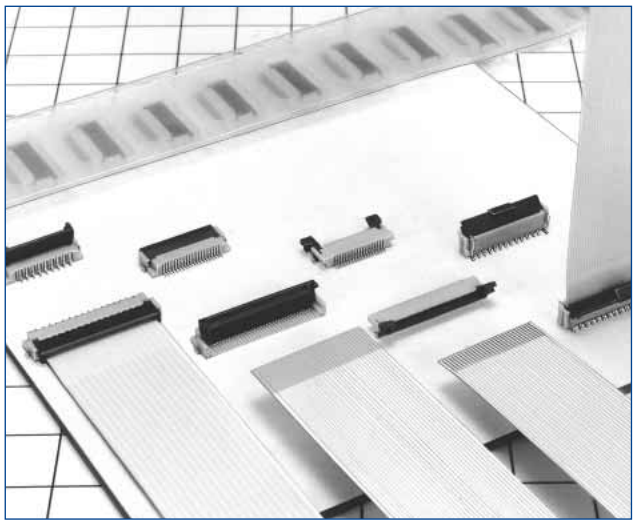
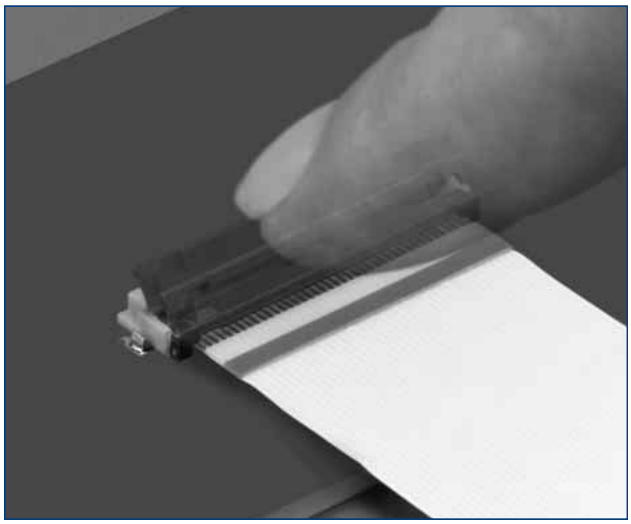
0.5 mm and 1 mm Pitch FPC/FFC Connectors

FH12 Series





■Features

1. Rotating one-touch ZIF mechanism

The one-touch rotating ZIF mechanism is easier to operate and works with a light force.

2. Clear tactile click

A clear tactile click is delivered upon the successful completion of the mating process

3. Supports high density mounting

The FH12's one-touch ZIF system requires less space than a slide locking connector and can be mounted in the center of the PCB.

4. Top & Bottom Contact and Vertical Mount type

There are three connection types available: top contact, bottom contact and a Vertical mount.

5. 1 mm pitch product

In addition to the 0.5 mm pitch connector, we also offer a 1 mm pitch connector.

6. Reinforced actuator

The FH12S version in 30, 40, 45, 50, and 53 pin counts are offered with a reinforced actuator that provides an extra measure of security against actuator breakage.

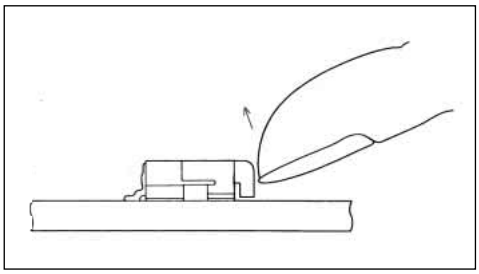
7. Supports 0.18 mm thick FPC

The FH12F version connector supports a 0.18 mm thick FPC (±0.05).

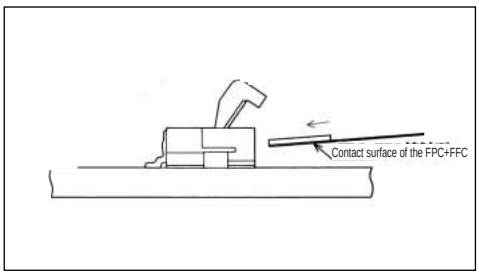
Double-sided FPC do not require a stiffener when used on the connectors.

Rotating one-touch ZIF mechanism

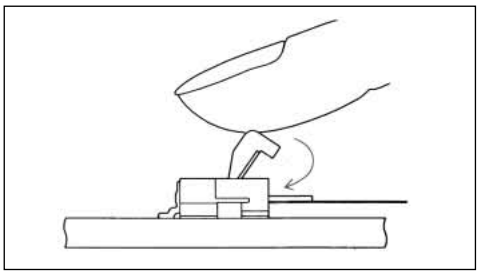
①



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)

Adaptive FPC/FFC contact specifications	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, for 10 cycles in 3 axial directions
6. Shock	No electrical discontinuity of 1μs or more Contact resistance: 50m ohms maximum. No damage, cracks, or parts dislocation.	Acceleration of 981 m/s^2, 6 ms duaration, 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.

■Material

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

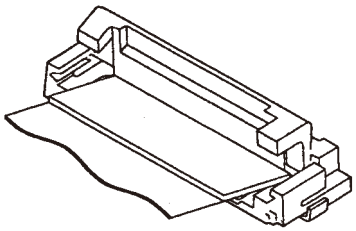
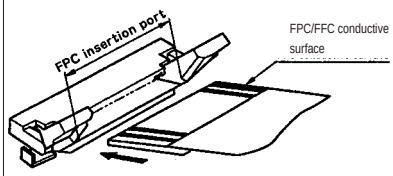
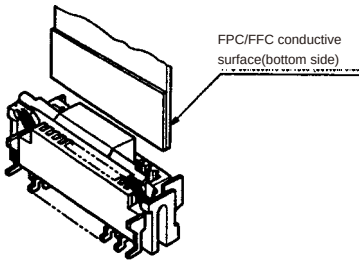
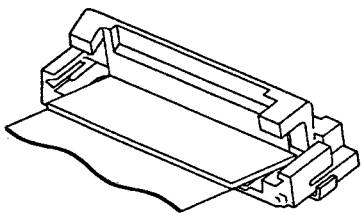
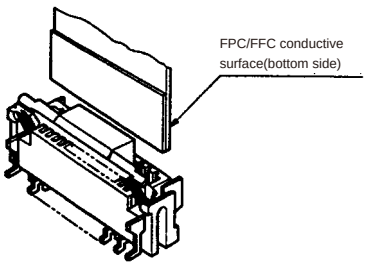
■Ordering Information

