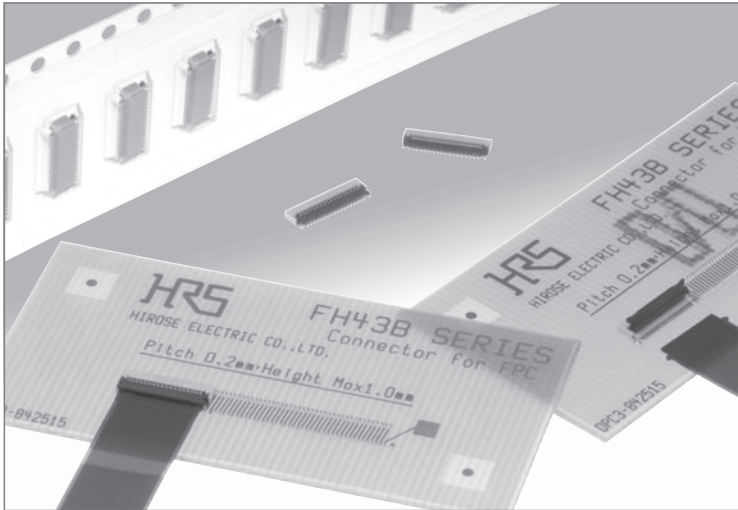


# 0.2 mm Pitch, 0.9 mm above the board, Flexible Printed Circuit ZIF Connectors

## FH43B Series



### ■ Features

#### 1. Low-profile, small PCB mounting area

Board footprint: Reduced approximately 45%  
Weight: Reduced approximately 55%  
(As compared with Hirose Electric's FH26 Series connectors 51 positions)

#### 2. Easy solderability on the PC board

The soldering leads are on 0.4 mm pitch, exiting on front and back of the connector.

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

No exposed contacts on the bottom of the connector.

#### 4. Easy FPC insertion and reliable electrical connection

Proven Flip Lock actuator allows easy insertion of FPC and provides a tactile sensation when fully closed, confirming complete electrical and mechanical connection.

#### 5. Easy FPC/FFC insertion

FPC/FFC is self-guided in the connector assuring correct and reliable electrical and mechanical connection.

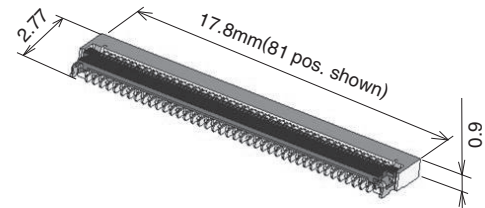
#### 6. Accepts standard FPC thickness

0.2mm thick standard Flexible Printed Circuit (FPC) can be used. This is the only ultra-low profile ZIF connector using standard FPC.

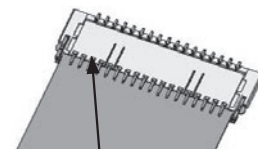
#### 7. Board placement with automatic equipment

Flat upper surface and tape and reel packaging facilitate vacuum pick-up and placement. Standard reel packaging contains 5000 connectors.

#### Space saving

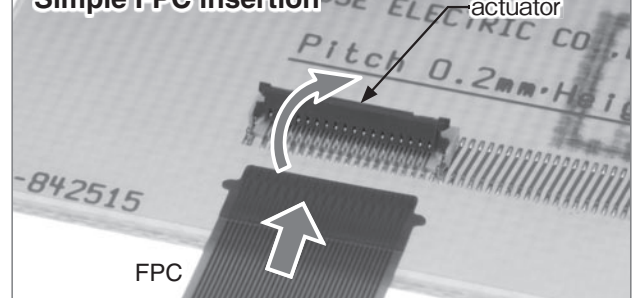


#### Can be mounted over conductive traces.

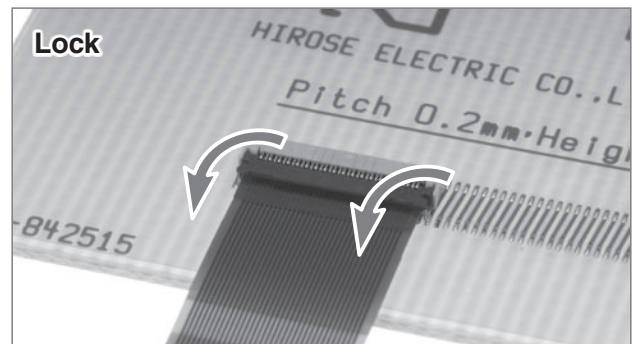


No exposed contacts on the bottom of the connector

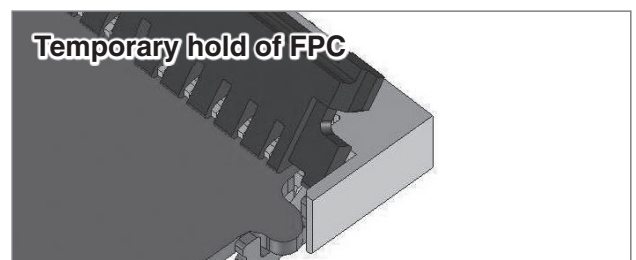
#### Simple FPC insertion



#### Lock



#### Temporary hold of FPC



## FH43B Series 0.2 mm Pitch, 0.9 mm above the board, Flexible Printed Circuit ZIF Connectors

### Specifications

|         |                |            |                             |  |                           |  |
|---------|----------------|------------|-----------------------------|--|---------------------------|--|
| Ratings | Current rating | 0.2 A      | Operating temperature range | -55 to +85°C (Note 1)                        | Storage temperature range | -10 to +50°C (Note 2)                        |
|         | Voltage rating | 30 Vrms AC | Operating humidity range    | Relative humidity 90% max. (No condensation) | Storage humidity range    | Relative humidity 90% max. (No condensation) |

