Title of Document: **HANDLING MANUAL**	Issue No. CHM-1-2247	Rev. 3
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Title subject: FXS Connector (Reverse Type)	Revision date: March 17, 2020	

This manual describes important and required points of handling about the FXS connector reverse type (embossed-taping product) for 0.3 m Customer m pitch FPC.
Be sure to read this manual thoroughly before using the FXS connector.

C O N T E N T S

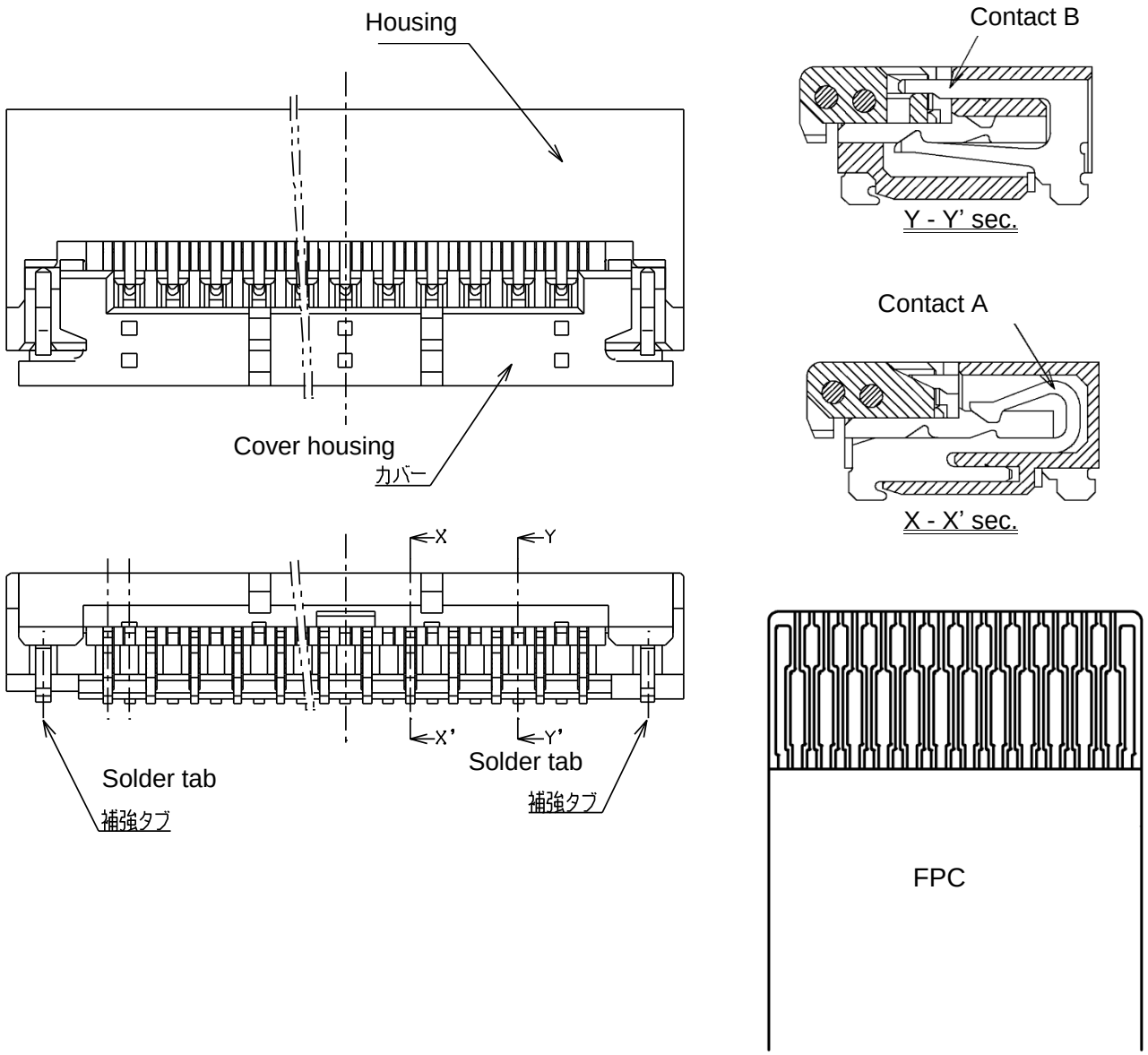
1. Model Number and Part Name

1.1. Model number

Part name		Model No.
FXS connector	Embossed-taping product	∗FXS-RSM1-( )-( )-TF ( )( )
	Loose piece product	∗FXS-RSM1-( )-( ) ( )( )

