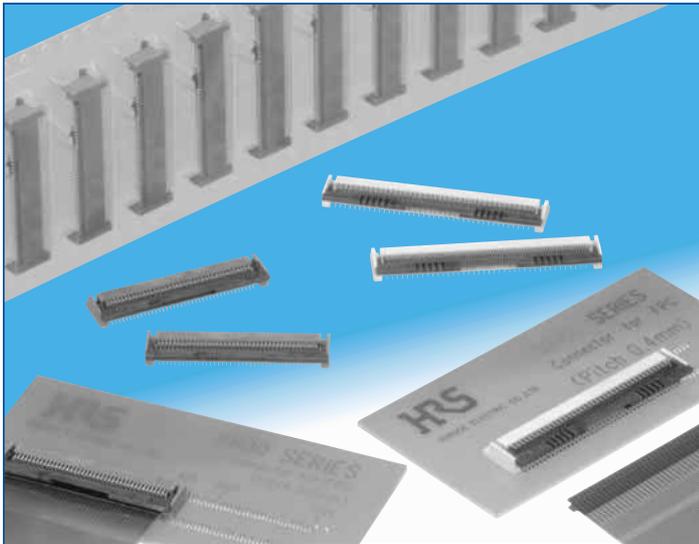
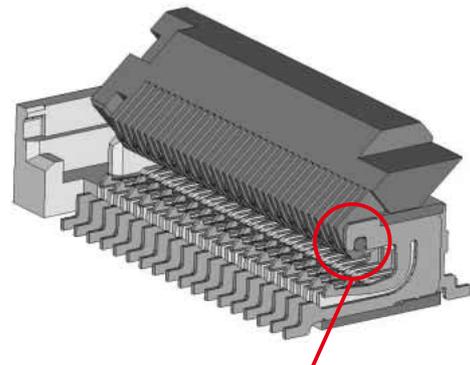


# 0.3 or 0.4 mm pitch, 3 mm above the board, Flip-Lock actuator, Flexible Printed Circuit ZIF connectors

## FH30 Series



### Strong actuator construction



Enclosed shaft of the actuator prevents it from dislocation

## ■ Features

### 1. Strong actuator retention

Actuator will not be dislodged when operating under harsh conditions.

### 2. Rotating Flip-Lock actuator

Rotating actuator permits easy insertion and retention of the FPC.

Tactile sensation confirms complete FPC insertion and reliable mechanical and electrical connection.

### 3. FPC position hold

Tabs on each side of the FPC assure correct placement and hold in the connector prior to closing of the actuator.

### 4. Accepts standard FPC thickness

0.3mm thick standard Flexible Printed Circuit (FPC) can be used.

### 5. Easy solderability on the PC board

The soldering leads are on 0.6 mm or 0.8 mm pitch, exiting on the front and back of the connector.

### 6. Board placement with automatic equipment

Flat upper surface and tape and reel packaging facilitate vacuum pick-up and placement. Standard reel packaging contains 1000 connectors.

### 7. Conductive traces on the PCB can run under the connector

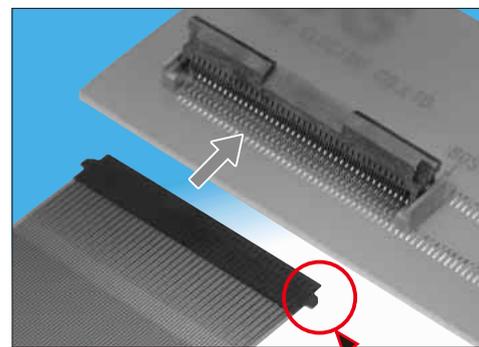
No exposed contacts on the bottom of the connector.

### 8. Halogen-free\*

\* As defined by IEC61249-2-21

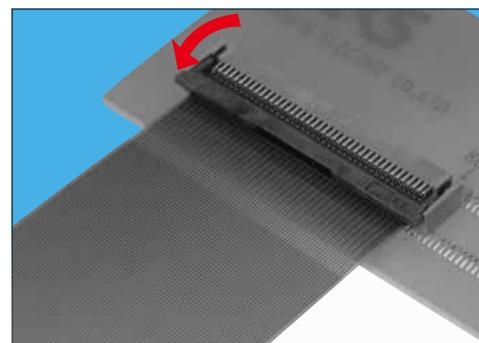
Br-900ppm maximum, Cl-900ppm maximum,  
Cl + Br combined-1,500ppm maximum

