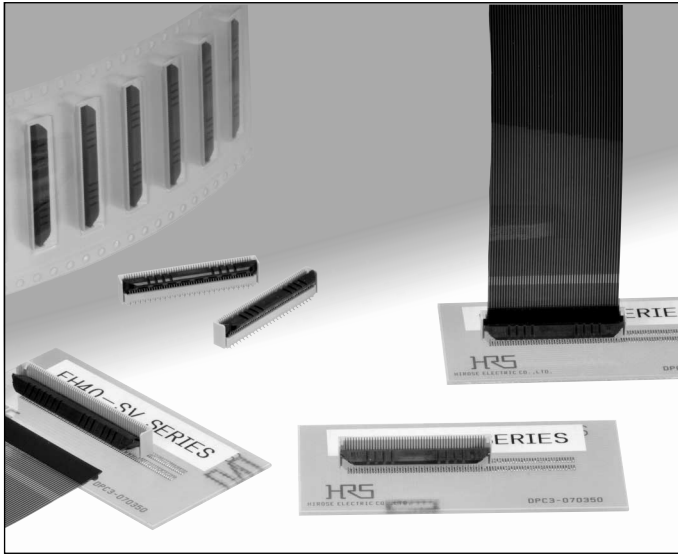
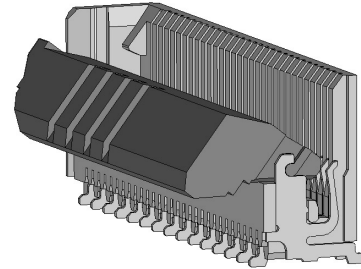


# 0.5 mm Pitch, 5.8 mm above the board, vertical connector for FPC

## FH40 Series



### ●Strong actuator construction



### ■Features

#### 1. Reduction in connection man-hours (a 30% reduction compared to our conventional item)

Our unique actuator form enables the completion of both FPC insertion ~ joint in the same motion.

#### 2. Prevention of half and diagonal joints

The side catcher for FPC positioning ensures accurate FPC insertion.

#### 3. Durable structure and no lost actuator

The unique terminal form means the actuator is retained, even under rough operation conditions.

#### 4. One-finger operation of the actuator

Proven (in several other Hirose's connectors!) Flip-Lock rotating actuator assures reliable mechanical and electrical connection with FPC, confirming it with a definite tactile feel.

#### 5. Accepts standard FPC thickness

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

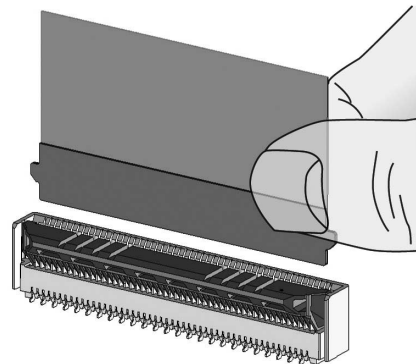
#### 6. Board placement with automatic equipment

Flat upper surface and tape and reel packaging facilitate vacuum pick-up and placement.  
Standard reel packaging contains 1,000 connectors.

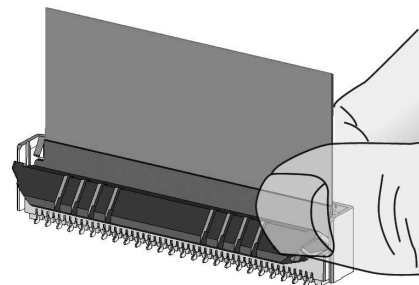
#### 7. Halogen-free \*

\*As defined by IEC61249-2-21  
Br-900ppm maximum, Cl-900ppm maximum,  
Cl + Br combined-1,500ppm maximum

### ●Simple FPC insertion



### ●Lock



## ■ Specifications

Ratings	Current rating: 0.5A DC(Note 1)	Operating Temperature Range: -40 to +85°C (Note 2)	Storage Temperature Range: -10 to +50°C (Note 2)
	Voltage rating: 50 Vrms AC	Operating Humidity Range: Relative humidity 90% max. (No condensation)	Storage Humidity Range: Relative humidity 90% max. (No condensation)

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

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

Note 1: When passing the current through all of the contacts, use 70% of the rated current.

