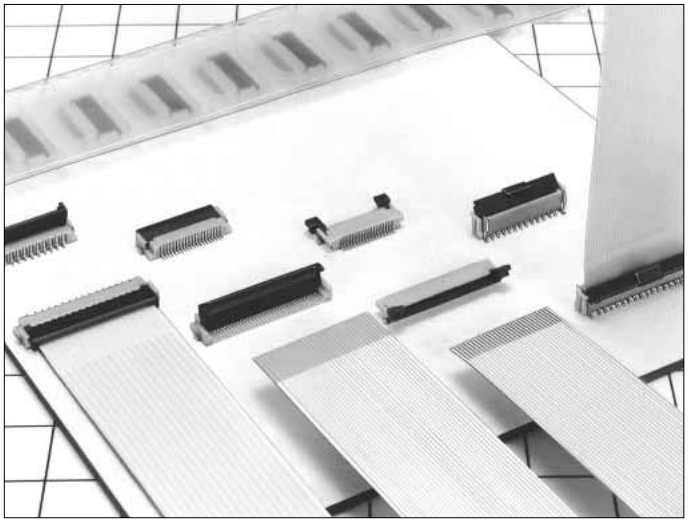
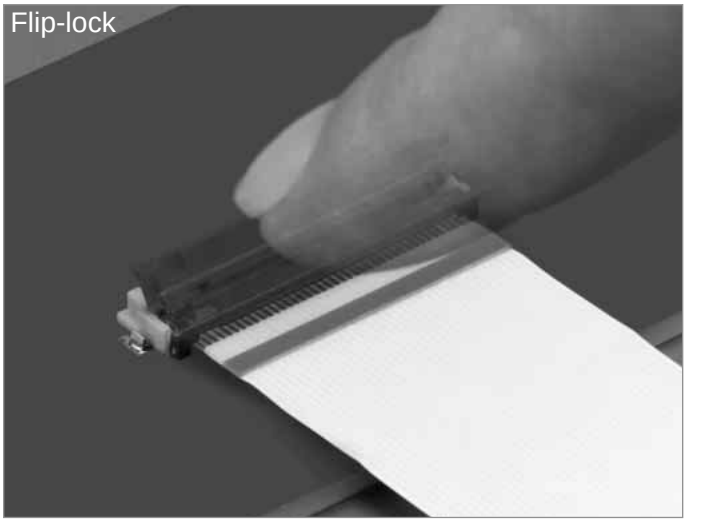
0.5mm and 1mm Pitch Connectors For FPC/FFC

FH12 Series





■Features

1. Ease of Use and Space Savings

Only one finger or 6.9N (Newtons) of force is required to lock Hirose's rotational actuator (flip-lock) as compared to using 2 fingers and 39.2N to close a FFC/FPC connector from our competition.

The Flip-Lock design also allows customers to place 2 or more connectors side by side as there is no need to waste additional board space for a side latch.

2. Strengthened Flip-lock Actuator

The standard Flip-Lock requires only 2.0mm height above the board. A strengthened lock lever is available which only requires an additional 0.4mm.

3. Supports Thin FPC (0.18mm)

Hirose does not require double-sided FPC to have any additional strengthening plate or stiffener and can therefore support a thickness of as little as 0.18mm +/- 0.05.

4. Hirose Ensures Reliability

Hirose's patented half tuning fork contacts maintain the required normal force without relying on the connector housing. With our competitor's conventional products the housing walls support the contact force, which does not provide for long-term reliability.

5. Prevention of Solder Bridge

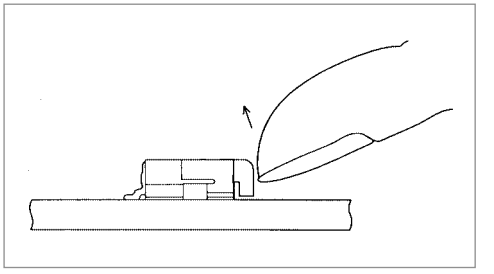
Excess solder cavity absorbs excessive solder and avoids solder bridging.

6. Three different assembly types

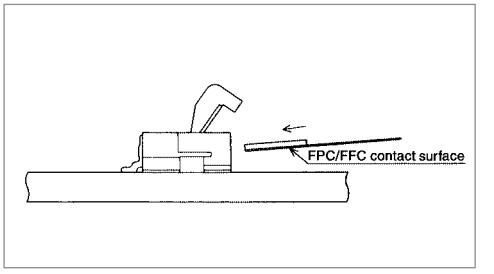
FH12 is offered in Top & Bottom Contact and Vertical Mount and offered in both a 0.5mm contact pitch as well as a 1.0mm contact pitch (bottom contact only).

Rotating One-touch Mechanism

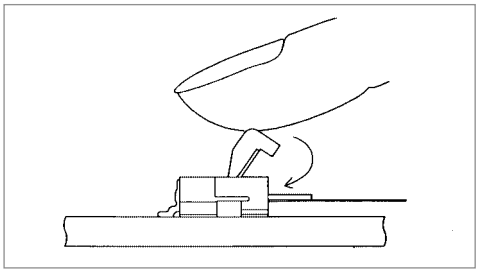
①



②



③



■Product Specifications

Rating	Current rating: 0.5A DC(Note 1) Voltage rating: 50V AC	Operating Temperature Range:−40 to +85℃ (Note 2) Operating Humidity Range:Relative humidity, 90% max. (Not dewed)	Storage Temperature Range:−10 to +50℃ (Note 3) Storage Humidity Range:Relative humidity, 90% max. (Not dewed)

Applicable FPC	t=0.3±0.05 Gold plated	t=0.18 ± 0.05 for FH12F-✻S-0.5SH

Item	Specification	Conditions
1. Insulation resistance	500M ohms minimum	100V DC
2. Withstanding voltage	No flashover or insulation breakdown.	150V AC/1 minute
3. Contact resistance	50m ohms maximum	1mA
4. Durability (Insertion/withdrawal)	Contact resistance: 50m ohms maximum No damage, cracks, or parts dislocation.	20 cycles
5. Vibration	No electrical discontinuity of 1μs or more Contact resistance: 50m ohms maximum. No damage, cracks, or parts dislocation.	Frequency: 10 to 55 Hz, single amplitude of 0.75 mm, 2 hours in each of the 3 directions. 10 cycles
6. Shock	No electrical discontinuity of 1μs or more Contact resistance: 50m ohms maximum. No damage, cracks, or parts dislocation.	Acceleration of 981 m/s², 6 ms duration, sine half-wave waveform, 3 cycles in each of the 3 axis.
7. Humidity(Steady state)	Contact resistance: 50m ohms maximum. Insulation resistance: 50M ohms minimum. No damage, cracks, or parts dislocation.	96 hours at 40℃ and humidity of 90% to 95%
8. Temperature Cycle	Contact resistance: 50m ohms maximum. Insulation resistance: 50M ohms minimum. No damage, cracks, or parts dislocation.	Temperature: -40℃ → 15 to 35℃ → 85℃ → 15 to 35℃, 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±10℃ for 5 seconds

Note 1: When passing the current through all of the contacts,use 70% of the current rating.
Note 2: Includes temperature rise caused by current flow.
Note 3: The term "storage" refers to products stored for long period of time prior to mounting and use. Operating Temperature Range and Humidity range covers nonconducting condition of installed connectors in storage, shipment or during transportation.
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

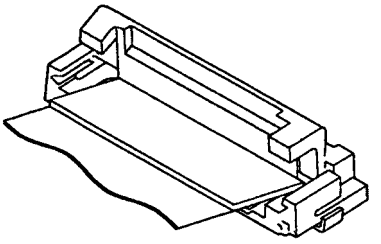
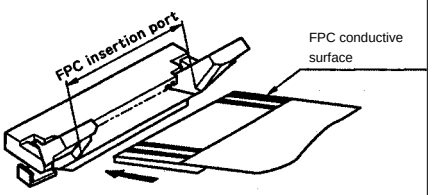
Part	Material	Finish	Remarks
Insulator	Polyamide, LCP(60 pos.)	Color : Beige	UL94V-0
Actuator	PPS	Color : Dark brown	
Contact	Phosphor bronze	Gold plated	———
Metal Fittings	Brass	Tin plated	

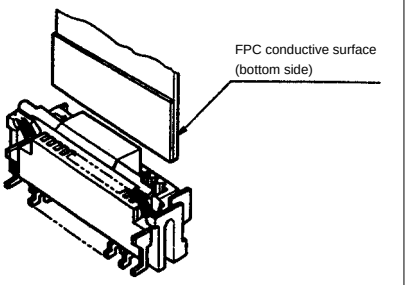
■Ordering Information

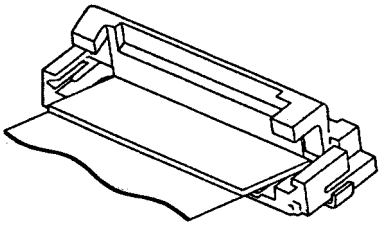
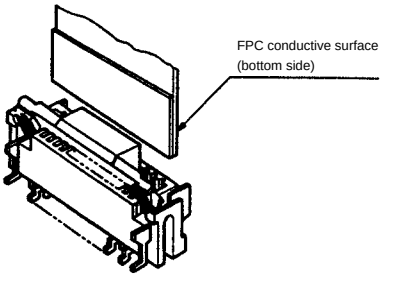
FH 12 A - 10 (4) - S A - 0.5 SH (✻✻)
❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾ ❿

❶ Series Name : FH	❻ Contact alignment: Single
❷ Series No. : 12	❼ Eccentric direction: Blank : standard type A : Eccentric type
❸ Blank : standard type A : Top contact type S : Type with strengthed flip-lock actuator F : Type with 0.18mm FPC End Thickness	❽ Contacts Pitch : 0.5mm, 1mm
❹ Standard type : Number of contacts Eccentric type : Number of contacts in 0.5mm housing	❾ Contact type SH : SMT horizontal mounting type SV : SMT vertical mounting type
❺ Standard type : Blank Eccentric type : Number of contacts	❿ Plating specification (54) : Selective gold plated (55) : Gold plated

