PRODUCT CATALOG

HIROSE ELECTRIC CO.,LTD.

FH58/FH58M Series

0.2/0.25mm Pitch, Height 0.9mm,Top and Bottom Contact, Back Flip, High Retention Force FPC Connector

FH™ Flip-Lock Pioneer Hirose

P= 0.2/0.25 mm
P=0.2/0.25mm

Back Flip

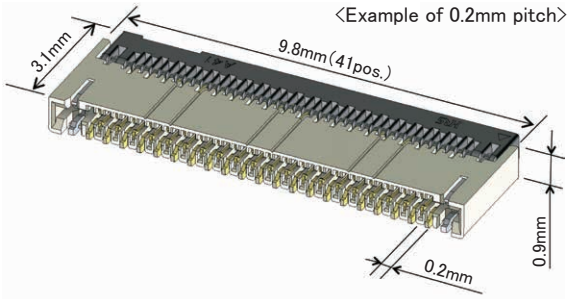
Top/Bottom Contact

Features

1. Space-Saving

The combination of a fine pitch of 0.2mm/0.25mm and narrow depth of 3.1mm saves board space.
*The depth of long actuator type is 3.4mm

Low profile, narrow pitch, and narrow depth create the space savings.

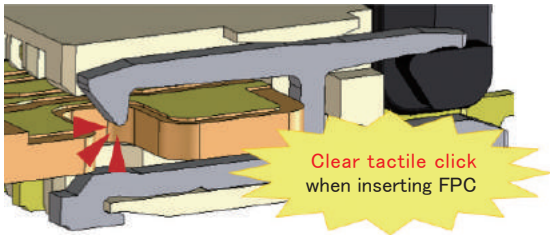


2. High FPC Retention Force

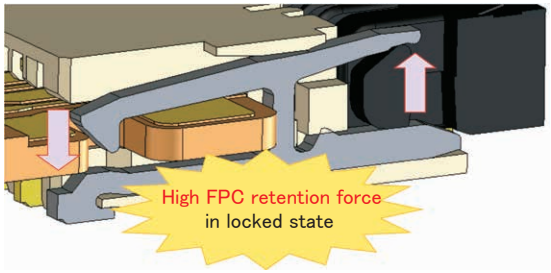
Metal locking tabs at both side of the connector provide high FPC retention force.
Being movable, the metal locking tab allows this connector to accept horizontal FPC insertions; it provides a clear tactile click and increased retention force when the FPC is inserted.

Multi-Functional Metal Locking Tabs

[FPC in place]



[Locked]

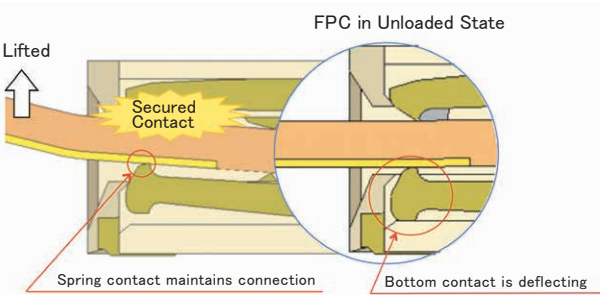


3. High Reliability Top and Bottom Contact Design

Top and bottom spring contacts follow up-and-down movement of the FPC to provide secure connectivity.

High Contact Reliability with Bottom Spring Contact

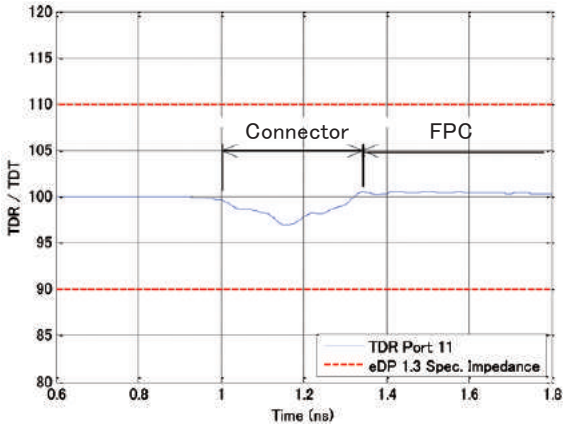
When bottom contact is used, FPC is lifted upward.



4. Supports High-Speed Transmissions

Excellent impedance characteristics enables high speed transmission.
By utilizing differential pairs of identical contacts (even-even contacts or odd-odd contacts) these connectors are able to provide superb transmission characteristics and have achieved compliance with the eDP (ver.1.3), MIPI (D-PHY) and USB3.0 standards.

FH58 Differential Impedance 130ps rise time (20—80%)



5. Environmental Compatibility

Halogen-free
No chlorine or bromine exceeding the standard values are used in this connector.

* As defined by IEC 61249-2-21
Br : 900ppm Max. , Cl : 900ppm Max. ,
Br+ Cl : 1500ppm Max.

Product Specifications

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

Note 1 : Includes temperature rise caused by current flow.
Note 2 : Storage refers to the long-term storage condition for unused products before the board mounting.
Operating temperature and humidity range apply when the product is not powered after PCB mounting and when temporarily stored during transportation.

Compatible FPC Terminal Specifications	t=0.2±0.02 Gold Plating

Item	Standards	Condition
Insulation Resistance	50MΩ Min.	Measured at 100V DC
Withstanding Voltage	No flashover or dielectric breakdown	90V AC for 1 min.
Contact Resistance	300mΩ Max.(0.2mm pitch products) 200mΩ Max. (0.25mm pitch products) ∗ Includes FPC conductor resistance.	Measured at 1mA
Mating Durability	Contact Resistance: 300mΩ Max. (0.2mm pitch products) 200mΩ Max. (0.25mm pitch products) No damage, cracks or part dislocation.	10 times
Vibration Resistance	No electrical discontinuity of 1μs or more Contact Resistance: 300mΩ Max. (0.2mm pitch products) 200mΩ Max. (0.25mm pitch products) No damage, cracks or part dislocation.	Frequency 10 to 55 Hz, Half amplitude 0.75mm, 10 cycles in each of the 3 axis
Shock Resistance	No electrical discontinuity of 1μs or more Contact Resistance: 300mΩ Max. (0.2mm pitch products) 200mΩ Max. (0.25mm pitch products) No damage, cracks or part dislocation.	Acceleration: 981m/s^2 duration: 6 ms Sine halfwave : 3 times each in 3 axial both directions
Steady-State Moisture Resistance	Contact Resistance: 300mΩ Max. (0.2mm pitch products) 200mΩ Max. (0.25mm pitch products) Insulation Resistance: 50MΩ Min. No damage, cracks or part dislocation.	Leave in a temperature of +40℃ and humidity of 90 to 95% for 96 hours.
Temperature Cycle	Contact Resistance: 300mΩ Max. (0.2mm pitch products) 200mΩ Max. (0.25mm pitch products) Insulation Resistance: 50MΩ Min. No damage, cracks or part dislocation.	Temperature: -55 to +15 to +35 to +85 to +15 to +35℃ Time: 30 min. -- > 2 to 3 min. -- > 30 min. -- > 2 to 3 min. 5 cycles under the above conditions
Solder Heat Resistance	No deformation in appearance and no significant rattling of terminals, etc.	Reflow: In recommended Temperature Profile Hand solder: 350±10℃ , 5 sec.

Materials / Finish

Component	Material	Color / Finish	Remarks
Insulator	LCP	Beige	UL94V-0
	PA	Black	
Contact	Phosphorous Bronze	Nickel Barrier Gold Plating	-
Retention Tab		Pure Tin Reflow Plating	

Product Number Structure

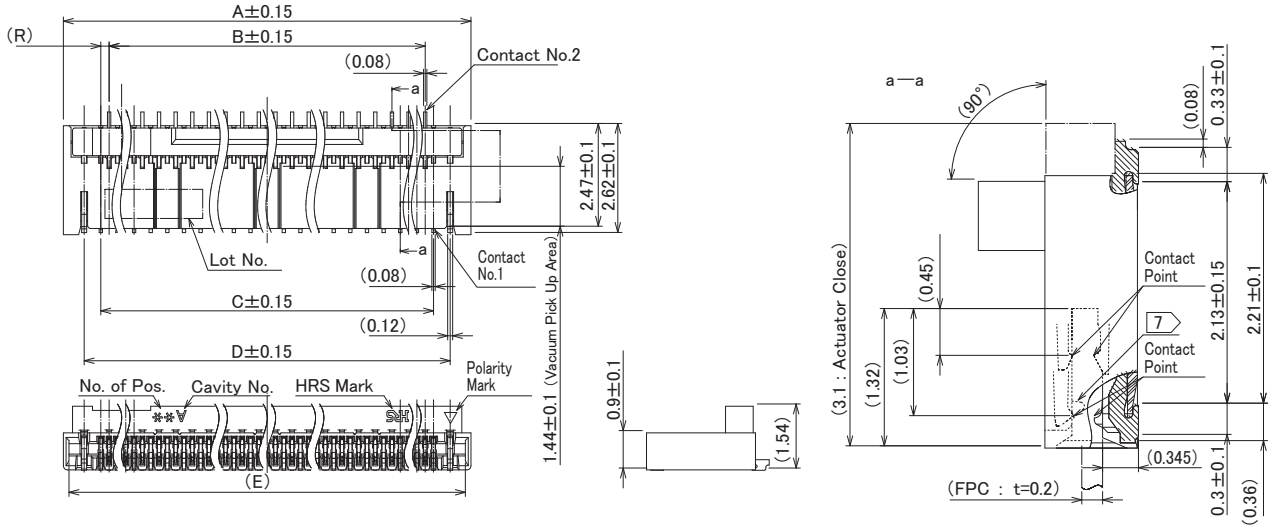
Refer to the chart below when determining the product specifications from the product number.
Please select from the product numbers listed in this catalog when placing orders.

FH58 M A - 41S - 0.25 SHW (99)
❶ ❷ ❸ ❹ ❺ ❻ ❼

❶ Series Name	FH58	❺ Contact Pitch	0.2mm, 0.25mm
❷ Connector Type	None: 0.2mm pitch M: 0.25mm pitch S: Housing Reinforced Type	❻ Contact Type	SHW: SMT Horizontal Staggered Mounting Type
❸ Actuator Type	None: Actuator - Standard Type A: Actuator - Long Type	❼ Specifications	None: Standard (5,000 pcs per reel) (99) : For Trial Production (500 pcs per reel)
❹ No. of Pos.	21,25,31,35,41,51,61,71, 81: 0.2mm pitch 7: 0.25mm pitch		

FH58(M) Connector Dimensions

FH58(M) Series
(0.2mm / 0.25mm pitch, Standard Actuator Type)



1 : The dimension in parentheses are for reference.
2 : The coplanarity of the contact and retention tab lead should be 0.1mm Max.
3 : To be delivered with tape and reel packages.
See the packaging specifications for details.
4 : Sink holes or slits could be added for improvements.
5 : Black spots may appear on the mold, however this does not represent a quality issue.
6 : This product satisfies halogen free requirements defined as 900ppm maximum chlorine, 900ppm maximum bromine, and 1500ppm maximum total of chlorine and bromine.
7 : 7 Shows hook part of the locking metal tabs.

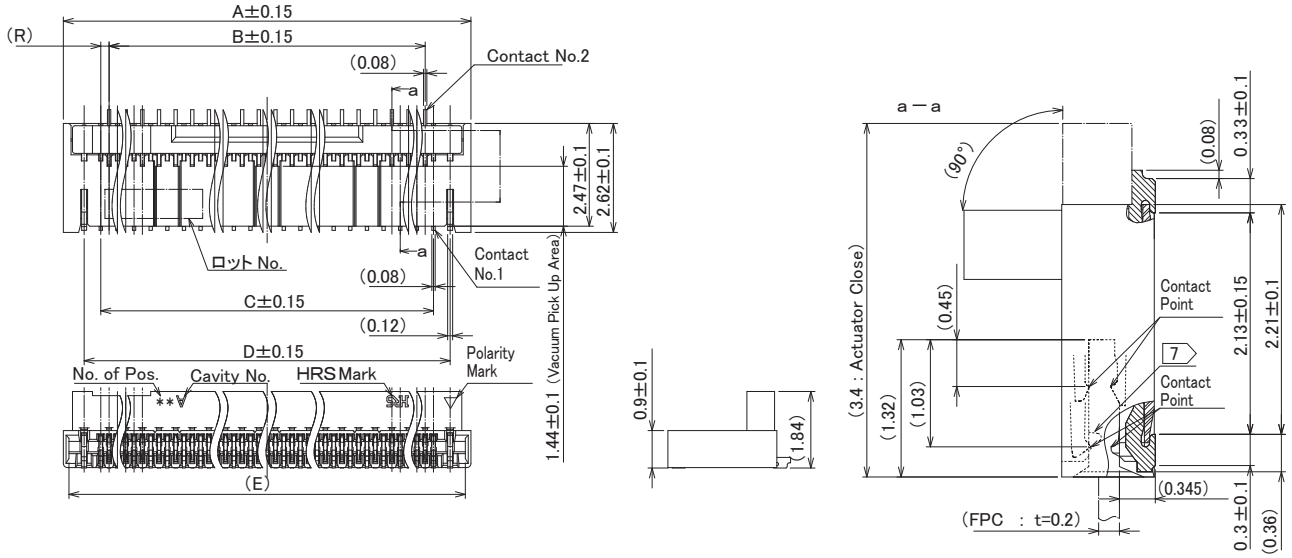
Unit : mm

Part No.	HRS No.	No. of Pos.	A	B	C	D	E	R
FH58-21S-0.2SHW(##)	CL0580-3812-0-##	21	5.8	3.6	4.0	4.8	5.53	0.2
FH58S-25S-0.2SHW(##)	CL0580-3828-0-##	25	6.8	4.4	4.8	5.6	6.33	
FH58-31S-0.2SHW(##)	CL0580-3806-9-##	31	7.8	5.6	6.0	6.8	7.53	
FH58-35S-0.2SHW(##)	CL0580-3810-0-##	35	8.6	6.4	6.8	7.6	8.33	
FH58-41S-0.2SHW(##)	CL0580-3801-5-##	41	9.8	7.6	8.0	8.8	9.53	
FH58-51S-0.2SHW(##)	CL0580-3807-0-##	51	11.8	9.6	10.0	10.8	11.53	
FH58M-7S-0.25SHW(##)	CL0580-3811-0-##	7	3.5	1.0	1.5	2.5	3.23	0.25

【Specification Number】
None: Standard (5,000pcs per reel)
(99) : For Trial Production (500pcs per reel)

FH58A Connector Dimensions

FH58A Series
(0.2mm pitch, Long Actuator Type)



1 : The dimension in parentheses are for reference.
2 : The coplanarity of the contact and retention tab lead should be 0.1mm Max.
3 : To be delivered with tape and reel packages.
See the packaging specifications for details.
4 : Sink holes or slits could be added for improvements.
5 : Black spots may appear on the mold, however this does not represent a quality issue.
6 : This product satisfies halogen free requirements defined as 900ppm maximum chlorine, 900ppm maximum bromine, and 1500ppm maximum total of chlorine and bromine.
7 : 7 Shows hook part of the locking metal tabs.

Unit : mm

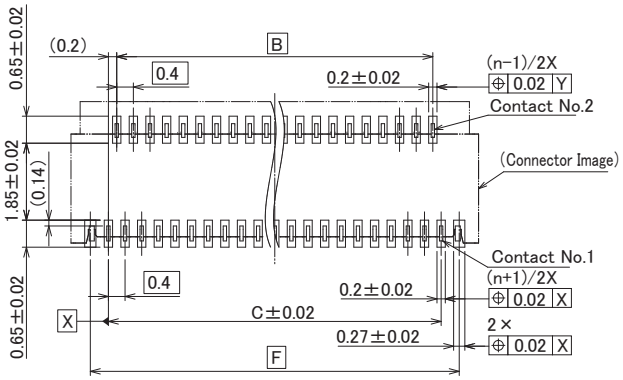
Part No.	HRS No.	No. of Pos.	A	B	C	D	E	R
FH58A-61S-0.2SHW(##)	CL0580-3803-0-##	61	13.8	11.6	12.0	12.8	13.53	0.2
FH58SA-71S-0.2SHW(##)	CL0580-3826-0-##	71	16.0	13.6	14.0	14.8	15.53	
FH58SA-81S-0.2SHW(##)	CL0580-3825-0-##	81	18.0	15.6	16.0	16.8	17.53	

【Specification Number】
None: Standard (5,000pcs per reel)
(99) : For Trial Production (500pcs per reel)

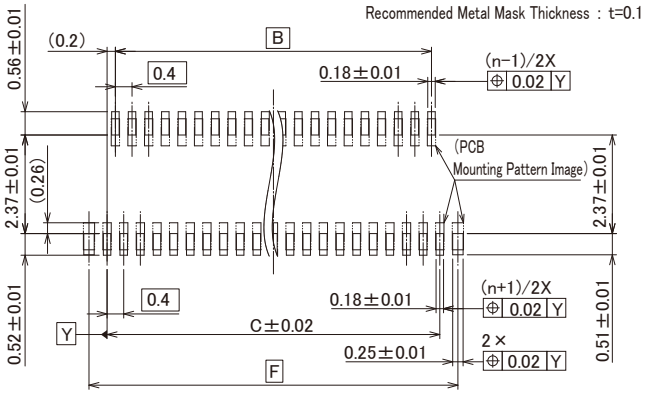
Recommended PCB Mounting Pattern, Metal Mask Dimensions

FH58(A) Series
(P=0.2mm pitch, Standard/Long Actuator Type)

● Recommended PCB Mounting Pattern



●Recommended Metal Mask Dimension

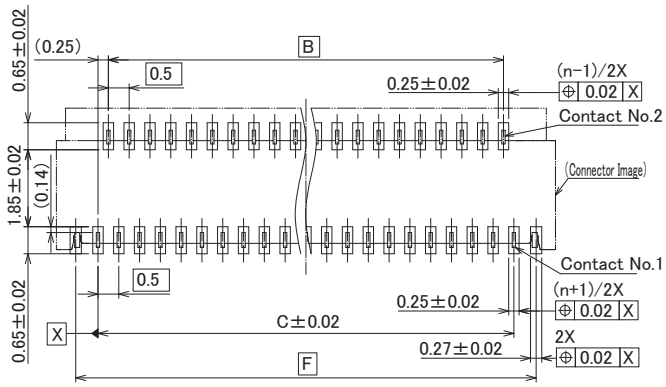


Unit : mm

Part No.	HRS No.	No. of Pos.	B	C	F
FH58-21S-0.2SHW(##)	CL0580-3812-0-##	21	3.6	4.0	4.87
FH58S-25S-0.2SHW(##)	CL0580-3828-0-##	25	4.4	4.8	5.67
FH58-31S-0.2SHW(##)	CL0580-3806-9-##	31	5.6	6.0	6.87
FH58-35S-0.2SHW(##)	CL0580-3810-0-##	35	6.4	6.8	7.67
FH58-41S-0.2SHW(##)	CL0580-3801-5-##	41	7.6	8.0	8.87
FH58-51S-0.2SHW(##)	CL0580-3807-0-##	51	9.6	10.0	10.87
FH58A-61S-0.2SHW(##)	CL0580-3803-0-##	61	11.6	12.0	12.87
FH58SA-71S-0.2SHW(##)	CL0580-3826-0-##	71	13.6	14.0	14.87
FH58SA-81S-0.2SHW(##)	CL0580-3825-0-##	81	15.6	16.0	16.87

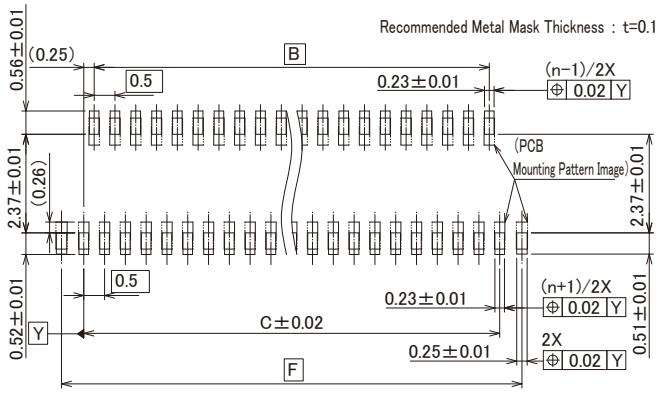
FH58M Series
(P=0.25mm pitch, Standard Actuator Type)

● Recommended PCB Mounting Pattern



Note : 'n' indicates the number of positions.

●Recommended Metal Mask Dimension

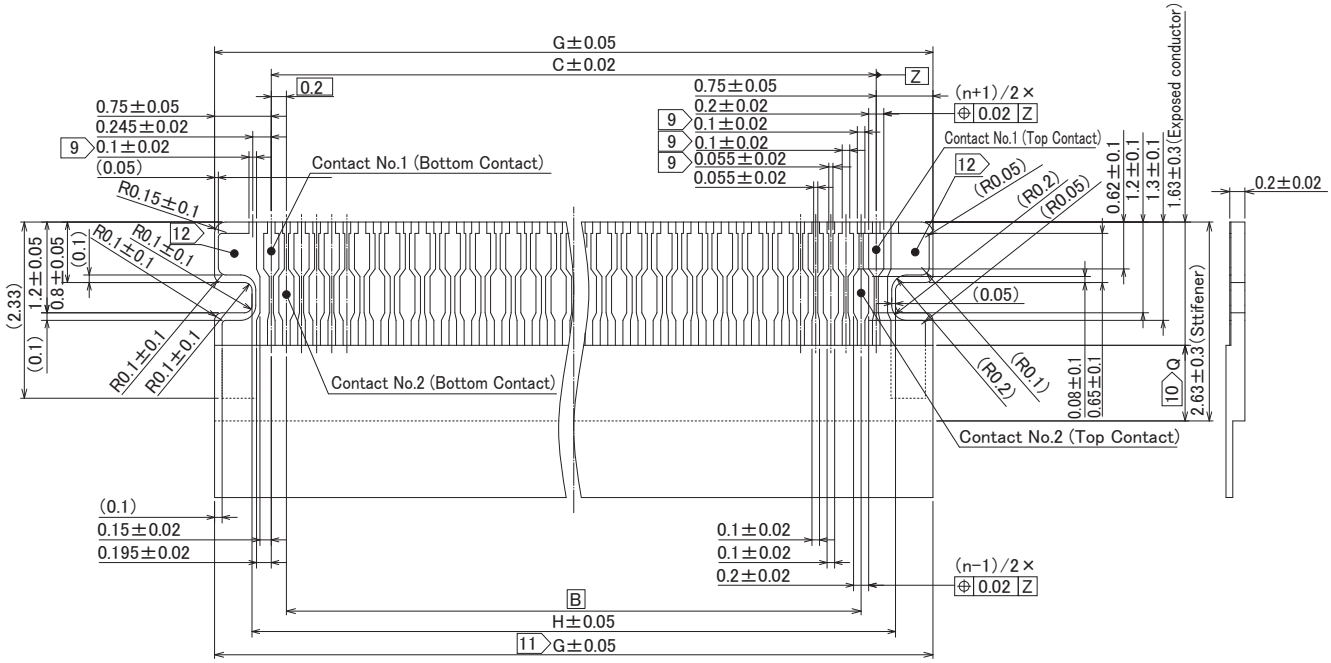


Unit : mm

Part No.	HRS No.	No. of Pos.	B	C	F
FH58M-7S-0.2SHW(##)	CL0580-3811-0-##	7	1.0	1.5	2.52

Recommended FPC

FH58(A) Series
(P=0.2mm pitch, Standard/Long Actuator Type)

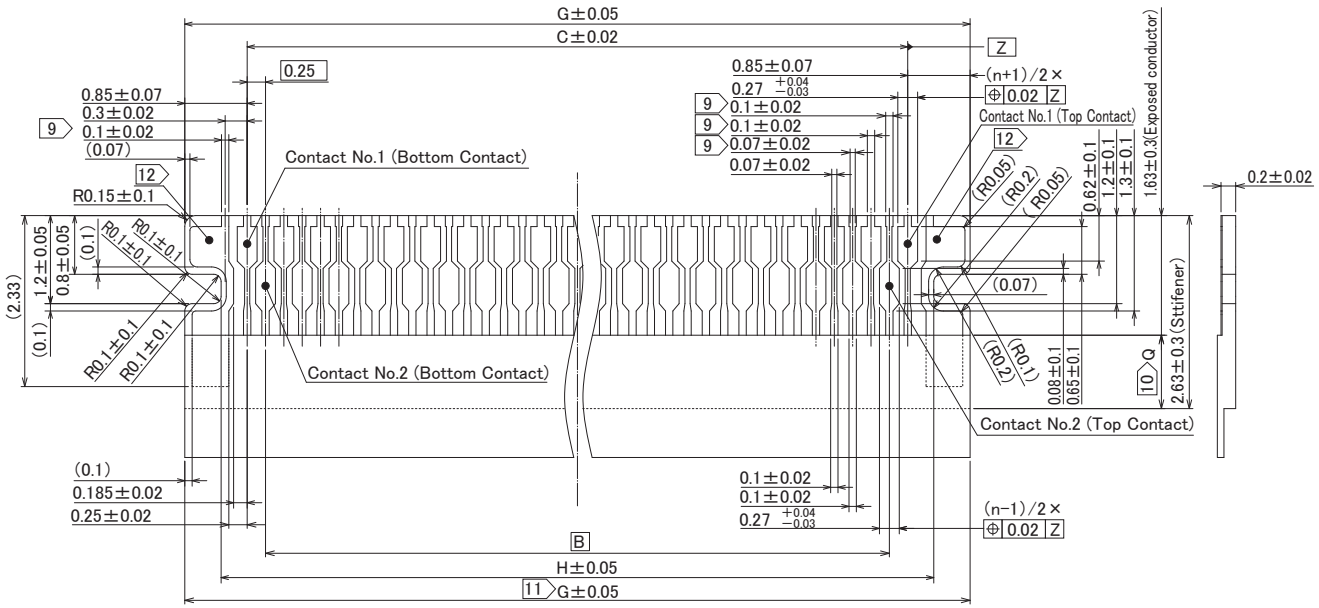


9 Shows recommended dimensions when lead for plating is required.
10 Dimension Q must be 0.5mm Min..
11 Indicated tolerance is applicable to the exposed conductor.
12 Both end sides of contact pad on FPC cannot be used for signal transmission.

