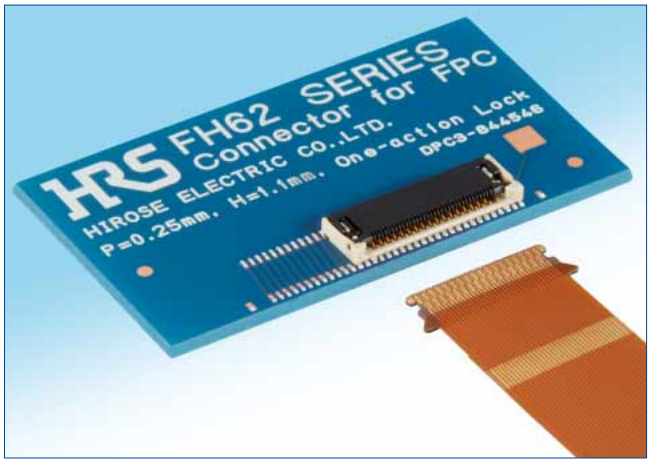
FH62 Series



Dimension diagram : 35 pos.

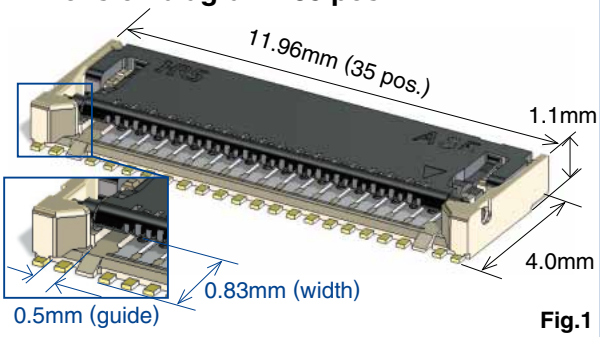
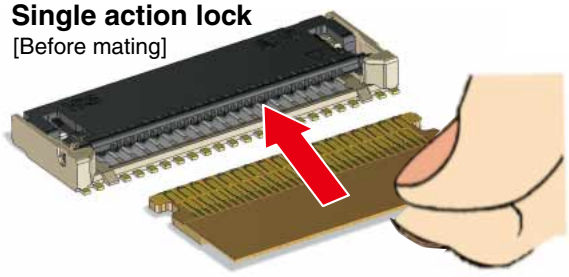


Fig.1

Single action lock

[Before mating]



[After mating]

Fig.2

High FPC retention force through the lock design

[FPC being inserted]

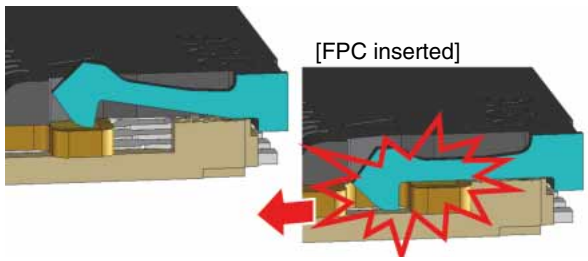


Fig.3

Supports high speed transmission (Differential impedance)

130ps rise time (20-80%)

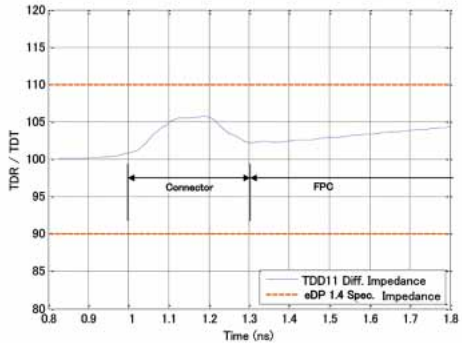


Fig.4

■Features

1. Space-saving design

・Space saving design with 0.25mm pitch, 4.0mm width. (Fig.1)

2. Automatic single action lock design

・Easy to use single action lock design by simply inserting FPC after mounting. (Fig.2) (Release the lock by operating or opening the lock lever when removing FPC.)

・Operation of the lock lever is not required at the time of mating FPC.
Can be operated with one hand.

・Operation of the lock lever is not required at the time of mating FPC.
Contributes to assembly time reduction.

・Operation of the lock lever is not required at the time of mating FPC.
Lock lever will not be damaged by operation.

・Operation of the lock lever is not required at the time of mating FPC.
No lever at insertion eliminates failures due to FPC movement during locking.

3. High FPC retention force

・The notches on both sides of FPC are held by the lock lever, generating a high FPC retention force in spite of the small size. (Fig.3)

4. Easy FPC insertion

・Wide guide for easy FPC insertion easy. (Fig.1)

5. Supports 0.3mm-thick FPC

・The design accommodates a rigid 0.3mm-thick FPC, which helps to prevent deformation of the FPC upon insertion.

6. Supports high speed transmission

・Supports high speed transmission with excellent impedance properties.
By making a differential pair with the same type of contacts (even number-even number of contacts, odd number-odd-number of contacts) excellent transmission characteristics are achieved, supporting eDP (ver1.4), MIPI (D-PHY) and USB3.0 standards. (Fig.4)

■Product Specifications

Rating	Rated current	0.3A	Operating temperature range	-55℃ to +85°C (Note 1)	Storage temperature range	-10℃ to +50°C (Note 2)
	Rated voltage	30V AC/DC	Operating humidity range	Relative humidity 90% max. (No condensation)	Storage humidity range	Relative humidity 90% max. (No condensation)

Adaptive FPC/FFC contact specifications	Thickness : = 0.3±0.03mm Gold plated contact traces

Item	Specification	Conditions
1. Insulation resistance	50Ω min.	100V DC
2. Withstanding voltage	No flashover or insulation breakdown	90V AC rms / 1 minute
3. Contact resistance	100mΩ max. ✻ Including FPC conductor resistance	1mA (AC)
4. Durability (insertion / withdrawal)	Contact resistance : 100mΩ max. No damage, cracks, or parts dislocation	10 cycles
5. Vibration	No electrical discontinuity of 1μs or more Contact resistance : 100mΩ max. No damage, cracks, or parts dislocation	Frequency : 10 to 55Hz, single amplitude of 0.75mm, 10 cycles in each of the 3 directions
6. Shock	No electrical discontinuity of 1μs or more Contact resistance : 100mΩ max. No damage, cracks, or parts dislocation	Acceleration of 981m/s², duration of 6ms, sine half-wave waveform, 3 cycles in each of the 3 axes
7. Humidity (Steady state)	Contact resistance : 100mΩ max. Insulation resistance : 50MΩ min. No damage, cracks, or parts dislocation	96 hours at temperature of 40℃ and humidity of 90% to 95%
8. Temperature cycle	Contact resistance : 100mΩ max. Insulation resistance : 50MΩ min. No damage, cracks, or parts dislocation	Temperature : -55°C → +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 : See recommended temperature profile (Page 8) Number of reflow : 2 times Manual soldering : 350 ± 10°C for 5 seconds

Note 1 : Includes temperature rise caused by current flow.
Note 2 : The term “storage” refers to products stored for long period of time prior to mounting and use. Operating Temperature Range and Humidity Range covers non-conducting condition of installed connectors in storage, shipment or during transportation.

■Materials / Finish

Part	Material	Color / Finish	Remarks
Insulator	LCP	Beige	UL94V-0
	Polyamide	Black	
Contacts	Copper alloy	Gold plated	————

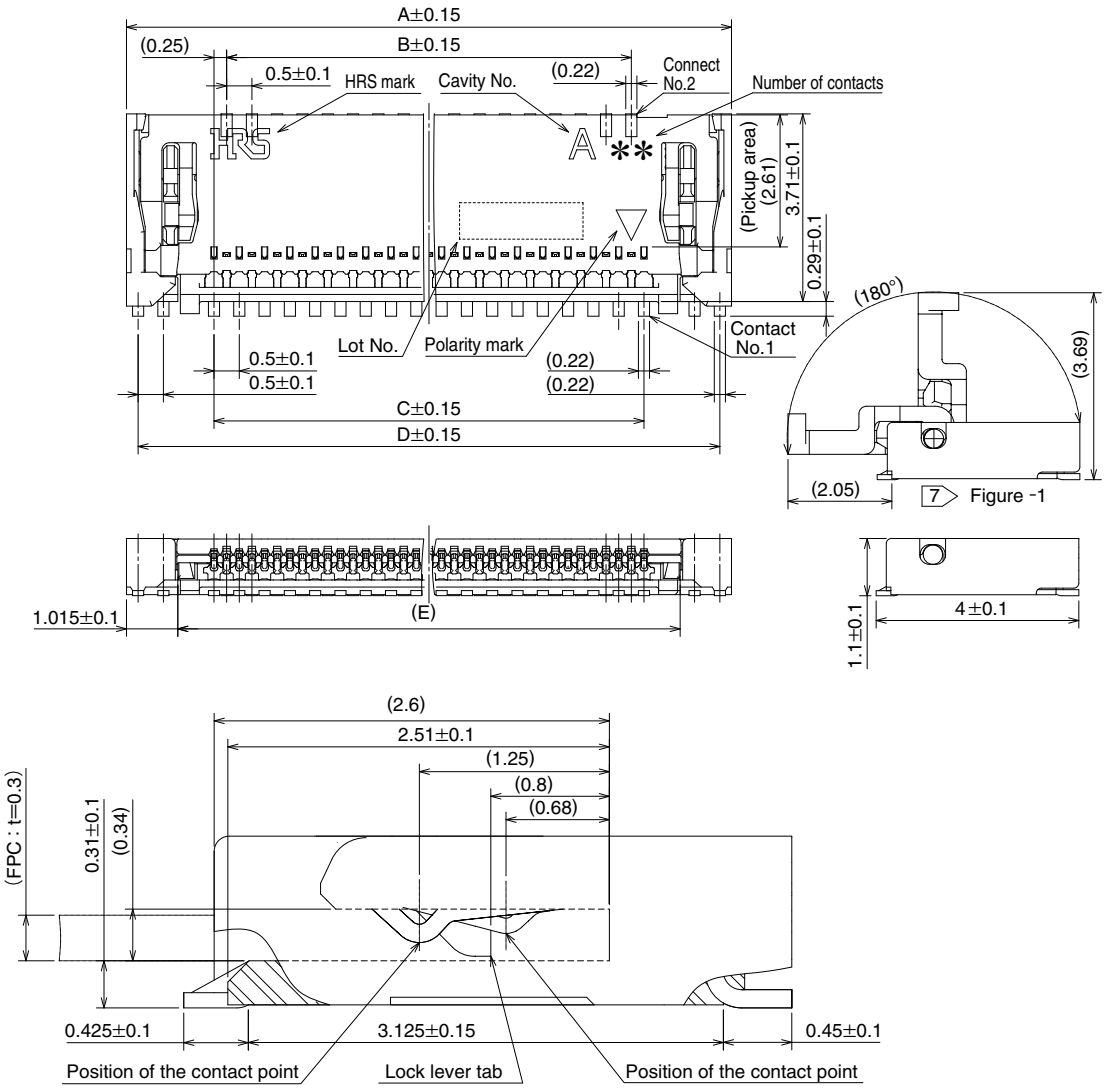
■Product Number Structure

Refer to the chart below when determining the product specifications from the product number.
Please select from the product numbers listed in this catalog when placing orders.

FH 62 – 35S – 0.25 SHW (10)
❶ ❷ ❸ ❹ ❺ ❻

❶ Series name : FH	❺ Termination type SHW･･･SMT Horizontal staggered array mounting type
❷ Series No. : 62	
❸ Number of contacts : 35	
❹ Contact pitch : 0.25mm	❻ Specifications (10) : Standard (5,000pcs/reel) (99) : 500pcs/reel

■Connector Dimensions



Note
1 : The dimension in parentheses are for reference.
2 : Lead co-planarity including reinforced chucking metals shall be 0.1 max.
3 : To be delivered with tape and reel packages.
See the packaging specifications for details.
4 : Note that preventive hole for sink mark or slit could be added for improvement.
5 : The quality remains good, even with the dark spots, which could occasionally occur on molded plastic.
6 : This product satisfies halogen free requirements defined as 900ppm maximum chlorine, 900ppm maximum bromine, and 1500ppm maximum total of chlorine and bromine.
7 Figure-1 Shows the state of opened lock cover. FPC can be pulled out by opening the lock lever by 45 degrees or more.

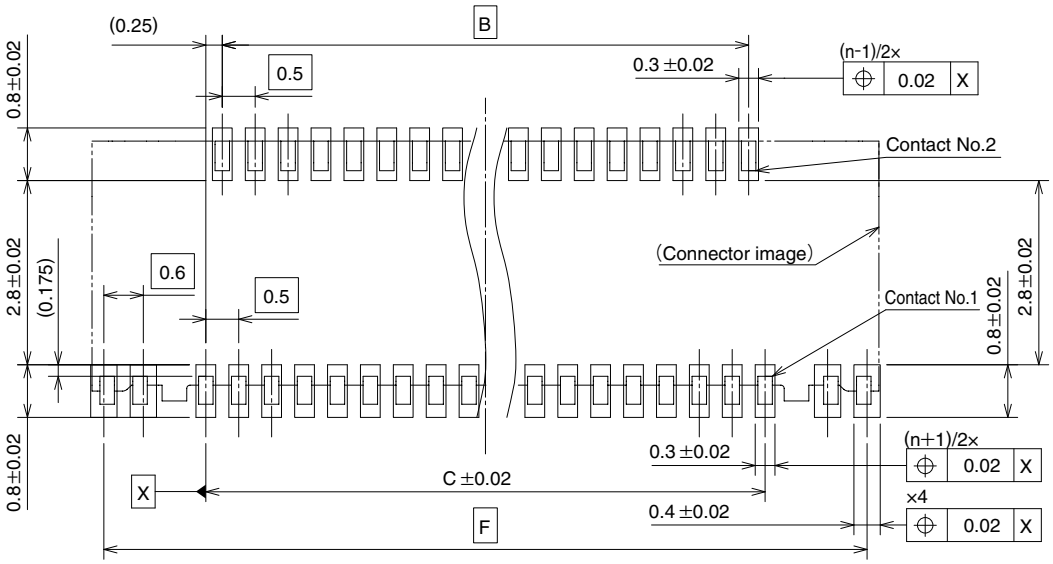
■Connector Dimensions

Units : mm

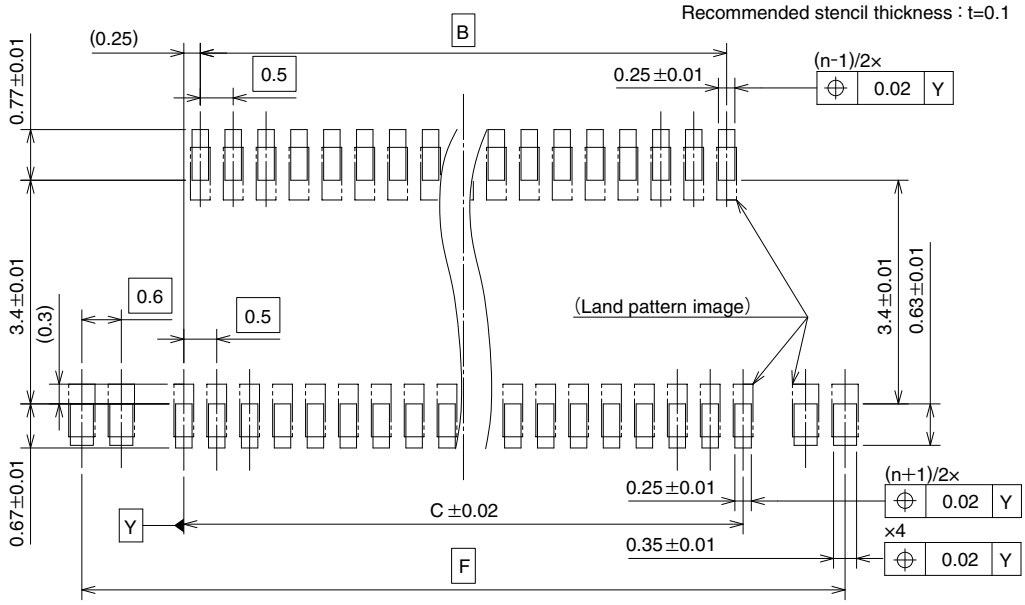
Part No.	HRS No.	No. of contacts	A	B	C	D	E
FH62-13S-0.25SHW(**)	580-4308-0 **	13	6.46	2.5	3	6	4.43
FH62-15S-0.25SHW(**)	Under planning (Note 1)	15	6.96	3	3.5	6.5	4.93
FH62-17S-0.25SHW(**)	580-4303-0 **	17	7.46	3.5	4	7	5.43
FH62-19S-0.25SHW(**)	Under planning (Note 1)	19	7.96	4	4.5	7.5	5.93
FH62-21S-0.25SHW(**)	580-4312-0 **	21	8.46	4.5	5	8	6.43
FH62-23S-0.25SHW(**)	Under planning (Note 1)	23	8.96	5	5.5	8.5	6.93
FH62-25S-0.25SHW(**)	Under planning (Note 1)	25	9.46	5.5	6	9	7.43
FH62-27S-0.25SHW(**)	Under planning (Note 1)	27	9.96	6	6.5	9.5	7.93
FH62-31S-0.25SHW(**)	580-4310-0 **	31	10.96	7	7.5	10.5	8.93
FH62-35S-0.25SHW(**)	580-4300-0 **	35	11.96	8	8.5	11.5	9.93
FH62-39S-0.25SHW(**)	580-4302-0 **	39	12.96	9	9.5	12.5	10.93
FH62-41S-0.25SHW(**)	580-4305-0 **	41	13.46	9.5	10	13	11.43
FH62-51S-0.25SHW(**)	Under planning (Note 1)	51	15.96	12	12.5	15.5	13.93
FH62-55S-0.25SHW(**)	580-4309-0 **	55	16.96	13	13.5	16.5	14.93
FH62-61S-0.25SHW(**)	580-4306-0 **	61	18.46	14.5	15	18	16.43

Note 1 : Contact positions without HRS No. are currently under planning.
Please contact hirose for detailed information about product variation.

◆Recommended PCB Mounting Pattern



◆Recommended Stencil Pattern



Note 8 : 'n' shows the number of contacts.

◆Recommended Dimensions of PCB Mounting Pattern and Stencil Pattern

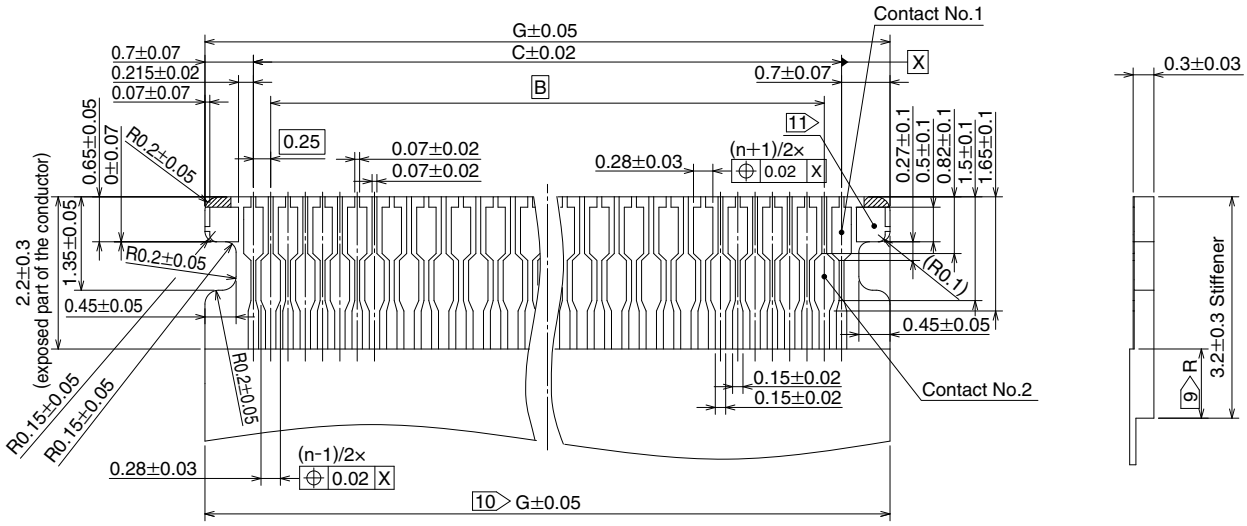
Units : mm

Part No.	HRS No.	No. of contacts	B	C	F
FH62-13S-0.25SHW(**)	580-4308-0 **	13	2.5	3	6.1
FH62-15S-0.25SHW(**)	Under planning (Note 1)	15	3	3.5	6.6
FH62-17S-0.25SHW(**)	580-4303-0 **	17	3.5	4	7.1
FH62-19S-0.25SHW(**)	Under planning (Note 1)	19	4	4.5	7.6
FH62-21S-0.25SHW(**)	580-4312-0 **	21	4.5	5	8.1
FH62-23S-0.25SHW(**)	Under planning (Note 1)	23	5	5.5	8.6
FH62-25S-0.25SHW(**)	Under planning (Note 1)	25	5.5	6	9.1
FH62-27S-0.25SHW(**)	Under planning (Note 1)	27	6	6.5	9.6
FH62-31S-0.25SHW(**)	580-4310-0 **	31	7	7.5	10.6
FH62-35S-0.25SHW(**)	580-4300-0 **	35	8	8.5	11.6
FH62-39S-0.25SHW(**)	580-4302-0 **	39	9	9.5	12.6
FH62-41S-0.25SHW(**)	580-4305-0 **	41	9.5	10	13.1
FH62-51S-0.25SHW(**)	Under planning (Note 1)	51	12	12.5	15.6
FH62-55S-0.25SHW(**)	580-4309-0 **	55	13	13.5	16.6
FH62-61S-0.25SHW(**)	580-4306-0 **	61	14.5	15	18.1

Note 1 : Contact positions without HRS No. are currently under planning.
Please contact hirose for detailed information about product variation.

◆Diagram of a recommended FPC dimension (when using plated lead part)

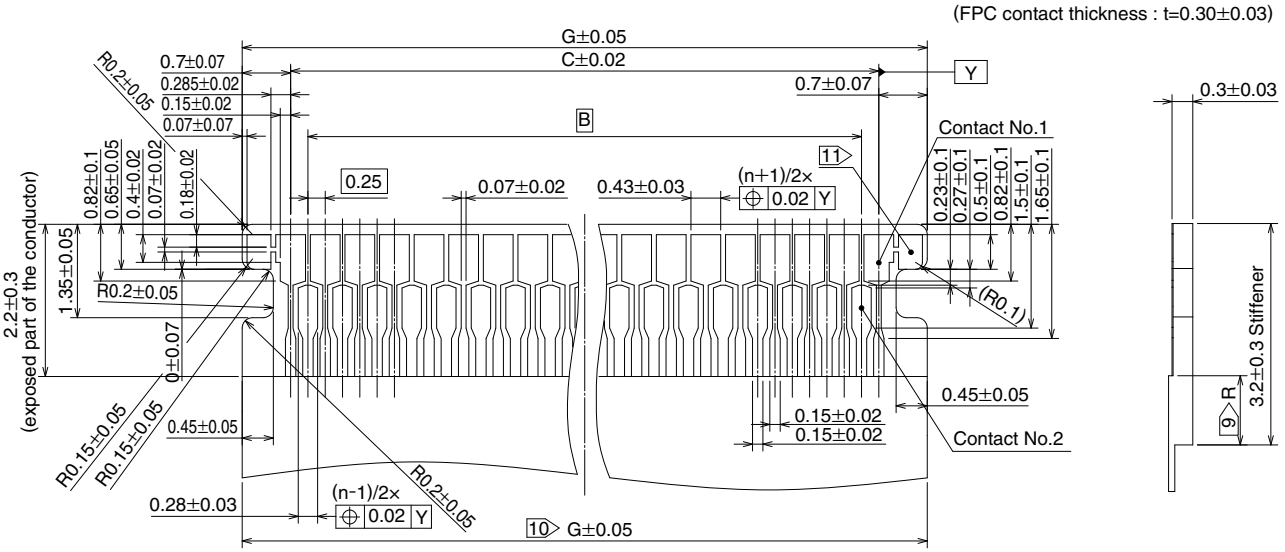
(FPC contact thickness : t=0.30±0.03)



Note
9 Dimension R must be 0.5mm minimum.
10 Indicated tolerance is applicable to the exposed conductor.
11 Both end sides of contact pad on FPC cannot be used for signal transmission.

◆Recommended FPC dimension (when not using plated lead part)

(FPC contact thickness : t=0.30±0.03)



Note
9 Dimension R must be 0.5mm minimum.
10 Indicated tolerance is applicable to the exposed conductor.
11 Both end sides of contact pad on FPC cannot be used for signal transmission.

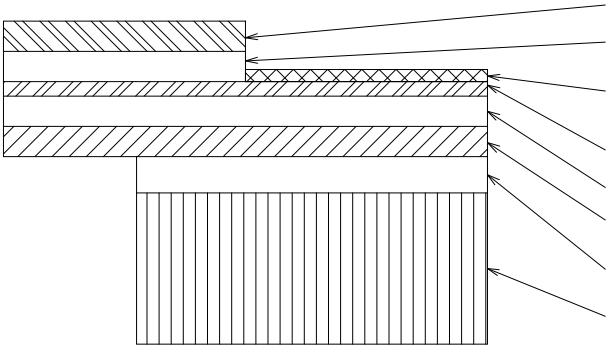
◆Recommended FPC Dimensions

Units : mm

Part No.	HRS No.	No. of contacts	B	C	G
FH62-13S-0.25SHW(**)	580-4308-0 **	13	2.5	3	4.4
FH62-15S-0.25SHW(**)	Under planning (Note 1)	15	3	3.5	4.9
FH62-17S-0.25SHW(**)	580-4303-0 **	17	3.5	4	5.4
FH62-19S-0.25SHW(**)	Under planning (Note 1)	19	4	4.5	5.9
FH62-21S-0.25SHW(**)	580-4312-0 **	21	4.5	5	6.4
FH62-23S-0.25SHW(**)	Under planning (Note 1)	23	5	5.5	6.9
FH62-25S-0.25SHW(**)	Under planning (Note 1)	25	5.5	6	7.4
FH62-27S-0.25SHW(**)	Under planning (Note 1)	27	6	6.5	7.9
FH62-31S-0.25SHW(**)	580-4310-0 **	31	7	7.5	8.9
FH62-35S-0.25SHW(**)	580-4300-0 **	35	8	8.5	9.9
FH62-39S-0.25SHW(**)	580-4302-0 **	39	9	9.5	10.9
FH62-41S-0.25SHW(**)	580-4305-0 **	41	9.5	10	11.4
FH62-51S-0.25SHW(**)	Under planning (Note 1)	51	12	12.5	13.9
FH62-55S-0.25SHW(**)	580-4309-0 **	55	13	13.5	14.9
FH62-61S-0.25SHW(**)	580-4306-0 **	61	14.5	15	16.4

Note 1 : Contact positions without HRS No. are currently under planning.
Please contact hirose for detailed information about product variation.

◆FPC Construction (Recommended Specifications)



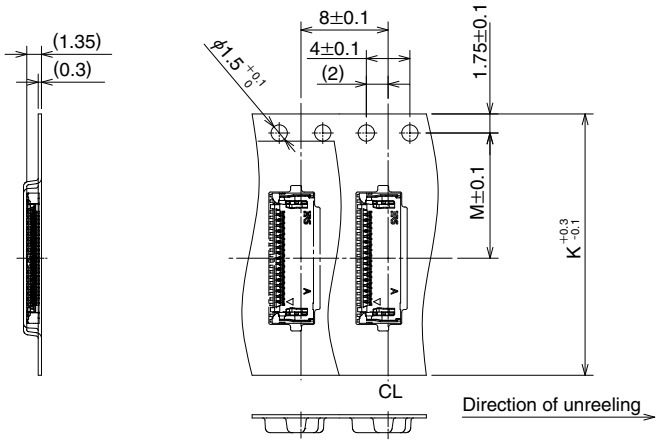
MATERIAL NAME	MATERIAL	THICKNESS (μm)
Covering film layer	Polyimide 1mil	25
Cover adhesive		25
Surface treatment	1μm to 6μm nickel underplated 0.2μm gold plated	(4)
Copper foil	Cu 1oz	35
Base adhesive	Heat-hardened adhesive	25
Base film	Polyimide 1mil	25
Reinforcement material adhesive	Heat-hardened adhesive	35
Stiffener	Polyimide 7mil	175

3. Caution

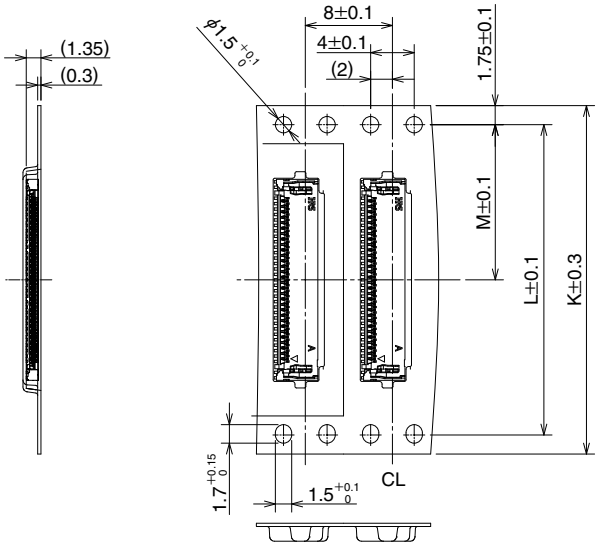
1. Material composition of FPC is a reference example. Please adjust the thickness of the FPC mating section to 0.3±0.03mm in reference to the material composition.
2. For the details of the material composition, please contact each FPC manufacturer.

◆Packaging Specifications

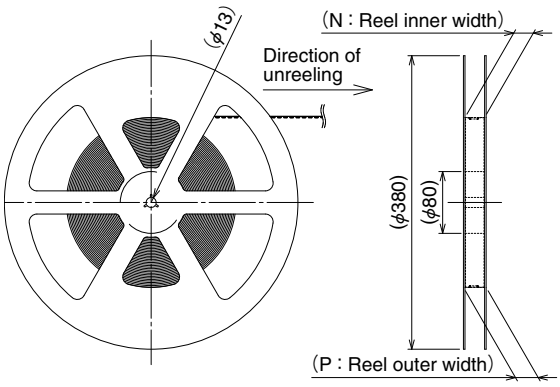
●Embossed Carrier Tape Dimensions (Tape width up to 24mm)



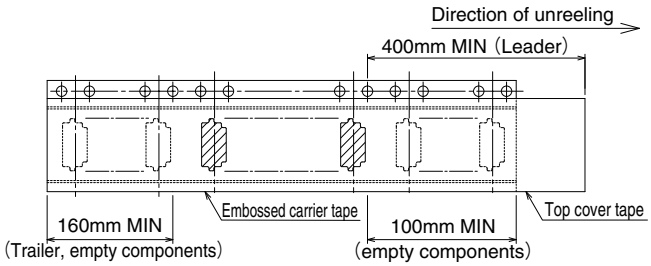
●Embossed Carrier Tape Dimensions (Tape width 32mm and over)



●Reel Dimensions



●Leader, Trailer Dimensions



Units : mm

Part No.	HRS No.	No. of contacts	K	L	M	N	P
FH62-13S-0.25SHW(**)	580-4308-0 **	13	16	-	7.5	17.4	21.4
FH62-15S-0.25SHW(**)	Under planning (Note 1)	15	24	-	11.5	25.4	29.4
FH62-17S-0.25SHW(**)	580-4303-0 **	17					
FH62-19S-0.25SHW(**)	Under planning (Note 1)	19					
FH62-21S-0.25SHW(**)	580-4312-0 **	21					
FH62-23S-0.25SHW(**)	Under planning (Note 1)	23					
FH62-25S-0.25SHW(**)	Under planning (Note 1)	25					
FH62-27S-0.25SHW(**)	Under planning (Note 1)	27					
FH62-31S-0.25SHW(**)	580-4310-0 **	31					
FH62-35S-0.25SHW(**)	580-4300-0 **	35					
FH62-39S-0.25SHW(**)	580-4302-0 **	39					
FH62-41S-0.25SHW(**)	580-4305-0 **	41					
FH62-51S-0.25SHW(**)	Under planning (Note 1)	51	32	28.4	14.2	33.4	37.4
FH62-55S-0.25SHW(**)	580-4309-0 **	55					
FH62-61S-0.25SHW(**)	580-4306-0 **	61					

Note 1 : Contact positions without HRS No. are currently under planning.
Please contact hirose for detailed information about product variation.

