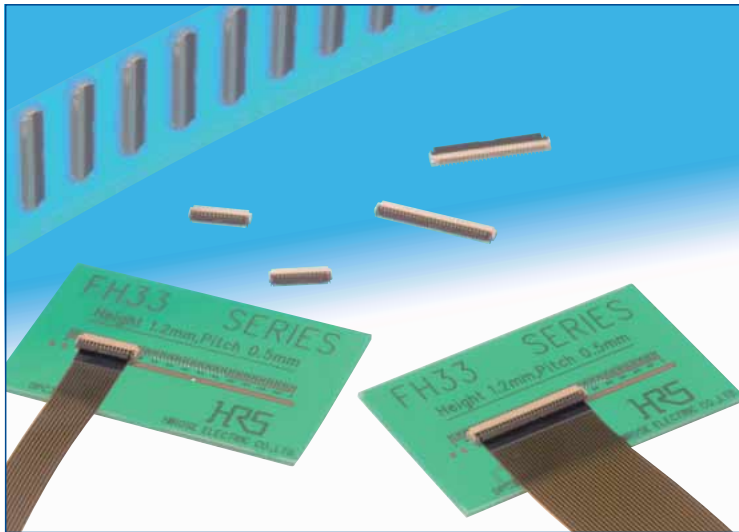


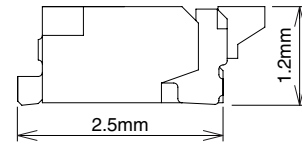
0.5 mm Pitch, 1.2 mm above the board, Flexible Printed Circuit & Flexible Flat Cable ZIF Connectors

FH33 Series

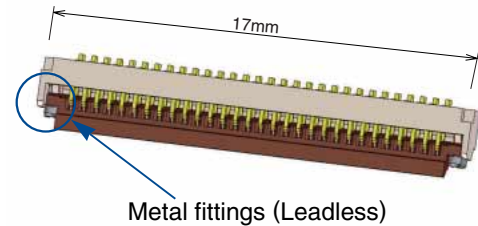


Increased FPC retention force

● Small size



[30 pos.]



■ Features

1. Low-profile, small PCB mounting area

Narrow width of only 2.5 mm reduced the board footprint by approximately 17% to 57%, as compared to several similar FH Series HRS connectors.

2. Increased FPC/FFC retention force

- In the horizontal direction: Approximately 2.0 times (compared to similar FH Series HRS connectors)
- In the vertical direction: Approximately 1.7 times (compared to similar FH Series HRS connectors)

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

No exposed contacts on the bottom of the connector.

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/FFC, confirming it with a definite tactile feel.

5. Easy FPC/FFC insertion

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

6. Accepts 0.3 mm thick FPC, FFC

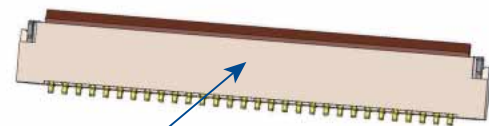
Increased rigidity 0.3 mm thick FPC / FFC is reliably inserted and terminated.

7. Board placement with automatic equipment

Flat top surface and packaging on the tape-and-reel allows use of vacuum nozzles.

Standard reel contains 5,000 connectors.

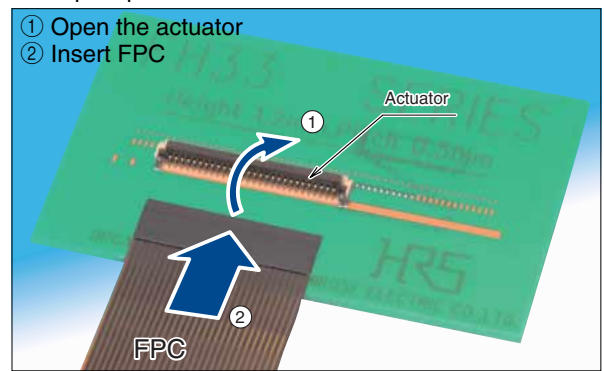
● Can be mounted over conductive traces.



No exposed contacts on the bottom of the connector

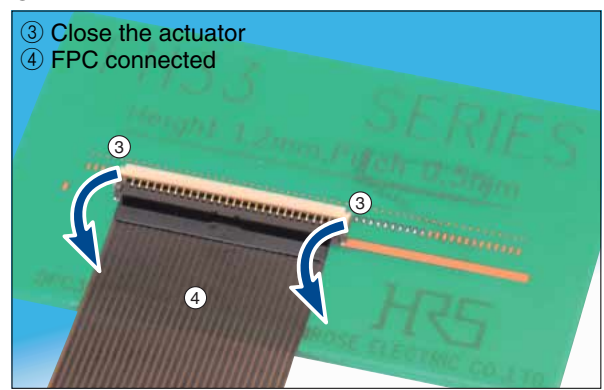
● Simple operation

- ① Open the actuator
- ② Insert FPC



● Locked condition

- ③ Close the actuator
- ④ FPC connected



■ Applications

Notebook computers, digital cameras, LCD connections, plasma displays, Digital Video Cameras, Portable Digital Assistants and other compact devices requiring Flexible Printed Circuit Connections using high reliability ZIF connectors.