Unit : mm

Part No.	HRS No.	No. of Pos.	B	C	G	H
FH58-21S-0.2SHW(##)	CL0580-3812-0-##	21	3.6	4.0	5.5	4.51
FH58S-25S-0.2SHW(##)	CL0580-3828-0-##	25	4.4	4.8	6.3	5.31
FH58-31S-0.2SHW(##)	CL0580-3806-9-##	31	5.6	6.0	7.5	6.51
FH58-35S-0.2SHW(##)	CL0580-3810-0-##	35	6.4	6.8	8.3	7.31
FH58-41S-0.2SHW(##)	CL0580-3801-5-##	41	7.6	8.0	9.5	8.51
FH58-51S-0.2SHW(##)	CL0580-3807-0-##	51	9.6	10.0	11.5	10.51
FH58A-61S-0.2SHW(##)	CL0580-3803-0-##	61	11.6	12.0	13.5	12.51
FH58SA-71S-0.2SHW(##)	CL0580-3826-0-##	71	13.6	14.0	15.5	14.51
FH58SA-81S-0.2SHW(##)	CL0580-3825-0-##	81	15.6	16.0	17.5	16.51

FH58M Series
(P=0.25mm pitch, Standard Actuator Type)



9 Shows recommended dimensions when lead for plating is required.
10 Dimension Q must be 0.5mm Min..
11 Indicated tolerance is applicable to the exposed conductor.
12 Both end sides of contact pad on FPC cannot be used for signal transmission.

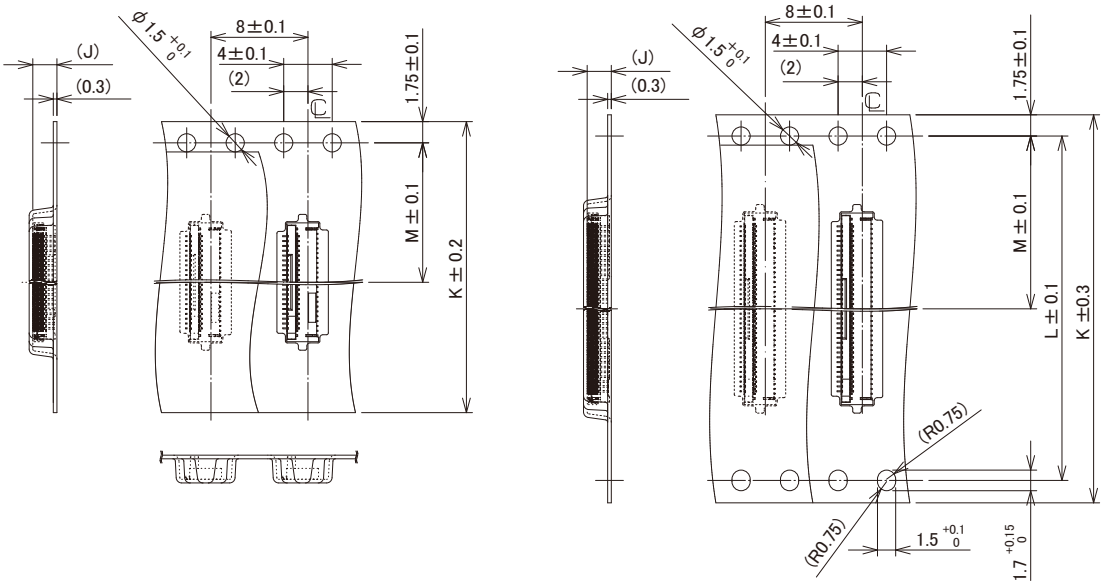
Unit : mm

Part No.	HRS No.	No. of Pos.	B	C	G	H
FH58M-7S-0.2SHW(##)	CL0580-3811-0-##	7	1.0	1.5	3.20	2.21

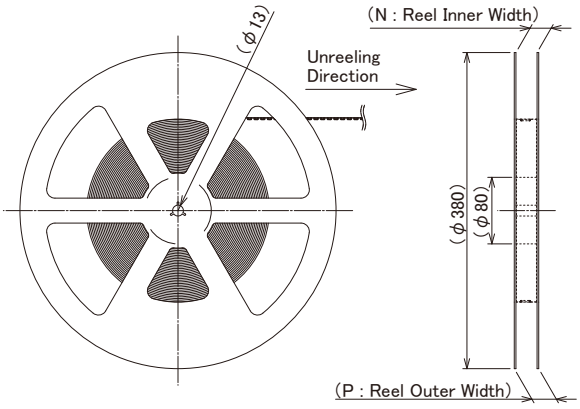
Packaging Specifications

FH58(M) (A) Series
(0.2mm/0.25mm pitch, Standard/Long Actuator Type)

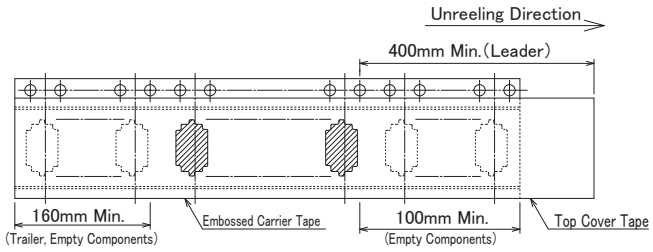
● Embossed Carrier Tape Dimensions



● Reel Dimensions



●Leader, Trailer Dimensions

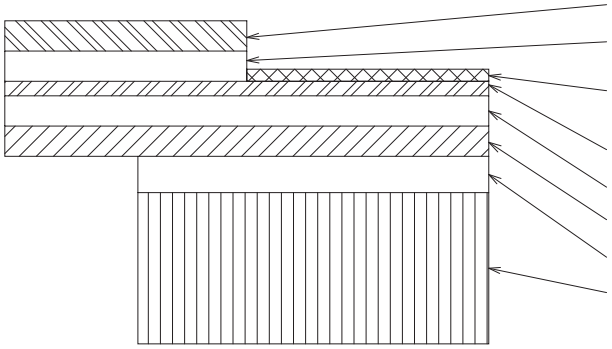


Unit : mm

Part No.	HRS No.	No. of Pos.	J	K	L	M	N	P
FH58-21S-0.2SHW(##)	CL0580-3812-0-##	21	1.69	16.0	-	7.5	17.4	21.4
FH58S-25S-0.2SHW(##)	CL0580-3828-0-##	25						
FH58-31S-0.2SHW(##)	CL0580-3806-9-##	31		24.0		11.5	25.4	29.4
FH58-35S-0.2SHW(##)	CL0580-3810-0-##	35						
FH58-41S-0.2SHW(##)	CL0580-3801-5-##	41						
FH58-51S-0.2SHW(##)	CL0580-3807-0-##	51						
FH58A-61S-0.2SHW(##)	CL0580-3803-0-##	61	1.99	32.0	28.4	14.2	334.0	37.4
FH58SA-71S-0.2SHW(##)	CL0580-3826-0-##	71						
FH58SA-81S-0.2SHW(##)	CL0580-3825-0-##	81						
FH58M-7S-0.25SHW(##)	CL0580-3811-0-##	7	1.69	16.0	-	7.5	17.40	21.4

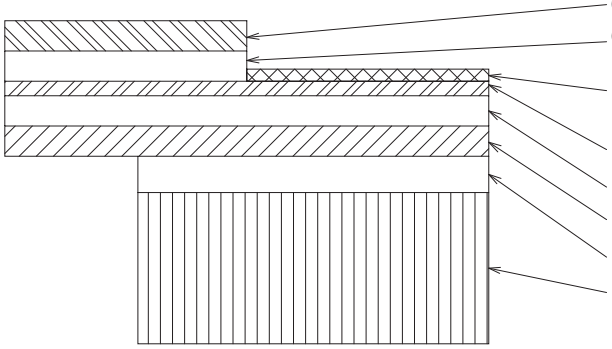
Recommended FPC Construction

FH58(A) Series



Material Name	Material	Thickness(μm)
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 1/2 oz	18
Base Adhesive	Heat-Hardened Adhesive	Non-Adhesive Type
Base Film	Polyimide 1mil	25
Reinforcement Material Adhesive	Heat-Hardened Adhesive	30
Adhesive Stiffener	Polyimide 5mil	125

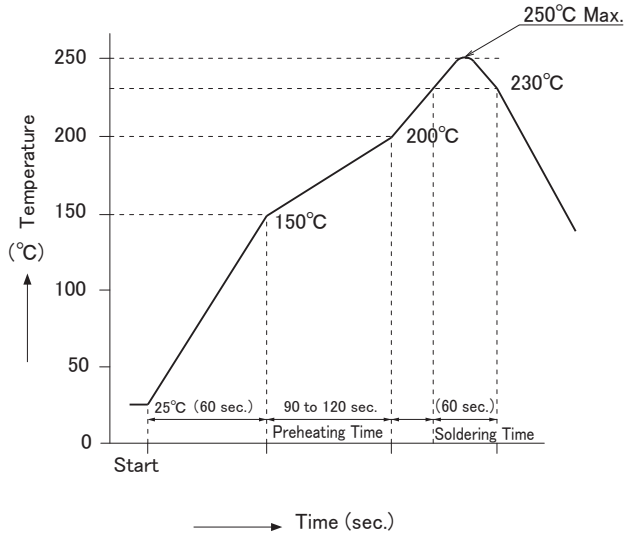
FH58M Series



Material Name	Material	Thickness(μm)
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 oz	35
Base Adhesive	Heat-Hardened Adhesive	25
Base Film	Polyimide 1mil	25
Reinforcement Material Adhesive	Heat-Hardened Adhesive	40
Adhesive Stiffener	Polyimide 3mil	75

Note 1 : This is a reference FPC construction.
Make the thickness of the FPC mated portion 0.2±0.02mm in reference to the FPC construction.
Note 2 : Contact an FPC maker for details on component construction.

Temperature Profile



Applicable Conditions	
Solder Method	Reflow, IR/Hot Air
Environment	Room Air
Solder Composition	Paste Type Sn/3.0Ag/0.5Cu (SENJU METAL INDUSTRY CO., LTD. Part No. : M705-GRN360-K2-V)
Test Board	Material and Size Glass Epoxy 32.85×18.3×1mm "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.

PRODUCT CATALOG

HIROSE ELECTRIC CO.,LTD.

FH64MA Series

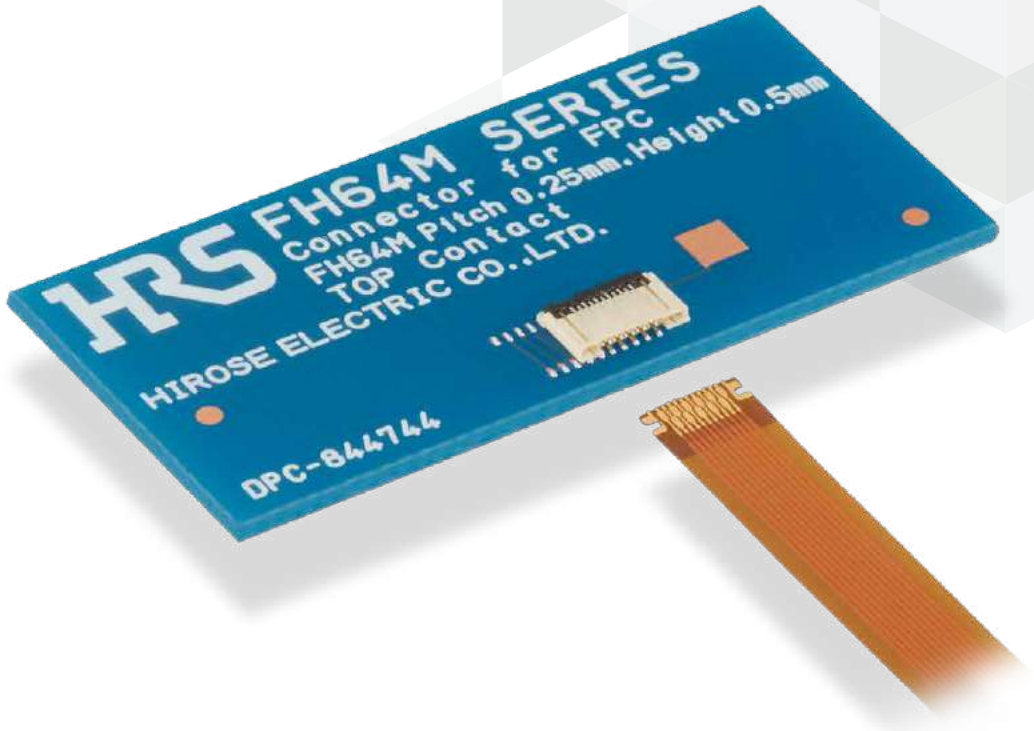
0.25mm Pitch, 0.5mm Height, Top Contact, Super Low Profile Back Flip FPC Connector

FH™ Flip-Lock Pioneer Hirose

P= 0.25mm

Ultra Low Profile

Back Flip

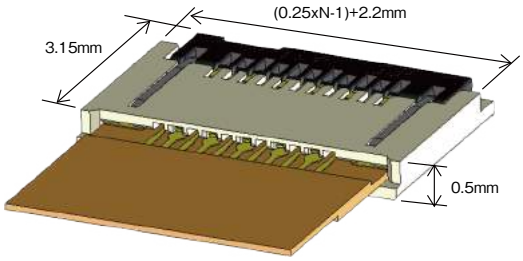


May 2021 ②

Features

1. Super Low Profile, Top Contact Connector

Low profile, top contact connector with a height of 0.5mm.



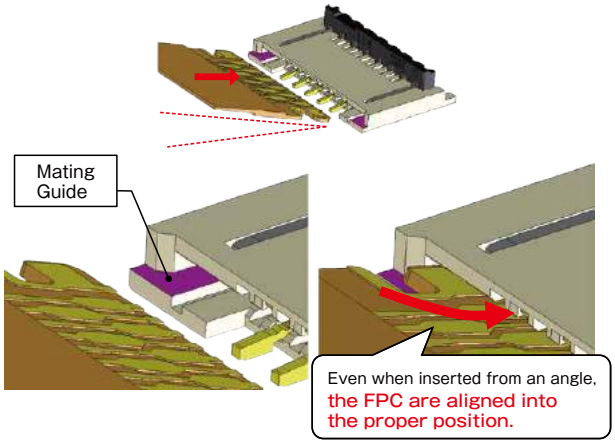
N= Number of Positions

2. Space-saving

A pitch of 0.25mm and width of 3.15mm (when actuator is locked) for ultimate space-saving.

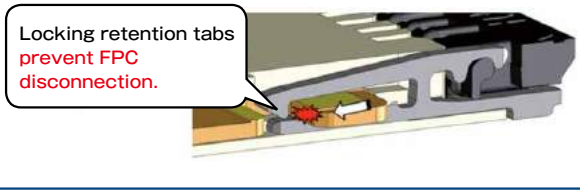
3. Superior FPC Insertion

The mating guides on the connector allow for smooth FPC insertion while maintaining a low product profile.



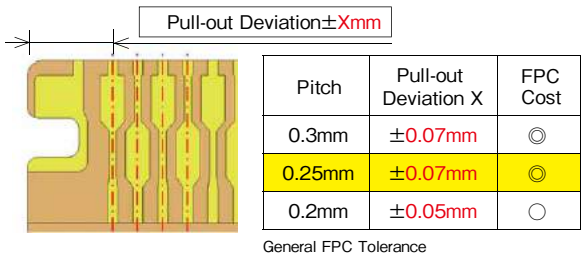
4. High FPC Retention Force

The notches on both sides of the FPC are held by retention tabs for high FPC retention even at smaller pin counts.



5. Narrow Pitch and Easy to Manufacture FPC

With the same deviation tolerance as 0.3mm pitch products at a pitch of 0.25mm, a narrower pitch is possible without increasing the cost.



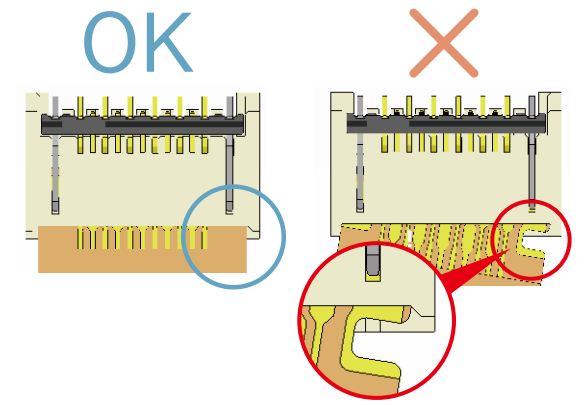
Pitch	Pull-out Deviation X	FPC Cost
0.3mm	±0.07mm	◎
0.25mm	±0.07mm	◎
0.2mm	±0.05mm	○

General FPC Tolerance

General FPC Tolerance

6. Original FPC Mis-Mating Detection Design

FPC insertion status can be checked with the FPC pattern for mis-mating detection.



7. Halogen-free

Connector does not use chlorine or bromine above the standard value.

*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℃
		Operating Humidity Range	Relative humidity 90% RH or less (No Condensation)
Rated Voltage	30V AC/DC	Storage Temperature(Note 2)	-10 to +50℃
		Storage Humidity Range(Note 2)	Relative humidity 90% RH or less (No Condensation)

Compatible FPC Specifications	t＝0.12±0.02mm　Gold Plated

Item	Specifications	Conditions
Insulation Resistance	50M Ω Min.	Measured at 100V DC
Withstanding Voltage	No flashover or insulation breakdown	90V AC for 1 min.
Contact Resistance	200m Ω Max. *Includes FPC resistance.	Measured at 1mA AC
Mating Durability	Contact Resistance : 200m Ω Max. No damage, cracks or part dislocation.	10 times
Vibration Resistance	No electrical discontinuity of 1 μ s Min. Contact Resistance : 200m Ω Max. No damage, cracks or part dislocation.	Frequency : 10 to 55 Hz, single amplitude of 0.75mm, 10 cycles in each of the 3 axis
Shock Resistance	No electrical discontinuity of 1 μ s Min. Contact Resistance : 200m Ω Max. No damage, cracks or part dislocation.	Acceleration of 981m/s^2, 6 ms duration, sine halfwave, 3cycles in each of the 3 axis
Steady State Moisture Resistance	Contact Resistance : 200m Ω Max. Insulation Resistance : 50M Ω Min. No damage, cracks or part dislocation.	Left for 96 hours at 40℃ and humidity of 90 to 95%
Temperature Cycle	Contact Resistance : 200m Ω Max. Insulation Resistance : 50M Ω Min. No damage, cracks or part dislocation.	Temperature : -55 → +15 to +35 → +85 → +15 to +35℃ Time : 30 → 2 to 3 → 30 → 2 to 3 minutes Above conditions repeated for 5 cycles
Soldering Heat Resistance	No deformation in appearance or significant damage to contacts.	Reflow : Refer to the recommended temperature profile Number of reflow times : 2 or less Manual soldering : 350℃± 10℃ for 5 seconds

Note 1 : Includes temperature rise due to current flow.
Note 2 : Storage refers to the long-term storage condition of unused products prior to PCB mounting.
The operating temperature and humidity range are applicable to the non-energized state after PCB mounting.

Materials / Finish

Component	Material	Color/Finish	UL Standard
Insulator	LCP	Beige	UL94V-0
	Polyamide Resin	Black	UL94V-0
Contact	Phosphor Bronze	Nickel Barrier Gold Plated	–
Retention Tab	Phosphor Bronze	Pure Tin Reflow Plated	–

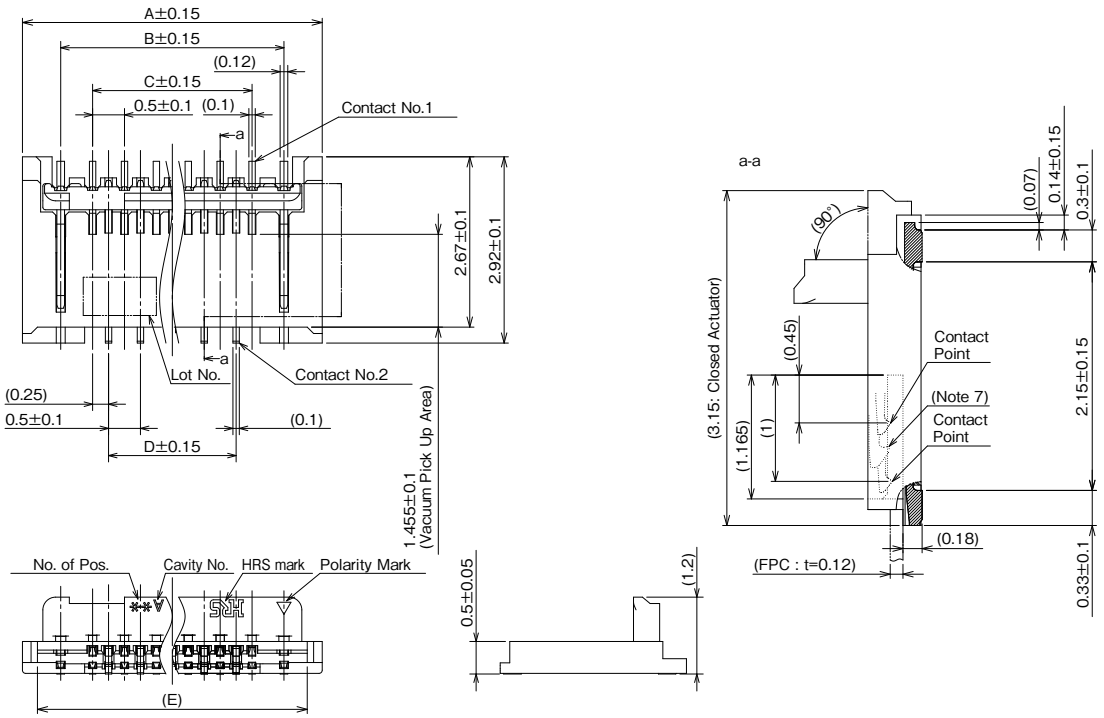
Product Number Structure

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.