### Simple FPC insertion



FPC positioning tab

### Lock



## Product Specifications

|         |                        |              |              |   |   |
|---------|------------------------|--------------|--------------|---|---|
| Ratings |                        | 0.3 mm pitch | 0.4 mm pitch | Operating temperature range -40 to +85°C (Note 2)   | Storage temperature range -10 to +50°C (Note 3)   |
|         | Current rating(Note 1) | 0.15 A       | 0.3 A        | Operating humidity range Relative humidity 90% max. | Storage humidity range Relative humidity 90% max. |
|         | Voltage rating         | 30 Vrms AC   | 50 Vrms AC   | (No condensation)                                   | (No condensation)                                 |

|                 |   |
|-----------------|---|
| Recommended FPC | Thickness: 0.3±0.05, Gold plated contact pads |
|-----------------|---|

| Item                            | Specification  | Conditions   |
|---------------------------------|--|--|
| 1. Insulation resistance        | 500 MΩ min.  | 100 V DC   |
| 2. Withstanding voltage         | No flashover or insulation breakdown   | 0.3 mm pitch: 90 Vrms AC / 1 minute<br>0.4mm pitch: 150 Vrms AC / 1 minute                                   |
| 3. Contact resistance           | 150 mΩ max.<br>* Including FPC conductor resistance  | 1 mA AC  |
| 4. Durability                   | Contact resistance: 150 mΩ max.<br>No damage, cracks, or parts dislocation   | 20 cycles  |
| 5. Vibration                    | No electrical discontinuity of 1μs or longer<br>Contact resistance: 150 mΩ max.<br>No damage, cracks, or parts dislocation | Frequency: 10 to 55 Hz, single amplitude of 0.75 mm<br>10 cycles in each of the 3 directions                 |
| 6. Shock                        | No electrical discontinuity of 1μs or longer<br>Contact resistance: 150 mΩ max.<br>No damage, cracks, or parts dislocation | Acceleration of 981m/s <sup>2</sup> , 6 ms duration,<br>sine half-wave, 3 cycles in each of the 3 axis       |
| 7. Humidity (Steady state)      | Contact resistance: 150 mΩ max.<br>Insulation resistance: 50MΩ min.<br>No damage, cracks, or parts dislocation             | 96 hours at 40°C and humidity of 90 to 95%   |
| 8. Temperature cycle            | Contact resistance: 150 mΩ max.<br>Insulation resistance: 50MΩ min.<br>No damage, cracks, or parts dislocation             | Temperature: -40°C → +15°C to 35°C → +85°C → +15°C to 35°C<br>Time: -30 → 2 to 3 → +30 → +2 to 3<br>5 cycles |
| 9. Resistance to soldering heat | No deformation of components affecting performance.  | Reflow: At the recommended temperature profile<br>Manual soldering: 350°C for 5 seconds                      |

Note1: When passing the current through all of the contacts, use 70% of the rated current.

Note2: Includes temperature rise caused by current flow.

Note3: The term "storage" refers to products stored for a long period prior to mounting and use.

The operating temperature and humidity range covers the non-conducting condition of connectors after installation on a board.

## Materials

| Part      | Material        | Finish                   | Remarks |
|-----------|-----------------|--------------------------|---------|
| Insulator | LCP             | FH30 series Color:Gray   | UL94V-0 |
|           |                 | FH30M series Color:Beige |         |
| Contacts  | Phosphor bronze | Gold plated              | —————   |

