ETAD-F0916-00

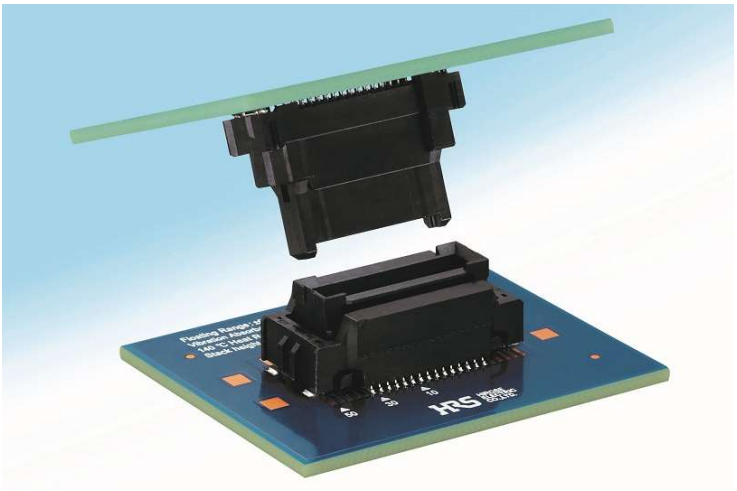
FunctionMAX™

1mm pitch, Up to 140ºC
High Performing Board-to-Board Connector in Vibration Environments

FX26 Series

Design Guideline

September, 2020



https://www.hirose.com/product/series/FX26?lang=ja

September, 2020

— Table of Contents—

1. Foreword

1-1 Purpose

This instruction manual for the FX26 Series is intended to provide information on the features and handling of the FX26 Series and to improve the efficiency of product design and assembly process when using the FX26 Series.

By providing this information, Hirose believes it can help its customers with product development, improve quality and reliability while limiting overall system costs.

This manual is provided for general information only and does not restrict customer design or guarantee results under any circumstances. If the product does not conform to this manual, please contact a Hirose representative for alternative solutions.

1-2 Scope

This instruction manual provides basic connector design information, recommended board dimensions, and specifications.
This manual will be revised as needed in accordance with changes in technology and manufacturing capacity.

2. Product Information

2-1 Basic Specifications

○Product Pitch : Mated Portion 1mm (2 Rows), SMT Portion 1mm (Including both sides)
○Connection Type : Parallel connection (Stacking Height 12-25mm)
○Floating Range : ± 0.7mm in the X direction, ± 0.7mm in the Y direction
○Design Mating Length : +/- 0.75mm in the Z direction
○PCB Amplitude Absorption : 0.05mm max. in the Z direction
○Current Capacity : 0.5A/pin
○No. of Pos. : 20/30/40/50/60pos.

2-2 Product Number Structure

○Header

FX26 – 60P – 1 SV 5
① ②③ ④ ⑤ ⑥

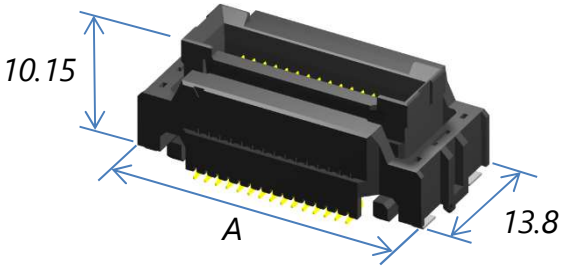
○Receptacle

FX26 – 60S – 1 SV 20
① ②③ ④ ⑤ ⑥

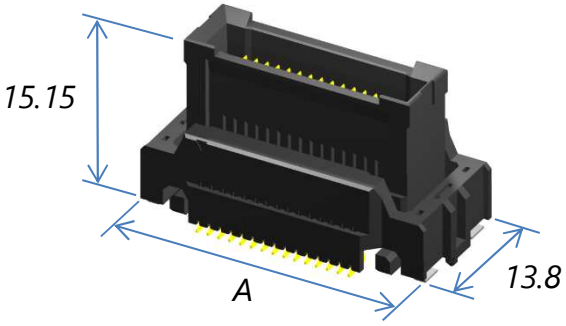
① Series Name	FX26
② No. of Pos.	20/30/40/50/60
③ Connector Type	P: Header S: Receptacle
④ Contact Pitch	1mm
⑤ Product Type	SV: Straight Type
⑥ Product Height	Mated height [mm] =Numerical value on the header side + Numerical value on the receptacle side (Ex.)FX26-60P-1SV5×FX26-60S-1SV20…h=25mm

2-3 Basic Dimensions (Outermost Dimensions) FX26 Series

■Header



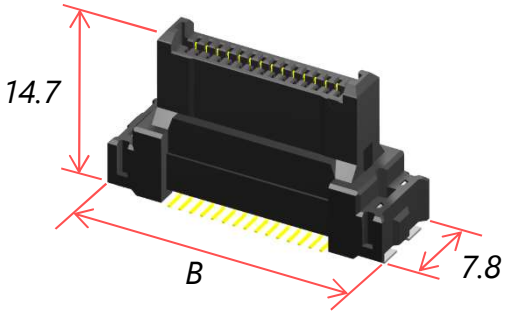
FX26-**P-1SV



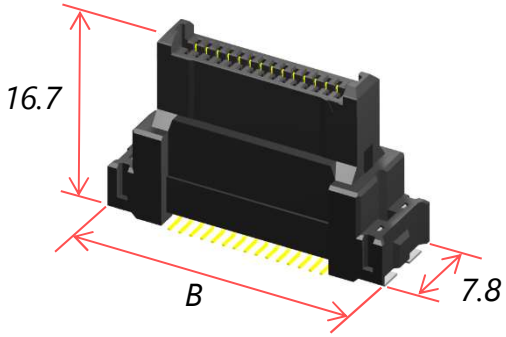
Note 3 FX26-**P-1SV5

No. of Pos.	20pos.	30pos.	40pos.	50pos.	60pos.
Dimension A	21.7	26.7	31.7	36.7	41.7

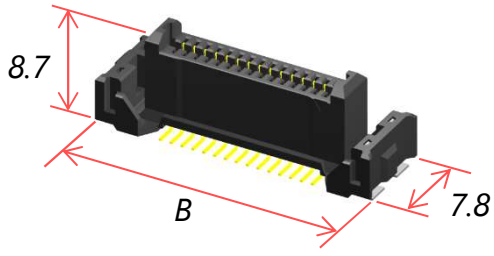
■Receptacle



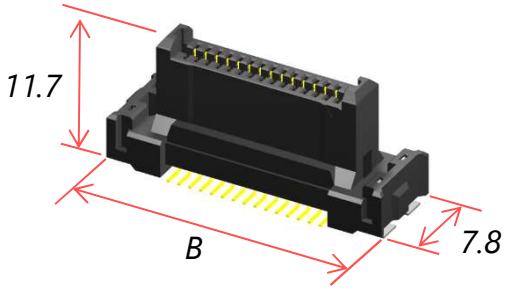
FX26-**S-1SV18



FX26-**S-1SV20



Note 3 FX26-**S-1SV12



FX26-**S-1SV15

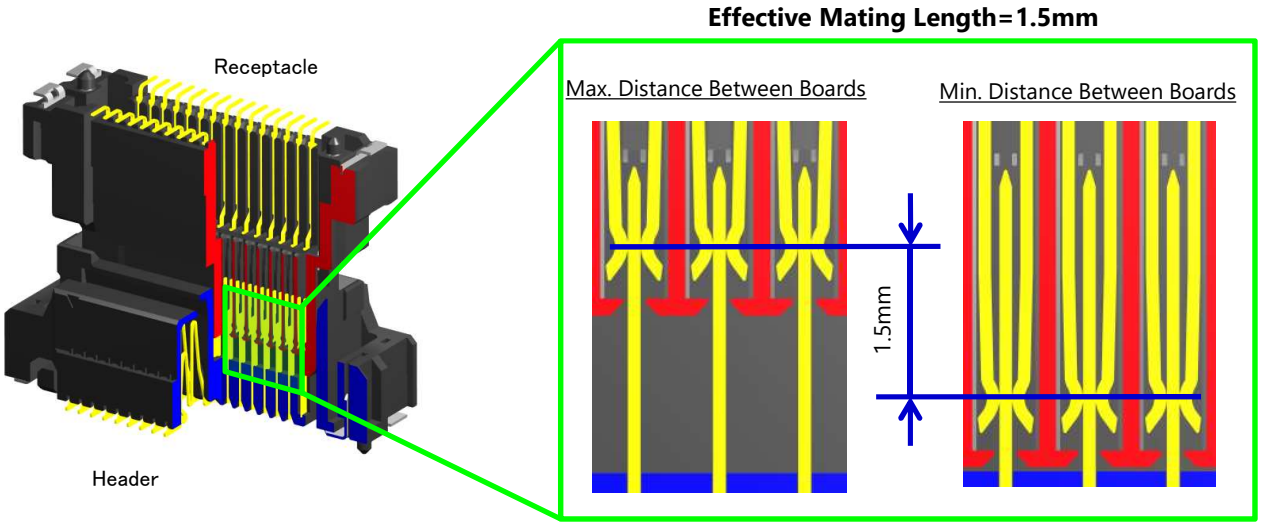
No. of Pos.	20pos.	30pos.	40pos.	50pos.	60pos.
Dimension B	20.3	25.3	30.3	35.3	40.3