FH64MA - ##S - 0.25 SHW (##)
❶ ❷ ❸ ❹ ❺

❶ Series Name	FH64MA	❹ Contact Design	SHW : SMT Horizontal Staggered Mounting Type
❷ No. of Pos.	5-31	❺ Specifications	(00) : Standard, 5,000pcs per reel (99) : 500pcs per reel
❸ Contact Pitch	0.25mm		

Connector Dimensions



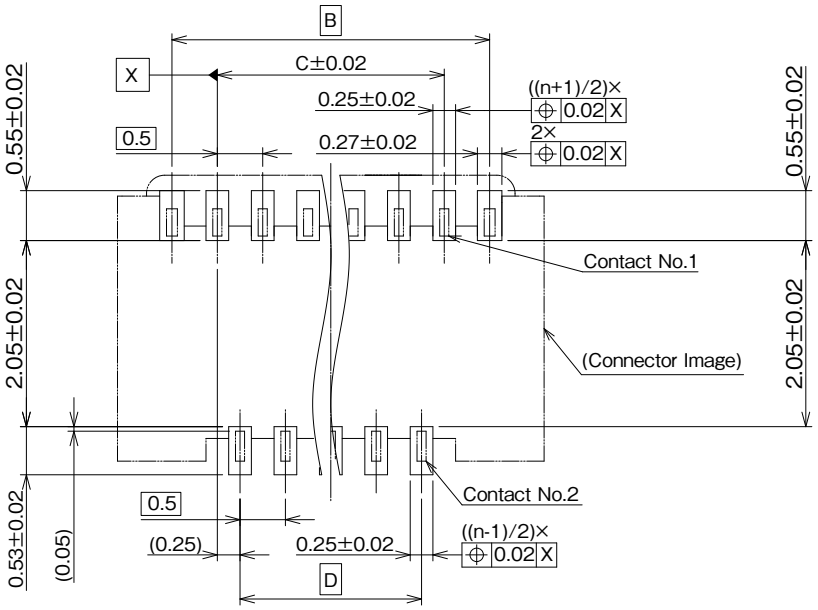
Notes :
1. The dimensions in paretheses are for reference.
2. The coplanarity of the contact and retention tab lead should be 0.1mm Max.
3. Packaged in tape and reel. Check the packaging specifications for details.
4. Sink holes or slits may be added for improvements.
5. Black spots may appear on the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

Unit : mm

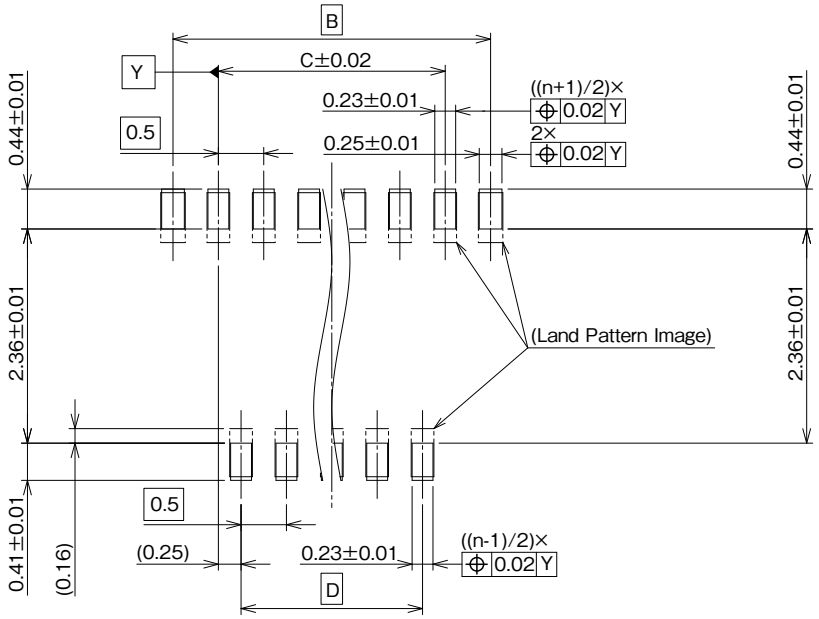
Part No.	HRS No.	No. of Pos.	A	B	C	D	E	Purchase Unit	
								(##) : (00)	(##) : (99)
FH64MA-5S-0.25SHW(##)	CL0580-4643-0-##	5	3.2	2.0	1.0	0.5	2.73	5,000pcs per reel	500pcs per reel
FH64MA-7S-0.25SHW(##)	CL0580-4610-0-##	7	3.7	2.5	1.5	1.0	3.23		
FH64MA-9S-0.25SHW(##)	Under Planning (Note)	9	4.2	3.0	2.0	1.5	3.73		
FH64MA-11S-0.25SHW(##)	CL0580-4612-0-##	11	4.7	3.5	2.5	2.0	4.23		
FH64MA-13S-0.25SHW(##)	Under Planning (Note)	13	5.2	4.0	3.0	2.5	4.73		
FH64MA-15S-0.25SHW(##)	CL0580-4608-0-##	15	5.7	4.5	3.5	3.0	5.23		
FH64MA-17S-0.25SHW(##)	Under Planning (Note)	17	6.2	5.0	4.0	3.5	5.73		
FH64MA-19S-0.25SHW(##)	CL0580-4616-0-##	19	6.7	5.5	4.5	4.0	6.23		
FH64MA-21S-0.25SHW(##)	Under Planning (Note)	21	7.2	6.0	5.0	4.5	6.73		
FH64MA-23S-0.25SHW(##)	Under Planning (Note)	23	7.7	6.5	5.5	5.0	7.23		
FH64MA-25S-0.25SHW(##)	CL0580-4642-0-##	25	8.2	7.0	6.0	5.5	7.73		
FH64MA-31S-0.25SHW(##)	Under Planning (Note)	31	9.7	8.5	7.5	7.0	9.23		

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

Recommended Land Pattern



Recommended Metal Mask Dimensions



Note 8 : 'n' represents the number of positions.

Unit : mm

Part No.	HRS No.	No. of Pos.	B	C	D
FH64MA-5S-0.25SHW(##)	CL0580-4643-0-##	5	2.0	1.0	0.5
FH64MA-7S-0.25SHW(##)	CL0580-4610-0-##	7	2.5	1.5	1.0
FH64MA-9S-0.25SHW(##)	Under Planning (Note)	9	3.0	2.0	1.5
FH64MA-11S-0.25SHW(##)	CL0580-4612-0-##	11	3.5	2.5	2.0
FH64MA-13S-0.25SHW(##)	Under Planning (Note)	13	4.0	3.0	2.5
FH64MA-15S-0.25SHW(##)	CL0580-4608-0-##	15	4.5	3.5	3.0
FH64MA-17S-0.25SHW(##)	Under Planning (Note)	17	5.0	4.0	3.5
FH64MA-19S-0.25SHW(##)	CL0580-4616-0-##	19	5.5	4.5	4.0
FH64MA-21S-0.25SHW(##)	Under Planning (Note)	21	6.0	5.0	4.5
FH64MA-23S-0.25SHW(##)	Under Planning (Note)	23	6.5	5.5	5.0
FH64MA-25S-0.25SHW(##)	CL0580-4642-0-##	25	7.0	6.0	5.5
FH64MA-31S-0.25SHW(##)	Under Planning (Note)	31	8.5	7.5	7.0

Note : Products without HRS No. are currently being planned for development.
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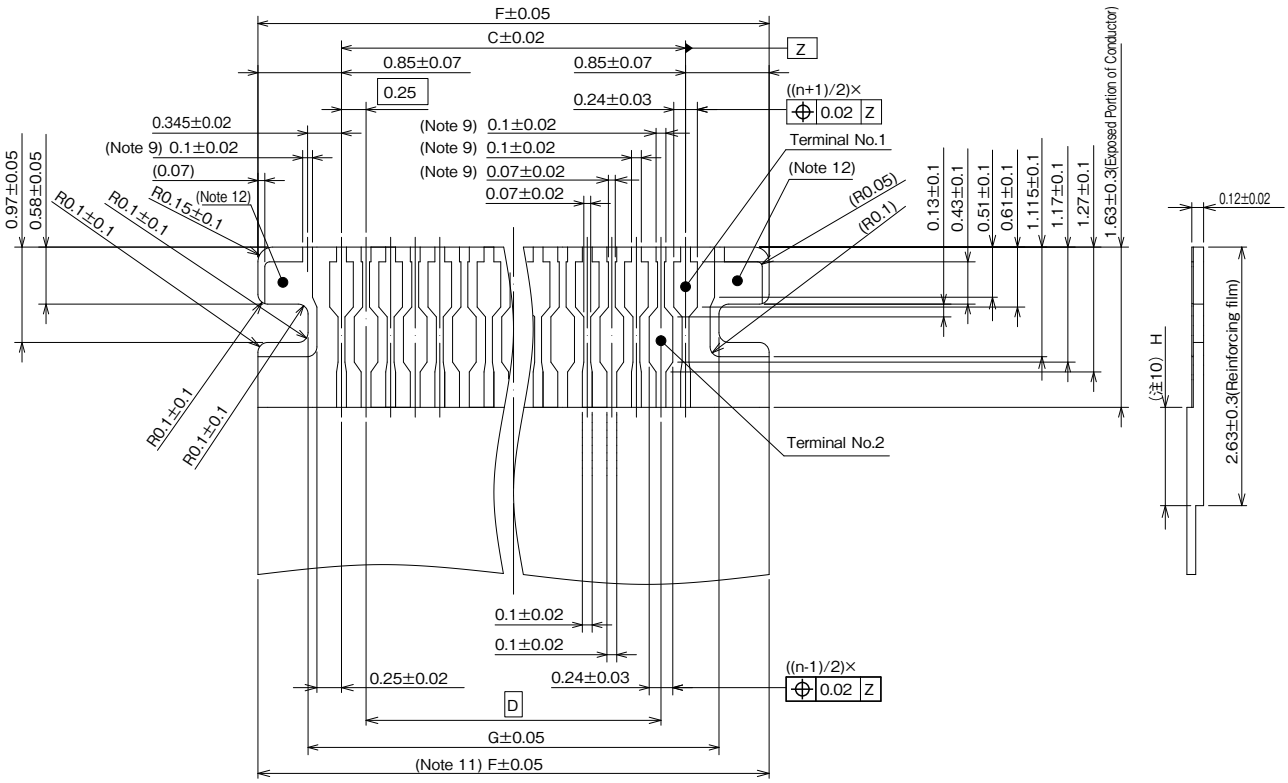
Recommended FPC Dimensions



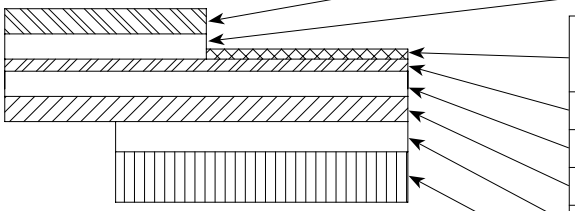
Note 9 : Shows recommended dimensions when plating lead is required.
Note 10 : When designing the FPC, keep Dimension H 0.5mm or greater.
Note 11 : Indicated tolerance is applicable to the exposed conductor.
Note 12 : Both ends of the contact pad on the FPC cannot be used for signal contacts.

Unit : mm

Part No.	HRS No.	No. of Pos.	C	D	F	G
FH64MA-5S-0.25SHW(##)	CL0580-4643-0-##	5	1.0	0.5	2.7	1.68
FH64MA-7S-0.25SHW(##)	CL0580-4610-0-##	7	1.5	1.0	3.2	2.18
FH64MA-9S-0.25SHW(##)	Under Planning (Note)	9	2.0	1.5	3.7	2.68
FH64MA-11S-0.25SHW(##)	CL0580-4612-0-##	11	2.5	2.0	4.2	3.18
FH64MA-13S-0.25SHW(##)	Under Planning (Note)	13	3.0	2.5	4.7	3.68
FH64MA-15S-0.25SHW(##)	CL0580-4608-0-##	15	3.5	3.0	5.2	4.18
FH64MA-17S-0.25SHW(##)	Under Planning (Note)	17	4.0	3.5	5.7	4.68
FH64MA-19S-0.25SHW(##)	CL0580-4616-0-##	19	4.5	4.0	6.2	5.18
FH64MA-21S-0.25SHW(##)	Under Planning (Note)	21	5.0	4.5	6.7	5.68
FH64MA-23S-0.25SHW(##)	Under Planning (Note)	23	5.5	5.0	7.2	6.18
FH64MA-25S-0.25SHW(##)	CL0580-4642-0-##	25	6.0	5.5	7.7	6.68
FH64MA-31S-0.25SHW(##)	Under Planning (Note)	31	7.5	7.0	9.2	8.18

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 Construction

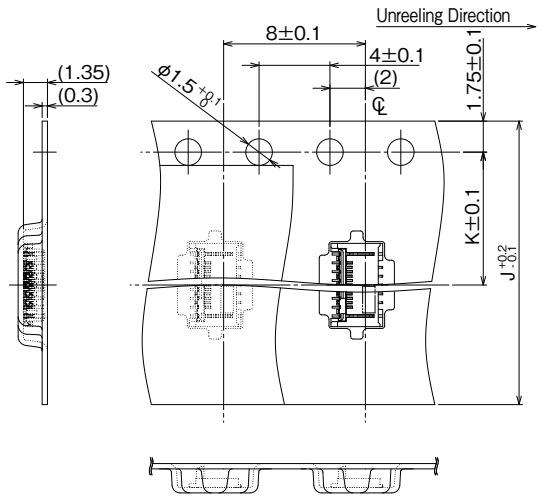


Material Name	Material	Thickness(μm)
Cover Film Layer	Polymind 1mil	25
Cover Adhesive		25
Surface Treatment	1μm to 6μm nickel underplated, 0.2μm gold plated	(4)
Copper Foil	Cu 1/2oz	18
Base Adhesive	Thermosetting Adhesive	No adhesive
Base Film	Polymide 1mil	25
Reinforcement Adhesive	Thermosetting Adhesive	30
Reinforcement Film	Polymide 2mil	50

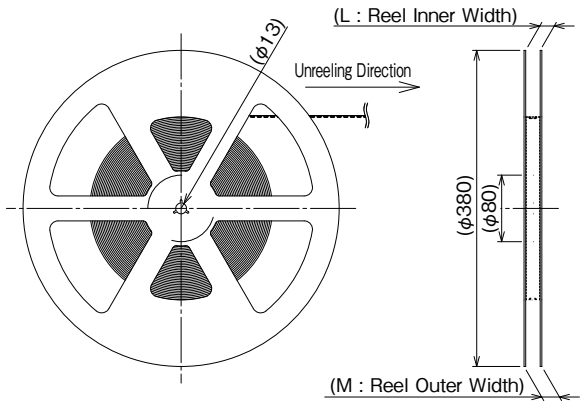
Note 1 : This is a reference FPC construction.
Make the thickness of the FPC mated portion 0.12±0.02mm in reference to the FPC construction.
Note 2 : Contact an FPC maker for details on component construction.

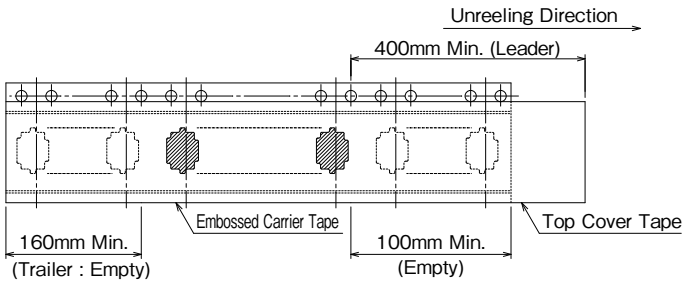
Packaging Specifications

● Embossed Carrier Tape Dimensions



● Reel Dimensions



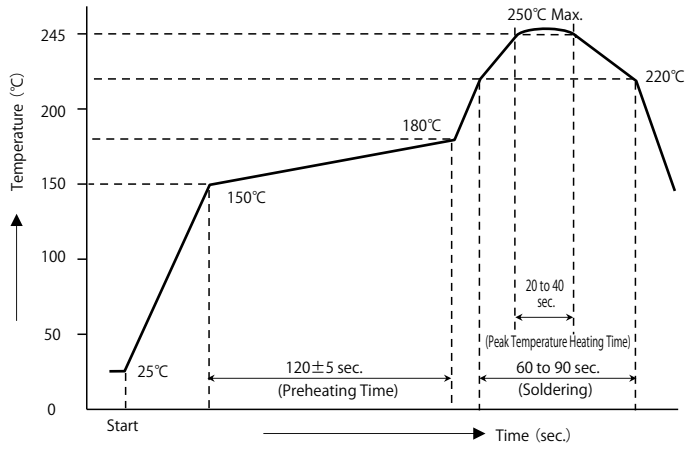


Unit : mm

Part No.	HRS No.	No. of Pos.	J	K	L	M
FH64MA-5S-0.25SHW(##)	CL0580-4643-0-##	5	16.0	7.5	17.4	21.4
FH64MA-7S-0.25SHW(##)	CL0580-4610-0-##	7	16.0	7.5	17.4	21.4
FH64MA-9S-0.25SHW(##)	Under Planning (Note)	9	16.0	7.5	17.4	21.4
FH64MA-11S-0.25SHW(##)	CL0580-4612-0-##	11	16.0	7.5	17.4	21.4
FH64MA-13S-0.25SHW(##)	Under Planning (Note)	13	16.0	7.5	17.4	21.4
FH64MA-15S-0.25SHW(##)	CL0580-4608-0-##	15	16.0	7.5	17.4	21.4
FH64MA-17S-0.25SHW(##)	Under Planning (Note)	17	16.0	7.5	17.4	21.4
FH64MA-19S-0.25SHW(##)	CL0580-4616-0-##	19	16.0	7.5	17.4	21.4
FH64MA-21S-0.25SHW(##)	Under Planning (Note)	21	24.0	11.5	25.4	29.4
FH64MA-23S-0.25SHW(##)	Under Planning (Note)	23	24.0	11.5	25.4	29.4
FH64MA-25S-0.25SHW(##)	CL0580-4642-0-##	25	24.0	11.5	25.4	29.4
FH64MA-31S-0.25SHW(##)	Under Planning (Note)	31	24.0	11.5	25.4	29.4

Note : 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

Reflow Method :	IR/Hot Air
Reflow Environment :	Room Air
Solder :	Paste SN/3.0Ag/0.5Cu (Senju Metal Industry, Co. Ltd Part Number: M705-GRN360-K2-V)
Test Board :	Test Board Material and Size Glass epoxy 32.85 × 15.7 × 1mm Land size as listed on "Recommended Land Pattern".
Metal Mask :	Recommended thickness and aperture dimensions as listed on "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

[Operating Method]

This connector is a compact, low profile product and requires care during handling.
Check the following before use.

1. Initial Delivery State

Since the product is delivered with the actuator open, there is no need to operate the actuator before FPC insertion.

[Cautions]

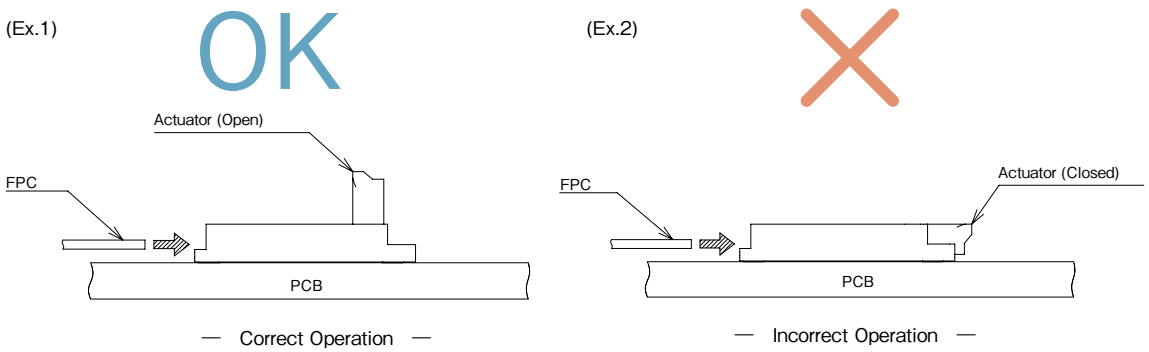
・Do not close the actuator without the FPC inserted.
Closing the actuator without the FPC inserted causes the contact gap to narrow and may result in a higher FPC insertion force.
・Do not operate the connector while it is not mounted on the board.

2. FPC Insertion Method

Insert the FPC fully to the back of the connector and parallel in respect to the board. (Ex.1)

[Cautions]

・Do not insert the FPC while the actuator is closed. (Ex.2)
・Do not twist upwards or downwards or to either side during FPC insertion.

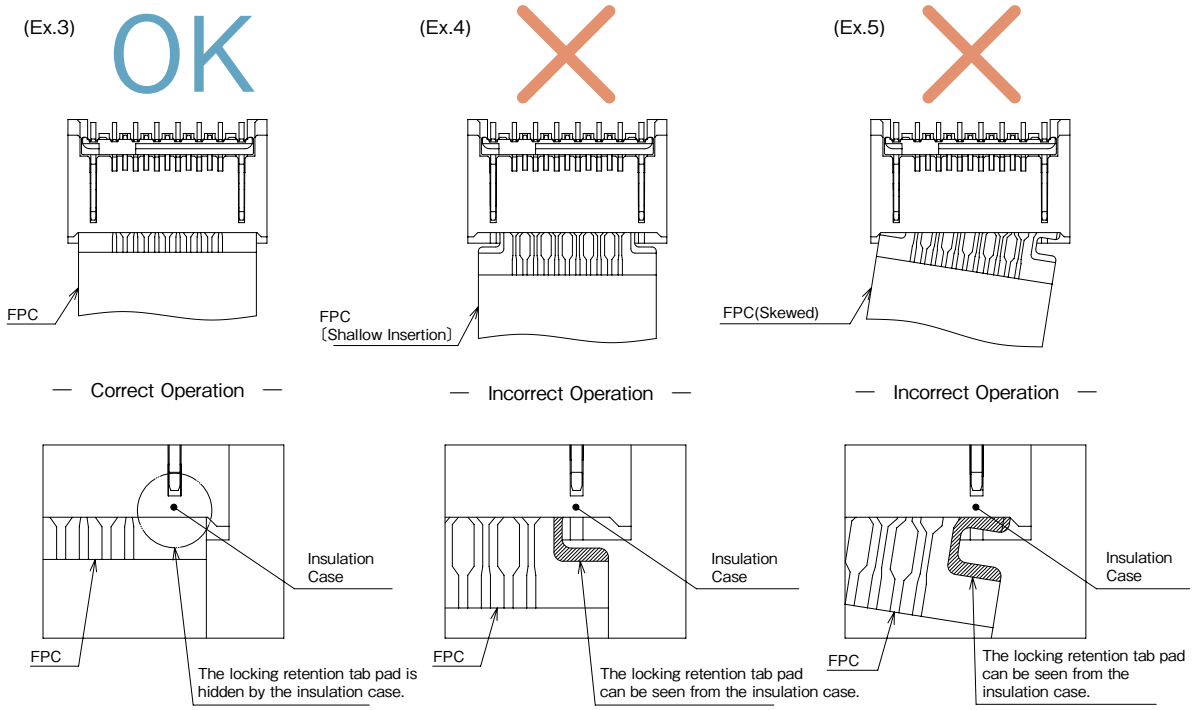


3. FPC Insertion Confirmation

Visually confirm the insertion status once FPC insertion is completed. (Ex. 3)

[Caution]

・Avoid shallow insertion or insertion at a slant. (Ex. 4) (Ex. 5)



4. Actuator Locking Method

The actuator rotates at its center.

After FPC insertion, operate the actuator by rotating it 90°.

