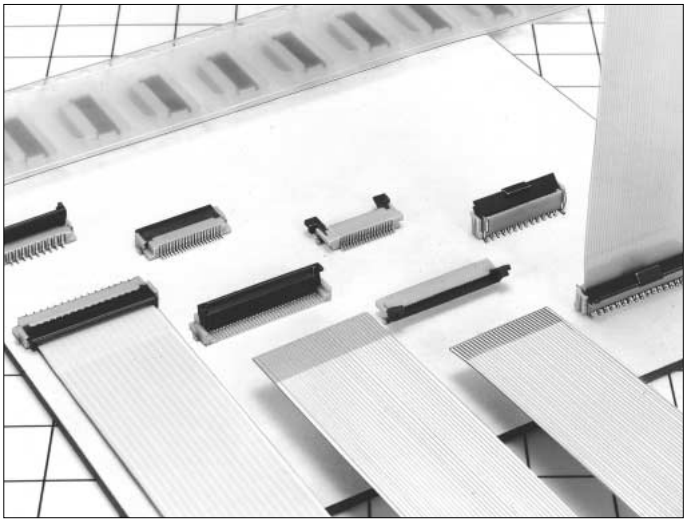
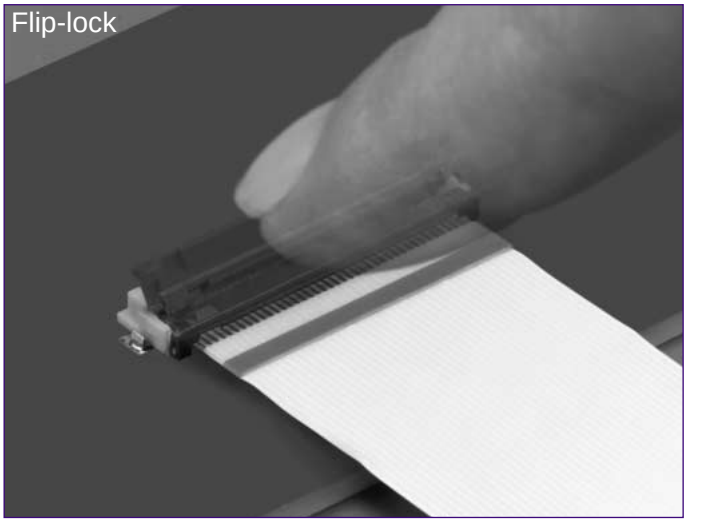
THE DATASHEET OF

FH12S-40S-0.5SH

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 Lock Lever

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

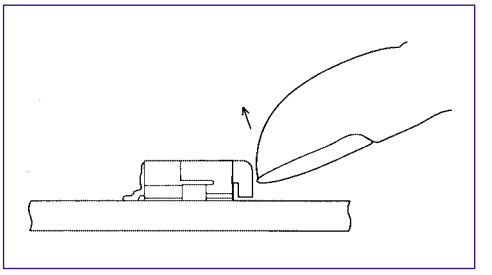
Excess solder cavity absorbs excessive solder and avoids solder bridging.

6. Three different assembly types

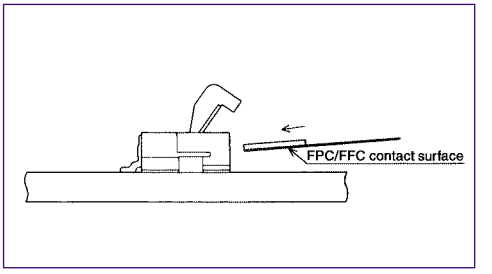
FH12 is offered in Top & Bottom Contact and Vertical Mount and offered in both a 0.5mm contact pitch as well as a 1.0mm contact pitch (bottom contact only).

Rotating One-touch Mechanism

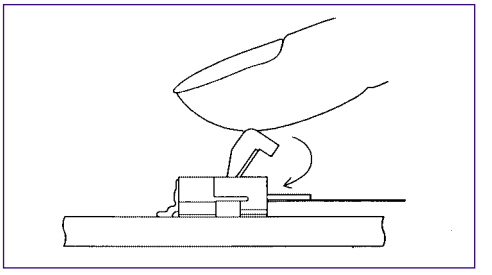
①



②



③



■Applications

Notebook computers, printers, PDAs, digital cameras and other compact devices for interconnecting the main circuit board with the LCD, HDD or other device.

■Product Specifications

Rating	Current rating: 0.4A DC Voltage rating: 50V AC	Operating Temperature Range: −40 to +70℃ (Note 1) Operating Humidity Range: Relative humidity, 90% max. (Not dewed)	Storage Temperature Range: −10 to +50℃ (Note 2) Storage Humidity Range: Relative humidity, 90% max. (Not dewed)

Applicable FPC	t=0.3±0.05 Solder plating(Note 3)	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.
6. Shock	No electrical discontinuity of 1μs or more Contact resistance: 50m ohms maximum. No damage, cracks, or parts dislocation.	Acceleration of 490 m/s², 11 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 maximum. No damage, cracks, or parts dislocation.	96 hours at temperature of 40℃ and humidity of 90% to 95%
8. Temperature Cycle	Contact resistance: 50m ohms maximum. Insulation resistance: 50M ohms maximum. No damage, cracks, or parts dislocation.	5 cycles under conditions as follows; Temperature: -40℃ → 15 to 35℃ → 85℃ → 15 to 35℃, Time: 30 → 5 max. → 30 → 5 max.(minutes)
9.Resistance to Soldering heat	No deformation of components affecting performance.	Reflow: At the recommended temperature profile Manual soldering: 350±5℃ for 3 seconds

Note 1: Includes temperature rise caused by current flow.

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

Note 3: When FPC is gold plated, the connector contacts should be also gold plated: Select the (05) specification.

■Material

Part	Material	Finish	Remarks
Insulator	Polyamide	Color : Beige	UL94V-0
	PPS	Color : Deep brown	
Contact	Phosphor bronze	Solder plating	———
Macal Fittings	Brass	Solder plating	