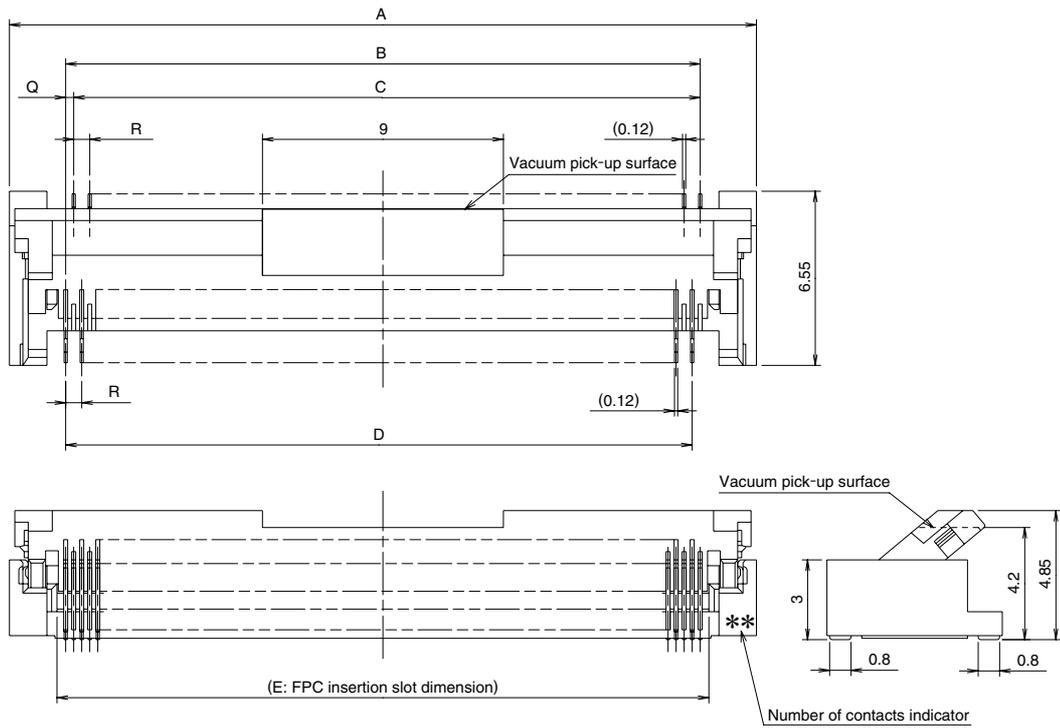
## Ordering information

**FH 30 M - 80S - 0.3 SHW (05)**

① ② ③ ④ ⑤ ⑥ ⑦

|                          |   |
|--------------------------|---|
| ① Series name            | : FH  |
| ② Series No.             | : 30  |
| ③ Blank                  | : 0.3mm pitch<br>M : 0.4 mm pitch                           |
| ④ Number of contacts     | : FH30 series 60, 80, 90<br>FH30M series 80, 96             |
| ⑤ Contact pitch          | : 0.3 mm, 0.4 mm  |
| ⑥ Contact type           | : SHW(SMT horizontal staggered mounting)                    |
| ⑦ Plating specifications | : (05)...Gold plated<br>(98)...Gold plated, 500 pieces/reel |

## ■ Dimensions



- Notes 1: The coplanarity of each terminal lead is within 0.1.  
 2: Packaged on tape and reel only. Check packaging specification.  
 3: Slight variations in color of the plastic compounds do not affect form, fit or function of the connector.  
 4: After reflow, the terminal plating may change color, however this does not represent a quality issue.

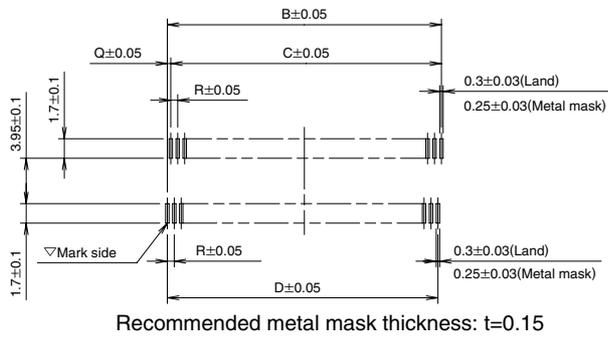
All dimensions: mm

| Part Number          | CL No.        | Number of Contacts | FPC contact pitch | A    | B    | C    | D    | E     | Q   | R   |
|----------------------|---------------|--------------------|-------------------|------|------|------|------|-------|-----|-----|
| FH30-60S-0.3SHW(05)  | 580-0105-8-05 | 60                 | 0.3               | 21.9 | 17.7 | 17.4 | 17.4 | 18.35 | 0.3 | 0.6 |
| FH30-80S-0.3SHW(05)  | 580-0100-4-05 | 80                 | 0.3               | 27.9 | 23.7 | 23.4 | 23.4 | 24.35 | 0.3 | 0.6 |
| FH30-90S-0.3SHW(05)  | 580-0106-0-05 | 90                 | 0.3               | 30.9 | 26.7 | 26.4 | 26.4 | 27.35 | 0.3 | 0.6 |
| FH30M-80S-0.4SHW(05) | 580-0102-0-05 | 80                 | 0.4               | 35.8 | 31.6 | 31.2 | 31.2 | 32.25 | 0.4 | 0.8 |
| FH30M-96S-0.4SHW(05) | 580-0103-2-05 | 96                 | 0.4               | 42.2 | 38   | 37.6 | 37.6 | 38.65 | 0.4 | 0.8 |

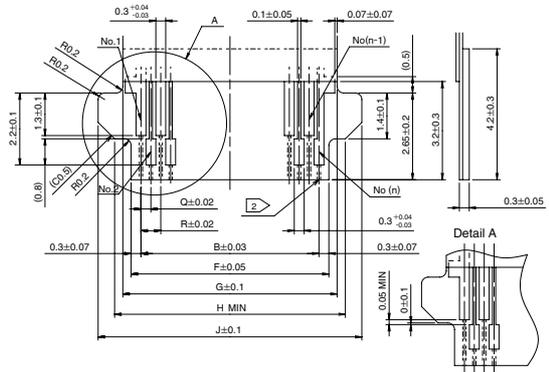
Tape and reel packaging (1,000 pieces/reel, 500 pieces/reel).

Order by number of reels.

## Recommended PCB mounting pattern and metal mask dimensions



## Recommended FPC Dimensions



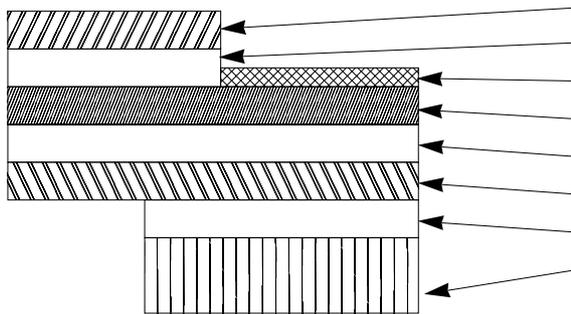
Note ①: Conductor width shall be  $0.1 \pm 0.05$  if FPC has plating bars.