Note 1) * * is the number of positions.
Note 2) If you have any questions about release status, please contact a Hirose sales representative.
Note 3) These connectors (Header: Height 5mm, Receptacle: Height 12mm) are available upon request. Please contact a Hirose sales representative for details.

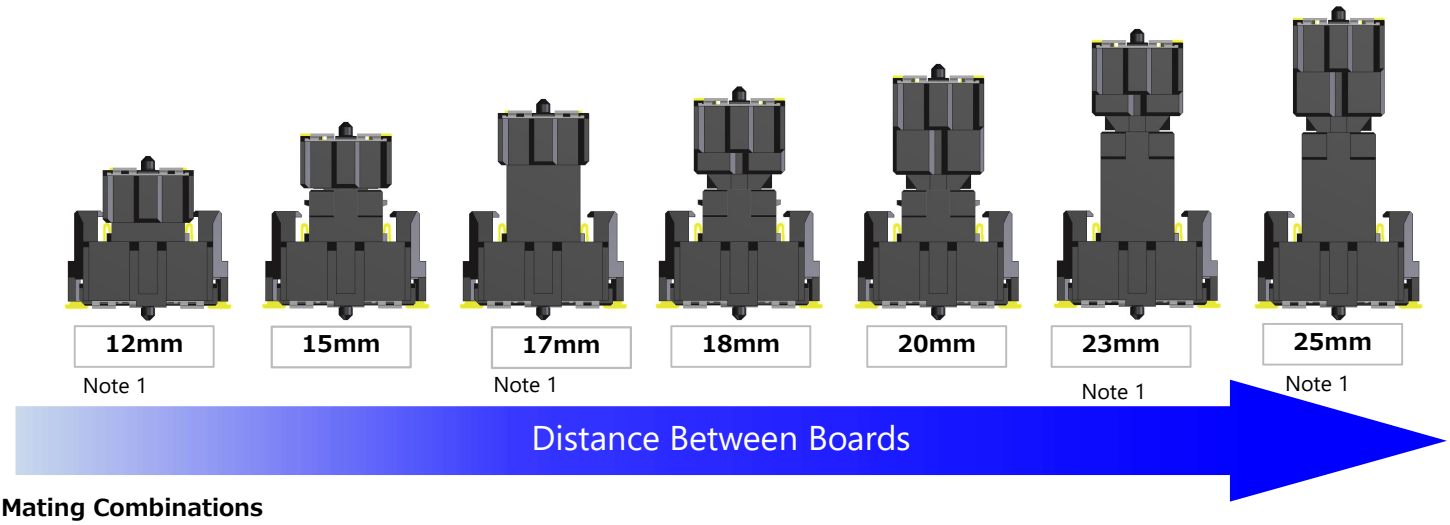
2-4 Mated Length

The designed mated length of this connector is 1.5mm.

Keep the displacement between boards in the mating direction within ± 0.75mm of the reference dimension.



2-5 Connector Height Variation List



Mating Combinations

Inter-Board Distance	12mm	15mm	17mm	18mm	20mm	23mm	25mm
Receptacle	Note 1 FX26-**S-1SV12	FX26-**S-1SV15	Note 1 FX26-**S-1SV12	FX26-**S-1SV18	FX26-**S-1SV20	FX26-**S-1SV18	FX26-**S-1SV20
Header	FX26-**P-1SV	FX26-**P-1SV	Note 1 FX26-**P-1SV5	FX26-**P-1SV	FX26-**P-1SV	注1) FX26-**P-1SV5	注1) FX26-**P-1SV5

Note 1) These connectors (12, 17, 23 and 25mm heights) are available upon request. Please contact a Hirose sales representative for details.

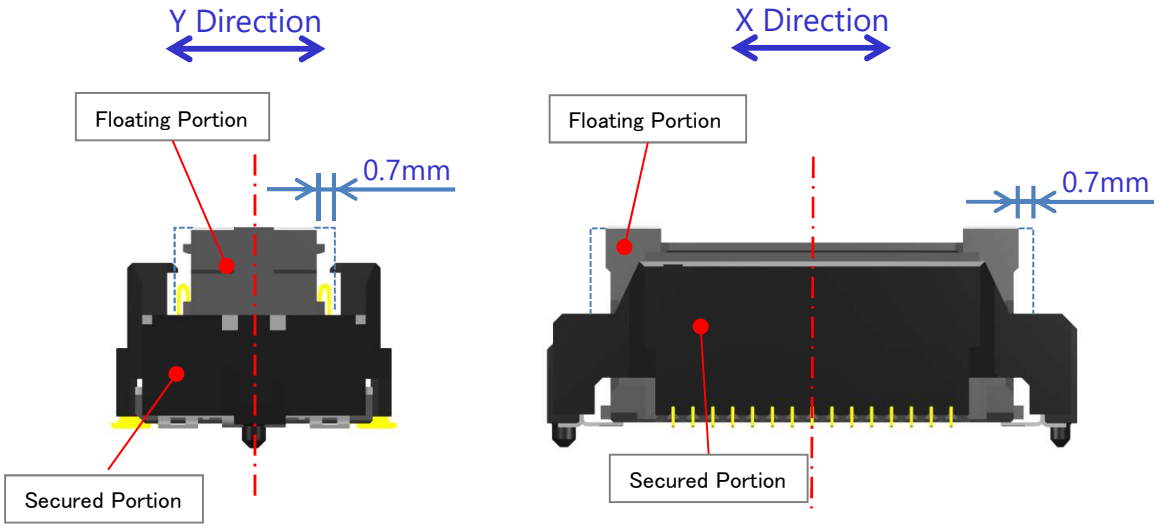
2-6 Floating Range

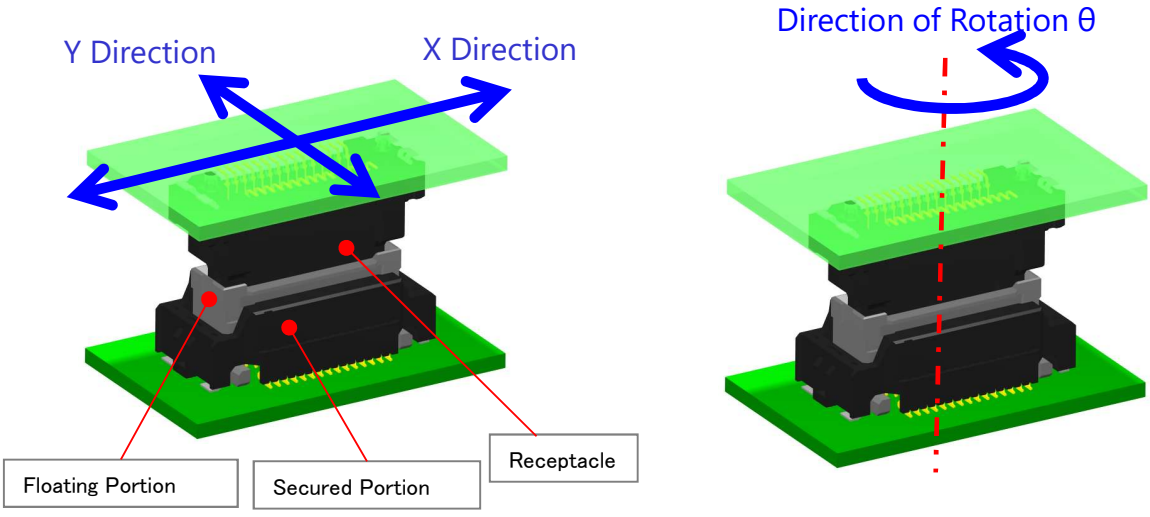
The header of the FX26 Series has a floating design.