|                           |   |
|---------------------------|---|
| Recommended FPC Thickness | 0.2 ± 0.02 mm, Gold plated contact pads |
|---------------------------|---|

| Item                            | Specification  | Conditions   |
|---------------------------------|--|--|
| 1. Insulation resistance        | 50 MΩ min.   | 100 V DC   |
| 2. Withstanding voltage         | No flashover or insulation breakdown   | 90 Vrms AC / one minute  |
| 3. Contact resistance           | 100 mΩ max.<br>* Including FPC conductor resistance  | 1 mA, AC max (AC: 1kHz)  |
| 4. Durability                   | Contact resistance: 100 mΩ max.<br>No damage, cracks, or parts dislocation   | 10 cycles  |
| 5. Vibration                    | No electrical discontinuity of 1μs or longer<br>Contact resistance: 100 mΩ max.<br>No damage, cracks, or parts dislocation | Frequency: 10 to 55 Hz, single amplitude of 0.75mm, 10 cycles in each of the 3 axis                                  |
| 6. Shock                        | No electrical discontinuity of 1μs or longer<br>Contact resistance: 100 mΩ max.<br>No damage, cracks, or parts dislocation | Acceleration of 981m/s <sup>2</sup> , 6 ms duration, sine halfwave, 3 cycles in each of the 3 axis                   |
| 7. Humidity (Steady state)      | Contact resistance: 100 mΩ max.<br>Insulation resistance: 50 MΩ min.<br>No damage, cracks, or parts dislocation            | 96 hours at 40°C and humidity of 90 to 95%   |
| 8. Temperature cycle            | Contact resistance: 100 mΩ max.<br>Insulation resistance: 50 MΩ min.<br>No damage, cracks, or parts dislocation            | Temperature : -55°C → +15°C to +35°C → +85°C → +15°C to +35°C<br>Time: 30 → 2 to 3 → 30 → 2 to 3 minutes<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 ±10°C for 5 seconds                        |

Note 1. Includes temperature rise caused by current flow.

Note 2. 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 installed connectors in storage, shipment or during transportation after board mounting.

Note 3. Information contained in this catalog represents general requirements for this Series.

Contact us for the drawings and specifications for a specific part number shown.

### Materials

| Part         | Material        | Finish                 | Remarks |
|--------------|-----------------|------------------------|---------|
| Insulator    | LCP             | Color:Beige            | UL94V-0 |
|              | PA              | Color:Black            |         |
| Contacts     | Phosphor bronze | Gold plated            | —       |
| Metafittings |                 | Pure tin reflow plated | —       |

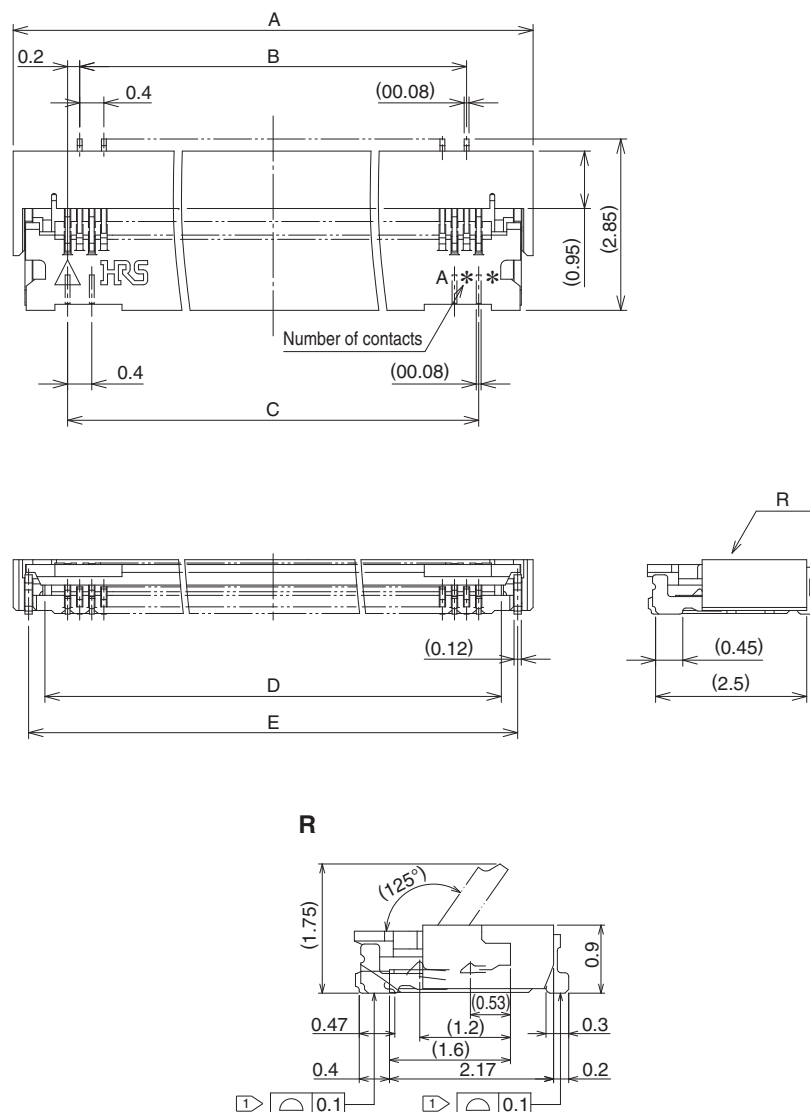
### Ordering information

**FH 43B – 51S – 0.2 SHW (10)**

① ② ③ ④ ⑤ ⑥

|                                |   |
|--------------------------------|---|
| ① Series name : FH             | ⑤ Termination type :<br>SHW...SMT horizontal staggered row mount type |
| ② Series No.: 43B              |   |
| ③ Number of positions : 21to81 | ⑥ Plating specifications<br>(10)...Gold plating with nickel barrier   |
| ④ Contact pitch : 0.2mm        |   |