All dimensions: mm

| Part Number          | CL No.        | Number of Contacts | FPC contact pitch | B    | C    | D    | F    | G    | H    | J    | Q   | R   |
|----------------------|---------------|--------------------|-------------------|------|------|------|------|------|------|------|-----|-----|
| FH30-60S-0.3SHW(05)  | 580-0105-8-05 | 60                 | 0.3               | 17.7 | 17.4 | 17.4 | 18.3 | 18.8 | 19.3 | 20.3 | 0.3 | 0.6 |
| FH30-80S-0.3SHW(05)  | 580-0100-4-05 | 80                 | 0.3               | 23.7 | 23.4 | 23.4 | 24.3 | 24.8 | 25.3 | 26.3 | 0.3 | 0.6 |
| FH30-90S-0.3SHW(05)  | 580-0106-0-05 | 90                 | 0.3               | 26.7 | 26.4 | 26.4 | 27.3 | 27.8 | 28.3 | 29.3 | 0.3 | 0.6 |
| FH30M-80S-0.4SHW(05) | 580-0102-0-05 | 80                 | 0.4               | 31.6 | 31.2 | 31.2 | 32.2 | 32.7 | 33.2 | 34.2 | 0.4 | 0.8 |
| FH30M-96S-0.4SHW(05) | 580-0103-2-05 | 96                 | 0.4               | 38   | 37.6 | 37.6 | 38.6 | 39.1 | 39.6 | 40.6 | 0.4 | 0.8 |

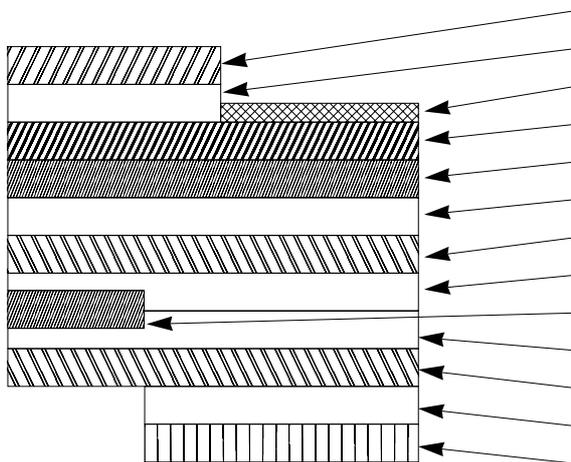
## FH30 Series Recommended FPC Construction

### 1. Using Single-sided FPC



| Material Name                   | Material  | Material Thickness ( $\mu\text{m}$ ) |
|---------------------------------|---|--------------------------------------|
| Covering film layer             | Polyimide 1 mil thick   | (25)                                 |
| Cover adhesive                  |   | (25)                                 |
| Surface treatment               | $0.2\mu\text{m}$ thick gold plated over 1 to $5\mu\text{m}$ thick nickel underplating | 3                                    |
| Copper foil                     | Cu 1oz  | 35                                   |
| Base adhesive                   | Thermosetting adhesive  | 25                                   |
| Base film                       | Polyimide 1 mil thick   | 25                                   |
| Reinforcement material adhesive | Thermosetting adhesive  | 30                                   |
| Stiffener                       | Polyimide 7 mil thick   | 175                                  |
| Total                           |   | 293                                  |

### 2. Using Double-sided FPC



| Material Name                   | Material  | Material Thickness ( $\mu\text{m}$ ) |
|---------------------------------|---|--------------------------------------|
| Covering layer film             | Polyimide 1 mil thick   | (25)                                 |
| Cover adhesive                  |   | (25)                                 |
| Surface treatment               | $0.2\mu\text{m}$ thick gold plated over 1 to $5\mu\text{m}$ thick nickel underplating | 3                                    |
| Through-hole copper             | Cu  | 15                                   |
| Copper foil                     | Cu 1/2oz  | 18                                   |
| Base adhesive                   | Thermosetting adhesive  | 18                                   |
| Base film                       | Polyimide 1 mil thick   | 25                                   |
| Base adhesive                   | Thermosetting adhesive  | 18                                   |
| Copper foil                     | Cu 1/2oz  | (18)                                 |
| Cover adhesive                  | Thermosetting adhesive  | 25                                   |
| Covering film layer             | Polyimide 1 mil thick   | 25                                   |
| Reinforcement material adhesive | Thermosetting adhesive  | 50                                   |
| Stiffener                       | Polyimide 4 mil thick   | 100                                  |
| Total                           |   | 297                                  |