■Series Configuration

<table>
<tr><th>Pitch</th><th>Bottom Contact Type</th><th>Top Contact Type</th><th>Vertical mounting Type</th></tr>
<tr><td rowspan="5">0.5mm</td><td>
FH12- ** S-0.5SH P.4
Number of contacts 6, 8, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 22, 24, 25, 26, 28, 30, 32, 33, 34, 35, 36, 40, 45, 50, 53</td><td rowspan="5">

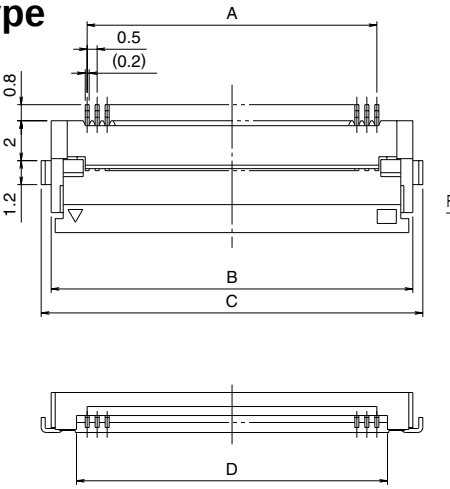
FH12A- ** S-0.5SH P.7
Number of contacts 10, 12 ,15, 16, 18, 20, 22, 24, 26, 28, 29, 30, 32, 33, 34, 36, 40, 42, 45, 50</td><td rowspan="5">

FH12- ** S-0.5SV P.8
Number of contacts 10, 12, 13, 15, 16, 17, 18, 20, 22, 24, 26, 30, 32, 33, 34, 36, 40, 45, 49, 50, 60</td></tr>
<tr><td>Type with Strengthened Lock Lever</td></tr>
<tr><td>FH12S- ** S-0.5SH P.5
Number of contacts 30, 40, 45, 50, 53</td></tr>
<tr><td>Type with 0.18mm FPC End Thickness</td></tr>
<tr><td>FH12F- ** S-0.5SH P.6
Number of contacts 6, 8, 10, 12, 13, 14, 15, 16, 18, 20, 22, 24, 25, 26, 28, 30, 32, 34, 36, 40</td></tr>
<tr><td>1mm</td><td>
Standard FH12- ** S-1SH P.9
Eccentric FH12- ** (**) SA-1SH
Standard
Number of contacts 5, 6, 7, 8, 9, 11, 12,16,17,22,26
Eccentric
Number of contacts 4, 6, 8, 10, 11, 14, 19, 24</td><td></td><td>

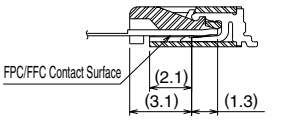
FH12- ** S-1SV P.10
Number of contacts 6, 7, 8, 16, 20, 22, 24</td></tr>
</table>

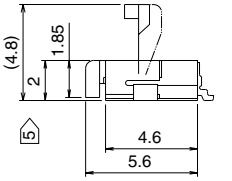
■0.5mm Pitch Bottom Contact Type





Mated Cross-sectional Diagram





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.
Note 5 : If there is no problem with the connector height, we recommend the type with the strengthened Flip-lock actuator (FH12S-*S-0.5SH). Standard type connector height: 2 mm Connector height of type with strengthened Flip-lock actuator: 2.4 mm

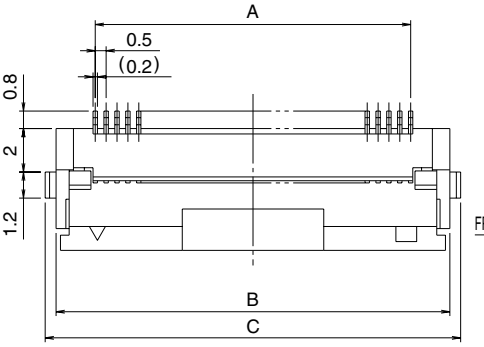
Unit:mm

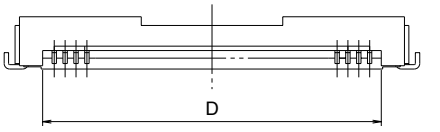
	Part Number	CL No.	Number of Contacts	A	B	C	D
	FH12-6S-0.5SH(**)	586-0582-5-**	6	2.5	6.1	7.1	3.57
	FH12-8S-0.5SH(**)	586-0744-5-**	8	3.5	7.1	8.1	4.57
	FH12-10S-0.5SH(**)	586-0522-3-**	10	4.5	8.1	9.1	5.57
	FH12-11S-0.5SH(**)	586-0600-5-**	11	5.0	8.6	9.6	6.07
	FH12-12S-0.5SH(**)	586-0704-0-**	12	5.5	9.1	10.1	6.57
	FH12-13S-0.5SH(**)	586-0549-0-**	13	6.0	9.6	10.6	7.07
	FH12-14S-0.5SH(**)	586-0533-0-**	14	6.5	10.1	11.1	7.57
	FH12-15S-0.5SH(**)	586-0523-6-**	15	7.0	10.6	11.6	8.07
	FH12-16S-0.5SH(**)	586-0531-4-**	16	7.5	11.1	12.1	8.57
	FH12-17S-0.5SH(**)	586-0606-1-**	17	8.0	11.6	12.6	9.07
	FH12-18S-0.5SH(**)	586-0530-1-**	18	8.5	12.1	13.1	9.57
	FH12-19S-0.5SH(**)	586-0534-2-**	19	9.0	12.6	13.6	10.07
	FH12-20S-0.5SH(**)	586-0524-9-**	20	9.5	13.1	14.1	10.57
	FH12-22S-0.5SH(**)	586-0532-7-**	22	10.5	14.1	15.1	11.57
	FH12-24S-0.5SH(**)	586-0521-0-**	24	11.5	15.1	16.1	12.57
	FH12-25S-0.5SH(**)	586-0692-3-**	25	12.0	15.6	16.6	13.07
	FH12-26S-0.5SH(**)	586-0576-2-**	26	12.5	16.1	17.1	13.57
	FH12-28S-0.5SH(**)	586-0612-4-**	28	13.5	17.1	18.1	14.57
Note 5	FH12-30S-0.5SH(**)	586-0525-1-**	30	14.5	18.1	19.1	15.57
	FH12-32S-0.5SH(**)	586-0681-7-**	32	15.5	19.1	20.1	16.57
	FH12-33S-0.5SH(**)	586-0520-8-**	33	16.0	19.6	20.6	17.07
	FH12-34S-0.5SH(**)	586-0617-8-**	34	16.5	20.1	21.1	17.57
	FH12-35S-0.5SH(**)	586-0740-4-**	35	17.0	20.6	21.6	18.07
	FH12-36S-0.5SH(**)	586-0526-4-**	36	17.5	21.1	22.1	18.57
Note 5	FH12-40S-0.5SH(**)	586-0527-7-**	40	19.5	23.1	24.1	20.57
Note 5	FH12-45S-0.5SH(**)	586-0528-0-**	45	22.0	25.6	26.6	23.07
Note 5	FH12-50S-0.5SH(**)	586-0529-2-**	50	24.5	28.1	29.1	25.57
Note 5	FH12-53S-0.5SH(**)	586-0595-7-**	53	26.0	29.6	30.6	27.07

Note 1 : Embossed tape reel packaging (2,000 pieces/reel). Order by number of reels.
Note 2 : (**):Specification. Refer to ordering information.

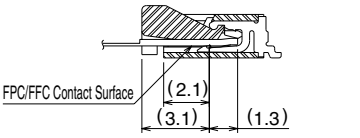
■0.5mm Pitch Bottom Contact Type with Strengthened Flip-lock Actuator

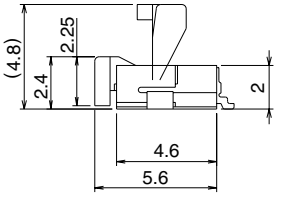






Mated Cross-sectional Diagram





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.

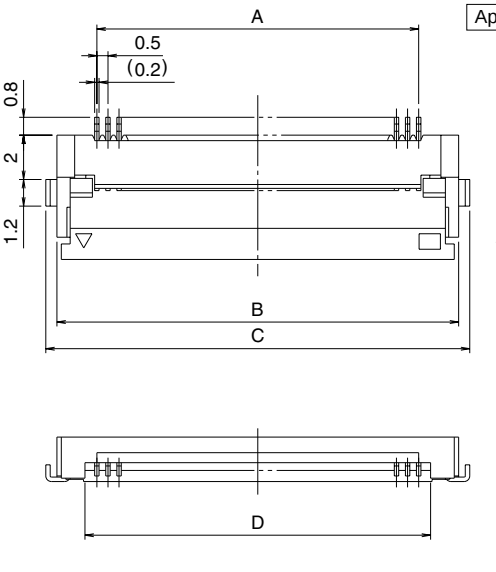
Unit:mm

Part Number	CL No.	Number of Contacts	A	B	C	D
FH12S-30S-0.5SH(**)	586-0667-6-**	30	14.5	18.1	19.1	15.57
FH12S-40S-0.5SH(**)	586-0640-0-**	40	19.5	23.1	24.1	20.57
FH12S-45S-0.5SH(**)	586-0665-0-**	45	22.0	25.6	26.6	23.07
FH12S-50S-0.5SH(**)	586-0642-5-**	50	24.5	28.1	29.1	25.57
FH12S-53S-0.5SH(**)	586-0691-0-**	53	26.0	29.6	30.6	27.07

Note 1 : Embossed tape reel packaging (2,000 pieces/reel).
Order by number of reels.
Note 2 : Indicates the specification. For details, please refer to the column "composition of product number".