## ■Connector Dimensions



Note 1 The coplanarity of each terminal lead within specified dimension is 0.1 mm Max.

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.

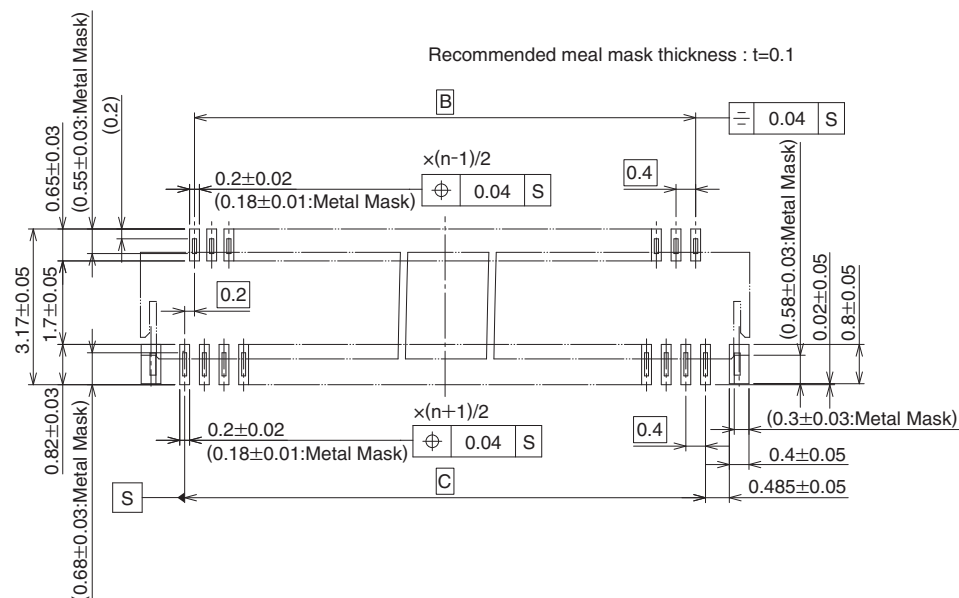
Unit : mm

| Part Number          | CL No.         | Number of contacts | A    | B    | C   | D     | E     |
|----------------------|----------------|--------------------|------|------|-----|-------|-------|
| FH43B-21S-0.2SHW(10) | —              | 21                 | 5.8  | 3.6  | 4   | 4.53  | 5.29  |
| FH43B-25S-0.2SHW(10) | —              | 25                 | 6.6  | 4.4  | 4.8 | 5.33  | 6.09  |
| FH43B-31S-0.2SHW(10) | —              | 31                 | 7.8  | 5.6  | 6   | 6.53  | 7.29  |
| FH43B-35S-0.2SHW(10) | 0580-2803-5-10 | 35                 | 8.6  | 6.4  | 6.8 | 7.33  | 8.09  |
| FH43B-41S-0.2SHW(10) | —              | 41                 | 9.8  | 7.6  | 8   | 8.53  | 9.29  |
| FH43B-45S-0.2SHW(10) | —              | 45                 | 10.6 | 8.4  | 8.8 | 9.33  | 10.09 |
| FH43B-51S-0.2SHW(10) | 0580-2806-3-10 | 51                 | 11.8 | 9.6  | 10  | 10.53 | 11.29 |
| FH43B-61S-0.2SHW(10) | 0580-2805-0-10 | 61                 | 13.8 | 11.6 | 12  | 12.53 | 13.29 |
| FH43B-71S-0.2SHW(10) | 0580-2807-6-10 | 71                 | 15.8 | 13.6 | 14  | 14.53 | 15.29 |
| FH43B-81S-0.2SHW(10) | —              | 81                 | 17.8 | 15.6 | 16  | 16.53 | 17.29 |