The floating range is is ± 0.7mm in both the X and Y directions.

The floating operation can be repeated up to 10 times in accordance with the number of mating cycles.

Floating portion on header can be moved.





The header can also be rotated parallel to the board surface.
The rotation angle varies based on the number of positions, so please check the below table.

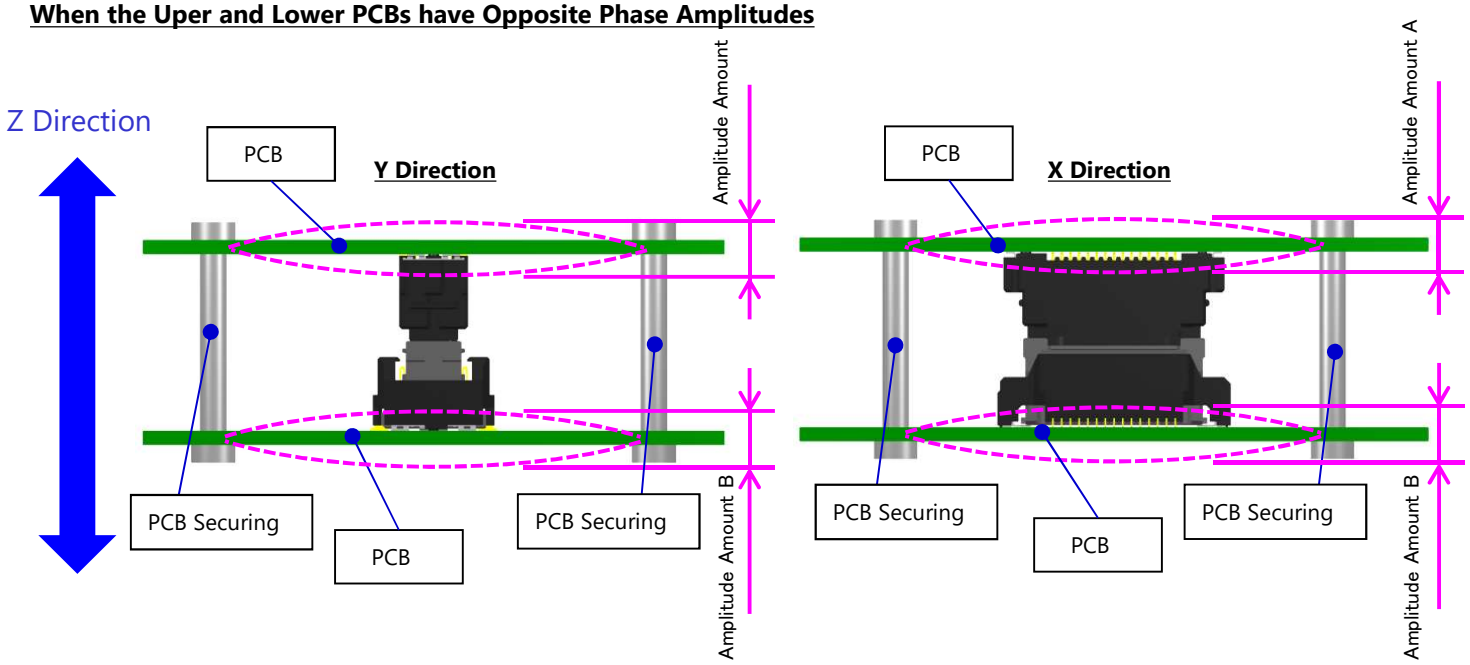
No. of Pos.	20pos.	30pos.	40pos.	50pos.	60pos.
Direction of Rotation θ (max value)	5.1°	3.8°	3.1°	2.6°	2.2°

*The center of rotation is the value at the center of the connector. If the axis of rotation is not at the center, the amount of rotation is less than the above values.

2 -7 PCB Amplitude Absorption (Vibration Resistance)

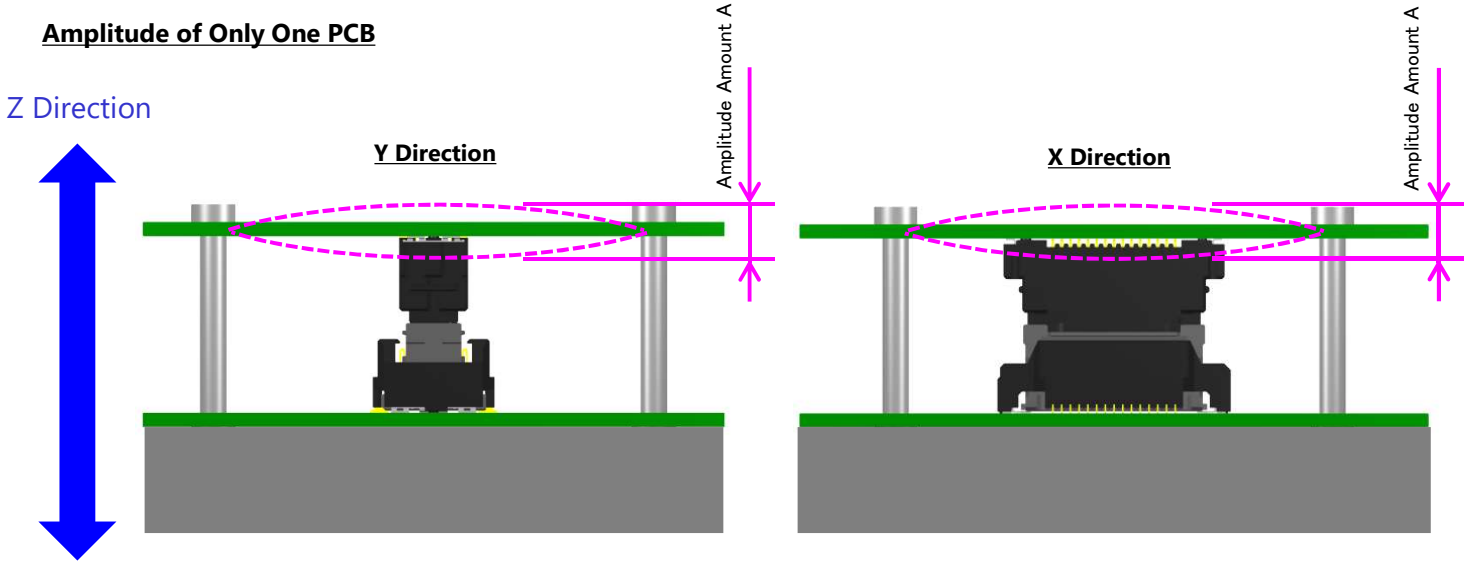
The FX26 Series has a vibration resistant design with a floating spring on the header side that absorbs PCB amplitude and prevents the contact from sliding. In the Z direction the PCB amplitude absorbed is up to 0.05mm. The PCB amplitude may vary depending on several factors including where the connector is secured, board design, peripheral mounted components and vibration conditions (frequency and acceleration). Please design so that the PCB amplitude in the immediate surroundings of the connector mounted portion is 0.05mm or less under the expected vibration environment. Pay particular attention to board resonance. If the frequency of constant vibration or sweep vibration exceeds1000Hz, reduce the acceleration applied to the connector or the board of the connector mounted portion to 5G or less.

When the Uper and Lower PCBs have Opposite Phase Amplitudes



Amplitude Amount A + Amplitude Amount B = 0.05mm Max.

Amplitude of Only One PCB



Amplitude A = 0.05mm Max.