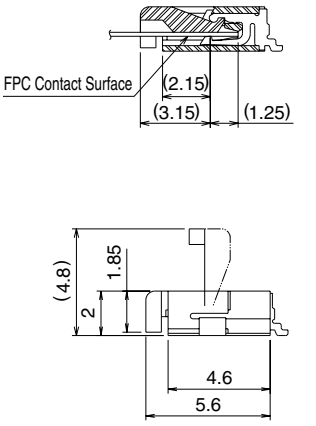
■0.5mm Pitch Bottom Contact Type with 0.18mm FPC End Thickness





Applicable FPC end thickness : 0.18±0.05

Mated Cross-sectional Diagram



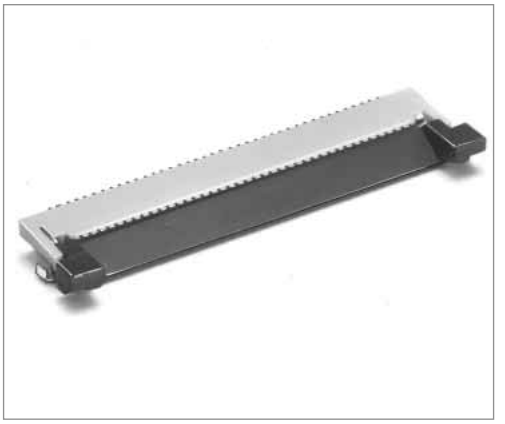
Note 1 : The coplanarity of each terminal lead within specified dimension is 0.1 mm Max.
Note 2 : Packaged on tape and reel only. Check packaging specification.
Note 3 : Slight variations in color of the plastic compounds do not affect form, fit or function of the connector.
Note 4 : After reflow, the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

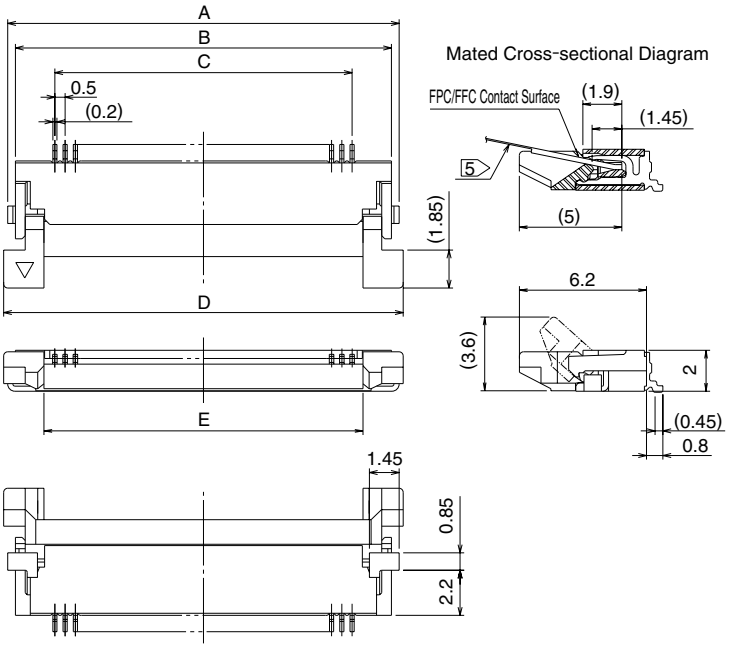
Unit:mm

Part Number	CL No.	Number of Contacts	A	B	C	D
FH12F-6S-0.5SH(**)	586-0672-6-**	6	2.5	6.1	7.1	3.57
FH12F-8S-0.5SH(**)	586-0738-2-**	8	3.5	7.1	8.1	4.57
FH12F-10S-0.5SH(**)	586-0709-4-**	10	4.5	8.1	9.1	5.57
FH12F-12S-0.5SH(**)	586-0653-1-**	12	5.5	9.1	10.1	6.57
FH12F-13S-0.5SH(**)	586-0629-7-**	13	6.0	9.6	10.6	7.07
FH12F-14S-0.5SH(**)	586-0655-7-**	14	6.5	10.1	11.1	7.57
FH12F-15S-0.5SH(**)	586-0680-4-**	15	7.0	10.6	11.6	8.07
FH12F-16S-0.5SH(**)	586-0673-9-**	16	7.5	11.1	12.1	8.57
FH12F-18S-0.5SH(**)	586-0626-9-**	18	8.5	12.1	13.1	9.57
FH12F-20S-0.5SH(**)	586-0636-2-**	20	9.5	13.1	14.1	10.57
FH12F-22S-0.5SH(**)	586-0630-6-**	22	10.5	14.1	15.1	11.57
FH12F-24S-0.5SH(**)	586-0632-1-**	24	11.5	15.1	16.1	12.57
FH12F-25S-0.5SH(**)	586-0733-9-**	25	12.0	15.6	16.6	13.07
FH12F-26S-0.5SH(**)	586-0627-1-**	26	12.5	16.1	17.1	13.57
FH12F-28S-0.5SH(**)	586-0643-8-**	28	13.5	17.1	18.1	14.57
FH12F-30S-0.5SH(**)	586-0628-4-**	30	14.5	18.1	19.1	15.57
FH12F-32S-0.5SH(**)	586-0705-3-**	32	15.5	19.1	20.1	16.57
FH12F-34S-0.5SH(**)	586-0677-0-**	34	16.5	20.1	21.1	17.57
FH12F-36S-0.5SH(**)	586-0656-0-**	36	17.5	21.1	22.1	18.57
FH12F-40S-0.5SH(**)	586-0635-0-**	40	19.5	23.1	24.1	20.57

Note 1 : Embossed tape reel packaging (2,000 pieces/reel).
Order by number of reels.
Note 2 : Indicates the specification. For details, please refer to the column "composition of product number".

■0.5mm Pitch Top Contact Type





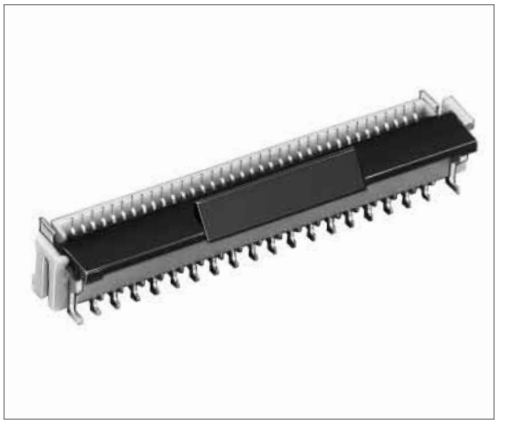
Note 1 : The coplanarity of each terminal lead within specified dimension is 0.1 mm Max.
Note 2 : Packaged on tape and reel only. Check packaging specification.
Note 3 : Slight variations in color of the plastic compounds do not affect form, fit or function of the connector.
Note 4 : After reflow, the terminal plating may change color, however this does not represent a quality issue.
Note 5 : If there is no problem with the connector height, we recommend the type with the strengthened Flip-lock actuator (FH12S-*S-0.5SH). Standard type connector height: 2 mm Connector height of type with strengthened Flip-lock actuator: 2.4 mm

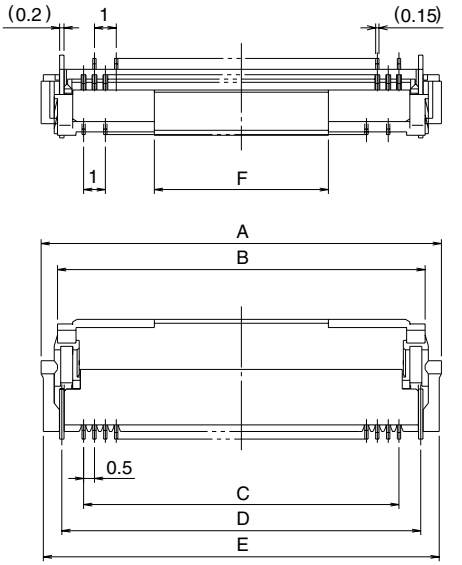
Unit:mm

Part Number	CL No.	Number of Contacts	A	B	C	D	E
FH12A-10S-0.5SH(**)	586-0550-9-**	10	9.1	8.35	4.5	9.5	5.57
FH12A-12S-0.5SH(**)	586-0696-4-**	12	10.1	9.35	5.5	10.5	6.57
FH12A-15S-0.5SH(**)	586-0551-1-**	15	11.6	10.85	7.0	12.0	8.07
FH12A-16S-0.5SH(**)	586-0552-4-**	16	12.1	11.35	7.5	12.5	8.57
FH12A-18S-0.5SH(**)	586-0553-7-**	18	13.1	12.35	8.5	13.5	9.57
FH12A-20S-0.5SH(**)	586-0554-0-**	20	14.1	13.35	9.5	14.5	10.57
FH12A-22S-0.5SH(**)	586-0686-0-**	22	15.1	14.35	10.5	15.5	11.57
FH12A-24S-0.5SH(**)	586-0555-2-**	24	16.1	15.35	11.5	16.5	12.57
FH12A-26S-0.5SH(**)	586-0663-5-**	26	17.1	16.35	12.5	17.5	13.57
FH12A-28S-0.5SH(**)	586-0725-0-**	28	18.1	17.35	13.5	18.5	14.57
FH12A-29S-0.5SH(**)	586-0585-3-**	29	18.6	17.85	14.0	19.0	15.07
FH12A-30S-0.5SH(**)	586-0556-5-**	30	19.1	18.35	14.5	19.5	15.57
FH12A-32S-0.5SH(**)	586-0687-3-**	32	20.1	19.35	15.5	20.5	16.57
FH12A-33S-0.5SH(**)	586-0570-6-**	33	20.6	19.85	16.0	21.0	17.07
FH12A-34S-0.5SH(**)	586-0670-0-**	34	21.1	20.35	16.5	21.5	17.57
FH12A-36S-0.5SH(**)	586-0662-2-**	36	22.1	21.35	17.5	22.5	18.57
FH12A-40S-0.5SH(**)	586-0557-8-**	40	24.1	23.35	19.5	24.5	20.57
FH12A-42S-0.5SH(**)	586-0698-0-**	42	25.1	24.35	20.5	25.5	21.57
FH12A-45S-0.5SH(**)	586-0558-0-**	45	26.6	25.85	22.0	27.0	23.07
FH12A-50S-0.5SH(**)	586-0559-3-**	50	29.1	28.35	24.5	29.5	25.57

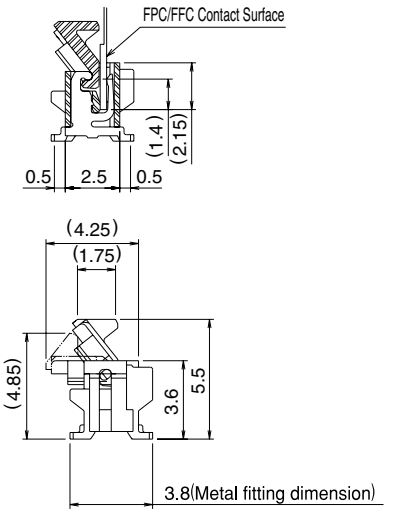
Note 1 : Embossed tape reel packaging (2,000 pieces/reel).
Order by number of reels.
Note 2 : (**):Specification. Refer to ordering information.