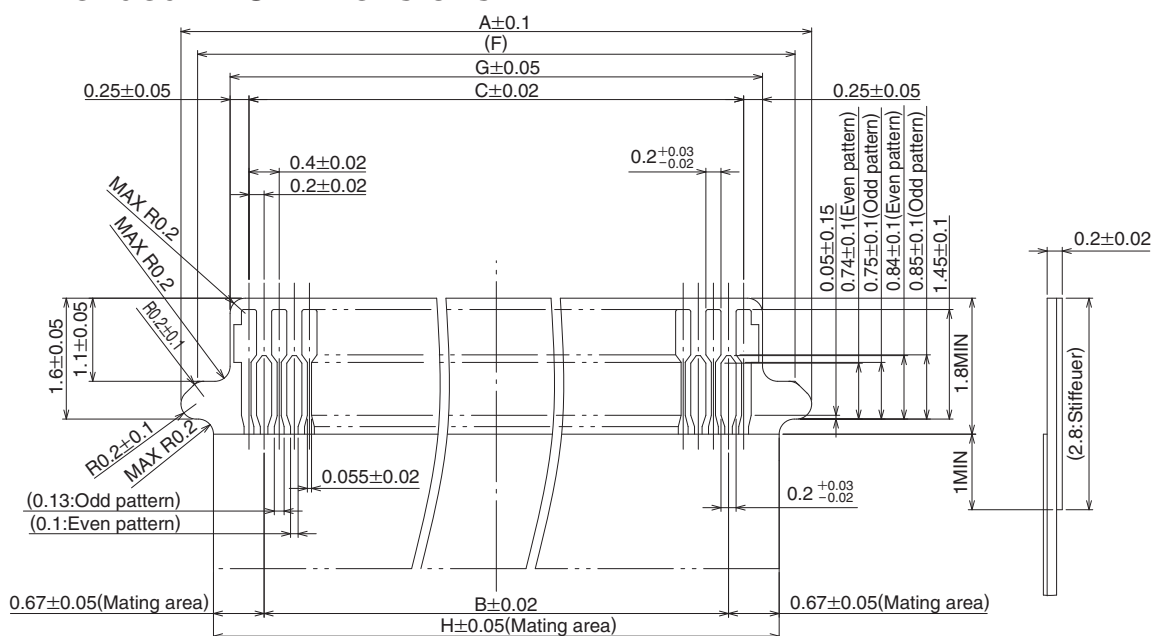
Note1. Tape and reel packaging (5,000 pieces/reel).

Order by number of reels.

## Recommended PCB mounting pattern and metal mask dimensions



## Recommended FPC Dimensions



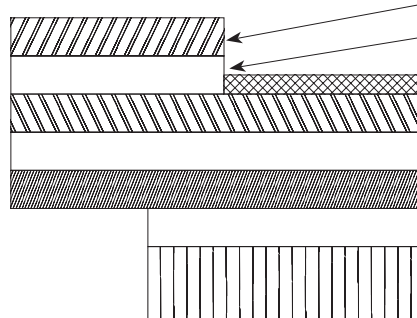
## Recommended FPC construction

Unit : mm

| Part Number          | CL No.         | Number of contacts | B    | C   | F    | G    | H     |
|----------------------|----------------|--------------------|------|-----|------|------|-------|
| FH43B-21S-0.2SHW(10) | —              | 21                 | 3.6  | 4   | 5.3  | 4.5  | 4.94  |
| FH43B-25S-0.2SHW(10) | —              | 25                 | 4.4  | 4.8 | 6.1  | 5.3  | 5.74  |
| FH43B-31S-0.2SHW(10) | —              | 31                 | 5.6  | 6   | 7.3  | 6.5  | 6.94  |
| FH43B-35S-0.2SHW(10) | 0580-2803-5-10 | 35                 | 6.4  | 6.8 | 8.1  | 7.3  | 7.74  |
| FH43B-41S-0.2SHW(10) | —              | 41                 | 7.6  | 8   | 9.3  | 8.5  | 8.94  |
| FH43B-45S-0.2SHW(10) | —              | 45                 | 8.4  | 8.8 | 10.1 | 9.3  | 9.74  |
| FH43B-51S-0.2SHW(10) | 0580-2806-3-10 | 51                 | 9.6  | 10  | 11.3 | 10.5 | 10.94 |
| FH43B-61S-0.2SHW(10) | 0580-2805-0-10 | 61                 | 11.6 | 12  | 13.3 | 12.5 | 12.94 |
| FH43B-71S-0.2SHW(10) | 0580-2807-6-10 | 71                 | 13.6 | 14  | 15.3 | 14.5 | 14.94 |
| FH43B-81S-0.2SHW(10) | —              | 81                 | 15.6 | 16  | 17.3 | 16.5 | 16.94 |

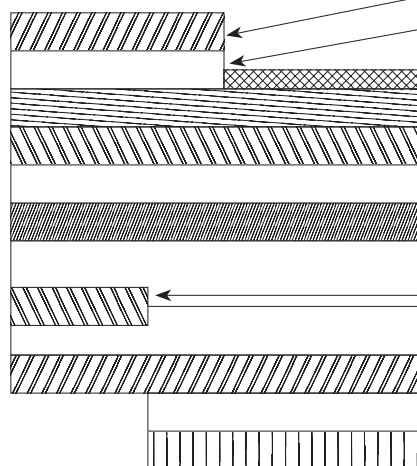
## ■FHB Series FPC

### 1. Using Single-sided FPC



| Material Name                   | Material  | Material Thickness (μm) |
|---------------------------------|---|-------------------------|
| Covering film layer             | Polyimide 1 mil thick.                                    | (25)                    |
| Cover adhesive                  |   | (25)                    |
| Surface treatment               | 0.2μm thick gold plated over 1 to 6μm nickel underplating | 4                       |
| Copper foil                     | Cu 1/3oz  | 12                      |
| Base adhesive                   | Thermosetting adhesive                                    | 10                      |
| Base film                       | Polyimide 1/2mil thick                                    | 15                      |
| Reinforcement material adhesive | Thermosetting adhesive                                    | 30                      |
| Stiffener                       | Polyimide 5 mil thick                                     | 125                     |
| Total                           |   | 194                     |