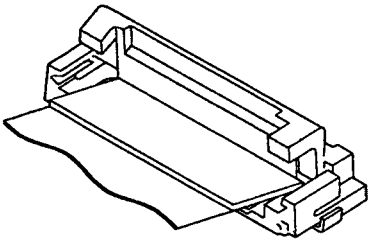
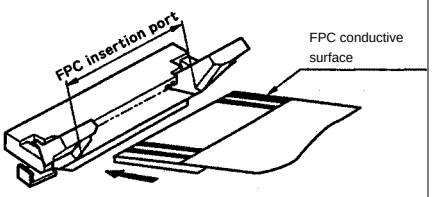
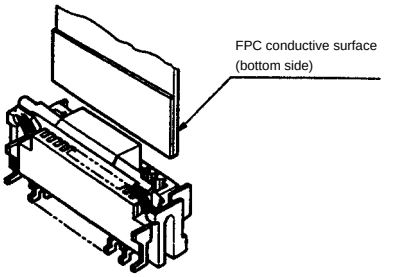
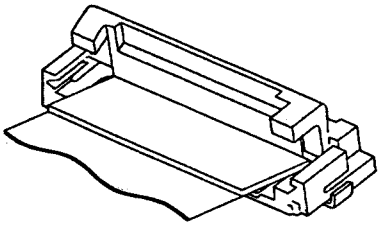
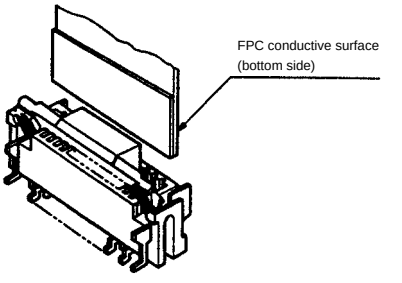
■Ordering Information

FH12 A - 10 (4) - S A - 0.5 SH (05)

❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾

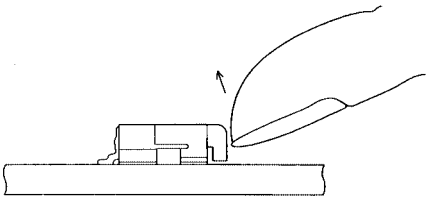
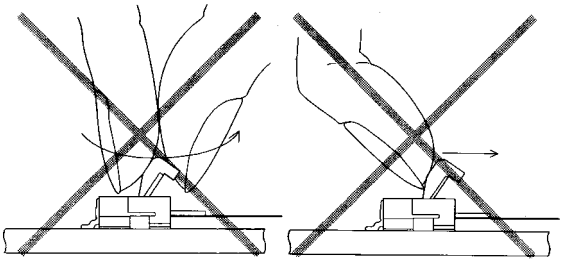
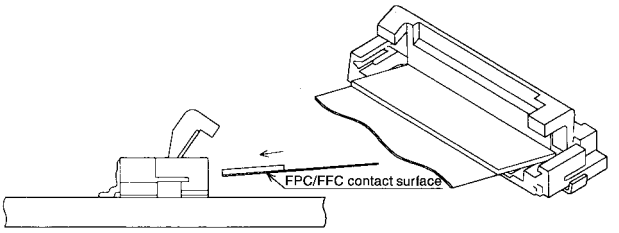
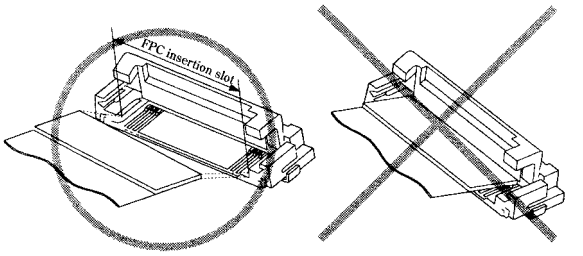
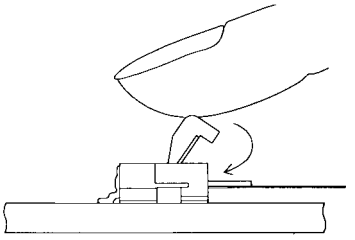
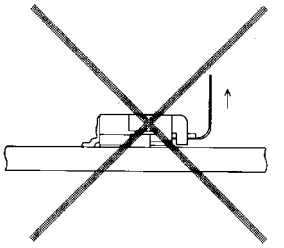
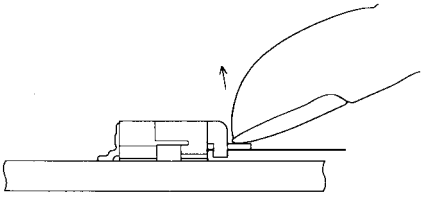
❶ Series Name : FH12	❺ Contact alignment: Single
❷ Blank : standard type A : Top contact type S : Type with strengthed lock lever F : Type with 0.18mm FPC End Thickness	❻ Eccentric direction: Blank : standard type A : Eccentric type
	❼ Contacts Pitch : 0.5mm, 1mm
❸ Standard type : Number of contacts Eccentric type : Number of contacts in 0.5mm housing	❽ Contact type SH : SMT horizontal mounting type SV : SMT vertical mounting type
❹ Standard type : Blank Eccentric type : Number of contacts	❾ Plating specification No symbol: Solder plating (05): Gold plating

◆Series Configuration

Pitch	Bottom Contact Type	Top Contact Type	Vertical mounting Type
0.5mm	 **FH12- ** S-0.5SH** P.12 Number of contacts 6, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 22, 24, 25, 26, 28, 30, 32, 33, 34, 36, 40, 45, 50, 53 Type with Strengthened Lock Lever **FH12S- ** S-0.5SH** P.13 Number of contacts 30, 40, 45, 50, 53 Type with 0.18mm FPC End Thickness **FH12F- ** S-0.5SH** P.14 Number of contacts 6, 10, 12, 13, 14, 15, 16, 18, 20, 22, 24, 26, 28, 30, 32, (33), 34, 36, 40	 **FH12A- ** S-0.5SH** P.15 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.16 Number of contacts 10, 12, 13, 15, 16, 17, 18, 20, 22, 24, 26, 30, 32, 33, 34, 36, 40, 45, 49, 50
1mm	 Standard **FH12- ** S-1SH** P.18 Eccentric **FH12- ** (**) S-1SH** Standard Number of contacts 5, 6, 7, 8, 9, 11, 16, 22, 26 Eccentric Number of contacts 4, 6, 8, 10, 11, 14, 19, 24		 **FH12- ** S-1SV** P.19 Number of contacts 6, 7, 8, 16, 20, 22, 24

◆Connector Operating Instructions & Precautions

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

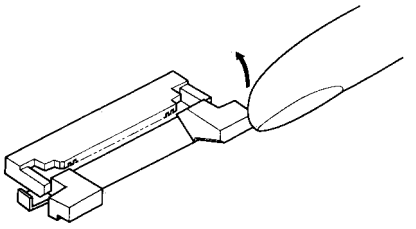
Operating Instruction	Precautions for Use
1. FPC/FFC Insertion ① Lift up the lock lever. (The lock is released.) The lock lever can be simply operated by flicking it up with the fingernail of the thumb or forefinger.	① Avoid grasping the lock lever with your fingers or hooking the lever (especially with your fingernail). The part is small and thin and could be damaged.
	
② Insert the FPC with the conductive surface facing down. Insert the FPC so that it is perpendicular with respect to the connector.	② Please ensure that the FPC is properly inserted into the connector insertion slot. Failing to insert the FPC properly could cause FPC breakage and conduction faults.
	