Note 2: Includes temperature rise caused by current flow.

Note 3: 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 4: Information contained in this catalog represents general requirements for this Series.

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

## ■ Material

Part	Material	Finish	Remarks
Insulator	LCP	Color : Beige	UL94V-0
	LCP	Color : Black	
Contact	Phosphor bronze	Gold plated	————

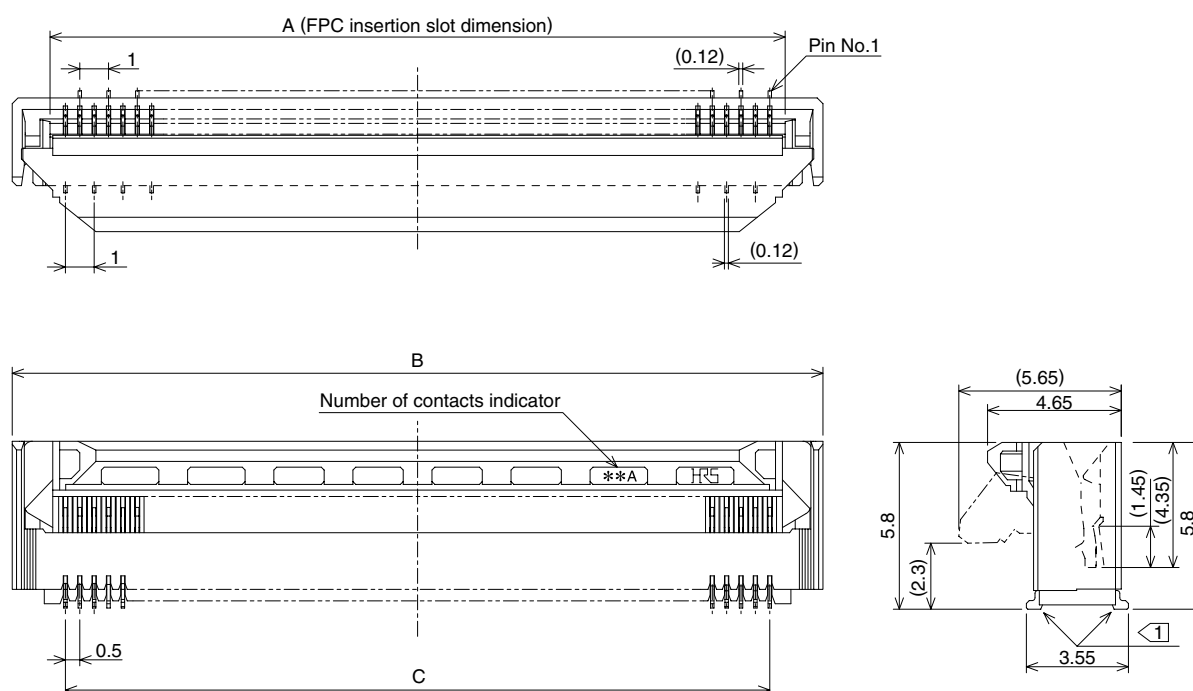
## ■ Ordering information

**FH 40 - 50S - 0.5 SV**

①    ②                    ③                    ④                    ⑤

① Series Name	: FH
② Series No.	: 40
③ Number of positions	: 10 to 80
④ Contact pitch	: 0.5mm
⑤ SV	: SMT vertical mounting type

## ■ Connector Dimensions



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

Note 2 : Packaged on tape and reel only. Check packaging specification.

Note 3 : Slight variations in color of the plastic compounds do not affect form, fit or function of the connector.

Note 4 : After reflow, the terminal plating may change color, however this does not represent a quality issue.