FH 12 A - 10 (4) S A - 0.5 SH (∗∗)

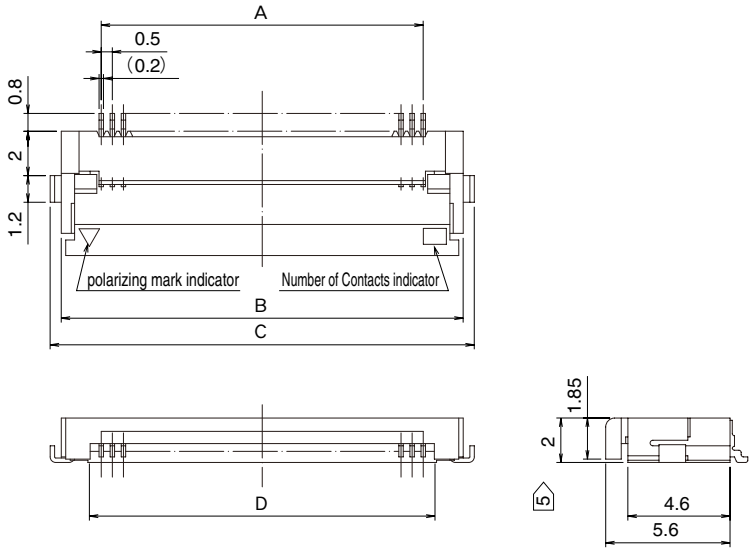
❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾ ❿

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 (1)(98) : Gold plated 500 pieces/reel

■Series Configuration

Pitch	Bottom Contact Type	Top Contact Type	Vertical mounting Type
0.5mm	 **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	 **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	 **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
	Type with Strengthened Lock Lever **FH12S- ** S-0.5SH** P.5 Number of contacts 30, 40, 45, 50, 53		
	Type with 0.18mm FPC End Thickness **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		
1mm	 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		 **FH12- ** S-1SV** P.10 Number of contacts 6, 7, 8, 16, 20, 22, 24

■0.5mm Pitch Bottom Contact Type



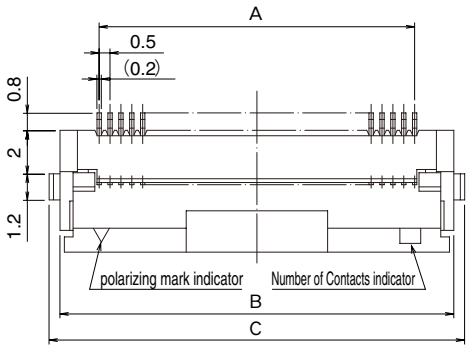
Note 1 : The coplanarity of each terminal lead within specified dimension is 0.1 mm Max.
Note 2 : Packaged on tape and reel only. Check packaging specification.
Note 3 : Slight variations in color of the plastic compounds do not affect form, fit or function of the connector.
Note 4 : After reflow, the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

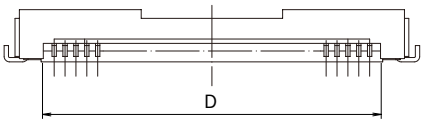
Unit:mm

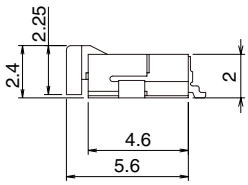
	Part Number	CL No.	Number of Contacts	A	B	C	D
	FH12-6S-0.5SH(**)	586-0582-5-**	6	2.5	6.1	7.1	3.57
	FH12-8S-0.5SH(**)	586-0744-5-**	8	3.5	7.1	8.1	4.57
	FH12-10S-0.5SH(**)	586-0522-3-**	10	4.5	8.1	9.1	5.57
	FH12-11S-0.5SH(**)	586-0600-5-**	11	5.0	8.6	9.6	6.07
	FH12-12S-0.5SH(**)	586-0704-0-**	12	5.5	9.1	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, 500 pieces/reel). Order by number of reels.

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







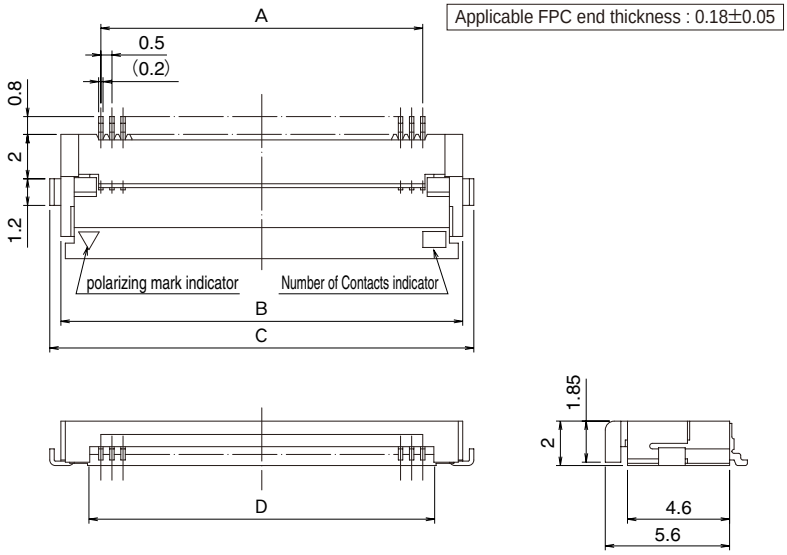
Note 1 : The coplanarity of each terminal lead within specified dimension is 0.1 mm Max.
Note 2 : Packaged on tape and reel only. Check packaging specification.
Note 3 : Slight variations in color of the plastic compounds do not affect form, fit or function of the connector.
Note 4 : After reflow, the 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, 500 pieces/reel).
Order by number of reels.