③ Press down the lock lever When the FPC is partially inserted or there is an extreme insertion offset, the lock level will engage poorly or not at all. Should this happen, remove the FPC with the removal method of 2-(1) and perform the operation of 1-(1) again.	③ Due to the structure of the connectors, they do not have strong resistance to upward pulling; therefore, support the FPC when a pulling force is applied to it.
	
2. FPC/FFC Removal ① Lift up the lock lever and pull out the FPC after the lock is released.	
	

●Top Contact Type

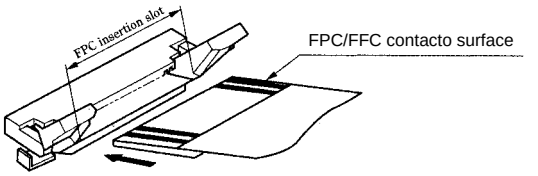
Operating Instruction	Precautions for Use

1. FPC/FFC Insertion

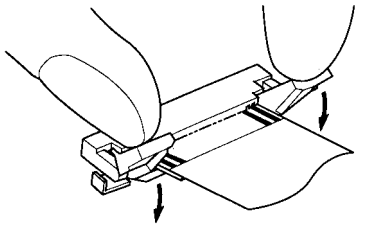
① Lift up the lock lever.
(The lock is released.)
The lock lever can be simply operated by flicking it up with the fingernail of the thumb or forefinger.



② Insert the FPC with the conductive surface facing up. Fully insert the FPC into the insertion slot of the connector.

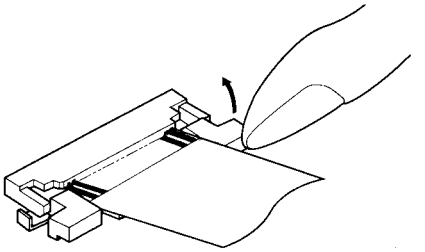


③ Firmly press down the lock lever on both sides.
The design is such that pressing only on one side will not engage the lock, but incomplete pressing will result in locking failure.

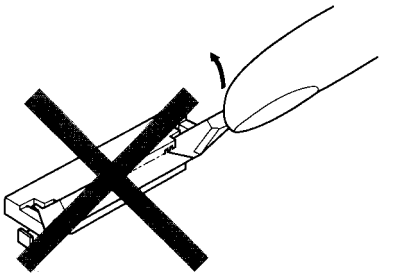


2. FPC/FFC Removal

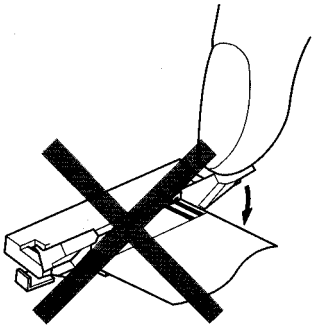
① Lift up the lock lever and pull out the FPC after the lock is released.



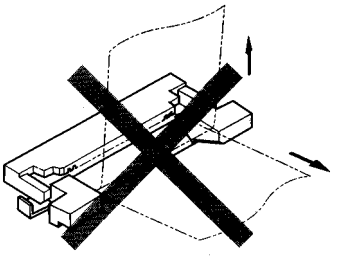
① Avoid forcing the lock lever upward when the FPC is not inserted. The part is small and thin and could be damaged.



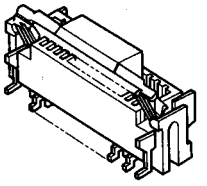
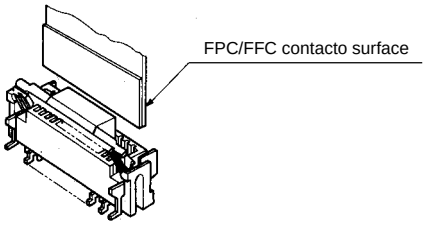
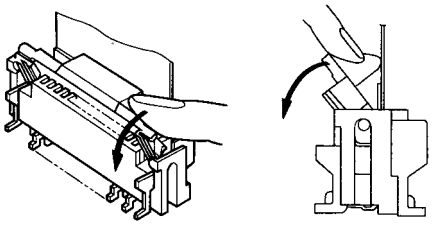
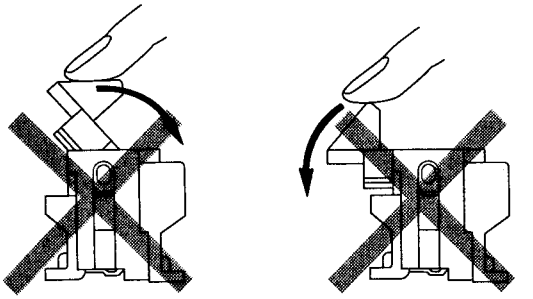
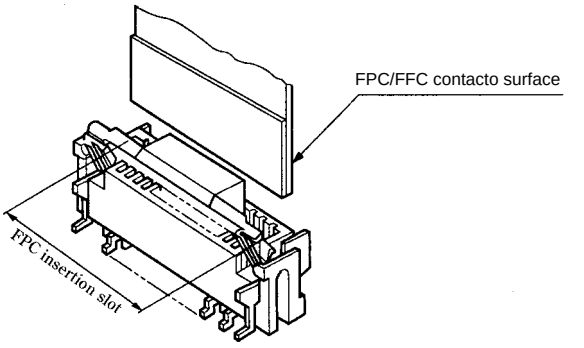
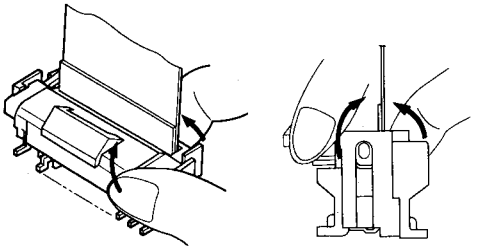
② Avoid operation with only one side of the lock lever at the time of locking. The use of only one side will cause a locking fault.



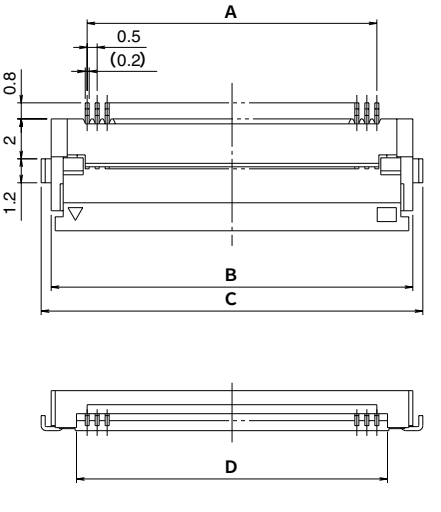
③ Avoid forced pulling of the FPC. Forced pulling will cause the FPC to become disconnected or damaged.