FH33 Series 0.5 mm Pitch, 1.2 mm above the board, Flexible Printed Circuit & Flexible Flat Cable ZIP Connectors

Product Specifications

Ratings	Current rating	0.5 A	Operating temperature range Operating humidity range	-55 °C to +85°C (Note 1) Relative humidity 90% max. (No condensation)	Storage temperature range Storage humidity range	-10°C to +50°C (Note 2) Relative humidity 90% max. (No condensation)
	Voltage rating	50 V AC				

Recommended FPC	Thickness = 0.3 ± 0.05mm gold plated (under 30 pos.), 0.3 ± 0.03mm gold plated (over 31 pos.)
-----------------	---

Item	Specification	Conditions
1. Insulation resistance	500 MΩ min.	100 V DC
2. Withstanding voltage	No flashover or insulation breakdown.	150 V AC /one minute
3. Contact resistance	50 mΩ max. * Including FPC conductor resistance	1 mA
4. Durability (insertion/ withdrawal)	Contact resistance: 50 mΩ max. No damage, cracks, or parts dislocation.	20 cycles
5. Vibration	No electrical discontinuity of 1 μs or more. 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 directions.
6. Shock		Acceleration of 981 m/s ² , 6 ms duration, sine half-wave waveform, 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		Temperature : -55°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 ± 10°C for 5 seconds

Note 1: Includes temperature rise caused by current flow.

Note 2: The term "storage" refers to products stored for long period of time prior to mounting and use. Operating Temperature Range and Humidity range covers non- conducting condition of installed connectors in storage, shipment or during transportation.

Materials

Part	Material	Finish	Remarks
Insulator	Polyamide	Color : Beige	UL94V-0
Actuator		Color : Dark brown	
Contacts	Phosphor bronze	Gold flash plated	_____
Metal fittings		Pure tin reflow plated	_____

Ordering information

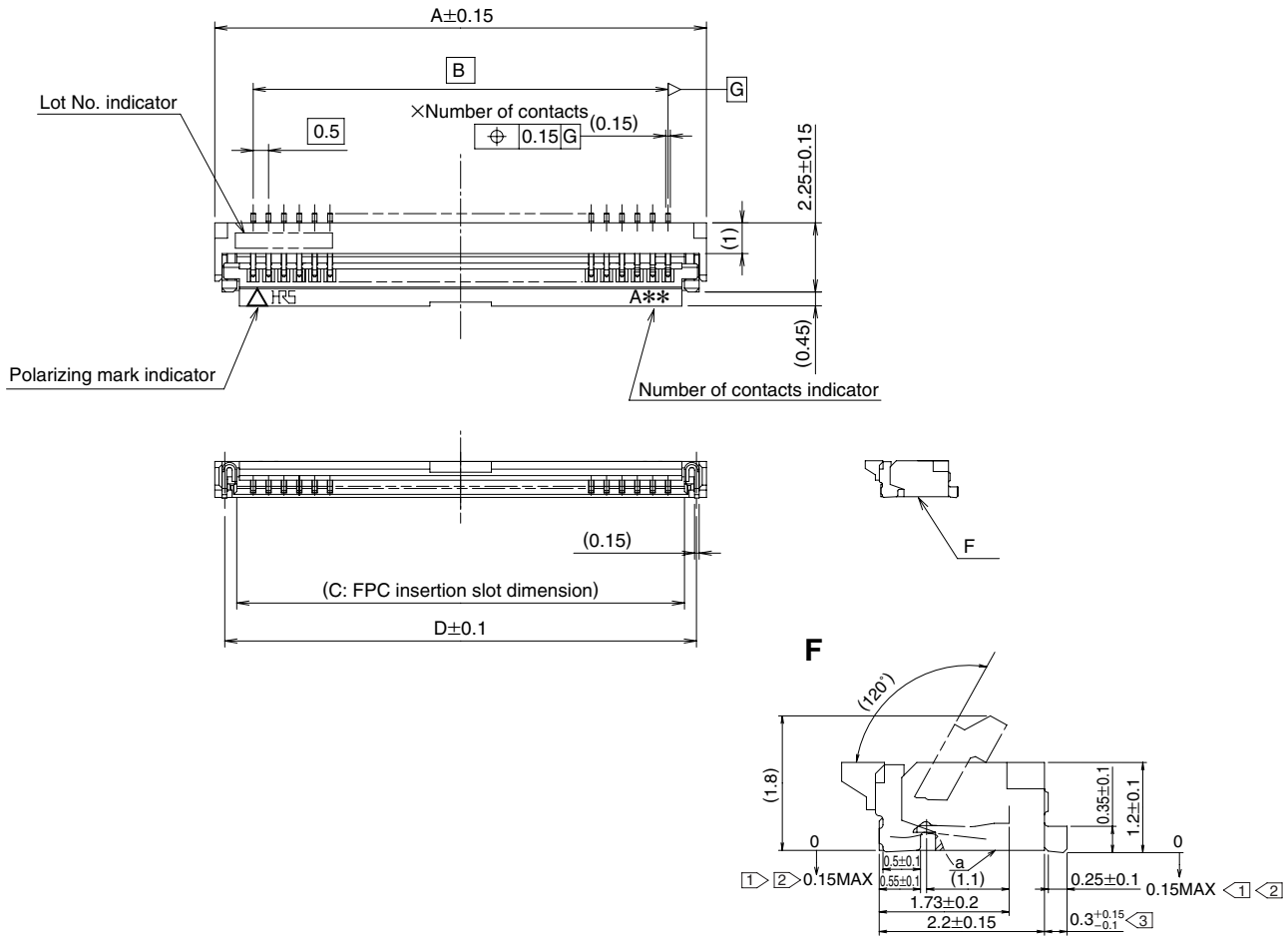
FH33 - 28S - 0.5 SH (10)