■0.5mm Pitch Vertical mounting Type





Mated Cross-sectional Diagram



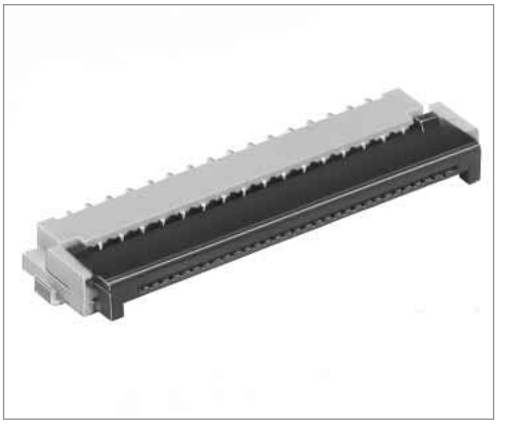
Note 1 : The coplanarity of each terminal lead within specified dimension is 0.1 mm Max.
Note 2 : Packaged on tape and reel only. Check packaging specification.
Note 3 : Slight variations in color of the plastic compounds do not affect form, fit or function of the connector.
Note 4 : After reflow, the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

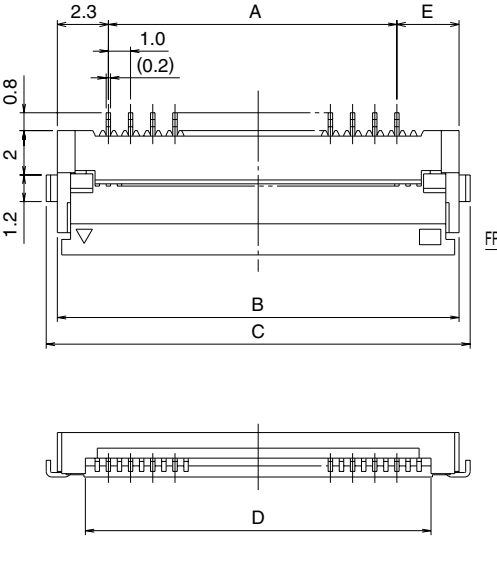
Unit:mm

Part Number	CL No.	Number of Contacts	A	B	C	D	E	F
FH12-10S-0.5SV(**)	586-0560-2-**	10	8.4	6.9	4.5	6.5	8.2	4
FH12-12S-0.5SV(**)	586-0615-2-**	12	9.4	7.9	5.5	7.5	9.2	4
FH12-13S-0.5SV(**)	586-0575-0-**	13	9.9	8.4	6.0	8.0	9.7	4
FH12-15S-0.5SV(**)	586-0561-5-**	15	10.9	9.4	7.0	9.0	10.7	4
FH12-16S-0.5SV(**)	586-0572-1-**	16	11.4	9.9	7.5	9.5	11.2	4
FH12-17S-0.5SV(**)	586-0601-8-**	17	11.9	10.4	8.0	10.0	11.7	4
FH12-18S-0.5SV(**)	586-0573-4-**	18	12.4	10.9	8.5	10.5	12.2	4
FH12-20S-0.5SV(**)	586-0562-8-**	20	13.4	11.9	9.5	11.5	13.2	4
FH12-22S-0.5SV(**)	586-0589-4-**	22	14.4	12.9	10.5	12.5	14.2	8
FH12-24S-0.5SV(**)	586-0563-0-**	24	15.4	13.9	11.5	13.5	15.2	8
FH12-26S-0.5SV(**)	586-0664-8-**	26	16.4	14.9	12.5	14.5	16.2	8
FH12-30S-0.5SV(**)	586-0564-3-**	30	18.4	16.9	14.5	16.5	18.2	8
FH12-32S-0.5SV(**)	586-0699-2-**	32	19.4	17.9	15.5	17.5	19.2	8
FH12-33S-0.5SV(**)	586-0565-6-**	33	19.9	18.4	16.0	18.0	19.7	8
FH12-34S-0.5SV(**)	586-0706-6-**	34	20.4	18.9	16.5	18.5	20.2	8
FH12-36S-0.5SV(**)	586-0641-2-**	36	21.4	19.9	17.5	19.5	21.2	8
FH12-40S-0.5SV(**)	586-0566-9-**	40	23.4	21.9	19.5	21.5	23.2	8
FH12-45S-0.5SV(**)	586-0567-1-**	45	25.9	24.4	22.0	24.0	25.7	8
FH12-49S-0.5SV(**)	586-0602-0-**	49	27.9	26.4	24.0	26.0	27.7	8
FH12-50S-0.5SV(**)	586-0568-4-**	50	28.4	26.9	24.5	26.5	28.2	8
FH12-60S-0.5SV(**)	586-0735-4-**	60	33.4	31.9	29.5	31.5	33.2	8

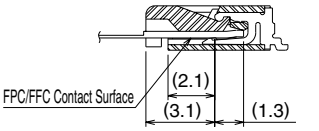
Note 1 : Embossed tape reel packaging (1,000 pieces/reel).
Order by number of reels.
Note 2 : (**):Specification. Refer to ordering information.

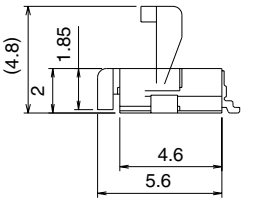
■1mm Pitch Type Bottom Contact Type





Mated Cross-sectional Diagram





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.

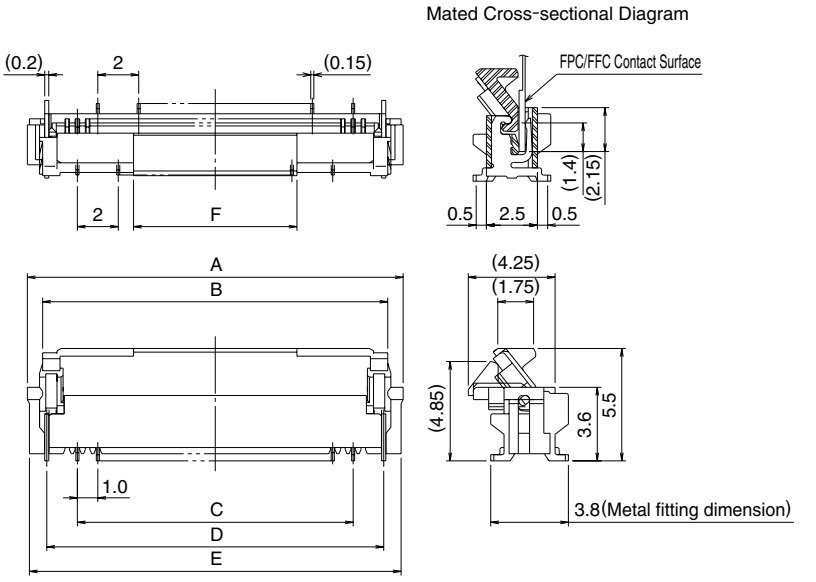
Unit:mm

	Part Number	CL No.	Number of Contacts	A	B	C	D	E
Standard type	FH12-5S-1SH(**)	586-0591-6-**	5	4	8.6	9.6	6.07	2.3
	FH12-6S-1SH(**)	586-0607-4-**	6	5	9.6	10.6	7.07	2.3
	FH12-7S-1SH(**)	586-0535-5-**	7	6	10.6	11.6	8.07	2.3
	FH12-8S-1SH(**)	586-0579-0-**	8	7	11.6	12.6	9.07	2.3
	FH12-9S-1SH(**)	586-0540-5-**	9	8	12.6	13.6	10.07	2.3
	FH12-11S-1SH(**)	586-0668-9-**	11	10	14.6	15.6	12.07	2.3
	FH12-12S-1SH(**)	586-0741-7-**	12	11	15.6	16.6	13.07	2.3
	FH12-16S-1SH(**)	586-0536-8-**	16	15	19.6	20.6	17.07	2.3
	FH12-17S-1SH(**)	586-0739-5-**	17	16	20.6	21.6	18.07	2.3
	FH12-22S-1SH(**)	586-0547-4-**	22	21	25.6	26.6	23.07	2.3
	FH12-26S-1SH(**)	586-0592-9-**	26	25	29.6	30.6	27.07	2.3
Eccentric type	FH12-10(4)SA-1SH(**)	586-0537-0-**	4	3	8.1	9.1	5.57	2.8
	FH12-14(6)SA-1SH(**)	586-0538-3-**	6	5	10.1	11.1	7.57	2.8
	FH12-18(8)SA-1SH(**)	586-0539-6-**	8	7	12.1	13.1	9.57	2.8
	FH12-22(10)SA-1SH(**)	586-0541-8-**	10	9	14.1	15.1	11.57	2.8
	FH12-24(11)SA-1SH(**)	586-0542-0-**	11	10	15.1	16.1	12.57	2.8
	FH12-30(14)SA-1SH(**)	586-0543-3-**	14	13	18.1	19.1	15.57	2.8
	FH12-40(19)SA-1SH(**)	586-0546-1-**	19	18	23.1	24.1	20.57	2.8
	FH12-50(24)SA-1SH(**)	586-0548-7-**	24	23	28.1	29.1	25.57	2.8

Note 1: Embossed tape reel packaging (2,000 pieces/reel). Order by number of reels.
Note 2: The 1mm version of FH12 is constructed by loading every other contact into the 0.5mm housing.
When a housing designed for an odd number of 0.5mm pitch contacts is used; the spacing from the edge to the first contact on either side is the same as the distance between each contact, 1.0mm. Hirose considers this design to be a **standard-type 1.0mm** connector.
An **eccentric-type** connector using a housing designed for an even number of 0.5mm pitch contacts and consequently one side has 1.5mm distance from the edge to the first contact. (See FPC/FFC dimensional drawing on page 19) The part number for the eccentric type describes the size of the 0.5mm housing used and lists the number of 1.0mm pitch contacts in parentheses () as shown in the above table.

