align the connector so that it is in this position.

2. Once aligned, the connector engages.
   You can feel the mated height of the connector lower.



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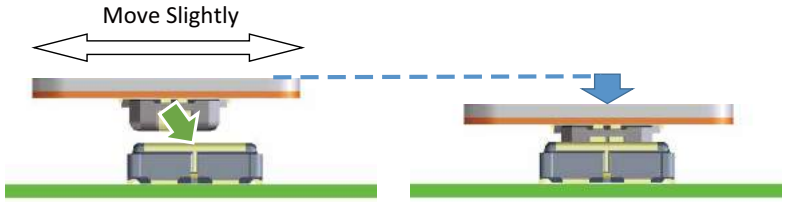
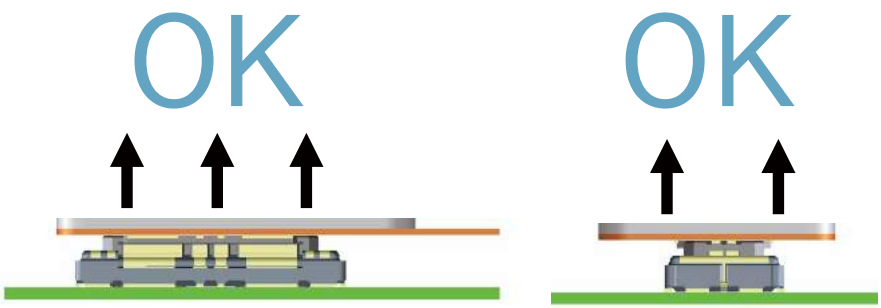
3. In the engaged state, the connectors are parallel to each other, and the connectors cannot move forward, backward, left, or right. Complete mating from this state.



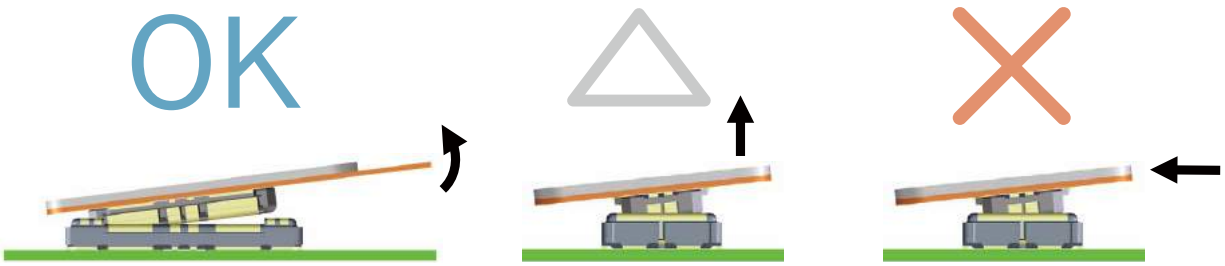
4. Check that mating is completed.
If one side is floating, or if it is mated at a diagonal, remove and re-mate.

【Handling Precautions for Connector Removal】

1. When removing the connector, it is preferable to pull it out in the upward direction from the connector mounting surface.
However, when removing the FPC from the circuit board it becomes more difficult to remove it vertically with higher pin counts and thin FPCs.



2. If difficult to remove, extract the connector diagonally in the direction of the pitch.
Note that removal from the widthwise side will apply a large load to the contacts.
When removing from the width direction, pull the end of the FPC in the upward direction.
(When a force is applied in the horizontal direction, a large load is applied to the contact.)



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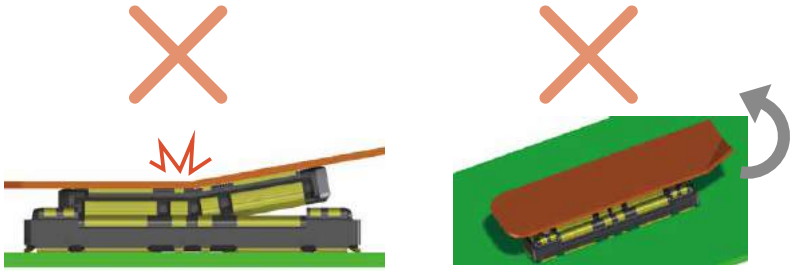
3. If the FPC does not have sufficient rigidity, solder stripping or connector breakage may occur.
Please use it after checking the repetitive operation with a flexible board in advance, such as during a trial manufacture run.
Refrain from holding the corner of the flexible board and removing it diagonally as it will result in a large load to the contacts.



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While Taking into Consideration

Specifications mentioned in this catalog are reference values.
When considering to order or use this product, please confirm 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, assurance will not be given.
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.