① ② ③ ④ ⑤

① Series name: FH33	④ Termination type SH : SMT horizontal
② No. of contacts Number of contacts: 6, 9, 10, 12, 14, 19, 20, 26, 28, 30, 32, 36, 40, 45	
③ Contact pitch: 0.5 mm	⑤ Blank : Gold flash plated (RoSH compliant) (10) : Nickel barrier gold flash plated (RoHS compliant)

FH33 Series 0.5 mm Pitch, 1.2 mm above the board, Flexible Printed Circuit & Flexible Flat Cable ZIP Connectors

Connector Dimensions



- Notes
- ① The coplanarity of each terminal lead is within 0.1 max.
 - ② The contact terminal lead position indicates the dimension from the bottom a surface of the insulator body.
 - ③ Difference of each terminal lead is within 0.1 max.
 - 4 Slight variations in color of the plastic compounds do not affect form, fit or function of the connector.

Unit: mm

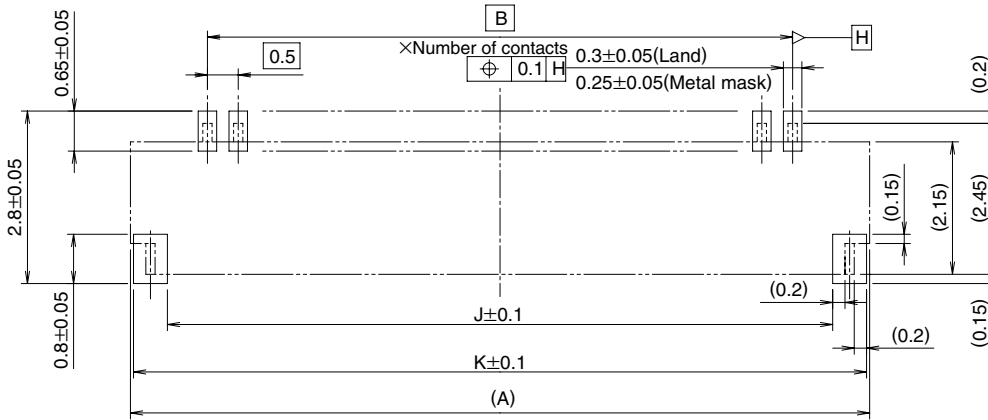
Part Number	CL No.	Number of Contacts	A	B	C	D	RoHS
FH33- 6S-0.5SH (**)	580-1301-1-**-	6	5	2.5	3.57	4.35	YES (Note 1)
FH33- 9S-0.5SH (**)	580-1303-7-**-	9	6.5	4	5.07	5.85	
FH33-10S-0.5SH (**)	580-1304-0-**-	10	7	4.5	5.57	6.35	
FH33-12S-0.5SH (**)	580-1302-4-**-	12	8	5.5	6.57	7.35	
FH33-14S-0.5SH (**)	580-1305-2-**-	14	9	6.5	7.57	8.35	
FH33-19S-0.5SH (**)	580-1307-8-**-	19	11.5	9	10.07	10.85	
FH33-20S-0.5SH (**)	580-1317-1-**-	20	12	9.5	10.57	11.35	
FH33-26S-0.5SH (**)	580-1306-5-**-	26	15	12.5	13.57	14.35	
FH33-28S-0.5SH (**)	580-1300-9-**-	28	16	13.5	14.57	15.35	
FH33-30S-0.5SH (**)	580-1312-8-**-	30	17	14.5	15.57	16.35	
FH33-32S-0.5SH (**)	580-1310-2-**-	32	18	15.5	16.57	17.35	
FH33-36S-0.5SH (**)	580-1311-5-**-	36	20	17.5	18.57	19.35	
FH33-40S-0.5SH (**)	580-1308-0-**-	40	22	19.5	20.57	21.35	
FH33-45S-0.5SH (**)	580-1316-9-**-	45	24.5	22	23.07	23.85	

Note 1: (**): Plating specification. Refer to ordering information.

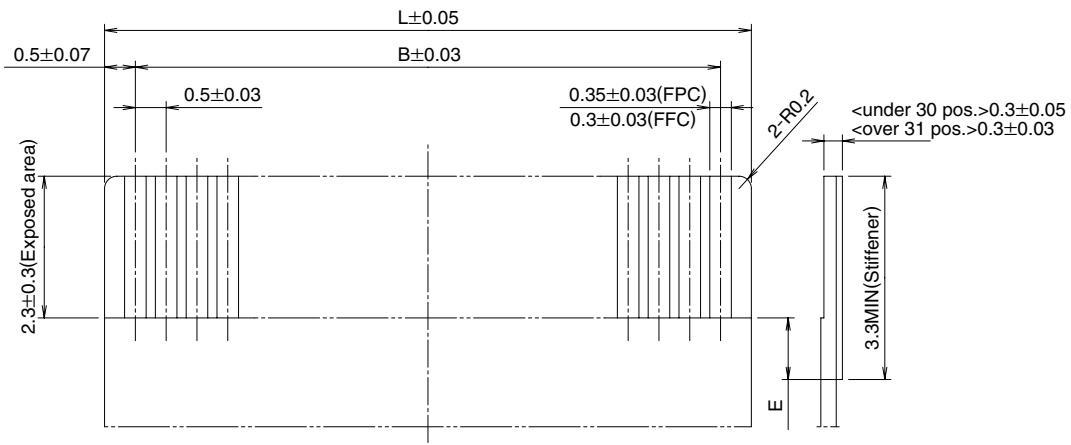
Note 2: Tape-and-reel packaging (5,000 pieces/reel).