■1mm Pitch Vertical Mounting Type





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	D	E	F
FH12-6S-1SV(**)	586-0605-9-**	6	9.9	8.4	5	8	9.7	4
FH12-7S-1SV(**)	586-0610-9-**	7	10.9	9.4	6	9	10.7	4
FH12-8S-1SV(**)	586-0593-1-**	8	11.9	10.4	7	10	11.7	4
FH12-16S-1SV(**)	586-0574-7-**	16	19.9	18.4	15	18	19.7	8
FH12-20S-1SV(**)	586-0634-7-**	20	23.9	22.4	19	22	23.7	8
FH12-22S-1SV(**)	586-0584-0-**	22	25.9	24.4	21	24	25.7	8
FH12-24S-1SV(**)	586-0594-4-**	24	27.9	26.4	23	26	27.7	8

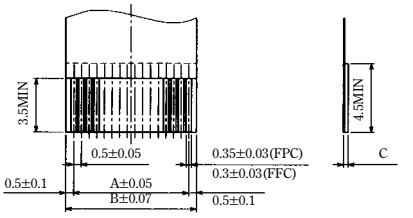
Note 1 : Embossed tape reel packaging (1,000 pieces/reel).
Order by number of reels.
Note 2 : (**):Specification. Refer to ordering information.

■Recommended FPC/FFC dimensions and Land/Metal Mask dimensions

●0.5mm Pitch Product

0.5mm Pitch Bottom Contact Type / 0.5mm Pitch Top Contact Type

FPC/FFC dimensions

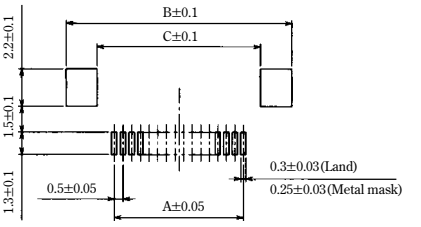


Product Type	C Dimension
Types other than those below	0.3±0.05min
	Stiffener thickness should be 0.188 mm (7.5 mil) min
FH12F	0.18±0.05

Unit: mm

Number of Contacts \ Dimension	A	B	Number of Contacts \ Dimension	A	B
6	2.5	3.5	25	12.0	13.0
8	3.5	4.5	26	12.5	13.5
10	4.5	5.5	28	13.5	14.5
11	5.0	6.0	29	14.0	15.0
12	5.5	6.5	30	14.5	15.5
13	6.0	7.0	32	15.5	16.5
14	6.5	7.5	33	16.0	17.0
15	7.0	8.0	34	16.5	17.5
16	7.5	8.5	35	17.0	18.0
17	8.0	9.0	36	17.5	18.5
18	8.5	9.5	40	19.5	20.5
19	9.0	10.0	42	20.5	21.5
20	9.5	10.5	45	22.0	23.0
22	10.5	11.5	50	24.5	25.5
24	11.5	12.5	53	26.0	27.0

Land / Metal Mask dimensions



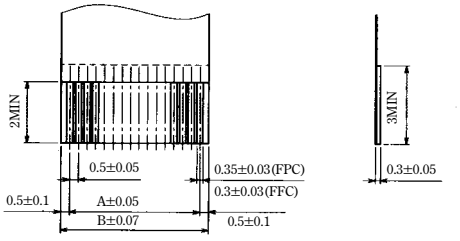
Recommended metal mask thickness : 0.15mm

Unit: mm

Number of Contacts \ Dimension	A	B	C	Number of Contacts \ Dimension	A	B	C
6	2.5	8.1	4.5	25	12.0	17.6	14.0
8	3.5	9.1	5.5	26	12.5	18.1	14.5
10	4.5	10.1	6.5	28	13.5	19.1	15.5
11	5.0	10.6	7.0	29	14.0	19.6	16.0
12	5.5	11.1	7.5	30	14.5	20.1	16.5
13	6.0	11.6	8.0	32	15.5	21.1	17.5
14	6.5	12.1	8.5	33	16.0	21.6	18.0
15	7.0	12.6	9.0	34	16.5	22.1	18.5
16	7.5	13.1	9.5	35	17.0	22.6	19.0
17	8.0	13.6	10.0	36	17.5	23.1	19.5
18	8.5	14.1	10.5	40	19.5	25.1	21.5
19	9.0	14.6	11.0	42	20.5	26.1	22.5
20	9.5	15.1	11.5	45	22.0	27.6	24.0
22	10.5	16.1	12.5	50	24.5	30.1	26.5
24	11.5	17.1	13.5	53	26.0	31.6	28.0

0.5mm Pitch Vertical Mounting Type

FPC/FFC dimensions

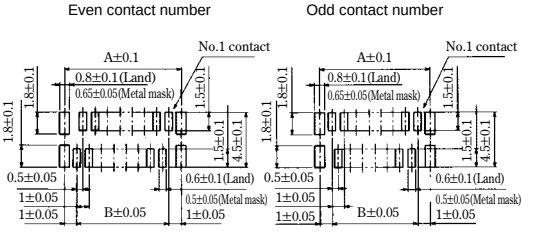


∗Set the stiffener thickness to 0.188 (7.5mil) min.

Unit: mm

Number of Contacts \ Dimension	A	B	Number of Contacts \ Dimension	A	B
10	4.5	5.5	26	12.5	13.5
12	5.5	6.5	30	14.5	15.5
13	6.0	7.0	32	15.5	16.5
15	7.0	8.0	33	16.0	17.0
16	7.5	8.5	34	16.5	17.5
17	8.0	9.0	36	17.5	18.5
18	8.5	9.5	40	19.5	20.5
20	9.5	10.5	45	22.0	23.0
22	10.5	11.5	49	24.0	25.0
24	11.5	12.5	50	24.5	25.5
			60	29.5	30.5

Land / Metal Mask dimensions



Recommended metal mask thickness : 0.15mm

Unit: mm

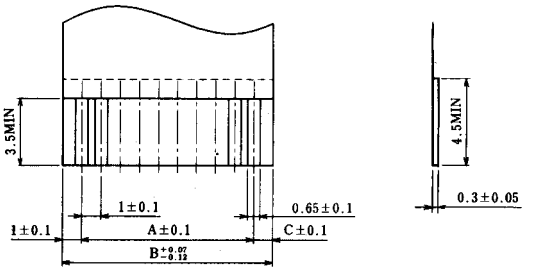
Number of Contacts \ Dimension	A	B	Number of Contacts \ Dimension	A	B
10	6.5	4.5	26	14.5	12.5
12	7.5	5.5	30	16.5	14.5
13	8.0	6.0	32	17.5	15.5
15	9.0	7.0	33	18.0	16.0
16	9.5	7.5	34	18.5	16.5
17	10.0	8.0	36	19.5	17.5
18	10.5	8.5	40	21.5	19.5
20	11.5	9.5	45	24.0	22.0
22	12.5	10.5	49	26.0	24.0
24	13.5	11.5	50	26.5	24.5
			60	31.5	29.5

■Recommended FPC/FFC dimensions and Land/Metal Mask dimensions

●1mm Pitch Product

1mm Pitch Bottom Contact Type

FPC/FFC dimensions



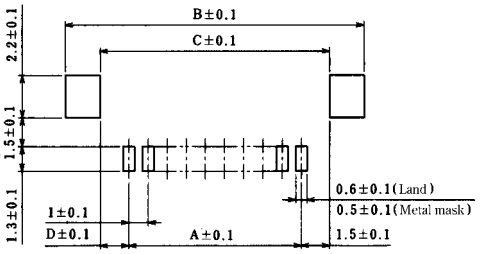
※Set the stiffener thickness to 0.188 (7.5mil) min.