### 2. Using Double-sided FPC



| Material Name                   | Material  | Material Thickness (μm) |
|---------------------------------|---|-------------------------|
| Covering film layer             | Polyimide 1 mil thick.                                    | (25)                    |
| Cover adhesive                  |   | (25)                    |
| Surface treatment               | 0.2μm thick gold plated over 1 to 6μm nickel underplating | 4                       |
| Through-hole copper             | Cu  | 12                      |
| Copper foil                     | Cu 1/3oz  | 12                      |
| Base adhesive                   | Thermosetting adhesive                                    | —                       |
| Base film                       | Polyimide 1/2mil thick                                    | 13                      |
| Base adhesive                   | Thermosetting adhesive                                    | —                       |
| Copper foil                     | Cu 1/3oz  | (12)                    |
| Cover adhesive                  | Thermosetting adhesive                                    | 25                      |
| Covering film layer             | Polyimide 1/2 mil thick                                   | 13                      |
| Reinforcement material adhesive | Thermosetting adhesive                                    | 25                      |
| Stiffener                       | Polyimide 4 mil thick                                     | 100                     |
| Total                           |   | 204                     |

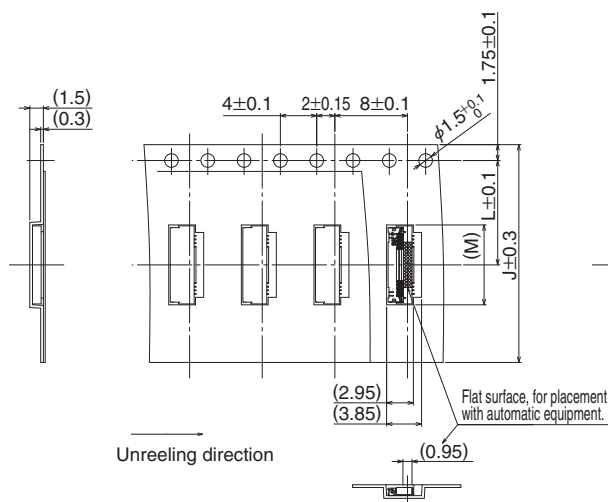
\* To prevent release of the FPC due to its bending, use of the double sided FPC with copper foil on the back side is NOT RECOMMENDED.

### 3. Precautions

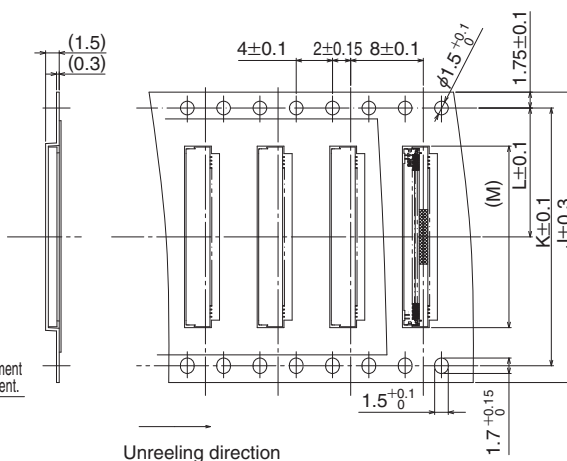
1. This specification is a recommendation for the construction of the FH43B Series FPC and FFC (t=0.2 ±0.02).
2. For details about the construction, please contact the FPC/FFC manufacturers.

## ■Packaging Specification

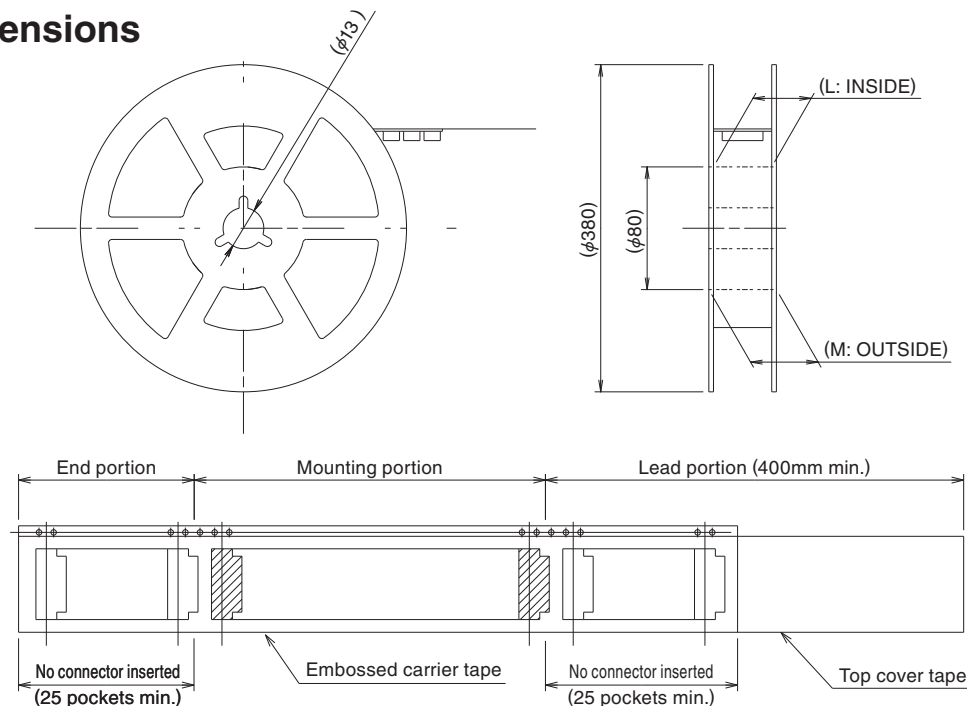
### ●Embossed Carrier Tape Dimensions (Tape width to 24mm max.)