Order by number of reels.

◆ Recommended PCB mounting pattern and metal mask dimensions



◆ Recommended FPC dimensions



Note 1: Polyimide and a thermally hardened adhesive is recommended as the materials for the stiffener.

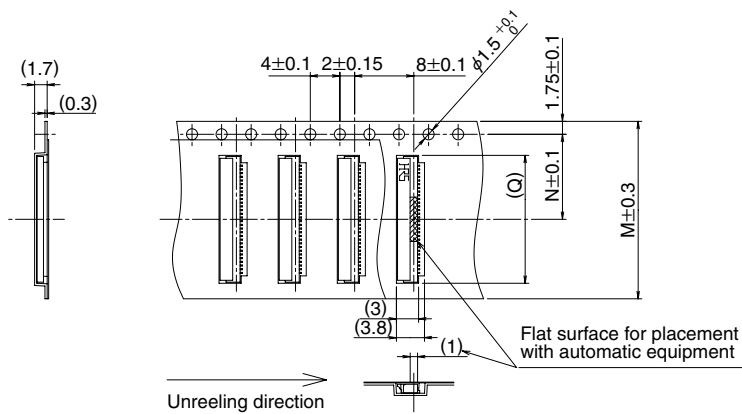
Note 2: If the stiffener is less than 3.3 mm, E dimension must be 0.5 mm min.

Unit: mm

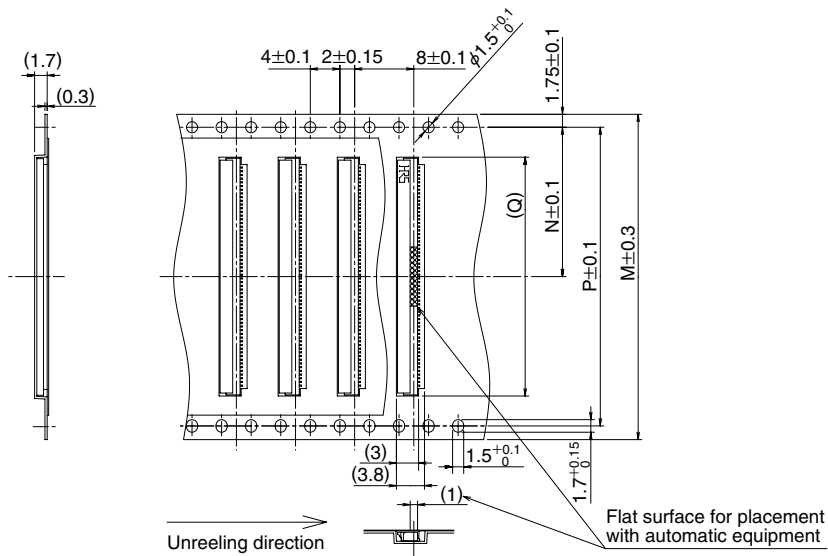
Part Number	CL No.	Number of Contacts	A	B	J	K	L
FH33- 6S-0.5SH (**)	580-1301-1-**-	6	5	2.5	3.8	4.9	3.5
FH33- 9S-0.5SH (**)	580-1303-7-**-	9	6.5	4	5.3	6.4	5
FH33-10S-0.5SH (**)	580-1304-0-**-	10	7	4.5	5.8	6.9	5.5
FH33-12S-0.5SH (**)	580-1302-4-**-	12	8	5.5	6.8	7.9	6.5
FH33-14S-0.5SH (**)	580-1305-2-**-	14	9	6.5	7.8	8.9	7.5
FH33-19S-0.5SH (**)	580-1307-8-**-	19	11.5	9	10.3	11.4	10
FH33-20S-0.5SH (**)	580-1317-1-**-	20	12	9.5	10.8	11.9	10.5
FH33-26S-0.5SH (**)	580-1306-5-**-	26	15	12.5	13.8	14.9	13.5
FH33-28S-0.5SH (**)	580-1300-9-**-	28	16	13.5	14.8	15.9	14.5
FH33-30S-0.5SH (**)	580-1312-8-**-	30	17	14.5	15.8	16.9	15.5
FH33-32S-0.5SH (**)	580-1310-2-**-	32	18	15.5	16.8	17.9	16.5
FH33-36S-0.5SH (**)	580-1311-5-**-	36	20	17.5	18.8	19.9	18.5
FH33-40S-0.5SH (**)	580-1308-0-**-	40	22	19.5	20.8	21.9	20.5
FH33-45S-0.5SH (**)	580-1316-9-**-	45	24.5	22	23.3	24.4	23

◆ Packaging Specifications

● Embossed Carrier Tape Dimensions (Tape width up to 24mm)



● Embossed Carrier Tape Dimensions (Tape width 32mm and over)