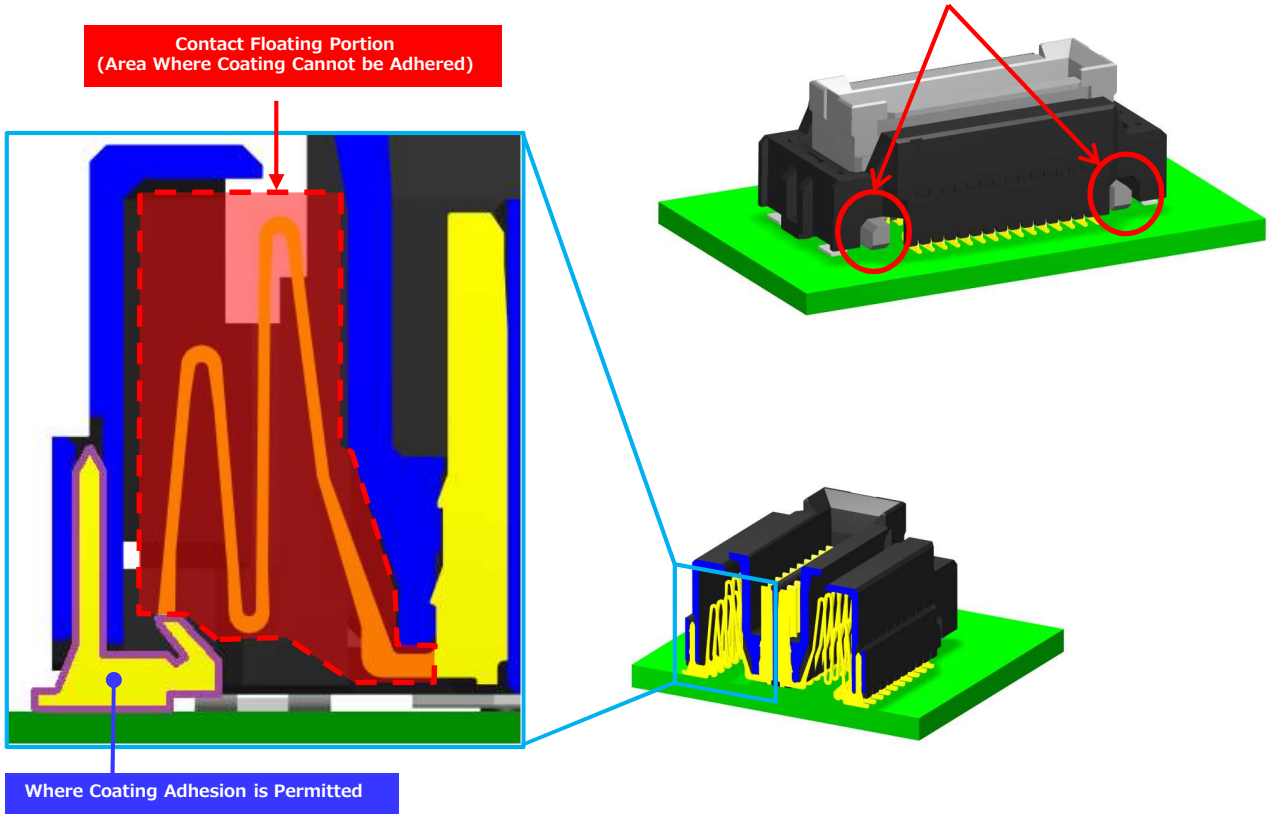
2 -8 Insulating Coating Agent

When applying an insulating coating agent to the FX26 Series, pay attention to the following points.

■Header

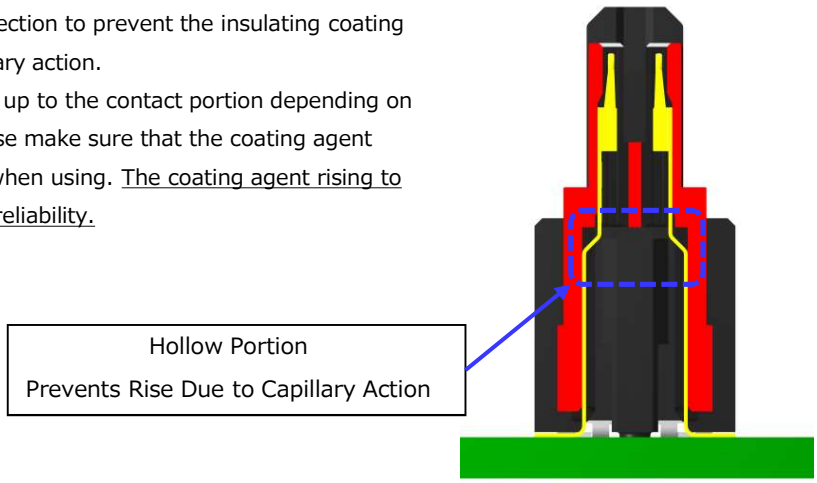
1. Make sure that the coating agent does not adhere to the floating portion of the contact.
Failure to do so will impair floating and vibration resistance.

2. Make sure that the coating agent does not adhere to the movable porting of the housing.
Failure to do so will impair floating and vibration resistance.



■Receptacle

The contact is design with a hollow section to prevent the insulating coating agent from rising as a result of capillary action.
However, the coating agent may rise up to the contact portion depending on the fluidity and amount applied. Please make sure that the coating agent does not rise up to the contact side when using. The coating agent rising to the contact side may impart contact reliability.

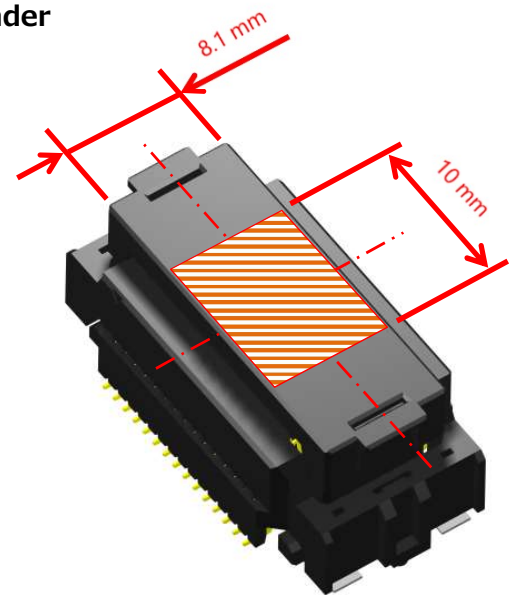


3. Connector Mounting

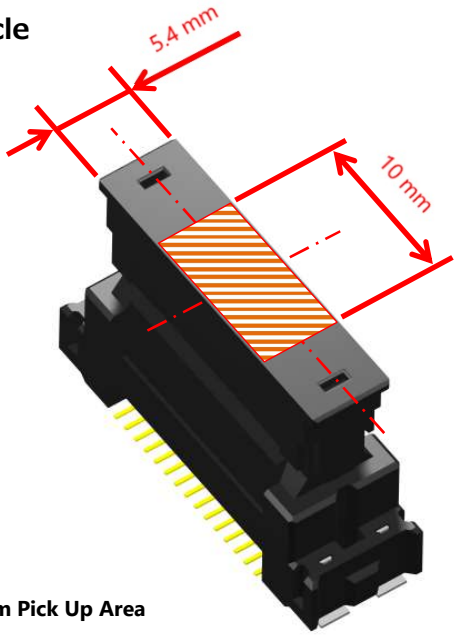
3-1 Vacuum Pick Up Area

Cap is attached for Pick & Place mounting.

■ Header

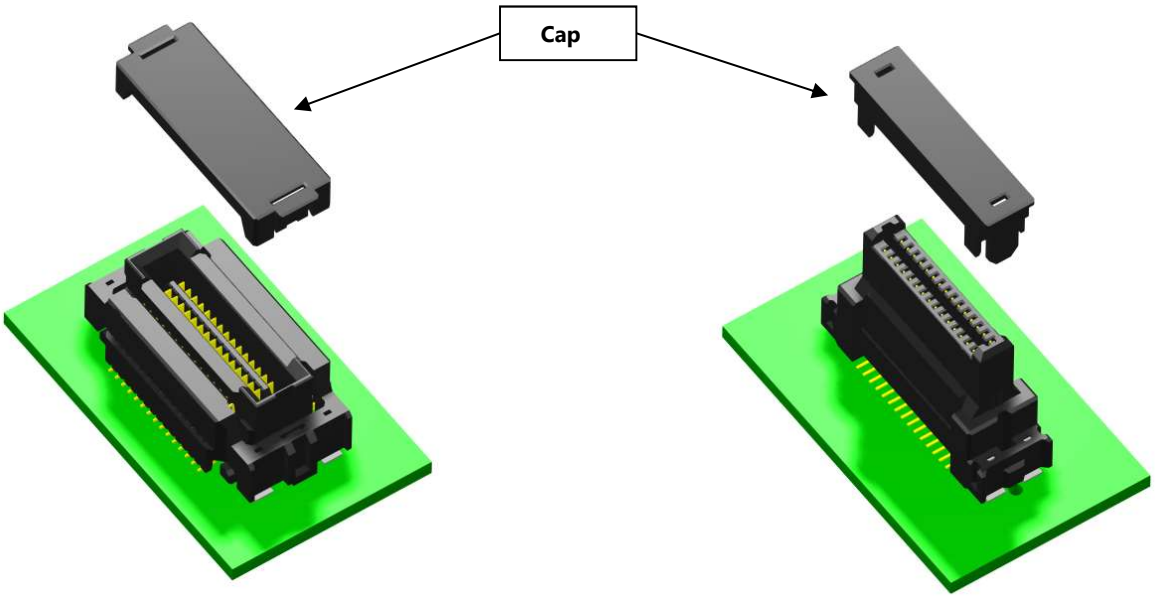


■ Receptacle



Vacuum Pick Up Area

Please remove the cap before mating.