### ●Embossed Carrier Tape Dimensions (Tape width to 32mm min.)



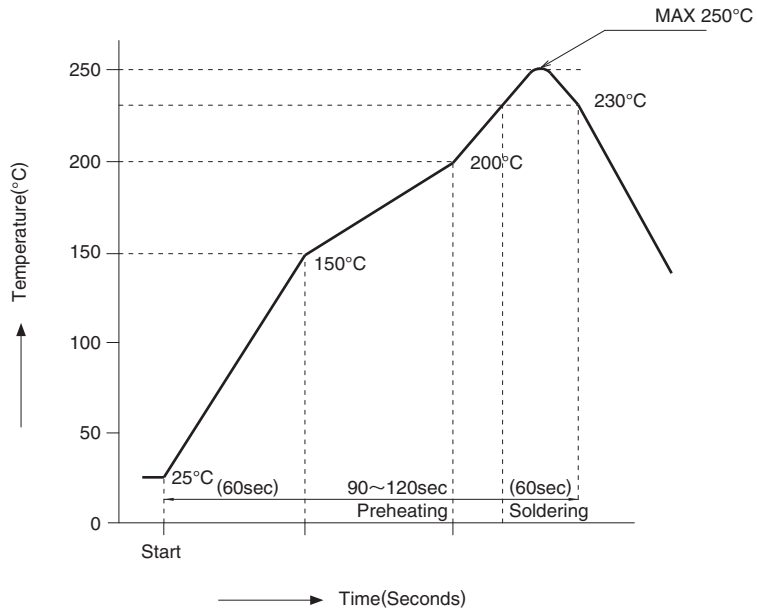
## ■Reel Dimensions



Unit : mm

| Part Number          | CL No.         | Number of contacts | J  | K    | L    | M    | N    | P    |
|----------------------|----------------|--------------------|----|------|------|------|------|------|
| FH43B-21S-0.2SHW(10) | —              | 21                 | 16 | —    | 7.5  | 6    | 17.4 | 21.4 |
| FH43B-25S-0.2SHW(10) | —              | 25                 | 16 | —    | 7.5  | 6.8  | 17.4 | 21.4 |
| FH43B-31S-0.2SHW(10) | —              | 31                 | 24 | —    | 11.5 | 8    | 25.4 | 29.4 |
| FH43B-35S-0.2SHW(10) | 0580-2803-5-10 | 35                 | 24 | —    | 11.5 | 8.8  | 25.4 | 29.4 |
| FH43B-41S-0.2SHW(10) | —              | 41                 | 24 | —    | 11.5 | 10   | 25.4 | 29.4 |
| FH43B-45S-0.2SHW(10) | —              | 45                 | 24 | —    | 11.5 | 10.8 | 25.4 | 29.4 |
| FH43B-51S-0.2SHW(10) | 0580-2806-3-10 | 51                 | 24 | —    | 11.5 | 12   | 25.4 | 29.4 |
| FH43B-61S-0.2SHW(10) | 0580-2805-0-10 | 61                 | 24 | —    | 11.5 | 14   | 25.4 | 29.4 |
| FH43B-71S-0.2SHW(10) | 0580-2807-6-10 | 71                 | 24 | —    | 11.5 | 16   | 25.4 | 29.4 |
| FH43B-81S-0.2SHW(10) | —              | 81                 | 32 | 28.4 | 14.2 | 18   | 33.4 | 37.4 |

## Temperature Profile



### 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 100mm×72.5mm×0.8mm thick

Land dimensions : 0.2mm×0.65mm, 0.2mm×0.82mm

Metal mask : 0.18×0.55, 0.18×0.68×0.1mm thick

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.

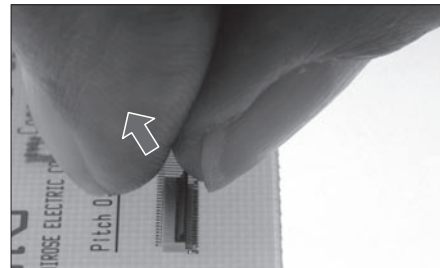


## ■Operation and Precautions

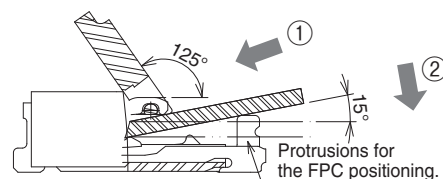
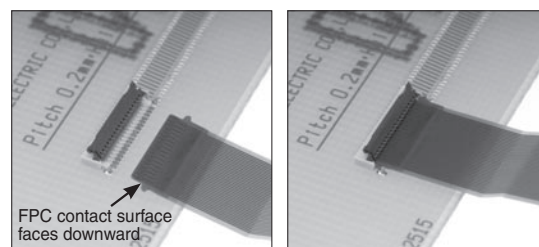
### Operation

#### 1. FPC insertion procedure. Connector installed on the board.

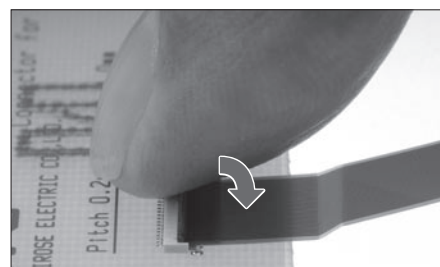
- ① Lift up the actuator.  
Use thumb or index finger.



- ② Insert the FPC (contact surfaces facing down) at angle of approximately 10° to the board surface ①, making sure that the FPC positioning tabs clear the protrusions on both sides of the connector. Lower the FPC down ②, parallel to the board surface.