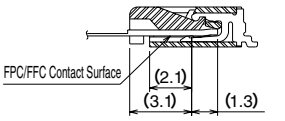
●Vertical Mounting Type

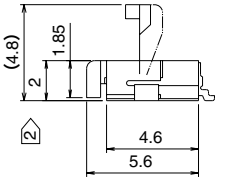
Operating Instruction	Precautions for Use
1. FPC/FFC Insertion ① Check that the lock lever is standing upright. If the lock lever has fallen to the side, stand it upright.  ② Insert the FPC vertically with the conductive side (i.e., wire connection portion) of the FPC facing away from the lock lever. Fully insert the FPC into the insertion slot.  ③ Press down the upright standing lock lever in the direction of rotation. 	① Avoid grasping and twisting the lock lever with your fingers or forcefully pressing the lock lever without a cable inserted.  ② Please ensure that the FPC is fully inserted into the connector insertion slot. Failing to insert the FPC properly could cause FPC breakage and conduction faults. 
2. FPC/FFC Removal ① Press the lock lever upward and pull out the FPC after the lock is released. This operation is easily done by inserting your thumb and forefinger. 	

■0.5mm Pitch Bottom Contact Type



Mated Cross-sectional Diagram





Unit:mm

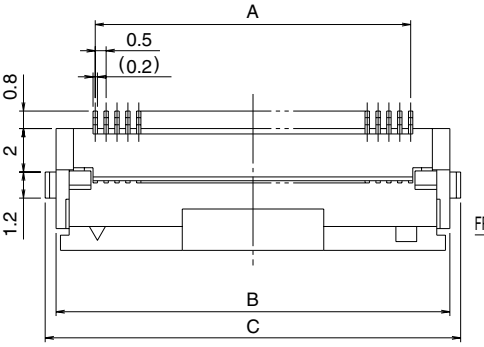
	Part Number	CL No.	Number of Contacts	A	B	C	D
	FH12- 6S-0.5SH	586-0582-5	6	2.5	6.1	7.1	3.57
	FH12-10S-0.5SH	586-0522-3	10	4.5	8.1	9.1	5.57
	FH12-11S-0.5SH	586-0600-5	11	5	8.6	9.6	6.07
	FH12-12S-0.5SH	586-0704-0	12	5.5	9.1	10.1	6.57
	FH12-13S-0.5SH	586-0549-0	13	6	9.6	10.6	7.07
	FH12-14S-0.5SH	586-0533-0	14	6.5	10.1	11.1	7.57
	FH12-15S-0.5SH	586-0523-6	15	7	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	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	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	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 2	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	19.6	20.6	17.07
	FH12-34S-0.5SH	586-0617-8	34	16.5	20.1	21.1	17.57
	FH12-36S-0.5SH	586-0526-4	36	17.5	21.1	22.1	18.57
Note 2	FH12-40S-0.5SH	586-0527-7	40	19.5	23.1	24.1	20.57
Note 2	FH12-45S-0.5SH	586-0528-0	45	22	25.6	26.6	23.07
Note 2	FH12-50S-0.5SH	586-0529-2	50	24.5	28.1	29.1	25.57
Note 2	FH12-53S-0.5SH	586-0595-7	53	26	29.6	30.6	27.07

Note 1 : Products are packaged in embossed tape. (2,000 pcs./reel)
Please order in multiples of 2,000.

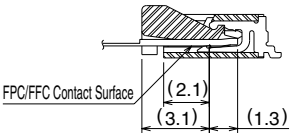
Note 2 : If there is no problem with the connector height, we recommend the type with the strengthened lock lever (FH12S-✻S-0.5SH).

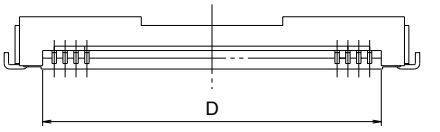
Standard type connector height: 2 mm
Connector height of type with strengthened lock lever: 2.4 mm

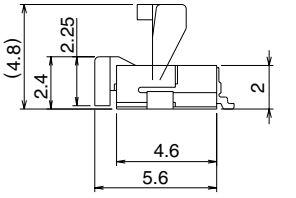
■0.5mm Pitch Bottom Contact Type with Strengthened Lock Lever



Mated Cross-sectional Diagram





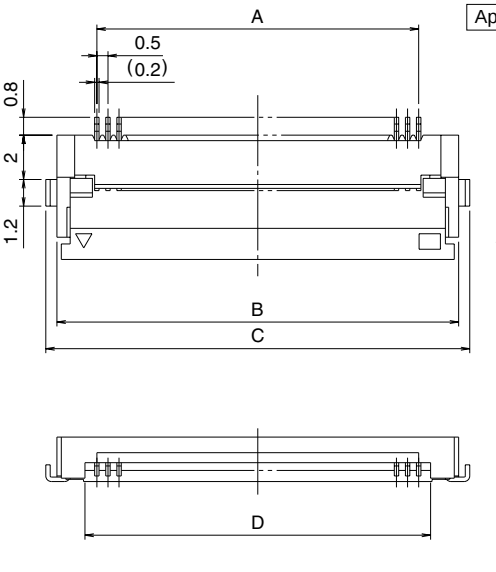


Unit:mm

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

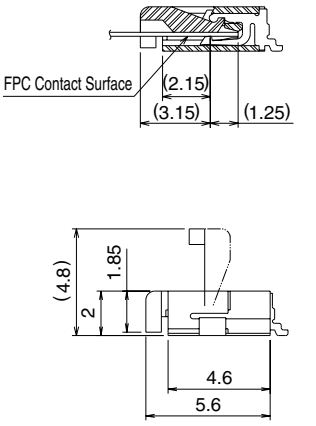
Note: Products are packaged in embossed tape. (2,000 pcs./reel)
Please order in multiples of 2,000.

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



Applicable FPC end thickness : 0.18±0.05

Mated Cross-sectional Diagram

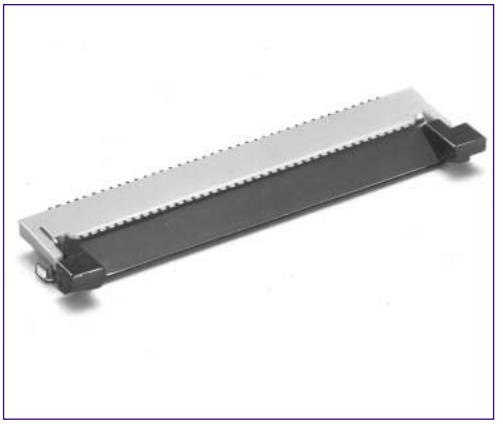


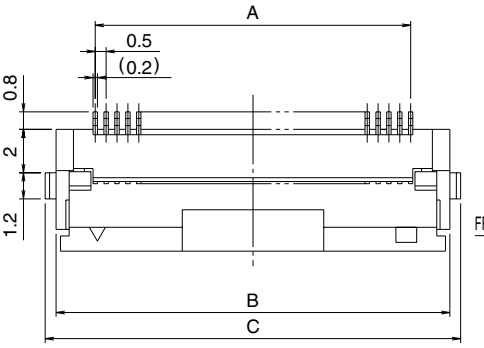
Unit:mm

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-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-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-33S-0.5SH	————	33	16.0	19.6	20.6	17.07
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

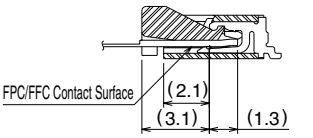
Note: Products are packaged in embossed tape. (2,000 pcs./reel)
Please order in multiples of 2,000.