Unit: mm

	Number of Contacts	A	B	C
Standard Type	5	4	6	1
	6	5	7	1
	7	6	8	1
	8	7	9	1
	9	8	10	1
	11	10	12	1
	12	11	13	1
	16	15	17	1
	17	16	18	1
	22	21	23	1
	26	25	27	1

	Number of Contacts	A	B	C
Eccentric Type	4	3	5.5	1.5
	6	5	7.5	1.5
	8	7	9.5	1.5
	10	9	11.5	1.5
	11	10	12.5	1.5
	14	13	15.5	1.5
	19	18	20.5	1.5
	24	23	25.5	1.5

Land / Metal Mask dimensions



Recommended metal mask thickness : 0.15mm

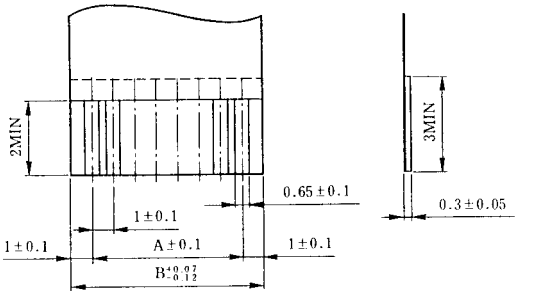
Unit: mm

	Number of Contacts	A	B	C	D
Standard Type	5	4	10.6	7	1.5
	6	5	11.6	8	1.5
	7	6	12.6	9	1.5
	8	7	13.6	10	1.5
	9	8	14.6	11	1.5
	11	10	16.6	13	1.5
	12	11	17.6	14	1.5
	16	15	21.6	18	1.5
	17	16	22.6	19	1.5
	22	21	27.6	24	1.5
	26	25	31.6	28	1.5

	Number of Contacts	A	B	C	D
Eccentric Type	4	3	10.1	6.5	2
	6	5	12.1	8.5	2
	8	7	14.1	10.5	2
	10	9	16.1	12.5	2
	11	10	17.1	13.5	2
	14	13	20.1	16.5	2
	19	18	25.1	21.5	2
	24	23	30.1	26.5	2

1mm Pitch Vertical Mounting Type

FPC/FFC dimensions

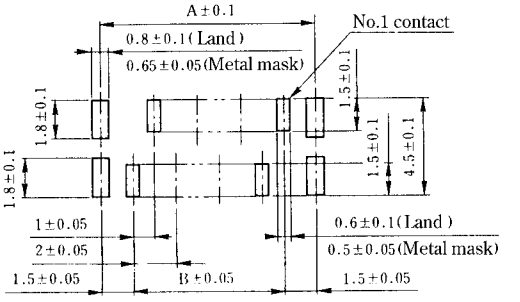


※Set the stiffener thickness to 0.188 (7.5mil) min.

Unit: mm

Number of Contacts	A	B
6	5	7
7	6	8
8	7	9
16	15	17
20	19	21
22	21	23
24	23	25

Land / Metal Mask dimensions



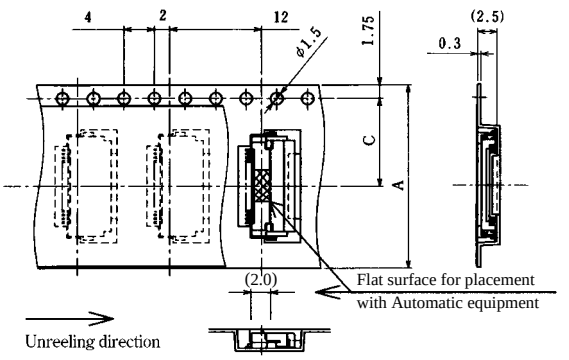
Recommended metal mask thickness : : 0.15mm

Unit: mm

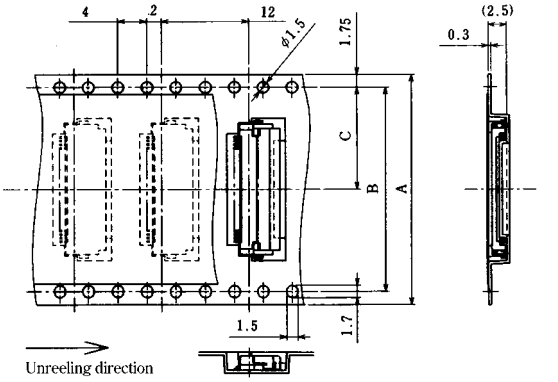
Number of Contacts	A	B
6	8	5
7	9	6
8	10	7
16	18	15
20	22	19
22	24	21
24	26	23

■Packaging Specification
Embossed Carrier Tape Dimensions
Horizontal Type (Common to Bottom/Top Contact, 0.5mm/1mm Pitch)

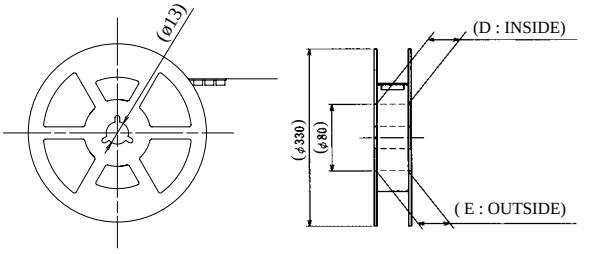
Tape width 24mm max.

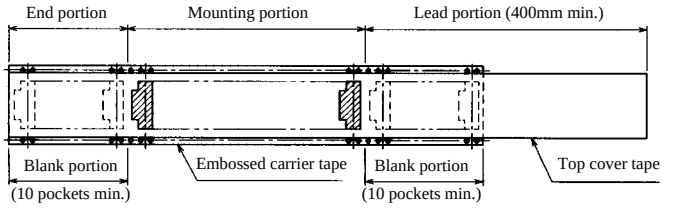


Tape width 32mm min.



Reel Dimensions (Common to All Types)





●0.5mm Pitch Bottom/Top Contact Type

Unit:mm

Number of Contacts \ Dimension	A	B	C	D	E
6	16	——	7.5	17.4	21.4
8	16	——	7.5	17.4	21.4
10	16	——	7.5	17.4	21.4
11	16	——	7.5	17.4	21.4
12	24	——	11.5	25.4	29.4
13	24	——	11.5	25.4	29.4
14	24	——	11.5	25.4	29.4
15	24	——	11.5	25.4	29.4
16	24	——	11.5	25.4	29.4
17	24	——	11.5	25.4	29.4
18	24	——	11.5	25.4	29.4
19	24	——	11.5	25.4	29.4
20	24	——	11.5	25.4	29.4
22	24	——	11.5	25.4	29.4
24	24	——	11.5	25.4	29.4

Number of Contacts \ Dimension	A	B	C	D	E
25	24	——	11.5	25.4	29.4
26	24	——	11.5	25.4	29.4
28	32	28.4	14.2	33.4	37.4
29	32	28.4	14.2	33.4	37.4
30	32	28.4	14.2	33.4	37.4
32	32	28.4	14.2	33.4	37.4
33	32	28.4	14.2	33.4	37.4
34	32	28.4	14.2	33.4	37.4
35	44	40.4	20.2	45.4	49.4
36	44	40.4	20.2	45.4	49.4
40	44	40.4	20.2	45.4	49.4
42	44	40.4	20.2	45.4	49.4
45	44	40.4	20.2	45.4	49.4
50	44	40.4	20.2	45.4	49.4
53	44	40.4	20.2	45.4	49.4

Note: 2,000 pieces per reel.

● 1mm Pitch Bottom Contact Type

Unit:mm

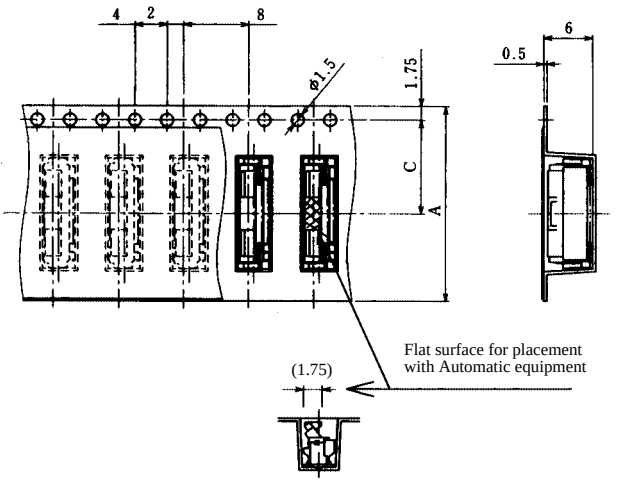
	Number of Contacts \ Dimension	A	B	C	D	E
Standard Type	5	16	——	7.5	17.4	21.4
	6	24	——	11.5	25.4	29.4
	7	24	——	11.5	25.4	29.4
	8	24	——	11.5	25.4	29.4
	9	24	——	11.5	25.4	29.4
	11	24	——	11.5	25.4	29.4
	12	24	——	11.5	25.4	29.4
	16	32	28.4	14.2	33.4	37.4
	17	44	40.4	20.2	45.4	49.4
	22	44	40.4	20.2	45.4	49.4
	26	44	40.4	20.2	45.4	49.4

	Number of Contacts \ Dimension	A	B	C	D	E
Eccentric Type	4	16	——	7.5	17.4	21.4
	6	24	——	11.5	25.4	29.4
	8	24	——	11.5	25.4	29.4
	10	24	——	11.5	25.4	29.4
	11	24	——	11.5	25.4	29.4
	14	32	28.4	14.2	33.4	37.4
	19	44	40.4	20.2	45.4	49.4
	24	44	40.4	20.2	45.4	49.4

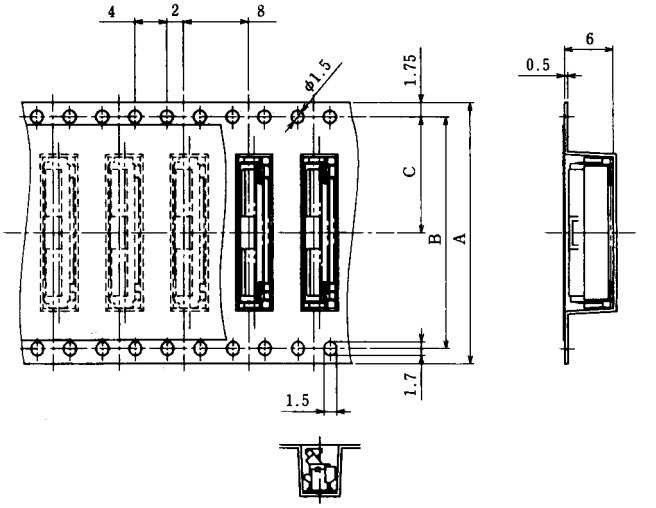
Note: 2,000 pieces per reel.