Note$_1$: 2-digit figure in "∗" denotes the circuit number.
e.g.: 51FXS-RSM1-GAN-TF (LF)(SN)
51-circuit FXS connector reverse type (embossed-taping product)
Nickel-underplated Striped gold-plating lead-free product

1.2. Part name



2. Storage

2.1. Connector storage

Recommended storage condition: Temperature: 5 – 35 ˚C, Relative humidity 60 % or less
(Under packaging like the state of JST shipment)

Keep off direct sunlight, places exposing to such corrosive gas as industrial gas (generate from a stove and whatnot) and ammonia gas (generate from a toilet and whatnot), dusty place and condensation.

Note that the resin molding part may break due to transportation and handling, such as processing and mating, under dry or low temperature condition.

2.2. Storage of the mounted connector

Not leaving the mounted connector to stand in a place exposed to high humidity and direct sunshine, and not placing them directly on the ground, keep them in a clean storage room.

3. Applicable FPC

Item	Rated value
Applicable FPC for tin-plated product	Lead: Tin-plated copper foil Lead pitch: 0.3 mm Lead width: 0.3 mm Mating part thickness: 0.20 ± 0.03 mm

Item	Rated value
Applicable FPC for gold-plated product	Lead: Gold-plated copper foil Lead pitch: 0.3 mm Lead width: 0.3 mm Mating part thickness: 0.20 ± 0.03 mm

Note$_2$: The dimensions of FPC greatly affect the contacting reliability with the connector.
The dimensions of the FPC, please check the applicable FPC described in the product specifiations.

Note$_3$: Especially, a narrow pitch connector is likely to come off of the contact point due to warpage, deformation, slant insertion and insufficient insertion of FPC.
In order to reduce these risks, manage that the important dimensions, such as conductor width, length, pitch, FPC total width and position misalignment between the conductor and FPC width, shall meet fully the given tolerances, considering the variations of those dimensions.

Note$_4$: Confirm the applicability of the connector with a FPC to be used, before using.
The FPC, which the applicability is not confirmed, might not be able to guarantee the performance.

Note$_5$: Blanking shall be conducted in the direction from the conductor side to the reinforcing plate side.

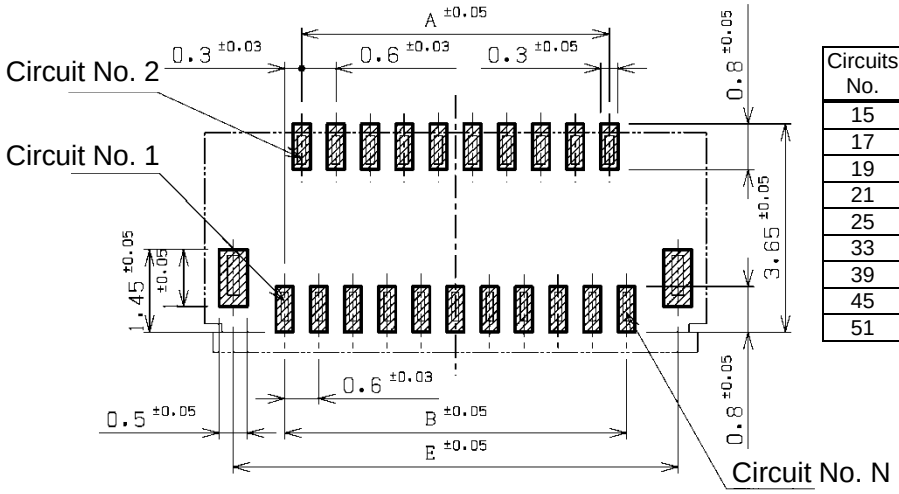
Note$_6$: The material of the reinforcing plate should be polyimide.

Note$_7$: Thermosetting adhesive shall be used.

Note$_8$: Do not mate the different type metal of FPC with the connector.

4. PC Board Pattern Layout

We recommend the following PC board pattern layout.