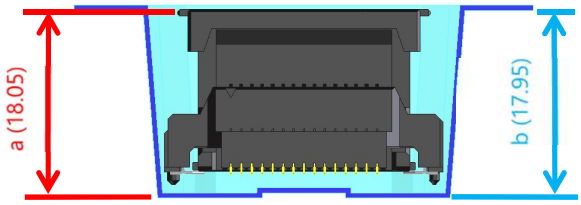
Embossed carrier tape material thickness t = 0.5

a: Height from the bottom surface of the embossed carrier tape to the vacuum pick up surface (Cap)

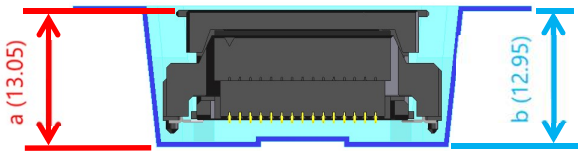
b: Embossed carrier tape, pocket depth

■Header

■FX 26 -** P -1 SV5

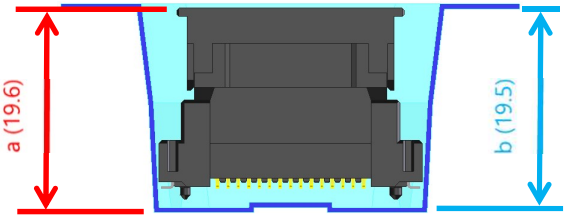


■FX 26 -** P -1 SV

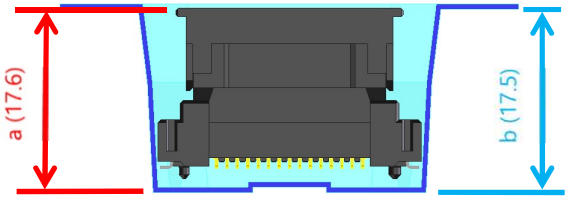


■Receptacle

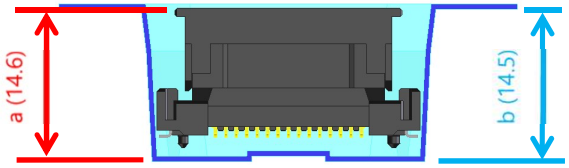
■FX 26 -** S -1 SV 20



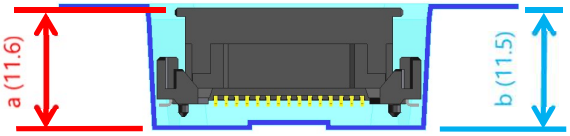
■FX 26 -** S -1 SV 18



■FX 26 -** S -1 SV 15

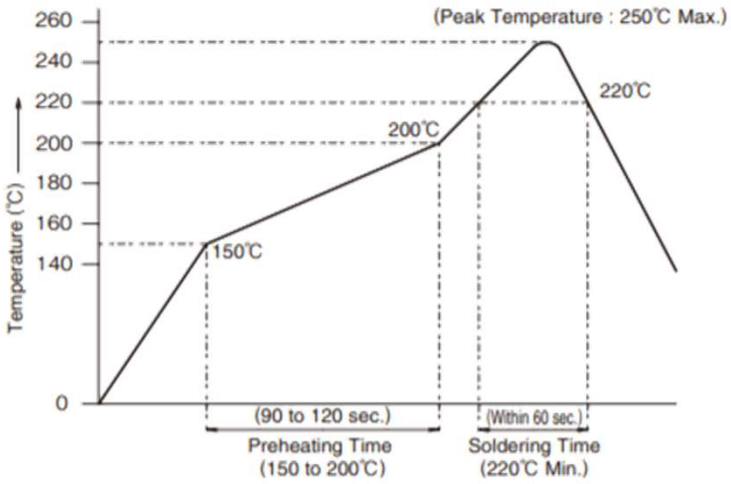


■FX 26 -** S -1 SV 12



3 -2 Recommended Temperature Profile

The temperature profile is a reference under the following conditions. Temperature profile may change depending on the solder paste types, manufacturers, PCB size, and other soldering materials. Please fully check the mounting conditions before use.

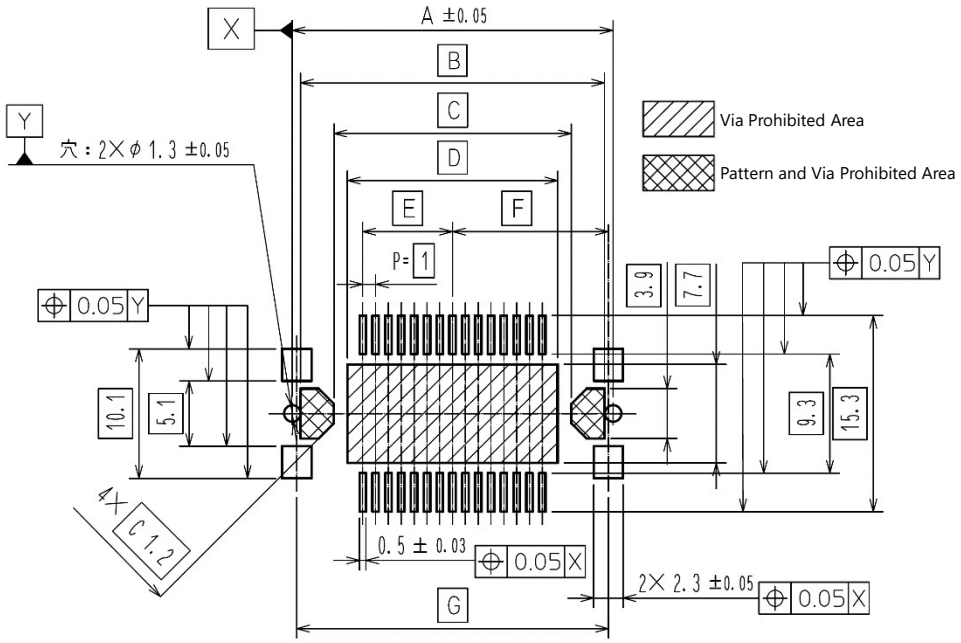


<Applicable Conditions>
Test Board Measurements ： 110×85×1.6mm
Material ： Glass Epoxy
Solder Composition ： Sn-3Ag-0.5Cu
Flux Content ： 11wt%
Metal Mask Thickness ： 0.15mm
Reflow Times ： 2 times Max.

* The temperature profile is a reference under the above conditions. Temperature profile may change depending on the solder paste types, manufacturers, PCB size, and other soldering materials. Please fully check the mounting conditions before use.