PRODUCT CATALOG

HIROSE ELECTRIC CO.,LTD.

FH82 Series

0.25mm Pitch, 0.65mm Height, Top Contact, One Action Lock, FPC Connector

FH™

OneAction Flip-Lock Pioneer Hirose

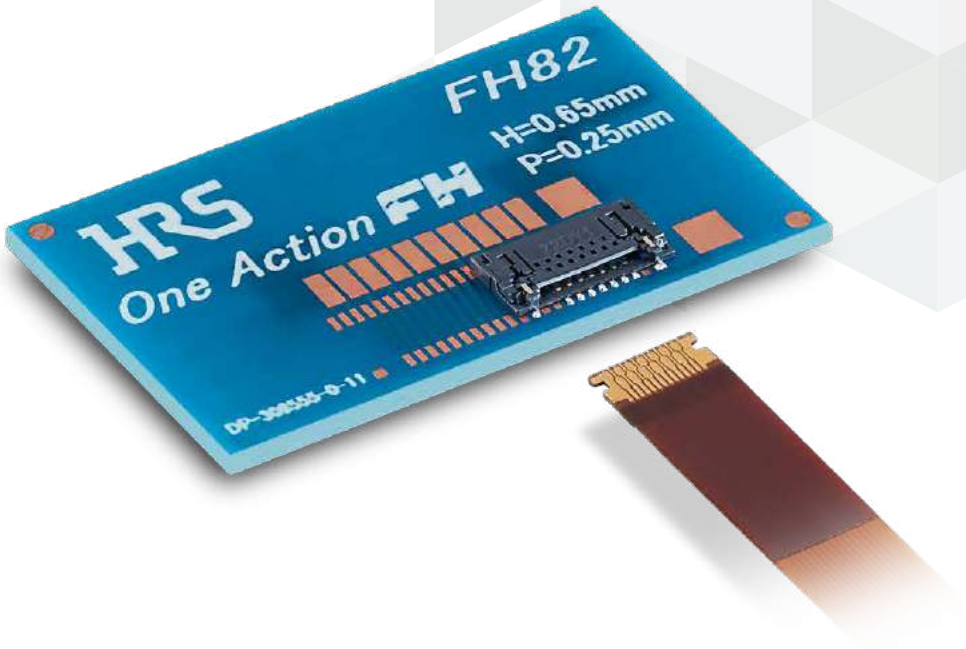
One Action

One Action

Low Profile

P= 0.25 mm

P= 0.25mm

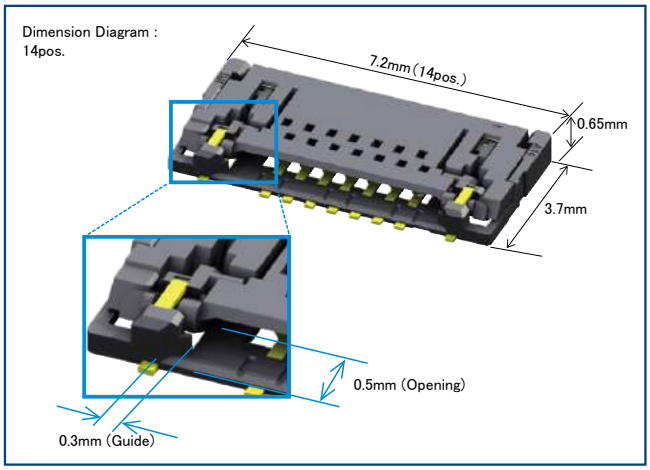


NEW

Features

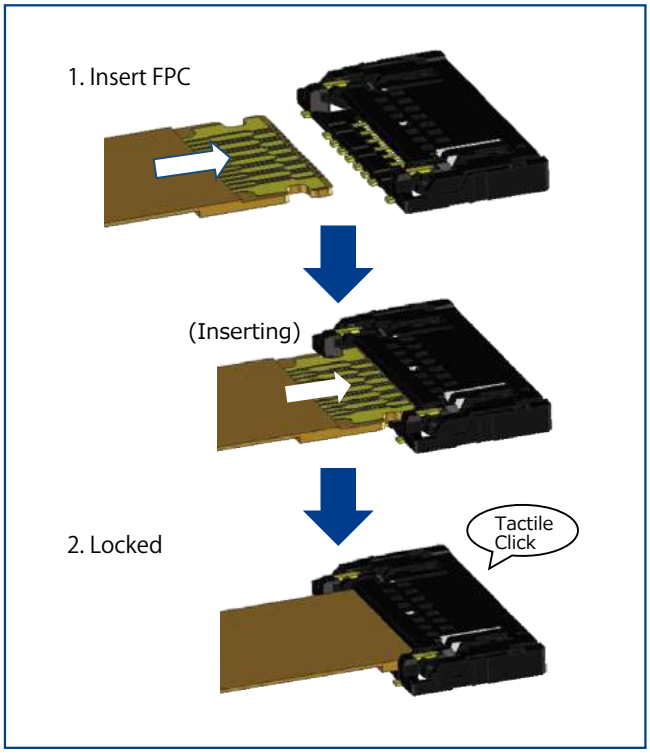
1. Ultra Low Height, Space-saving Design

Space-saving design with 0.65mm height and 0.25mm pitch



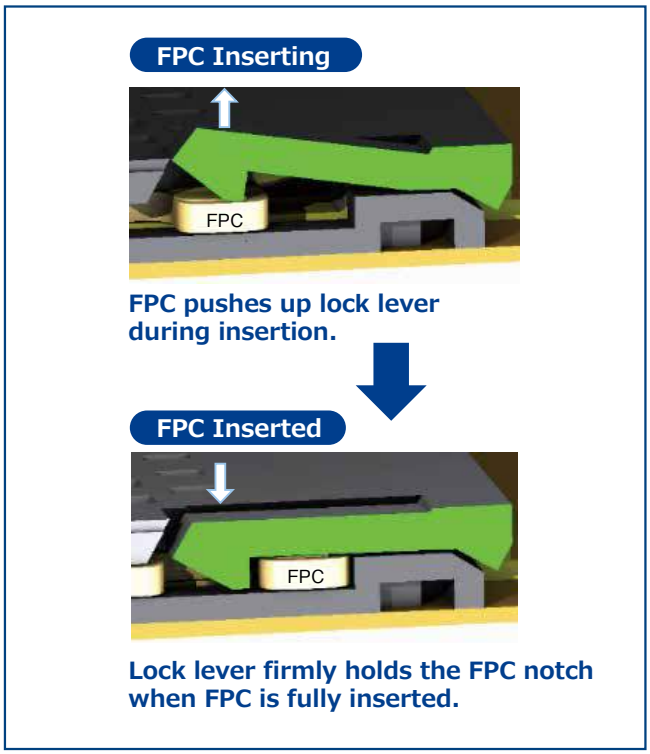
2. One Action Automatic Locking Design

There is no need to touch the actuator during insertion, preventing actuator damage. Incomplete mating due to FPC misalignment is also prevented.



3. High FPC Retention Force

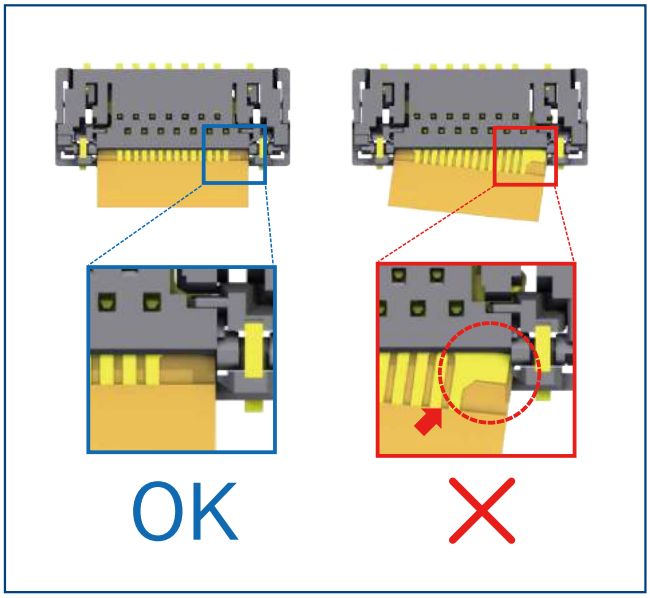
The lock lever holds the notches on both sides of the FPC for high FPC retention force even at small pin counts.



Lock Design Firmly Retains FPC

4. Original FPC Mis-mating Detection Design

Can detect mis-mating by using the FPC pattern for mating detection to confirm the insertion status.



Can Detect FPC Mis-mating

5. Environmental Compatibility

Halogen Free
No chlorine or bromine exceeding the standard value is used in the connector.

*As defined by IEC 61249-2-21
Br: 900ppm Max., Cl: 900ppm Max., Br+Cl: 1,500ppm Max.

Product Specifications

Rated Current	0.2A	Operating Temperature (Note 1)	-55 to +85℃
Rated Voltage	30V AC/DC	Operating Humidity Range	RH 90% Max. (No Condensation)
		Storage Temperature (Note 2)	-10 to +50℃
		Storage Humidity Range (Note 2)	RH 90% Max. (No Condensation)

Adaptive FPC Contact Specifications	Thickness = 0.2±0.02mm Gold plated

Item	Specifications	Conditions
Insulation Resistance	50MΩ Min.	Measured at 100V DC
Withstanding Voltage	No insulation breakdown	90V AC rms for 1 min.
Contact Resistance	150mΩ Max. *Including FPC conductor resistance	Measured at 1mA (AC)
Mating Durability	Contact resistance : 150mΩ Max. No damage, cracks, or parts dislocation	10 times
Vibration Resistance	No electrical discontinuity of 1μs Min. Contact Resistance : 150mΩ Max. No damage, cracks, or parts dislocation	Frequency : 10 to 55Hz, single amplitude of 0.75mm, 10 cycles in each of the 3 directions
Shock Resistance	No electrical discontinuity of 1μs Min. Contact Resistance : 150mΩ Max. No damage, cracks, or parts dislocation	Acceleration of 981m/s^2, duration of 6ms, sine half-wave waveform, 3 cycles in each of the 3 axes
Humidity (Steady state)	Contact Resistance : 150mΩ Max. Insulation Resistance : 50MΩ Min. No damage, cracks, or parts dislocation	96 hours at temperature of 40℃ and humidity of 90% to 95%
Temperature Cycle	Contact Resistance : 150mΩ Max. Insulation Resistance : 50MΩ Min. No damage, cracks, or parts dislocation	Temperature : -55℃ → +15℃ to +35℃ → +85℃ → +15℃ to +35℃ Time : 30 → 2 to 3 → 30 → 2 to 3 (Minutes) 5 cycles
Resistance to Soldering Heat	No deformation of components affecting performance	Reflow : See recommended temperature profile Manual soldering : 350 ± 10℃ for 5 seconds

Note 1 : Includes the temperature rise due to current flow.
Note 2 : The term "storage" refers to products stored for long period of time prior to mounting and use.
Operating temperature and humidity range are applicable to the non-energized state after board mounting.

Materials / Finish

Component	Material	Color / Finish	Remarks
Housing	LCP	Black	UL94V-0
Actuator	LCP	Black	
Contact	Copper Alloy	Gold Plating	-
Retention Tab	Copper Alloy	Gold Plating	-

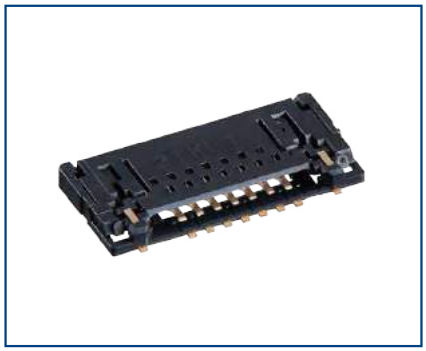
Product Number Structure

Please utilize the below part number chart when selecting.

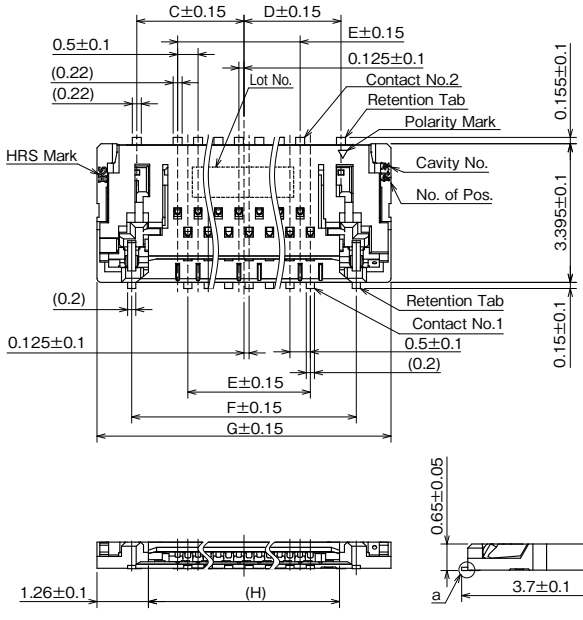
FH 82 - 14S - 0.25 SHW (##)
❶ ❷ ❸ ❹ ❺ ❻

❶ Series Name	FH	❹ Contact Pitch	0.25mm
❷ Series No.	82	❺ Contact Type	SHW : SMT Horizontal Staggered Array Mounting Type
❸ No. of Pos.	14	❻ Specifications	Blank : Standard, 8000pcs/reel (99) : 500pcs/reel (For trial production)

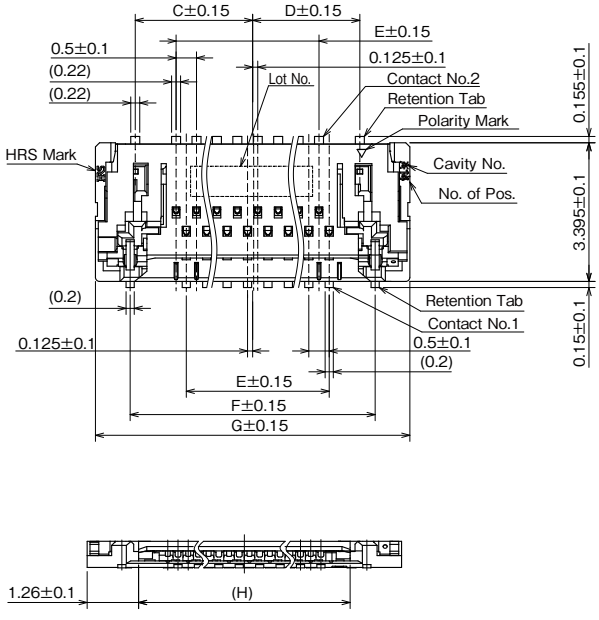
Connector Dimensions



Type A



Type B



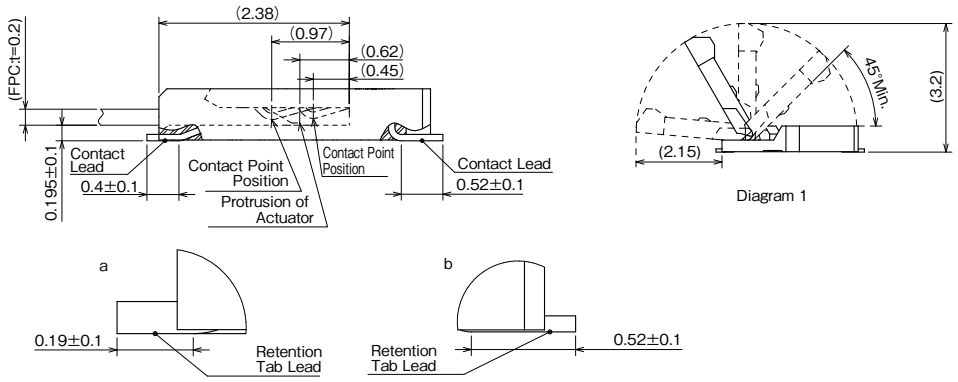


Diagram 1

Note 1 : The dimensions in parentheses are for reference.
Note 2 : The coplanarity of the contact and retention tab lead should be 0.1mm Max.
Note 3 : Packaged in tape and reel. Check the packaging specifications for details.
Note 4 : Sink holes or slits may be added for improvements.
Note 5 : This product is halogen-free.
(Br : 900ppm maximum, Cl : 900ppm maximum, Cl + Br combined : 1,500ppm maximum)
Note 6 : Diagram 1 shows the state of the actuator opened.
FPC can be pulled out by opening the actuator to 45 degrees or more.
Note 7 : The retention tabs cannot be used as signal contacts.

Unit : mm

Part No.	HRS No.	Type	No. of Pos.	C	D	E	F	G	H	Purchase Unit (##) : Blank	Purchase Unit (##) : (99)
FH82-6S-0.25SHW(##)	Under Planning (Note 9)	A	6	1.625	1.375	1.0	3.5	5.2	2.68	8000pcs per reel	500pcs per reel
FH82-10S-0.25SHW(##)	Under Planning (Note 9)	A	10	2.125	1.875	2.0	4.5	6.2	3.68		
FH82-14S-0.25SHW(##)	CL0580-5501-0-##	A	14	2.625	2.375	3.0	5.5	7.2	4.68		
FH82-18S-0.25SHW(##)	Under Planning (Note 9)	A	18	3.125	2.875	4.0	6.5	8.2	5.68		

Unit : mm

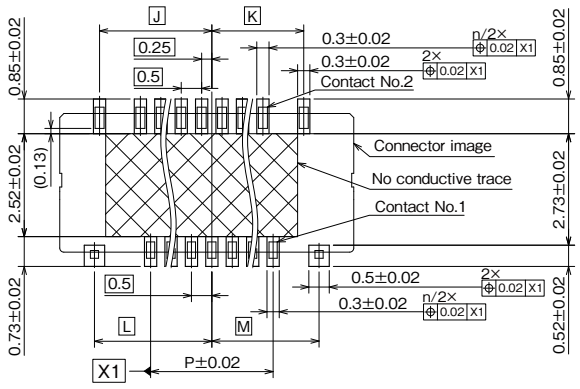
Part No.	HRS No.	Type	No. of Pos.	C	D	E	F	G	H	Purchase Unit (##) : Blank	Purchase Unit (##) : (99)
FH82-8S-0.25SHW(##)	Under Planning (Note 9)	B	8	1.875	1.625	1.5	4.0	5.7	3.18	8000pcs per reel	500pcs per reel
FH82-12S-0.25SHW(##)	Under Planning (Note 9)	B	12	2.375	2.125	2.5	5.0	6.7	4.18		
FH82-16S-0.25SHW(##)	Under Planning (Note 9)	B	16	2.875	2.625	3.5	6.0	7.7	5.18		
FH82-20S-0.25SHW(##)	Under Planning (Note 9)	B	20	3.375	3.125	4.5	7.0	8.7	6.18		

Note 8 : Two product types are available depending on the number of positions. Please refer to the dimensional drawings for Type A or Type B.
Note 9 : Contact positions without HRS No. are currently under planning.
Please contact a Hirose representative regarding questions on pin count variation development.

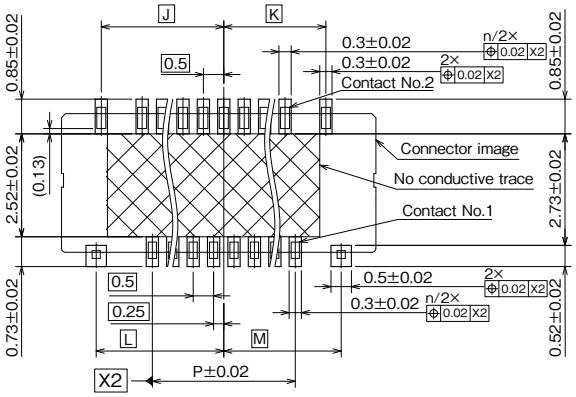
Recommended PCB Mounting Pattern, Metal Mask Dimensions

Recommended PCB Mounting Pattern

Type A

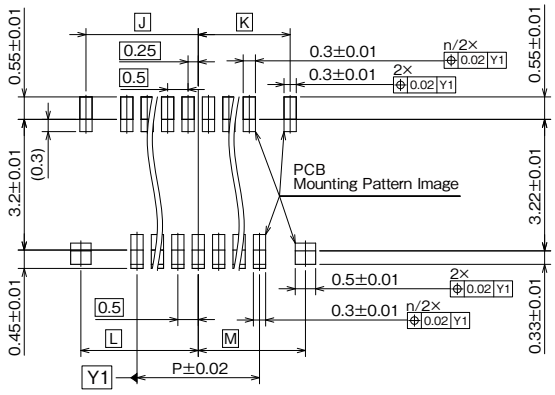


Type B

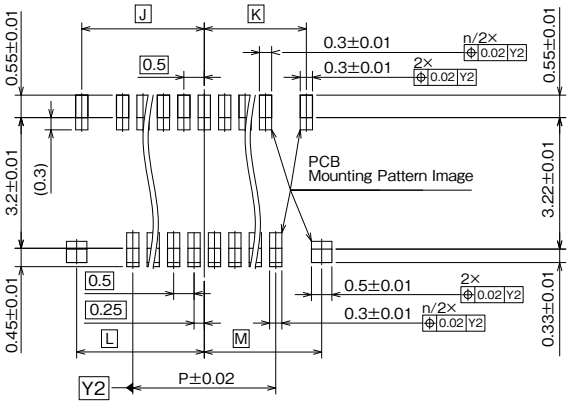


Recommended Metal Mask Dimensions

Type A



Type B



Recommended Metal Mask Thickness : 0.1
Note 1 : 'n' indicates the number of positions.

Unit : mm

Part No.	HRS No.	Type	No. of Pos.	J	K	L	M	P
FH82-6S-0.25SHW(##)	Under Planning (Note 3)	A	6	1.75	1.25	1.875	1.625	1.0
FH82-10S-0.25SHW(##)	Under Planning (Note 3)	A	10	2.25	1.75	2.375	2.125	2.0
FH82-14S-0.25SHW(##)	CL0580-5501-0-##	A	14	2.75	2.25	2.875	2.625	3.0
FH82-18S-0.25SHW(##)	Under Planning (Note 3)	A	18	3.25	2.75	3.375	3.125	4.0

Unit : mm

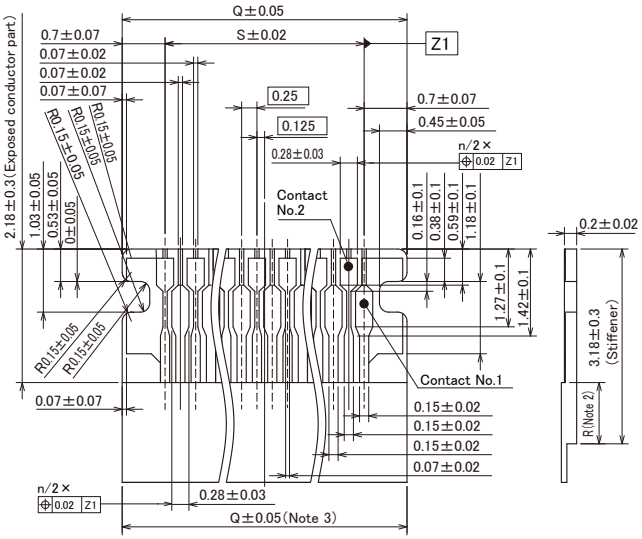
Part No.	HRS No.	Type	No. of Pos.	J	K	L	M	P
FH82-8S-0.25SHW(##)	Under Planning (Note 3)	B	8	2.0	1.5	2.125	1.875	1.5
FH82-12S-0.25SHW(##)	Under Planning (Note 3)	B	12	2.5	2.0	2.625	2.375	2.5
FH82-16S-0.25SHW(##)	Under Planning (Note 3)	B	16	3.0	2.5	3.125	2.875	3.5
FH82-20S-0.25SHW(##)	Under Planning (Note 3)	B	20	3.5	3.0	3.625	3.375	4.5

Note 2 : Two product types are available depending on the number of positions. Please refer to the dimensional drawings for Type A or Type B.
Note 3 : Contact positions without HRS No. are currently under planning.
Please contact a Hirose representative regarding questions on pin count variation development.

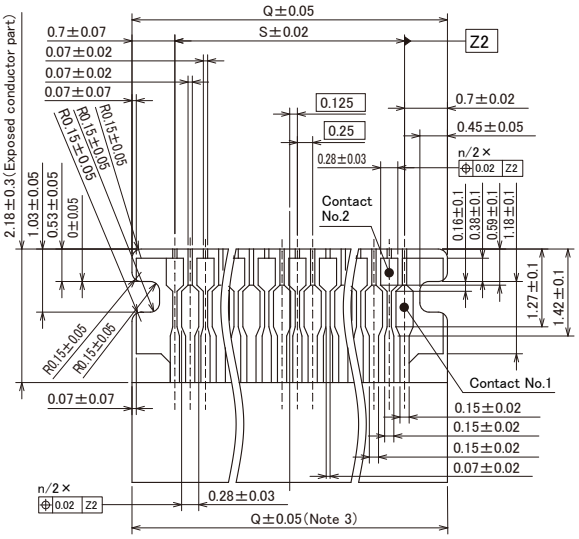
Recommended FPC Dimensions

Thickness of FPC at the Mated Portion : t=0. 20±0. 02

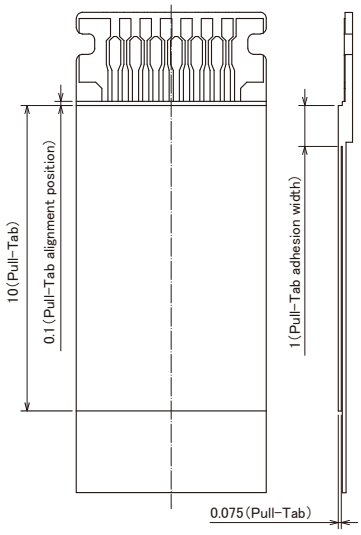
Type A



Type B



FPC with Pull-Tab Specifications (Example)



Note 1 : 'n' indicates the number of positions.
Note 2 : Dimension R must be 0.5mm minimum.
Note 3 : Indicated tolerance is applicable to the exposed conductor.

Unit : mm

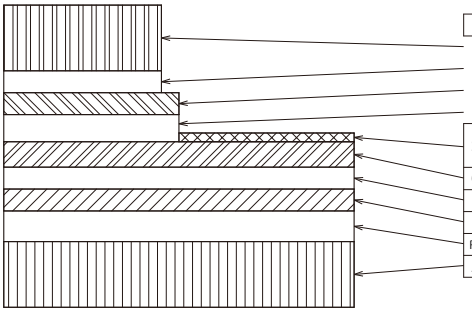
Part No.	HRS No.	Type	No. of Pos.	Q	S
FH82-6S-0.25SHW(##)	Under Planning (Note 5)	A	6	2.65	1.25
FH82-10S-0.25SHW(##)	Under Planning (Note 5)	A	10	3.65	2.25
FH82-14S-0.25SHW(##)	CL0580-5501-0-##	A	14	4.65	3.25
FH82-18S-0.25SHW(##)	Under Planning (Note 5)	A	18	5.65	4.25

Unit : mm

Part No.	HRS No.	Type	No. of Pos.	Q	S
FH82-8S-0.25SHW(##)	Under Planning (Note 5)	B	8	3.15	1.75
FH82-12S-0.25SHW(##)	Under Planning (Note 5)	B	12	4.15	2.75
FH82-16S-0.25SHW(##)	Under Planning (Note 5)	B	16	5.15	3.75
FH82-20S-0.25SHW(##)	Under Planning (Note 5)	B	20	6.15	4.75

Note 4 : Two product types are available depending on the number of positions. Please refer to the dimensional drawings for Type A or Type B.
Note 5 : Contact positions without HRS No. are currently under planning.
Please contact a Hirose representative regarding questions on pin count variation development.

FPC Construction (Recommended Specifications)

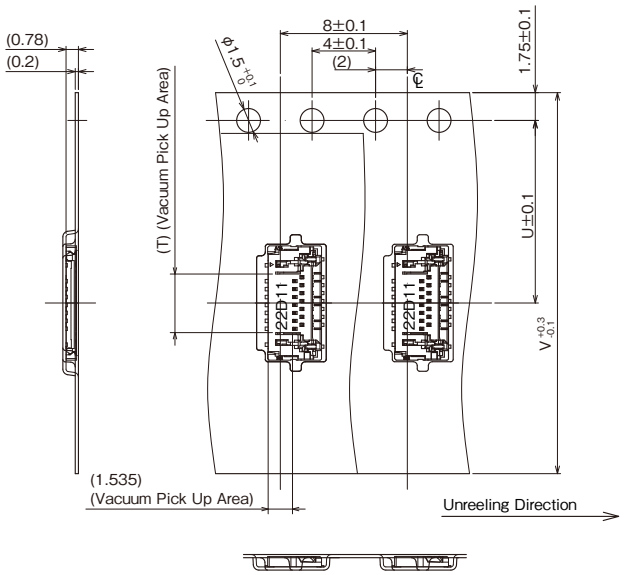


Material Name	Material	Thickness (μm)
Pull-Tab	Polyimide 3mil	75
Pull-Tab adhesive		25
Covering film layer	Polyimide 1mil	25
Covering adhesive		25
Surface treatment	1 to 6μm nickel underplated 0.2μm gold plated	(4)
Conductor copper foil	Cu 1/2oz	18
Base adhesive	Heat-hardened adhesive	25
Base film	Polyimide 1mil	25
Reinforcement material adhesive	Heat-hardened adhesive	30
Adhesive Stiffener	Polyimide 4mil	100

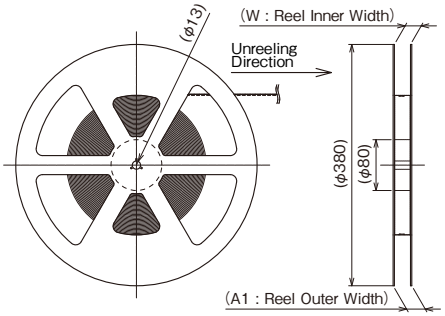
Note 1 : Material composition of FPC is a reference example.
Please adjust the thickness of the FPC mating section to 0.2±0.02mm in reference to the material composition.
Note 2 : For details about the construction, please contact the FPC manufacturers.

Packaging Specifications

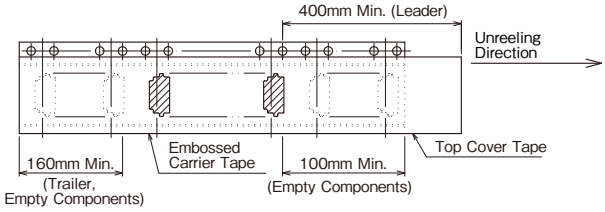
Embossed Carrier Tape Dimensions



Reel Dimensions



Leader, Trailer Dimensions



Note 1 : The package complies with JIS C 0806 and IEC 60286-3 (Packaging of components for automatic handling).