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



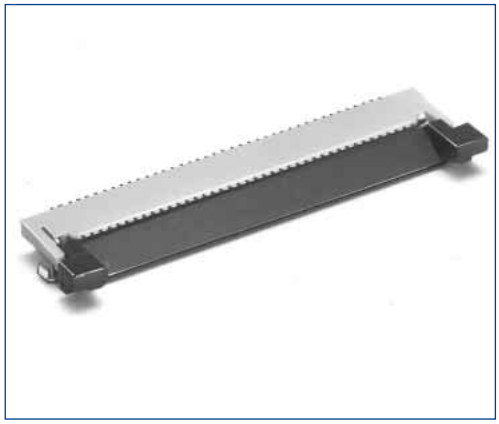
Note 1 : The coplanarity of each terminal lead within specified dimension is 0.1 mm Max.
Note 2 : Packaged on tape and reel only. Check packaging specification.
Note 3 : Slight variations in color of the plastic compounds do not affect form, fit or function of the connector.
Note 4 : After reflow, the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

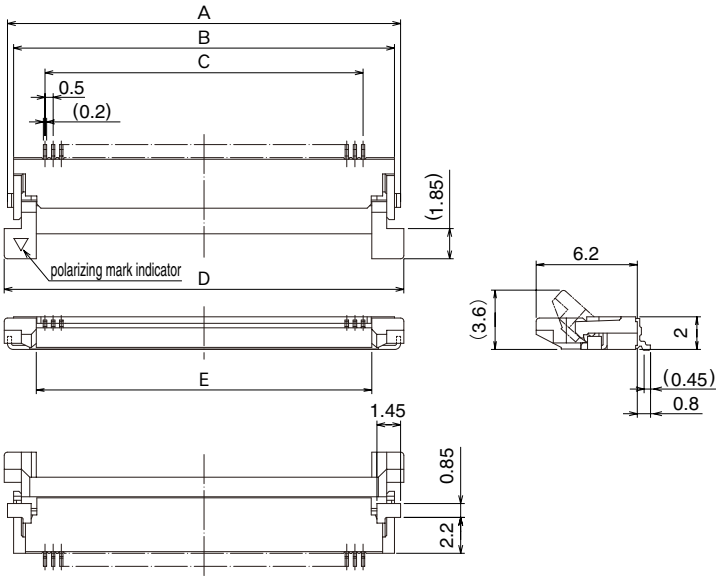
Unit:mm

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.

■0.5mm Pitch Top Contact Type





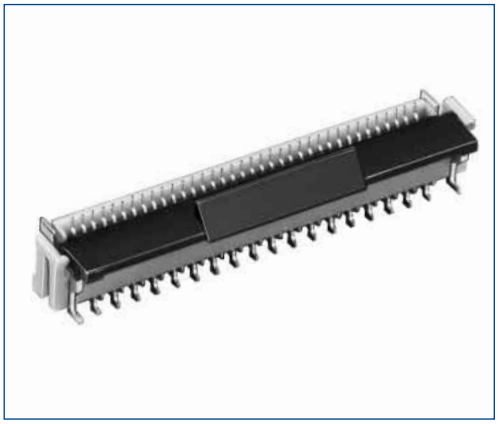
Note 1 : The coplanarity of each terminal lead within specified dimension is 0.1 mm Max.
Note 2 : Packaged on tape and reel only. Check packaging specification.
Note 3 : Slight variations in color of the plastic compounds do not affect form, fit or function of the connector.
Note 4 : After reflow, the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

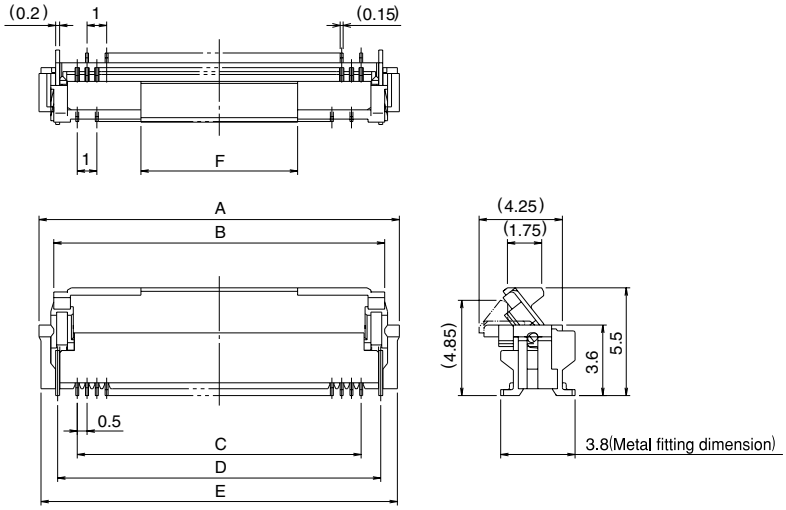
Unit:mm

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.

■0.5mm Pitch Vertical mounting Type





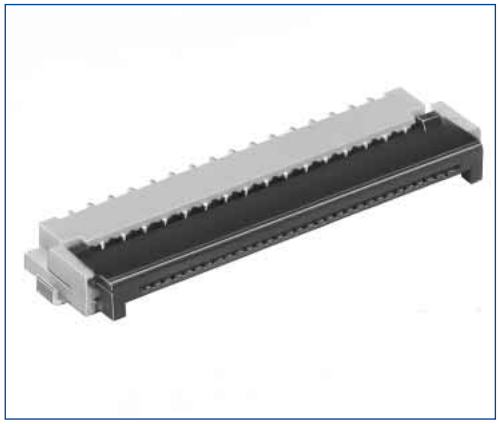
Note 1 : The coplanarity of each terminal lead within specified dimension is 0.1 mm Max.
Note 2 : Packaged on tape and reel only. Check packaging specification.
Note 3 : Slight variations in color of the plastic compounds do not affect form, fit or function of the connector.
Note 4 : After reflow, the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

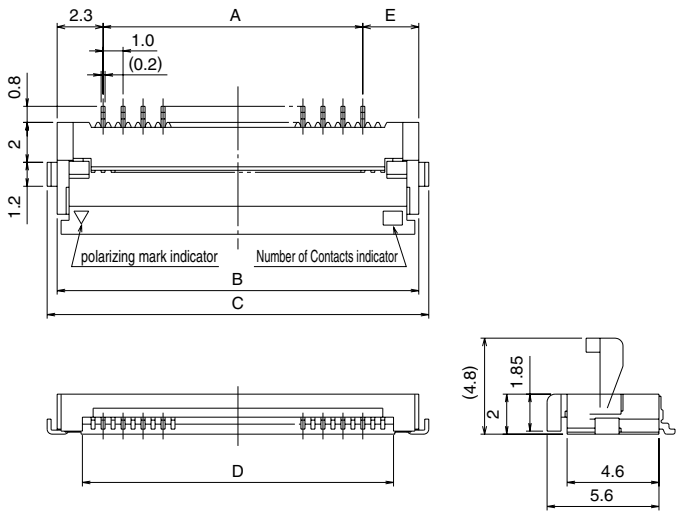
Unit:mm

Part Number	CL No.	Number of Contacts	A	B	C	D	E	F
FH12-10S-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, 500 pieces/reel).
Order by number of reels.