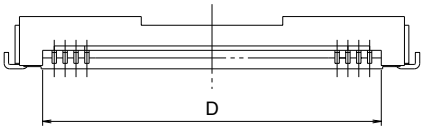
■0.5mm Pitch Top Contact Type

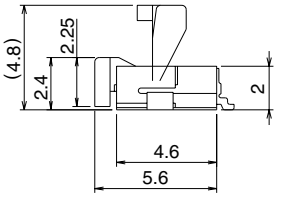




Mated Cross-sectional Diagram







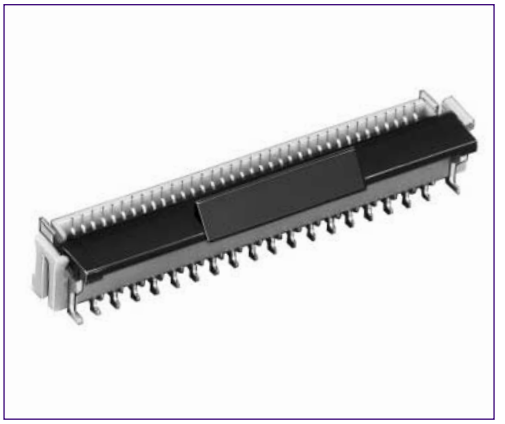
Unit:mm

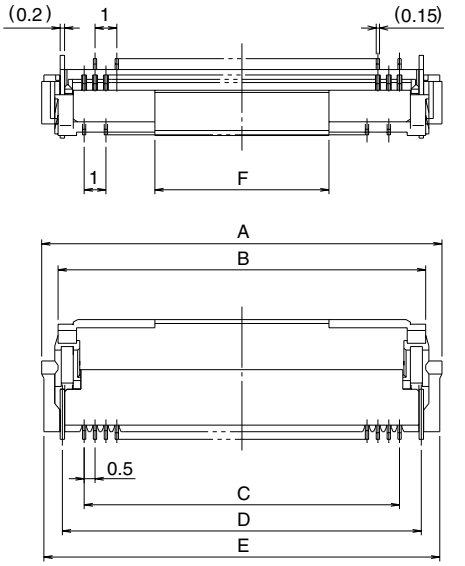
Part Number	CL No.	Number of Contacts	A	B	C	D	E
FH12A-10S-0.5SH	586-0550-9	10	9.1	8.35	4.5	9.5	5.57
FH12A-12S-0.5SH	586-0696-4	12	10.1	9.35	5.5	10.5	6.57
FH12A-15S-0.5SH	586-0551-1	15	11.6	10.85	7.0	12.0	8.07
FH12A-16S-0.5SH	586-0552-4	16	12.1	11.35	7.5	12.5	8.57
FH12A-18S-0.5SH	586-0553-7	18	13.1	12.35	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 : Products are packaged in embossed tape. (2,000 pcs./reel)
Please order in multiples of 2,000.

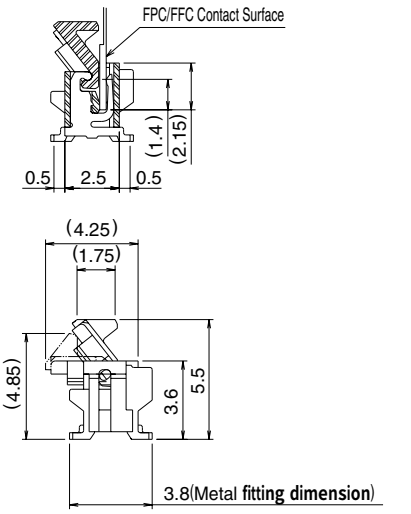
Note〈2〉: The design is such that the FPC/FFC protrudes on an upward angle so that other parts can be mounted beneath the PFC/FFC. In view of this, please take note of the gap at the top surface of the connector.

■0.5mm Pitch Vertical mounting Type





Mated Cross-sectional Diagram



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

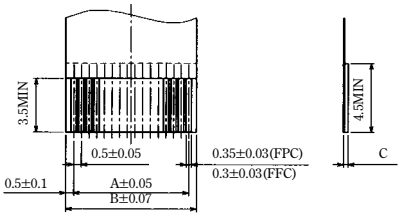
Note 1 : Products are packaged in embossed tape. (1,000 pcs./reel)
Please order in multiples of 1,000.

◆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

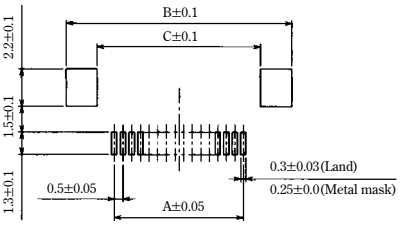


Product Type	C Dimension
Types other than those below	0.3±0.05min
	Stiffener thickness should be 0.188 mm (7.5 mil) min
Types with an FPC end thickness of 0.18 mm	0.18±0.05

Unit: mm

Number of Contacts	A	B	Number of Contacts	A	B
6	2.5	3.5	25	12.0	13.0
10	4.5	5.5	26	12.5	13.5
11	5.0	6.0	28	13.5	14.5
12	5.5	6.5	29	14.0	15.0
13	6.0	7.0	30	14.5	15.5
14	6.5	7.5	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
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



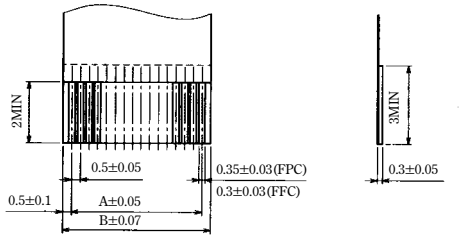
Recommended metal mask thickness : t=0.15

Unit: mm

Number of Contacts	A	B	C	Number of Contacts	A	B	C
6	2.5	8.1	4.5	25	12.0	17.6	14.0
10	4.5	10.1	6.5	26	12.5	18.1	14.5
11	5.0	10.6	7.0	28	13.5	19.1	15.5
12	5.5	11.1	7.5	29	14.0	19.6	16.0
13	6.0	11.6	8.0	30	14.5	20.1	16.5
14	6.5	12.1	8.5	32	15.5	21.1	17.5
15	7.0	12.6	9.0	33	16.0	21.6	18.0
16	7.5	13.1	9.5	34	16.5	22.1	18.5
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

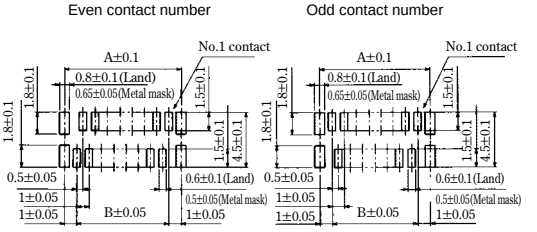


∗Set the stiffener thickness to 0.188 (7.5mil) min.