Circuits No.	Dimension				
	A	B	C	D	E
15	3.6	4.2	4.8	7.0	6.0
17	4.2	4.8	5.4	7.6	6.6
19	4.8	5.4	6.0	8.2	7.2
21	5.4	6.0	6.6	8.8	7.8
25	6.6	7.2	7.8	10.0	9.0
33	9.0	9.6	10.2	12.4	11.4
39	10.8	11.4	12.0	14.2	13.2
45	12.6	13.2	13.8	16.0	15.0
51	14.4	15.0	15.6	17.8	16.8

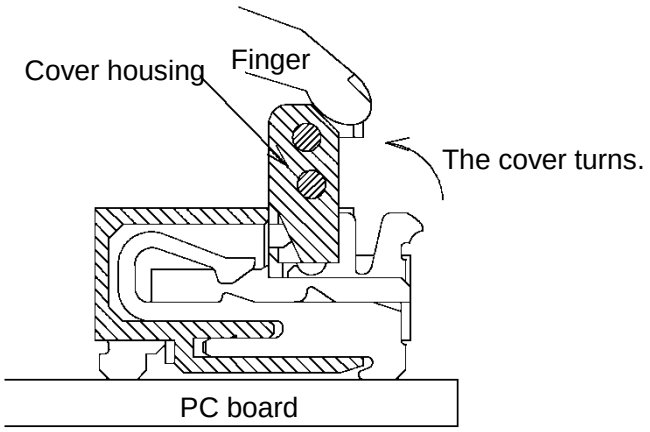
Reference PC board pattern layout (Viewed from component side)

5. Handling Precautions

5.1. Inserting FPC

5.1.1. Opening the cover housing of the connector

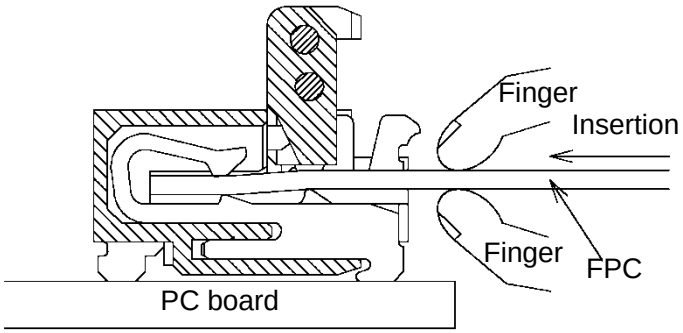
The cover housing is unlocked at the time of the delivery.
As shown below, open the cover housing.



Point: The cover housing stops at 90 degrees. If it is opened over 90 degrees, an excessive load applies to the pivot, which may result in the deformation of the pivot.

5.1.2. Inserting FPC into the connector

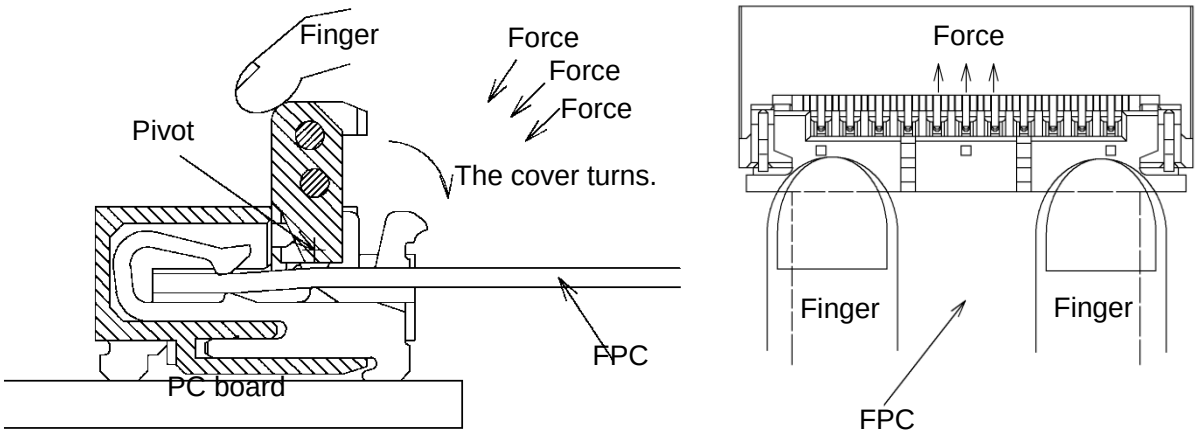
Make FPC lead part down and supporting the reinforcing plate of FPC by finger, insert FPC into the FXS connector up to the backmost as shown in the figure below.