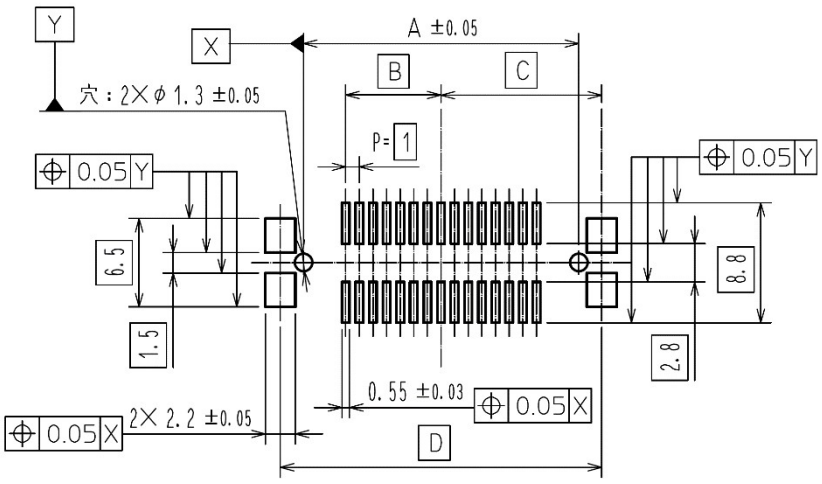
3 -3 Recommended Land Pattern (Recommended Board Thickness: t = 1.6 mm)

FX26-**P-1SV** (Header)



	20pos.	30pos.	40pos.	50pos.	60pos.
A	20	25	30	35	40
B	18.7	23.7	28.7	33.7	38.7
C	13.5	18.5	23.5	28.5	33.5
D	11.4	16.4	21.4	26.4	31.4
E	4.5	7	9.5	12	14.5
F	9.65	12.15	14.65	17.15	19.65
G	19.3	24.3	29.3	34.3	39.3

FX26-**S-1SV** (Receptacle)

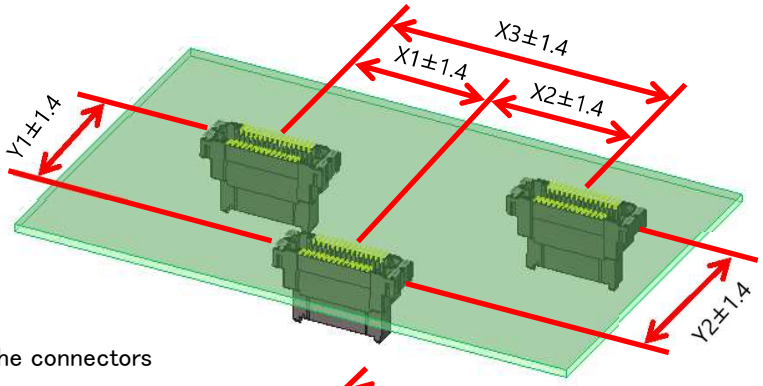


	20pos.	30pos.	40pos.	50pos.	60pos.
A	15.2	20.2	25.2	30.2	35.2
B	4.5	7	9.5	12	14.5
C	9.3	11.8	14.3	16.8	19.3
D	18.6	23.6	28.6	33.6	38.6

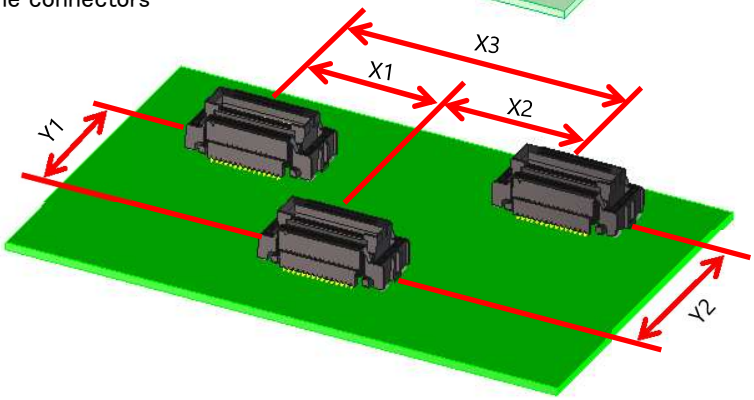
3 -4 Mounting Rules When Using Multiple Connectors

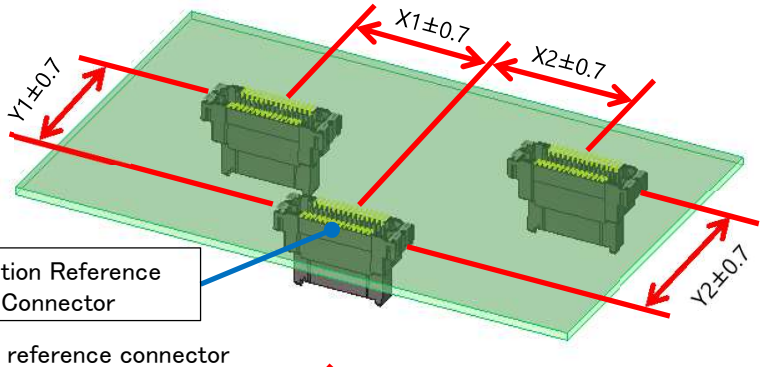
Keep the mounting accuracy within the floating range when mounting more than one unit.

However, the insertion and removal force increases based on the number of connectors mounted so check before use.

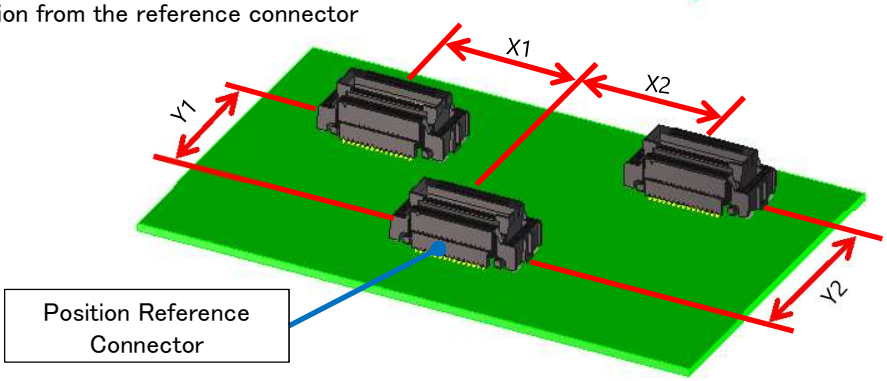


Misalignment Rule 1
・・・Defined by relative positions on the connectors





Misalignment Rule 2
・・・Defined by the position from the reference connector



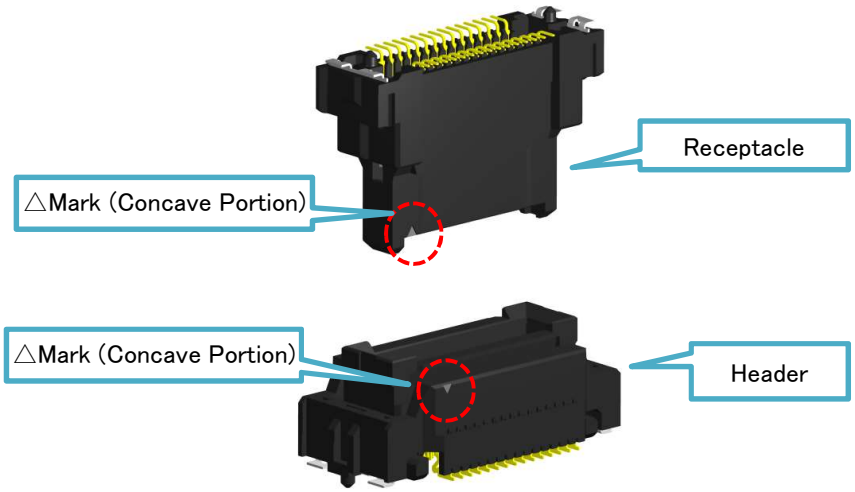
*The above diagram is for mounting 3 connectors. When mounting 2 connectors, the positional deviation is managed only by X1 and Y1 and kept within ±1.4mm in both the X and Y directions.

4. Mating Operation

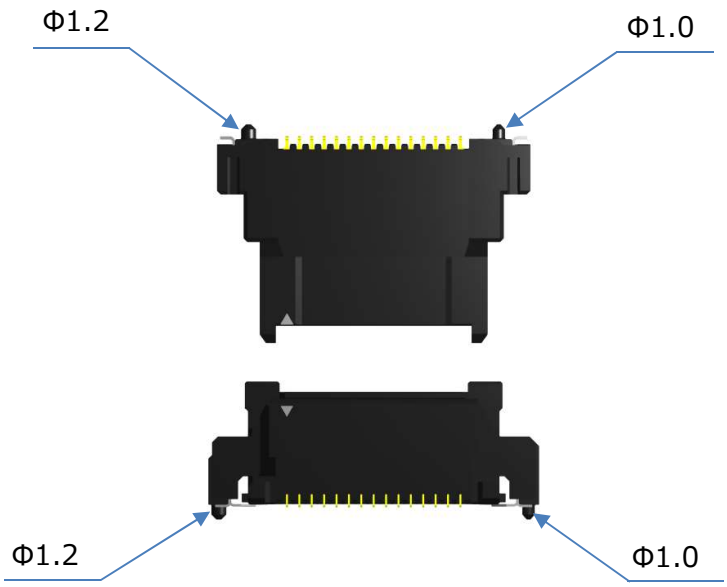
4 -1 Connector Orientation During Mating

The FX26 Series has no polarity and came be mated even when rotated 180°. However for convenience a concave △ mark is placed on one side to identify the direction. Please check before use.
The positioning boss has a different diameter on the left and right sides, but since the board hole dimensions are the same on both sides, it can be mounted and mated even when mounted in reverse.