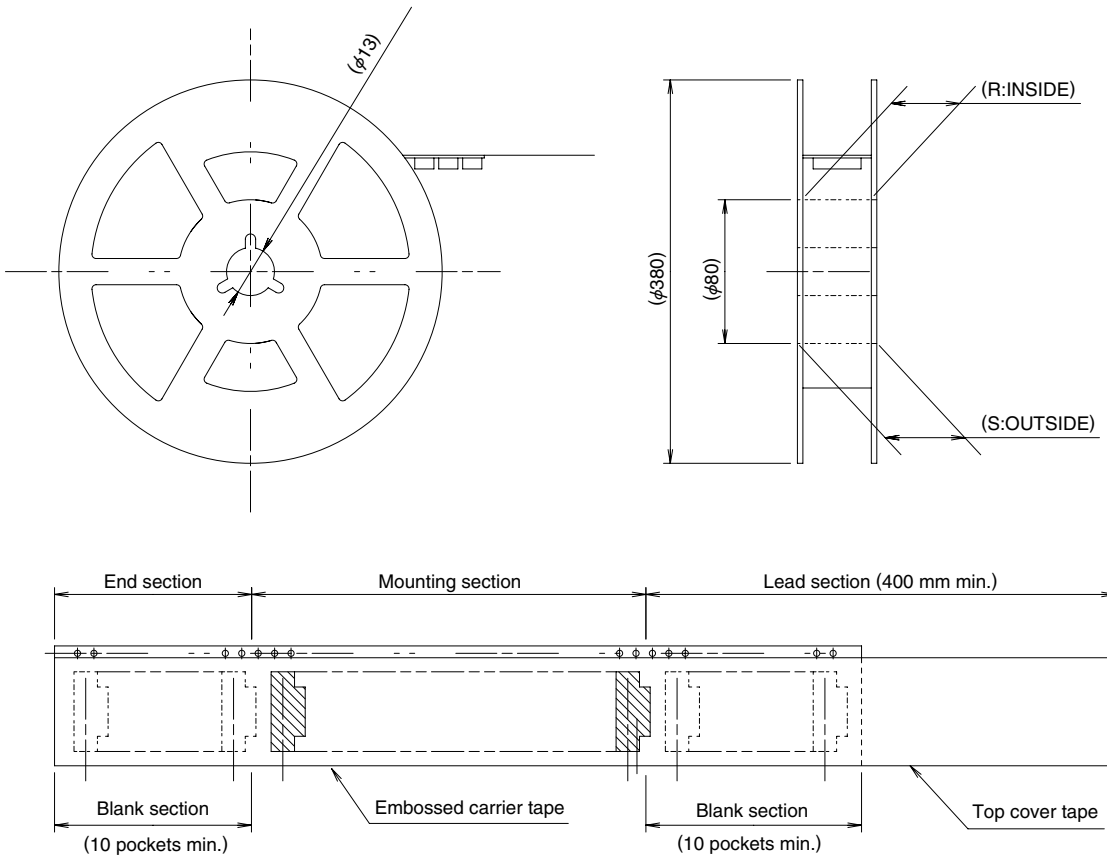


Unit: mm

Part Number	CL No.	Number of Contacts	M	N	P	Q	R	S
FH33- 6S-0.5SH (**)	580-1301-1-**	6	16	7.5	—	5.3	17.4	21.4
FH33- 9S-0.5SH (**)	580-1303-7-**	9	16	7.5	—	6.8	17.4	21.4
FH33-10S-0.5SH (**)	580-1304-0-**	10	16	7.5	—	7.3	17.4	21.4
FH33-12S-0.5SH (**)	580-1302-4-**	12	16	7.5	—	8.3	17.4	21.4
FH33-14S-0.5SH (**)	580-1305-2-**	14	16	7.5	—	9.3	17.4	21.4
FH33-19S-0.5SH (**)	580-1307-8-**	19	24	11.5	—	11.8	25.4	29.4
FH33-20S-0.5SH (**)	580-1317-1-**	20	24	11.5	—	12.3	25.4	29.4
FH33-26S-0.5SH (**)	580-1306-5-**	26	24	11.5	—	15.3	25.4	29.4
FH33-28S-0.5SH (**)	580-1300-9-**	28	24	11.5	—	16.3	25.4	29.4
FH33-30S-0.5SH (**)	580-1312-8-**	30	24	11.5	—	17.3	25.4	29.4
FH33-32S-0.5SH (**)	580-1310-2-**	32	32	14.2	28.4	18.3	33.4	37.4
FH33-36S-0.5SH (**)	580-1311-5-**	36	32	14.2	28.4	20.3	33.4	37.4
FH33-40S-0.5SH (**)	580-1308-0-**	40	44	20.2	40.4	22.3	45.4	49.4
FH33-45S-0.5SH (**)	580-1316-9-**	45	44	20.2	40.4	24.8	45.4	49.4

FHS3 Series 0.5 mm Pitch, 1.2 mm above the board, Flexible Printed Circuit & Flexible Flat Cable ZIP Connectors

● Reel Dimensions

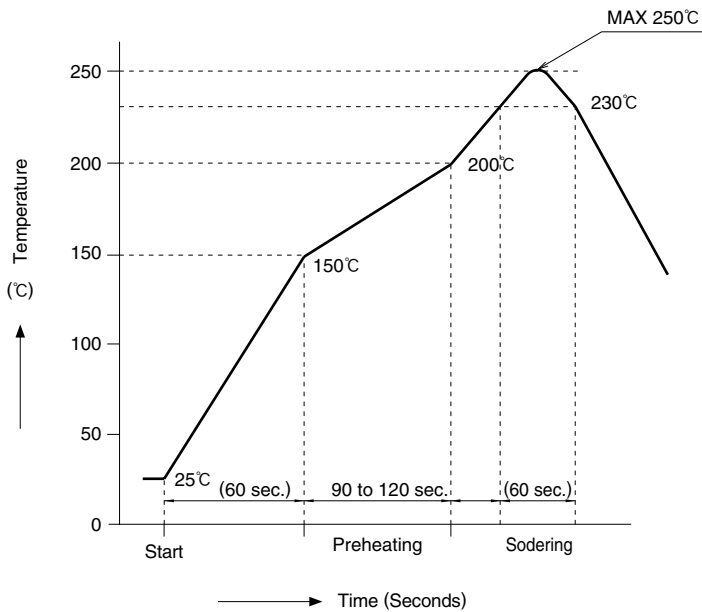


Note: 5,000 pieces per reel.