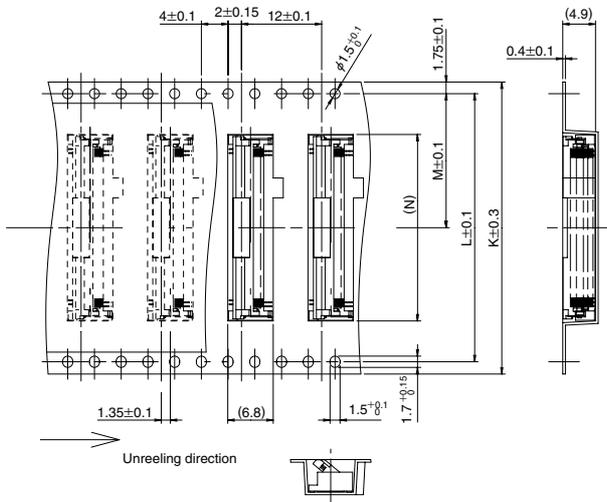
\* To prevent release of the FPC due to its bending, use of the double-sided FPC with copper foil on the back side is NOT RECOMMENDED.

### 3. Precautions

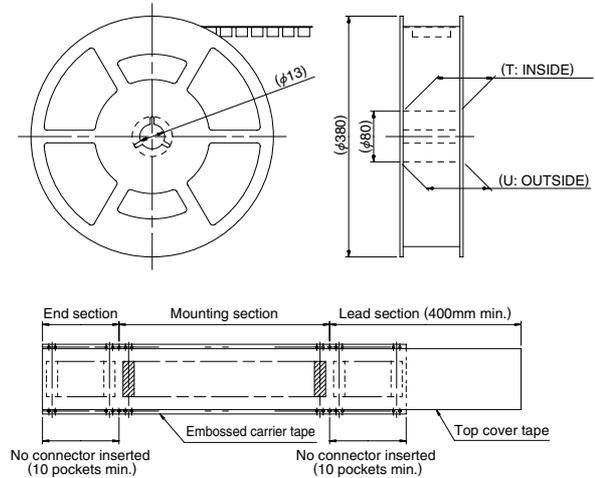
1. This specification is a recommendation for the construction of the FH30 Series FPC ( $t=0.3 \pm 0.05$ ).
2. For details about the construction, please contact the FPC manufacturers.

## ■ Packaging Specifications

### ● Embossed Carrier Tape Dimensions



### ● Reel Dimensions



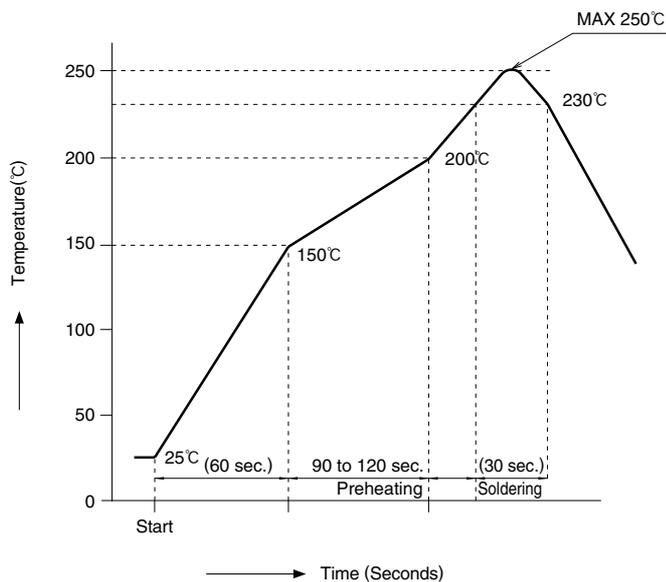
All dimensions: mm

| Part Number          | CL No.        | Number of Contacts | K  | L    | M    | N    | T    | U    |
|----------------------|---------------|--------------------|----|------|------|------|------|------|
| FH30-60S-0.3SHW(05)  | 580-0105-8-05 | 60                 | 44 | 40.4 | 20.2 | 22.1 | 45.4 | 49.4 |
| FH30-80S-0.3SHW(05)  | 580-0100-4-05 | 80                 | 44 | 40.4 | 20.2 | 28.1 | 45.4 | 49.4 |
| FH30-90S-0.3SHW(05)  | 580-0106-0-05 | 90                 | 44 | 40.4 | 20.2 | 31.1 | 45.4 | 49.4 |
| FH30M-80S-0.4SHW(05) | 580-0102-0-05 | 80                 | 56 | 52.4 | 26.2 | 36   | 57.4 | 61.4 |
| FH30M-96S-0.4SHW(05) | 580-0103-2-05 | 96                 | 56 | 52.4 | 26.2 | 42.4 | 57.4 | 61.4 |

Tape and reel packaging (1,000 pieces/reel).