Unit: mm

Number of Contacts	A	B	Number of Contacts	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

Land / Metal Mask dimensions

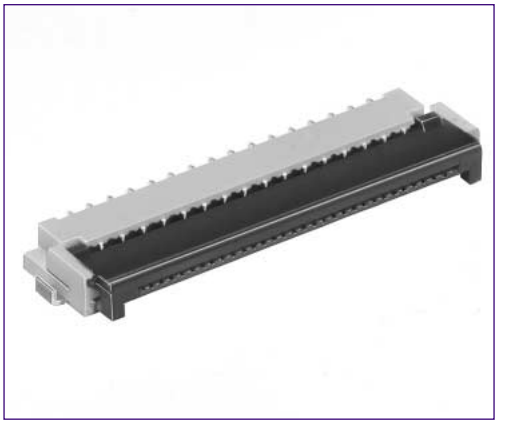


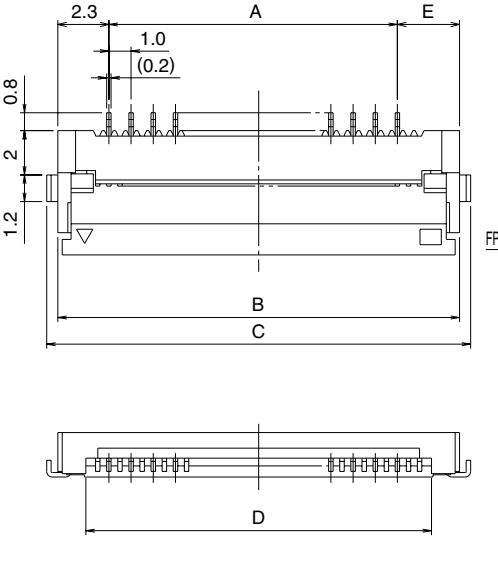
Recommended metal mask thickness : t=0.15

Unit: mm

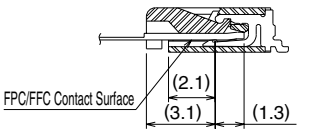
Number of Contacts	A	B	Number of Contacts	A	B
10	6.5	4.5	26	14.5	12.5
12	7.5	5.5	30	16.5	14.5
13	8.0	6.0	32	17.5	15.5
15	9.0	7.0	33	18.0	16.0
16	9.5	7.5	34	18.5	16.5
17	10.0	8.0	36	19.5	17.5
18	10.5	8.5	40	21.5	19.5
20	11.5	9.5	45	24.0	22.0
22	12.5	10.5	49	26.0	24.0
24	13.5	11.5	50	26.5	24.5

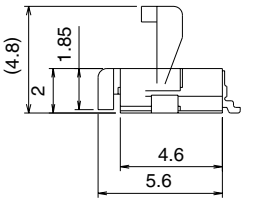
■1mm Pitch Type Bottom Contact Type





Mated Cross-sectional Diagram





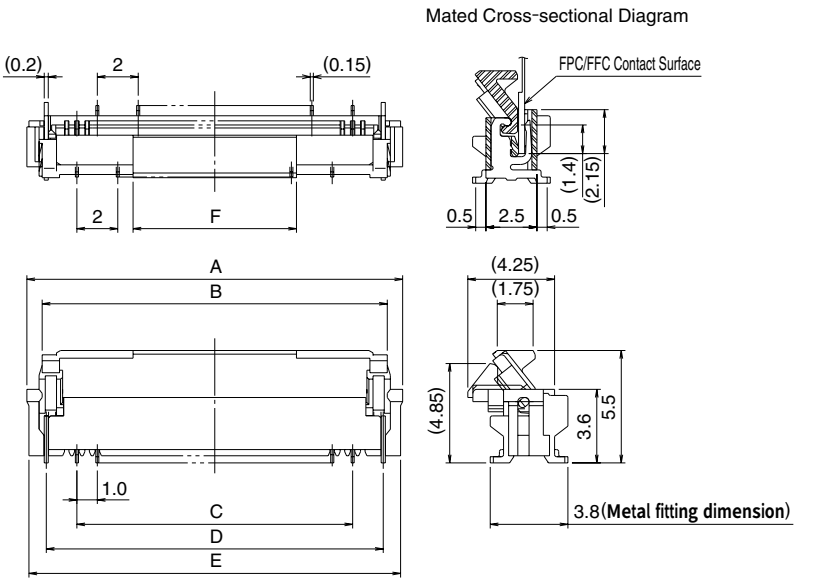
Unit:mm

	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
	FH12-16S-1SH	586-0536-8	16	15	19.6	20.6	17.07	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: Products are packaged in embossed tape. (2,000 pcs. per reel)
Please order in multiples of 2,000.

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



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

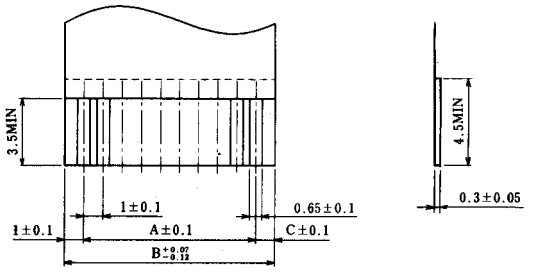
Note: Products are packaged in embossed tape. (1,000 pcs. per reel)
Please order in multiples of 1,000.

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

●1mm Pitch Product

1mm Pitch Bottom Contact Type

FPC/FFC dimensions



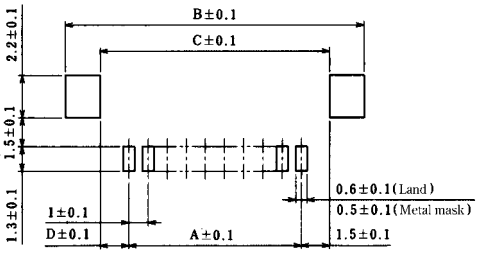
※Set the stiffener thickness to 0.188 (7.5mil) min.