Unit : mm

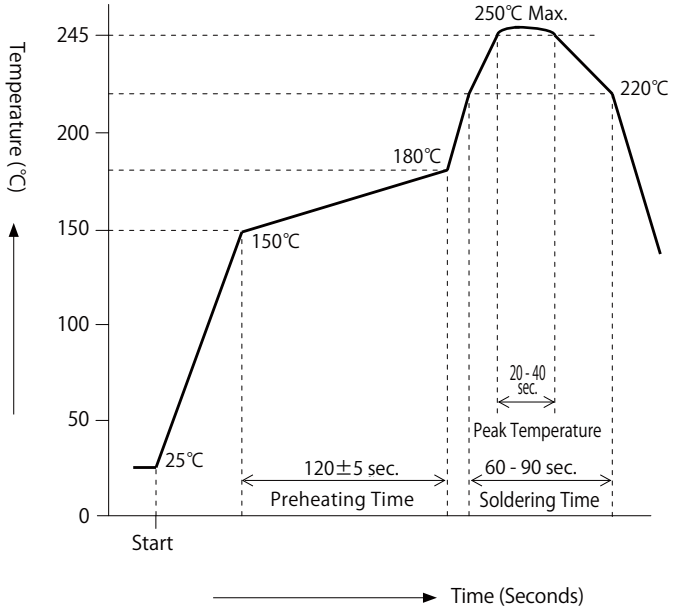
Part No.	HRS No.	Type	No. of Pos.	T	U	V	W	A1
FH82-6S-0.25SHW(##)	Under Planning (Note 2)	A	6	1.69	7.5	16.0	17.4	21.4
FH82-10S-0.25SHW(##)	Under Planning (Note 2)	A	10	2.69	7.5	16.0	17.4	21.4
FH82-14S-0.25SHW(##)	CL0580-5501-0-##	A	14	3.69	11.5	24.0	25.4	29.4
FH82-18S-0.25SHW(##)	Under Planning (Note 2)	A	18	4.69	11.5	24.0	25.4	29.4

Unit : mm

Part No.	HRS No.	Type	No. of Pos.	T	U	V	W	A1
FH82-8S-0.25SHW(##)	Under Planning (Note 2)	B	8	2.19	7.5	16.0	17.4	21.4
FH82-12S-0.25SHW(##)	Under Planning (Note 2)	B	12	3.19	11.5	24.0	25.4	29.4
FH82-16S-0.25SHW(##)	Under Planning (Note 2)	B	16	4.19	11.5	24.0	25.4	29.4
FH82-20S-0.25SHW(##)	Under Planning (Note 2)	B	20	5.19	11.5	24.0	25.4	29.4

Note 2 : Products without HRS No. are currently being planned for development.
Please contact a Hirose representative regarding questions on pin count variation development.

Temperature Profile



Applicable Conditions

Solder Method	: Reflow, IR/Hot Air
Environment	: Room Air
Solder	: Paste Type Sn/3.0Ag/0.5Cu
Composition	(SENJU METAL INDUSTRY CO., LTD.
	Part Number : M705-GRN360-K2-V)
Test Board	: Material and Size
	Glass Epoxy 27×16.5×1.0mm
	"Recommended PCB Mounting Pattern"
Metal Mask	: Thick and Opening dimensions
	"Recommended Metal Mask Dimensions"

This temperature profile is for the above conditions.
The temperature profile may vary depending on the type of cream solder, the manufacturer, the board size and other conditions such as mounting materials.
Please check the mounting status before use.

Connector Operation and Precautions

This is a small and thin connector that requires caution during handling.
Please check the following before use.

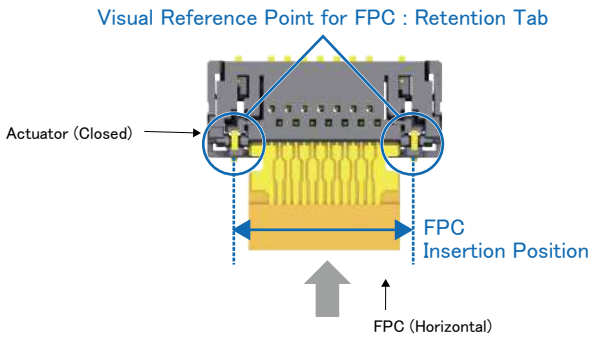
1. Initial Delivery State

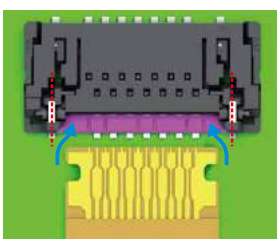
The product is delivered with the actuator closed.
You do not need to operate it except for when removing the FPC.

2. How to Insert FPC

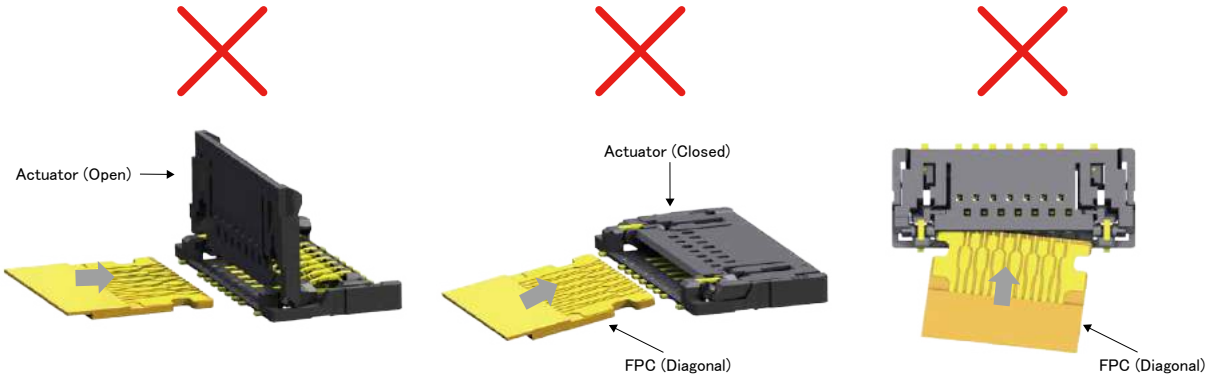
Insert the FPC with the conductor side up and horizontal to the board surface, aiming between the retention tabs.
Insert the FPC completely.

[Caution]
・Do not bend the FPC in any direction during FPC insertion.
It may cause deformation of the contacts and contact failure.

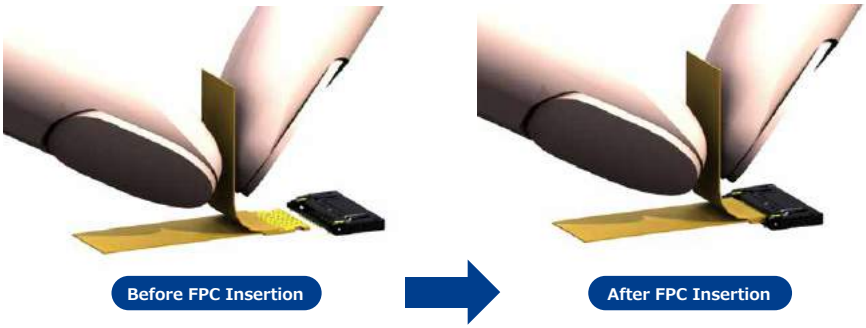




The alignment tapers between the retention tabs guide the FPC.

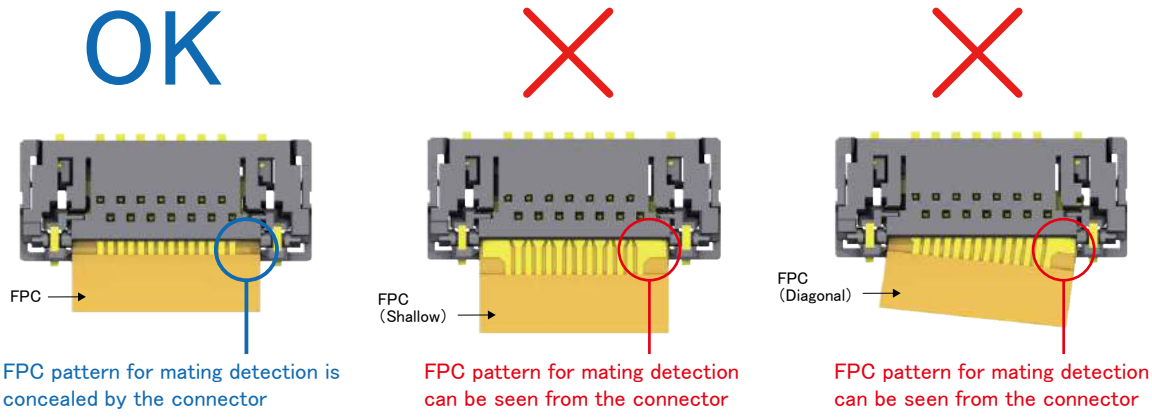


◆FPC Layer for Pull-Tab Design
Pinch the pull-tab with your finger and insert it into the connector.



3. Confirming the FPC Insertion Status

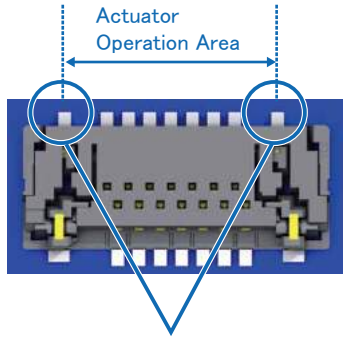
Visually confirm the FPC insertion status after completing insertion.



4. FPC Removal

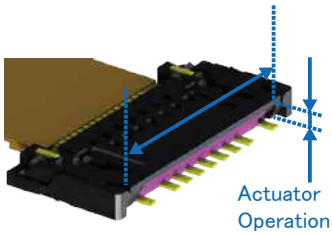
Push up the center of the actuator slowly (use the retention tabs as a guide) and release the lock.

[Caution]
・Operate the center of the actuator and do not push in both ends of the connector.
・The actuator cannot be opened over 170°.
・Do not touch the contact after releasing the actuator lock.
・Do not raise, pull, or twist the actuator.

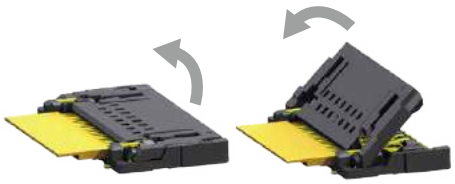


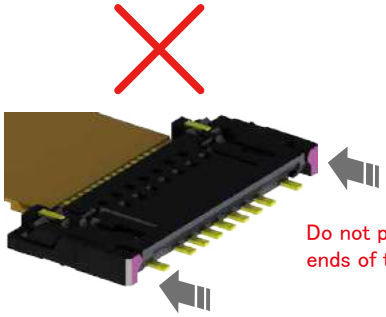
Visual Reference Point for FPC :
Between Retention Tabs

OK

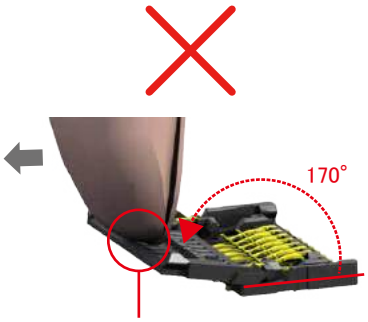


OK

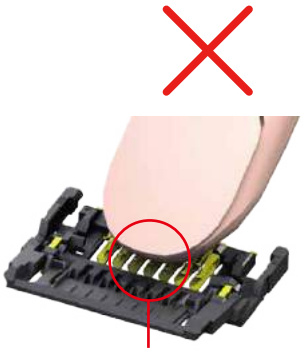




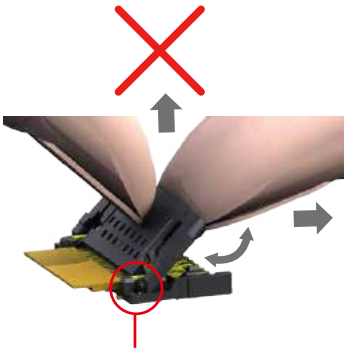
Do not push both
ends of the connector.



Excessive force is applied
to the actuator.



Do not touch the contact.



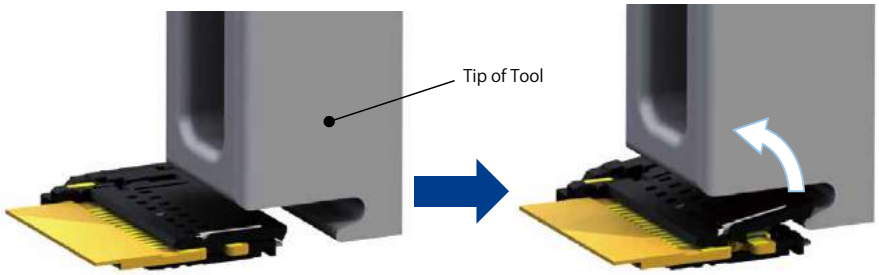
Load is concentrated on the rotational
axis leading to damage.

◆The Actuator Lock Release Tool

(1) Dedicated actuator lock release tools are available for smooth operation.

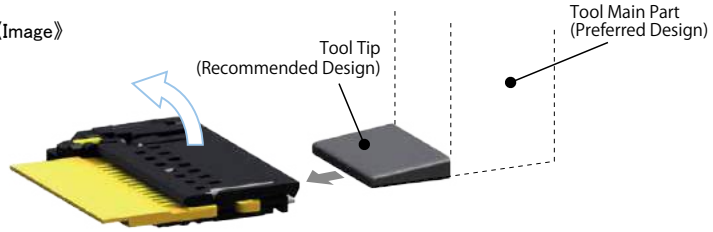
Part No. FH58 MATING TOOL (21)
HRS No. CL0580-3817-0-00

《Usage Example》



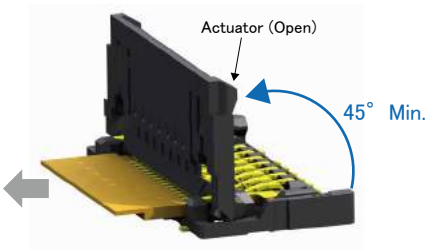
(2) The customer can design the actuator lock removal tool as preferred.
However, the tip of the tool must be made as shown in the recommended design.
For details refer to the 2D drawing.

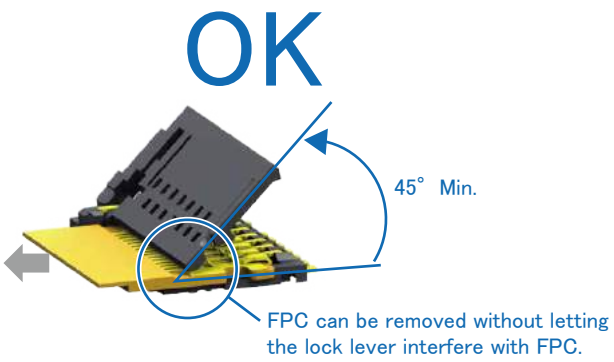
《Image》

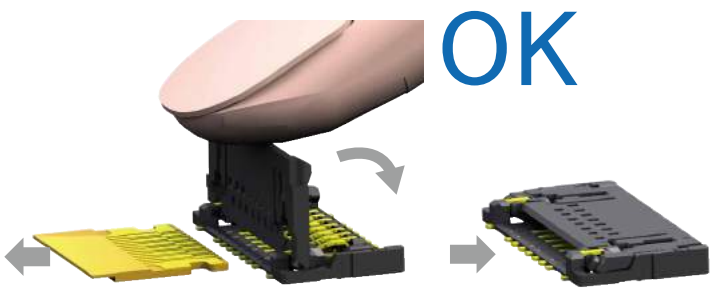


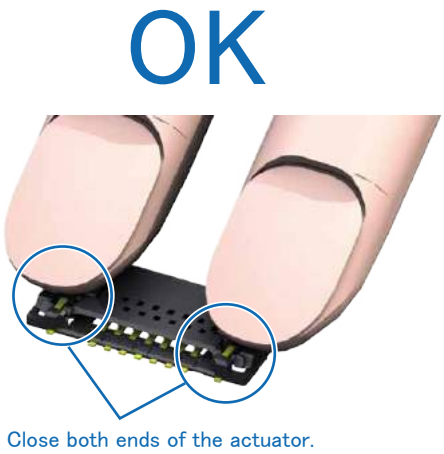
Pull out the FPC horizontally after releasing the actuator lock.
After removing the FPC, close the actuator.

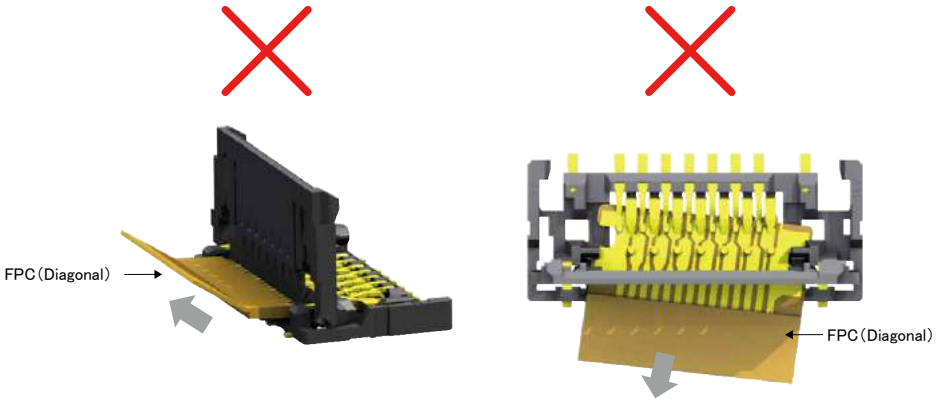
[Caution]
・Do not pull out the FPC when the actuator is not opened to at least 45°.
・Ensure both ends of the actuator are closed when closing the actuator.







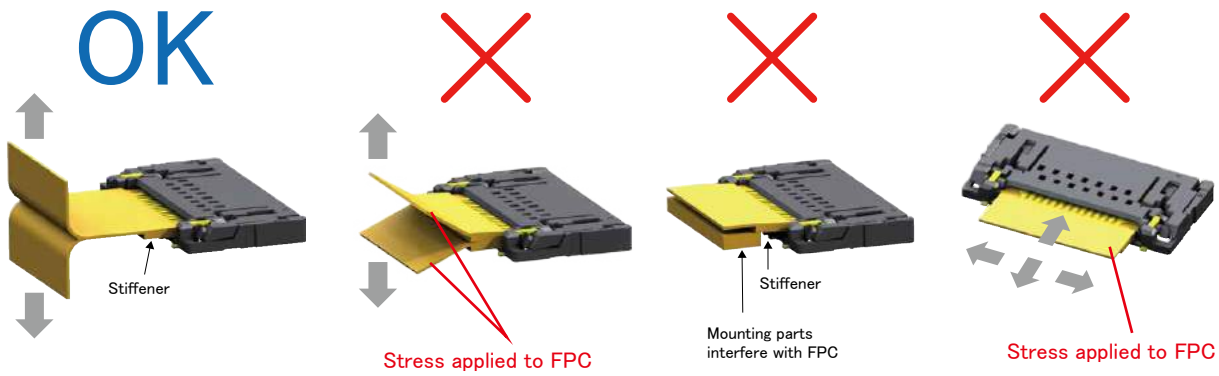




5. FPC Routing

Make sure not to apply stress to the FPC during FPC routing in order to prevent disconnect and damage.
There is also a risk of stress to the connector and contact failure.

[Caution]
- Make sure that FPC and stiffener do not touch the panel.
- Avoid applying forces to the FPC in the vertical or horizontal directions.
  In addition, avoid pulling up and down on the FPC.
- When securing the FPC after routing, avoid pulling the FPC, and route the FPC with slack
  Make sure that the stiffener is parallel to the PCB.
- Do not mount other components that will interfere with the FPC underneath the reinforcing film.



【PCB Mounting Precautions】

◆PCB Warpage
Minimize PCB warpage as much as possible.
The coplanarity of this connector is 0.1mm Max.
Soldering failure may occur due to excessive board warpage.

◆Mounting to FPC
When mounting the FPC, design a reinforcing plate for easy handling.
Reinforcing plates made of glass epoxy with a thickness of 0.3mm Min. are recommended.

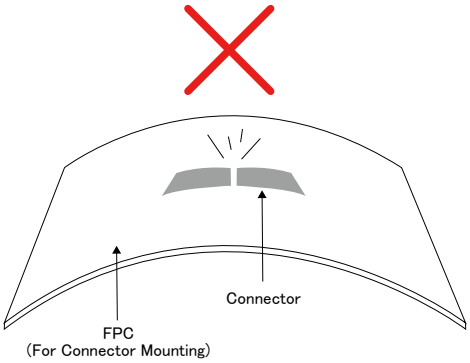
◆Load to Connector
Do not apply a force of 1.0N or greater to the connector when it is not mounted on the board or the connector may get damaged.
Do not insert the FPC or operate the connector before board mounting.

◆Load to PCB

・Splitting a large PCB into several pieces

・Screwing the PCB

Avoid the handling described above so that no force is exerted on the PCB during the assembly process. Otherwise, the connector may become defective.



◆Manual Soldering Instructions

Follow the instructions shown below when soldering the connector manually during repair work, etc

(1) Do not perform reflow soldering or manual soldering with the FPC inserted into the connector.

(2) Do not apply extreme heat, or allow the soldering iron to touch anything other than the connector lead. This may cause the connector to be deformed or melted.

(3) Do not supply excessive solder (flux). If excessive solder (flux) is applied to the contact, the solder or flux could adhere on the contact point and cause contact failure.

PRODUCT CATALOG

HIROSE ELECTRIC CO.,LTD.

FH63S Series

0.5mm Pitch, Height 2.8mm Lower Contact, One-Action Lock, 2-point Contact, 125℃ Compatible, FPC/FFC/Shielded FFC Connector

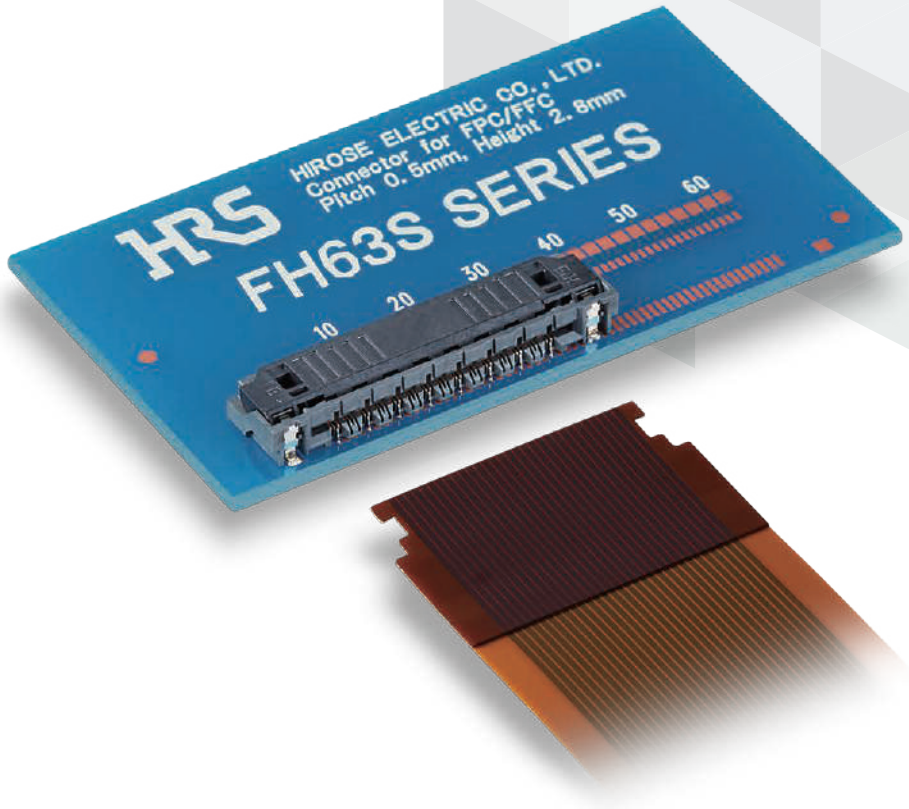
FH™

OneAction Flip-Lock Pioneer Hirose

Robust

One Action

Automotive

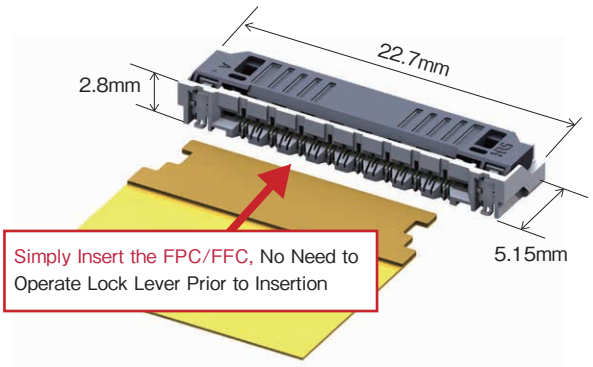


Feautures

1. Automatic one action locking design

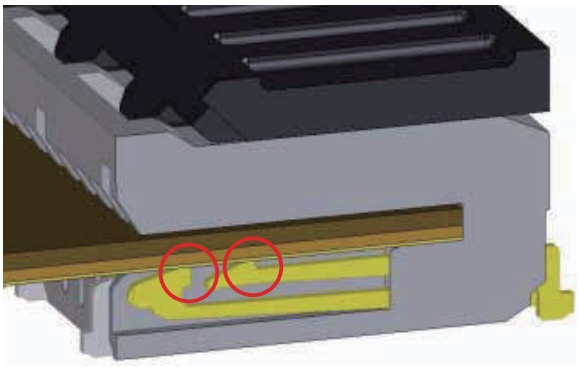
One action locking by simply inserting FPC after mounting contributes to enhanced workability. (Remove FPC by operating lock to release.)
Lock lever operation is not required when mating the FPC. Insertion can be performed using one hand.
The FH63S Series's locking design contributes to reducing assembly time. The lock lever is not damaged by operation and incomplete mating resulting from lock lever operation does not occur.

Dimension Diagram : 30pos.



2. Dust prevention

High contact reliability by independent spring two-point contact design that prevents contact failure by dust.



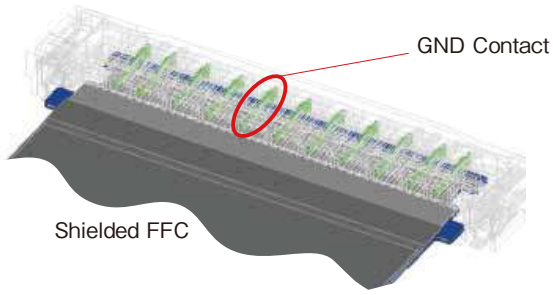
3. Supports FPC/FFC/Shielded FFC

FH63S allows you to choose from FPC, FFC and shielded FFC.
Shielded FPC enables EMI prevention.

Supports FPC/FFC/Shielded FFC

FPC FFC Shielded FFC

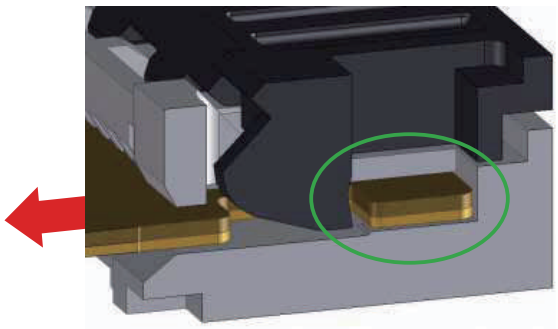
Shield FFC Supports EMI Prevention



GND Contact and FFC GND Plate Contact at Multiple Points.

4. High FPC retention force

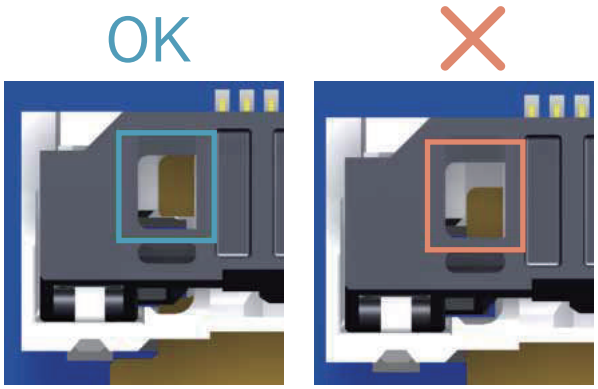
After the single FPC/FFC insertion action, the connector locks automatically. The lock lever holds the notches on both sides of the FPC for high FPC retention force even at small pin counts.



Robust Lock Firmly Retains FPC/FFC.

5. FPC/FFC mating detection

The position of the notches on both sides of the FPC can be checked from above after FPC/FFC insertion, preventing incomplete insertion.



Mated Condition (Correct Position)

Incomplete Insertion (Incorrect Position)

FPC/FFC Can be Checked from Above After Mating

6. Environmental compatibility

Halogen free

*As defined by IEC 61249-2-21.
Br : 900ppm Max, Cl : 900ppm Max, Br+Cl : 1,500ppm Max.

Product Specifications

Rated Current	0.5A	Operating Temperature (Note 1)	-55 to +125℃
Rated Voltage	50V AC/DC	Operating Humidity Range	RH 90% Max. (No Condensation)
		Storage Temperature Range (Note 2)	-10 to +60℃
		Storage Humidity Range	RH 90% Max. (No Condensation)

Adaptive FPC Contact Specifications	Thickness : = 0.30 ± 0.05mm Signal Layout : Gold Plating, GND Plate : Tin Plating

Item	Specification	Conditions
Insulation Resistance	500MΩ Min.	100V DC
Withstanding Voltage	No flashover or insulation breakdown	150V AC rms per 1 min.
Contact Resistance	100mΩ Max. Including FPC/FFC conductor resistance	1mA AC
Mating Durability (Insertion / Withdrawal)	Contact Resistance : 100mΩ Max. No damage, cracks, or parts dislocation	10 cycles
Vibration	No electrical discontinuity of 1μs or more Contact resistance : 100mΩ Max. No damage, cracks, or parts dislocation	Frequency : 10 to 55Hz, single amplitude of 0.75mm, 10 cycles in each of the 3 directions
Shock	No electrical discontinuity of 1μs or more Contact resistance : 100mΩ Max. No damage, cracks, or parts dislocation	Acceleration of 981m/s^2, duration of 6 ms, sine half-wave waveform, 3 cycles in each of the 3 axes
Damp Heat (Steady State)	Contact resistance : 100mΩ Max. Insulation resistance : 50MΩ Min. No damage, cracks, or parts dislocation	96 hours at temperature of +60℃ and humidity of 90 to 95%
Temperature Cycle	Contact resistance : 100mΩ Max. Insulation resistance : 50MΩ Min. No damage, cracks, or parts dislocation	Temperature : -40 → +15 to +35 → +125 → +15 to +35℃ Time : 30 → 2 to 3 → 30 → 2 to 3 (Minutes) 5 cycles
Soldering Heat Resistance	No deformation of components affecting performance	Reflow : Recommended Temperature Profile Manual Soldering : 350 ± 10℃ for 5 seconds

Note 1 : Includes temperature rise due to current flow. The heat resistant when using FFC is 105℃. When the heat resistant temperature is less than 125℃ for FPC and 105℃ for FFC, the heat resistant temperature of the FPC/FFC is applied.
Note 2 : The term "storage" refers to products stored for long period of time prior to mounting and use. Operating temperature and humidity range are applicable to the non-energized state after board mounting.