Point: As the rear side contact adopts Non-Zero Insertion Force (Non-ZIF) mechanism, some degree of force is necessary in the temporal insertion of FPC.

5.1.3. Closing the cover housing (Mating FPC with the FXS connector)

Raise the both ends of the cover housing by finger and press them with applying force to the pivot of the cover housing as shown in the figure below.
Then, be sure to check that the pins that protrude at the both ends of the cover housing are engaged with the solder tab.
(There is a sound when the pins are engaged with the solder tab. When it sounds, they are locked properly.)

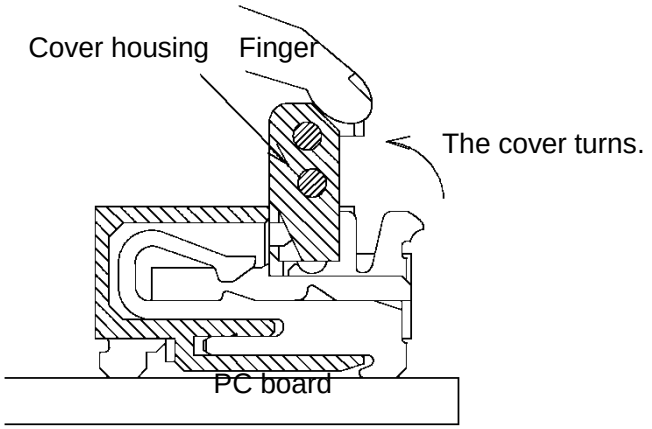


Point: In the case of large circuit numbers, unless the aforementioned procedures are not strictly carried out, the cover housing deflects at the center part of the cover housing, which may result in the disengagement of the contact.

5.2. Releasing FPC

5.2.1. Opening the cover housing of the connector

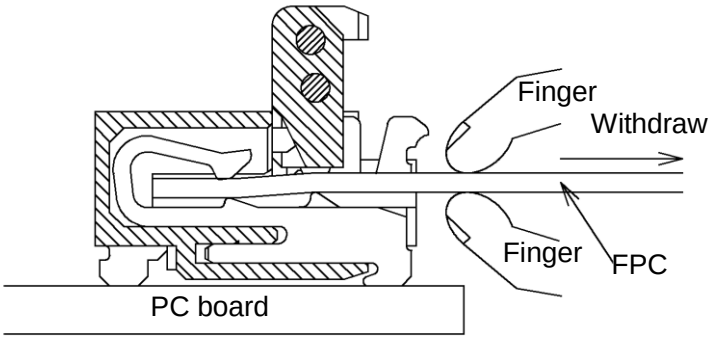
Put your finger on the center part of the cover housing as shown below, and open it in the upward direction shown by the arrow.



Point: ① W : your finger on the center part of the cover housing. If the cover housing is opened with catching the ends of the cover housing, the parts that are caught may be broken.
② The cover housing stops opening at 90 degrees. When the cover housing is opened more than 90 degrees, excessive force applies to the pivot, which may result in the deformation.

5.2.2. Releasing FPC from the FXS connector

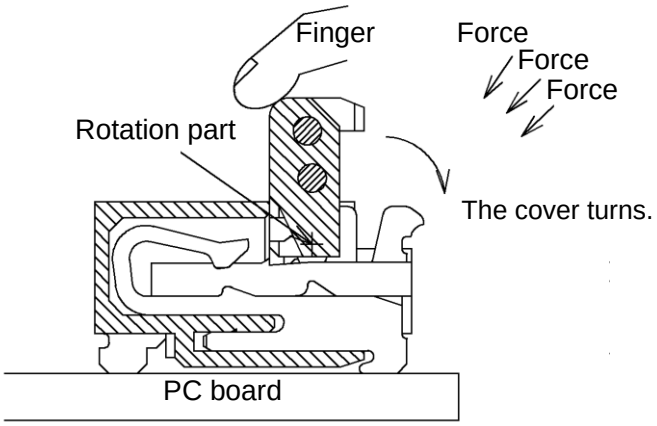
Release FPC straight as shown in the figure below



Point: As the rear side contact adopts Non-Zero Insertion Force (Non-ZIF) mechanism, some degree of force is necessary in releasing FPC.