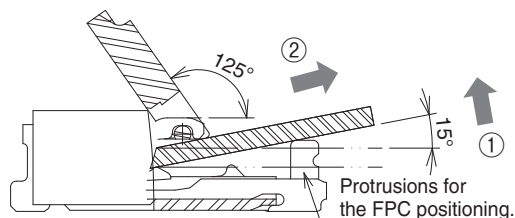
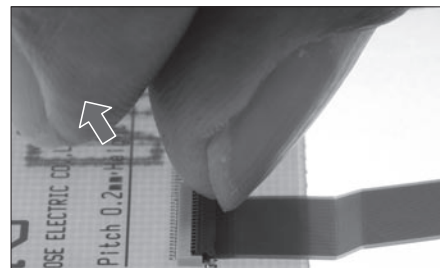


- ③ Rotate down the actuator until firmly closed.



#### 2. FPC removal

- ① Lift up the actuator  
Pull up the FPC at an angle of approximately 10° ① and then withdrew it from the connector ②.





## Precautions

Exercise care when handling connectors. Follow recommendations given below.

### [ Precautions when mounting connectors on the PCB ]

#### ◆Handling before mounting on PCB

Insertion of the FPC or operation of the actuator prior to mounting on the PCB is NOT RECOMMENDED.

#### ◆PC board warpage

Minimize the warpage as much as possible. The connector is straight within 0.1 mm max. Make sure that the mounting area flatness can accept the connector terminals without causing any failure of the solder joints.

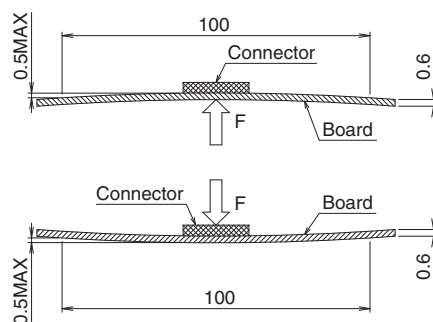
#### ◆When braking the large PC board into individual boards exercise care NOT to damage the installed connectors.

#### ◆When attaching the boards or other components with the screws make sure that any stresses will NOT cause board deflections affecting the mounting areas of the connector.

#### ◆Bending of the board

For a board width of 100 mm, bending of the board must be 0.5 mm max. (Ref to Fig. 1)

Fig. 1

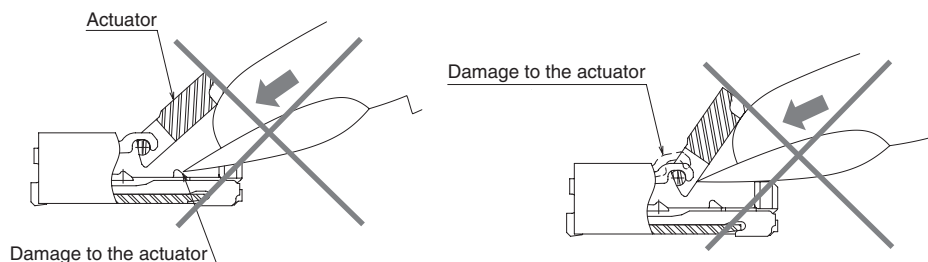


### [ Precautions during FPC insertion and mating ]

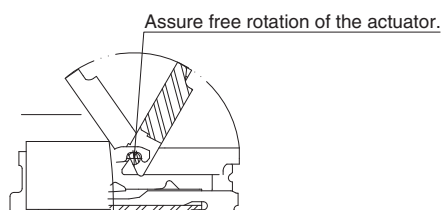
Pay attention to the following points when inserting FPC.

#### ◆Actuator operation

- 1 Do not apply excessive force when opening the actuator prior to FPC insertion. When opening make sure that the force is applied only to the actuator itself, avoiding touching of the contacts.

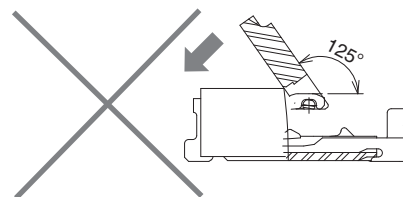


#### ② Axis of rotation

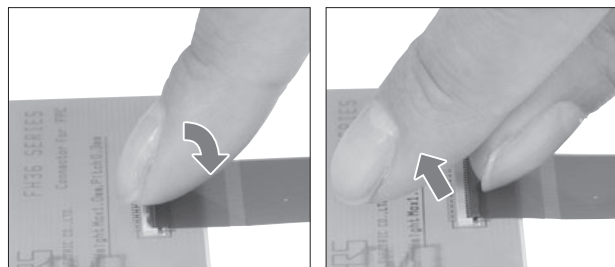


## Precautions

- ③ The actuator will rotate 125°C Do not apply force to rotate further.



- ④ When opening or closing the actuator, do so at the center section.



- ⑤ Do not grasp or lift the actuator (Fig. 3) nor insert the nail from the back of it (Fig. 4).