Embossed tape 32 mm or wider will have perforated feed holes on two sides.

◆ Recommended Temperature Profile

● Using Lead-free Solder paste



HRS test conditions

Solder method : Reflow, IR/hot air

(Nihon Den-netsu Co., Ltd.'s Part Number: SENSBY NR-2)

Environment : Room air

Solder composition : Paste, 96.5%Sn/3.0%Ag/0.5%Cu

(Senju Metal Industry, Co., Ltd.'s Part Number: M705-GRN360-K2-V)

Test board : Glass epoxy 25mm×50mm×0.8mm thick

Land dimensions : Contacts lead 0.3mm×0.65mm

Metal fittings 0.55mm×0.8mm

Metal mask : Contacts lead 0.25mm×0.65mm×0.1mm thick

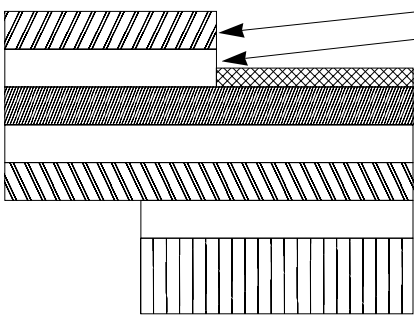
Metal fittings 0.55mm×0.8mm×0.1mm thick

This temperature profile is 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.

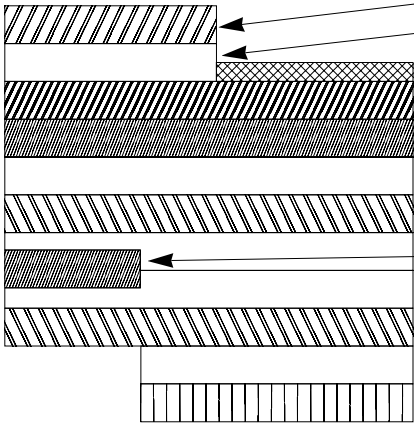
◆FH33 Series FPC/FFC Construction (Recommended Specifications)

1. Using Single-sided FPC



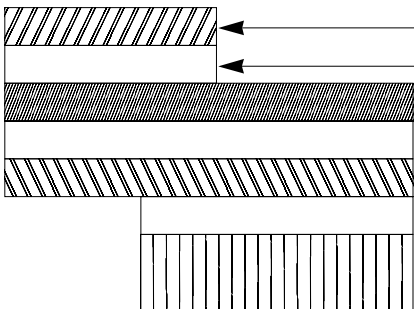
Material Name	Material	Thickness (μm)
Covering film layer	Polyimide 1 mil thick	25
Cover adhesive		25
Surface treatment	Nickel under plated 1 to 5μm / Gold plated 0.2μm	3
Copper foil	Cu 1oz	35
Base adhesive		25
Base film	Polyimide 1 mil thick	25
Reinforcement material adhesive	Heat-hardened adhesive	30
Stiffener	Polyimide 7 mil thick	175
Total		293

2. Using Double-sided FPC



Material Name	Material	Thickness (μm)
Covering film layer	Polyimide 1 mil thick	25
Cover adhesive		25
Surface treatment	Nickel under plated 1 to 5μm / Gold plated 0.2μm	3
Through-hole copper	Cu	15
Copper foil	Cu 1/2oz	18
Base adhesive		18
Base film	Polyimide 1 mil thick	25
Base adhesive		18
Copper foil	Cu 1/2oz	18
Cover adhesive		25
Covering film layer	Polyimide 1 mil thick	25
Reinforcement material adhesive	Heat-hardened adhesive	50
Stiffener	Polyimide 4 mil thick	100
Total		297

3. Using FFC



Material Name	Material	Thickness (μm)
Polyester film		12
Adhesive	polyester thermoplastic type	30
Gold plated, soft copper film		35
Adhesive	Polyester	30
Polyester		12
Adhesive	Polyester	30
Stiffener	Polyester	188
Total		295

※ Practical tolerance of thickness dimension is ±20 μm

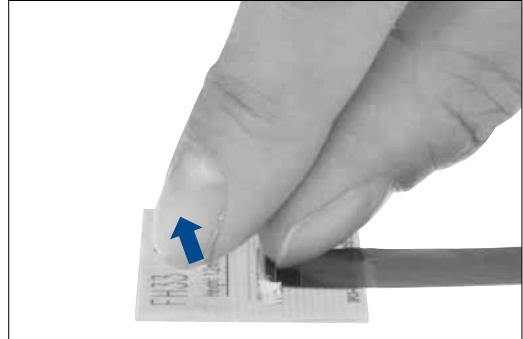
●To prevent release of the FPC due to it's bending, use of double sided FPC with copper foil on the back side is NOT RECOMMENDED.