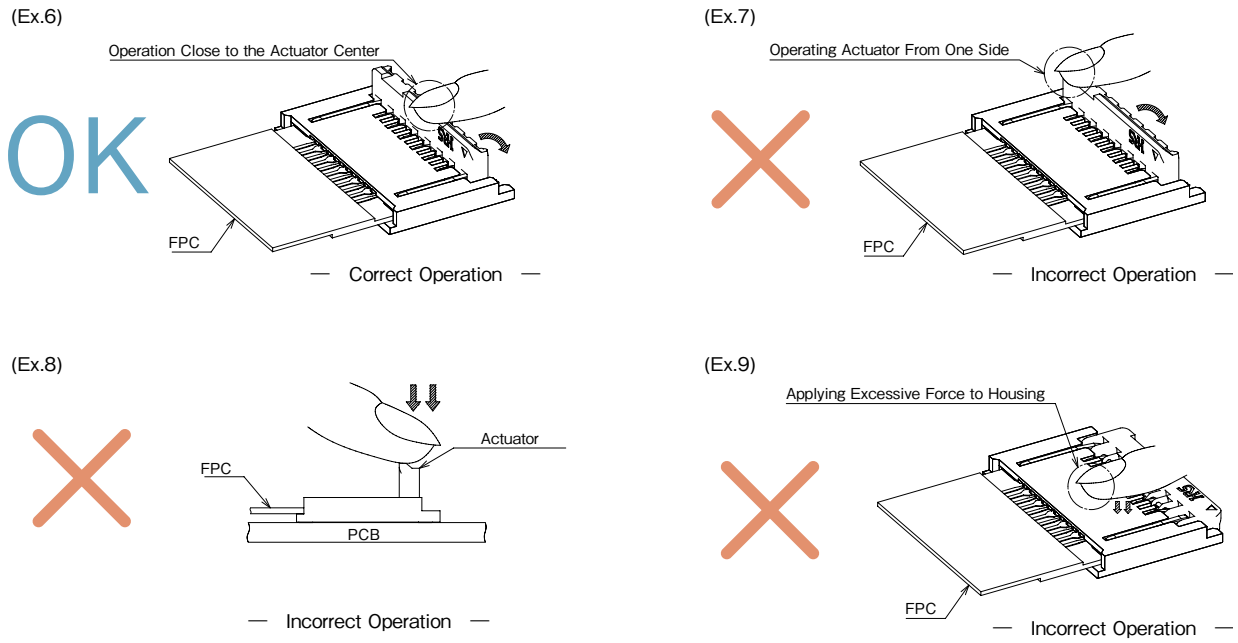
[Cautions]

・When locking, operate the actuator close to its center. (Ex. 6)

・When locking, do not operate the actuator only on one side. (Ex. 7)

・Do not operate the actuator by pushing from above. (Ex. 8)

・Do not apply excessive force to the housing during operation. (Ex. 9)



5. Actuator Lock Release Method

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

[Cautions]

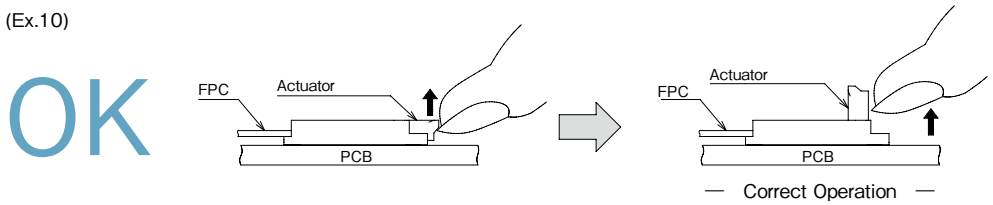
・When unlocking, operate the actuator close to its center. (Ex.11)

・When unlocking, do not operate the actuator on only one side. (Ex.12)

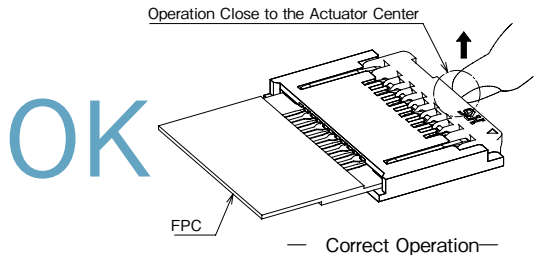
・The actuator only opens to 90°.Do not try to open the actuator above this angle. (Ex.13)

・This connector has a back flip design. The FPC insertion direction and actuator opening are in different directions. Do not attempt to open the actuator from the FPC insertion side. (Ex.14)

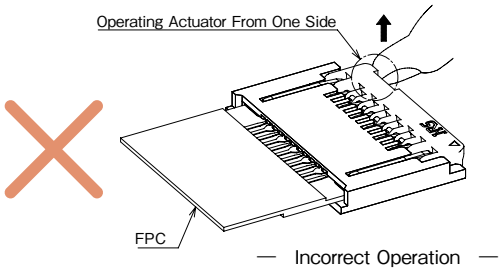
(Ex.10)



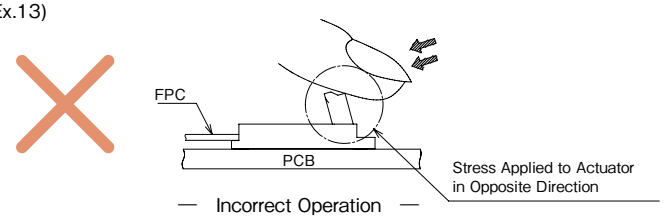
(Ex.11)



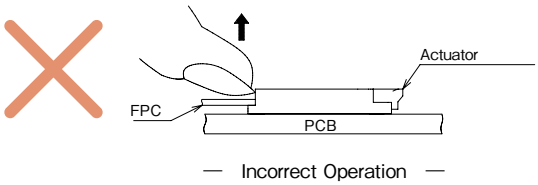
(Ex.12)



(Ex.13)



(Ex.14)



6. FPC Removal Method

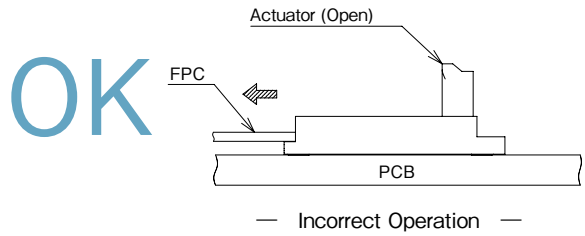
After releasing the actuator lock, pull the FPC out in the horizontal direction. (Ex. 15)

[Cautions]

・Do not apply stress in the upward direction or the sides when removing the FPC. (Ex. 16)

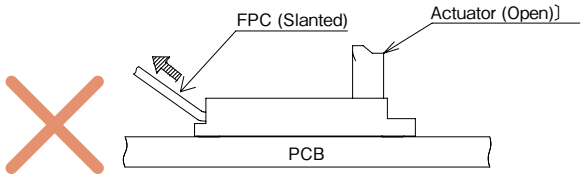
・Do not pull out the FPC while the actuator is locked. (Ex. 17)

(Ex.15)



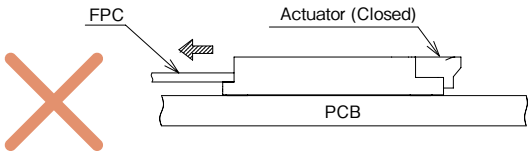
— Incorrect Operation —

(Ex.16)



— Incorrect Operation —

(Ex.17)



— Incorrect Operation —

7. FPC Routing

Depending on how the FPC that will be mated is routed, stress may be applied to the connector, resulting in poor performance including contact failure. In order to prevent failure, please consider the following when designing.

[Cautions]

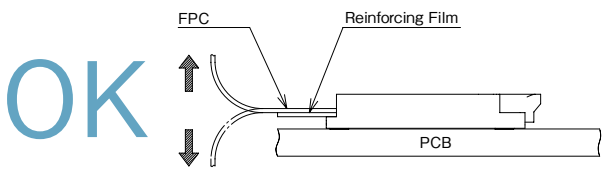
・When routing the FPC for use, make sure it has enough slack and do not pull tightly. Make sure that the reinforcing film is horizontal to the board surface. (Ex. 18)

・Make sure not to apply stress to the connector in the pulling, inserting or lateral directions. (Ex. 19) (Ex. 20)

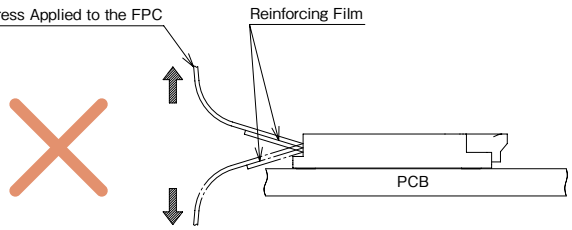
・When routing the FPC for use, route it so that stress is not directly applied to the connector. (Ex. 19)

・Do not place mounted parts that interfere with the FPC. (Ex. 21)

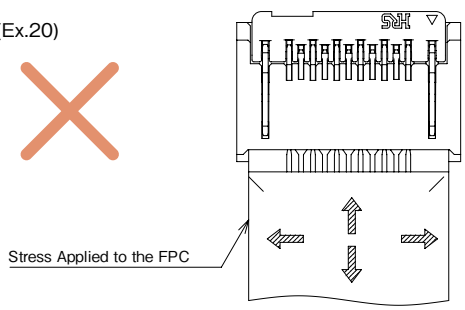
(Ex.18)



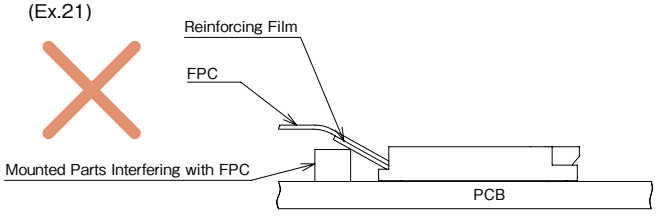
(Ex.19)



(Ex.20)



(Ex.21)



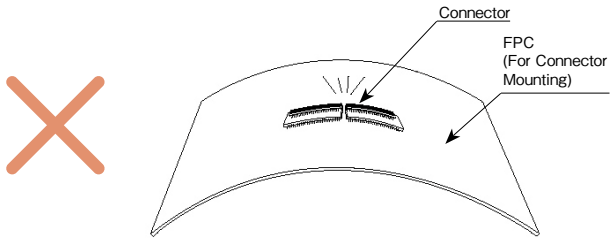
[PCB Mounting Cautions]

● PCB Warpage
Minimize PCB warpage as much as possible.
Lead co-planarity is 0.1mm or less, however too much warpage may result in a soldering failure.

● Mounting to FPC
When mounting on the FPC, be sure to install a reinforcing plate that is easy to handle.
A glass epoxy material with a thickness of 0.3mm Min. is recommended.

● Stress to Connector
Do not apply an external force of 0.5N or more prior to mounting as it may result in connector damage.
Additionally, do not insert the FPC or operate the connector prior to 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 be damaged.



● Cautions for Manual Soldering
Note the following when performing soldering during repair, etc.

①Do not perform reflow or manual soldering with the FPC inserted in the connector.
②Do not apply excessive heat to the connector or let the soldering iron in contact with any parts other than the contact leads. Failure to do so may result in connector deformation or melting.
③Do not supply excessive solder (flux).
If excessive solder (flux) is applied to the contacts solder or flux may adhere to the contacts or the rotating portion of the actuator, resulting in poor contact or poor actuator rotation.
Supplying excessive solder to the locking retention tabs may result in actuator rotation failure, causing connector damage.

PRODUCT CATALOG

HIROSE ELECTRIC CO.,LTD.

FH69 Series

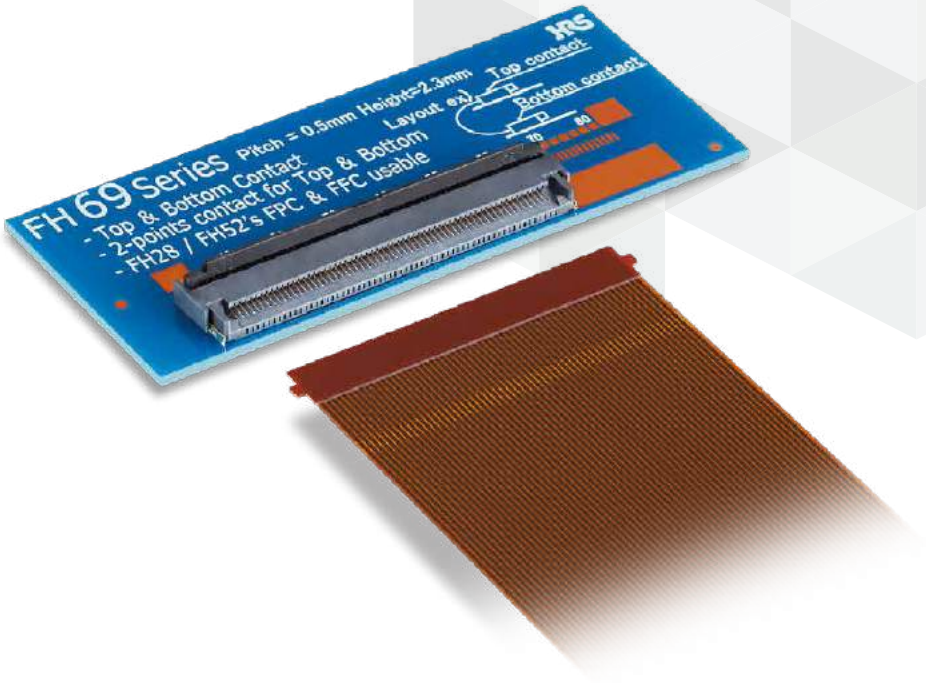
0.5mm Pitch, 2.3mm Height, Top and Bottom Independent 2-point Contact, 125℃ Heat Resistance FPC/FFC Connector

FH™ Flip-Lock Pioneer Hirose

P= 0.5 mm
P= 0.5mm

Top/Bottom Contact

Automotive



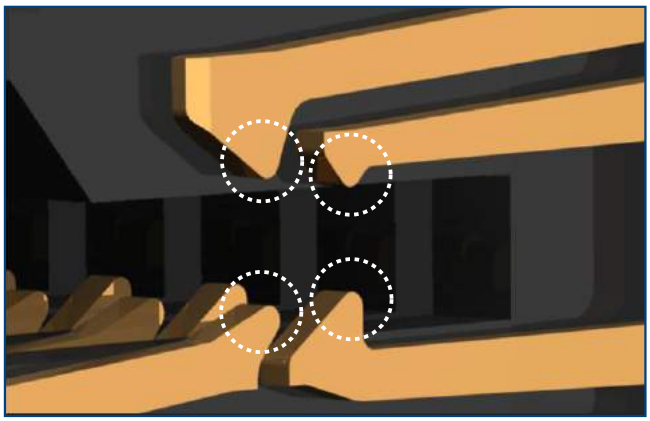
NEW

Sep. 2021

Features

1. Industry's first top and bottom 2-point contact design prevents dust intrusion.

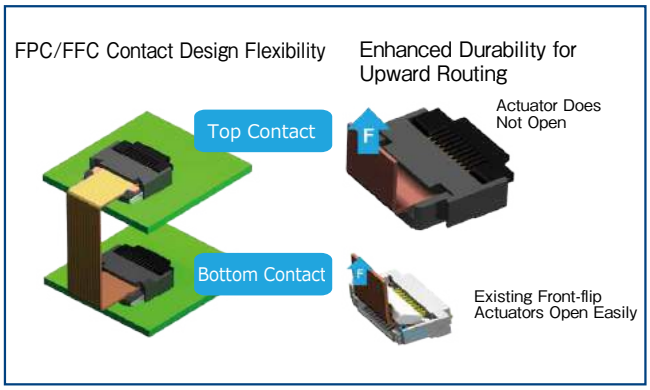
The top and bottom two-point contacts with springs prevent dust intrusion and enhance contact reliability.



2-point contacts on the top and bottom prevent dust.

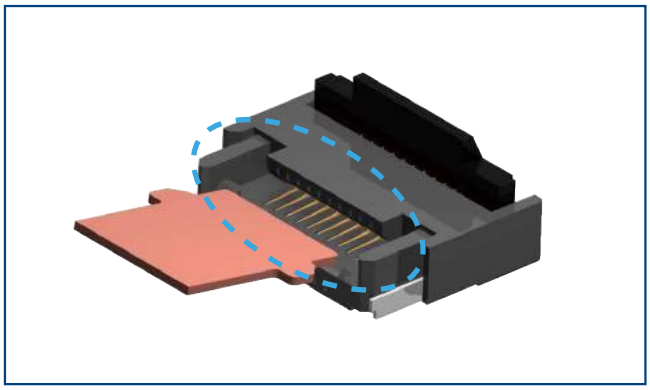
2. Greater Design Flexibility

Can be used with both top and bottom contacts for enhanced product design.
Additionally, FH69's back flip design greatly increases the FPC/FFC retention force in the vertical direction.



3. Improved Workability

Even with the back-flip design, FH69 has a wide mating port like existing front-flip types for easy FPC/FFC insertion. Additionally, since the product is delivered with the actuator open, mating is completed in the two simple steps of 1. FPC/FFC insertion, and 2. Closing the actuator.



Wide Mating Port Even with Back-flip Design

4. FPC/FFC Mis-mating detection

Can detect mis-mating after FPC/FFC insertion by checking the location of the FPC/FFC tabs.

5. Reduced switching time

Compatible with the FPC/FFC and land pattern of 0.5mm pitch standard products FH28/FH28K/FH52K/FH52T/FH75 for easy replacement when top contact or vertical routing are required.

*Consult a Hirose representative about competitor products.

6. 125℃ Heat Resistance

Ideal for applications requiring 125℃ heat resistance

*When using FFC the heat resistance is up to 105℃. When the heat resistance of the FPC/FFC is less than 125 ℃ for FPC and 105℃ for FFC, the heat resistance of the FPC/FFC is applicable.

7. Passes Strict Automotive Testing Requirements

FH69 passes rigorous tests for various automotive applications.

(Ex. : Temperature Cycle)
Temperature : -55 → +15 to +35 → +125
→ +15 to 35℃
Time : 30 → 2 to 3 → 30 → 2 to 3min.
1000 cycles repeated under the above conditions

8. Halogen-Free

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

*As defined by IEC61249-2-21
Br-900ppm maximum, Cl-900ppm maximum,
Cl + Br combined-1,500ppm maximum

Product Specifications

Rated Current	0.5A	Operating Temperature (Note 1)(Note 2)	-55 to +125℃
Rated Voltage	50V AC/DC	Operating Humidity Range	RH 90% Max. (No Condensation)
		Storage Temperature (Note 3)	-10 to +50℃
		Storage Humidity Range (Note 3)	RH 90% Max. (No Condensation)

Recommended FPC/FFC Specifications	t=0.3±0.05mm, Gold Plated

Item	Specifications	Conditions
Insulation Resistance	500MΩ Min.	Measured at 100V DC
Withstanding Voltage	No flashover or insulation breakdown	150V AC for 1 min.
Contact Resistance	Initial : 50mΩ, After Testing: 70mΩ Max. Includes FPC/FFC conductor resistance.	Measured at 1mA (DC or 1000Hz)
Mating Durability	Contact Resistance : 70mΩ Max. No damage, cracks or part dislocation.	10 times
Vibration Resistance	No electrical discontinuity of 1μs Min. Contact Resistance : 70mΩ Max. No damage, cracks or part dislocation.	Frequency : 10 to 55 Hz, single amplitude of 0.75mm, 10 cycles in each of the 3 axis
Shock Resistance	No electrical discontinuity of 1μs Min. Contact Resistance : 70mΩ Max. No damage, cracks or part dislocation.	Acceleration of 981m/s^2, 6 ms duration, sine halfwave, 3 cycles in each of the 3 axis
Steady-state Moisture Resistance	Contact Resistance : 70mΩ Max. Insulation Resistance : 50MΩ Min. No damage, cracks or part dislocation.	Left for 1000 hours at 60℃ and humidity of 90 to 95%
Temperature Cycle	Contact Resistance : 70mΩ Max. Insulation Resistance : 50MΩ Min. No damage, cracks or part dislocation.	Temperature : -55 → +15 to +35 → +125 → +15 to +35℃ Time : 30 → 2 to 3 → 30 → 2 to 3 minutes Above conditions repeated for 5 cycles
Solder Heat Resistance	No deformation in appearance or significant damage to contacts.	Reflow : At the recommended temperature profile Manual soldering : 400℃± 10℃ for 5 seconds

Note 1 : Includes the temperature rise due to current flow.
Note 2 : When using FFC the heat resistance is up to 105℃. When the heat resistance of the FPC/FFC is less than 125℃ for FPC and 105℃ for FFC, the heat resistance of the FPC/FFC is applicable.
Note 3 : Storage refers to long-term storage of products before board mounting. The operating temperature and humidity apply to the non-energized state after mounting.

Material and Finish

Component	Material	Finish/Remarks	UL Standard
Insulation Case	LCP	Gray	UL94V-0
Actuator	PA 9T	Black	
Contact	Copper Alloy	Partially Gold Plated	–
Retention Tab	Brass	Pure Tin Reflow Plating	

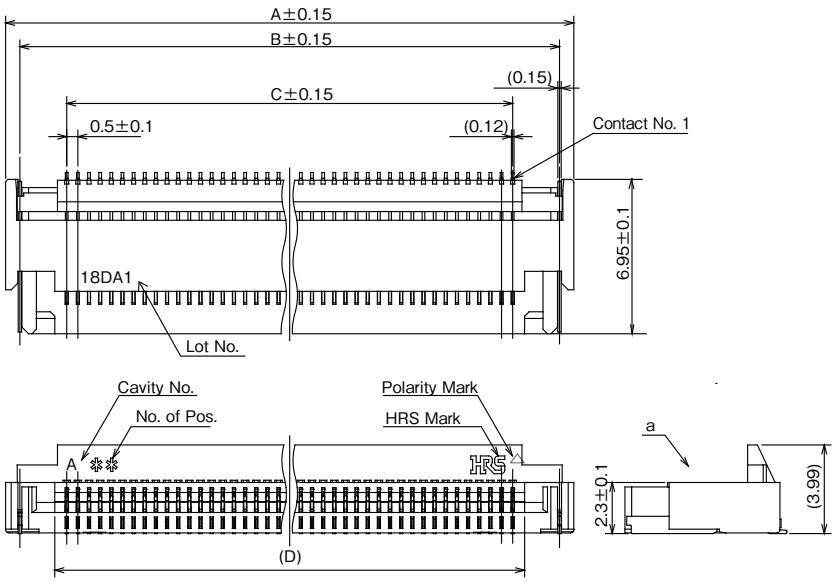
Part Number Structure

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.

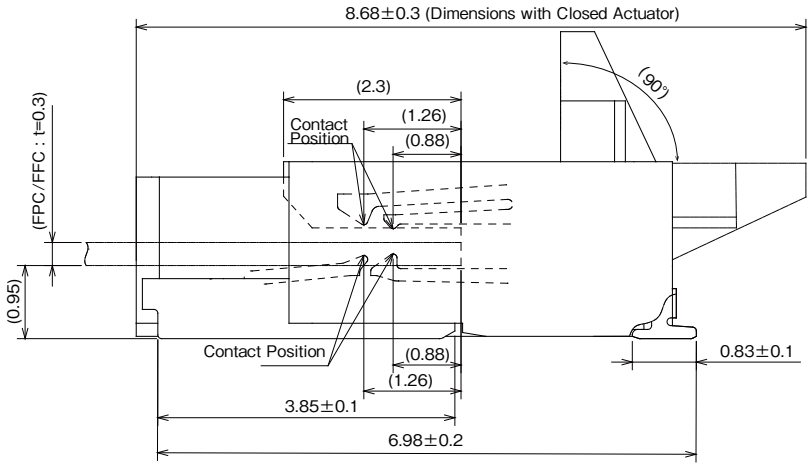
FH69 - 60S - 0.5 SH (##)
① ② ③ ④ ⑤

① Series Name	FH69	④ Termination Type	SH : SMT Horizontal Mounting Type
② No. of Pos.	60	⑤ Specifications	(00) : Standard (1,000pcs) (99) : 500pcs
③ Contact Pitch	0.5mm		

Connector Dimensions



Detailed View a



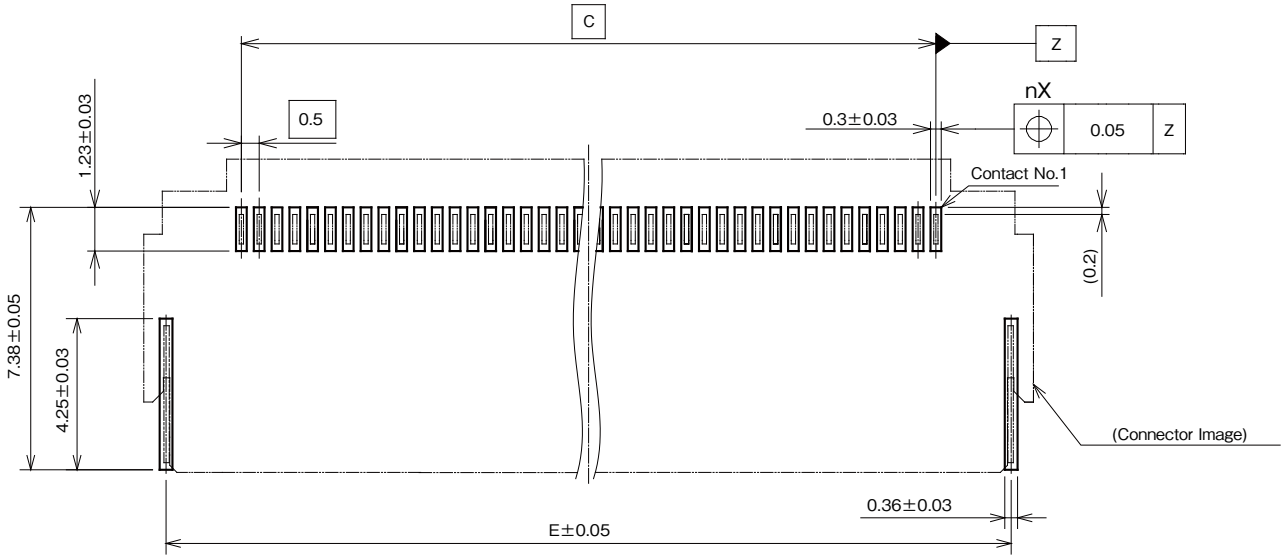
Note 1 : The dimensions in parenthesis are for reference.
Note 2 : The coplanarity of the contact and retention tab lead should be 0.1mm Max.
Note 3 : Packaged in tape and reel. Check the packaging specifications for details.
Note 4 : Sink holes may be added for improvements.
Note 5 : This product is 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	Purchase Unit (##) : (00)	Purchase Unit (##) : (99)
FH69-10S-0.5SH(##)	Under Planning (Note)	10	9.98	8.7	4.5	5.57	1,000pcs per reel	500pcs per reel
FH69-20S-0.5SH(##)	Under Planning (Note)	20	14.98	13.7	9.5	10.57		
FH69-30S-0.5SH(##)	Under Planning (Note)	30	19.98	18.7	14.5	15.57		
FH69-40S-0.5SH(##)	Under Planning (Note)	40	24.98	23.7	19.5	20.57		
FH69-50S-0.5SH(##)	Under Planning (Note)	50	29.98	28.7	24.5	25.57		
FH69-60S-0.5SH(##)	CL0580-5007-0-##	60	34.98	33.7	29.5	30.57		

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

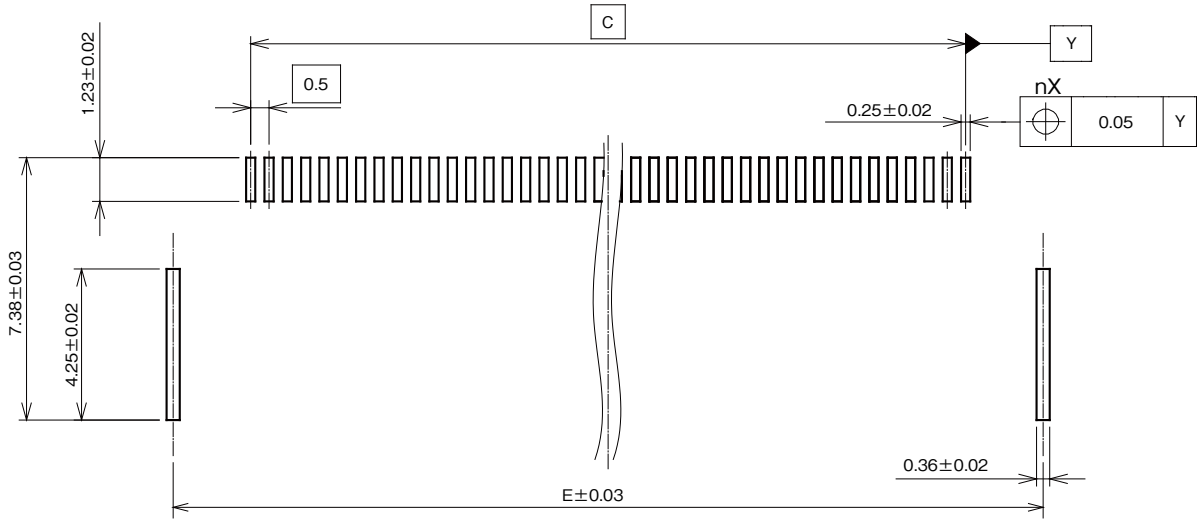
●Recommended PCB Layout



Note : 'n' indicated the number of positions.