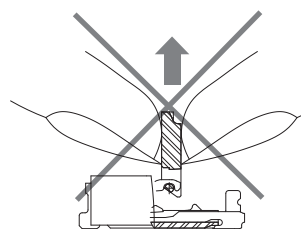


Fig. 3

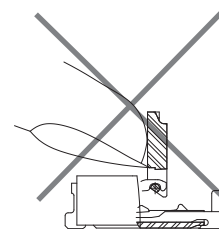
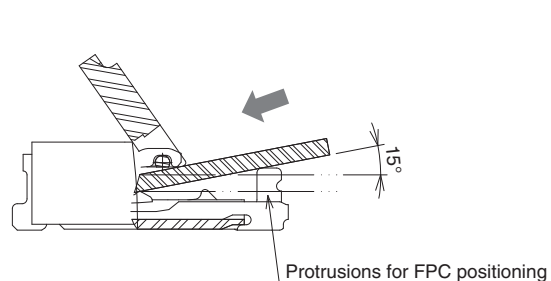


Fig. 4

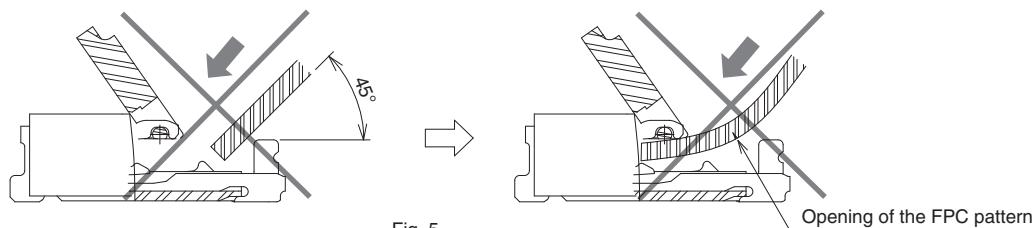
### ◆FPC insertion

Do not insert the FPC at any high angle from above.



## Precautions

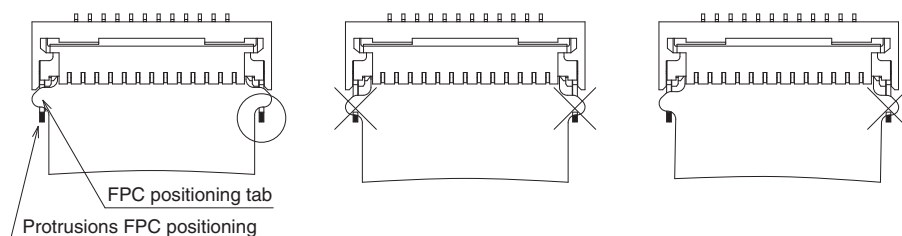
As illustrated (Fig. 5) angle insertion may cause electrical discontinuity when the FPC is deflected in use.



- To avert insertion of the FPC at an angle, consideration should be given to securing enough insertion space when designing the board lay-out. Insertion will be difficult when the FPC is too short.
- Contact FPC manufacturer for information about the bending specifications.

### ◆Verification of the fully closed actuator

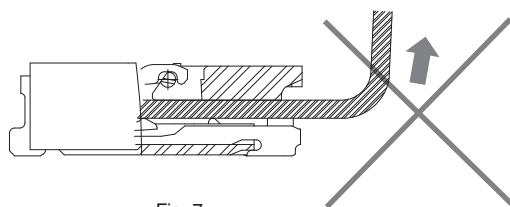
The FPC should be fully inserted, with its positioning tabs fully behind the protrusions on both sides of the connector's insertion slot (Fig. 6).



### [ Routing of the FPC (FPC fully inserted / actuator closed) ]

#### ◆Do not apply any pull or upward-directed force to the FPC.

Do not make any sharp bends of FPC close to the immediate exit from the connector (Fig. 7)

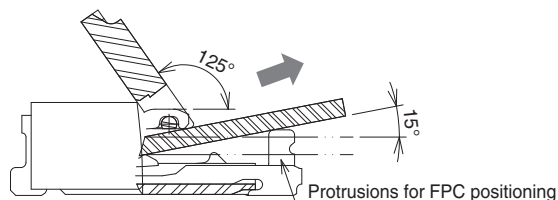
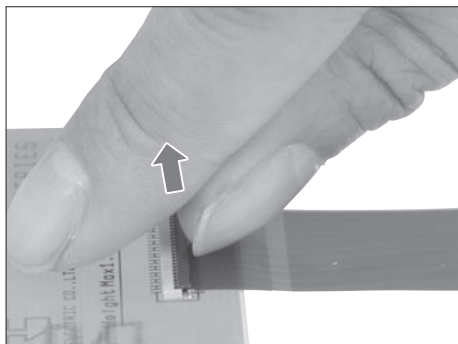


## Precautions

### [ Removing of the FPC ]

#### ◆Rotate the actuator to the fully open position (max. angle of 125°C)

Lift the FPC approximately 10°C (making sure that the positioning tabs clear the protrusions on both sides) and carefully withdraw it from the connector.



### [ Other Precautions ]

#### ◆Hand Soldering Precautions

When hand soldering:

- ① Do not perform reflow or hand soldering with the FPC inserted in the connector.
- ② Do not apply excessive heat or touch the soldering iron anywhere other than the connector leads.
- ③ Do not use excessive amount of solder or flux compounds.

Operation of the actuator or contacts may be affected by excessive amounts of solder or flux compounds.



## HIROSE ELECTRIC CO.,LTD.

5-23, OSAKI 5-CHOME, SHINAGAWA-KU, TOKYO 141-8587, JAPAN  
PHONE: 81-3-3491-5300, FAX: 81-3-3495-5230  
<http://www.hirose.com>  
<http://www.hirose-connectors.com>

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[FH43B-21S-0.2SHW\(10\)](#) [FH43B-35S-0.2SHW\(10\)](#) [FH43B-51S-0.2SHW\(10\)](#) [FH43B-71S-0.2SHW\(10\)](#) [FH43B-45S-0.2SHW\(10\)](#)