△ Mark



Boss

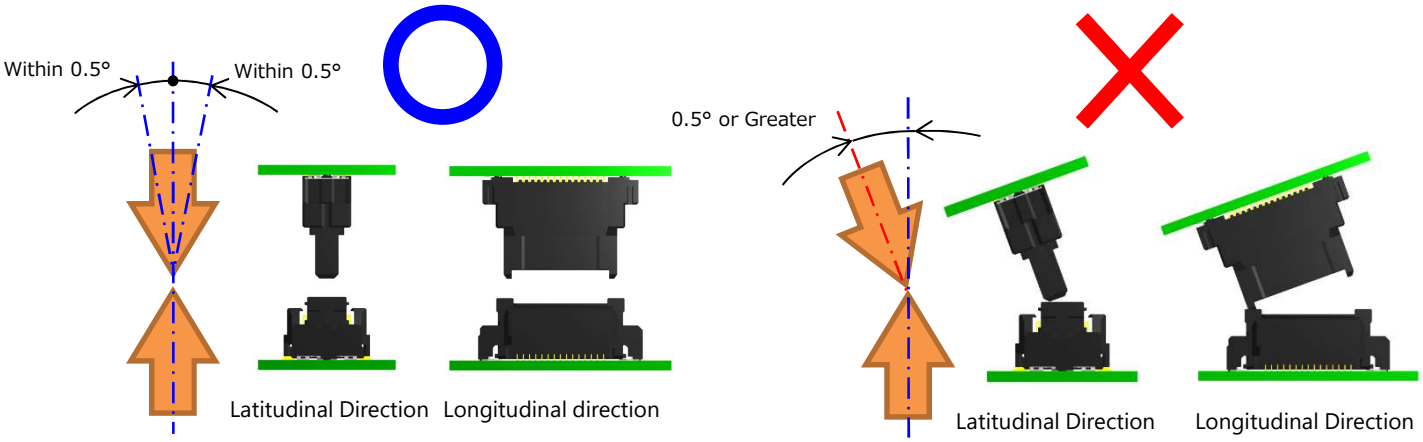


4 -2 Insertion and Removal Method

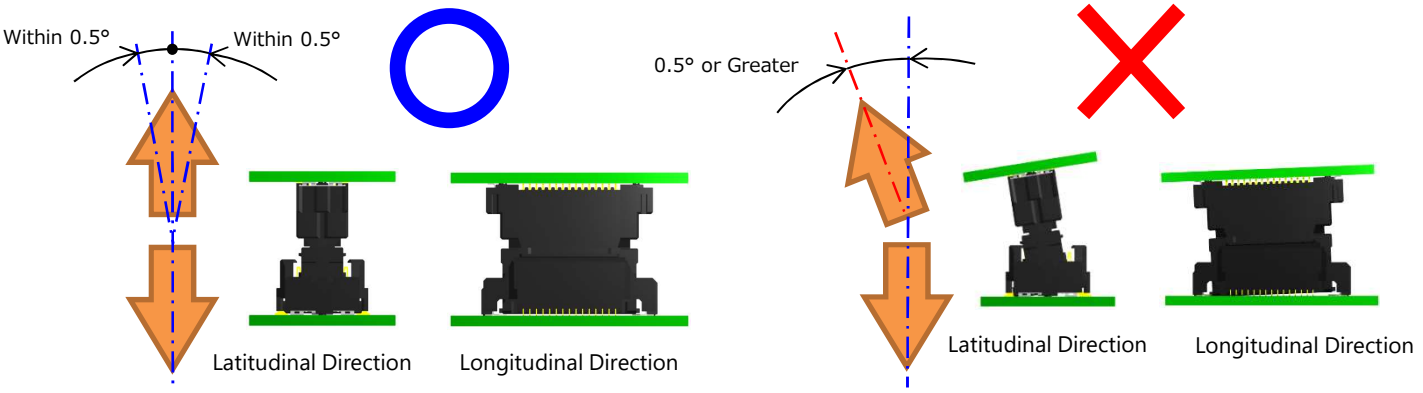
There is no locking mechanism. Insert until the board is secured. When mating the connector keep the boards parallel to each other until the connector is completely inserted or removed. If operation parallel to the board is not possible due to the board layout, insert and remove the connector within the following inclination angle.

Latitudinal Direction → Within 0.5°. Longitudinal Direction → Within 0.5°

During Insertion



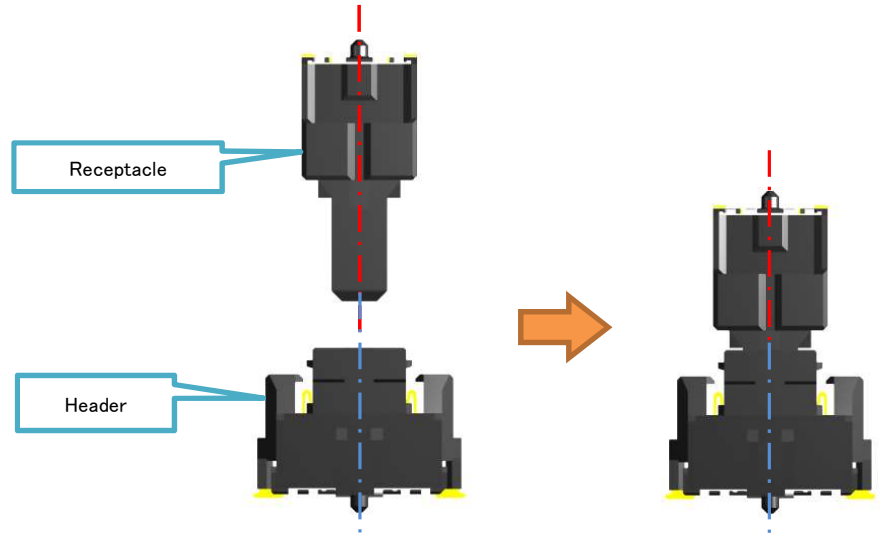
During Removal



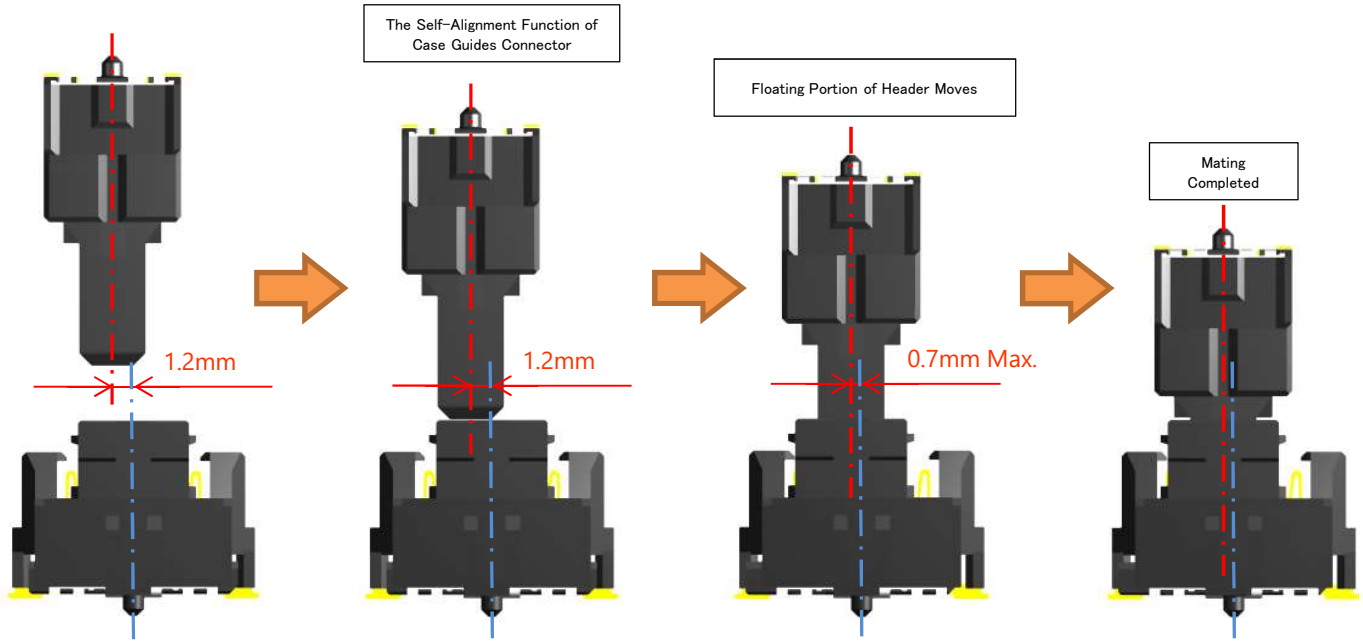
4-3 Tolerable Misalignment Amount During Mating