## ■ Temperature Profile

### ● Using Lead-free Solder Paste



### HRS test condition

- Solder method :Reflow, IR/hot air
- Environment :Room air
- Solder composition :Paste, 96.5%Sn/3.0%Ag/0.5%Cu  
(Senju Metal Industry, Co., Ltd.'s Part Number:M705-221CM5-32-10.5)
- Test board :Glass epoxy FH30:45×80×1.6mm thick  
FH30M:70×130×1.6mm thick
- Land dimensions :0.3mm×1.7mm
- Metal mask :0.15mm thick  
0.25mm×1.7mm

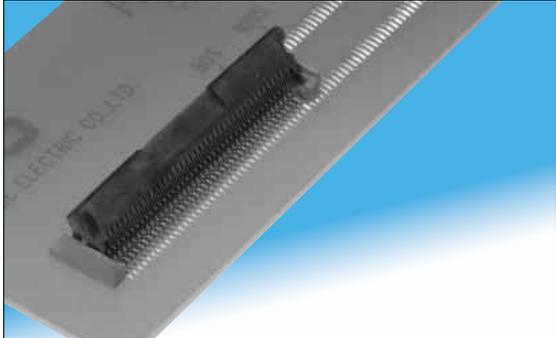
The temperature profiles shown are based on the above conditions.

In individual applications the actual temperature may vary, depending on solder paste type, volume / thickness and board size / thickness. Consult your solder paste and equipment manufacturer for specific recommendations.

## ■ Operation and Precautions

### Operation and Precautions

- 1 Install on the PC board with the actuator open.



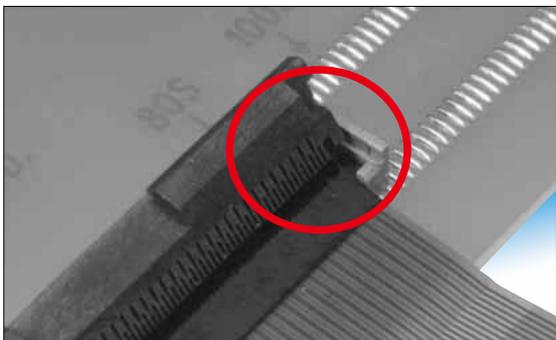
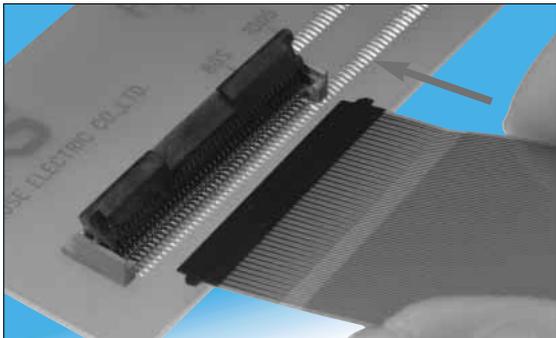
- 2 FPC Insertion

Orient the FPC with the contact pads facing down. Insert in the connector at an angle, assuring that the positioning tabs are placed in the corresponding positioning tab areas on both sides of the insulator body.

Lower the FPC to a position parallel to the mounting surface.

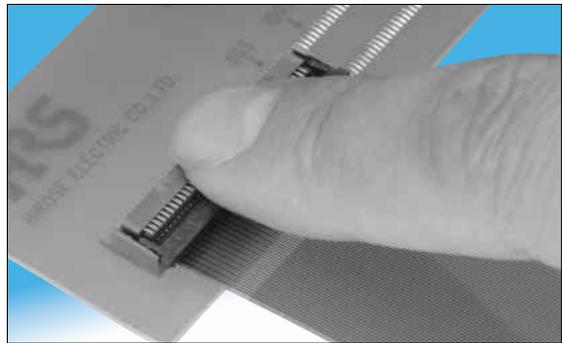
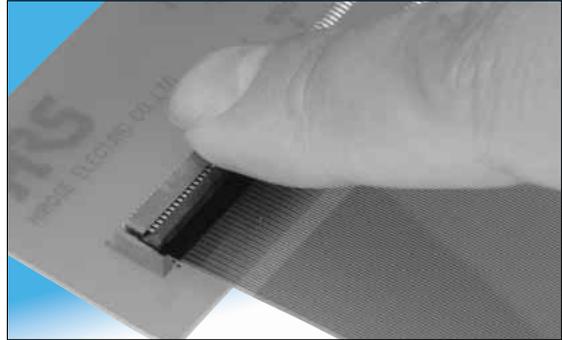
Verify the correct position by slightly pulling horizontally on the FPC.

Positioning tab area (each side)



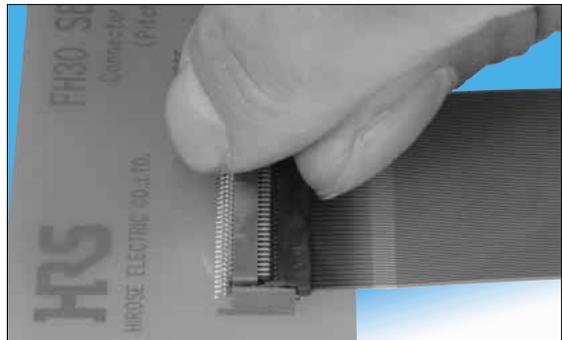
Positioning part

- 3 Actuator closing after the FPC is fully inserted. Rotate the actuator down to a full stop, pushing it at the center.