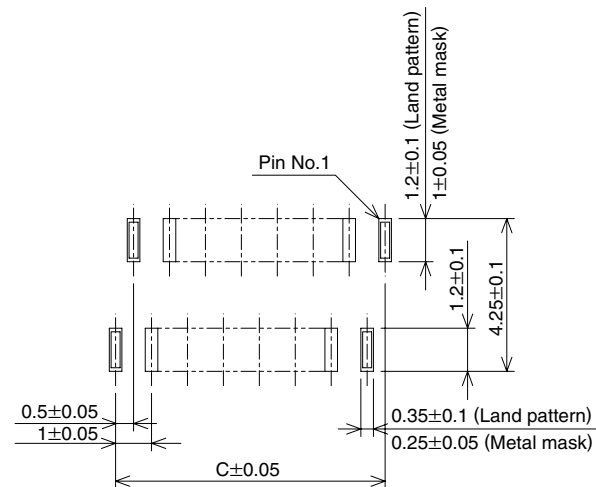
Unit:mm

Part Number	CL No.	Number of Contacts	A	B	C
FH40-10S-0.5SV	580-2104-6	10	5.57	8.2	4.5
FH40-20S-0.5SV	580-2105-9	20	10.57	13.2	9.5
FH40-24S-0.5SV	580-2106-1	24	12.57	15.2	11.5
FH40-30S-0.5SV	580-2108-7	30	15.57	18.2	14.5
FH40-40S-0.5SV	580-2107-4	40	20.57	23.2	19.5
FH40-45S-0.5SV	580-2101-8	45	23.07	25.7	22
FH40-50S-0.5SV	580-2100-5	50	25.57	28.2	24.5
FH40-60S-0.5SV	580-2109-0	60	30.57	33.2	29.5
FH40-64S-0.5SV	580-2102-0	64	32.57	35.2	31.5
FH40-80S-0.5SV	580-2103-3	80	40.57	43.2	39.5

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

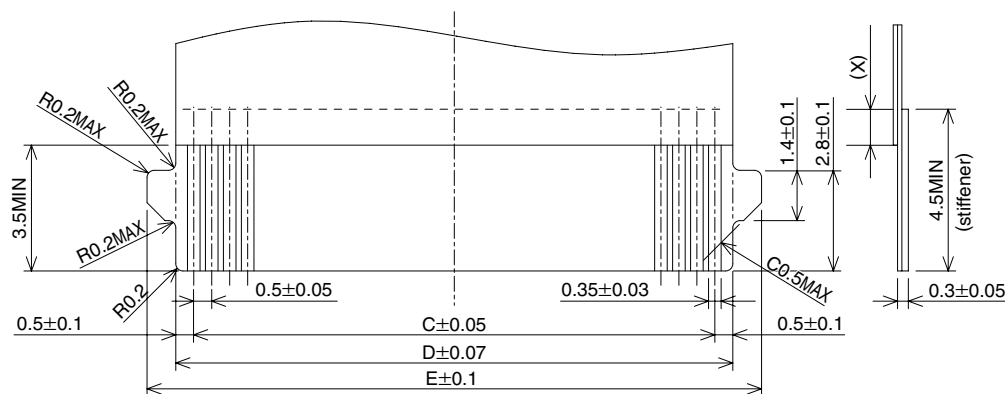
Order by number of reels.

## Recommended PCB mounting pattern and metal mask dimensions



Recommended metal mask thickness :  $t=0.15$

## Recommended FPC Dimensions



Note 1 : Stiffener dimension should be 3.5mm min., and X dimension should be 0.5mm for improved flexibility of FPC.