Materials / Finish

Part	Materials	Color ／ Finish	UL Standard
Insulator	LCP	Gray	UL94V-0
		Black	
Signal Contact	Copper Alloy	Nickel Barrier Gold Plating	-
Ground Contact		Pure Tin Reflow Plating	-
Retention Tabs	SUS	Pure Tin Reflow Plating	-

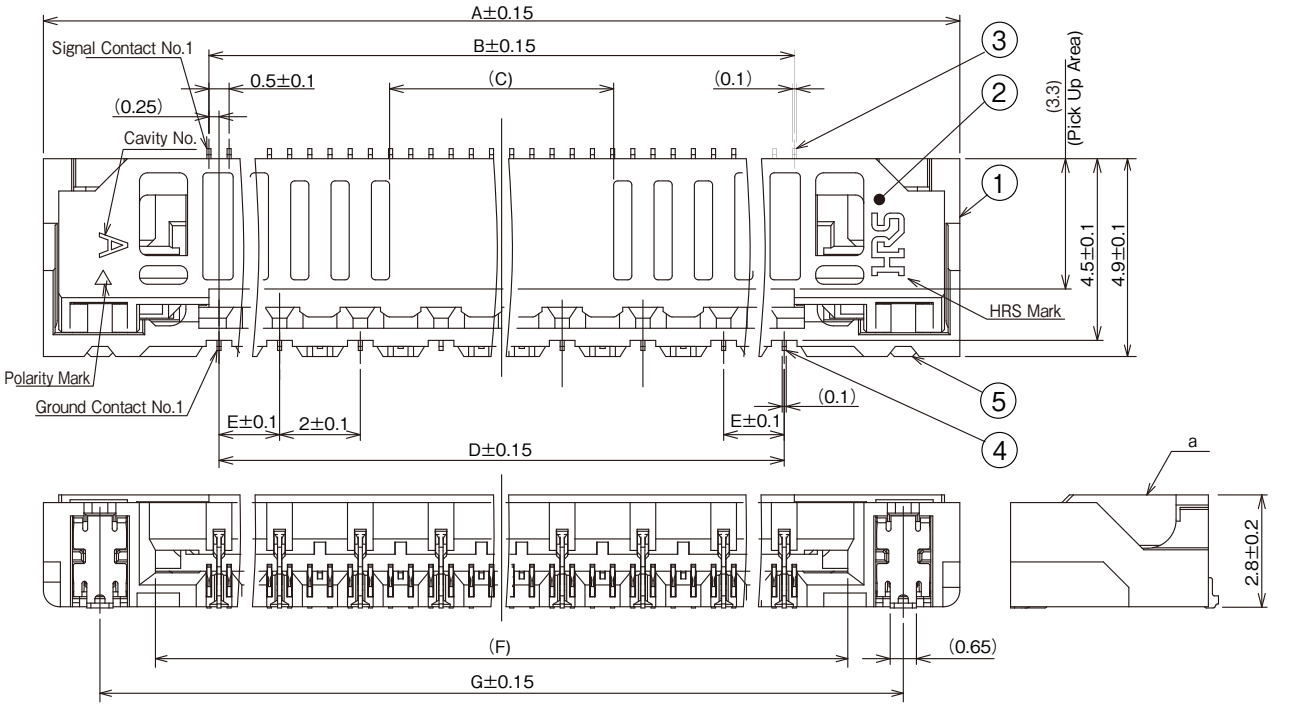
Product Number Structure

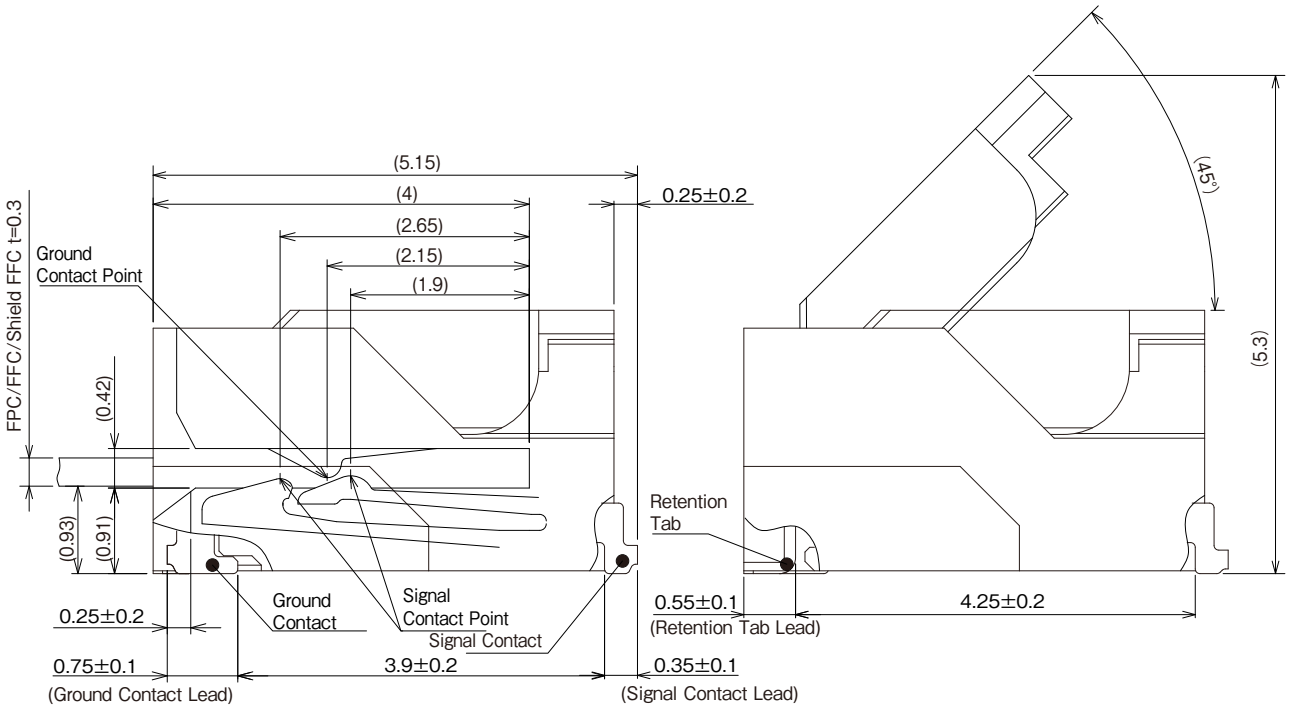
FH63S - 30S - 0.5 SH (##)

❶ ❷ ❸ ❹ ❺

❶ Series Name	FH63S	❹ Termination Type	SH : SMT
❷ No. of Pos.	10 to 40	❺ Specifications	Blank : Standard 3,500pcs per reel (05) : 2,000pcs per reel (99) : 500pcs per reel (For trial production)
❸ Contact Pitch	0.5mm		

Connector Dimensions





Note 1 : The dimension in parentheses are for reference.
Note 2 : The coplanarity of the contact and retention tab lead should be 0.1mm Max.
Note 3 : Packaged in tape and reel. Check the packaging specifications for details.
Note 4 : Sink holes or slits may be added for improvements.
Note 5 : Black spots may appear on the mold however this does not represent a quality issue.
Note 6 : This product is halogen-free.
(Br : 900ppm maximum, Cl : 900ppm maximum, Cl + Br combined : 1,500ppm maximum)

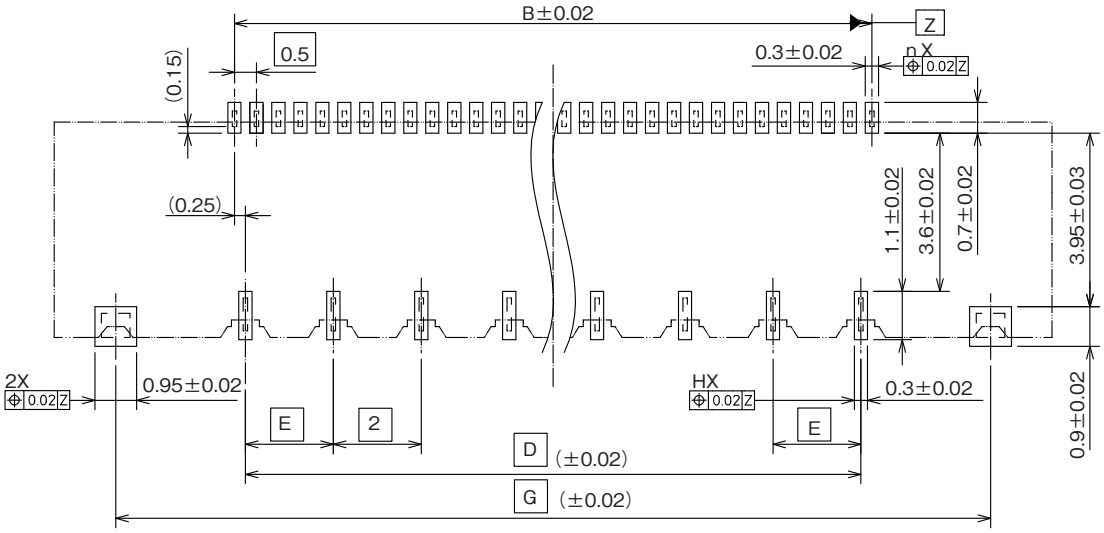
Unit : mm

Part No.	HRS No.	No. of Pos.	A	B	C	D	E	F	G	Purchase Unit (##) : (00)	Purchase Unit (##) : (05)	Purchase Unit (##) : (99)
FH63S-10S-0.5SH(##)	CL0580-4414-0-##	10	12.7	4.5	5.55	4.0	2.0	7.15	9.9	3,500pcs per reel	-	500pcs per reel
FH63S-20S-0.5SH(##)	CL0580-4419-0-##	20	17.7	9.5	6.55	9.0	1.5	12.15	14.9			
FH63S-30S-0.5SH(##)	CL0580-4415-0-##	30	22.7	14.5	5.55	14.0	2.0	17.15	19.9			
FH63S-40S-0.5SH(##)	CL0580-4416-0-##	40	27.7	19.5	10.55	19.0	1.5	22.15	24.9			
FH63S-50S-0.5SH(##)	Under Planning (Note)	50	32.7	24.5	15.55	24.0	2.0	27.15	29.9	-	2,000pcs per reel	
FH63S-60S-0.5SH(##)	Under Planning (Note)	60	37.7	29.5	20.55	29.0	1.5	32.15	34.9			

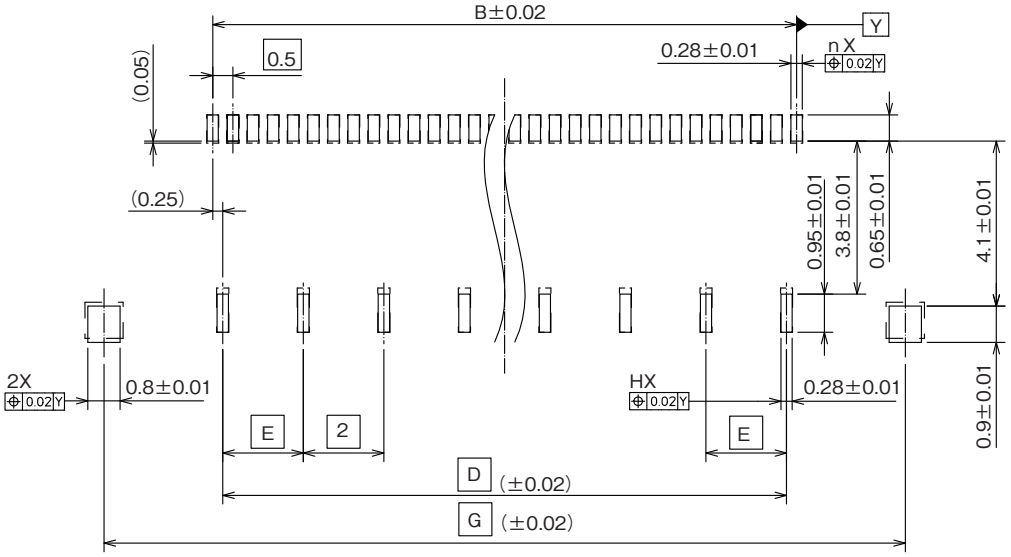
Note : Products without HRS No. are currently being planned for development. Please contact a Hirose representative regarding questions on pin count variation development.

Recommended PCB Mounting Pattern, Metal Mask Dimensions

● Recommended PCB Mounting Pattern



● Recommended Metal Mask Dimensions



Recommended PCB Mounting Thickness : 0.12
Note : 'n' indicates the number of positions.

● Recommended PCB Mounting Pattern, Metal Mask Dimensions and FPC/FFC Dimensions Table

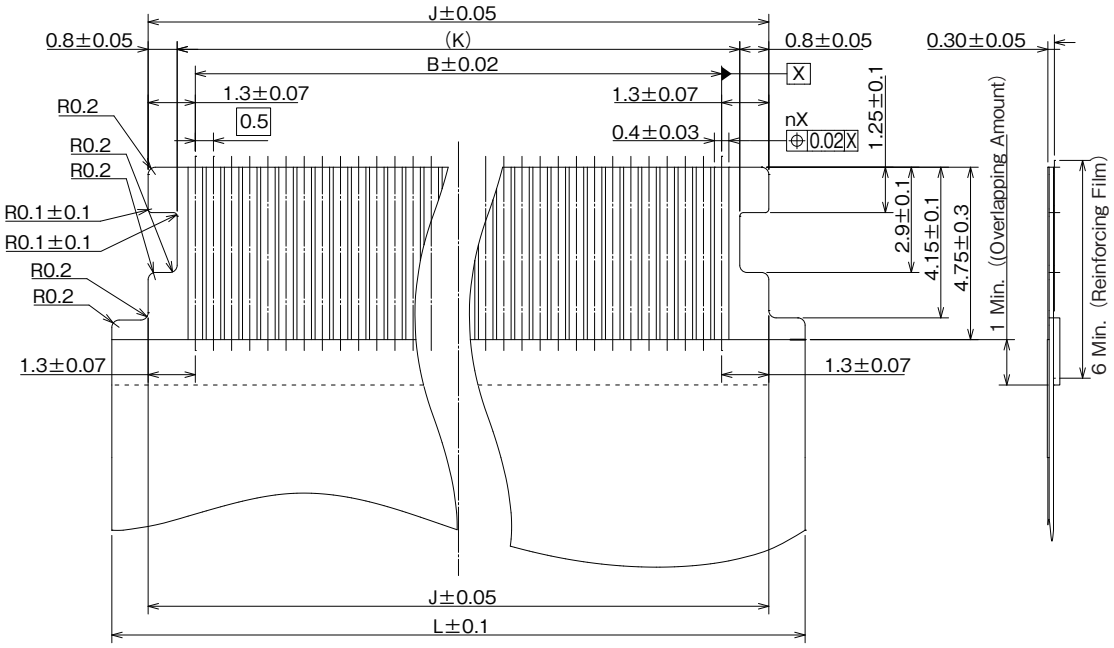
Unit : mm

Part No.	HRS No.	No. of Pos.	B	D	E	G	H
FH63S-10S-0.5SH(##)	CL0580-4414-0-##	10	4.5	4.0	2.0	9.9	3.0
FH63S-20S-0.5SH(##)	CL0580-4419-0-##	20	9.5	9.0	1.5	14.9	6.0
FH63S-30S-0.5SH(##)	CL0580-4415-0-##	30	14.5	14.0	2.0	19.9	8.0
FH63S-40S-0.5SH(##)	CL0580-4416-0-##	40	19.5	19.0	1.5	24.9	11.0
FH63S-50S-0.5SH(##)	Under Planning (Note)	50	24.5	24.0	2.0	29.9	13.0
FH63S-60S-0.5SH(##)	Under Planning (Note)	60	29.5	29.0	1.5	34.9	16.0

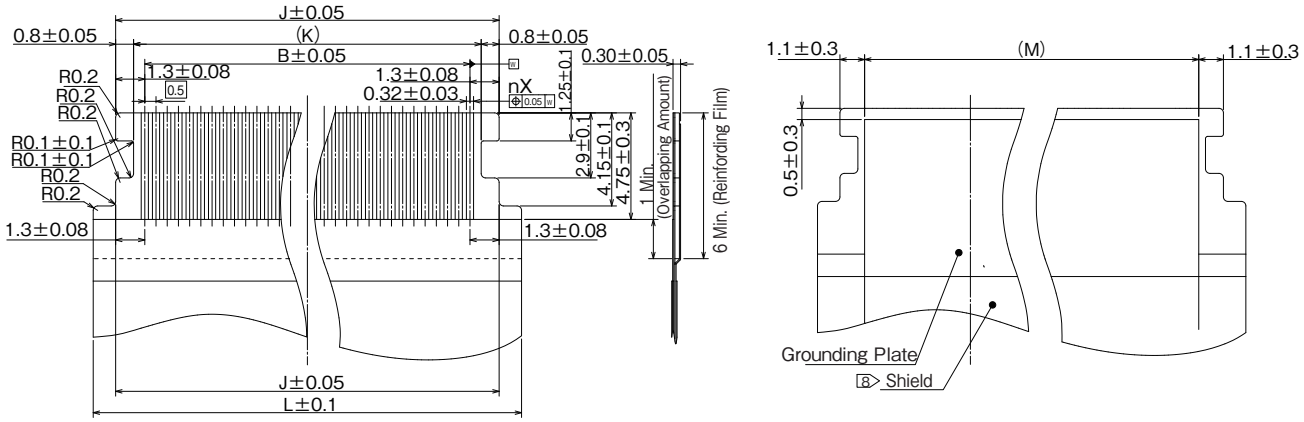
Note : Products without HRS No. are currently being planned for development. Please contact a Hirose representative regarding questions on pin count variation development.

Recommended FPC/FFC, Shielded FFC

● Recommended FPC/FFC Dimensions



● Recommended Shielded FFC Dimensions



Note : 'n' indicates the number of positions.
8 Place the shield on top of the ground plate.

● Recommended Dimensions of FPC/FFC/Shielded FFC

Unit : mm

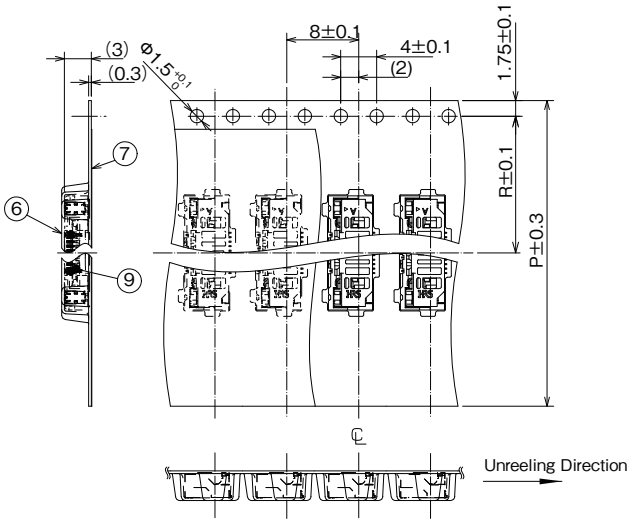
Part No.	HRS No.	No. of Pos.	B	J	K	L	M
FH63S-10S-0.5SH(##)	CL0580-4414-0-##	10	4.5	7.1	5.5	9.1	4.9
FH63S-20S-0.5SH(##)	CL0580-4419-0-##	20	9.5	12.1	10.5	14.1	9.9
FH63S-30S-0.5SH(##)	CL0580-4415-0-##	30	14.5	17.1	15.5	19.1	14.9
FH63S-40S-0.5SH(##)	CL0580-4416-0-##	40	19.5	22.1	20.5	24.1	19.9
FH63S-50S-0.5SH(##)	Under Planning (Note)	50	24.5	27.1	25.5	29.1	24.9
FH63S-60S-0.5SH(##)	Under Planning (Note)	60	29.5	32.1	30.5	34.1	29.9

Note : Products without HRS No. are currently being planned for development. Please contact a Hirose representative regarding questions on pin count variation development.

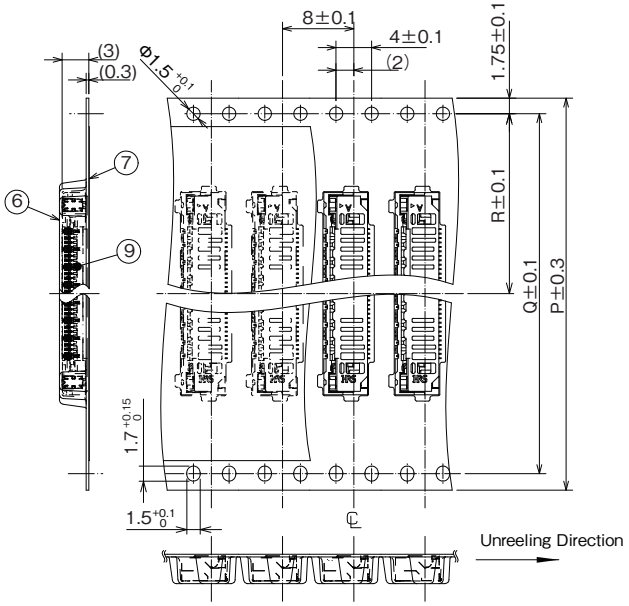
Packaging Specifications

● Embossed Carrier Tape Dimensions

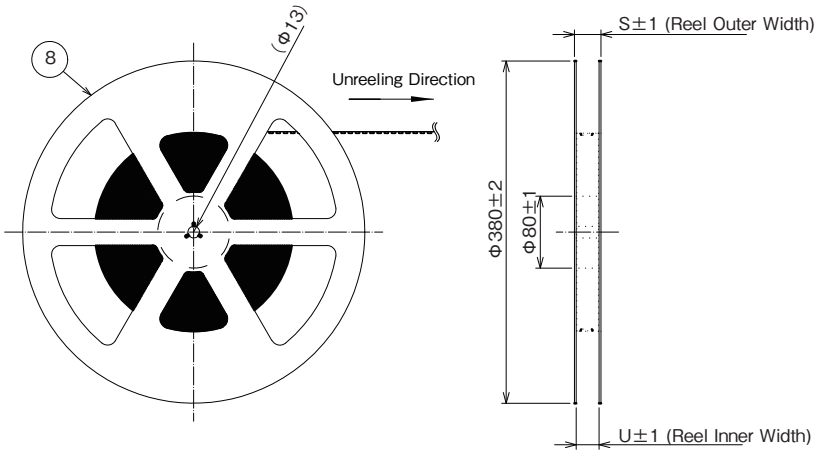
Tape Width 24mm or Less



Tape Width 32mm or More

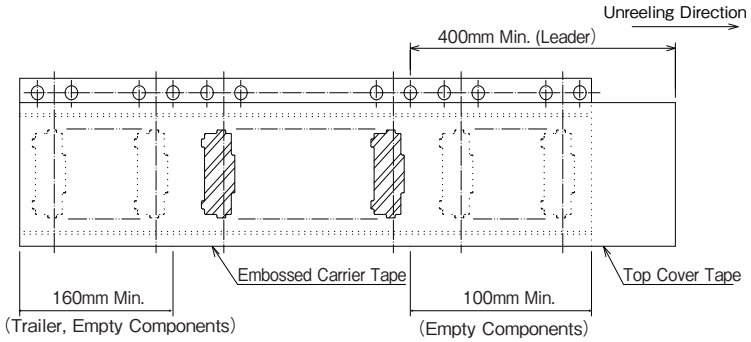


● Reel Dimensions



Note : The package complies with JIS C 0806 and IEC 60286-3 (Packaging of components for automatic handling).

● Leader, Trailer Dimensions

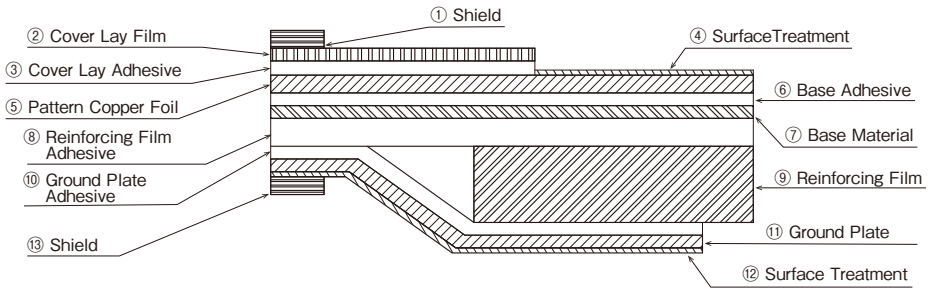


Unit : mm

Part No.	HRS No.	No. of Pos.	P	Q	R	S	U
FH63S-10S-0.5SH(##)	CL0580-4414-0-##	10	24.0	-	11.5	29.4	25.4
FH63S-20S-0.5SH(##)	CL0580-4419-0-##	20	32.0	28.4	14.2	37.4	33.4
FH63S-30S-0.5SH(##)	CL0580-4415-0-##	30	44.0	40.4	20.2	49.4	45.4
FH63S-40S-0.5SH(##)	CL0580-4416-0-##	40	44.0	40.4	20.2	49.4	45.4
FH63S-50S-0.5SH(##)	Under Planning (Note)	50	56.0	52.4	26.2	61.4	57.4
FH63S-60S-0.5SH(##)	Under Planning (Note)	60	56.0	52.4	26.2	61.4	57.4

Note : Products without HRS No. are currently being planned for development. Please contact a Hirose representative regarding questions on pin count variation development.

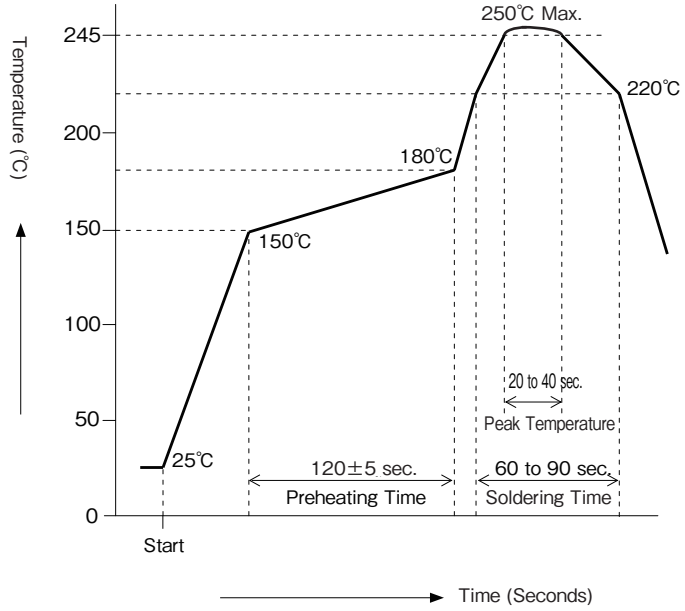
Recommended FPC/FFC/Shielded FFC Construction



	Material Name	FPC		FFC		
		Materials	Thickness (μm)	Materials	Shield FFC Thickness (μm)	FFC Thickness (μm)
①	Shield Tape	—	—		—	—
②	Cover Lay Film	Polyimide 1mil	25	Polyester	12	12
③	Cover Lay Adhesive	Thermosetting Adhesive	25	Adhesive	30	30
④	Surface Treatment	Nickel Underplate 1- 6μm +Gold Plated 0.2μm	(3.7)	Nickel Foundation 0.5 - 5μm +Gold Plated 0.05 - 1μm	(3.275)	(3.275)
⑤	Pattern Copper Foil	Rolled Copper 1oz	35	Annealed Copper Foil	35	35
⑥	Base Adhesive	Thermosetting Adhesive	25	Adhesive	15	30
⑦	Base Material	Polyimide 1mil	25	Polyester	12	12
⑧	Reinforcing Film Adhesive	Thermosetting Adhesive	30	Adhesive	30	30
⑨	Reinforcing Film	Polyimide 8mil	175	Polyester	150	188
⑩	Grounding Plate Adhesive	—	—	Adhesive	15	—
⑪	Grounding Plate	—	—	Conductive Tape Tin Plated 1 to 5μm	37	—
⑫	Surface Treatment	—	—			
⑬	Shield Tape	—				—

Note 1 : This is a reference FPC/FFC/Shielded FFC construction.
Make the thickness of the FPC/FFC mated portion 0.30 ± 0.05mm in reference to the FPC construction.
Note 2 : Contact an FPC/FFC/Shielded FFC maker for details on component construction.

Temperature Profile

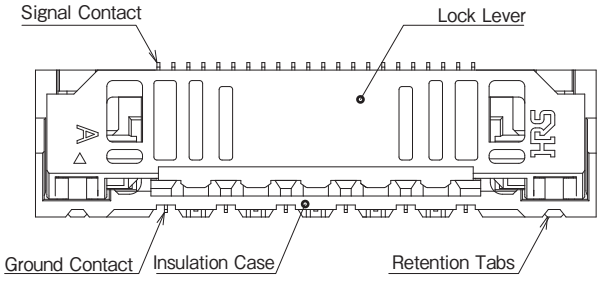


Reflow Method : IR/Hot Air
Reflow Environment : Room Air
Solder : Paste Type Sn/3.0Ag/0.5Cu
(M705-GRN360-K2-V made by Senju Metal Industry Co.)
Test PCB : PCB Material and Size
Glass Epoxy 45×25×1mm
As Listed in Recommended PCB Mounting Pattern
Metal Mask : Thickness and Opening Size
As Listed in Recommended Metal Mask Dimensions

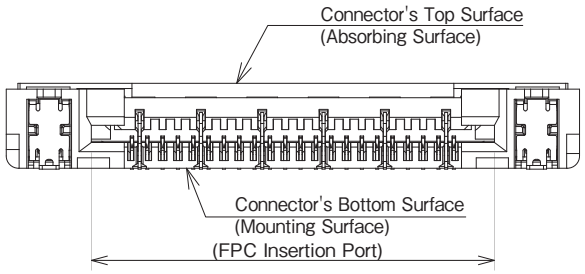
This temperature profile is for the above conditions.
The temperature profile may vary depending on the type of cream solder, the manufacturer, the board size and other conditions such as mounting materials. Please check the mounting status before use.

Connector Operation and Points to Note

This connector requires care during handling. In order to prevent damage and contact failure etc. (incorrect mating, disconnection of FPC pattern) of connectors and FPC, please use after confirming the following.
This connector supports FPC, FFC and Shielded FFC, however only FPC is written below for convenience.



<Diagram of the Connector's Top Surface>



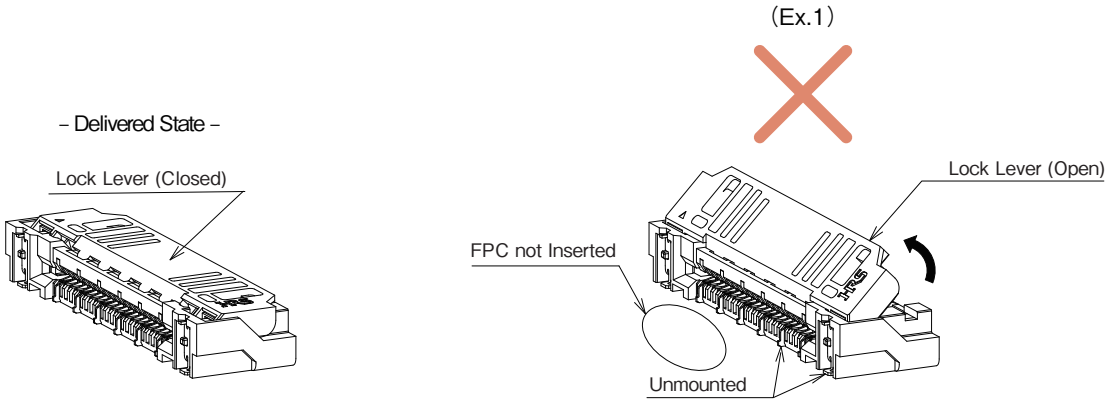
<Diagram of the Connector's Front Surface>

1. Initial Delivery State

This product is delivered with the lock lever closed. The lock lever does not need to be operated before FPC insertion.

[Caution]
· Do not open the lock lever when FPC is not inserted.
Additionally, the lock lever does not need to be opened except to remove the FPC. (Ex. 1)
· Do not operate the connector until it is mounted on the board. (Ex. 1)

(Ex.1)

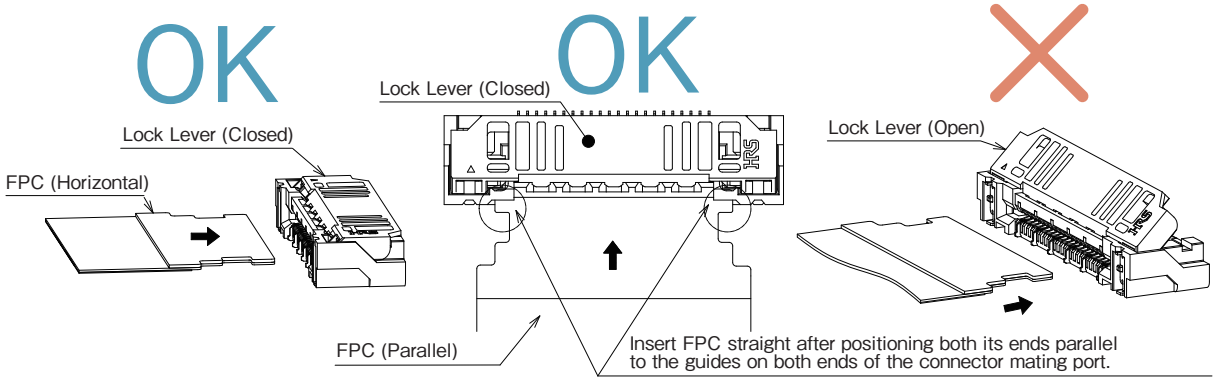


2. FPC Insertion

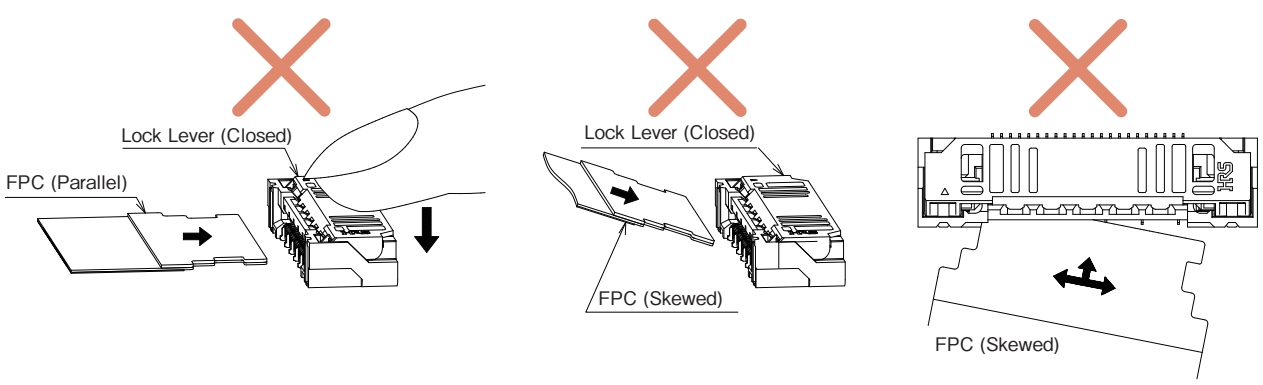
Insert the FPC fully to the back of the connector and parallel in respect to the board. (Ex. 2)

[Caution]
· Please confirm that the lock lever is closed when you insert FPC.
Do not insert FPC while the lock lever is open. (Ex. 3)
· Do not insert FPC while at the same time pressing the lock lever. (Ex. 4)
· Insert FPC straight after positioning its tip end in a horizontal plane in reference to the guides on both ends of the connector mating port.
· Insert in a manner that it won't be diagonal to the insertion direction. (Ex. 5)
· When inserting, do not move the FPC in a vertical, lateral or diagonal direction. (Ex. 6)

(Ex.2) (Ex.3)



(Ex.4) (Ex.5) (Ex.6)



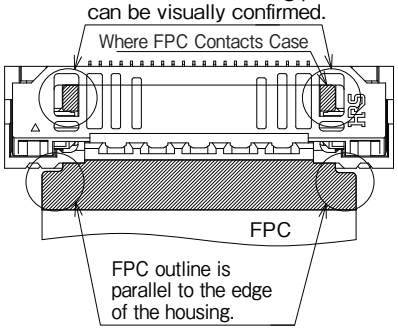
3. FPC Mating Confirmation

Visually confirm the insertion status once FPC insertion is completed. (Ex. 7)
(This connector uses the lock protrusion of the lock lever for positioning FPC.)