■1mm Pitch Type Bottom Contact Type





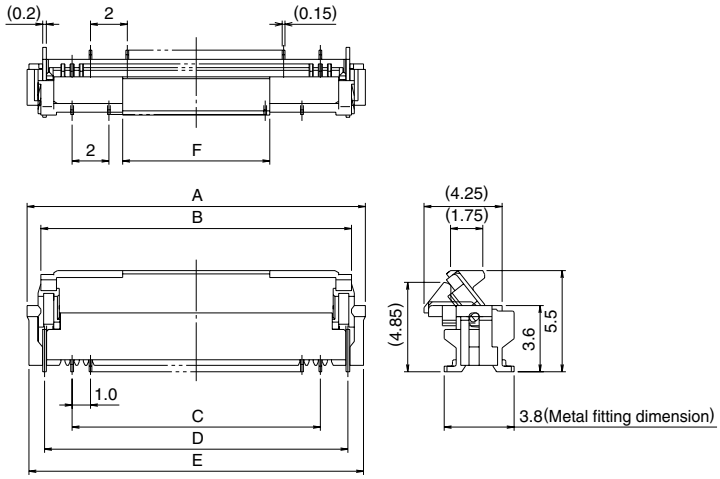
Note 1 : The coplanarity of each terminal lead within specified dimension is 0.1 mm Max.
Note 2 : Packaged on tape and reel only. Check packaging specification.
Note 3 : Slight variations in color of the plastic compounds do not affect form, fit or function of the connector.
Note 4 : After reflow, the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

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, 500 pieces/reel). Order by number of reels.

■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

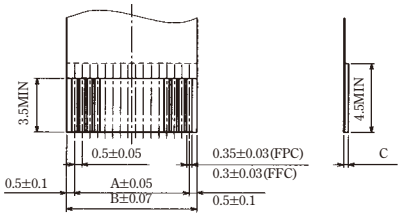
Note 1 : Embossed tape reel packaging (1,000 pieces/reel, 500 pieces/ree).
Order by number of reels.

■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

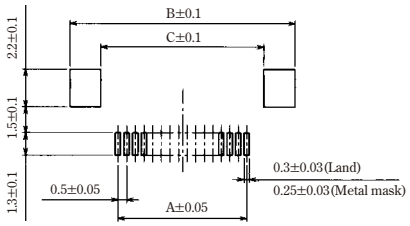


Product Type	C Dimension
Types other than those below	0.3±0.05min
	Stiffener thickness should be 0.188 mm (7.5 mil) min
FH12F	0.18±0.05

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



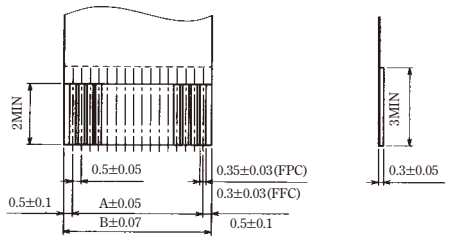
Recommended metal mask thickness : 0.15mm

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

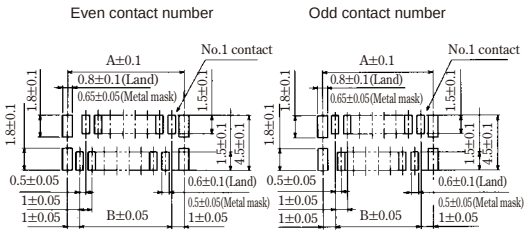


∗Set the stiffener thickness to 0.188 (7.5mil) min.

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

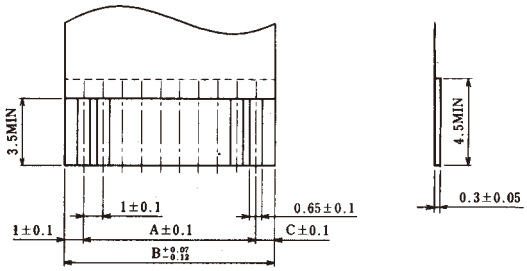
Number of Contacts \ Dimension	A	B	Number of Contacts \ Dimension	A	B
10	6.5	4.5	26	14.5	12.5
12	7.5	5.5	30	16.5	14.5
13	8.0	6.0	32	17.5	15.5
15	9.0	7.0	33	18.0	16.0
16	9.5	7.5	34	18.5	16.5
17	10.0	8.0	36	19.5	17.5
18	10.5	8.5	40	21.5	19.5
20	11.5	9.5	45	24.0	22.0
22	12.5	10.5	49	26.0	24.0
24	13.5	11.5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



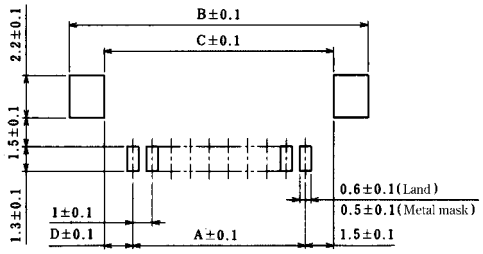
※Set the stiffener thickness to 0.188 (7.5mil) min.

Unit: mm

Dimension / 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

Dimension / 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

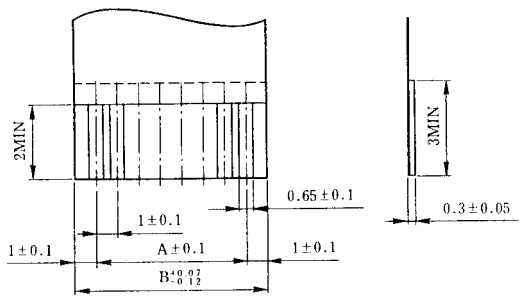
Unit: mm

Dimension / 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

Dimension / 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

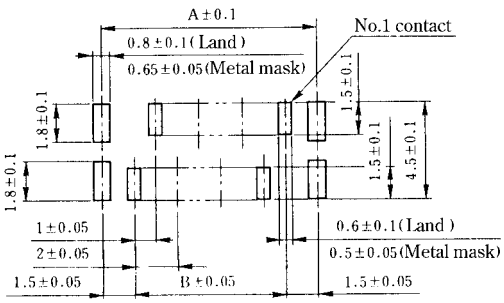


∗Set the stiffener thickness to 0.188 (7.5mil) min.