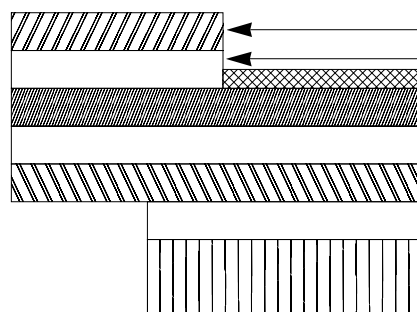
Unit:mm

Part Number	CL No.	Number of Contacts	C	D	E
FH40-10S-0.5SV	580-2104-6	10	4.5	5.5	7.1
FH40-20S-0.5SV	580-2105-9	20	9.5	10.5	12.1
FH40-24S-0.5SV	580-2106-1	24	11.5	12.5	14.1
FH40-30S-0.5SV	580-2108-7	30	14.5	15.5	17.1
FH40-40S-0.5SV	580-2107-4	40	19.5	20.5	22.1
FH40-45S-0.5SV	580-2101-8	45	22	23	24.6
FH40-50S-0.5SV	580-2100-5	50	24.5	25.5	27.1
FH40-60S-0.5SV	580-2109-0	60	29.5	30.5	32.1
FH40-64S-0.5SV	580-2102-0	64	31.5	32.5	34.1
FH40-80S-0.5SV	580-2103-3	80	39.5	40.5	42.1

## ■ Recommended FPC construction

### 1. Using Single-sided FPC

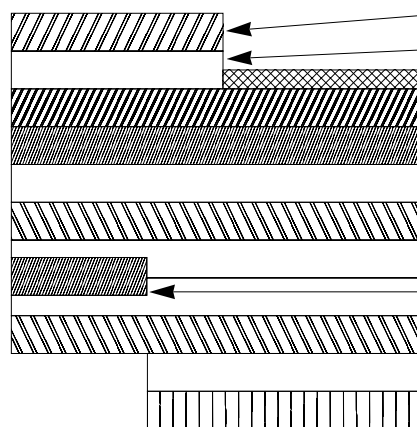
### FPC : Flexible Printed Circuit



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 5μm 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	40
Stiffener	Polyimide 7 mil thick	175
Total		303

### 2. Using Double-sided FPC

### FPC : Flexible Printed Circuit



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 5μm 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

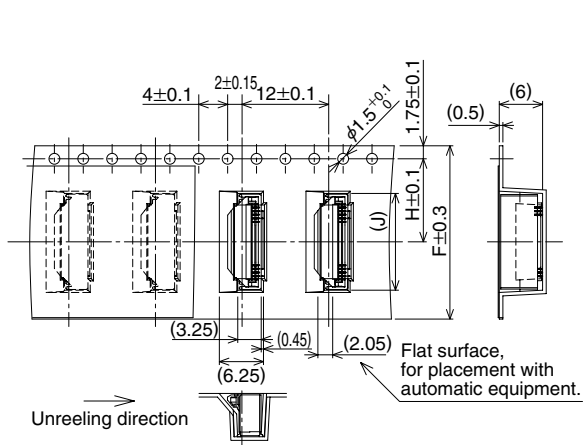
\* To prevent release of the FPC due to its bending, use of the double sided FPC with copper foil on the back side is NOT RECOMMENDED.

### 3. Precautions

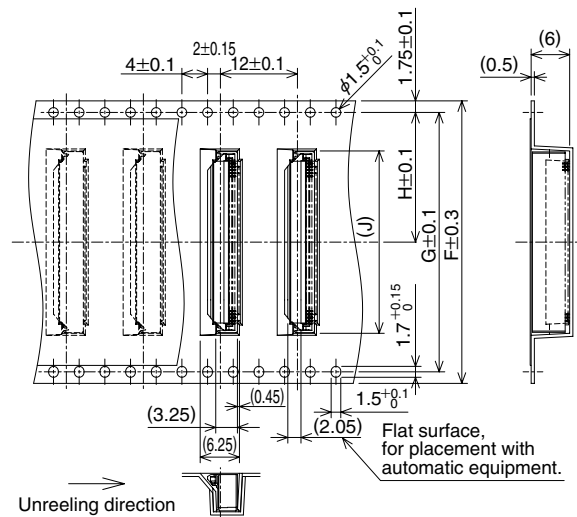
- 1: This specification is a recommendation for the construction of the FH40 Series FPC (t=0.3±0.05).
- 2: For details about the construction, please contact the FPC manufacturers.