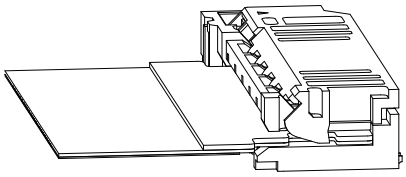
[Caution]
· Avoid shallow insertion or insertion at a slant. (Ex. 8) (Ex. 9)
· The lock lever does not need to be operated after FPC insertion due to the one action lock design.

(Ex.7)

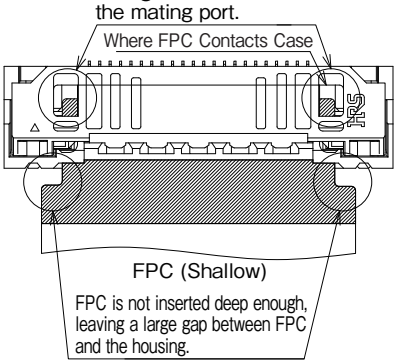
OK



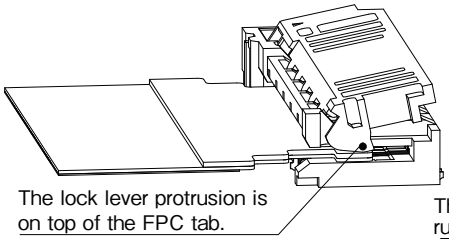
– Locking Portion Cross-section –



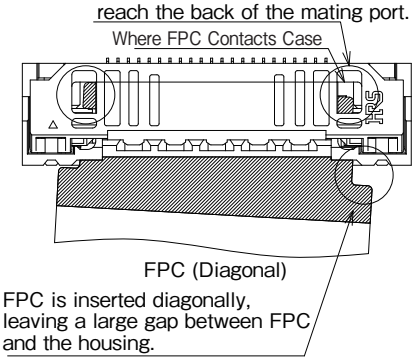
(Ex.8)



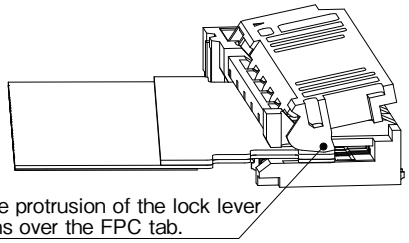
– Locking Portion Cross-section –



(Ex.9)



– Locking Portion Cross-section –



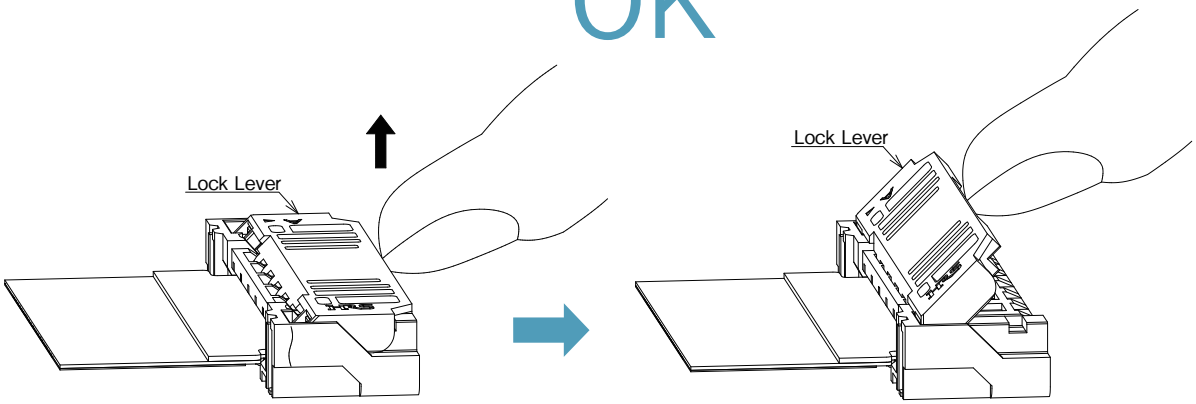
4. How to Unlock the Lock Lever

Slowly raise the actuator and release the lock. (Ex. 10)

[Caution]
- When releasing the lock, operate the lock lever around the center. (Ex. 11)
- When releasing the lock, do not operate only one side of the lock lever. (Ex. 12)
- As the lock lever cannot be opened to over 45°, do not open it over this angle. (Ex. 13)
- Do not pull or raise the lock lever by grabbing it. (Ex. 14)
- Be sure to operate the lock lever by hand, and do not operate it with sharp-edged tools such as tweezers etc. (Ex. 15)
- Don't apply an excessive force to the housing during operation. (Ex. 16)
- The FPC insertion direction for this connector is different from the direction of the lock lever operation section. Do not attempt to open from the FPC insertion side. (Ex. 17)

(Ex.10)

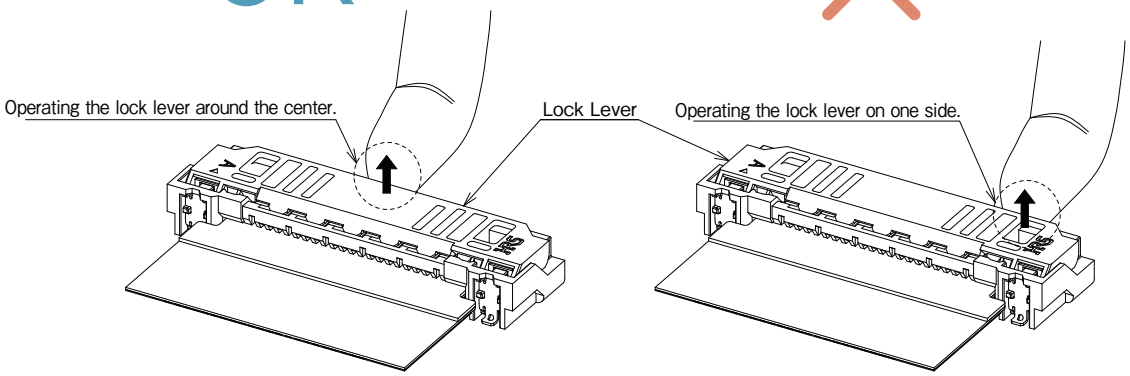
OK



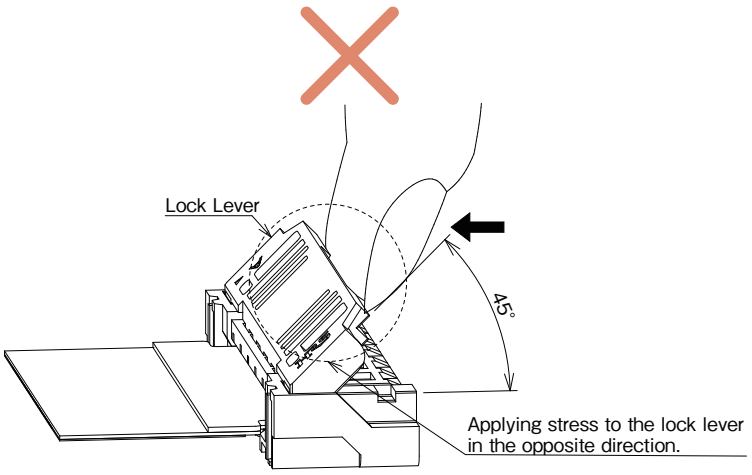
(Ex.11)

OK

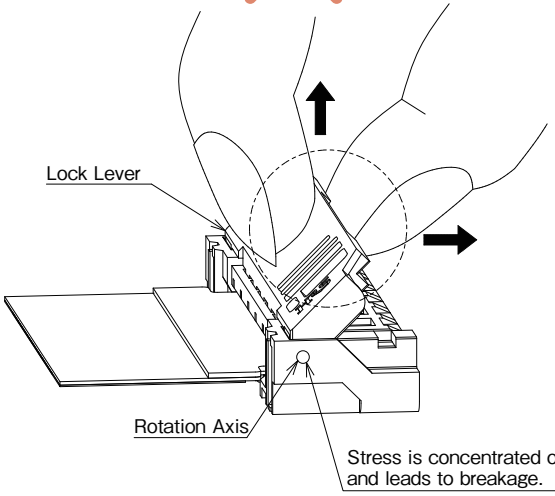
(Ex.12)



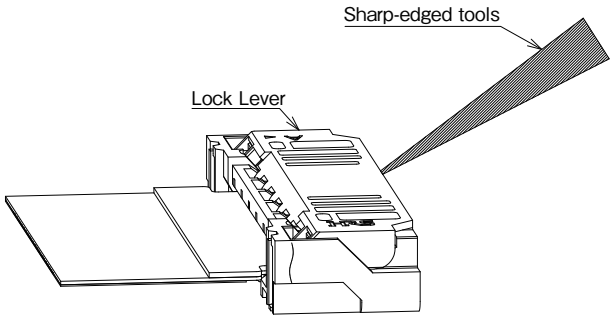
(Ex.13)



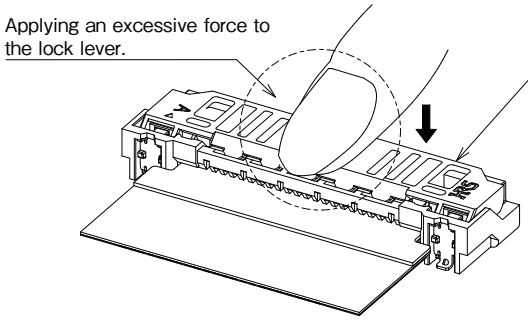
(Ex.14)



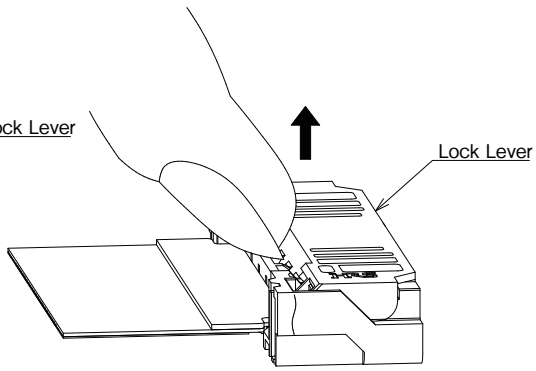
(Ex.15)



(Ex.16)



(Ex.17)

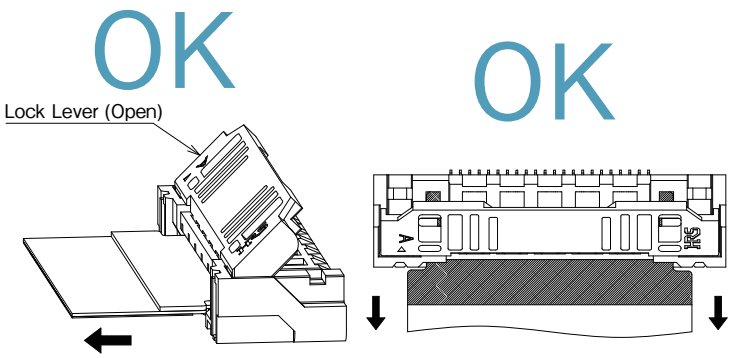


5. FPC Removal

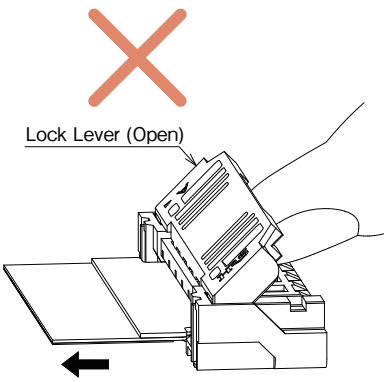
After releasing the lock lever, pull out the FPC in the horizontal direction. (Ex.18)
When removing the FPC, do not press the lock lever. (Ex.19)
The released lock lever may close automatically but this is not a product defect. (Ex.20)

[Caution]
· Do not pull out the FPC while the lever is locked. (Ex.21)
· This connector is designed with an FPC retention mechanism with the lock lever. When pulling out the FPC, do not apply stress above or from the sides. (Ex.22)

(Ex.18)

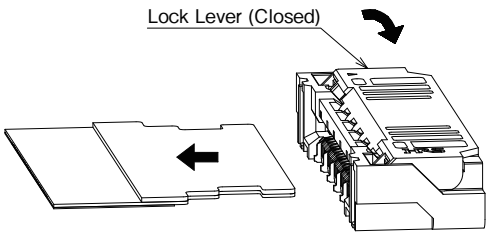


(Ex.19)

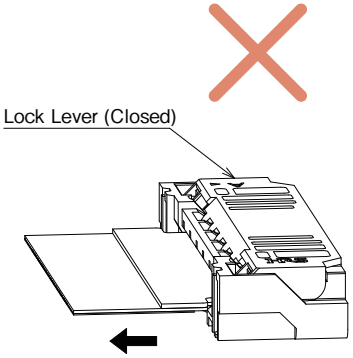


(Ex.20)

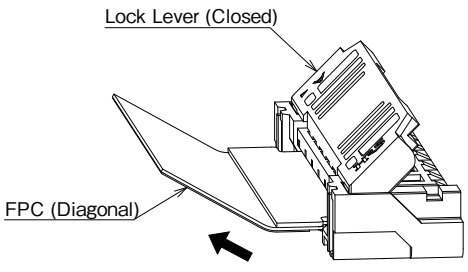
– After FPC Removal –



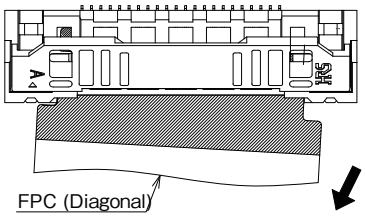
(Ex.21)



(Ex.22)



(Ex.23)

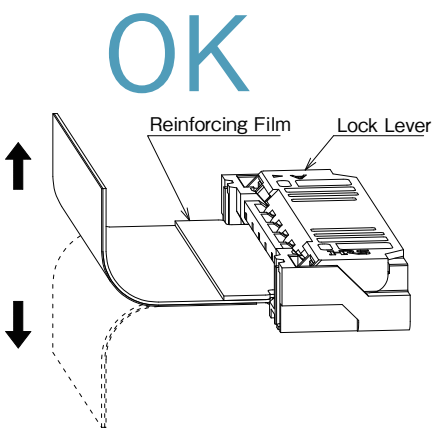


[PCB Layout Cautions]

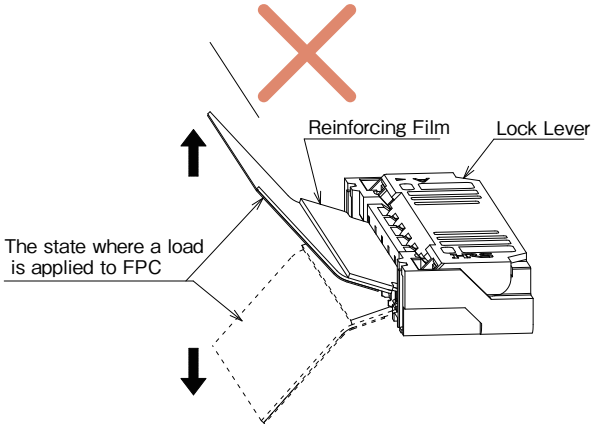
Stress leading to contact failure may be applied to the connector depending on the routing of the FPC the connector will be mated with.
In order to prevent failure, please consider the following during mechanical design.

[Caution]
- When routing the FPC for use, make sure it has enough slack and do not pull tightly.
- Please check that the reinforcing film is placed horizontal to the board surface. (Ex.23)
- Please insure there is no load applied to the connector in the pulling, inserting or lateral directions.
  Using an FPC bent close to the connector may cause contact failure or FPC FPC damage/disconnection.
  Therefore, please take some measure to secure the FPC etc. (Ex.24)(Ex.25)
- Do not place mounted parts that interfere with the FPC. (Ex.26)
- Please make adjustments with FPC manufacturer for FPC flexibility.
- Please ensure the FPC has adequate insertion space when designing the layout so that it is not inserted diagonally.
  Additionally, insertion becomes difficult if the FPC is too short, so pleasue ensure an adequate FPC length and component layout.
- When you design the board/layout, please secure space needed for connector operation.

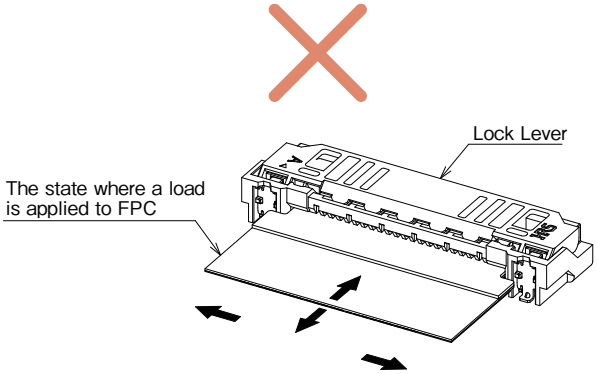
(Ex.23)



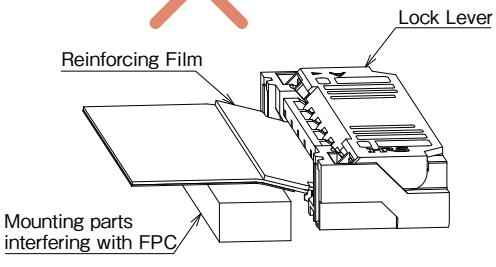
(Ex.24)



(Ex.25)



(Ex.26)



[Board Mounting Notes]

Please be careful of the following during board mounitng.

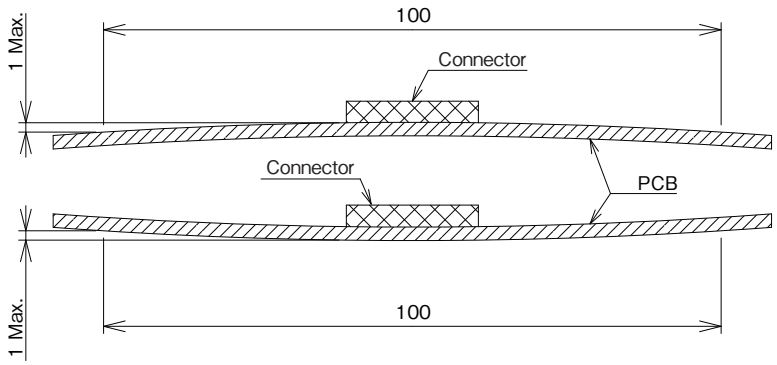
[Caution]
- Please confirm the recommended PCB mounting pattern, metal mask opening size and FPC design.
- If the PCB mounting pattern is narrower than recommended or the metal mask opening is wider than recommended, solder (flux) wicking is more likely to occur.
  If there is difference from the recommendation, please use after checking the mounted state.
- The dimensional difference between the bottom surface of the contact lead and the mold is designed to be minimal.
  When there is silk print etc. on the bottom surface of the connector, the lower surface of the connector may be pushed up, resulting in solder not applied or defective fillet formation.
  When there is silk print etc. on the bottom surface of the connector, please use after checking the mounted state.
- Use the reflow conditions within the specifications designated by Hirose.
  The mounted status may vary due to external conditions such as the type of cream solder, manufacturer, and board size. Please use after checking the mounted state.
- Please control the board warpage as much as possible. While the coplanarity of this connector is 0.1mm or less, defective soldering could occur if the board warpage is considerable.
- When mounted on FPC, be sure to provide a reinforcing plate to ease handling. We recommend a reinforcing plate of 0.3mm or thicker made of glass epoxy material.
- Do not apply excessive force (1N or more) when pulling out the emboss from the reel or suctioning the connector from the emboss.

[Cautions When Handling the Board After Mounting]

Please be careful of the following when handling the board after mounting.

[Caution]
- Refrain from handing that may put strain on the board during the assembly process, such as splitting a board into several pieces or screwing the board to a frame. Otherwise the connector may be damaged.
- Board deflection should be 1mm or less when the board width is 100mm. (Ex.27)
  Board deflection may cause stress to the connector resulting in damage.

(Example 27)



[Cautions for Manual Soldering]

Note the following when performing soldering during repair, etc.

[Caution]
- Do not perform manual soldering with the FPC inserted in the connector.
- Please be careful not to apply excessive heat, or allow the solder iron to touch any place other than the connector contact lead.
  Failure to do so may result in connector deformation or melting.
- Do not supply an excessive amount of solder (flux).
  If too much solder (flux) is supplied to the contact, the solder or flux could adhere on the contact point and cause contact failure.
  Additionally, supplying excessive solder to the retention tabs may result in actuator rotation failure, causing connector damage.

PRODUCT CATALOG

HIROSE ELECTRIC CO.,LTD.

FH67 Series

0.5mm Pitch, 3.57mm Width, One Action Lock, Vertical Connection FFC/FPC/Shield FFC Connector

FH™

OneAction Flip-Lock Pioneer Hirose

One Action — One Action

Robust — Robust

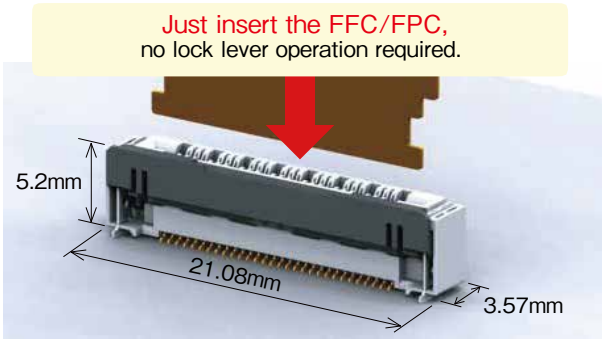
125℃ — High Temp

NEW

Features

1. Automatic one action lock design

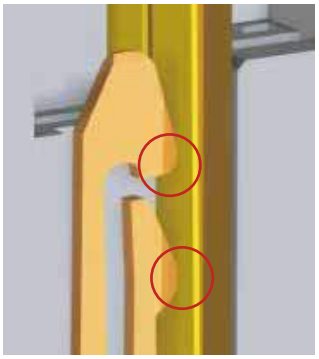
- One action locking by simply inserting FPC after mounting contributes to enhanced workability. (Use the lock lever to release the lock during removal.)
- Operation of the lock lever is not required at the time of mating FPC. Can be inserted with one hand.
  Contributes to reduced assembly time.
  The lock lever will not be damaged by operation.
  Mating failure due to FPC displacement does not occur during lock lever operation.



One Action Lock (Dimensions Shown : 30pos.)

2. Two-point contact prevents contact failure by dust

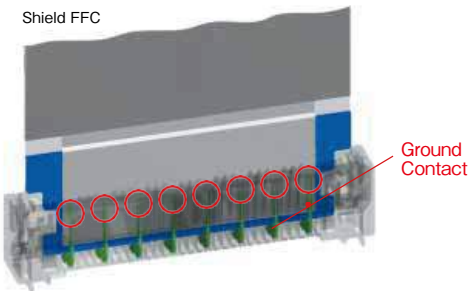
- 2-point contact design with independent springs prevent contact failure due to dust for high contact reliability.



Two-point Independent Spring Contact

3. Supports FFC/FPC/Shield FFC

- FH67 allows you to choose from FFC/FPC/Shield FFC.
- Compatible with shield FFC for EMI prevention.

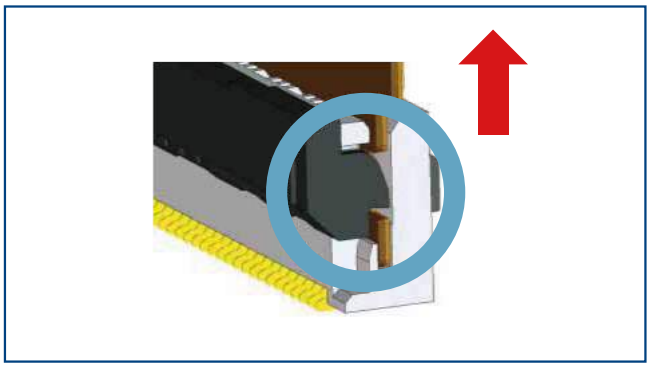


Ground contact and FFC ground plate contact at multiple points.

Shield FFC Compatible for EMI Prevention

4. High FPC retention force

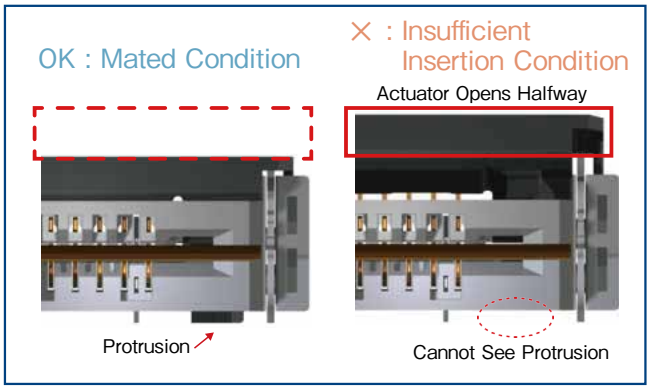
・After the FFC/FPC insertion is completed in one action, the circuit automatically locks. The lock lever holds the notches on both sides of the FPC, generating a high FPC retention force even at low pin counts.



Robust Lock Firmly Secures FFC/FPC

5. Visual FFC/FPC Insertion Status Confirmation

・Insufficient insertion during assembly is prevented due to lock lever protrusion visible after FPC/FFC insertion.



FFC/FPC can be checked from the top surface after mating.

6. Environmental Compatibility

・Halogen Free

*As defined by IEC 61249-2-21.
Br : 900ppm max, Cl : 900ppm max, Br+Cl : 1,500ppm max

Product Specifications

Rated Current	0.5A
Rated Voltage	50V AC/DC
Operating Temperature (Note 1)	-55 to +125℃
Operating Humidity Range	Relative Humidity 90% Max.(No Condensation)
Storage Temperature (Note 2)	-10 to +60℃
Storage Humidity Range	Relative Humidity 90% Max.(No Condensation)
Adaptive FPC Contact Specifications	Thickness : = 0.33 ± 0.03mm Signal Layout : Gold Plated, GND plate : Tin Pated

Note 1 : Includes temperature rise due to current flow.
Note 2 : The term "storage" refers to products stored for long period of time prior to mounting and use.
Operating Temperature and Humidity Range covers non-conducting condition of installed connectors in storage, shipment or during transportation.

Item	Specification	Condition
Insulation Resistance	500MΩ Min.	100V DC
Withstanding Voltage	No flashover or insulation breakdown	150V AC for 1 min.
Contact Resistance	[FPC] First cycle : 60mΩ Max. After testing : 80mΩ Max. (Including FPC 8mm conductor resistance) [FFC] First cycle : 80mΩ Max. After testing : 100mΩ Max. (Including FFC 26mm conductor resistance)	Measured at 1mA AC
Mating Durability (Insertion/Withdrawal)	Contact resistance : 80mΩ Max. (FPC) 100mΩ Max. (FFC) No damage, cracks, or parts dislocation	10 cycles
Vibration	No electrical discontinuity of 1μs or more Contact resistance : 80mΩ Max. (FPC) 100mΩ Max. (FFC) No damage, cracks, or parts dislocation	Frequency : 10 to 55Hz, single amplitude of 0.75mm, 10 cycles in each of the 3 directions
Shock	No electrical discontinuity of 1μs or more Contact resistance : 80mΩ Max. (FPC) 100mΩ Max. (FFC) No damage, cracks, or parts dislocation	Acceleration of 981m/s^2, duration of 6 ms, sine half-wave waveform, 3 cycles in each of the 3 axes
Damp Heat (Steady State)	Contact resistance : 80mΩ Max.(FPC) 100mΩ Max.(FFC) Insulation resistance : 50MΩ Min. No damage, cracks, or parts dislocation	96 hours at temperature of 60℃ and humidity of 90% to 95%
Temperature Cycle	Contact resistance : 80mΩ Max.(FPC) 100mΩ Max.(FFC) Insulation resistance : 50MΩ Min. No damage, cracks, or parts dislocation	Temperature : -55 → +15 to +35 → +125 → +15 to +35℃ Time : 30 → 2 to 3 → 30 → 2 to 3 (Minutes) 1000 cycles
Resistance to Soldering Heat	No deformation of components affecting performance	Reflow : Recommended Temperature Profile Manual Soldering : 350 ± 10℃ for 5 seconds

Note 1 : Includes temperature rise due to current flow. The heat resistance when using FFC is 105℃.
When the heat resistance temperature is less than 125℃ for FPC and 105℃ for FFC, the heat resistance temperature of the FPC/FFC is applicable.
Note 2 : The term "storage" refers to products stored for long period of time prior to mounting and use.
Operating Temperature and Humidity Range covers non-conducting condition of installed connectors in storage, shipment or during transportation.