Unit: mm

Dimension / 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

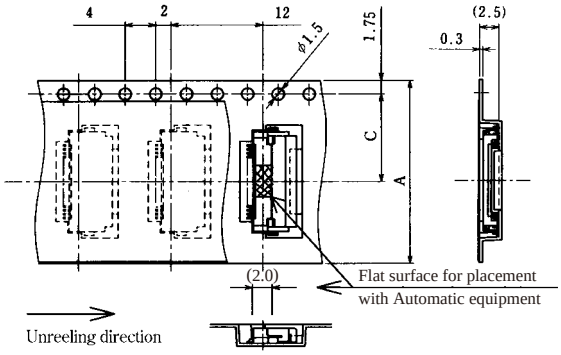
Dimension / Number of Contacts	A	B
6	8	5
7	9	6
8	10	7
16	18	15
20	22	19
22	24	21
24	26	23

■Packaging Specification

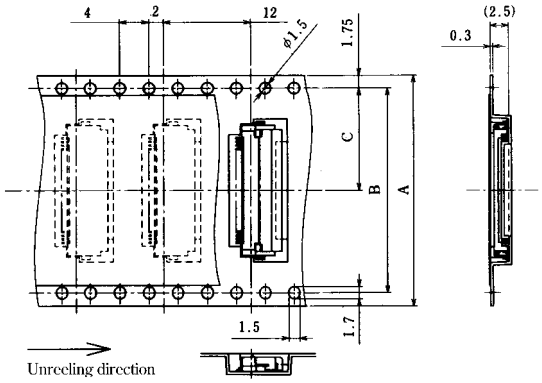
Embossed Carrier Tape Dimensions

Horizontal Type (Common to Bottom/Top Contact, 0.5mm/1mm Pitch)

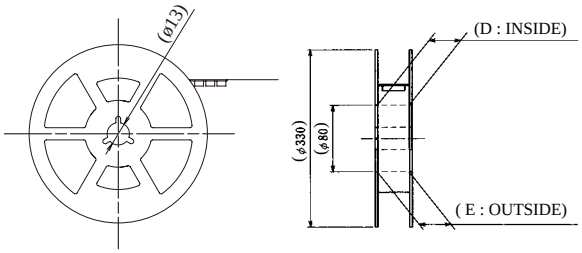
Tape width 24mm max.

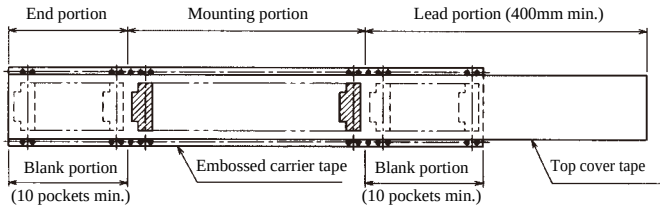


Tape width 32mm min.



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

● 1mm Pitch Bottom Contact Type

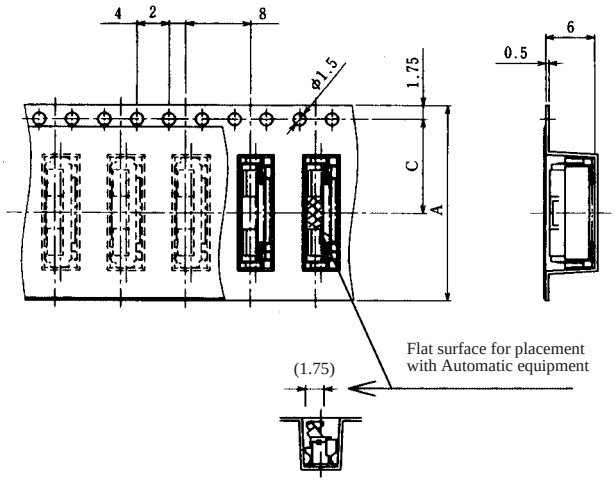
Unit:mm

	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

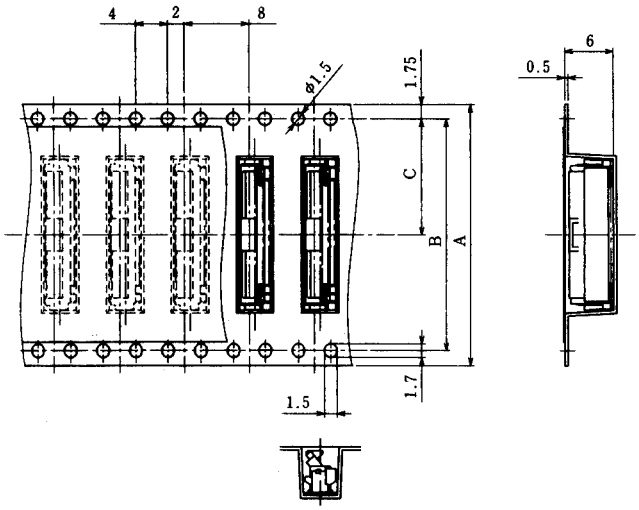
	Number of Contacts \ Dimension	A	B	C	D	E
Eccentric Type	4	16	——	7.5	17.4	21.4
	6	24	——	11.5	25.4	29.4
	8	24	——	11.5	25.4	29.4
	10	24	——	11.5	25.4	29.4
	11	24	——	11.5	25.4	29.4
	14	32	28.4	14.2	33.4	37.4
	19	44	40.4	20.2	45.4	49.4
	24	44	40.4	20.2	45.4	49.4

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

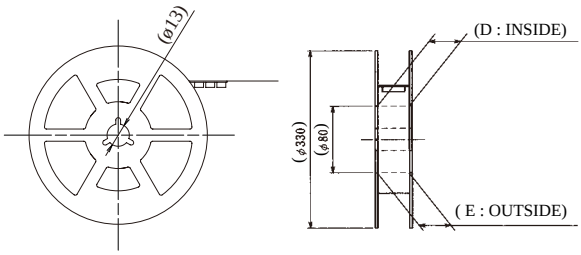
Tape width 24mm max.