## ■ Packaging Specification

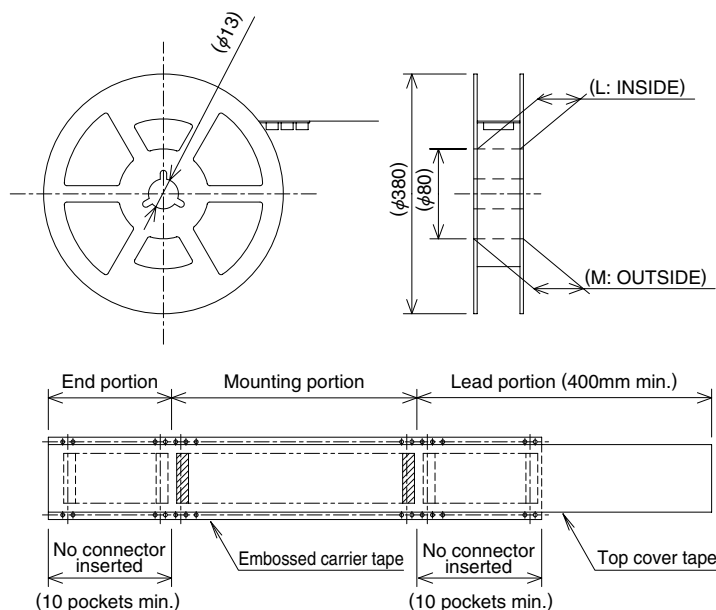
### ● Embossed Carrier Tape Dimensions (Tape width to 24mm max.)



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



### ● Reel Dimensions

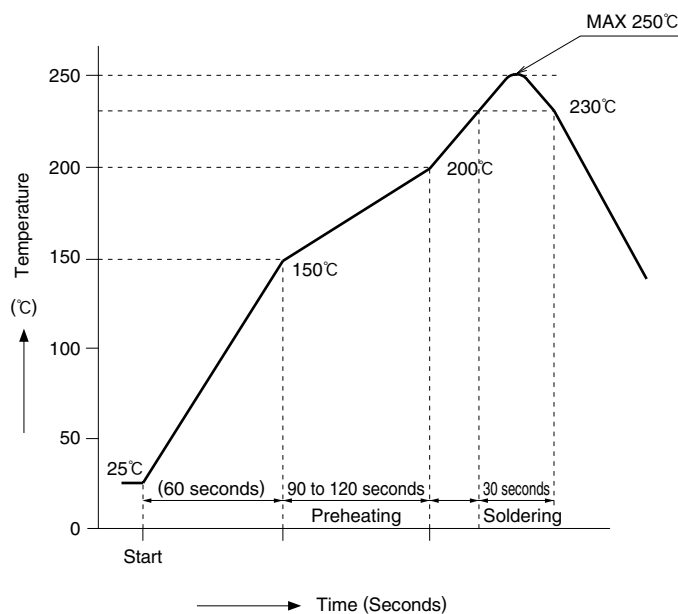


Unit:mm

Part Number	CL No.	Number of Contacts	F	G	H	J	K	L
FH40-10S-0.5SV	580-2104-6	10	16	—	7.5	8.4	17.4	21.4
FH40-20S-0.5SV	580-2105-9	20	24	—	11.5	13.4	25.4	29.4
FH40-24S-0.5SV	580-2106-1	24	24	—	11.5	15.4	25.4	29.4
FH40-30S-0.5SV	580-2108-7	30	32	28.4	14.2	18.4	33.4	37.4
FH40-40S-0.5SV	580-2107-4	40	44	40.4	20.2	23.4	45.4	49.4
FH40-45S-0.5SV	580-2101-8	45	44	40.4	20.2	25.9	45.4	49.4
FH40-50S-0.5SV	580-2100-5	50	44	40.4	20.2	28.4	45.4	49.4
FH40-60S-0.5SV	580-2109-0	60	56	52.4	26.2	33.4	57.4	61.4
FH40-64S-0.5SV	580-2102-0	64	56	52.4	26.2	35.4	57.4	61.4
FH40-80S-0.5SV	580-2103-3	80	56	52.4	26.2	43.4	57.4	61.4