5.2.3. Closing the cover housing of the connector

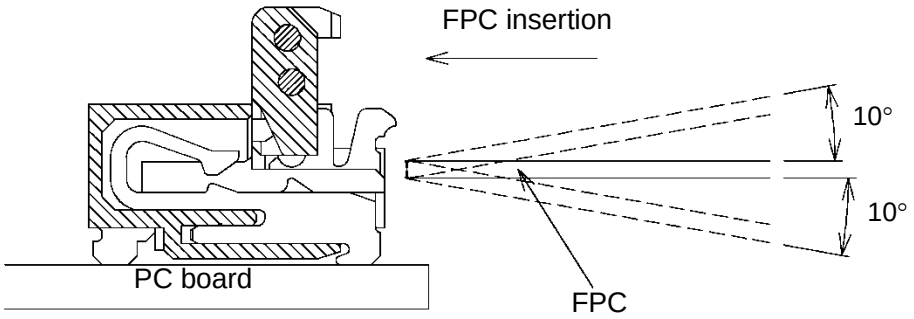
Do the same procedure as in item 4-1-3.

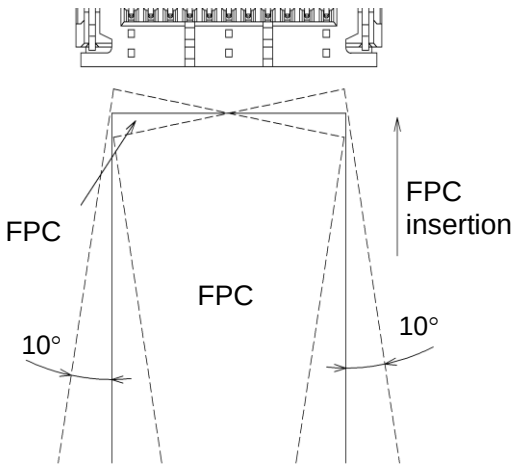


Point: Do not touch other than the cover housing in closing the cover housing.

5.3. Inserting and releasing FPC

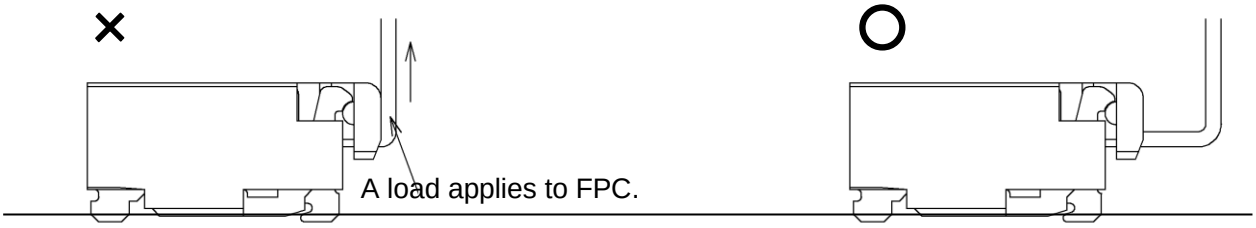
Inserting and releasing operations with the FXS connector and FPC shall be conducted on the same axis. When the operation on the same axis is difficult, operate it quickly within 10 degrees to each direction as shown in the figure below.