◆ Operation and Precautions

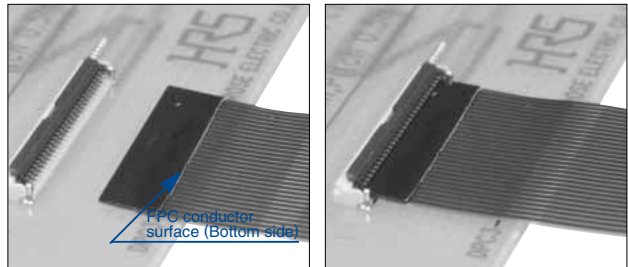
Operation

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

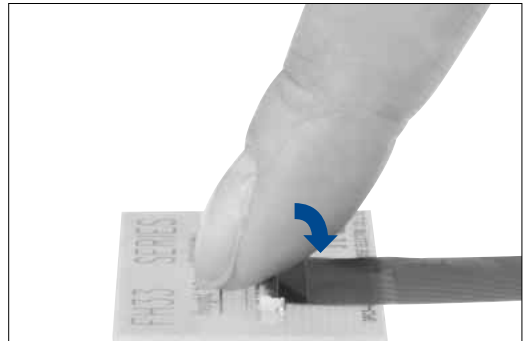
- 1 Lift up the actuator. Use thumb or index finger.



- 2 Fully insert the FPC in the connector parallel to mounting surface, with the exposed conductive traces facing down.

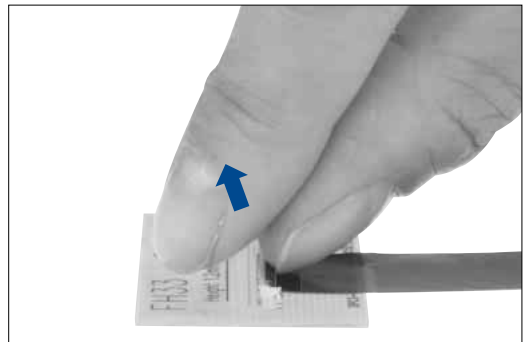


- 3 Rotate down the actuator until firmly closed. It is critical that the inserted FPC is not moved and remains fully inserted.



2.FPC removal

- 1 Lift up the actuator. Carefully withdraw the FPC.



Precautions

Exercise care when handling connectors. Follow recommendations given below.

PC board flexing

◆ PC board connector mounting area

The connectors are straight within 0.1 mm max.

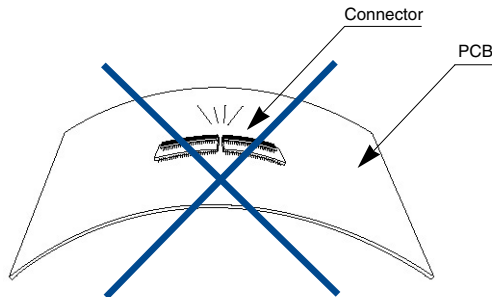
Make sure that the PC board connector mounting area flatness can accept the connector terminals without causing any failure of the solder joints.

◆ 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 handling

Exercise caution when handling boards with the connectors installed. Do not apply any forces affecting soldered joints.

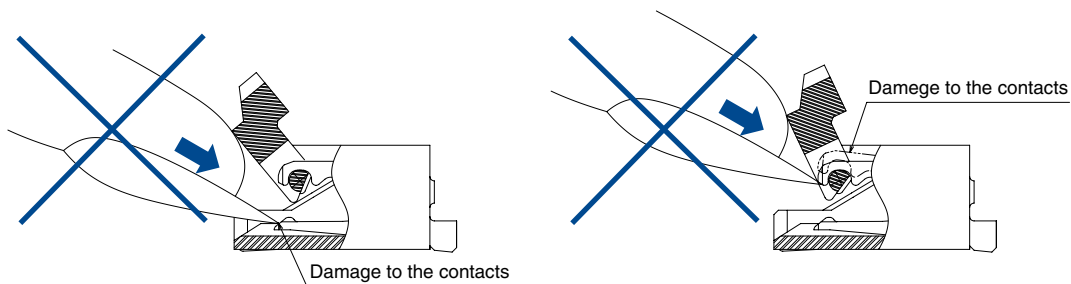


Precautions When Inserting or Removing FPC

Pay attention to the following points when inserting FPC.

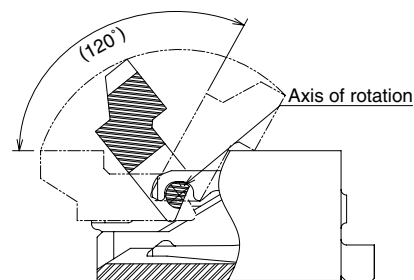
◆ Actuator operation

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.

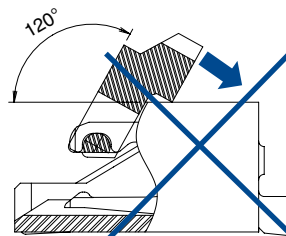


② Axis of rotation

Assure free rotation of the actuator

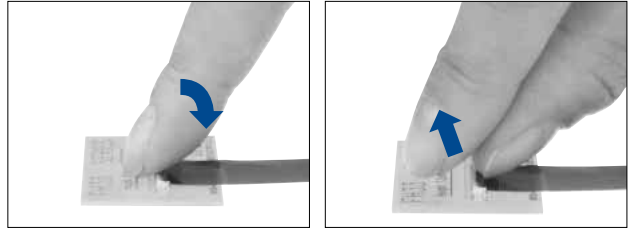


③ The actuator will rotate 120 degrees maximum. Do not force it to rotate further.