Vertical Mounting Type (Common to 0.5mm/1mm Pitch)

Tape width 24mm max.



Tape width 32mm min.



●0.5mm Pitch Vertical mounting Type

Unit:mm

Dimension / Number of Contacts	A	B	C	D	E
10	16	——	7.5	17.4	21.4
12	16	——	7.5	17.4	21.4
13	24	——	11.5	25.4	29.4
15	24	——	11.5	25.4	29.4
16	24	——	11.5	25.4	29.4
17	24	——	11.5	25.4	29.4
18	24	——	11.5	25.4	29.4
20	24	——	11.5	25.4	29.4
22	24	——	11.5	25.4	29.4
24	24	——	11.5	25.4	29.4

Note: 1,000 pieces per reel.

Dimension / Number of Contacts	A	B	C	D	E
26	24	——	11.5	25.4	29.4
30	32	28.4	14.2	33.4	37.4
32	32	28.4	14.2	33.4	37.4
33	32	28.4	14.2	33.4	37.4
34	44	40.4	20.2	45.4	49.4
36	44	40.4	20.2	45.4	49.4
40	44	40.4	20.2	45.4	49.4
45	44	40.4	20.2	45.4	49.4
49	44	40.4	20.2	45.4	49.4
50	44	40.4	20.2	45.4	49.4
60	56	52.4	26.2	57.4	61.4

●1mm Pitch Vertical mounting Type

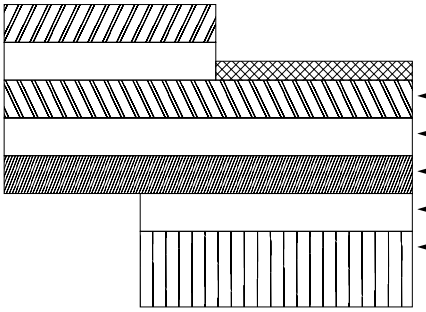
Unit:mm

Dimension / Number of Contacts	A	B	C	D	E
6	24	——	11.5	25.4	29.4
7	24	——	11.5	25.4	29.4
8	24	——	11.5	25.4	29.4
16	32	28.4	14.2	33.4	37.4
20	44	40.4	20.2	45.4	49.4
22	44	40.4	20.2	45.4	49.4
24	44	40.4	20.2	45.4	49.4

Note: 1,000 pieces per reel.

■FH12 Series FPC/FFC Construction (Recommended Specifications)

1. FFC　　FFC : Flexible Flat Cable

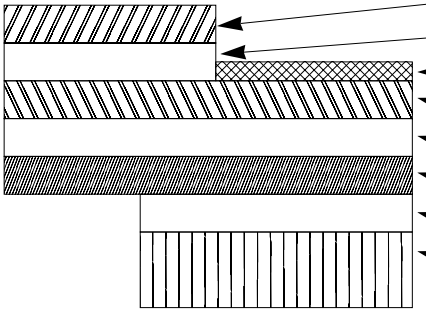


Material Name	Material	Thickness (μm)	
Polyester film		(12)	
Adhesive	Thermoplastic polyester	(30)	
(Nickel under plated / Gold plated), soft copper film		35	
Adhesive	Polyester type	30	
Polyester		12	
Adhesive	Polyester type	30	
Stiffener	Polyester type	188	(Note)
	Total	295	

✻Real tolerance of thickness dimension is on the order of ±20 μm (275 to 315 μm)

Note: Use of a thicker FFC results in a stiffer lock action and the lock is more easily released.
A factor that contributes to thicker FFC is the use of 250 μm stiffener which is thicker than the standard (188 μm) product. This results in a total thickness of 357 μm.
When using FFC, control of FFC thickness becomes easy if you indicate to us the thickness of the stiffener.

2. FPC　　FPC : Flexible Printed Circuit

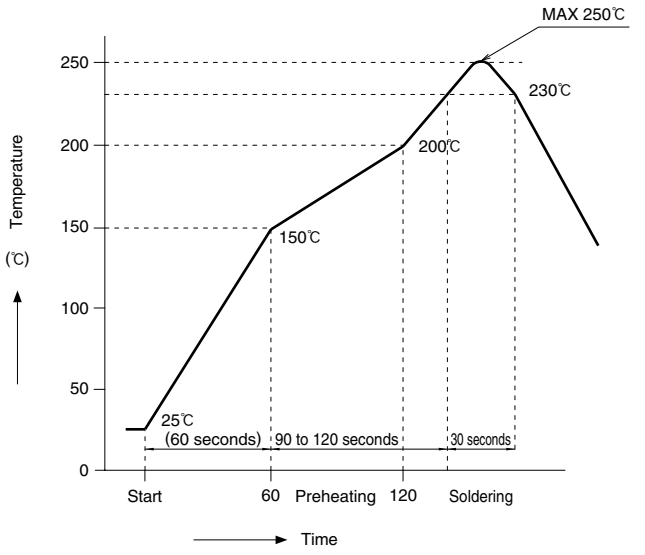


Material Name	Material	Thickness (μm)
Covering layer film	Polyimide 1 mil	(25)
Cover adhesive		(25)
Surface treatmenta	Nickel under plated 1to 5μm / Gold plated 0.2μm	3
Copper foil	Cu 1oz	35
Base adhesive	Heat-hardened adhesive	25
Base film	Polyimide 1 mil	25
Reinforcement material adhesive	Heat-hardened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

3. Precautions

1. This specification is a recommendation for the construction of the FH12 Series FPC and FFC (t=0.3 ±0.05).
2. For details about the construction, please contact the FPC/FFC manufacturers.

■Recommended Temperature Profile

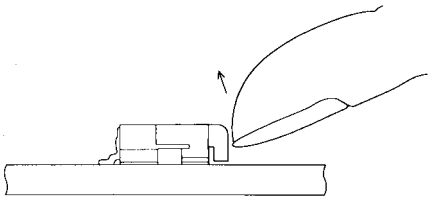
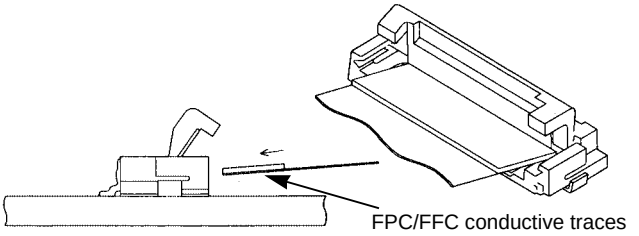
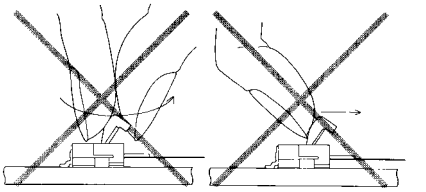
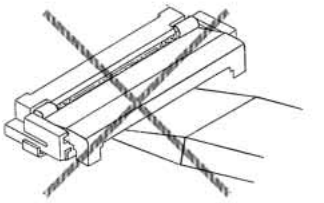
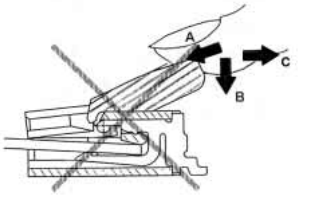
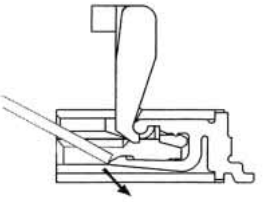
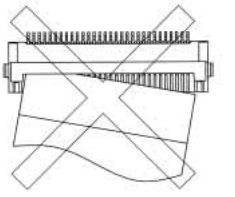


HRS test conditions

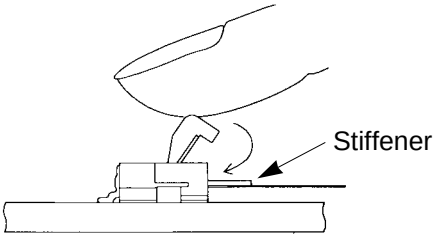
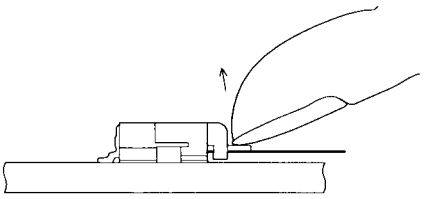
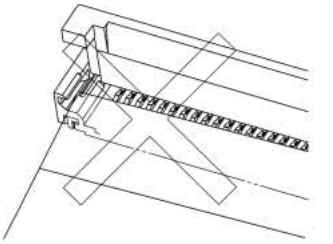
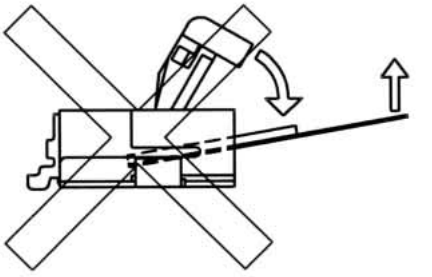
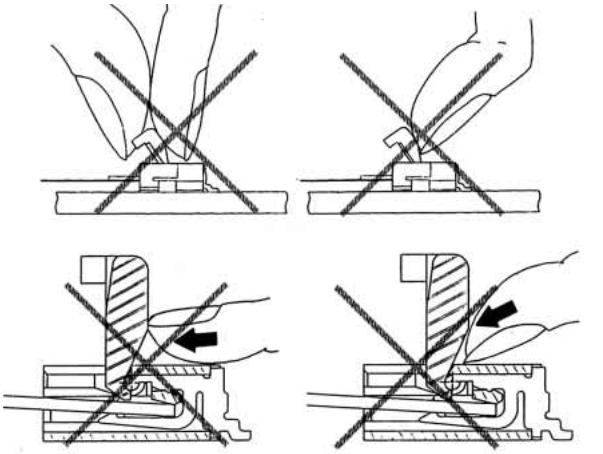
Solder method	:Reflow, IR/hot air
Environment:	:Room air
Solder composition	:Paste, 96.5%Sn/3%Ag/0.5%Cu (Senju Metal Industry, Co., Ltd.'s Part Number: M705-221CM5-32-10.5)
Test board	:Glass epoxy 40mm×80mm×1.6mm thick
Land dimensions	:Top and bottom contact type 0.3mm×1.3mm Vertical mounting type 0.6mm×1.5mm
Metal mask	:Top and bottom contact type 0.25mm×1.3mm×0.15mm thick Vertical mounting type 0.5mm×1.5mm×0.15mm 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.