Materials / Finish

Part	Materials	Finish	UL Standard
Insulator	LCP	Grey	UL94V-0
	LCP	Black	UL94V-0
Signal Contact	Copper Alloy	Nickel Barrier Gold Plated	-
Ground Contact	Copper Alloy	Pure Tin Reflow Plated	-
Reinforcing Retention Tabs	Copper Alloy	Pure Tin Reflow Plated	-

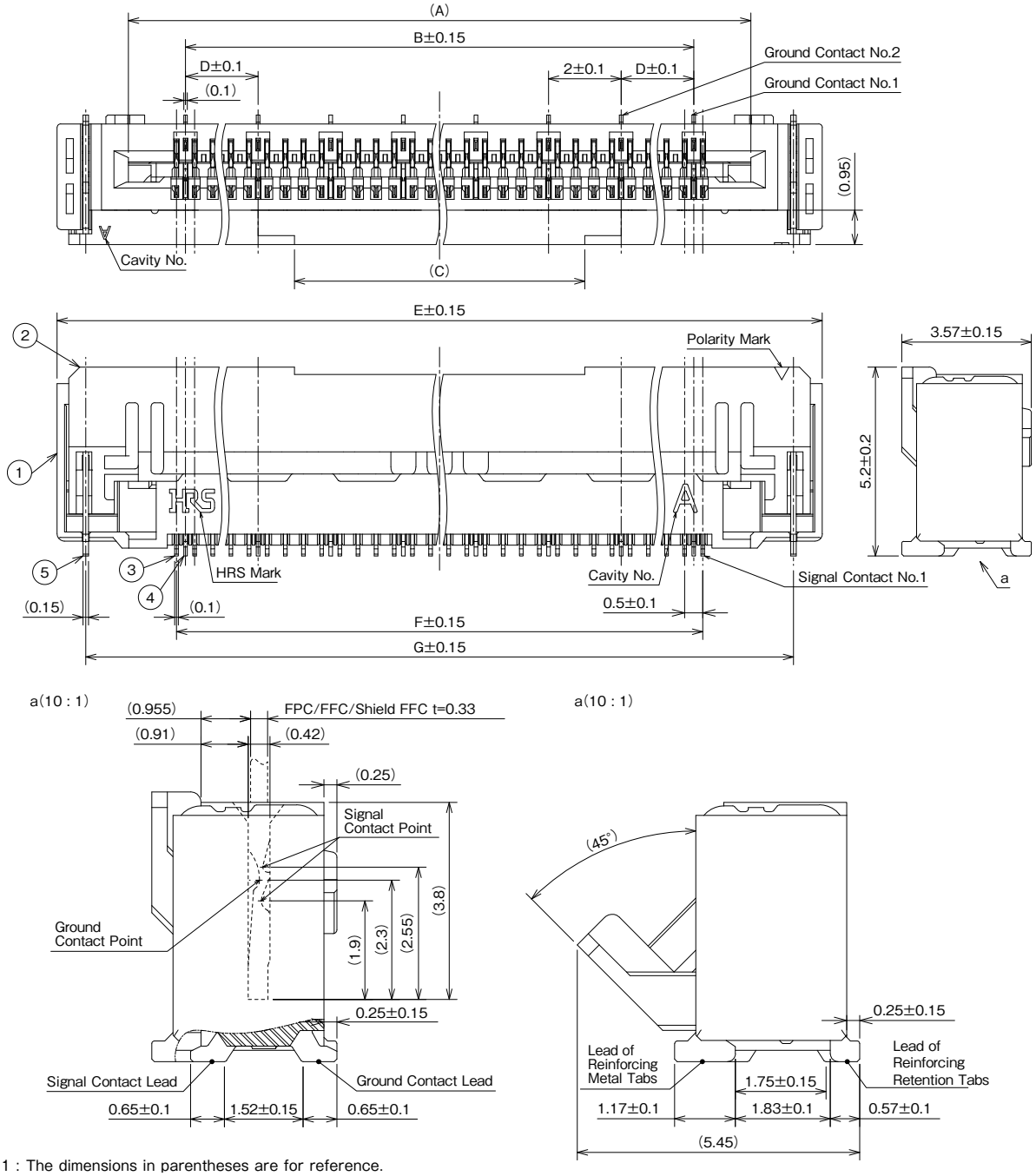
Product Number Structure

Refer to the chart below when determining the product specifications from the product number.
Please select from the product numbers listed in this catalog when placing orders.

FH67 - 30S - 0.5 SV (99)
❶ ❷ ❸ ❹ ❺

❶ Series Name	FH67	❹ Terminal Type	SV : SMT Vertical Mounting Type
❷ No. of Pos.	10-40	❺ Specification	Blank : Standard 1,000pcs/reel
❸ Contact Pitch	0.5mm		(99) : 500pcs/reel

Connector Dimensions



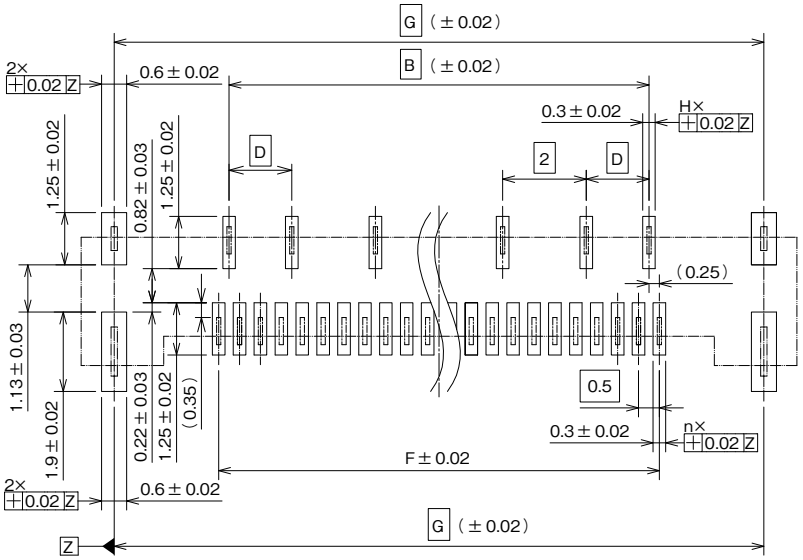
Note 1 : The dimensions in parentheses are for reference.
Note 2 : Lead co-planarity including lead of reinforcing metal tabs shall be 0.1mm max.
Note 3 : Delivered in tape and reel packaging.
See the packaging specifications for details.
Note 4 : Note that a preventive hole for sink mark or slit could be added for improvement.
Note 5 : Dark spots may appear on the molded plastic,
however this does not represent a quality issue.
Note 6 : This product satisfies halogen free requirements defined as 900ppm maximum chlorine,
900ppm maximum bromine, and 1500ppm maximum total of chlorine and bromine.

Unit : mm

Part No.	HRS No.	No. of Pos.	A	B	C	D	E	F	G	Purchase Unit	
										(#):(00)	(#):(99)
FH67-10S-0.5SV	CL0580-4900-0-##	10	7.15	4.0	5.0	2.0	11.08	4.5	9.5	1000pcs per reel	500pcs per reel
FH67-20S-0.5SV	CL0580-4906-0-##	20	12.15	9.0	7.5	1.5	16.08	9.5	14.5		
FH67-30S-0.5SV	Under Planning (Note)	30	17.15	14.0	8.0	2.0	21.08	14.5	19.5		
FH67-40S-0.5SV	CL0580-4903-0-##	40	22.15	19.0	17.0	1.5	26.08	19.5	24.5		
FH67-50S-0.5SV	Under Planning (Note)	50	27.15	24.0	17.0	1.5	31.08	24.5	29.5		

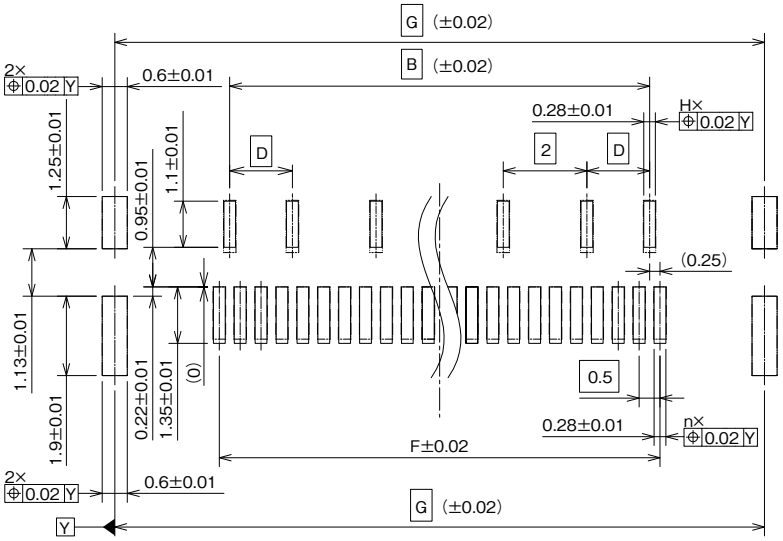
Note : Contact positions without HRS No. are currently under planning.
Please contact HRS for detailed information about product variations.

●Recommended PCB Mounting Pattern



Note : The value 'n' indicates the number of pos.

●Recommended Stencil Pattern



Note : The value 'n' indicates the number of pos.

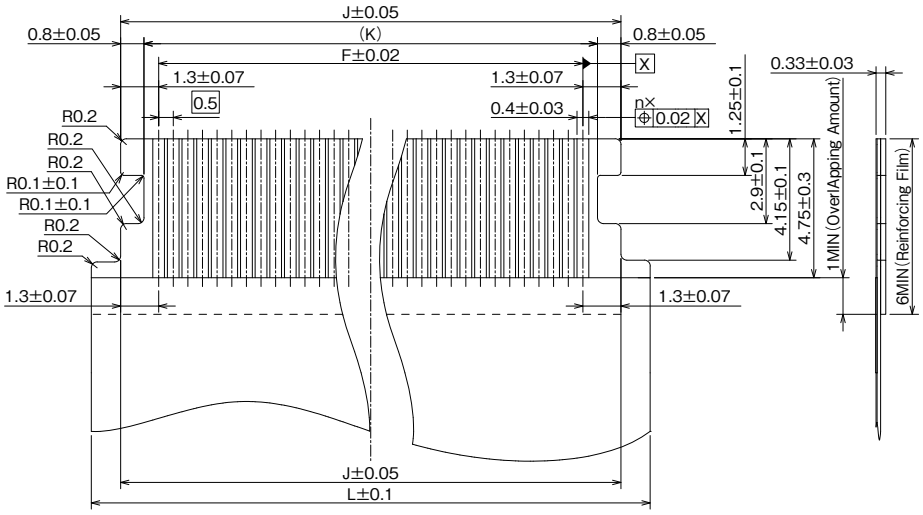
Unit : mm

Part No.	HRS No.	No. of Pos.	B	D	E	G	H
FH67-10S-0.5SV	CL0580-4900-0-##	10	4.0	2.0	11.08	9.5	3.0
FH67-20S-0.5SV	CL0580-4906-0-##	20	9.0	1.5	16.08	14.5	6.0
FH67-30S-0.5SV	Under Planning (Note)	30	14.0	2.0	21.08	19.5	8.0
FH67-40S-0.5SV	CL0580-4903-0-##	40	19.0	1.5	26.08	24.5	11.0
FH67-50S-0.5SV	Under Planning (Note)	50	24.0	1.5	31.08	29.5	13.0

Note : Contact positions without HRS No. are currently under planning.
Please contact HRS for detailed information about product variations.

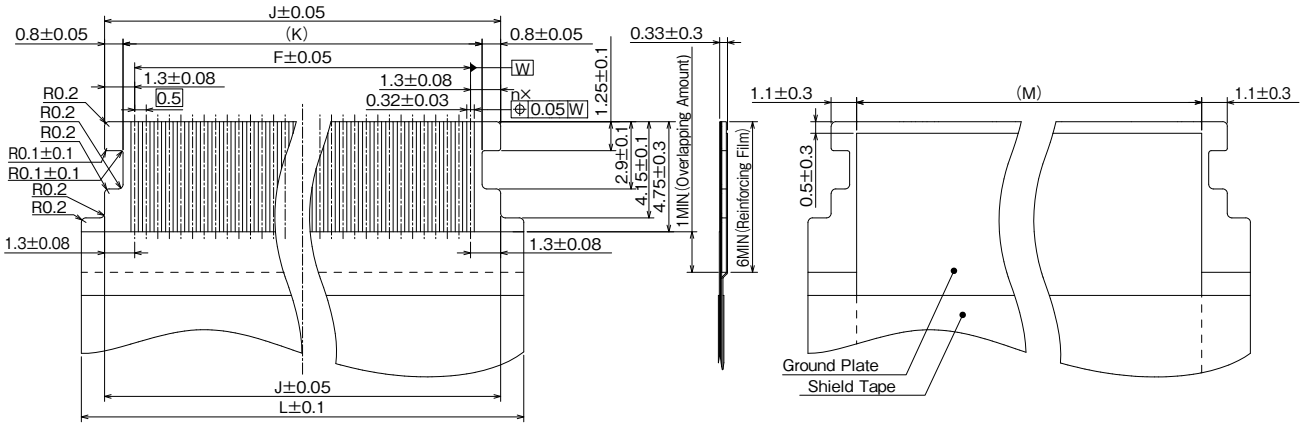
Recommended FFC/FPC/Shield FFC Dimensions

●Recommended FFC/FPC Dimensions



Note : The value 'n' indicates the number of pos.

●Recommended Shield FFC Dimensions



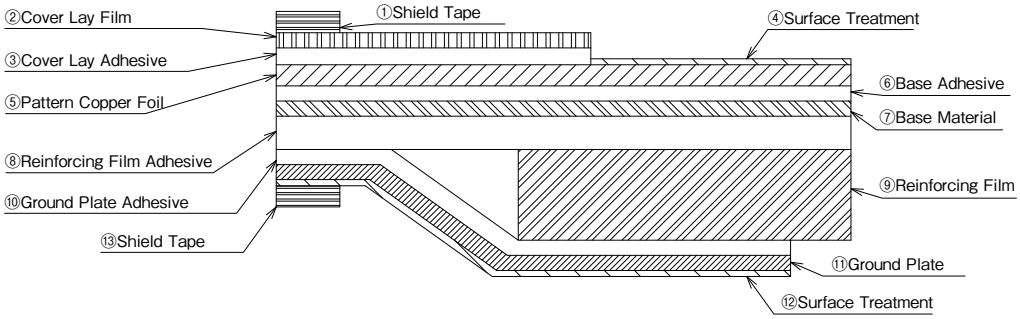
Note 1 : The value 'n' indicates the number of pos.
Note 2 : Place the shield tape on top of the grounding plate.

Unit : mm

Part No.	HRS No.	No. of Pos.	F	J	K	L	M
FH67-10S-0.5SV	CL0580-4900-0-##	10	4.5	7.1	5.5	9.1	4.9
FH67-20S-0.5SV	CL0580-4906-0-##	20	9.5	12.1	10.5	14.1	9.9
FH67-30S-0.5SV	Under Planning (Note)	30	14.5	17.1	15.5	19.1	14.9
FH67-40S-0.5SV	CL0580-4903-0-##	40	19.5	22.1	20.5	24.1	19.9
FH67-50S-0.5SV	Under Planning (Note)	50	24.5	27.1	25.5	29.1	24.9

Note : Contact positions without HRS No. are currently under planning.
Please contact HRS for detailed information about product variations.

Recommended FFC/FPC/Shield FPC Composition



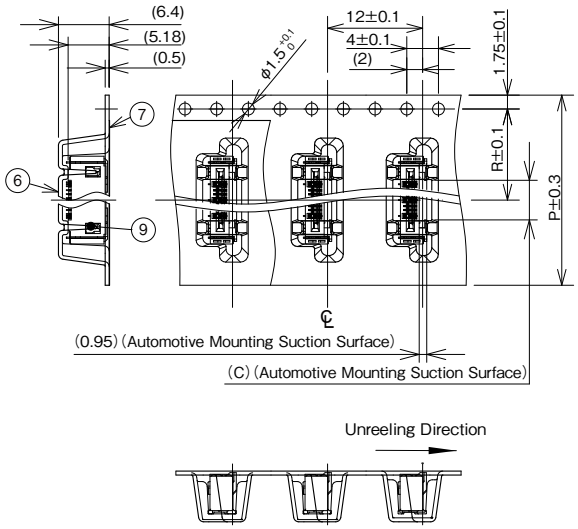
	Material Name	FPC		FFC		
		Materials	Thickness (μm)	Materials	Shield FFC	FFC
					Thickness (μm)	
①	Shield Tape	——	——			——
②	Cover Lay Film	Polyimide 1mil	25	Polyester	25	25
③	Cover Lay Adhesive	Thermosetting Adhesive	28	Adhesive	25	25
④	Surface Treatment	Nickel Underplated 1 to 6μm +Gold Plated 0.2μm	(3.7)	Nickel Underplated 0.5 to 5μm +Gold Plated 0.05 to 1μm	(3.275)	(3.275)
⑤	Pattern Copper Foil	Rolled Copper 1oz	35	Annealed Copper foil	35	35
⑥	Base Adhesive	Thermosetting Adhesive	8	Adhesive	25	25
⑦	Base Material	Polyimide 1mil	25	Polyester	25	50
⑧	Reinforcing Film Adhesive	Thermosetting Adhesive	55	Adhesive	30	30
⑨	Reinforcing Film	Polyimide 8mil	200	Polyester	150	188
⑩	Ground Plate Adhesive	——	——	Adhesive	30	——
⑪	Ground Plate	——	——	Copper foil Tin plated 1 to 5μm	37	——
⑫	Surface Treatment	——	——			
⑬	Shield Tape	——	——			——

Note 1 : This specification is recommendation for the construction of the FH67 Series FFC/FPC/Shield FFC (t=0.33±0.03mm)
Note 2 : For details about the construction, please contact FFC/FPC/Shield FFC manufacturers.

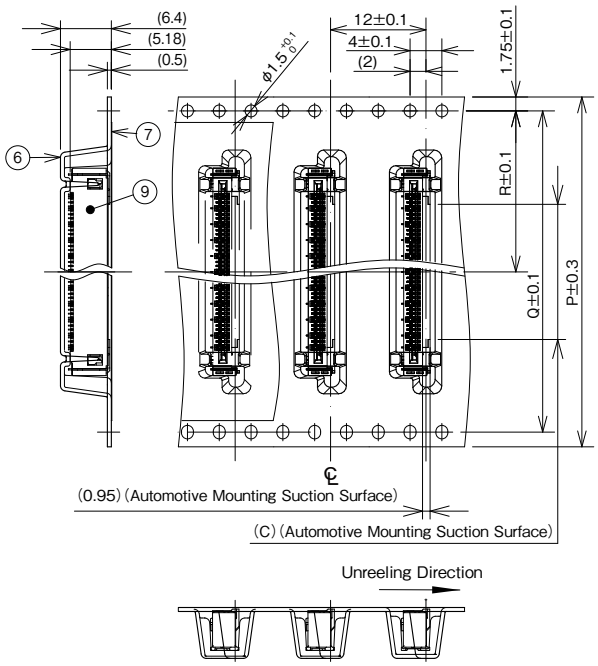
Packaging Specifications

●Embossed Carrier Tape Dimensions

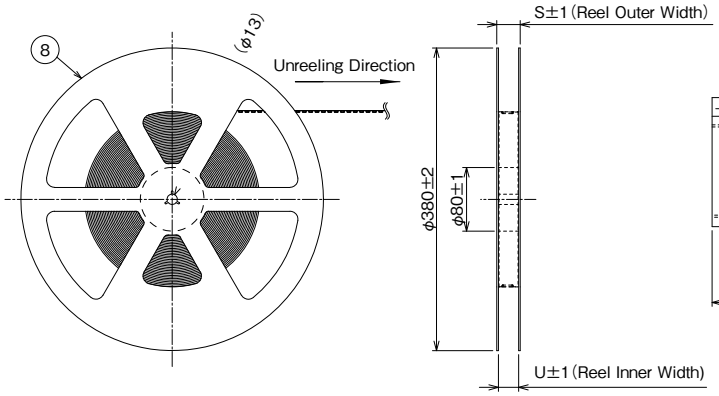
Tape Width : 24mm or less



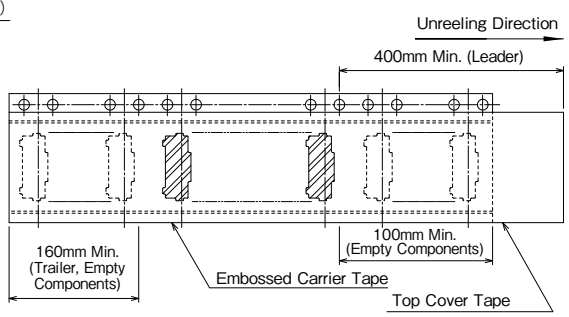
Tape Width : 32mm or less



●Reel Dimensions



●Leader, Trailer Dimensions



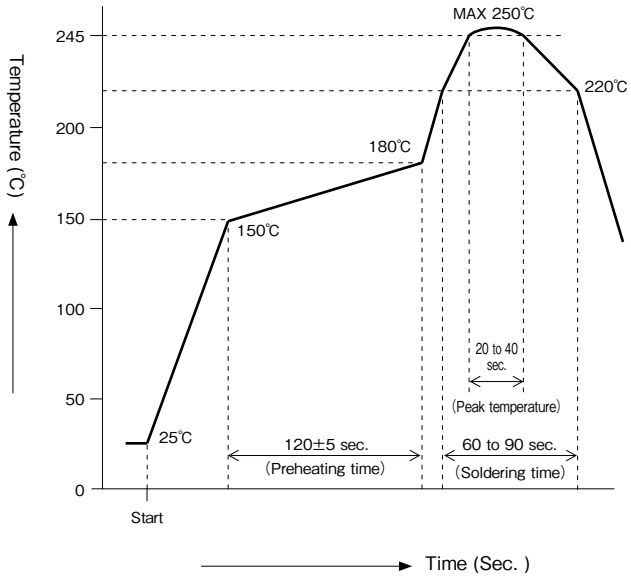
Note : 1000pcs per reel (standard product).
The package complies with JIS C 0806 and IEC 60286-3
(Packaging of components for automatic handling).

Unit : mm

Part No.	HRS No.	No. of Pos.	C	P	Q	R	S	U
FH67-10S-0.5SV	CL0580-4900-0-##	10	5.0	24.0	-	11.5	29.4	25.4
FH67-20S-0.5SV	CL0580-4906-0-##	20	7.5	32.0	28.4	14.2	37.4	33.4
FH67-30S-0.5SV	Under Planning (Note)	30	8.0	44.0	40.4	20.2	49.4	45.4
FH67-40S-0.5SV	CL0580-4903-0-##	40	17.0	44.0	40.4	20.2	49.4	45.4
FH67-50S-0.5SV	Under Planning (Note)	50	17.0	56.0	52.4	26.2	61.4	57.4

Note : Contact positions without HRS No. are currently under planning.
Please contact HRS for detailed information about product variations.

Temperature Profile



Applicable Conditions

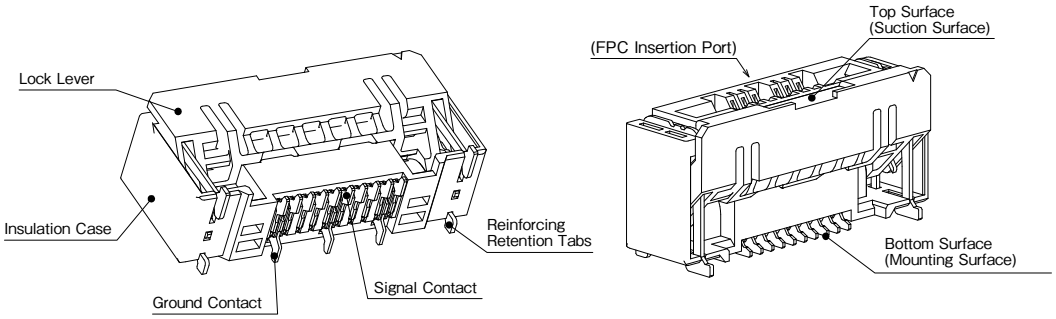
Reflow method : IR/Hot air
Reflow environment : Room air
Solder : Paste type Sn/3.0Ag/0.5Cu
(M705-GRN360-K2-V made by Senju Metal Industry Co.)
Test PCB : PCB material and size
Glass epoxy 45×25×1mm
As Listed in Recommended PCB Mounting Pattern
Metal mask : Thickness and opening size
As Listed in Recommended Metal Mask Dimensions

This temperature profile is based on the above conditions. It may vastly depending on solder paste type, manufacturer, PCB size and mounting materials. Please use only after checking the mounting conditions.

Connector Operation and Precautions

●Operation Method

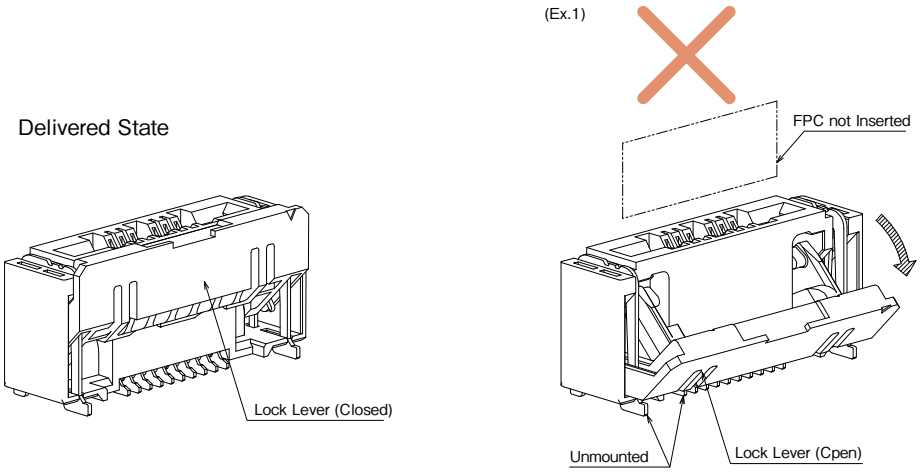
Handle this connector with care. To prevent damage to the connector and contact failure (incomplete mating, FPC pattern disconnection), confirm the following before use.
This connector supports FFC/FPC/Shield FFC, however, for convenience, only FPC is listed.



1. Initial Delivery State

This product is delivered with the lock lever closed. The lock lever does not need to be operated before FPC insertion.

[Caution]
・Do not open the lock lever when FPC is not inserted.
Additionally, the lock lever does not need to be opened except to remove the FPC. (Ex. 1)
・Do not operate the connector until it is mounted on the board. (Ex. 1)



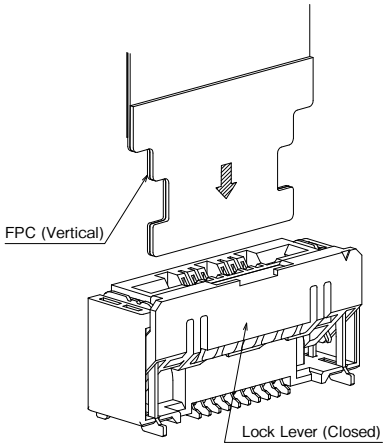
2. FPC Insertion

Insert the FPC fully perpendicular in respect to the board surface (Ex.2).

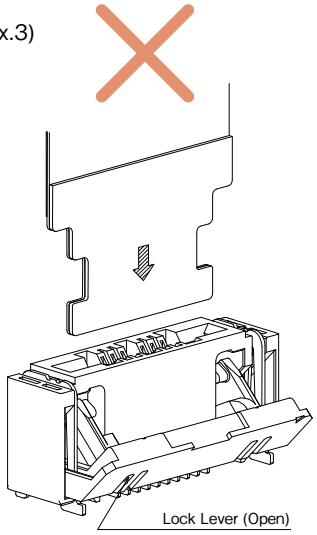
[Caution]

- Please confirm that the lock lever is closed during FPC insertion.
  Do not insert FPC while the lock lever is open. (Ex.3)
  Product is designed so that the FPC cannot be inserted when the lock lever is opened. However forcing insertion causes damage.
- Do not insert FPC while at the same time pressing the lock lever. (Ex.4)
- Insert FPC pattern side facing opposite of the operating portion of the lock lever. (Ex.5)
- Insert FPC straight after positioning its tip vertically in reference to the guides on both ends of the connector mating port. (Ex.6)
- Do not insert at an angle to the insertion direction. (Ex.7)
- When inserting, do not move the FPC in a vertical, lateral or diagonal direction. (Ex.8)
  (Recommended Insertion Angle ±2.5°)
- Refrain from opening the lock level with a finger when inserting the FPC. (Ex.9)

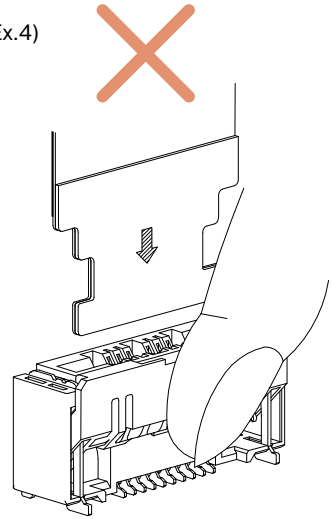
(Ex.2)



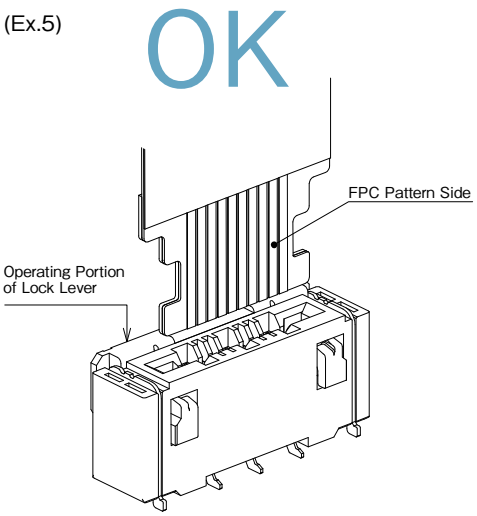
(Ex.3)



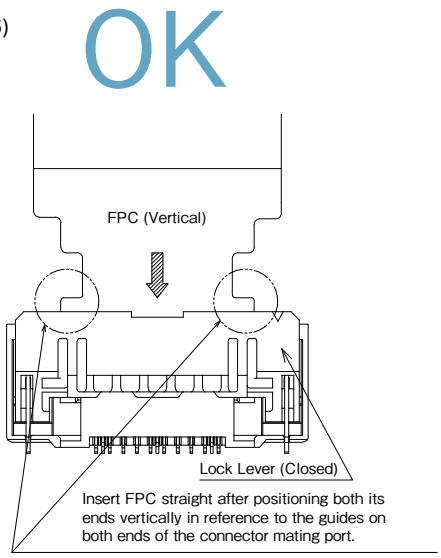
(Ex.4)



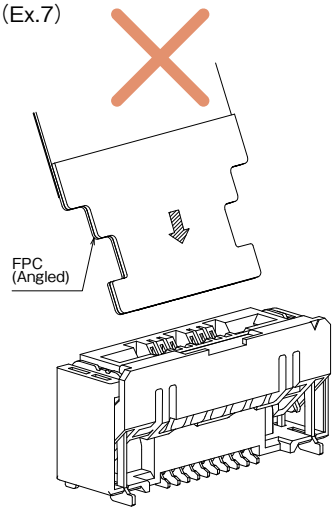
(Ex.5)



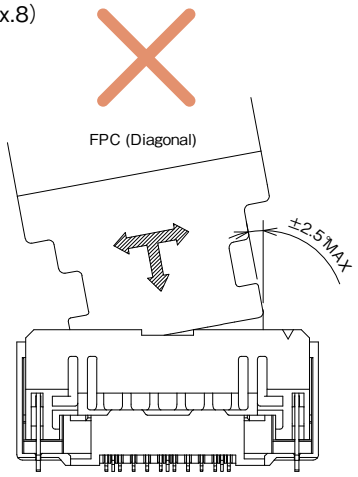
(Ex.6)



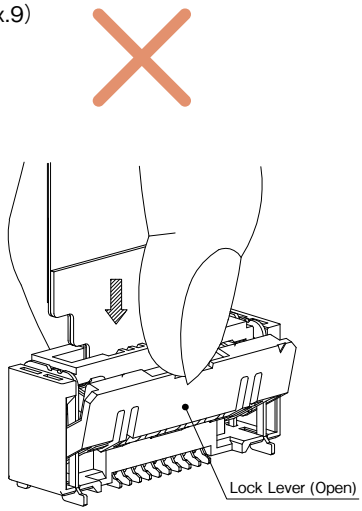
(Ex.7)



(Ex.8)



(Ex.9)



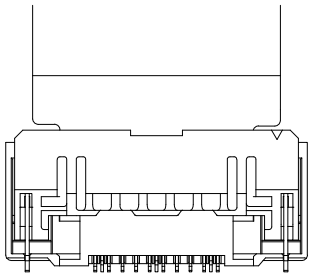
3. FPC Mated State Confirmation

When FPC is completely inserted, visually inspect the inserted status of FPC. (Ex. 10)
(This connector uses the lock protrusion of the lock lever for FPC positioning.)

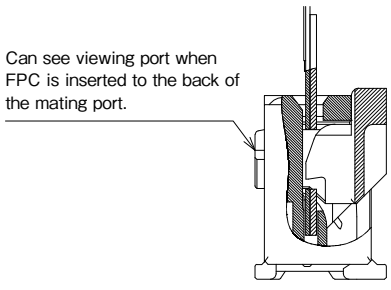
[Caution]
· Avoid shallow FPC insertion or insertion at a slant. (Ex. 11)(Ex. 12)
· The lock lever does not need to be operated after FPC insertion due to the one action lock design.