*Can also be mounted using the recommended land pattern of FH28/FH28K/FH52K/FH52T/FH75 Series.

●Recommended Metal Mask Dimensions



(Recommended Metal Mask Thickness : t=0.12)

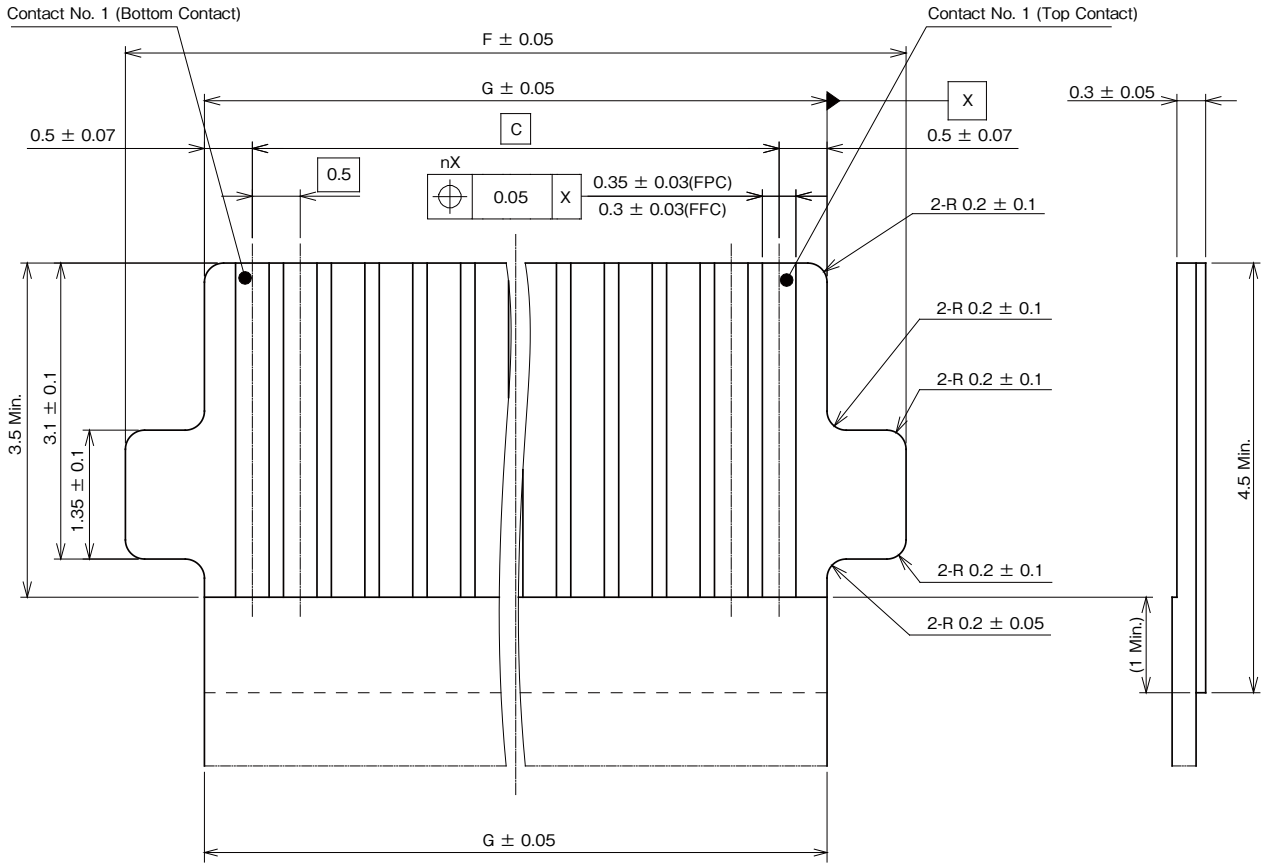
Note : 'n' indicated the number of positions.

Unit : mm

Part No.	HRS No.	No. of Pos.	C	E
FH69-10S-0.5SH(##)	Under Planning (Note)	10	4.5	8.73
FH69-20S-0.5SH(##)	Under Planning (Note)	20	9.5	13.73
FH69-30S-0.5SH(##)	Under Planning (Note)	30	14.5	18.73
FH69-40S-0.5SH(##)	Under Planning (Note)	40	19.5	23.73
FH69-50S-0.5SH(##)	Under Planning (Note)	50	24.5	28.73
FH69-60S-0.5SH(##)	CL0580-5007-0-##	60	29.5	33.73

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 Layout



Note : 'n' indicates the number of positions.

Unit : mm

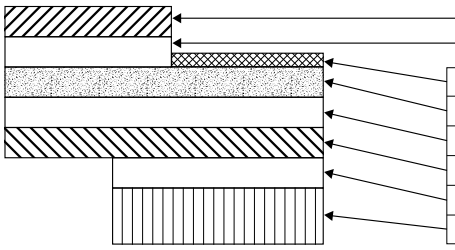
Part No.	HRS No.	No. of Pos.	C	F	G
FH69-10S-0.5SH(##)	Under Planning (Note)	10	4.5	7.15	5.5
FH69-20S-0.5SH(##)	Under Planning (Note)	20	9.5	12.15	10.5
FH69-30S-0.5SH(##)	Under Planning (Note)	30	14.5	17.15	15.5
FH69-40S-0.5SH(##)	Under Planning (Note)	40	19.5	22.15	20.5
FH69-50S-0.5SH(##)	Under Planning (Note)	50	24.5	27.15	25.5
FH69-60S-0.5SH(##)	CL0580-5007-0-##	60	29.5	32.15	30.5

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 Construction

● FPC

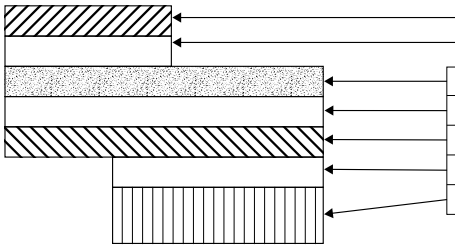
FPC : Flexible Printed Circuit



Material Name	Material	Thickness (μm)
Cover Film Layer	Polymide 1mil	(25)
Cover Adhesive	1/2 oz	(18)
Surface Treatment	0.2μm thick gold plated over 1 to 5μm thick nickel underplating	3
Copper Foil	Cu 1 oz	35
Base Adhesive	Thermosetting Adhesive	25
Base Film	Polymide 1 mil	25
Reinforcement Adhesive	Thermosetting Adhesive	30
Reinforcement Film	Polymide 7 mil	175
	Total	293

● FFC

FFC : Flexible Flat Cable



Material Name	Material	Thickness (μm)
Polyester Film		(12)
Adhesive	Thermoplastic Polyester	(30)
Gold Plated Anneal Copper Foil		35
Adhesive	Polyester	30
Polyester		12
Adhesive	Polyester	30
Stiffener	Polyester	188
	Total	295

*The allowable thickness tolerance is approx. 20μm.

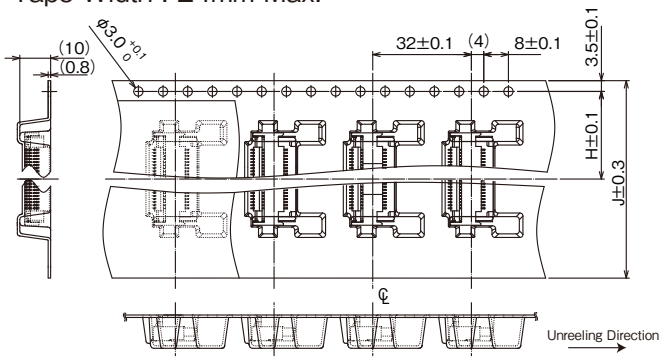
Note 1 : This is a reference specification for the FH69 Series FPC/FFC construction (t=0.3±0.05mm). The thickness of the FPC/FFC mated portion should be 0.3±.0.05mm in reference to the construction materials.

Note 2 : Contact an FPC/FFC maker for details on component construction.

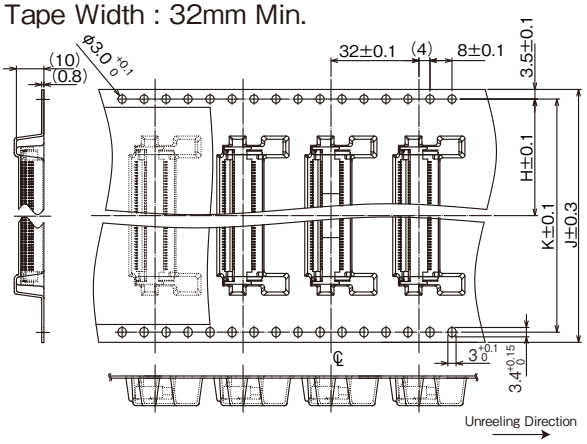
Packaging Specifications

●Embossed Carrier Tape Dimensions

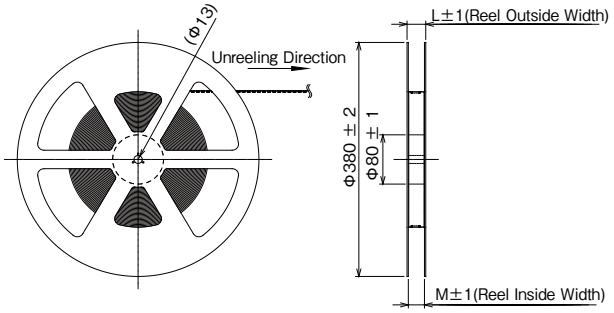
Tape Width : 24mm Max.



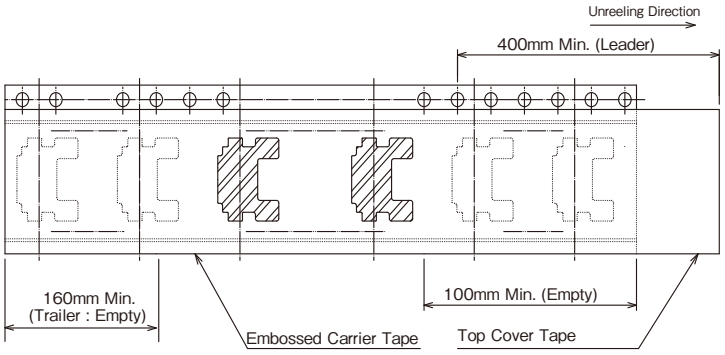
Tape Width : 32mm Min.



●Reel Dimensions



●Leader, Trailer Dimensions



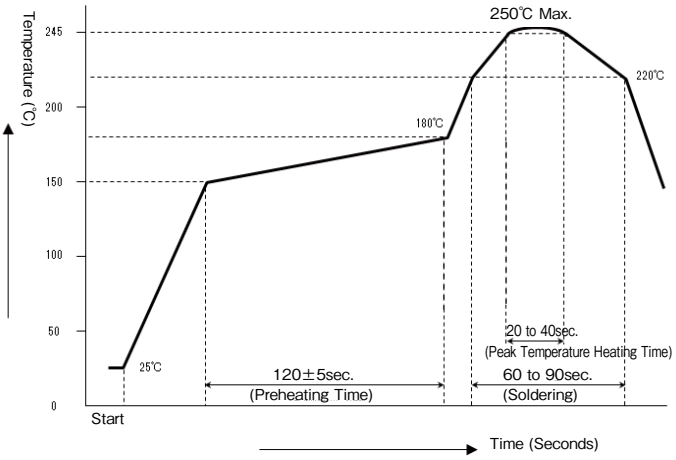
Note : This packaging meets JIS C 0806 and IEC 60286-3 (Packing of Components for Automatic Handling) standards.

Unit : mm

Part No.	HRS No.	No. of Pos.	H	J	K	L	M
FH69-10S-0.5SH(##)	Under Planning (Note)	10	11.5	24.0	-	29.4	25.4
FH69-20S-0.5SH(##)	Under Planning (Note)	20	14.2	32.0	28.4	37.4	33.4
FH69-30S-0.5SH(##)	Under Planning (Note)	30	20.2	44.0	40.4	49.4	45.4
FH69-40S-0.5SH(##)	Under Planning (Note)	40	20.2	44.0	40.4	49.4	45.4
FH69-50S-0.5SH(##)	Under Planning (Note)	50	26.2	56.0	52.4	61.4	57.4
FH69-60S-0.5SH(##)	CL0580-5007-0-##	60	26.2	56.0	52.4	61.4	57.4

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

Temperature Profile



Applicable Conditions
Solder Method : Reflow, IR/Hot air
Environment : Room Air
Solder Composition
: Paste SN/3.0Ag/0.5Cu
(Senju Metal Industry, co. Ltd Part Number :
M705-221CM5-42-10.5)
Test Board : Board materials and size : Glass epoxy 80x100x1.6mm
As listed on "Recommended Land Dimensions"
Metal Mask : Recommended thickness and aperture dimensions
As listed on "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

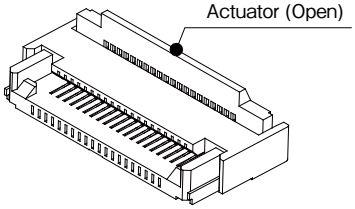
【Operating Method】

Please use this connector after confirming the following operation instructions in order to prevent connector or FPC damage and contact failure (incomplete mating, FPC pattern disconnection). This connector is compatible with both FPC and FFC but only FPC is listed for convenience.

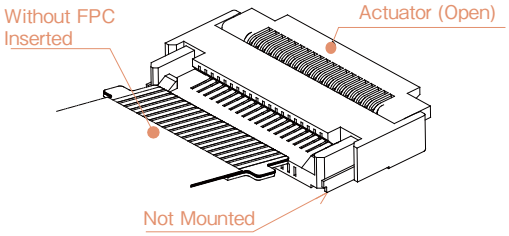
1.Initial Delivery State

Since the product is delivered with the actuator open, there is no need to operate the actuator before FPC insertion.

Initial Delivery State



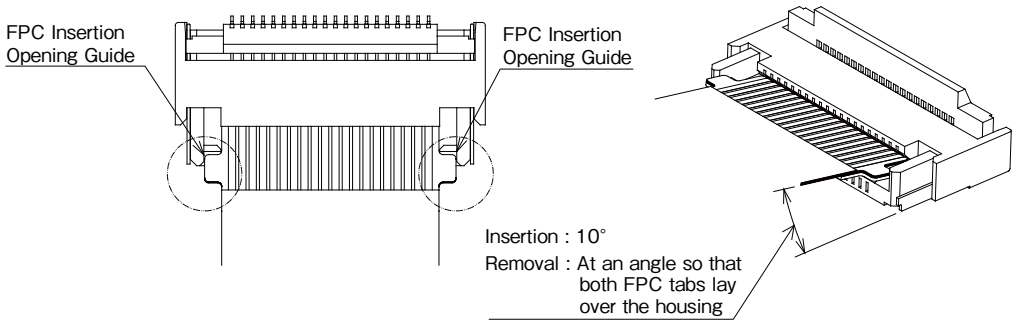
Operating the connector when the FPC is not inserted or it is not mounted.



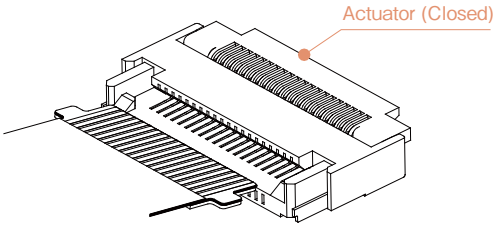
2. FPC Insertion and Extraction Method

・Insert the FPC fully at a 10° upward angle in respect to the board. Position both FPC tabs to the insertion opening guide and then insert completely.
・When removing the FPC, pull it out upward in a diagonal direction so that both tabs lay over the housing boss.

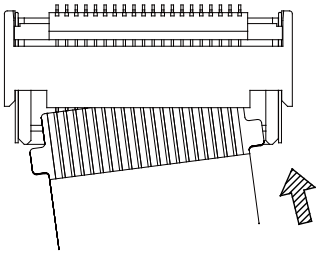
OK



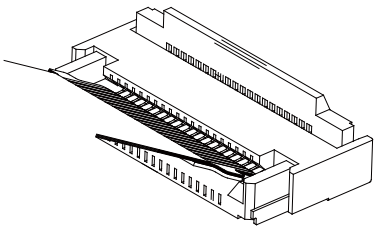
FPC Insertion or Removal while Actuator is Closed



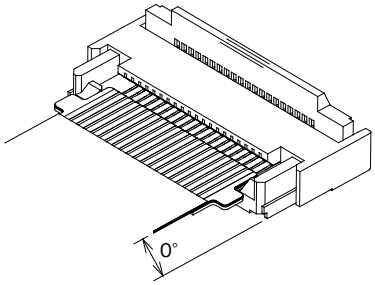
Twisting the FPC during FPC Insertion or Removal



Insertion or Removal of FPC at an Excessive Angle in Respect to the Board

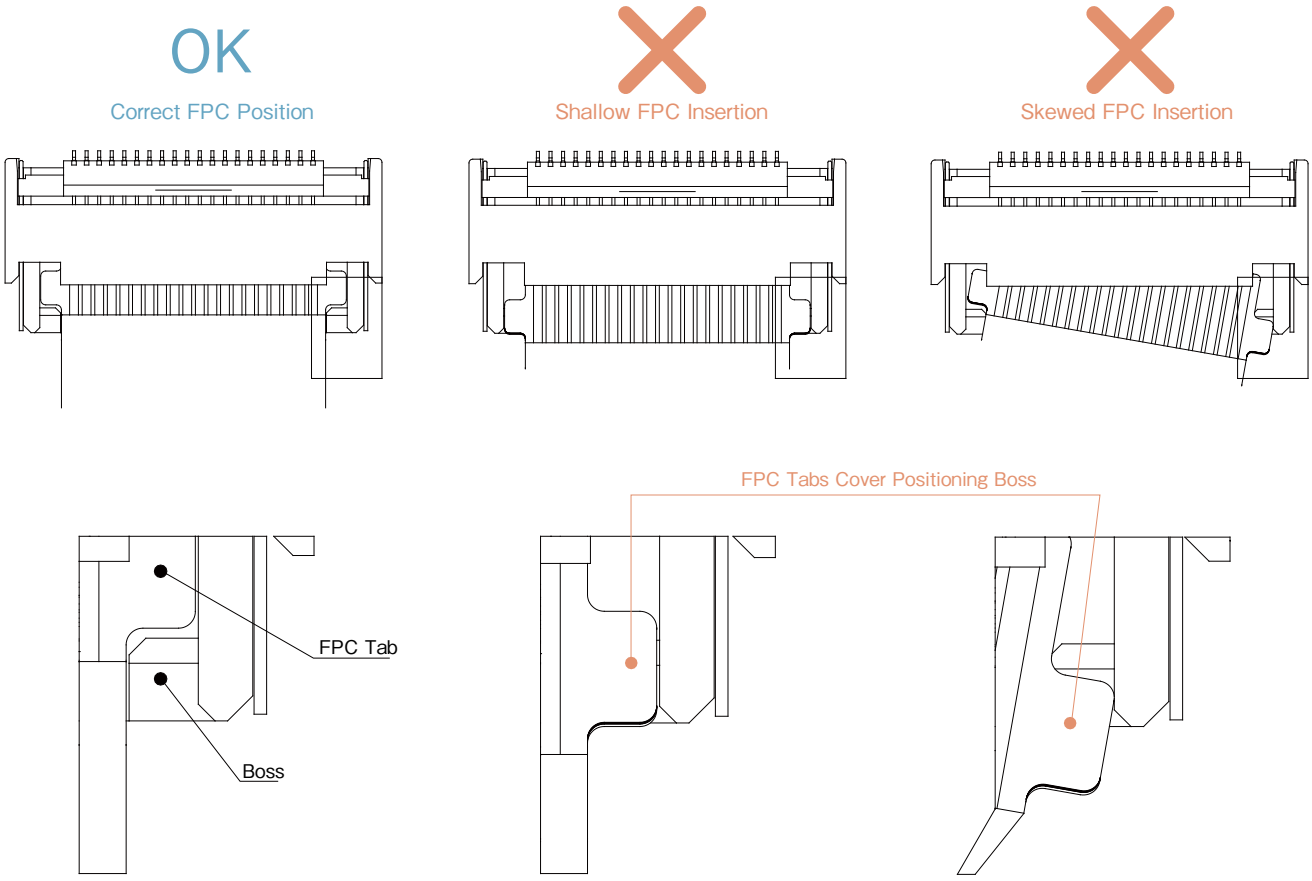


Insertion or Removal Horizontal to the Board



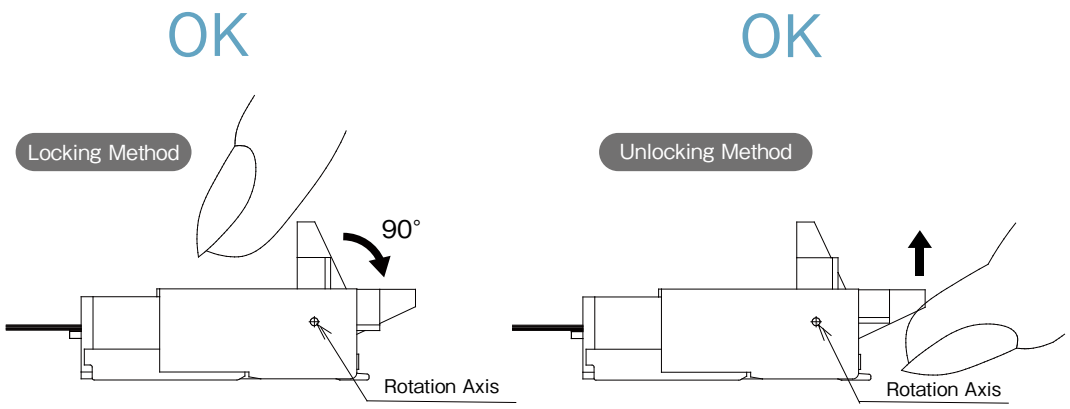
3. Confirm Actuator Locking After FPC Insertion

The FPC position is determined using the FPC positioning boss on the housing. After FPC insertion is completed and the actuator is locked, check whether both FPC tabs are in the below indicated positions.



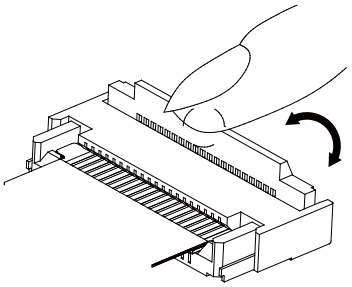
4. Actuator Locking and Release Method

The actuator rotates at its center.
Locking : After inserting the FPC, operate the actuator and rotate it 90°.
Release : Slowly raise the actuator.