During mating, when either the header or receptacle can be freely moved, do not apply excessive force in any direction other than the mating direction. Allow the self-alignment function of the connector to guide naturally. The self-alignment range of the connector is ±1.2mm. If the mating axis deviates in all areas from the beginning to the end of mating due to automated assembly, the maximum misalignment must be within the floating range. (±0.7mm in both X and Y directions)

Normal Mating Operation



Mating With Misalignment

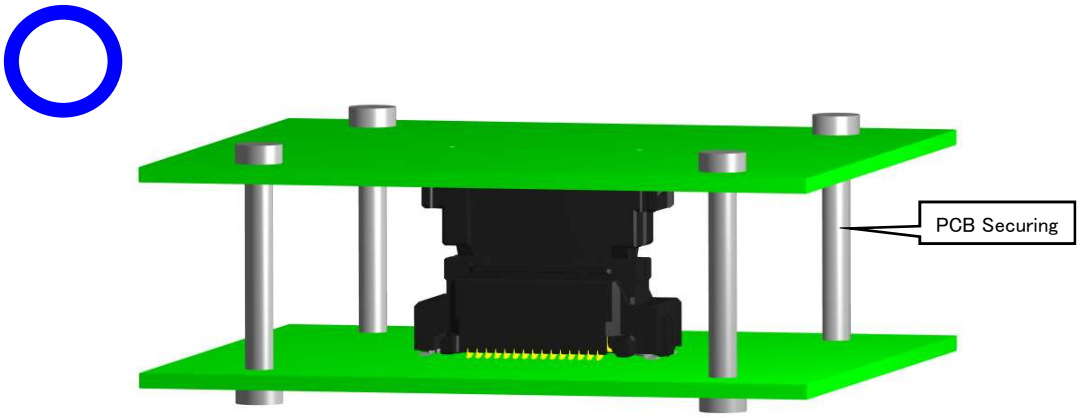


5. Securing PCBs

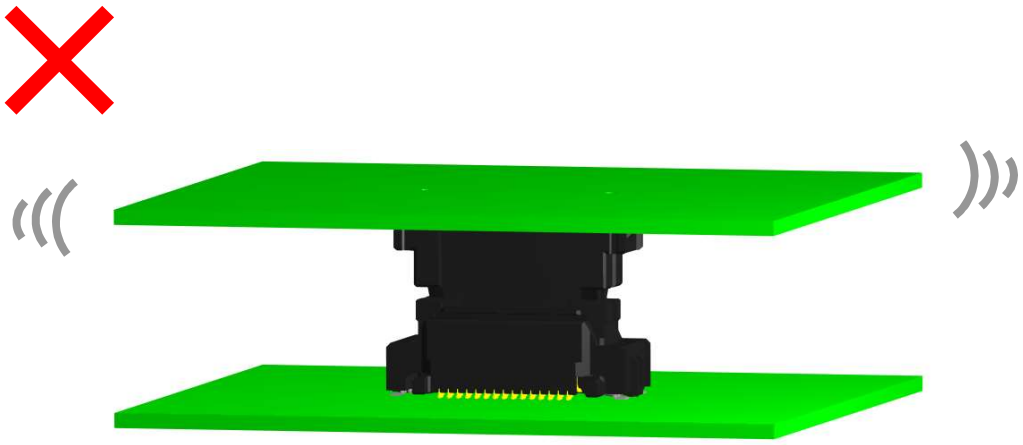
5 -1 Securing PCBs

This connector absorbs misalignment between PCBs (X Direction ±0.7mm/Y Direction ±0.7mm/Z Direction ±0.75mm) and PCB amplitude (Z Direction 0.05mm), but must be secured between boards. If only the connector is used to support the PCBs and no other method is used, excessive force may be applied to the connector resulting in damage or contact failure. Take measures to secure the board so that the board excluding the connector cannot move.

・Securing Between PCBS Using Spacers or Panels



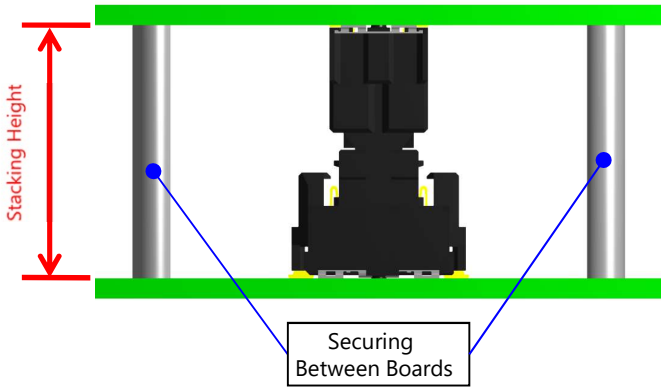
・PCBs are Not Secured



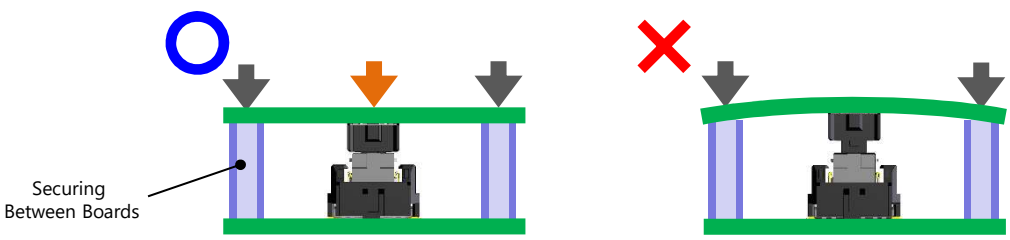
5-2 Distance Between Boards

Stacking Height	Largest / Smallest	Product Mated Combination	
		Header	Receptacle
Note 1 12±0.75mm	12.75mm / 11.25mm	FX26-**P-1SV	Note 1 FX26-**S-1SV12
15±0.75mm	15.75mm / 14.25mm	FX26-**P-1SV	FX26-**S-1SV15
Note 1 17±0.75mm	17.75mm / 16.25mm	Note 1 FX26-**P-1SV5	Note 1 FX26-**S-1SV12
18±0.75mm	18.75mm / 17.25mm	FX26-**P-1SV	FX26-**S-1SV18
20±0.75mm	20.75mm / 19.25mm	FX26-**P-1SV	FX26-**S-1SV20
Note 1 23±0.75mm	23.75mm / 22.25mm	Note 1 FX26-**P-1SV5	FX26-**S-1SV18
Note 1 25±0.75mm	25.75mm / 24.25mm	Note 1 FX26-**P-1SV5	Note 1 FX26-**S-1SV20

Note 1) These connectors (12, 17, 23 and 25mm heights) are available upon request. Please contact a Hirose sales representative for details.



When the area where the boards are secured is away from the connector, the PCB deflection may be affected just by screwing and the connector may not fully mate. To prevent incomplete mating, design a back up on the back surface of the connector mounted portion during mating etc. and secure the board with screws after the connectors are fully mated.



FX26 Series Design Guideline

Rev.	1.0
Contact	AIC Abe
Inspection	AIC Doi
Approval	AIC Shindo

Revision History

Revision	Date	Contact	Contents
1.0	2020/9/29	AIC Abe	First Edition