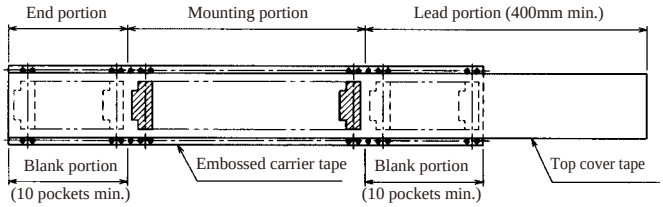


Tape width 32mm min.



Reel Dimensions (Common to All Types)





●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

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

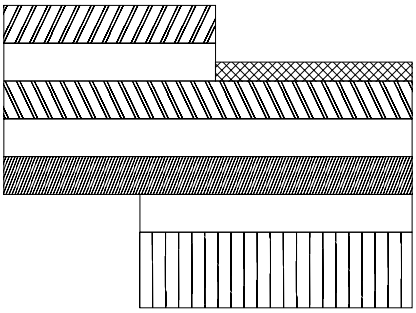
Unit:mm

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

■FH12 Series FPC/FFC Construction (Recommended Specifications)

1. FFC

FFC : Flexible Flat Cable



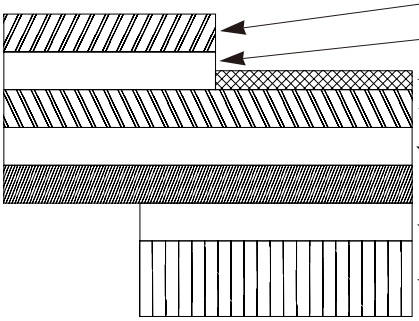
Material Name	Material	Thickness (μm)	
Polyester film		(12)	
Adhesive	Thermoplastic polyester	(30)	
(Nickel under plated / Gold plated), soft copper film		35	
Adhesive	Polyester type	30	
Polyester		12	
Adhesive	Polyester type	30	
Stiffener	Polyester type	188	(Note)
	Total	295	

✻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

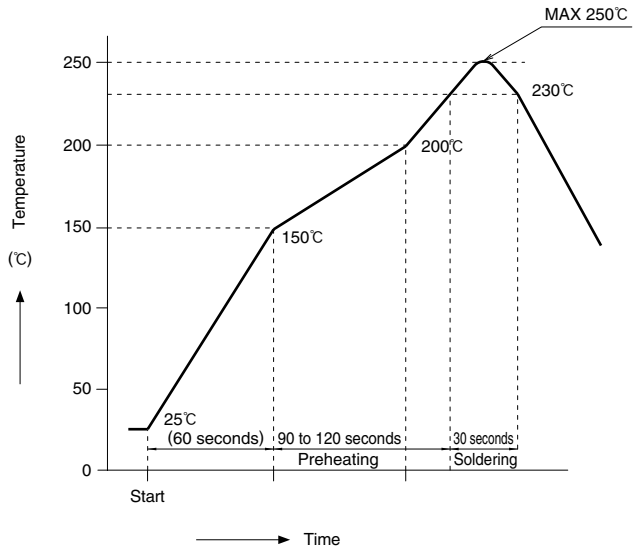


Material Name	Material	Thickness (μm)
Covering layer film	Polyimide 1 mil	(25)
Cover adhesive		(25)
Surface treatmenta	Nickel under plated 1to 5μm / Gold plated 0.2μm	3
Copper foil	Cu 1oz	35
Base adhesive	Heat-hardened adhesive	25
Base film	Polyimide 1 mil	25
Reinforcement material adhesive	Heat-hardened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



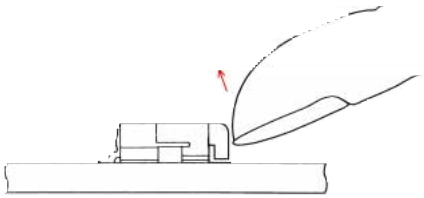
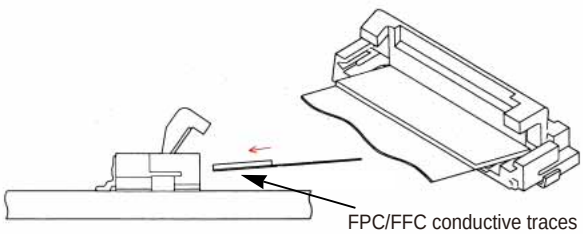
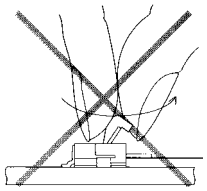
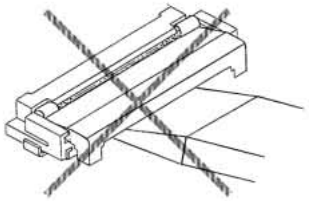
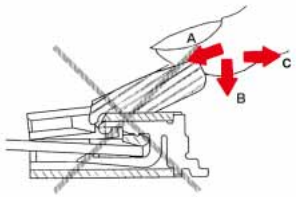
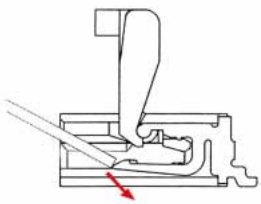
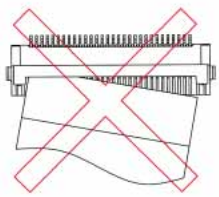
HRS test conditions