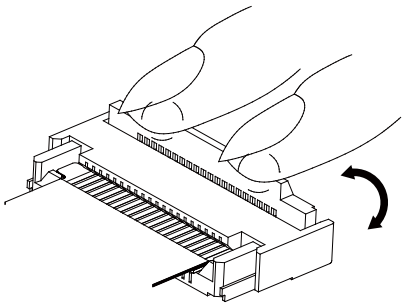
OK

Operate the Actuator Near its Center

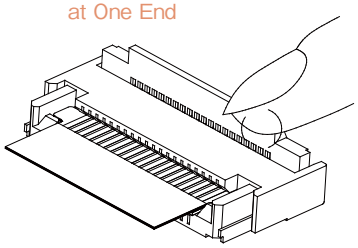


OK

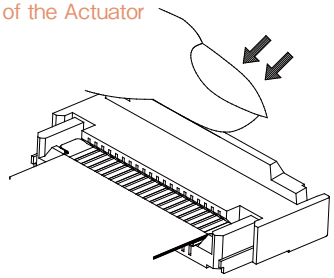
Operating at Both Ends of the Actuator at the Same Time



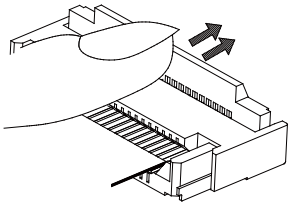
Operating the Actuator at One End



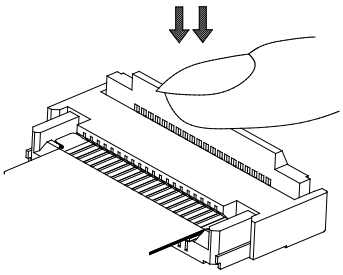
A Load in the Opposite Direction of the Actuator



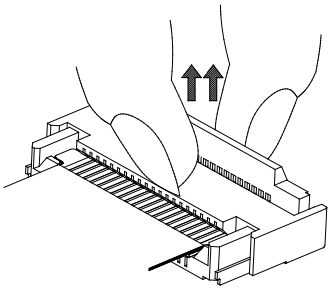
Pushing Horizontally to Lock



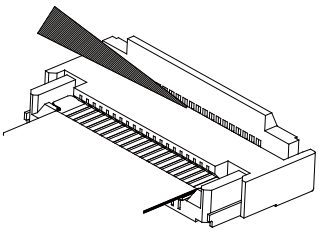
Pushing Down Vertically to Lock



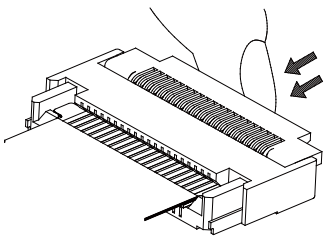
Lifting Up the Actuator



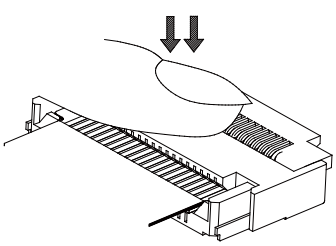
Operation Using Sharp Tools



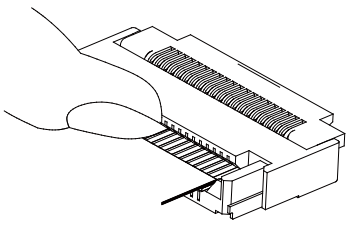
Pushing on the Actuator Towards the Connector Body



Applying Excessive Force to the Insulation Case



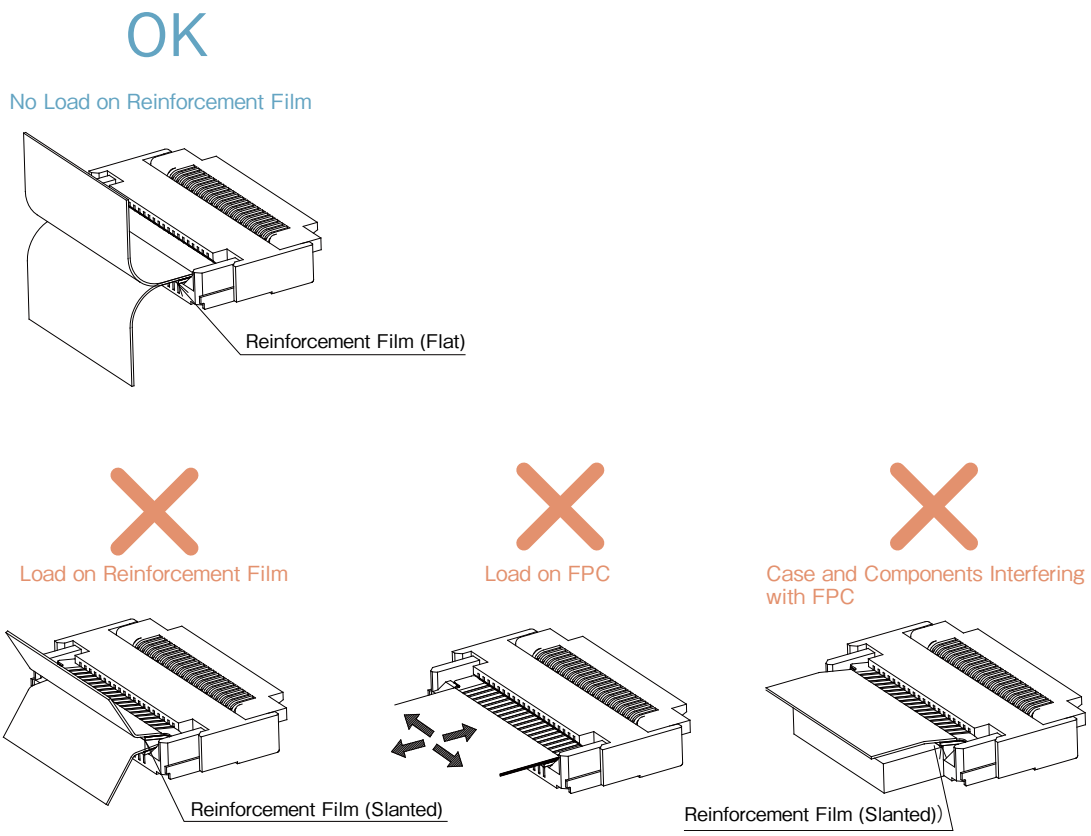
Operating From FPC Insertion Side



Precautions

【PCB Layout Precautions】

Design the board layout so that no load is applied to the connector FPC.
・Route the FPC so that it has leeway and is not pulled. Make sure that the reinforcing film is horizontal to the board surface.
・Do not place interfering components under the FPC.
・Check with the FPC manufacture regarding FPC flexibility.
・When designing the board/layout, ensure that there is enough space to operate and close the actuator.
・Consult with a Hirose representative about usage of FPC size and shape different from what is recommended.

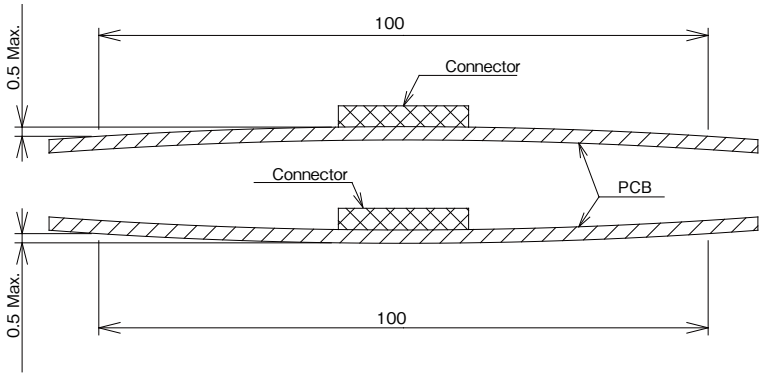


【Board Mounting Precautions】

・Please check the recommended mounting PCB land shape, metal mask opening and FPC. When using a pattern different from the recommendations, check the mounting condition before use.
・Check the mounting condition before use when there is silk printing below the connector.
・The reflow conditions must be within the specifications. Mounting conditions may be affected by the type of solder paste, manufacturer, PCB size and other mounted components. Please check the mounting conditions before use.
・Keep board warpage to a minimum. The coplanarity of this connector is 0.1mm Max. Soldering failure may occur due to excessive board warpage.
・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.
・Do not apply excessive force to the connector before mounting, such as by pulling the emboss out from the reel or suctioning the connector from the emboss. (0.5N Max.)

[Handling Precautions After PCB Mounting]

Board warpage may place a load to the connector and result in damage.
・Avoid placing a load to the board during the assembly processes such by as splitting a board into several pieces or screwing the board.
・The warpage of a 100mm wide board should be 0.5mm or less.



【Manual Soldering】

・Do not perform manual soldering with the FPC inserted into the connector.
・Do not heat the connector excessively or let the soldering iron touch any parts other than the contact leads.
・Do not use excessive solder (or flux).

PRODUCT CATALOG

HIROSE ELECTRIC CO.,LTD.

FH34 Series

0.5mm Pitch, 1.0mm Height, Top and Bottom Contact Back Flip FPC/FFC Connector

FH™ Flip-Lock Pioneer Hirose

P= 0.5 mm
P= 0.5mm

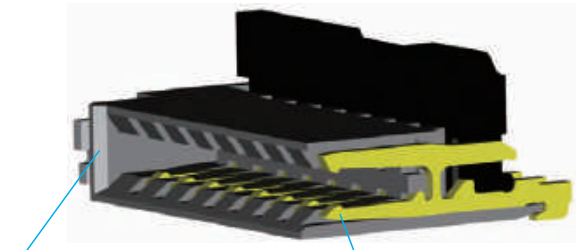
Back Flip

Top/Bottom Contact

Features

1. Low-profile 0.5mm Pitch, Both Upper and Lower Contacts Connector

Since it can be used in both top contact and bottom contact, freedom of Item design is improved.



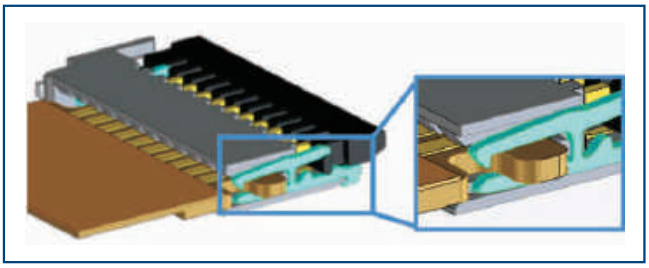
Top and Bottom Contact Design
Smooth FPC Insertion

2. FH34SRJ : Back Flip & Unique Contact Design Greatly Improves FPC Retention Force

In Horizontal Direction : Approx. 2.6 times Higher (Comparison Against Conventional Type)
In Vertical Direction : Approx. 2 times Higher (Comparison Against Conventional Type)

3. FH34D : FPC/FFC with Tabs and Improved FPC Retention Force

In Horizontal Direction : FH34SRJ + Approx. 2.5N (10pos.)

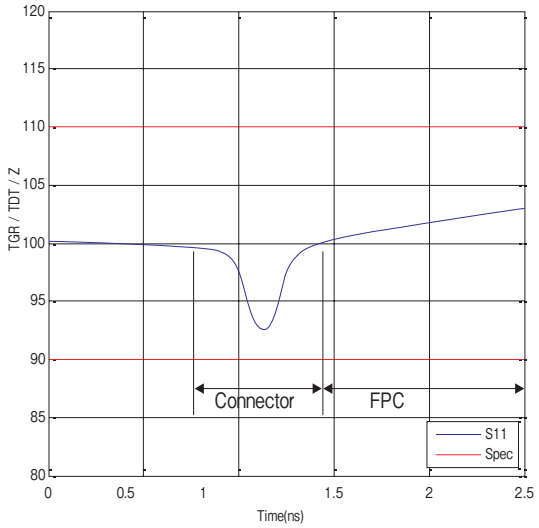


FPC/FFC Tab Compatible Product (FH34D) is available

4. High Speed Transmission

Excellent impedance characteristics and high speed transmission.
Supports eDP (ver 1.3) and MIPI (D-PHY) standards.

FH34SRJ/FH34D Differential Impedance
130ps rise time (20-80%)



5. Delivery with Lock Open

No need to open actuator before working because delivery with the lock open.

6. Easy FPC/FFC Insertion

The taper guide at the housing opening allows easy FPC/FFC insertion.

7. Compatible with 0.3mm thick FPC/FFC

Supports 0.3mm thick FPC/FFC which is the standard thickness of 0.5mm pitch connector. (The moderate rigidity of the reinforcing plate prevents deformation of the FPC and prevents troubles during insertion and mating.)

8. No pattern prohibited area is required on the lower surface of the connector. (Overmolding Design)

The lower surface of the connector is covered with plastic to eliminate the exposure of contact, so there is no restriction on the circuit board pattern. Increased flexibility in board design.

9. Halogen-free

Connector does not use chlorine or bromine above the standard value.
*AS defined by IEC 61249-2-21.
Br : 900ppm Max., Cl : 900ppm Max.,
Br+Cl : 1,500ppm Max.

10. Automatic Mounting

Pick & place mounting is possible with boss packaging.
(5,000pcs for reel)
Also, the normal product is 5,000pcs for reel, but we also have 500pcs for reel as trial use.
(The outer shape of the embossed reel is ϕ180mm.)

Product Specifications

Rated Current (Note 1)	0.5A	Operating Temperature (Note 2)	-55 to +105℃
Rated Voltage	50Vms AC/DC	Storage Temperature (Note 3)	-10 to +50℃
		Operating Humidity Range	RH 90% Max. (No Condensation)
		Storage Humidity Range (Note 3)	RH 90% Max. (No Condensation)

Recommended FPC/FFC Specifications	t=0.3±0.03 Gold Plated

Item	Specifications	Conditions
Insulation Resistance	500MΩ Min.	Measured at 100V DC
Withstanding Voltage	No flashover or insulation breakdown	250V AC for 1 min.
Contact Resistance	100mΩ Max. Includes FPC/FFC conductor resistance.	Measured at 1mA
Mating Durability	Contact Resistance : 100mΩ Max. No damage, cracks or part dislocation.	20 times
Vibration Resistance	No electrical discontinuity of 1μs Min. Contact Resistance : 100mΩ Max. No damage, cracks or part dislocation.	Frequency : 10 to 55Hz, single amplitude of 0.75mm, 10 cycles in each of the 3 axis
Shock Resistance	No electrical discontinuity of 1μs Min. Contact Resistance : 100mΩ Max. No damage, cracks or part dislocation.	Acceleration of 981m/s^2, 6ms duration, sine halfwave, 3 cycles in each of the 3 axis
Steady-state Moisture Resistance	Contact Resistance : 100mΩ Max. Insulation Resistance : 50MΩ Min. No damage, cracks or part dislocation.	96 hours at temperature of 40℃ and humidity of 90 to 95%
Temperature Cycle	Contact Resistance : 100mΩ Max. Insulation Resistance : 50MΩ Min. No damage, cracks or part dislocation.	Temperature : -55℃ → +15 to +35 → +105℃ → +15 to +35℃ Time : 30 → 2 to 3 → 30 → 2 to 3 minutes Above conditions repeated for 5 cycles
Solder Heat Resistance	No deformation in appearance or significant damage to contacts.	Reflow : At recommended temperature profile Hand Solder : Solder iron temperature of 350±10℃ for 5±1 seconds Max.

Note 1 : When passing the current through all of the contacts, use 70% of the current rating.
Note 2 : Includes the temperature rise due to current flow.
Note 3 : Storage refers to long-term storage of products before board mounting. The operating temperature and humidity apply to the non-energized state after mounting.

Materials / Finish

Part	Materials	Color / Finish	Remarks
Insulator	LCP	Gray	UL94V-0
	Polyamide Resin	Black	
Contact	Copper Alloy	Nickel Barrier Gold Plated	-
Retention Tab	Copper Alloy	Pure Tin Reflow Plated	-

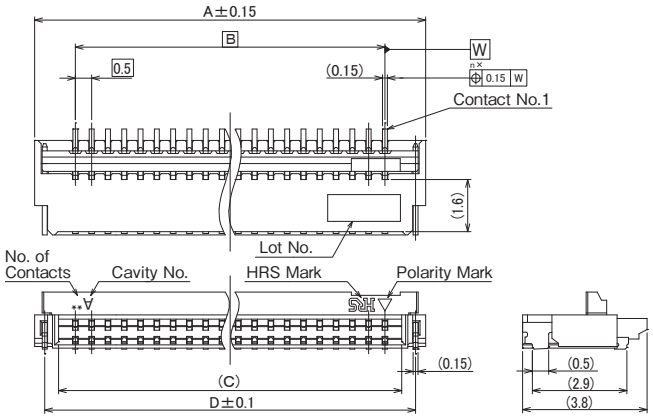
Product Number Structure

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.

FH 34 SRJ - 30S - 0.5 SH (50)
❶ ❷ ❸ ❹ ❺ ❻ ❼

❶ Series Name	FH	❺ Contact Pitch	0.5mm
❷ Series No.	34	❻ Termination Type	SH : SMT Horizontal Mounting Type
❸ Tab	SRJ : Incompatible with FPC/FFC Tabs D : Compatible with FPC/FFC Tabs	❼ Specification	(50) : Standard (5,000pcs) (99) : For Trial only (500pcs)
❹ No. of Pos.	4 to 50		

FH34SRJ Connector Dimensions

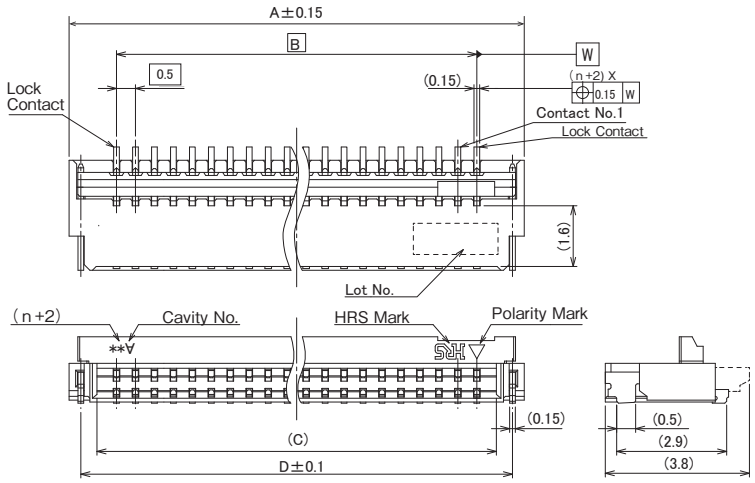


*'n' indicates the number of positions.
Note 1 : The coplanarity of the contact and solder tab lead is 0.1mm Max.
Note 2 : Packaged in tape and reel only. Check the "Packaging Specification" for details
Note 3 : Sink mark reliefs may be added due to improvements.
Black spots may appear on the mold resin but this does not affect the product quality.
Note 4 : After reflow, the contact plating may change color, however this does not represent a quality issue.

Unit : mm

Part. No.	HRS No.	No.of Pos.	A	B	C	D	Purchase Unit	
							(##) : (50)	(##) : (99)
FH34SRJ-4S-0.5SH(##)	CL0580-1238-7-##	4	4.0	1.5	2.53	3.38	5,000pcs per reel	500pcs per reel
FH34SRJ-5S-0.5SH(##)	CL0580-1264-7-##	5	4.5	2.0	3.03	3.88		
FH34SRJ-6S-0.5SH(##)	CL0580-1236-1-##	6	5.0	2.5	3.53	4.38		
FH34SRJ-7S-0.5SH(##)	CL0580-1200-0-##	7	5.5	3.0	4.03	4.88		
FH34SRJ-8S-0.5SH(##)	CL0580-1231-8-##	8	6.0	3.5	4.53	5.38		
FH34SRJ-9S-0.5SH(##)	CL0580-1262-1-##	9	6.5	4.0	5.03	5.88		
FH34SRJ-10S-0.5SH(##)	CL0580-1251-5-##	10	7.0	4.5	5.53	6.38		
FH34SRJ-11S-0.5SH(##)	CL0580-1258-4-##	11	7.5	5.0	6.03	6.88		
FH34SRJ-12S-0.5SH(##)	CL0580-1253-0-##	12	8.0	5.5	6.53	7.38		
FH34SRJ-14S-0.5SH(##)	CL0580-1252-8-##	14	9.0	6.5	7.53	8.38		
FH34SRJ-16S-0.5SH(##)	CL0580-1259-7-##	16	10.0	7.5	8.57	9.38		
FH34SRJ-18S-0.5SH(##)	CL0580-1248-0-##	18	11.0	8.5	9.57	10.38		
FH34SRJ-20S-0.5SH(##)	CL0580-1256-9-##	20	12.0	9.5	10.57	11.38		
FH34SRJ-22S-0.5SH(##)	CL0580-1254-3-##	22	13.0	10.5	11.57	12.38		
FH34SRJ-24S-0.5SH(##)	CL0580-1255-6-##	24	14.0	11.5	12.57	13.38		
FH34SRJ-26S-0.5SH(##)	CL0580-1247-8-##	26	15.0	12.5	13.57	14.38		
FH34SRJ-30S-0.5SH(##)	CL0580-1232-0-##	30	17.0	14.5	15.57	16.38		
FH34SRJ-32S-0.5SH(##)	CL0580-1257-1-##	32	18.0	15.5	16.53	17.38		
FH34SRJ-34S-0.5SH(##)	CL0580-1261-9-##	34	19.0	16.5	17.53	18.38		
FH34SRJ-40S-0.5SH(##)	CL0580-1260-6-##	40	22.0	19.5	20.53	21.38		
FH34SRJ-45S-0.5SH(##)	CL0580-1265-0-##	45	24.5	22.0	23.03	23.88		
FH34SRJ-50S-0.5SH(##)	CL0580-1266-2-##	50	27.0	24.5	25.53	26.38		

FH34D Connector Dimensions



*'n' indicates the number of positions.
Note 1 : The coplanarity of the contact and solder tab lead is 0.1mm Max.
Note 2 : Packaged in tape and reel only. Check the "Packaging Specification" for details
Note 3 : Sink mark reliefs may be added due to improvements.
Black spots may appear on the mold resin but this does not affect the product quality.
Note 4 : After reflow, the contact plating may change color, however this does not represent a quality issue.

Unit : mm

Part. No.	HRS No.	No. of Pos.	A	B	C	D	Purchase Unit	
							(##) : (50)	(##) : (99)
FH34D-4S-0.5SH(##)	CL0580-1274-0-##	4	5.0	2.5	3.53	4.38	5,000pcs per reel	500pcs per reel
FH34D-6S-0.5SH(##)	CL0580-1275-0-##	6	6.0	3.5	4.53	5.38		
FH34D-8S-0.5SH(##)	CL0580-1271-0-##	8	7.0	4.5	5.53	6.38		
FH34D-10S-0.5SH(##)	CL0580-1270-0-##	10	8.0	5.5	6.53	7.38		
FH34D-12S-0.5SH(##)	CL0580-1272-0-##	12	9.0	6.5	7.53	8.38		
FH34D-14S-0.5SH(##)	CL0580-1276-0-##	14	10.0	7.5	8.57	9.38		
FH34D-16S-0.5SH(##)	CL0580-1277-0-##	16	11.0	8.5	9.57	10.38		
FH34D-20S-0.5SH(##)	CL0580-1273-0-##	20	13.0	10.5	11.57	12.38		
FH34D-24S-0.5SH(##)	CL0580-1278-0-##	24	15.0	12.5	13.57	14.38		
FH34D-30S-0.5SH(##)	CL0580-1279-0-##	30	18.0	15.5	16.53	17.38		

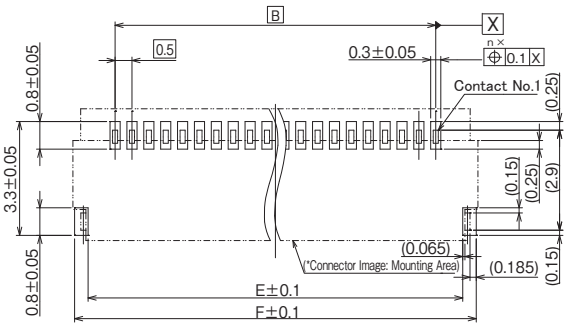
Note1 : Products without HRS No. are currently being planned for development. Please contact a Hirose representative regarding questions on pin count variation development.