- 4 Removing the FPC

Carefully rotate the actuator up, lifting it at the center. Lift the FPC slightly to clear the positioning tabs and withdraw it from the connector.

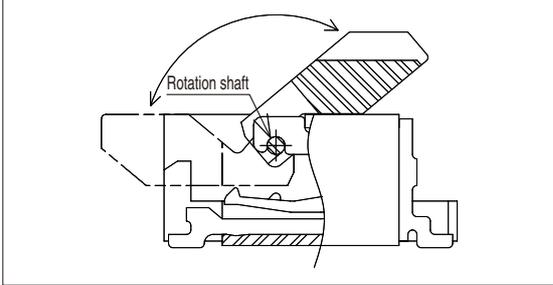


## ■ Precautions

### Operation and Precautions

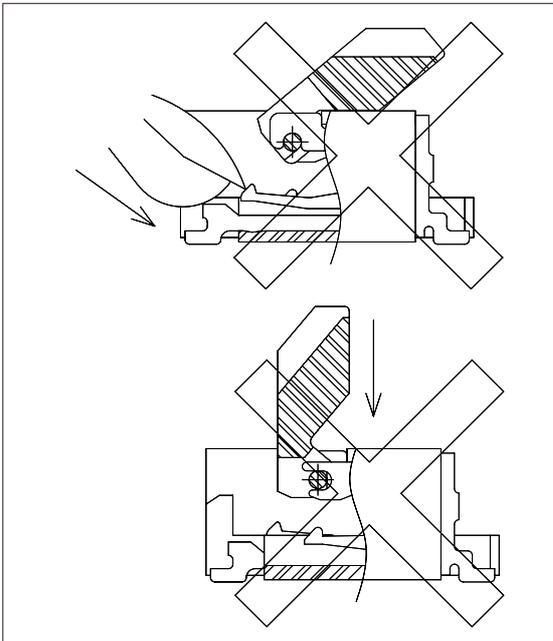
#### ① Actuator operation

The actuator rotates at the center of its shaft, as illustrated in the figure below.



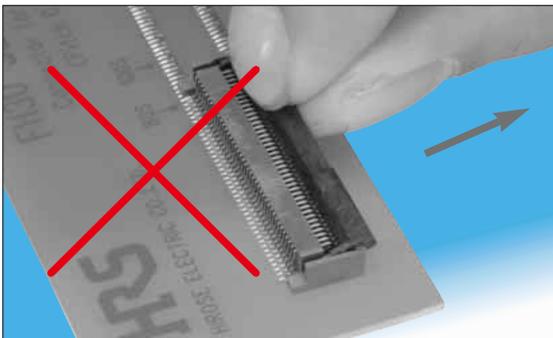
Be careful not to apply excessive force when operating the actuator from the open position (before the FPC has been inserted).

Exercise care not to touch the contacts with fingernails or any other object.



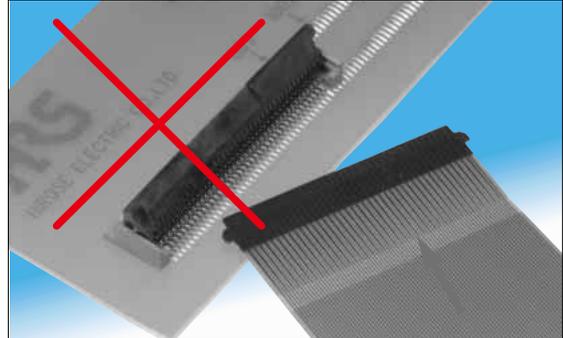
During the closing of the actuator do not pull up or push on it directly down.

Do not grasp the actuator and pull on it (photograph below).

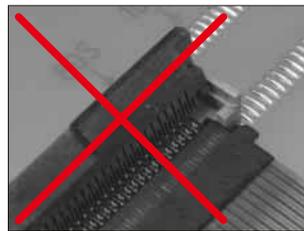


#### ② FPC Insertion and closing of the actuator.

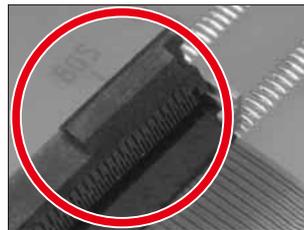
Do not insert the FPC on an angle as illustrated in the photograph below.



Properly insert the FPC positioning tabs into the corresponding areas on both sides of the insulator body.