(Ex.10)

OK



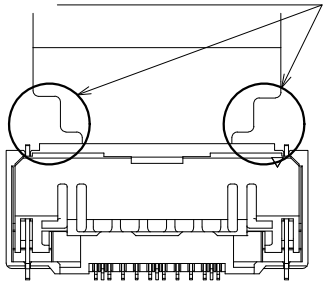
FPC inserted to the back of the mating port.



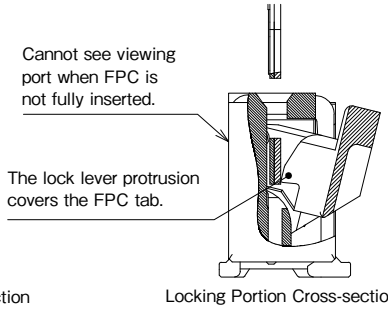
Locking Portion Cross-section

(Ex.11)

FPC is not inserted deep enough, leaving a large gap between FPC and the housing.



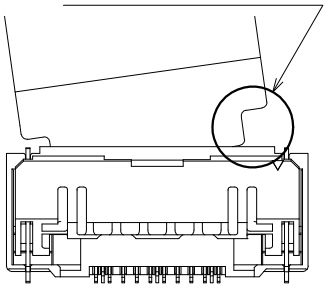
FPC is not inserted fully enough to reach the back of the mating port.



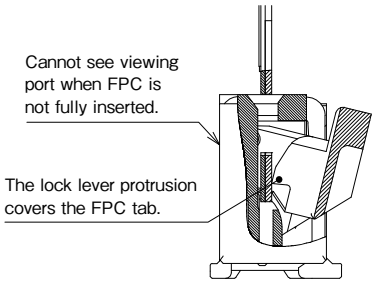
Locking Portion Cross-section

(Ex.12)

FPC is inserted at an angle. leaving a large gap between FPC and the housing.



FPC is inserted diagonally, and is not inserted fully enough to reach the back of the mating port.



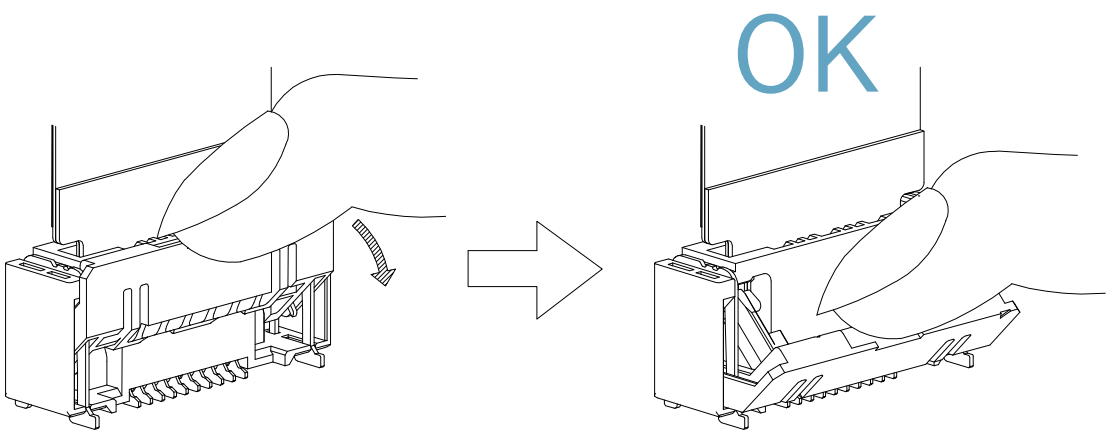
Locking Portion Cross-section

4. How to Unlock the Lock Lever

Push down the lock lever slowly, and release the lock. (Ex. 13)

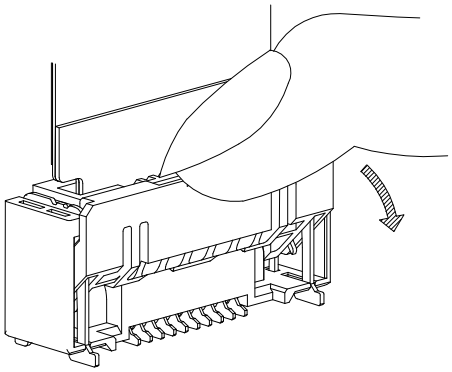
[Caution]
· When releasing the lock operate the lock lever around the center. (Ex. 14)
· When releasing the lock do not operate only one side of the lock lever. (Ex. 15)
· As the lock lever cannot be opened to over 45°, do not open it over this angle. (Ex. 16)
· Do not pick and raise the lock lever or pull it. (Ex. 17)
· Be sure to operate the lock lever by hand, and do not operate it with sharp-edged tools such as tweezers etc. (Ex. 18)
· Don't apply an excessive force to the housing during operation. (Ex. 19)

(Ex.13)



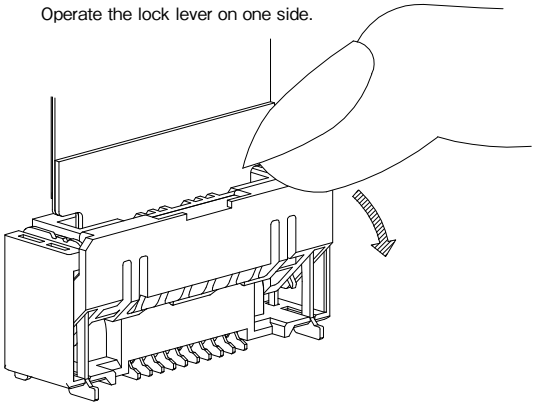
(Ex.14) OK

Operate the lock lever around the center.

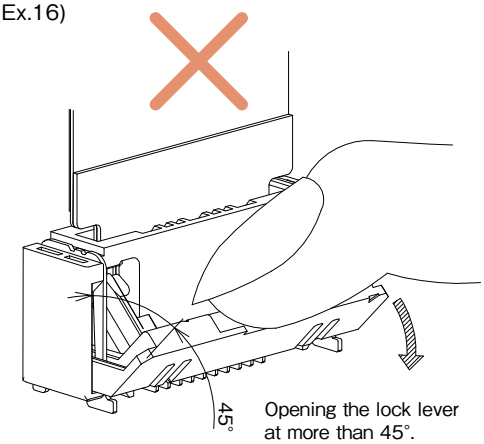


(Ex.15)

Operate the lock lever on one side.

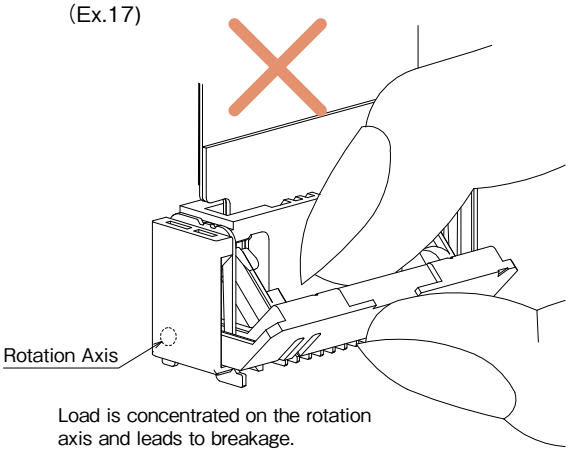


(Ex.16)



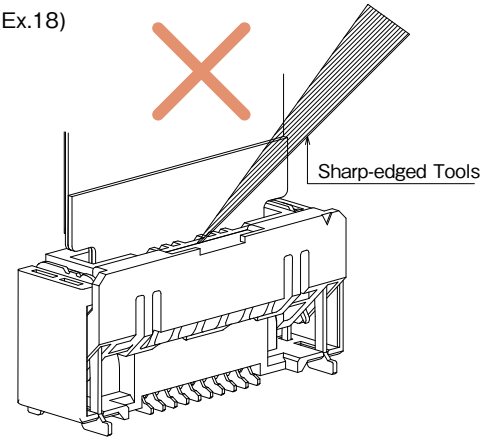
Opening the lock lever at more than 45°.

(Ex.17)

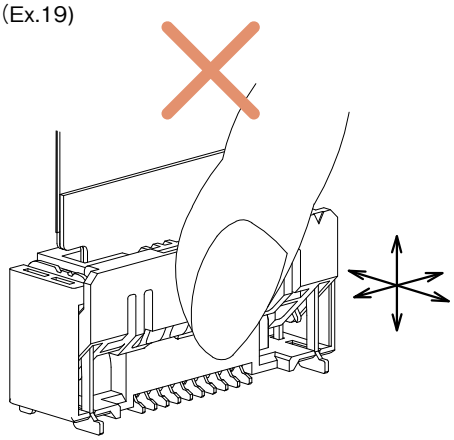


Load is concentrated on the rotation axis and leads to breakage.

(Ex.18)



(Ex.19)



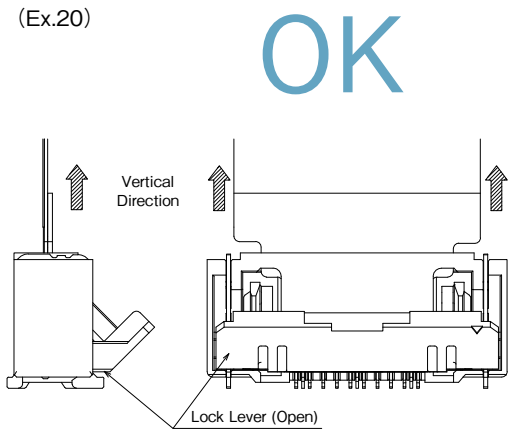
Applying excessive force to the lock lever.

5. FPC Removal Method

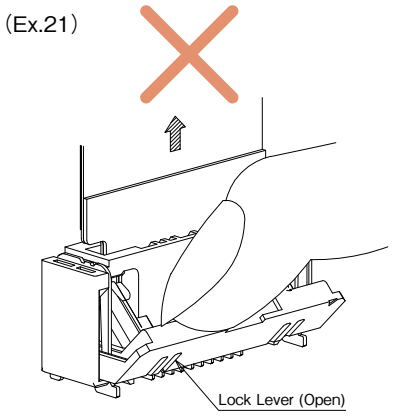
After releasing the lock lever, remove the FPC perpendicular to the board surface. (Ex.20)
When removing the FPC do not press the lock lever. (Ex.21)
The released lock lever may close automatically upon removal but this is not a product defect. (Ex.22)

[Caution]
· Do not pull out FPC while the lever is locked. (Ex.23)
There is a possibility of decrease in the FPC's retention force after forcefully removing the FPC.
· The lock lever provides the FPC retention mechanism.
When pulling out FPC, do not apply load in any direction other than perpendicular to the board surface. (Ex.24)

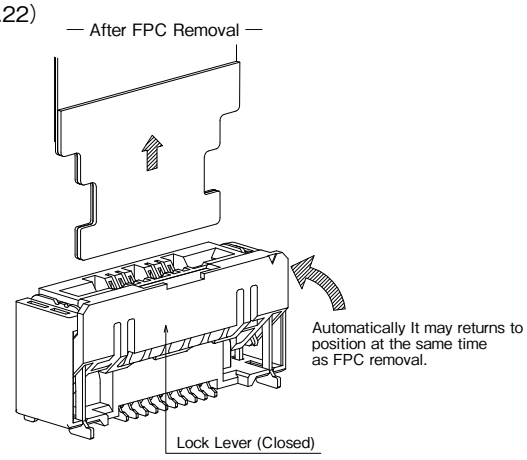
(Ex.20)



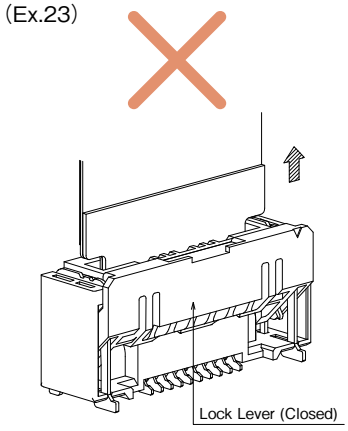
(Ex.21)



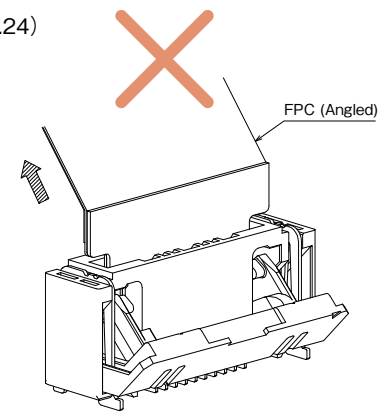
(Ex.22)

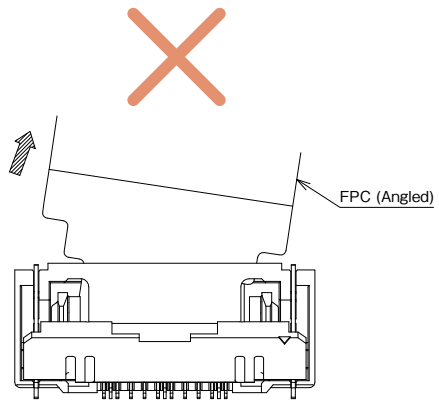


(Ex.23)



(Ex.24)





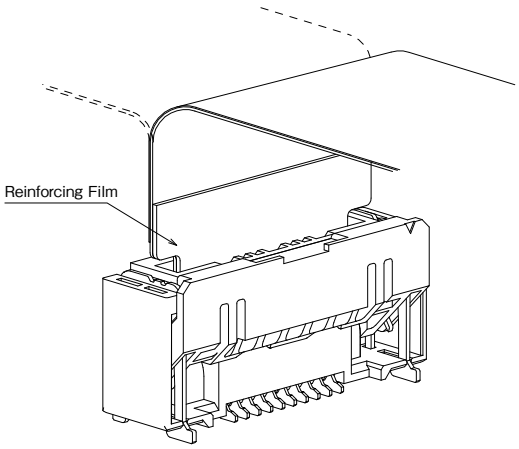
●PCB Layout Precautions

Stress leading to contact failure may be applied to the connector depending on the routing of the FPC the connector will be mated with.
In order to prevent failure, please consider the following during mechanical design.

[Caution]
- When routing the FPC for use, make sure it has enough slack and do not pull tightly.
  Please check that the reinforcing film is placed vertical to the board surface. (Ex.25)
- Please ensure there is no load applied to the connector in the pulling, inserting or lateral direction.
  Using an FPC bent close to the connector may cause contact failure or FPC damage/disconnection.
  Therefore, please take some measure to secure the FPC etc. (Ex.26)(Ex.27)
- Do not place panels or mounted parts that interfere with the FPC.(Ex.28)
- Please make adjustments with FPC manufacturer for FPC flexibility.
- Please ensure the FPC has adequate insertion space when designing the layout so that it is not inserted diagonally.
  Additionally, insertion becomes difficult if the FPC is too short, so please ensure an adequate FPC length and component layout.
- When you design the board/layout, please secure required space for operation.

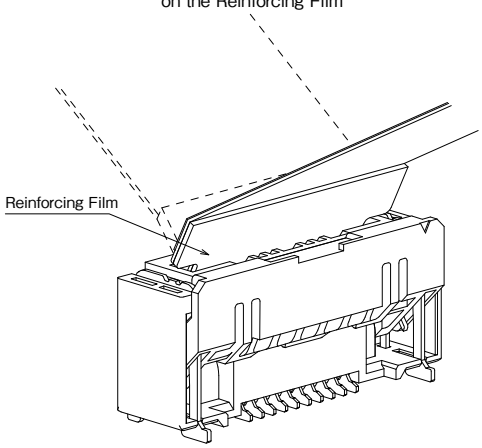
(Ex.25) OK

Routing that Does Not Place a Load on the Reinforcing Film



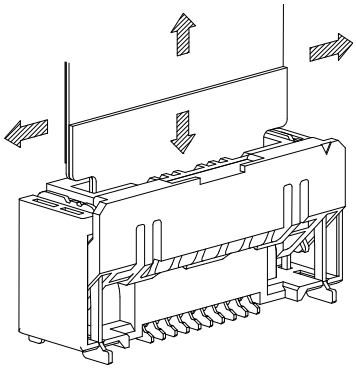
(Ex.26)

Routing that Places a Load on the Reinforcing Film



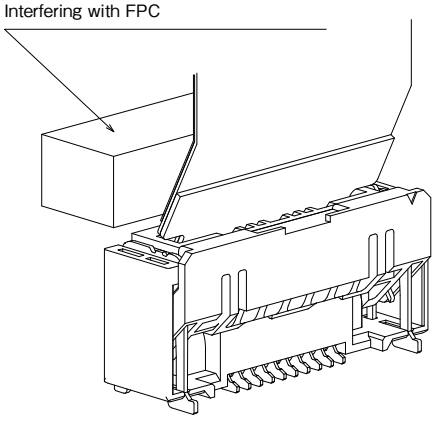
(Ex.27)

Load Applied to FPC



(Ex.28)

Housing/Mounted Components Interfering with FPC



Notes for Board Mounting and After Board Mounting

●Board Mounting Notes

Please be careful of the following at the time of board mounting.

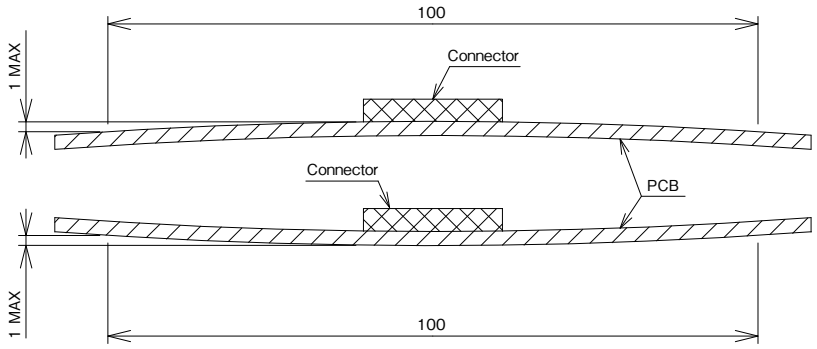
[Caution]
- Please confirm the recommended PCB mounting pattern, metal mask opening size and FPC design.
- If the PCB mounting pattern is narrower than recommended or the metal mask opening is wider than recommended, solder (flux) wicking is more likely to occur.
  If there is difference from the recommendation, please use after checking the mounting state.
- The level difference between the bottom surfaces of contact lead and the mold is designed to be minimal. When there is silk print etc. on the bottom surface of the connector, the lower surface of the connector may be pushed up, resulting in solder not applied or defective fillet formation. When there is silk print etc. on the bottom surface of the connector, please use after checking the mounted state.
- Use the reflow conditions within the specifications designated by Hirose. The mounted status may vary due to external conditions such as the paste solder type, manufacturer, and board size. Please use it after checking the mounted state.
- Please control the board warpage as much as possible. While the coplanarity of this connector is 0.1mm or less, defective soldering could occur if the board warpage is considerable.
- When mounted on FPC, be sure to provide a reinforcing plate to ease handling. We recommend a reinforcing plate of 0.3mm or thicker made of glass epoxy material.
- Do not apply excessive force (1N or more) when pulling out the emboss from the reel or suctioning the connector from the emboss.

●Cautions When Handling the Board After Mounting

Please be careful of the following when handling the board after mounting operation.

[Caution]
- Refrain from handing that may put strain on the board during the assembly process, such as splitting a board into several pieces or screwing the board to a frame. Otherwise the connector may be damaged.
- Board deflection should be 1mm or less when the board width is 100mm. (Ex.29) Board deflection may cause stress to the connector resulting in damage.

(Ex.29)



●Cautions for Manual Soldering

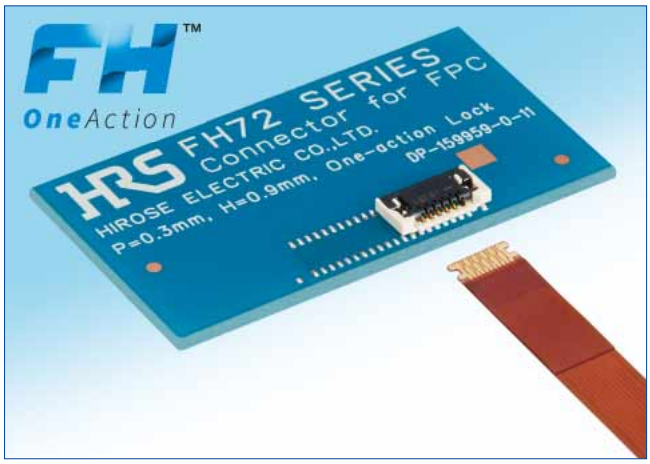
Please be careful of the following when hand-soldering for repair work etc.

[Caution]
- Do not perform manual soldering with the FPC inserted in the connector.
- Please be careful not to apply excessive heat or allow the solder iron to touch any place other than the connector contact lead. Failure to do so may result in connector deformation or melting.
- Do not supply an excessive amount of solder (flux). If too much solder (flux) is supplied to the contact, the solder or flux could adhere on the contact point and cause contact failure. Additionally, supplying excessive solder to the retention tabs may result in actuator rotation failure, causing connector damage.

NEW

0.3mm Pitch, 0.9mm Height, Top Contact One Action Lock, High FPC Retention Force Connector

FH72 Series



Dimension Diagram : 11pos.

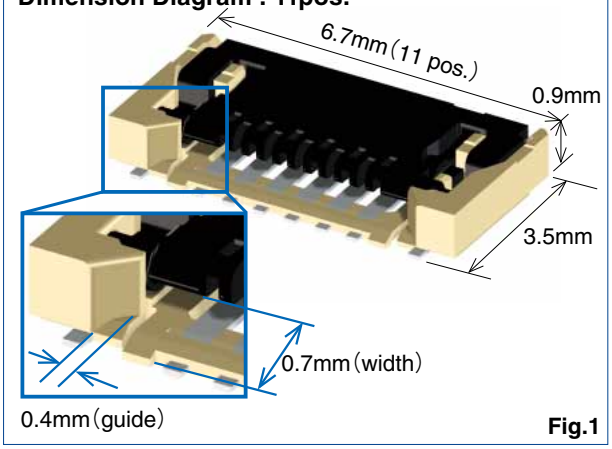


Fig.1

■Features

1. Space-saving design

· Space saving design with 0.3mm pitch, 3.5mm depth, 0.9mm height (Fig.1).

2. Automatic one action lock design

One action locking by simply inserting FPC after mounting contributes to enhanced workability (Fig.2). (Lock release by operating the lock lever when removing.)

· Operation of the actuator is not required at the time of FPC mating.
· Can be inserted with one hand.
· Contributes to assembly time reduction.
· Lock lever will not be damaged by operation.
· Eliminates failures due to FPC movement during locking.

3. High FPC retention force

· The notches on both sides of FPC are held by the lock lever, generating a high FPC retention force in spite of the small size (Fig.3).

4. Easy FPC insertion

· Wide guide for easy FPC insertion (Fig.1).

5. Compatible with 0.2mm thickness FPC

· 3mm pitch connector compatible with 0.2mm standard thickness FPC (Appropriate rigidness of metal plates prevents FPC deformation and issues during inserting and fitting).

6. Detect FPC Mis-Mating with Original Structure

· Can detect mis-mating by checking the FPC insertion status with FPC pattern (Fig.4).

7. Environmental

· Halogen free

*AS defined by IEC 61249-2-21.
Br : 900ppm max, Cl : 900ppm max, Br+Cl : 1,500ppm max

One Action Lock

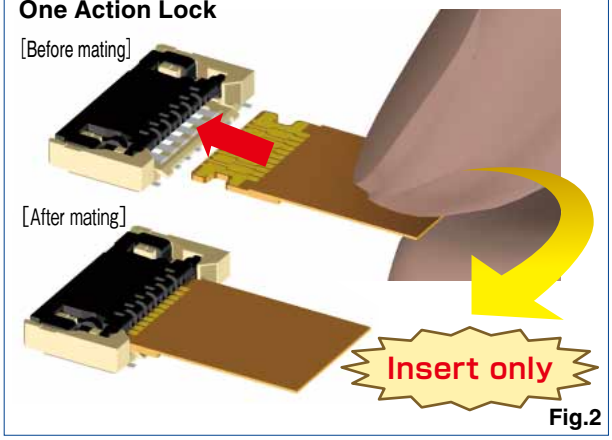


Fig.2

High FPC retention force due to lock design

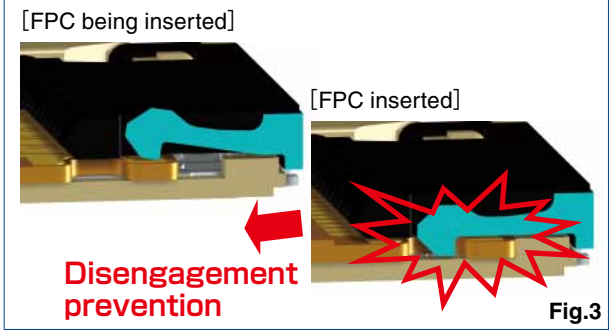


Fig.3

FPC mis-mating detection

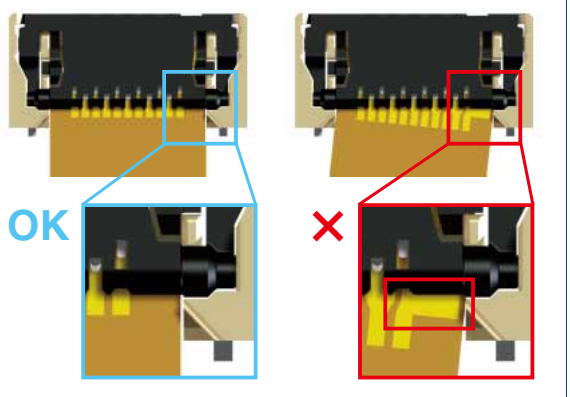


Fig.4

■Product Specifications

Rating	Rated current	0.3A	Operating temperature range	-55 to +85°C (Note 1)	Storage Temperature range	-10 to +50°C (Note 2)
	Rated voltage	30V AC/DC	Operating humidity range	Relative humidity 90% max. (No condensation)	Storage humidity range	Relative humidity 90% max. (No condensation)

Adaptive FPC/FFC contact specifications	Thickness : = 0.2±0.03mm Gold plated contact traces

Item	Specification	Conditions
1. Insulation resistance	50MΩ min.	100V DC
2. Withstanding voltage	No flashover or insulation breakdown	90V AC rms / 1minute
3. Contact resistance	100mΩ max. ✻ Including FPC conductor resistance	1mA (AC)
4. Durability (insertion/withdrawal)	Contact resistance : 100mΩ max. No damage, cracks, or parts dislocation	10 cycles
5. Vibration	No electrical discontinuity of 1μs or more Contact resistance : 100mΩ max. No damage, cracks, or parts dislocation	Frequency : 10 to 55Hz, single amplitude of 0.75mm, 10 cycles in each of the 3 directions
6. Shock	No electrical discontinuity of 1μs or more Contact resistance : 100mΩ max. No damage, cracks, or parts dislocation	Acceleration of 981m/s², duration of 6ms, sine half-wave waveform, 3 cycles in each of the 3 axes
7. Humidity (Steady state)	Contact resistance : 100mΩ max. Insulation resistance : 50MΩ min. No damage, cracks, or parts dislocation	96 hours at temperature of 40°C and humidity of 90% to 95%
8. Temperature cycle	Contact resistance : 100mΩ max. Insulation resistance : 50MΩ min. No damage, cracks, or parts dislocation	Temperature : -55°C→+15°C to +35°C→+85°C→ +15°C to +35°C Time : 30→ 2~3→ 30→ 2 to 3 (Minutes) 5 cycles
9. Resistance to soldiering heat	No deformation of components affecting performance	Reflow : See recommended temperature profile (Page 8) Manual soldering : 350 ± 10°C for 5 seconds

Note 1 : Includes temperature rise caused by current flow.
Note 2 : The term "storage" refers to products stored for long period of time prior to mounting and use. Operating Temperature Range and Humidity Range covers non-conducting condition of installed connectors in storage, shipment or during transportation.

■Materials / Finish

Part	Material	Color / Finish	UL standard
Insulator	LCP	Beige	UL94V-0
	Polyamide	Black	UL94V-0
Contact	Copper alloy	Gold plated	——

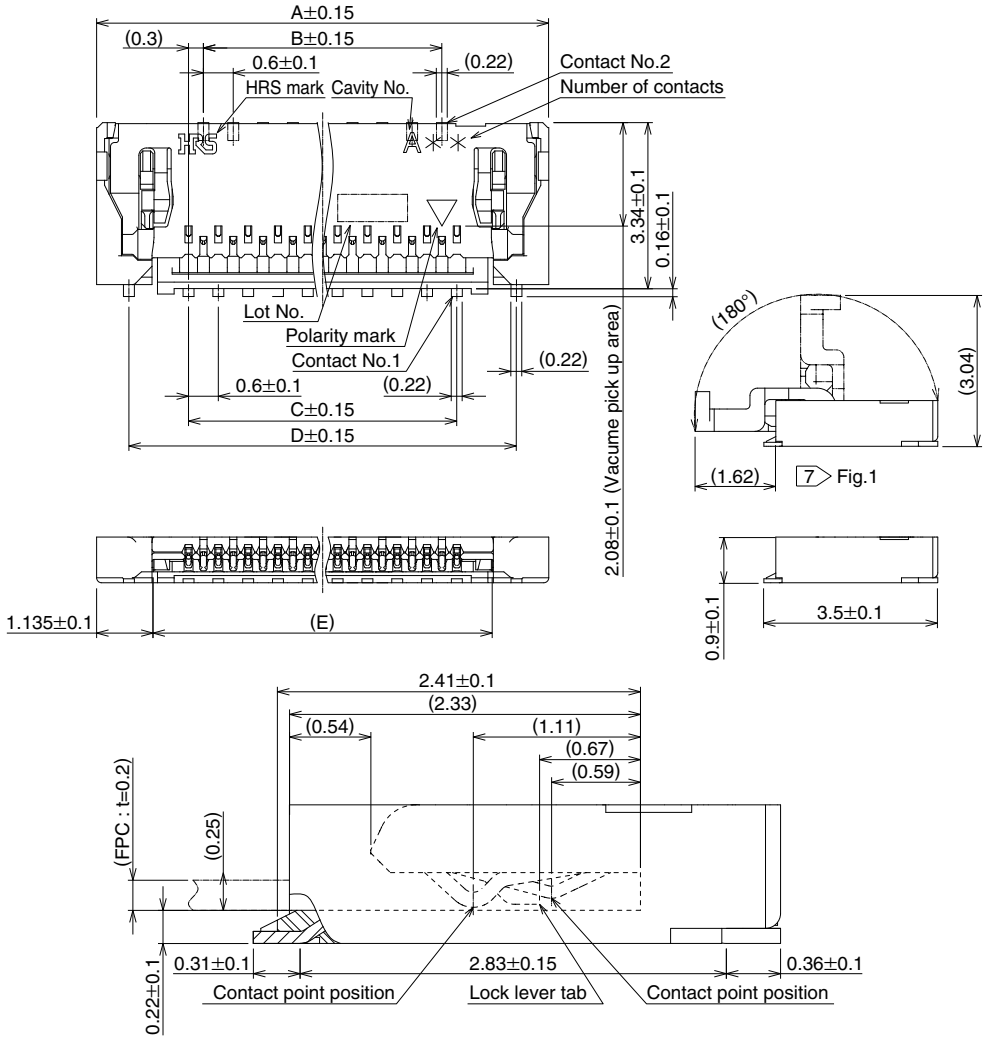
■Product Number Structure

Refer to the chart below when determining the product specifications from the product number.
Please select from the product numbers listed in this catalog when placing orders.