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

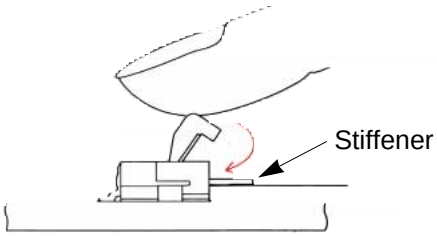
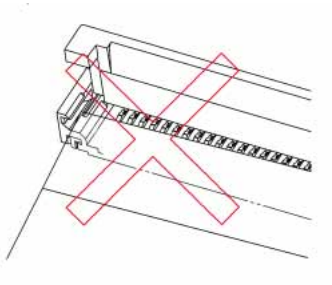
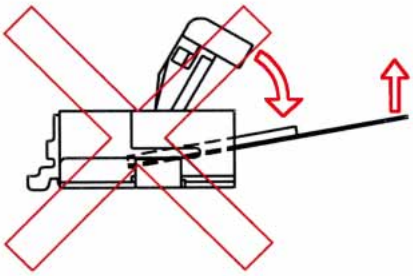
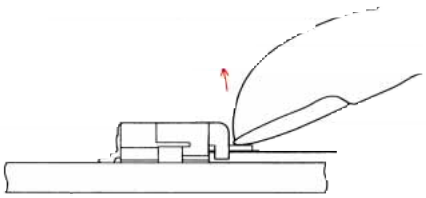
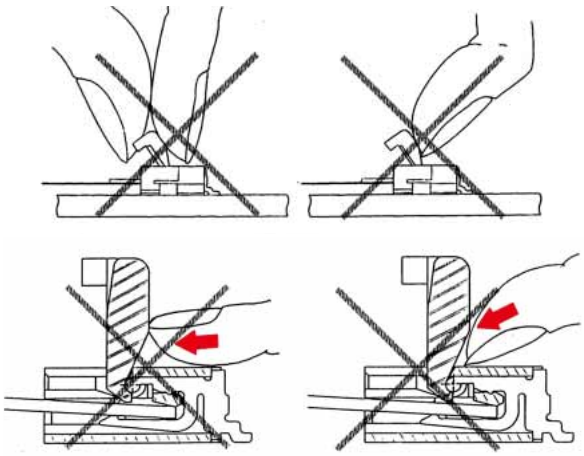
This temperature profile is based on the above conditions.
In individual applications the actual temperature may vary, depending on solder paste type, volume/thickness and board size/thickness. Consult your solder paste and equipment manufacturer for specific recommendations.

■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)

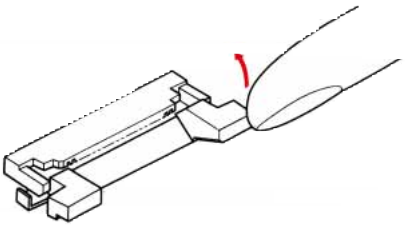
Operation	Precautions
3) Rotate down the actuator until firmly closed. It is critical that the inserted FPC/FFC is not moved and remains fully inserted. Should the FPC/FFC be moved, open the actuator and repeat the process, starting with Step 1.  	6) Partial insertion of the FPC/FFC, offset insertion, 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. 
2. FPC/FFC Removal 1) Lift up the actuator. 2) Carefully remove the FPC/FFC. 	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

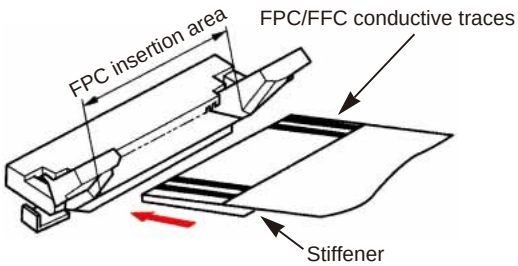
Operation	Precautions

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

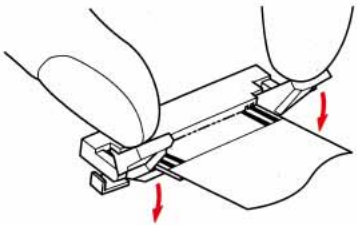
1) Lift up the actuator. Use thumb or index finger.



2) Fully insert the FPC/FFC parallel to mounting surface, with the exposed conductive traces facing UP.

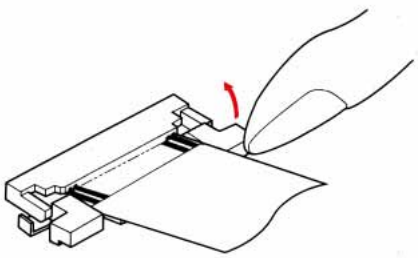


3) Rotate down the actuator until firmly closed. It is critical that the inserted FPC/FFC is not moved and remains fully inserted. Should the FPC/FFC be moved, open the actuator and repeat the process, starting with Step 1 above.

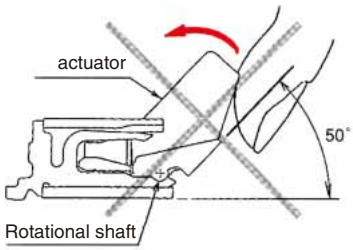


2. FPC/FFC Removal

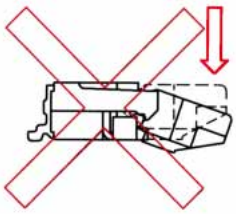
1) Lift up the actuator.
2) Carefully remove the FPC/FFC.



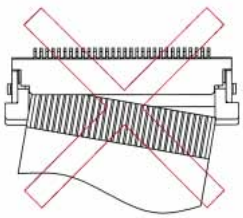
1) Avoid further lifting of the actuator once the lock has been released. Doing so will cause the lock lever to separate from the rotational shaft, and the lock lever will become disengaged or the hook portion of the connector body will be damaged.



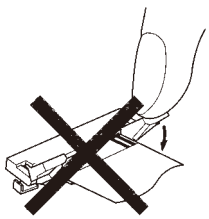
2) Avoid further pressing of the lock portion from the locked condition when the FPC/FFC has not yet been inserted. Doing so will cause the lock lever to become disengaged from the rotational shaft, and the hook portion of the connector body will be damaged.



3) Do not insert the FPC/FFC diagonally. D o i n g 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.

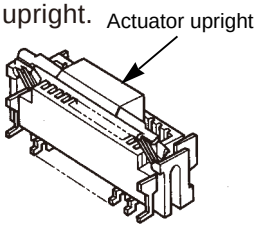


●Vertical Mounting type (common for 0.5 mm/1 mm pitch)

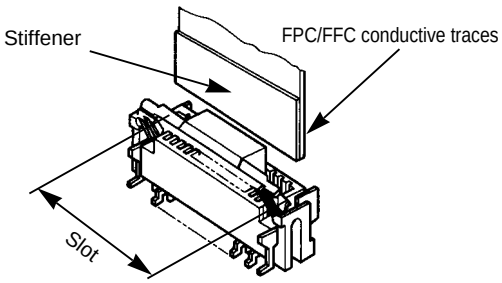
Operation

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

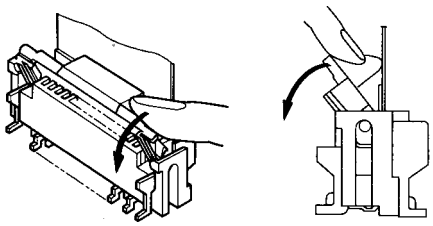
1) Verify that the actuator is positioned upright. If the actuator has rotated to the side, carefully rotate it upright.