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
16	15	17	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 : t=0.15

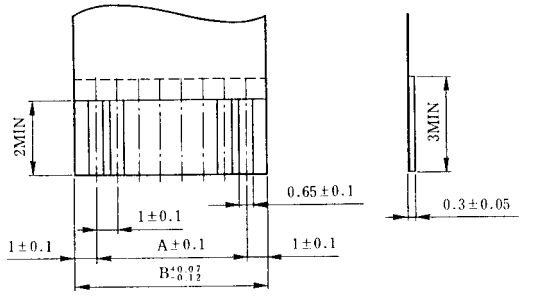
Unit: mm

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
16	15	21.6	18	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

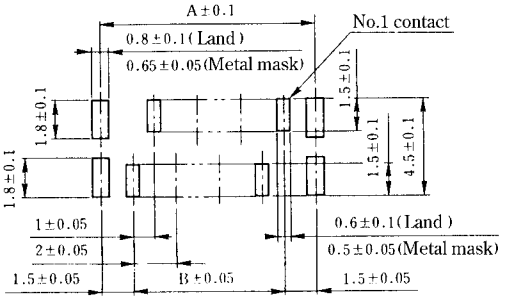


∗Set the stiffener thickness to 0.188 (7.5mil) min.

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 : t=0.15

Unit: mm

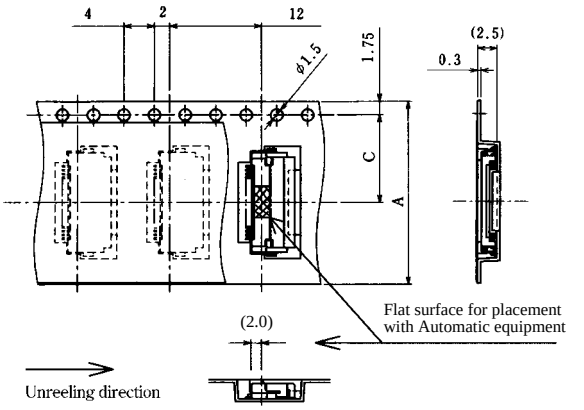
Dimension / Number of Contacts	A	B
6	8	5
7	9	6
8	10	7
16	18	15
20	22	19
22	24	21
24	26	23

◆Packaging Specification

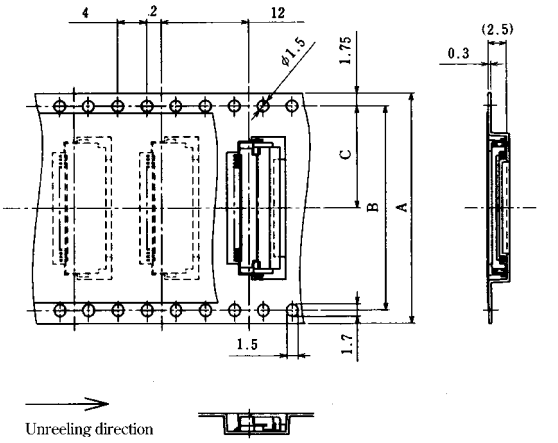
Embossed Carrier Tape Dimensions

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

Tape width 24mm max.



Tape width 32mm min.



●0.5mm Pitch Bottom/Top Contact Type

Unit:mm

Number of Contacts \ Dimension	A	B	C	D
6	16	——	7.5	16.5
10	16	——	7.5	16.5
11	16	——	7.5	16.5
12	24	——	11.5	24.5
13	24	——	11.5	24.5
14	24	——	11.5	24.5
15	24	——	11.5	24.5
16	24	——	11.5	24.5
17	24	——	11.5	24.5
18	24	——	11.5	24.5
19	24	——	11.5	24.5
20	24	——	11.5	24.5
22	24	——	11.5	24.5
24	24	——	11.5	24.5

Number of Contacts \ Dimension	A	B	C	D
25	24	——	11.5	24.5
26	24	——	11.5	24.5
28	32	28.4	14.2	32.5
29	32	28.4	14.2	32.5
30	32	28.4	14.2	32.5
32	32	28.4	14.2	32.5
33	32	28.4	14.2	32.5
34	32	28.4	14.2	32.5
36	44	40.4	20.2	44.5
40	44	40.4	20.2	44.5
42	44	40.4	20.2	44.5
45	44	40.4	20.2	44.5
50	44	40.4	20.2	44.5
53	44	40.4	20.2	44.5

Note: 2,000 pcs. per reel

● 1mm Pitch Bottom Contact Type

Unit:mm

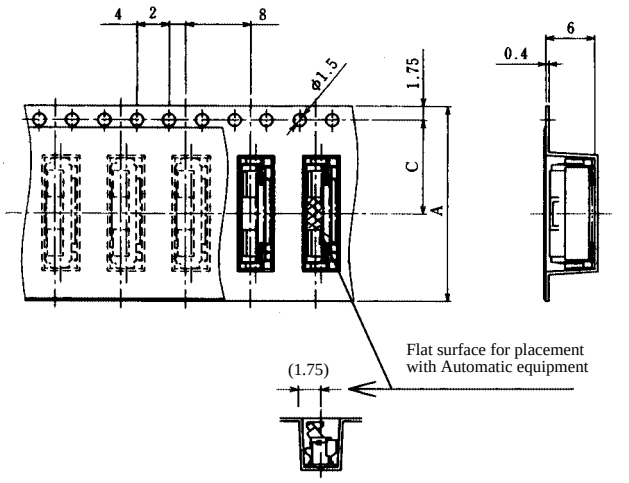
	Number of Contacts \ Dimension	A	B	C	D
Standard Type	5	16	——	7.5	16.5
	6	24	——	11.5	24.5
	7	24	——	11.5	24.5
	8	24	——	11.5	24.5
	9	24	——	11.5	24.5
	11	24	——	11.5	24.5
	16	32	28.4	14.2	32.5
	22	44	40.4	20.2	44.5
	26	44	40.4	20.2	44.5

	Number of Contacts \ Dimension	A	B	C	D
Eccentric Type	4	16	——	7.5	16.5
	6	24	——	11.5	24.5
	8	24	——	11.5	24.5
	10	24	——	11.5	24.5
	11	24	——	11.5	24.5
	14	32	28.4	14.2	32.5
	19	44	40.4	20.2	44.5
	24	44	40.4	20.2	44.5