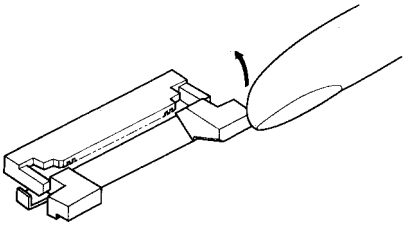
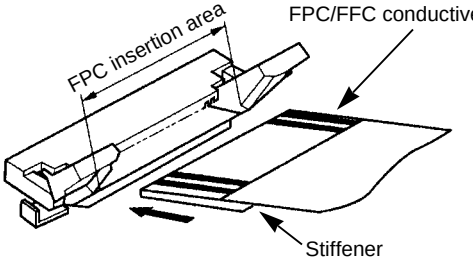
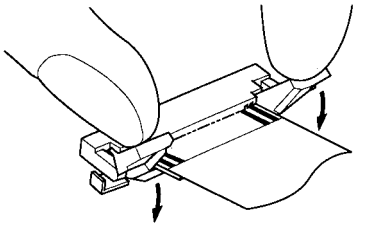
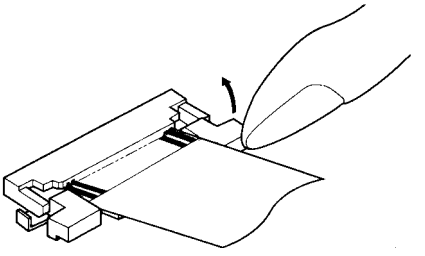
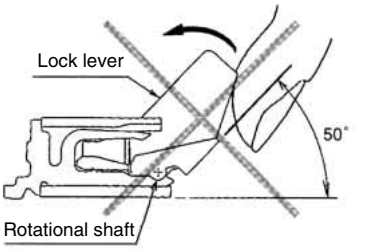
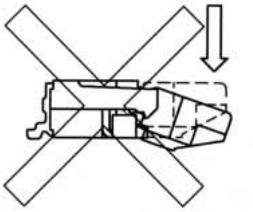
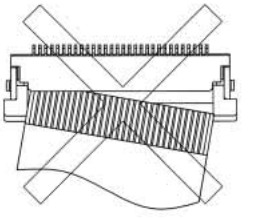
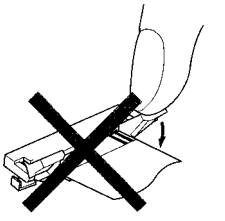
■Connector Operating Instructions, precautions and recommendations
●Bottom Contact Type (common for 0.5mm/1mm Pitch)

Operation	Precautions
1. FPC/FFC Termination procedure. Connector installed on the board. 1) Lift up the actuator. Use thumb or index finger.  2) Fully insert the FPC/FFC parallel to mounting surface, with the exposed conductive traces facing down. 	1) Avoid grasping the actuator with two fingers or lifting the actuator with fingernail.  2) Do not use a thin tool such as the tip of a screwdriver to release the lock lever. Doing so will cause deformation of the contacts.  3) Do not apply force in the direction of arrows A, B, or C while the lock lever is open. Doing so will cause the lock lever to become disen gaged, or will damage the hook portion of the connector body.  4) When inserting the FPC/FFC, do not forcefully rub against the surface beneath the connector insertion slot. Doing so will result in the FPC/FFC forcefully striking the contacts and this will cause contact deformation, peeling of the FPC/FFC conductors, and other irregularities.  5) Insert the FPC/FFC at the proper position of the connector insertion slot, and insert perpendicularly with respect to the connector. Improper insertion will cause continuity problems, disengagement of the lock lever, and damage to the hook portion. 

●Bottom Contact Type (common for 0.5mm/1mm Pitch)

Operation	Precautions
3) Rotate down the actuator until firmly closed. It is critical that the inserted FPC/FFC is not moved and remains fully inserted. Should the FPC/FFC be moved, open the actuator and repeat the process, starting with Step 1.  **2. FPC/FFC Removal** 1) Lift up the actuator. 2) Carefully remove the FPC/FFC. 	6) Partial insertion of the FPC/FFC, offset insertion, and diagonal insertion will result in an unfavorable engagement of the lock lever in which the lock lever is raised. To correct this, first remove the FPC/FFC and then reinsert it. Forcing the lock will damage the connector.  7) When locking, handle the FPC/FFC so that a load is not applied to the FPC/FFC as would occur by pulling the FPC/FFC, or lifting it, etc. When a load is applied in the opposite direction to the rotational movement of the lock, an excessive load will be applied and this will cause connector damage.  8) At the time of lock operation, application of force such as that indicated by the arrows in the diagrams below will cause the lock lever to disengage. When the lock lever has become disengaged, please exchange the entire connector. 

●Top Contact Type

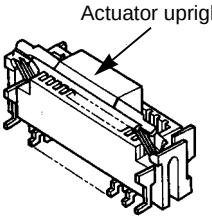
Operation	Precautions
1. FPC/FFC Termination procedure. Connector installed on the board. 1) Lift up the actuator. Use thumb or index finger.  2) Fully insert the FPC/FFC parallel to mounting surface, with the exposed conductive traces facing UP.  3) Rotate down the actuator until firmly closed. It is critical that the inserted FPC/FFC is not moved and remains fully inserted. Should the FPC/FFC be moved, open the actuator and repeat the process, starting with Step 1 above.  **2. FPC/FFC Removal** 1) Lift up the actuator. 2) Carefully remove the FPC/FFC. 	1) Avoid further lifting of the lock lever once the lock has been released. Doing so will cause the lock lever to separate from the rotational shaft, and the lock lever will become disengaged or the hook portion of the connector body will be damage  2) Avoid further pressing of the lock portion from the locked condition when the FPC/FFC has not yet been inserted. Doing so will cause the lock lever to become disengaged from the rotational shaft, and the hook portion of the connector body will be damaged.  3) Do not insert the FPC/FFC diagonally. Doing so will result in the corners of the FPC/FFC catching on the contacts and will cause deformation of the contacts.  4) When closing down the actuator apply equal pressure to both sides of the actuator. 

●Vertical Mounting Type (common for 0.5mm/1mm Pitch)

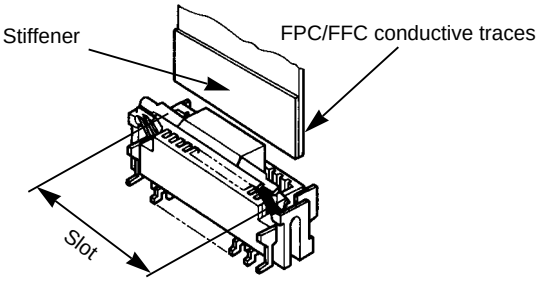
Operation	Precautions

1. FPC/FFC Termination procedure. Connector installed on the board.

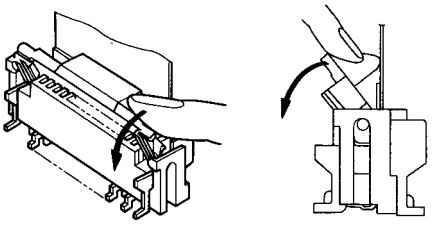
1) Verify that the actuator is positioned upright. If the actuator has rotated to the side, carefully rotate it upright.



2) Insert the FPC/FFC vertically in the connector slot assuring that the conductive traces of the FPC/FFC are facing away from the actuator.

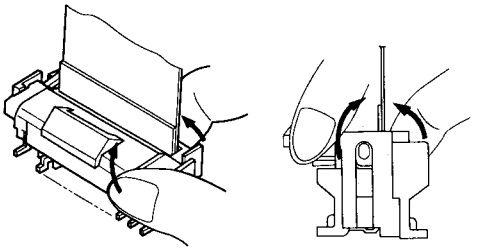


3) Press down the actuator in the direction shown.

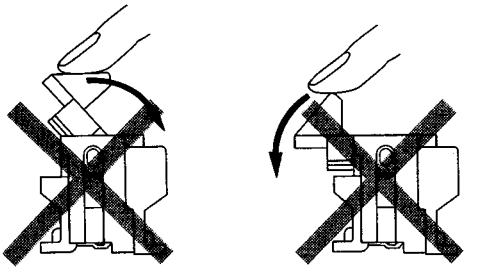


2. FPC/FFC Removal

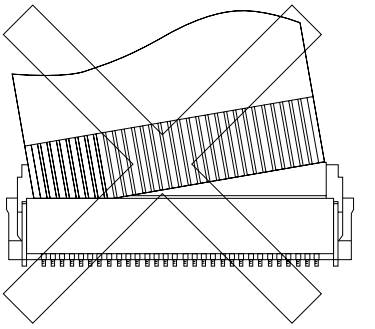
Rotate the actuator upward and withdraw the FPC/FFC.



1) Avoid forcing the actuator up or down without the FPC/FFC inserted.



2) Do not insert the FPC/FFC diagonally.
Doing so will result in the corners of the FPC/FFC catching on the contacts and will cause deformation of the contacts.



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The contents of this catalog are current as of date of 09/2010. Contents are subject to change without notice for the purpose of improvements.

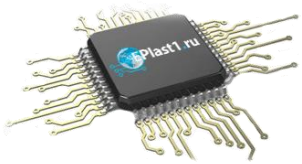
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