FH 72 – 11S – 0.3 SHW (99)
❶ ❷ ❸ ❹ ❺ ❻

❶ Series Name : FH	❺ Terminal type SHW : SMT horizontal staggered array type
❷ Series No. : 72	
❸ No. of contacts : 11	❻ Specification Blank : Standard 6,000pcs/reel (99) : 500pcs/reel
❹ Connector pitch : 0.3mm	

■Connector Dimensions



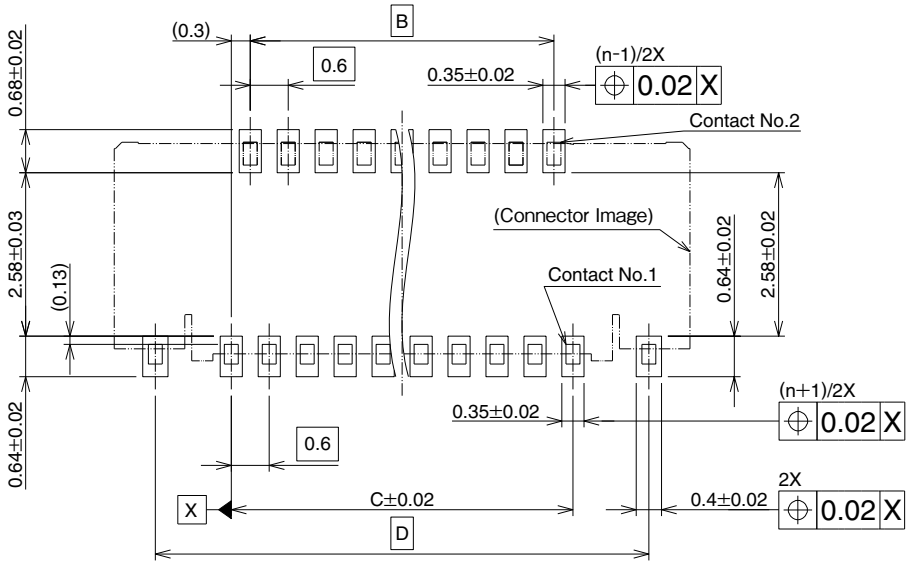
Note
1 : Dimensions in parentheses are reference.
2 : Level of contact and retention tab lead shall be 0.1 max.
3 : Packaged in tape and reel. See the packaging specifications for details.
4 : Please note that the appearance may change slightly in order to improve sink marks.
5 : Quality of product remains good even when dark spots occur on molded plastic.
6 : This product satisfies halogen free requirements defined as 900ppm maximum chlorine, 900ppm maximum bromine, and 1500ppm maximum total of chlorine and bromine.
7 Fig.1 indicates the lock lever in an open condition. FPC can be extracted by opening the lock lever more than 45°.

Unit : mm

Part No.	HRS No.	No. of Contacts	A	B	C	D	E
FH72-7S-0.3SHW(**)	Under planning (Note 1)	7	5.5	1.2	1.8	4.2	3.23
FH72-9S-0.3SHW(**)	Under planning (Note 1)	9	6.1	1.8	2.4	4.8	3.83
FH72-11S-0.3SHW(**)	580-5100-0 **	11	6.7	2.4	3.0	5.4	4.43
FH72-13S-0.3SHW(**)	Under planning (Note 1)	13	7.3	3.0	3.6	6.0	5.03
FH72-15S-0.3SHW(**)	580-5104-0 **	15	7.9	3.6	4.2	6.6	5.63
FH72-17S-0.3SHW(**)	Under planning (Note 1)	17	8.5	4.2	4.8	7.2	6.23
FH72-19S-0.3SHW(**)	Under planning (Note 1)	19	9.1	4.8	5.4	7.8	6.83
FH72-21S-0.3SHW(**)	580-5101-0 **	21	9.7	5.4	6.0	8.4	7.43
FH72-23S-0.3SHW(**)	Under planning (Note 1)	23	10.3	6.0	6.6	9.0	8.03
FH72-25S-0.3SHW(**)	Under planning (Note 1)	25	10.9	6.6	7.2	9.6	8.63
FH72-27S-0.3SHW(**)	Under planning (Note 1)	27	11.5	7.2	7.8	10.2	9.23
FH72-29S-0.3SHW(**)	Under planning (Note 1)	29	12.1	7.8	8.4	10.8	9.83
FH72-31S-0.3SHW(**)	580-5102-0 **	31	12.7	8.4	9.0	11.4	10.43

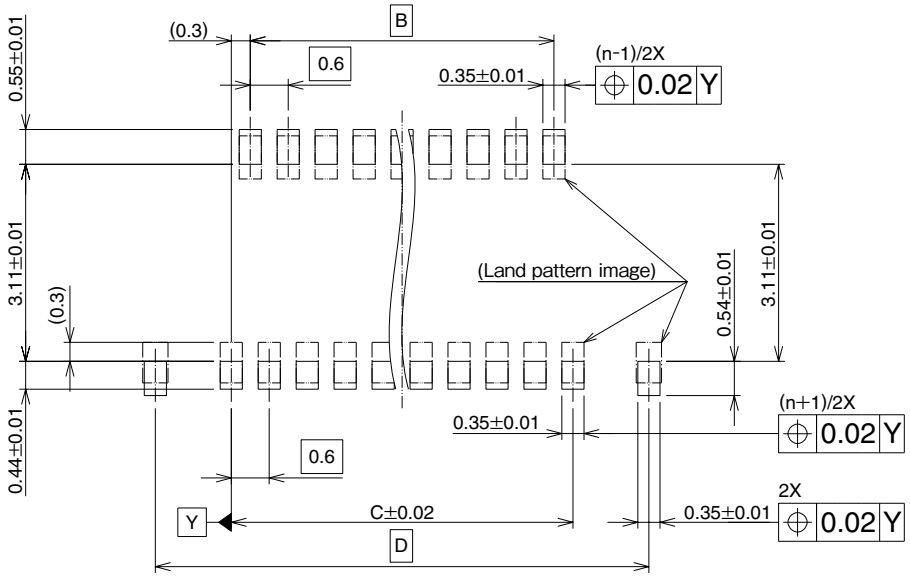
Note 1 : Contact positions without HRS No. are currently under planning.
Please contact Hirose for detailed information about product variations.

◆Recommended PCB Mounting Pattern



◆Recommended Stencil Pattern

(Recommended stencil pattern thickness : t=0.1)



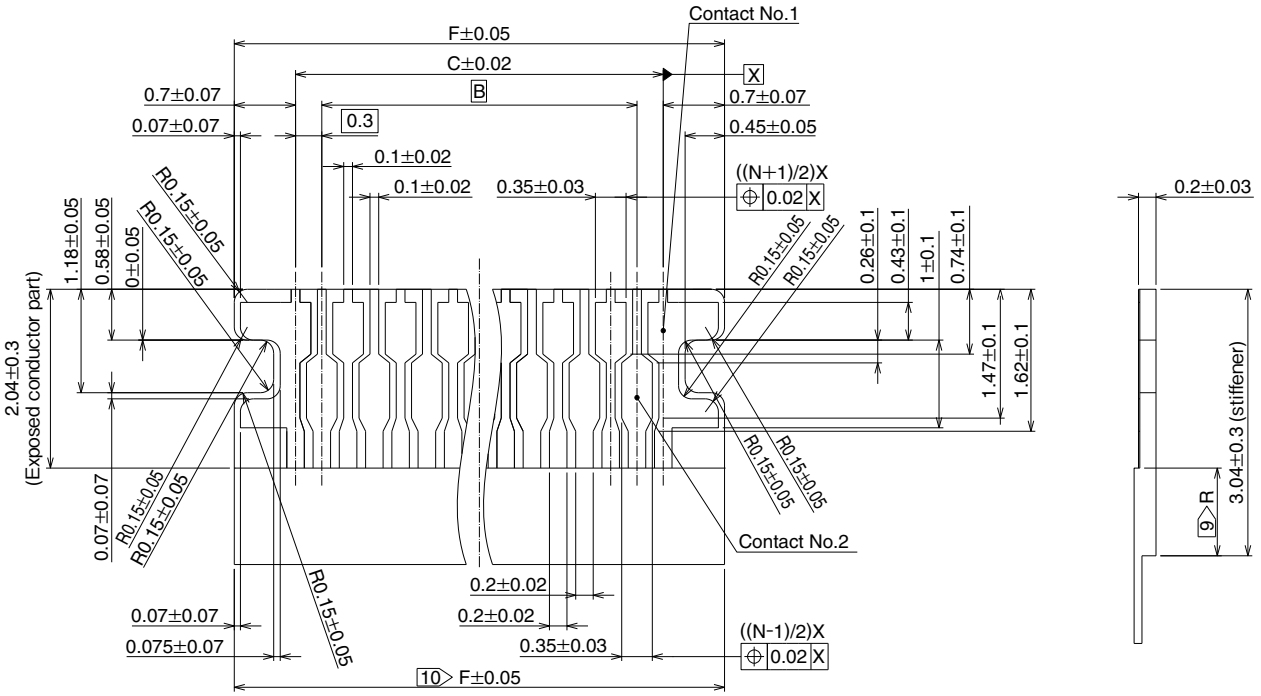
Note 8 : 'n' shows the number of contacts.

Unit : mm

Part No.	HRS No.	No. of contacts	B	C	D
FH72-7S-0.3SHW(**)	Under planning (Note 1)	7	1.2	1.8	4.2
FH72-9S-0.3SHW(**)	Under planning (Note 1)	9	1.8	2.4	4.8
FH72-11S-0.3SHW(**)	580-5100-0 **	11	2.4	3.0	5.4
FH72-13S-0.3SHW(**)	Under planning (Note 1)	13	3.0	3.6	6.0
FH72-15S-0.3SHW(**)	580-5104-0 **	15	3.6	4.2	6.6
FH72-17S-0.3SHW(**)	Under planning (Note 1)	17	4.2	4.8	7.2
FH72-19S-0.3SHW(**)	Under planning (Note 1)	19	4.8	5.4	7.8
FH72-21S-0.3SHW(**)	580-5101-0 **	21	5.4	6.0	8.4
FH72-23S-0.3SHW(**)	Under planning (Note 1)	23	6.0	6.6	9.0
FH72-25S-0.3SHW(**)	Under planning (Note 1)	25	6.6	7.2	9.6
FH72-27S-0.3SHW(**)	Under planning (Note 1)	27	7.2	7.8	10.2
FH72-29S-0.3SHW(**)	Under planning (Note 1)	29	7.8	8.4	10.8
FH72-31S-0.3SHW(**)	580-5102-0 **	31	8.4	9.0	11.4

Note 1 : Contact positions without HRS No. are currently under planning.
Please contact Hirose for detailed information about product variation.

◆Recommended FPC Dimensions Diagram



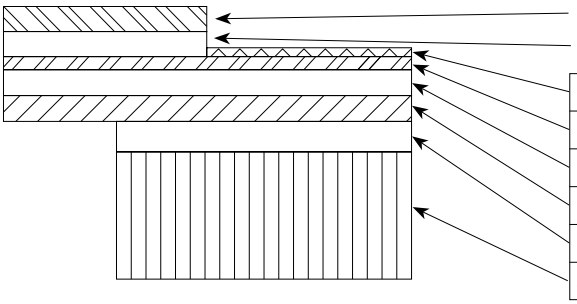
Note 9 When designing the FPC dimension R must be 0.5mm minimum.
10 Apply indicated tolerance to exposed part of conductor.

Unit : mm

Part No.	HRS No.	No. of contacts	B	C	F
FH72-7S-0.3SHW(**)	Under planning (Note 1)	7	1.2	1.8	3.2
FH72-9S-0.3SHW(**)	Under planning (Note 1)	9	1.8	2.4	3.8
FH72-11S-0.3SHW(**)	580-5100-0 **	11	2.4	3.0	4.4
FH72-13S-0.3SHW(**)	Under planning (Note 1)	13	3.0	3.6	5.0
FH72-15S-0.3SHW(**)	580-5104-0 **	15	3.6	4.2	5.6
FH72-17S-0.3SHW(**)	Under planning (Note 1)	17	4.2	4.8	6.2
FH72-19S-0.3SHW(**)	Under planning (Note 1)	19	4.8	5.4	6.8
FH72-21S-0.3SHW(**)	580-5101-0 **	21	5.4	6.0	7.4
FH72-23S-0.3SHW(**)	Under planning (Note 1)	23	6.0	6.6	8.0
FH72-25S-0.3SHW(**)	Under planning (Note 1)	25	6.6	7.2	8.6
FH72-27S-0.3SHW(**)	Under planning (Note 1)	27	7.2	7.8	9.2
FH72-29S-0.3SHW(**)	Under planning (Note 1)	29	7.8	8.4	9.8
FH72-31S-0.3SHW(**)	580-5102-0 **	31	8.4	9.0	10.4

Note 1 : Contact positions without HRS No. are currently under planning.
Please contact Hirose for detailed information about product variations.

◆FPC Construction (Recommended Specifications)

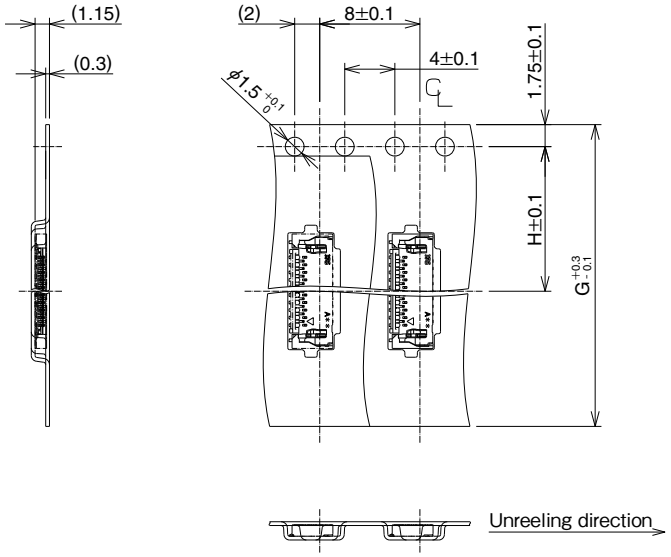


Material Name	Material	Thickness (μm)
Covering film	Polyimide 1mil	(25)
Cover adhesive		(25)
Surface treatment	1 to 6μm nickel underplated 0.2μm gold under plated	(4)
Conductor copper foil	Cu 1oz	35
Base adhesive	Heat-hardened adhesive	25
Base film	Polyimide 1mil	25
Reinforcement material	Heat-hardened adhesive	35
adhesiveStiffener	Polyimide 5mil	75

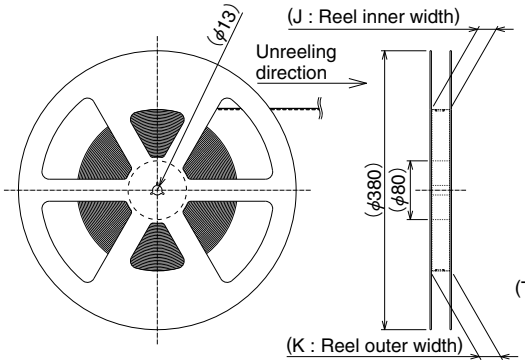
Note 1. Material composition of FPC is a reference example. Please adjust the thickness of the FPC mating section to 0.2±0.03mm in reference to the material composition.
2. For the details of the material composition, please contact each FPC manufacturer.

◆Packaging Specifications

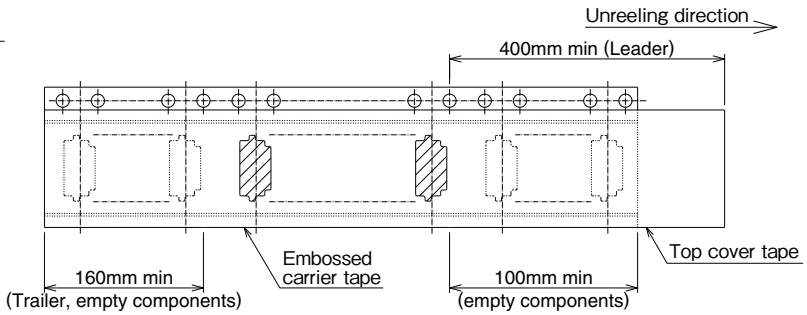
●Embossed Carrier Tape Dimensions



●Reel Dimensions



●Leader, Trailer Dimensions

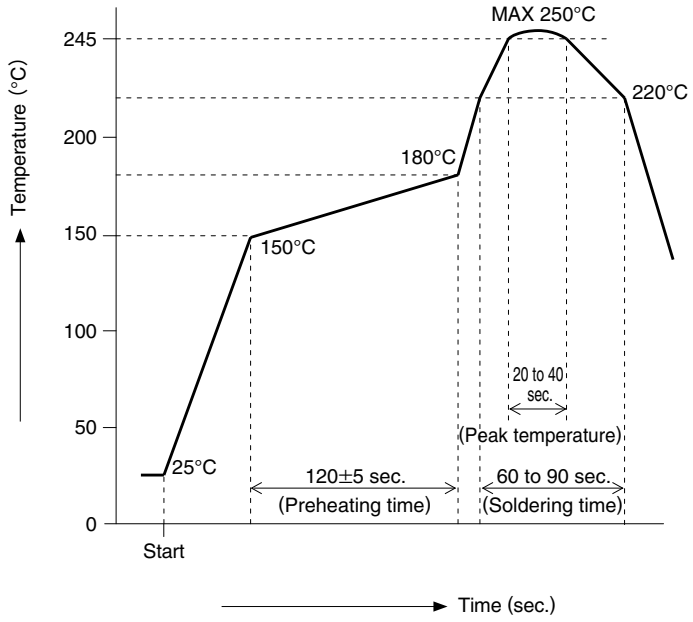


Unit : mm

Part No.	HRS No.	No. of contacts	G	H	J	K
FH72-7S-0.3SHW(**)	Under planning (Note 1)	7	16	7.5	17.4	21.4
FH72-9S-0.3SHW(**)	Under planning (Note 1)	9				
FH72-11S-0.3SHW(**)	580-5100-0 **	11	24	11.5	25.4	29.4
FH72-13S-0.3SHW(**)	Under planning (Note 1)	13				
FH72-15S-0.3SHW(**)	580-5104-0 **	15				
FH72-17S-0.3SHW(**)	Under planning (Note 1)	17				
FH72-19S-0.3SHW(**)	Under planning (Note 1)	19				
FH72-21S-0.3SHW(**)	580-5101-0 **	21				
FH72-23S-0.3SHW(**)	Under planning (Note 1)	23				
FH72-25S-0.3SHW(**)	Under planning (Note 1)	25				
FH72-27S-0.3SHW(**)	Under planning (Note 1)	27				
FH72-29S-0.3SHW(**)	Under planning (Note 1)	29				
FH72-31S-0.3SHW(**)	580-5102-0 **	31				

Note 1 : Contact positions without HRS No. are currently under planning.
Please contact Hirose for detailed information about product variations.

Temperature Profile



Applicable Conditions

Reflow method	: IR/Hot air
Reflow environment	: Room air
Solder	: Paste type Sn/3.0Ag/0.5Cu (M705-GRN360-K2-V made by Senju Metal Industry Co.)
Test PCB	: PCB material and size Glass epoxy 32.85×18.3×1mm Land size per recommendation on page 4.
Metal mask	: Thickness and opening size per recommendation on page 4.

This temperature profile is based on the above conditions. It may vastly depending on solder paste type, manufacturer, PCB size and mounting materials. Please use only after checking the mounting conditions.

◆Connector operation and points to note

[Operation Method]

As this connector is a small-sized, thin product, care needs to be taken when handling. Please check the following before use.

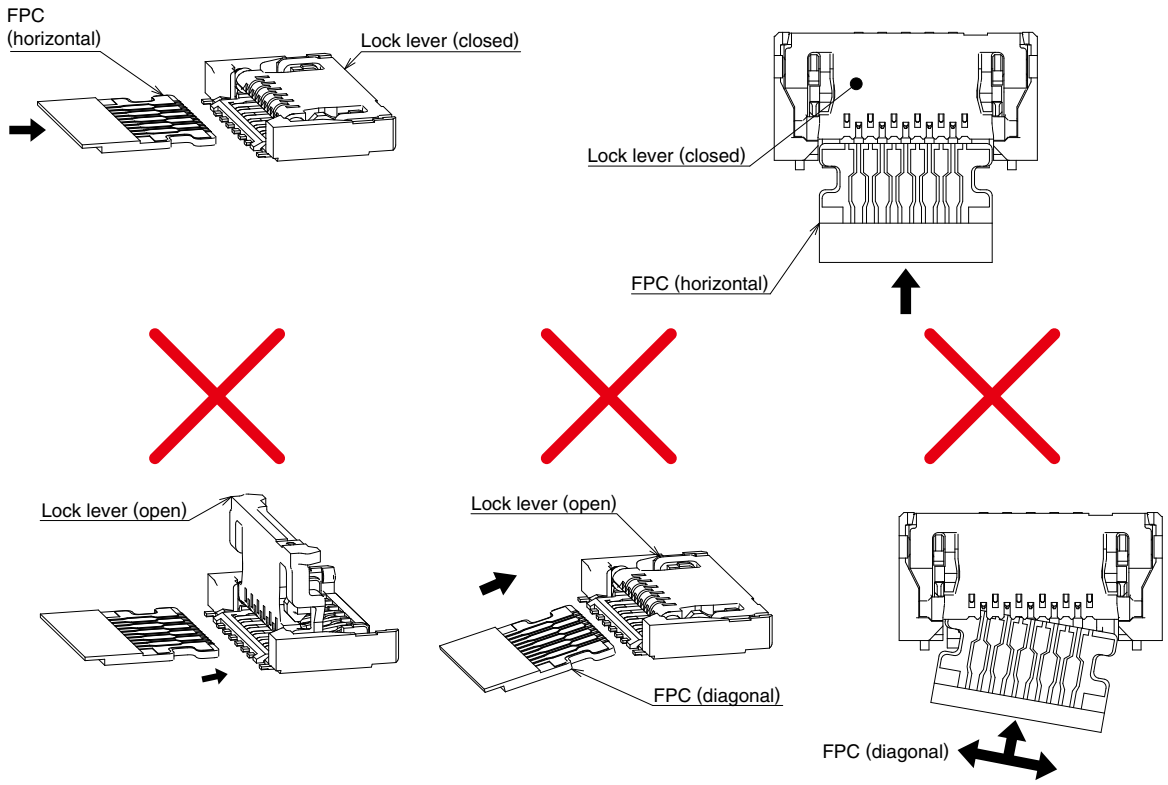
1. Initial Condition

①The product is delivered with the lock lever closed. The lock lever does not need to be operated other than when removing the FPC.

2. FPC insertion method

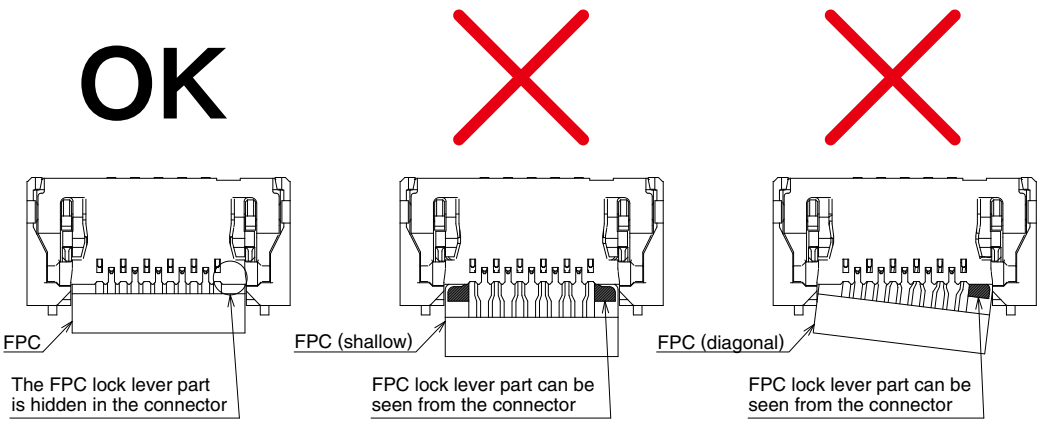
①Insert FPC with the conductor surface facing upwards, horizontally to the board surface until fully inserted.

[Caution]
· During FPC insertion do not twist the FPC vertically, laterally or diagonally. Doing so may result in deformation of the contacts and contact failure.



3. Checking the FPC insertion status

After FPC is completely inserted visually inspect the FPC insertion status.



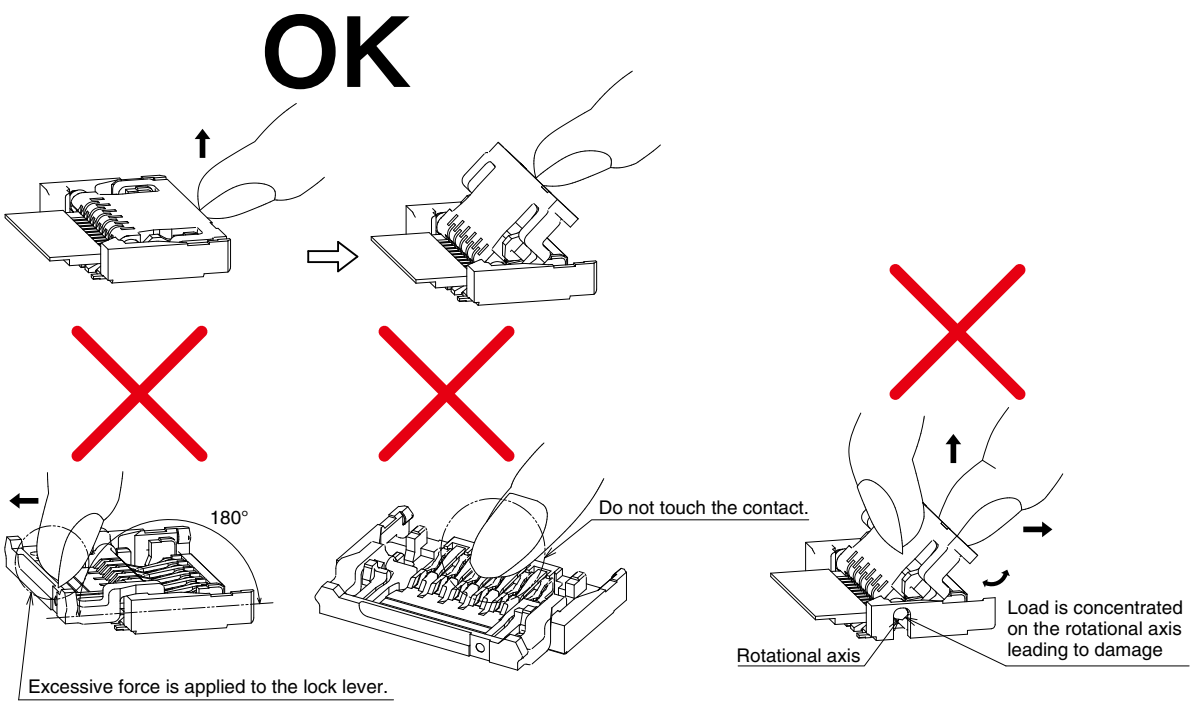
◆Connector operation and points to note

[Operation Method]

4. FPC extraction method

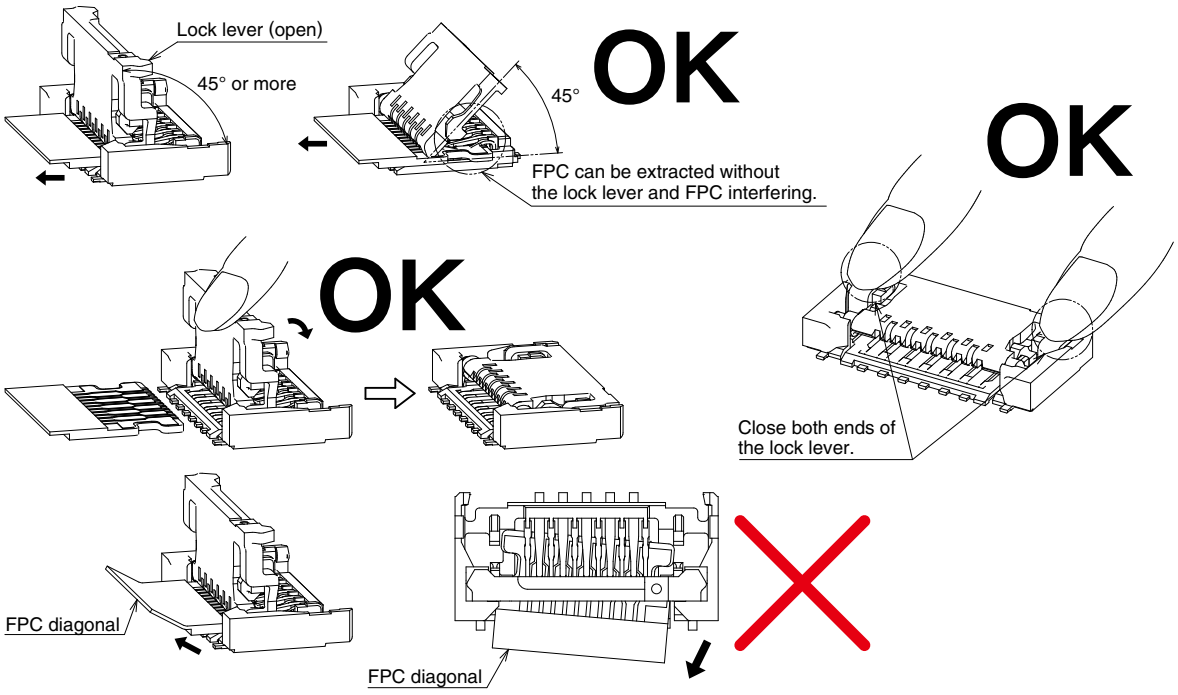
①Push up the lock lever slowly and release the lock.

[Caution]
・The lock lever cannot be opened over 180°. Do not open it over this angle.
・After releasing the lock lever, do not touch the contact.
・Do not raise, pull, or twist the lock lever.



②After releasing the lock lever, extract the FPC in the horizontal direction.
③After remove of the FPC, close the lock lever.

[Caution]
・Do not pull out FPC while the lock lever is not opened to 45° or more.
・Ensure both ends of the lock lever are closed.



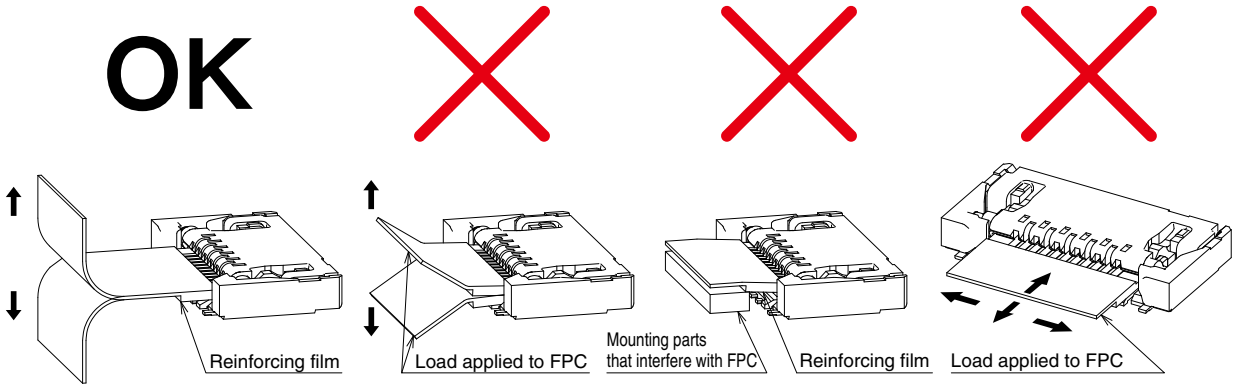
◆Connector operation and points to note

[Operation Method]

5. FPC routing

①When routing the FPC please do not apply a load as it may cause FPC disconnection and damage.
It also may cause additional load to the connector resulting in poor connection and other issues.

[Caution]
- Make sure the FPC's stiffener does not touch the chassis.
- When designing and assembling the FPC avoid applying stress by pulling, pushing and loosening on the connector. Additionally, avoid pulling up and down on the FPC
- When designing and assembling the FBC after cabling avoid pulling the FPC and route the wire with slack. In this case the stiffener should be parallel to the PCB.
- Do not mount other components under the FPC's stiffener.



[Cautions for mounting PCB]

◆PCB Warping
Minimize PCB warping as much as possible.
Lead co-planarity including reinforced metals is 0.1mm or less.
Too much PCB warping may result in a soldering failure.

◆FPC Mounting
When mounted on FPC, be sure to provide a reinforcing plate to ease handling.
We recommend a reinforcing plate of 0.3mm or thicker made of glass epoxy material.

◆Load to Connector
Do not apply an external for to the connector greater than 1.0N prior to mounting.
Additionally do not insert the FPC or operate the connector before mounting.

◆Load to PCB
- Splitting a large PCB into several pieces
- Screwing the PCB

Avoid the handling described above so that no force is exerted on the PCB during the assembly process.
Otherwise, the connector may become defective.