Recommended PCB Mounting Pattern and Metal Mask Dimensions

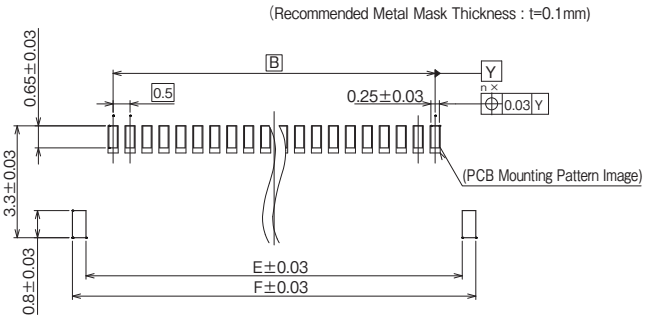
FH34SRJ

Recommended PCB Mounting Pattern and Metal Mask Dimensions

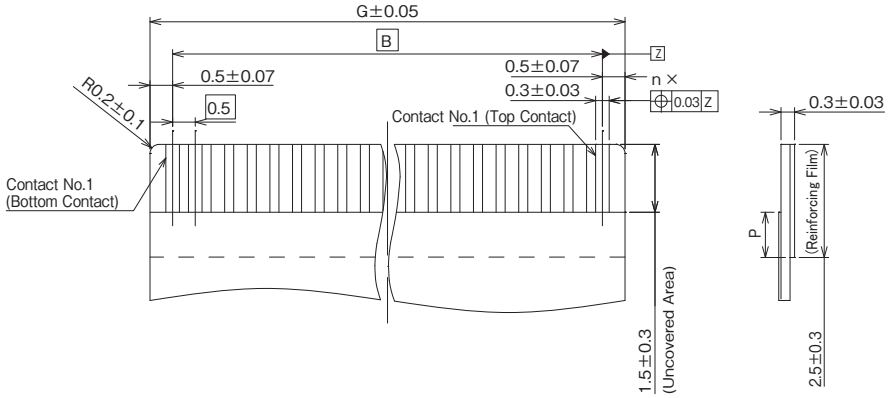
Recommended PCB Mounting Pattern



Recommended Metal Mask Dimensions



Recommended FPC/FFC Dimensions



*'n' indicates the number of positions.
*P dimension must be at least 0.5mm.
*The FPC recommended above is for FH34SRJ series only.
For compatibility (However, the pin number will change.) with FH19SC series (bottom contact), set the cover lay removal area to 2.5mm ± 0.3mm and rotational axis length to 3.5mm Min.

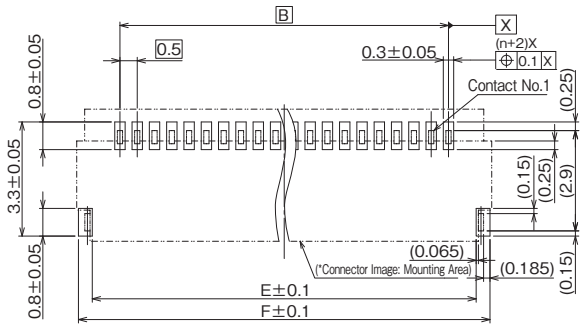
Unit : mm

Part. No.	HRS No.	No. of Pos.	B	E	F	G
FH34SRJ-4S-0.5SH(##)	CL0580-1238-7-##	4	1.5	3.1	3.9	2.5
FH34SRJ-5S-0.5SH(##)	CL0580-1264-7-##	5	2.0	3.6	4.4	3.0
FH34SRJ-6S-0.5SH(##)	CL0580-1236-1-##	6	2.5	4.1	4.9	3.5
FH34SRJ-7S-0.5SH(##)	CL0580-1200-0-##	7	3.0	4.6	5.4	4.0
FH34SRJ-8S-0.5SH(##)	CL0580-1231-8-##	8	3.5	5.1	5.9	4.5
FH34SRJ-9S-0.5SH(##)	CL0580-1262-1-##	9	4.0	5.6	6.4	5.0
FH34SRJ-10S-0.5SH(##)	CL0580-1251-5-##	10	4.5	6.1	6.9	5.5
FH34SRJ-11S-0.5SH(##)	CL0580-1258-4-##	11	5.0	6.6	7.4	6.0
FH34SRJ-12S-0.5SH(##)	CL0580-1253-0-##	12	5.5	7.1	7.9	6.5
FH34SRJ-14S-0.5SH(##)	CL0580-1252-8-##	14	6.5	8.1	8.9	7.5
FH34SRJ-16S-0.5SH(##)	CL0580-1259-7-##	16	7.5	9.1	9.9	8.5
FH34SRJ-18S-0.5SH(##)	CL0580-1248-0-##	18	8.5	10.1	10.9	9.5
FH34SRJ-20S-0.5SH(##)	CL0580-1256-9-##	20	9.5	11.1	11.9	10.5
FH34SRJ-22S-0.5SH(##)	CL0580-1254-3-##	22	10.5	12.1	12.9	11.5
FH34SRJ-24S-0.5SH(##)	CL0580-1255-6-##	24	11.5	13.1	13.9	12.5
FH34SRJ-26S-0.5SH(##)	CL0580-1247-8-##	26	12.5	14.1	14.9	13.5
FH34SRJ-30S-0.5SH(##)	CL0580-1232-0-##	30	14.5	16.1	16.9	15.5
FH34SRJ-32S-0.5SH(##)	CL0580-1257-1-##	32	15.5	17.1	17.9	16.5
FH34SRJ-34S-0.5SH(##)	CL0580-1261-9-##	34	16.5	18.1	8.9	17.7
FH34SRJ-40S-0.5SH(##)	CL0580-1260-6-##	40	19.5	21.1	21.9	20.5
FH34SRJ-45S-0.5SH(##)	CL0580-1265-0-##	45	22.0	23.6	24.4	23.0
FH34SRJ-50S-0.5SH(##)	CL0580-1266-2-##	50	24.5	26.1	26.9	25.5

FH34D

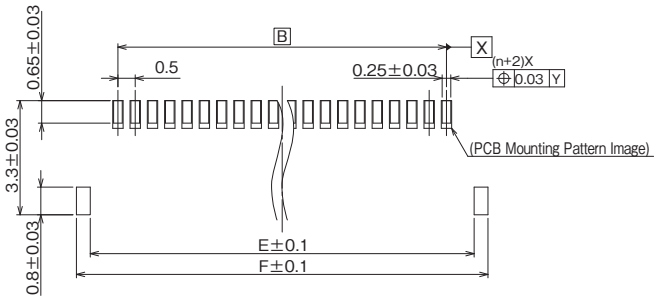
Recommended PCB Mounting Pattern and Metal Mask Dimensions

Recommended PCB Mounting Pattern

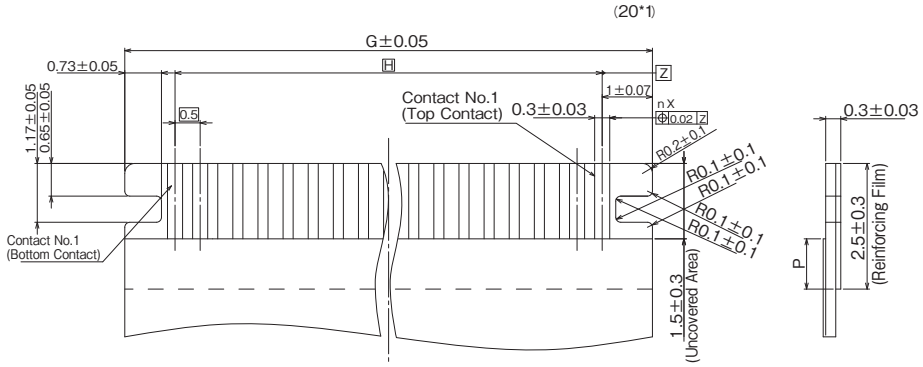


Recommended Metal Mask Pattern

(Recommended Metal Mask Thickness : t=0.1mm)



Recommended FPC/FFC Dimensions



*'n' indicates the number of positions.
*P dimension must be at least 0.5mm.
*The FPC recommended above is for FH34SRJ series only.

Unit : mm

Part No.	HRS No.	No. of Pos.	B	E	F	G	H
FH34D-4S-0.5SH(##)	CL0580-1274-0-##	4	2.5	4.1	4.9	3.5	1.5
FH34D-6S-0.5SH(##)	CL0580-1275-0-##	6	3.5	5.1	5.9	4.5	2.5
FH34D-8S-0.5SH(##)	CL0580-1271-0-##	8	4.5	6.1	6.9	5.5	3.5
FH34D-10S-0.5SH(##)	CL0580-1270-0-##	10	5.5	7.1	7.9	6.5	4.5
FH34D-12S-0.5SH(##)	CL0580-1272-0-##	12	6.5	8.1	8.9	7.52	5.5
FH34D-14S-0.5SH(##)	CL0580-1276-0-##	14	7.5	9.1	9.9	8.5	6.5
FH34D-16S-0.5SH(##)	CL0580-1277-0-##	16	8.5	10.1	10.9	9.5	7.5
FH34D-20S-0.5SH(##)	CL0580-1273-0-##	20	10.5	12.1	12.9	11.5	9.5
FH34D-24S-0.5SH(##)	CL0580-1278-0-##	24	12.5	14.1	14.9	13.5	11.5
FH34D-30S-0.5SH(##)	CL0580-1279-0-##	30	15.5	17.1	17.9	16.5	14.5

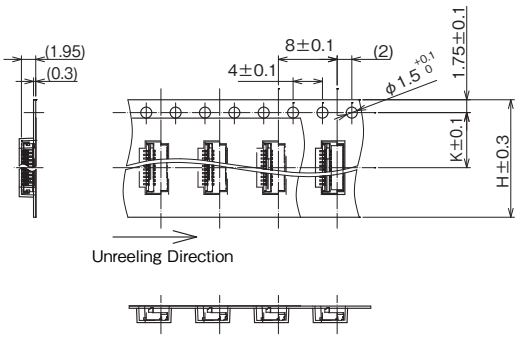
Note1 : Products without HRS No. are currently being planned for development. Please contact a Hirose representative regarding questions on pin count variation development.

Packaging Specifications

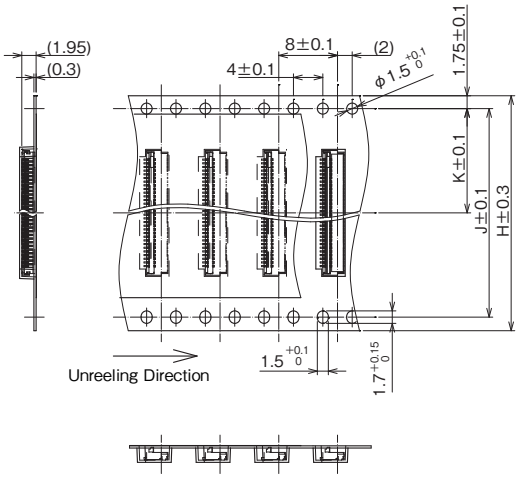
FH34SRJ

Embossed Carrier Tape Dimensions

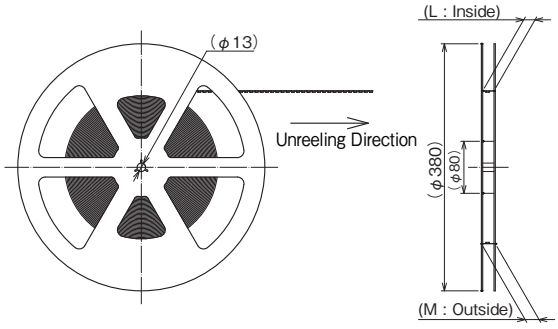
Tape Width : 24mm Max.

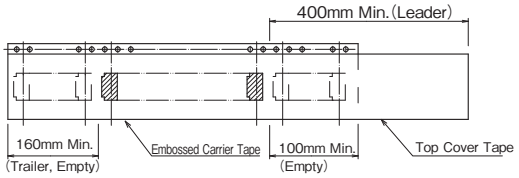


Tape Width : 32mm Min.



Reel Dimensions





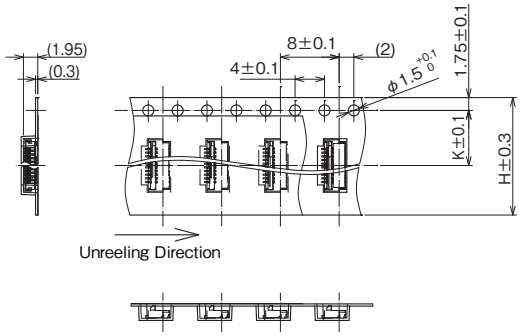
Unit : mm

Part. No.	HRS No.	No. of Pos.	H	J	K	L	M
FH34SRJ-4S-0.5SH(##)	CL0580-1238-7-##	4	16	-	7.5	17.4	21.4
FH34SRJ-5S-0.5SH(##)	CL0580-1264-7-##	5		-			
FH34SRJ-6S-0.5SH(##)	CL0580-1236-1-##	6		-			
FH34SRJ-7S-0.5SH(##)	CL0580-1200-0-##	7		-			
FH34SRJ-8S-0.5SH(##)	CL0580-1231-8-##	8		-			
FH34SRJ-9S-0.5SH(##)	CL0580-1262-1-##	9		-			
FH34SRJ-10S-0.5SH(##)	CL0580-1251-5-##	10		-			
FH34SRJ-11S-0.5SH(##)	CL0580-1258-4-##	11		-			
FH34SRJ-12S-0.5SH(##)	CL0580-1253-0-##	12	24	-	11.5	25.4	29.4
FH34SRJ-14S-0.5SH(##)	CL0580-1252-8-##	14		-			
FH34SRJ-16S-0.5SH(##)	CL0580-1259-7-##	16		-			
FH34SRJ-18S-0.5SH(##)	CL0580-1248-0-##	18		-			
FH34SRJ-20S-0.5SH(##)	CL0580-1256-9-##	20		-			
FH34SRJ-22S-0.5SH(##)	CL0580-1254-3-##	22		-			
FH34SRJ-24S-0.5SH(##)	CL0580-1255-6-##	24		-			
FH34SRJ-26S-0.5SH(##)	CL0580-1247-8-##	26		-			
FH34SRJ-30S-0.5SH(##)	CL0580-1232-0-##	30	32	28.4	14.2	33.4	37.4
FH34SRJ-32S-0.5SH(##)	CL0580-1257-1-##	32					
FH34SRJ-34S-0.5SH(##)	CL0580-1261-9-##	34					
FH34SRJ-40S-0.5SH(##)	CL0580-1260-6-##	40	44	40.4	20.2	45.4	49.4
FH34SRJ-45S-0.5SH(##)	CL0580-1265-0-##	45					
FH34SRJ-50S-0.5SH(##)	CL0580-1266-2-##	50					

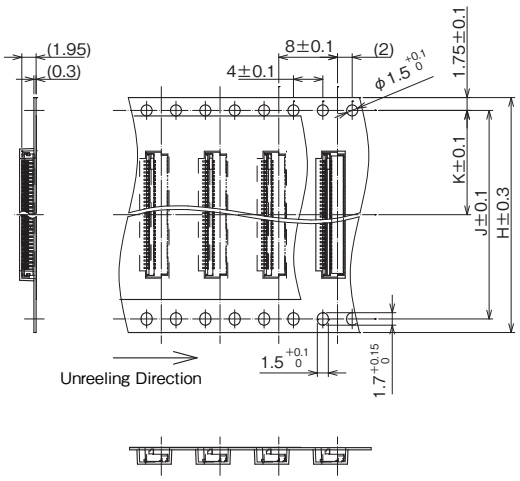
FH34D

Embossed Carrier Tape Dimensions

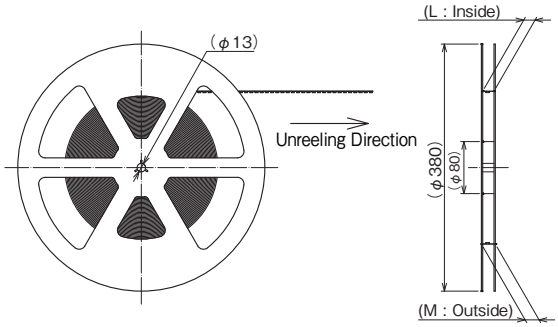
Tape Width : 24mm Max.

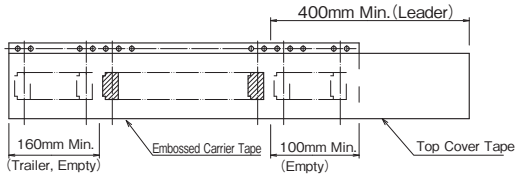


Tape Width : 32mm Min.



Reel Dimensions





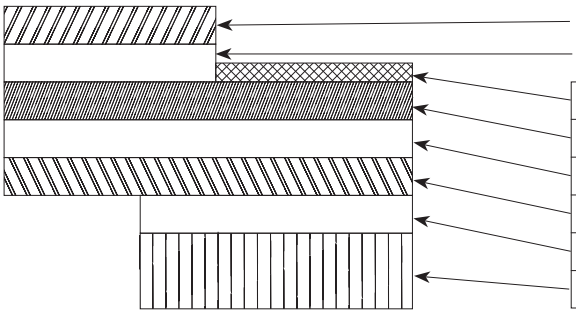
Unit : mm

Part. No.	HRS No.	No. of Pos.	H	J	K	L	M
FH34D-4S-0.5SH(##)	CL0580-1274-0-##	4	16.0	-	7.5	17.4	21.4
FH34D-6S-0.5SH(##)	CL0580-1275-0-##	6		-			
FH34D-8S-0.5SH(##)	CL0580-1271-0-##	8		-			
FH34D-10S-0.5SH(##)	CL0580-1270-0-##	10	24.0	-	11.5	25.4	29.4
FH34D-12S-0.5SH(##)	CL0580-1272-0-##	12		-			
FH34D-14S-0.5SH(##)	CL0580-1276-0-##	14		-			
FH34D-16S-0.5SH(##)	CL0580-1277-0-##	16		-			
FH34D-20S-0.5SH(##)	CL0580-1273-0-##	20		-			
FH34D-24S-0.5SH(##)	CL0580-1278-0-##	24		-			
FH34D-30S-0.5SH(##)	CL0580-1279-0-##	30	32.0	28.4	14.2	33.4	37.4

Note1 : Products without HRS No. are currently being planned for development. Please contact a Hirose representative regarding questions on pin count variation development.

FH34SRJ/FH34D Seies Recommended FPC/FFC Construction

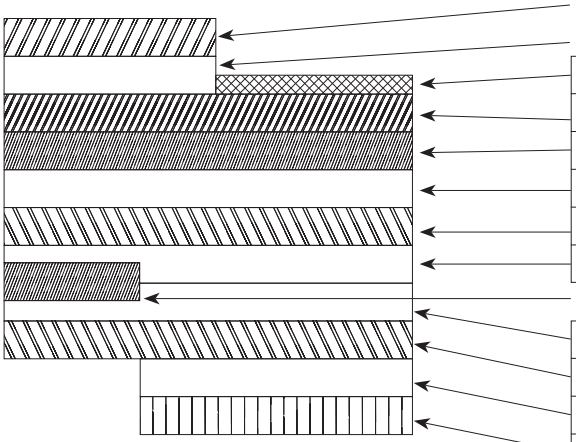
1. Single-sided FPC



FPC : Flexible Printed Circuit

Material Name	Material	Thickness (μm)
Cover Lay Film	Polymide 1mil	(25)
Cover Adhesive		(25)
Surface Treatment	0.2μm Thick Gold Plated over 1 to 5μm Thick Nickel Underplating	3
Copper Foil	Cu 1oz	35
Base Adhesive	Thermosetting Adhesive	25
Base Film	Polymide 1mil	25
Reinforcement Adhesive	Thermosetting Adhesive	35
Reinforcement Film	Polymide 7mil	175
	Total	298

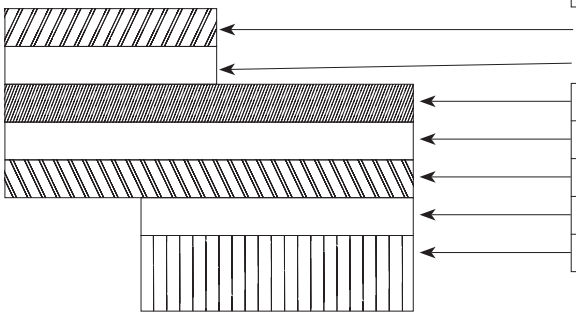
2. Double-sided FPC



FPC : Flexible Printed Circuit

Material Name	Material	Thickness (μm)
Cover Lay Film	Polymide 1mil	(25)
Cover Adhesive		(25)
Surface Treatment	0.2μm Thick Gold Plated over 1 to 5μm Thick Nickel Underplating	3
Through-hole Copper	Cu	15
Copper Foil	Cu 1/2oz	18
Base Adhesive	Thermosetting Adhesive	18
Base Film	Polymide 1mil	25
Base Adhesive		18
Copper Foil	Cu 1/2oz	(18)
Cover Adhesive	Thermosetting Adhesive	25
Cover Lay Film	Polymide 1mil	25
Reinforcement Adhesive	Thermosetting Adhesive	50
Reinforcing Film	Polymide 4mil	100
	Total	297

3. FFC



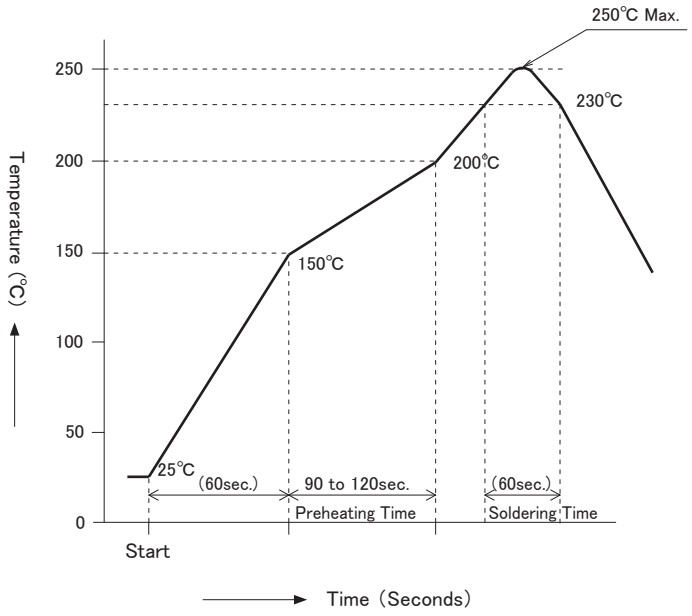
FFC : Flexible Flat Cable

Material Name	Material	Thickness (μm)
Polyester Film		(12)
Adhesive	Thermoplastic Polyester	(30)
Gold Plated Annealed Copper Foil		35
Adhesive	Polyester	30
Polyester		12
Adhesive	Polyester	30
Reinforcing Film	Polyester	188
	Total	295

*The thickness tolerance is approximately ±20μm.

1. This specifications is a recommended material configuration for FH34SRJ/FH34D series FPC (t=0.3±0.03).
2. Contact an FPC/FFC/Shielded FFC maker for details on component construction.

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 18.3 × 32.85 × 0.8mm
Land Size 0.3 × 0.8mm

Metal Mask : Thickness 0.1mm
Opening Size 0.25 × 0.65mm

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.

Operation and Precautions

This connector is a compact, thin Item with a back flip structure, and care must be taken when handling it. Please check the following before using.

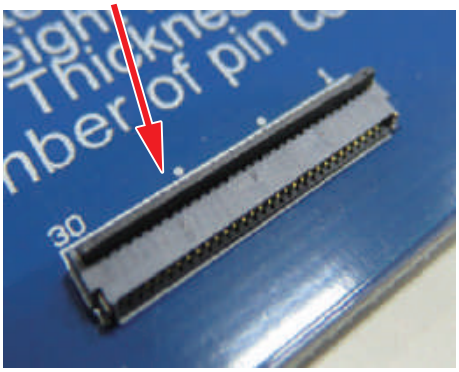
1. Initial Mounting State (Before FPC Insertion)

Since the product is delivered in an actuator open state, there is no need to operate the lock before inserting the FPC.

⚠ Caution

・Do not close actuator with the FPC not inserted.
・If you close actuator without inserting the FPC, the contact gap will narrow and the insertion force may increase.

The actuator packaged in the open condition.

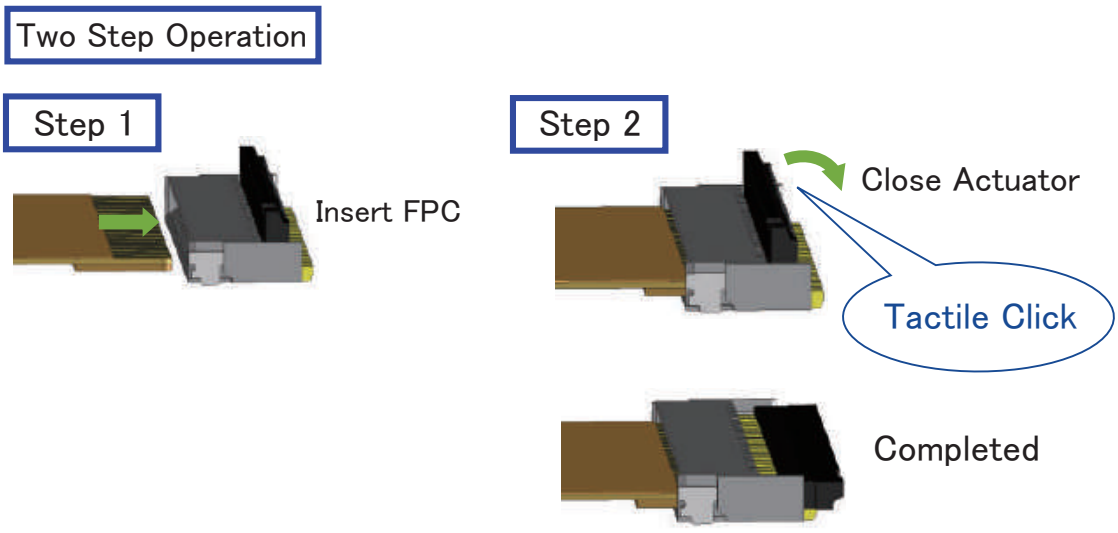


2. FPC Insertion Method

Be sure to insert the FPC into the board so that it is horizontal to the board.