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.

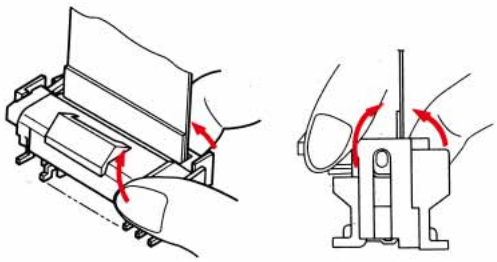


3) Press down the actuator in the direction shown.



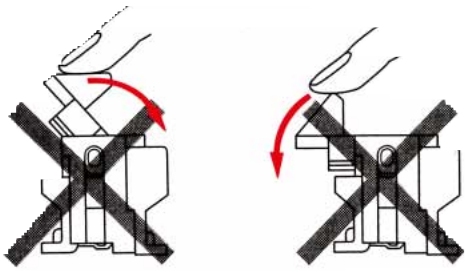
2. FPC/FFC Removal

Rotate the actuator upward and withdraw the FPC/FFC.

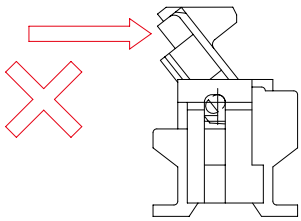


Precautions

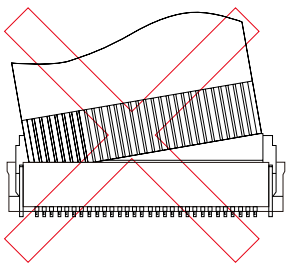
1) Avoid forcing the actuator up or down without the FPC/FFC inserted.



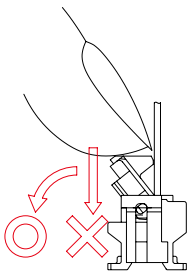
2) Do not attempt to open or over rotate an already released actuator (refer to the diagram below). These actions may damage the actuator.



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) Do not press down vertically on the actuator when the FPC/FFC already inserted, it needs to be rotated to engage the lock. Refer to the diagram below. Doing so may cause actuator failure.



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TEL: +81-45-620-3526 Fax: +81-45-591-3726
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FH12-10S-0.5SH(55) FH12-10S-0.5SV(55) FH12-12S-0.5SH(55) FH12-12S-0.5SV(55) FH12-15S-0.5SH(55) FH12-15S-0.5SV(55) FH12-16S-0.5SV(55) FH12-16S-1SH(55) FH12-18S-0.5SH(55) FH12-20S-0.5SH(55) FH12-20S-0.5SV(55) FH12-22S-0.5SH(55) FH12-22S-0.5SV(55) FH12-22S-1SH(55) FH12-24S-0.5SH(55) FH12-24S-0.5SV(55) FH12-26S-0.5SH(55) FH12-26S-0.5SV(55) FH12-26S-1SH(55) FH12-28S-0.5SH(55) FH12-30S-0.5SH(55) FH12-30S-0.5SV(55) FH12-32S-0.5SH(55) FH12-33S-0.5SH(55) FH12-33S-0.5SV(55) FH12-34S-0.5SH(55) FH12-36S-0.5SH(55) FH12-36S-0.5SV(55) FH12-40S-0.5SH(55) FH12-40S-0.5SV(55) FH12-45S-0.5SH(55) FH12-45S-0.5SV(55) FH12-50S-0.5SH(55) FH12-50S-0.5SV(55) FH12-5S-1SH(55) FH12-6S-0.5SH(55) FH12-6S-1SH(55) FH12-7S-1SH(55) FH12-8S-1SH(55) FH12-9S-1SH(55) FH12A-10S-0.5SH(55) FH12A-12S-0.5SH(55) FH12A-18S-0.5SH(55) FH12A-20S-0.5SH(55) FH12A-24S-0.5SH(55) FH12A-30S-0.5SH(55) FH12A-32S-0.5SH(55) FH12A-33S-0.5SH(55) FH12A-36S-0.5SH(55) FH12A-40S-0.5SH(55) FH12A-50S-0.5SH(55) FH12S-40S-0.5SH(55) FH12-11S-0.5SH(55) FH12A-16S-0.5SH(55) FH12-8S-1SV(55) FH12-16S-1SV(55) FH12-11S-1SH(55) FH12-16S-0.5SH(55) FH12-60S-0.5SV(55) FH12-18S-0.5SV(55) FH12-24S-1SV(55) FH12-14S-0.5SH(55) FH12S-45S-0.5SH(55) FH12-32S-0.5SV(55) FH12S-50S-0.5SH(55) FH12-6S-1SV(55) FH12-20S-1SV(55) FH12S-30S-0.5SH(55) FH12F-14S-0.5SH(55) FH12F-28S-0.5SH(55) FH12A-26S-0.5SH(55) FH12F-36S-0.5SH(55) FH12-13S-0.5SH(55) FH12F-20S-0.5SH(55) FH12F-32S-0.5SH(55) FH12-17S-0.5SV(55) FH12-49S-0.5SV(55) FH12A-15S-0.5SH(55) FH12F-40S-0.5SH(55) FH12S-53S-0.5SH(55) FH12F-30S-0.5SH(55) FH12F-16S-0.5SH(55) FH12F-6S-0.5SH(55) FH12-17S-0.5SH(55) FH12F-24S-0.5SH(55) FH12A-34S-0.5SH(55) FH12-53S-0.5SH(55) FH12F-22S-0.5SH(55) FH12-19S-0.5SH(55) FH12F-34S-0.5SH(55) FH12F-12S-0.5SH(55) FH12A-22S-0.5SH(55) FH12F-13S-0.5SH(55) FH12A-42S-0.5SH(55) FH12F-15S-0.5SH(55) FH12-13S-0.5SV(55) FH12A-29S-0.5SH(55) FH12F-10S-0.5SH(55) FH12F-26S-0.5SH(55) FH12-22S-1SV(55)