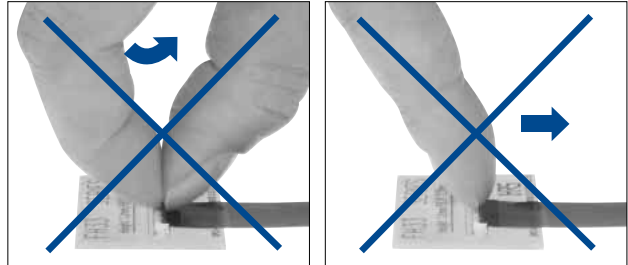


Precautions

- ④ When operating the actuator, do so at the center portion.

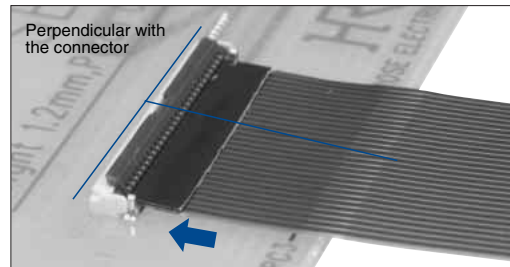
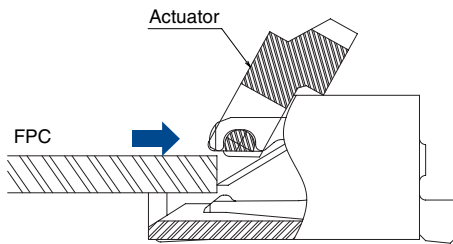


- ⑤ As illustrated, do not attempt removal or repositioning of the actuator.



◆ FPC Insertion①

The FPC should be aligned parallel with the board surface and perpendicular with the connector (as shown), then completely inserted.

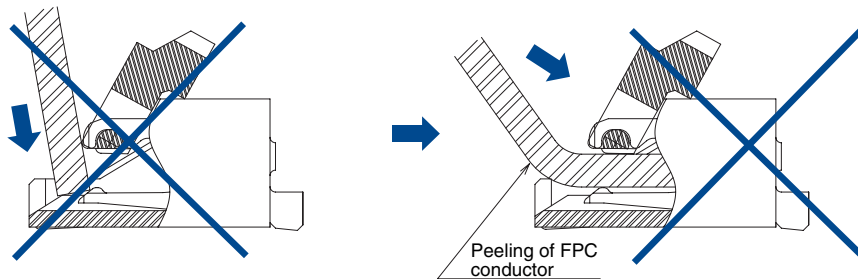


To assure correct electrical and mechanical connection do not insert FPC at angle. It must be fully inserted.

Make sure that the FPC is NOT MOVED during the closing of the actuator.

◆ FPC Insertion②

When inserting the FPC, do not forcefully rub against the bottom surface of the connector insertion entrance. Doing so will result in the contacts and FPC making strong contact and may cause deformation of the contacts, peeling of the FPC conductor, and other problems.



Precautions

◆ Verification of the fully closed actuator.

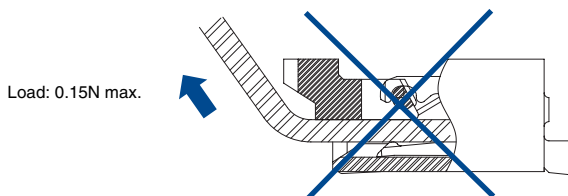
The actuator should be fully closed (as illustrated) and the FPC held firmly in the connector.

Do not press against the actuator when is fully closed. Max force applied to the fully closed actuator should not exceed 1 N.

Routing the FPC (FPC fully inserted/ actuator closed)

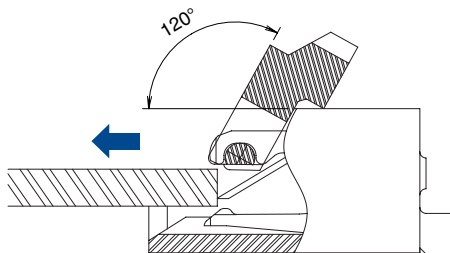
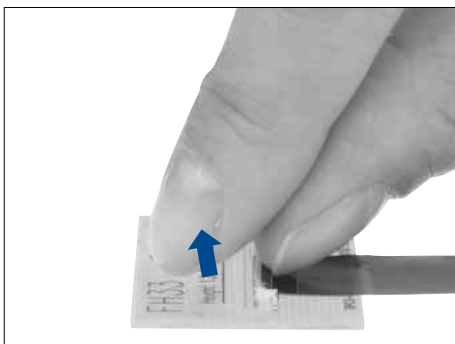
◆ FPC Load

Do not apply force in excess of 0.15N max. in the upward direction (as illustrated). Do not bend the FPC too close to the actuator.



Removing the FPC

Rotate the actuator to the open position (maximum open angle of 120°). Carefully withdraw the FPC.



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 and contacts may be affected by excessive amounts of solder or flux compounds.



HRS

HIROSE ELECTRIC CO.,LTD.

5-23,OSAKI 5-CHOME,SHINAGAWA-KU,TOKYO 141-8587,JAPAN

PHONE: 81-3-3491-9741, FAX: 81-3-3493-2933

<http://www.hirose.com>

<http://www.hirose-connectors.com>