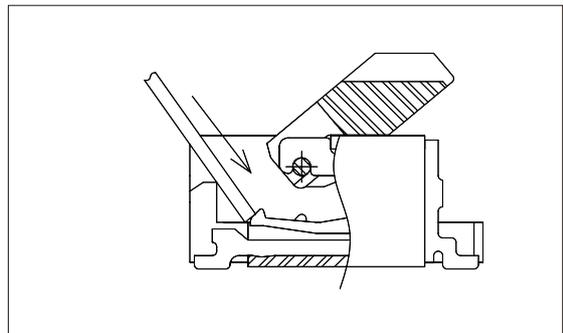


Incorrect FPC insertion



Correct FPC insertion

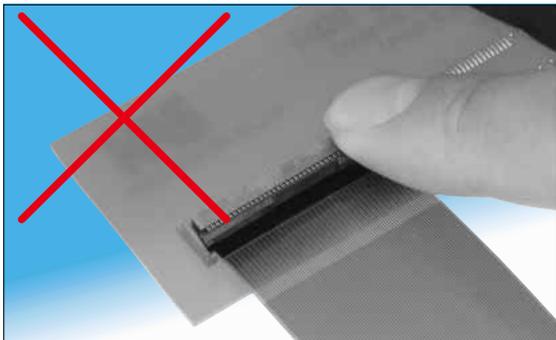
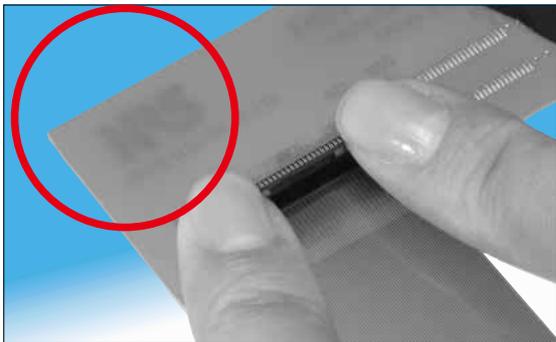
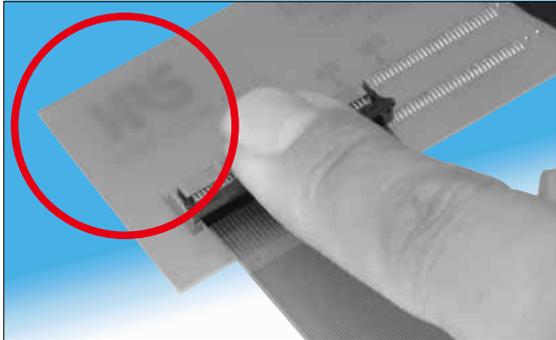
③ Make sure that the FPC does not rub against the insertion slot or the contacts, as illustrated on the figure below.



### Operation and Precautions

Closing of the actuator.

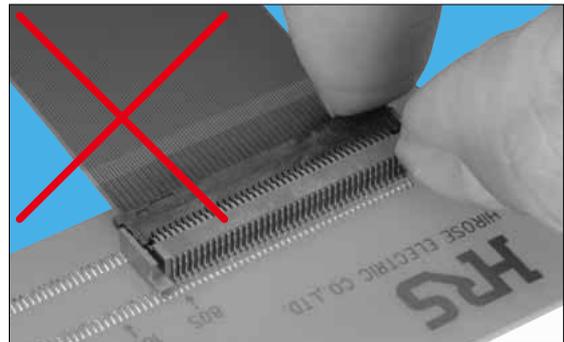
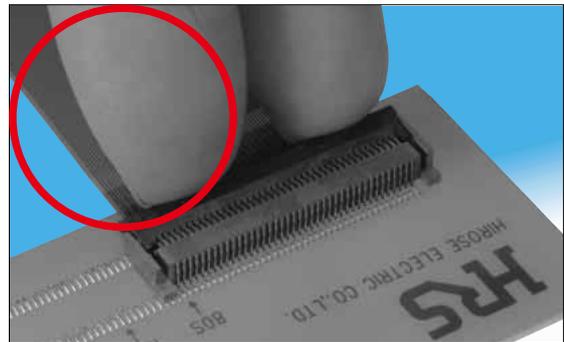
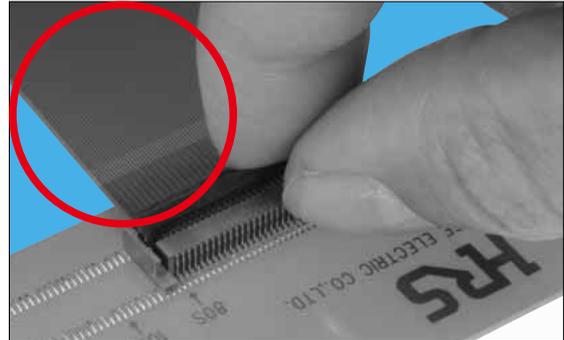
Rotate down pushing it at the center or evenly at each end, as shown on the photographs below. Do not push at one end only.



④ Opening of the actuator

Rotate up, lifting it at the center or evenly at each end of the actuator.

Do not lift at one end only.



⑤ Forces to the FPC after insertion and closing of the actuator.

Do not apply upward pull-force to the FPC close to the connector.

If a need arise to route the FPC upward, assure that it is NOT transferring any forces to the closed actuator.