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

## ■ Temperature Profile



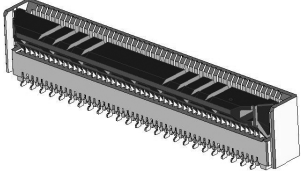
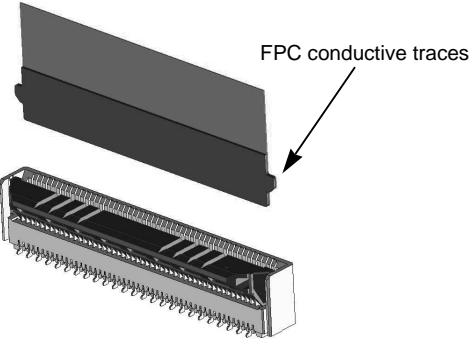
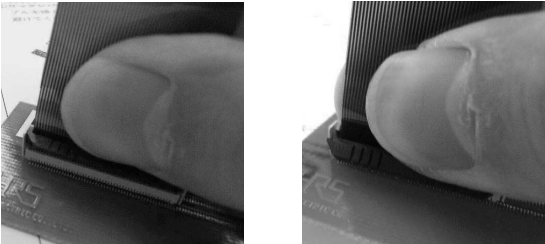
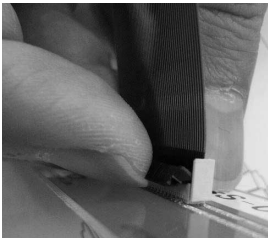
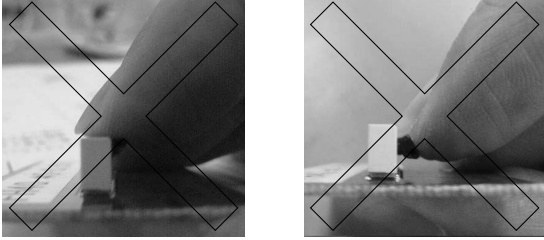
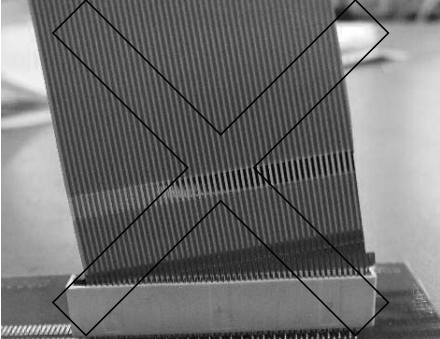
### HRS test conditions

Solder method	:Reflow, IR/hot air
Environment:	:Room air
Solder composition	:Paste, 96.5%Sn/3%Ag/0.5%Cu (Senju Metal Industry, Co., Ltd.'s Part Number: M705-GRN360-K2-V)
Test board	:Glass epoxy 30mm×66mm×0.8mm thick
Land dimensions	:0.35mm×1.2mm
Metal mask	:0.25×1.0×0.15mm 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	Precautions
<p><b>1. FPC Termination procedure.</b></p> <p>① Verify that the actuator is positioned upright. If the actuator has rotated to the side, carefully rotate it upright.</p>  <p>② Insert the FPC vertically in the connector slot assuring that the conductive traces of the FPC are facing away from the actuator.</p>  <p>③ Press down the actuator in the direction shown.</p>  <p><b>2. FPC Removal</b></p> <p>① Rotate the actuator upward and withdraw the FPC.</p> 	<p>① Avoid forcing the actuator up or down without the FPC inserted.</p>  <p>② Application of excessive force to the inserted FPC may cause damage to connector and may affect the reliability of electrical connection.</p>  <p>Do not insert the FPC diagonally. Doing so will result in the corners of the FPC catching on the contacts and will cause deformation of the contacts.</p>



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