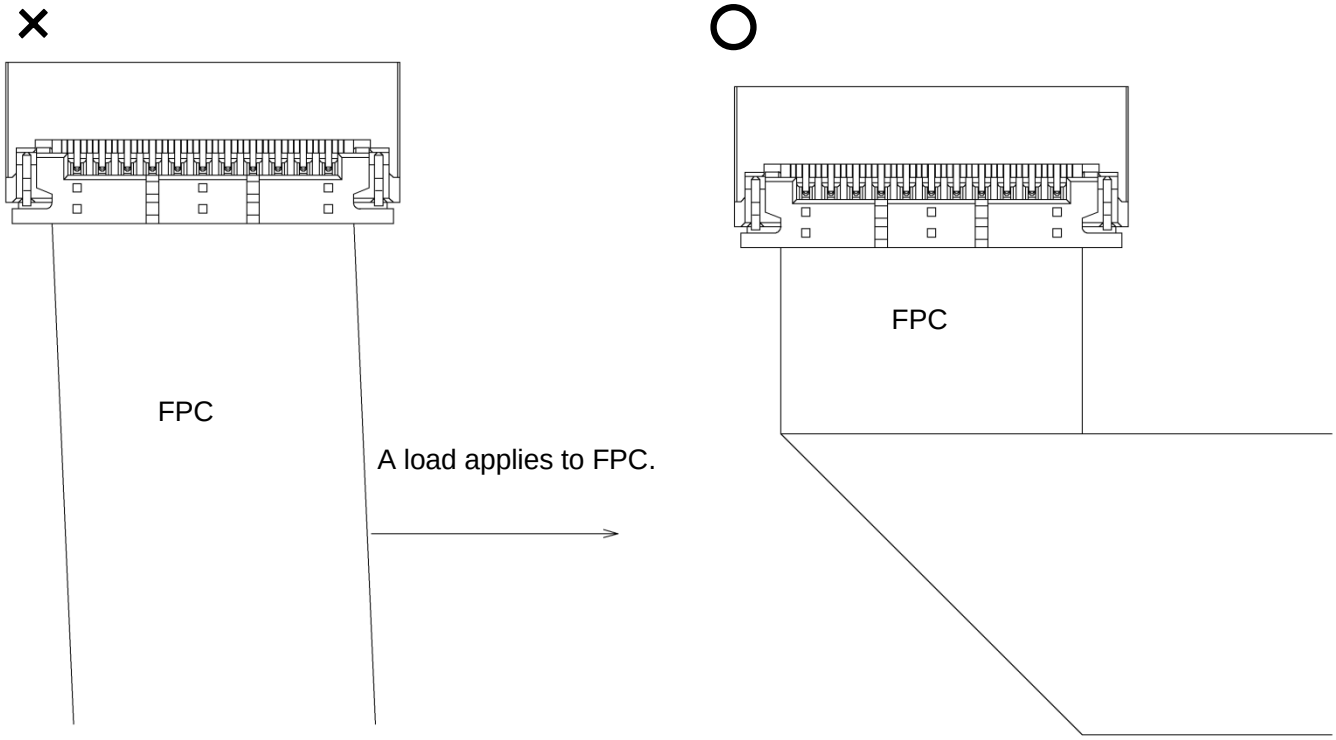


5.4. Handling of FPC after mounting the connector on PC board

When the FPC is handled after the connector is mounted on a PC board and FPC is inserted, keep the FPC length enough not to apply a load to the FXS connector.
(Because such a problem as damage on FPC, the breakage and electrical discontinuity of the connector may be caused.
In the case that the inserted FPC in the connector is used at the place where it moves together with the movement of the movable part, the breakage of the FPC and the connector and poor contact may be caused. Do not conduct stress from the outside directly to the connector by fixing the FPC and taking other countermeasures.



※FPC length is not sufficient to handle.　　※FPC length is sufficient to handle.



※　A load applies to FPC.　　※ Forming processing is conducted to FPC to apply no load to the connector.

5.5. Precautions for soldering operation

5.5.1. Solder iron method

Solder the mounted connector on a PC board quickly by using a soldering iron of 350°C, and visually check the soldering appearance.
During the operation, do not strongly press the soldering iron's tip on the contact lead part nor apply an abnormal load such as lateral load. If done, dismount and exchange the connector, and do soldering again. Do not reuse the dismounted connector but use the new one.
In re-soldering, open the cover housing, If the cover housing is closed, stress applies to the contact inside the connector, which may result in poor soldering.

5.5.2. Reflow soldering method

We recommend soldering at lower temperature than the temperature profile of reflow soldering described in item "Resistance to Soldering Heat" of the product specification.
As the recommended reflow temperature varies depending on soldering material, such as solder paste, do soldering according to the condition.
When bridge trouble appears in the process of reflow soldering method and repair is conducted by hand, strictly conduct item 4-5-1 "Soldering iron method."

5.5.3. Thickness of metal mask

We recommend the following configuration of the metal mask for mounting operation;

- Blanking part: same area as pad area on PC board
- Thickness: 0.12 mm

When the metal mask more than 0.12 mm thickness is used, the area of the blanking part should be smaller than the pad area on PC board, and the amount of solder should be properly adjusted.

5.5.4. Precautions for mounting the connector on PC board

When the cover housing is closed without inserting FPC, this contact is displaced on the mating mechanism and internal stress is caused. When the connector with closed the cover housing is mounted on PC board, the housing is deformed and poor soldering may happen. Therefore, never close the cover housing before soldering.
Especially, in case of double-sided soldering, when JST-made FXS connector is mounted on the front side at the time of the first soldering, handle with care not to close the cover housing due to an external load at the time of the second soldering for the rear side.
Besides, do not reuse the connector that has been closed once before soldering, because the socket housing may be deformed.