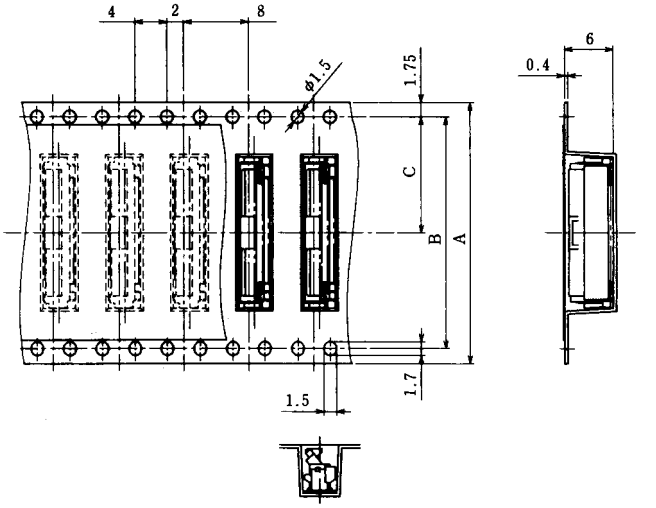
Note: 2,000 pcs. per reel

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
10	16	——	7.5	16.5
12	16	——	7.5	16.5
13	24	——	11.5	24.5
15	24	——	11.5	24.5
16	24	——	11.5	24.5
17	24	——	11.5	24.5
18	24	——	11.5	24.5
20	24	——	11.5	24.5
22	24	——	11.5	24.5
24	24	——	11.5	24.5

Dimension / Number of Contacts	A	B	C	D
26	24	——	11.5	24.5
30	32	28.4	14.2	32.5
32	32	28.4	14.2	32.5
33	32	28.4	14.2	32.5
34	44	40.4	20.2	44.5
36	44	40.4	20.2	44.5
40	44	40.4	20.2	44.5
45	44	40.4	20.2	44.5
49	44	40.4	20.2	44.5
50	44	40.4	20.2	44.5

Note: 1,000 pcs. per reel

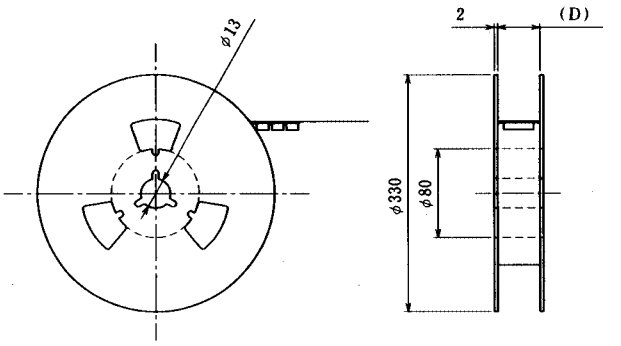
●1mm Pitch Vertical mounting Type

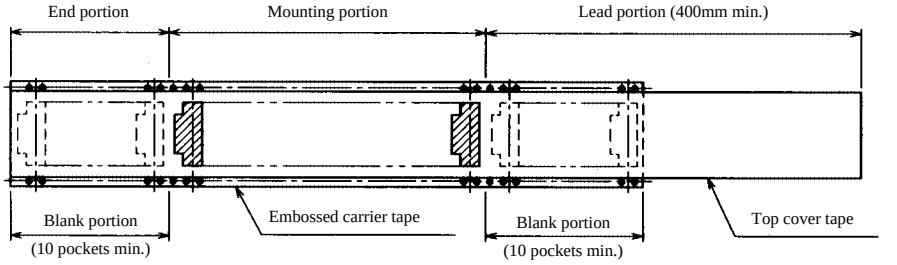
Unit:mm

Dimension / Number of Contacts	A	B	C	D
6	24	——	11.5	24.5
7	24	——	11.5	24.5
8	24	——	11.5	24.5
16	32	28.4	14.2	32.5
20	44	40.4	20.2	44.5
22	44	40.4	20.2	44.5
24	44	40.4	20.2	44.5

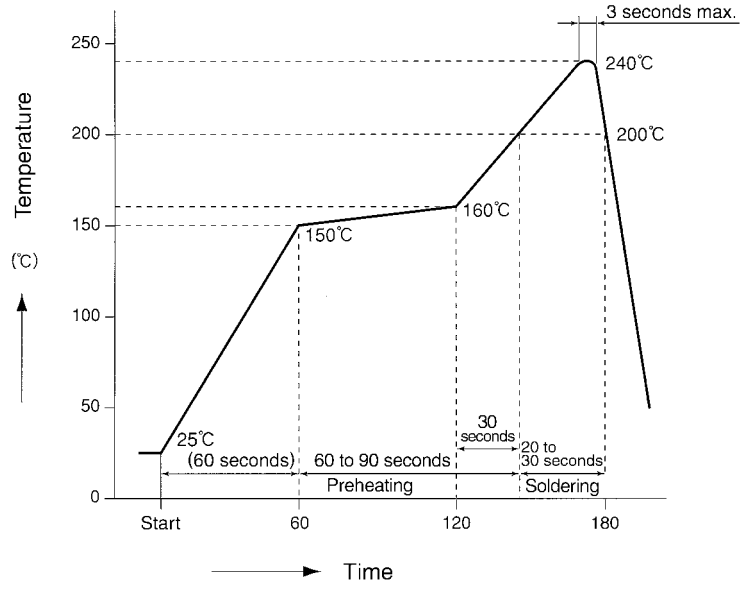
Note: 1,000 pcs. per reel

Reel Dimensions (Common to All Types)





◆Recommended Temperature Profile



Applicable condition

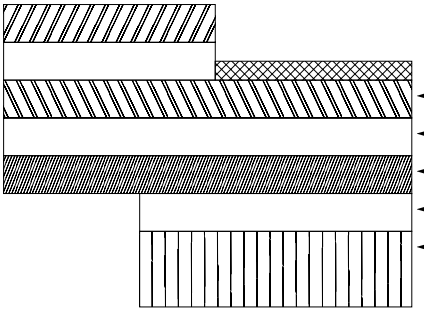
Reflow method	: IR reflow
Solder	: Paste type 63sn/37Pb (Flux content: 11wt%)
Test board	: Glass epoxy 40×80×1.6mm
Metal mask thickness	: 0.15mm

This temperature profile is a recommendation
The temperature may be slightly changed according to the solder paste type and amount.

◆FH12 Series FPC/FFC Construction (Recommended Specifications)

1. FFC

FFC : Flexible Flat Cable



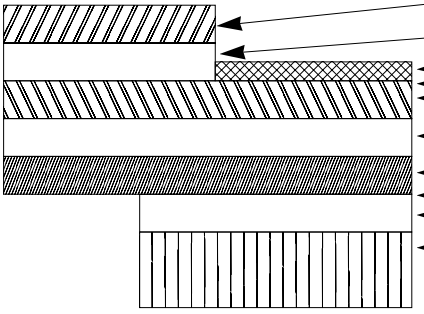
Material Name	Material	Thickness (μm)	
Hard copper foil with tin plating		35	
Adhesive	Polyester type	30	
Polyester		12	
Adhesive	Polyester type	30	
Stiffener	Polyester type	188	(Note)
	Total	295	

✻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	Polyamide 1 mil	25
Cover adhesive		25
Surface treatment	Solder plating	5
Copper foil	Cu 1oz	35
Base adhesive		25
Base film	Polyamide 1 mil	25
Reinforcement material adhesive	Heat-hardened adhesive	30
Stiffener	Polyamide 7 mil	175
	Total	295

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.

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