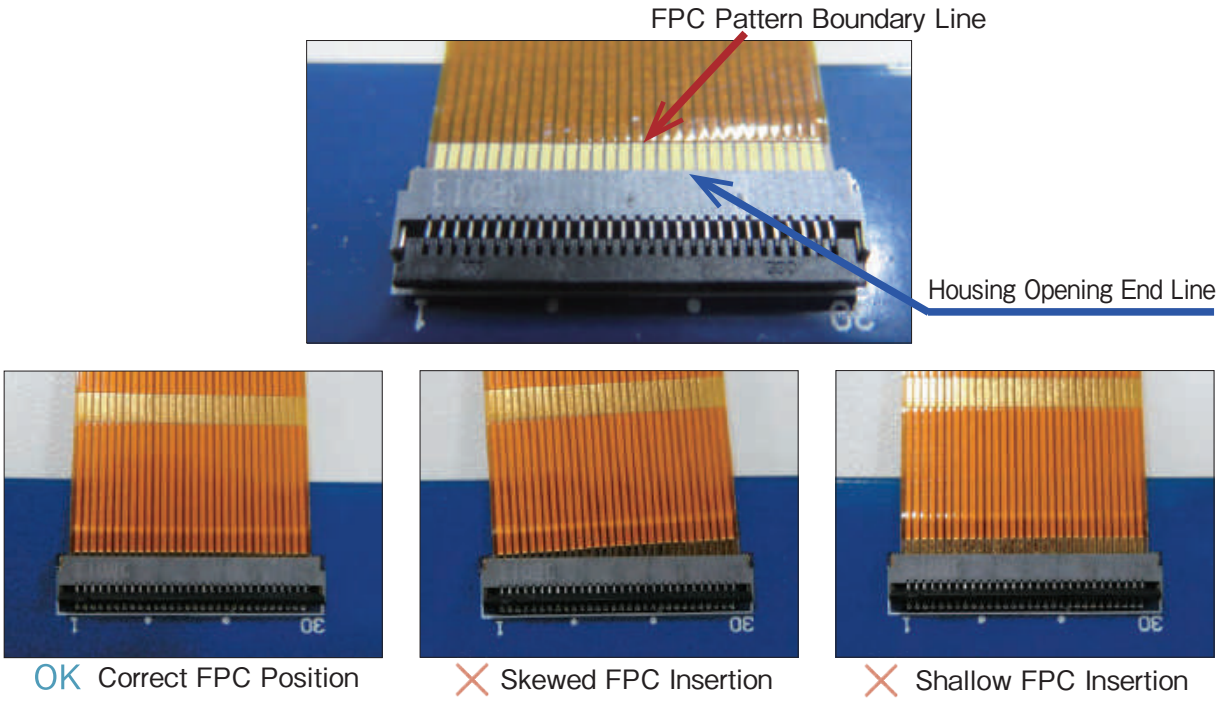
⚠ Caution

・Insert the FPC with actuator open.
・Inserting the FPC by rubbing it vertically, horizontally or diagonally may cause deformation of contact or poor contact.



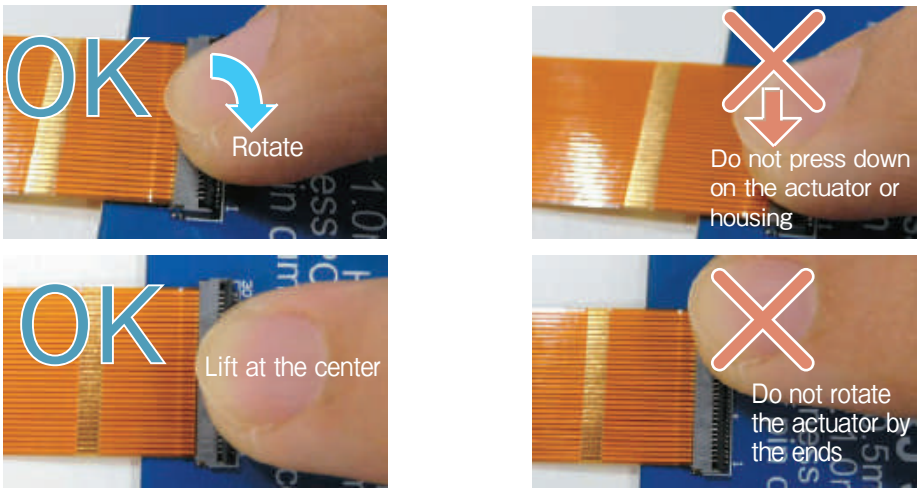
3. FPC Insertion Confirmation (When Used in Top Contact)

By visually comparing the end line of the housing opening with the boundary line of the FPC pattern, it is possible to prevent the erroneous insertion state of oblique insertion and shallow insertion.



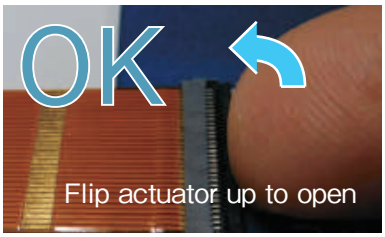
4. Locking

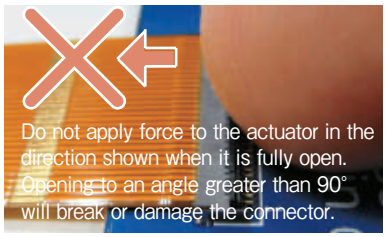
Rotate and press down on actuator.
At that time, rotate the middle part or the whole of actuator with the belly of your finger and completely knock it down.
(Do not push down on only one side of actuator. Actuator may twist, causing damage.)
*Be careful not to apply excessive force to the housing during work.

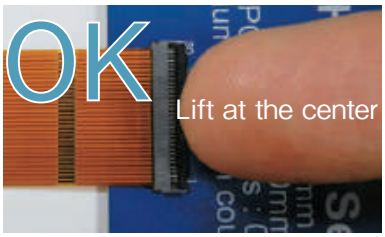


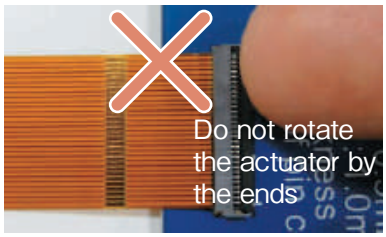
5. FPC/FFC Removal (Lock Release)

(1) Slowly push up actuator with a springy motion, then pull out the FPC after unlocking.
(2) Operate the center of actuator to unlock it.
(Please do not push up only one side of actuator. Actuator may twist, causing damage.)
*Actuator only opens to 90°. Do not attempt to open actuator at any further angle or apply more force than necessary.









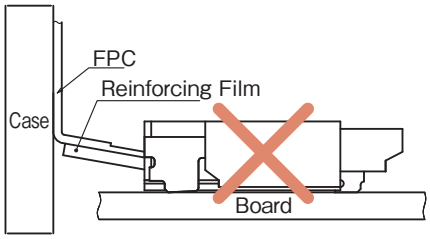
*This connector uses a back flip type structure, and the FPC insertion direction and actuator are in different directions. Do not open from the FPC insertion side.

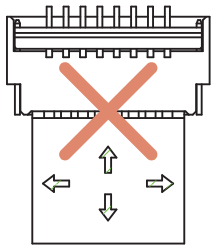
6. FPC Routing

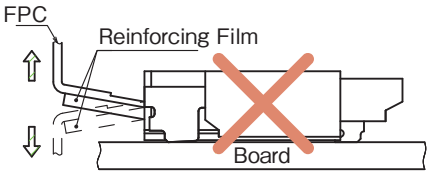
FPC should be routed in a manner that no strain or load is exerted onto the FPC. Placing any strain on the FPC may result in unintentional disconnect or damage to the FPC, which can lead to issues such as contact failure.

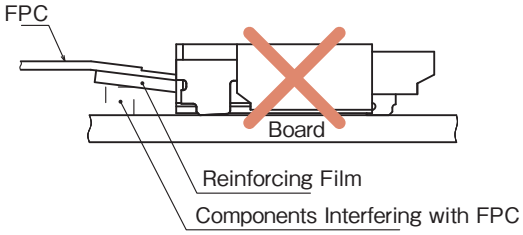
⚠ Caution

・Do not allow the FPC or reinforcing film to touch the casings, housings or any other items.
・When routing the FPC, make sure that no strain or load is applied to the connector in a pulling, pushing or side-to-side motion. Additionally, make sure that no excessive upward or downward force is applied to the connector.
・When routing the FPC, make sure that there is a stress free path for the FPC and the reinforcing film is parallel to the PCB. Observe correct bend radiuses.
・Do not place or mount any parts that will interfere with the FPC routing.









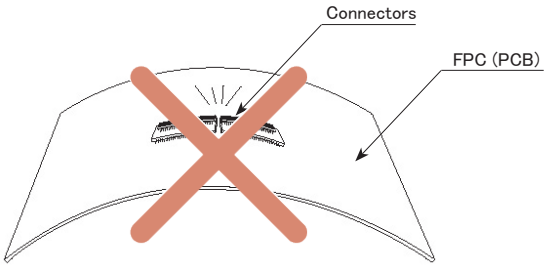
Precautions when Mounting Connectors on the PCB

About the Warpage Amount of the Board
Try to minimize the warpage of the board.
The flatness of this connector is 0.1mm Max. However, if the amount of warpage is large, soldering failure may occur.

About Mounting to FPC
When mounting the FPC, design a reinforcing plate for easy handling.
We recommend that the reinforcing plate be made of glass epoxy material and be 0.3mm Min.

About Loads on Connectors
Do not apply an external force greater than 0.5N to the connector before mounting it, as this can damage the connector.
Do not insert the FPC in front of mounting or operate the connector.

Load on Board
・Break a large number of the board
・Screw on the board
Be careful not to apply a load to the board during the assembly process as described above.
The connector may be damaged.



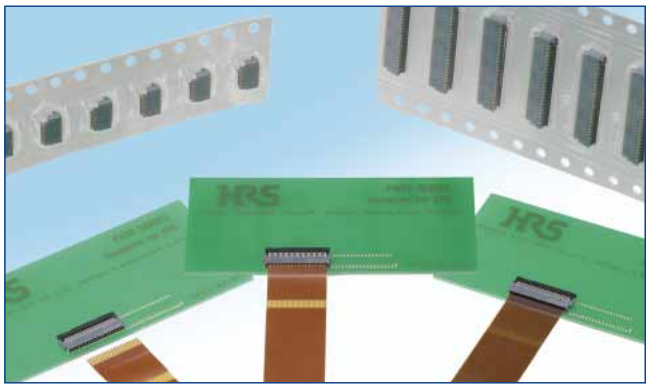
Precautions for Hand Soldering
When performing hand soldering such as repair, please pay attention to the following.
(1) Do not reflow or hand-solder with FPC inserted into the connector.
(2) Do not apply excessive heat or allow the solder iron to touch anything other than the lead of the connector.
Doing so may cause the connector to deform or melt.
(3) Do not use excessive solder (or flux).
If too much solder (flux) is supplied to contact, the solder and flux will adhere to the contacts and the rotating parts of actuator, causing poor contact and actuator rotation. Also, if solder is supplied excessively to retention pad, it will interfere with the rotation of Actuator, causing damage to the connector.

While Taking into Consideration

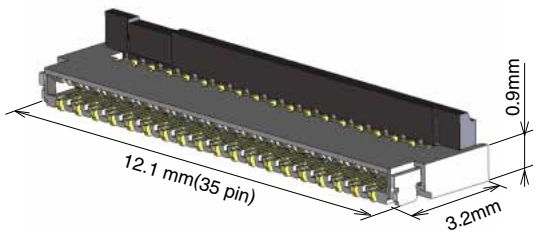
Specifications mentioned in this catalog are reference values.
When considering to order or use this product, please review the Drawing and Product Specifications sheets.
Use an appropriate cable when using the connector in combination with cables.
If considering usage of a non-specified cable, please contact your sales representative.
If assembly process is done by jigs & tools which are not identified by Hirose, the warranty of the product may be affected.
If considering usage for below mentioned applications, please contact your sales representative.
In cases where the application will demand a high level of reliability, such as automotive, medical instruments, public infrastructure, aerospace/defense etc. Hirose must review before assurance of reliability can be given.

0.3 mm pitch, 0.9 mm height, back flip type dual-sided FPC connector

FH35C Series



●3.2 mm in depth



■Features

1.0.3 mm pitch, Dual-sided connector

This connector utilizes both a top and bottom contact and provides design flexibility.

2.Improved FPC retention force achieved through the use of our proprietary contact structure and a back flip actuator.

FPC retention force (in the horizontal direction) is about 2.5 times greater than similar products produced by other companies.

3.Supports high speed transmissions

By utilizing its excellent impedance characteristics, it is capable of supporting high speed transmissions.
(Differential pairs of identical contacts allows for better transmission characteristics and eDP (ver1.3) and compatibility to MIPI(D–PHY) specifications.)

4.Delivered with actuator open

To reduce installation time and costs, the actuator is delivered in the open position and eliminates the need to open the actuator before FPC insertion.

5.Easy FPC Insertion

Equipped with tapered guides at the FPC insertions point, they help to create a smoother FPC insertion operation.

6.Compatible with 0.2mm thick FPC

The FH35C was designed to be used with 0.2 mm FPC. (Using the appropriate FPC will prevent deformation and problems that may occur during the insertion and mating processes.)

7.Bottom side protection

The bottom surface is over-molded and provides added protection to the contacts (no exposure). This allows the PCB space under the connector to be used for additional patterning.

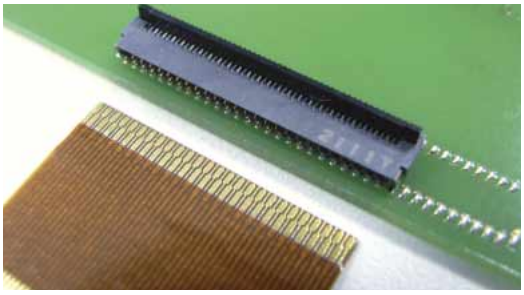
8.Halogen Free

Chlorine and bromine levels do not exceed the standard values as defined by IEC 61249-2-21. (Br: 900 ppm or less, Cl : 900 ppm or less, Br + Cl : 1,500 ppm or less)

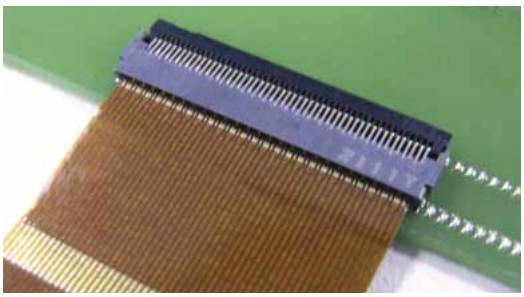
9.Compatible with Automatic Mounting

Tape-and-reel packaging is available for use with pick-and-place machines. Connectors are available on 5000 or 500 piece reels. (The outer diameter of an embossed reel is ϕ180mm)

●At Time of FPC Insertion

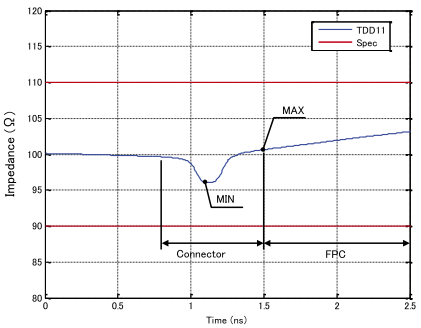


●Lock Completion State



FH35C Differential Impedance

130ps rise time (20-80%)



■Product Specifications

Ratings	Current rating: 0.2 A (Note 1) Voltage rating: AC 30 Vrms	Operating temperature Range: –55 to +85°C (Note 2) Operating temperature Range: 90% or less of relative humidity (No dew condensation is allowed)	Storage temperature Range: -10 to +50°C (Note 3) Storage temperature Range: 90% or less of relative humidity (No dew condensation is allowed)

With specifications compatible with FPC contacts	t = 0.2 ± 0.03 gold plating

Items	Specifications	Conditions
1.Insulation Resistance	No less than 50 MΩ	Measured at 100 V DC
2.Withstand Voltage	No flashover or breakdown	Conduct 90 V AC for one minute
3.Contact Resistance	100 mΩ MAX. ✻ Including FPC conductor resistance	AC 20 mV MAX (1 KHz), 1 mA
4.Mating Cycles	Contact resistance: no more than 100 mΩ No breakage, cracks, or loosened parts	10 times
5.Vibration Resistance	No electric outage of 1 μs or greater Contact resistance: no more than 100 mΩ No breakage, cracks, or loosened parts	At the frequency of 10-55 Hz, half amplitude 0.75 mm, and 10 cycles in each of three axial directions
6.Shock Resistance	No electric outage of 1 μs or greater Contact resistance: no more than 100 mΩ No breakage, cracks, or loosened parts	Acceleration: 981 m/s^2 Duration: 6 ms, sine half-wave, 3 cycles in each of the 3 axis each in both directions
7.Humidity Resistance (Steady State)	Contact resistance: no more than 100 mΩ Insulation Resistance: 50 MΩ or more No breakage, cracks, or loosened parts	Left to stand for 96 hours at the temperature of 40°C and the humidity of 90% to 95%
8.Temperature Cycles	Contact resistance: no more than 100 mΩ Insulation Resistance: 50 MΩ or more No breakage, cracks, or loosened parts	Temperature:-55→ +15 to+35→ +85→ +15 to +35°C Time: 30→ 2 to 3 → 30→ 2 to 3 minutes 5 cycles with the above conditions
9.Solder Heat Resistance	No deformation in appearance or marked instability of contacts	Reflow: According to the Recommended Temperature Profile Manual soldering: 350± 10°C for 5± 1 sec.

(Note 1) Use at 70% of the current rating when all pins are energized with the stated current rating.
(Note 2) Temperature rise at the time of electrification is included.
(Note 3) The term “storage” refers to the long-term storage condition of unused products before mounting on the PCB. The operating temperature and humidity ranges apply to non-energized state after PCB mounting.
(Note 4) The above specifications are representative of this series. Please refer to “drawing for approval” for official individual agreement.

■Materials

Part	Materials	Treatment	UL Regulation
Insulator	LCP	Gray	UL94V-0
	Polyamide resin	Black	
Contact	Phosphor bronze	Nickel barrier Gold plating	――
Metal fitting	Phosphor bronze	Pure tin reflow plating	

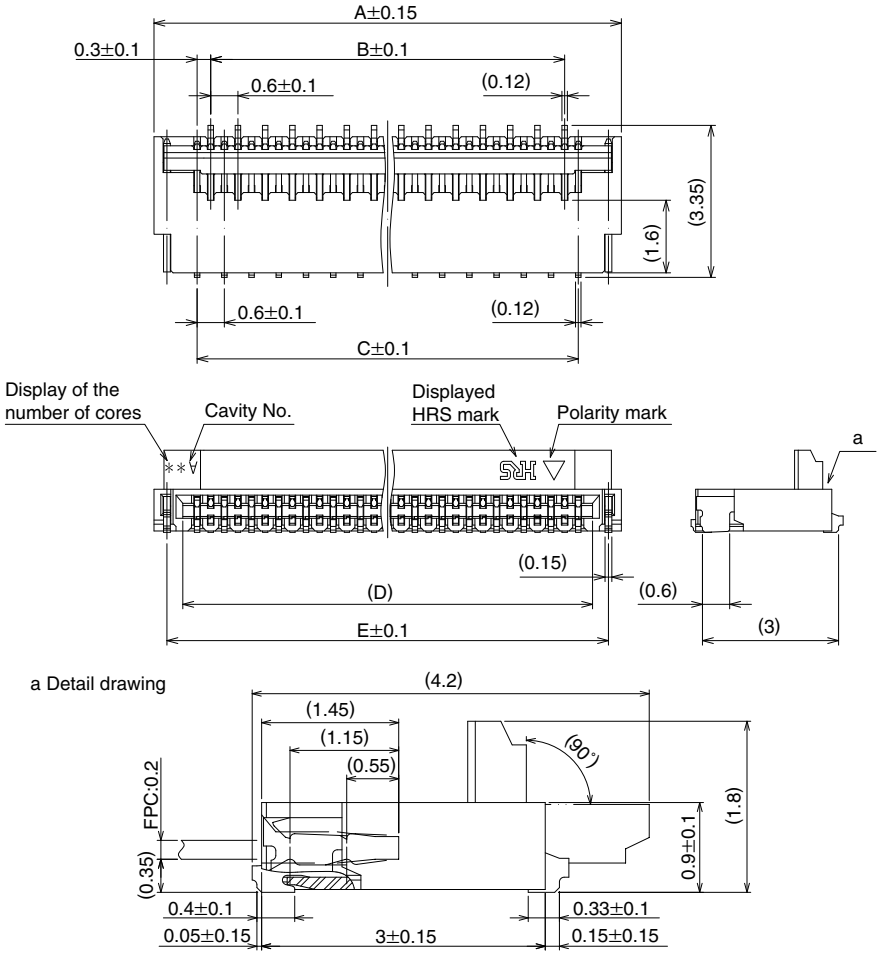
■Product Number Structure

Refer to the chart below when searching for the part number nomenclature.
Please select connectors listed in this catalog when placing orders.
The characteristics and specifications of the products described in this catalog are for reference only.
Please make sure to check the latest delivery specifications before the time of purchase.

FH ❶ 35 ❷ C ❸ – 35S ❹ – 0.3 ❺ SHW ❻ (50) ❼

❶ Series Name: FH	❻ Contact Form SHW: SMT horizontal staggered array mount type
❷ Series No.: 35	
❸ C: dual-sided, halogen-free product	❼ Specifications: (50): standard product (5000 connectors per reel) (99): 500 connectors per reel
❹ Number of contacts : 9 to 51	
❺ Contact Pitch: 0.3 mm	

■Connector Dimensions



Note 1: The lead coplanarity of contact and reinforcing metal fitting is a MAX of 0.1 mm.
2: This product packaged on tape-and-reel. See the package specification diagram for details.
3: Dimensions may be changed for sink mark prevention due to improvement, etc.
In addition, black dots, etc., may occur in the mold resin but they have no effect on quality.
4: This product is halogen-free.
(Br content: 900 ppm or less; Cl content: 900 ppm or less; Br + CL total content: 1,500 ppm or less)

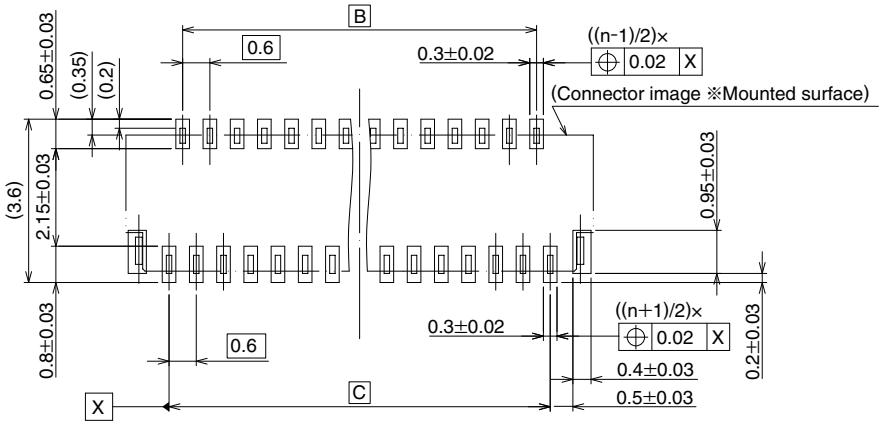
■Connector Dimension Table

Unit: mm

Product No.	HRS No.	The number of contacts	A	B	C	D	E
FH35C-9S-0.3SHW(50)	CL580-2910-5-50	9	4.3	1.8	2.4	3.03	3.73
FH35C-11S-0.3SHW(50)	CL580-2917-4-50	11	4.9	2.4	3	3.63	4.33
FH35C-13S-0.3SHW(50)	CL580-2925-2-50	13	5.5	3	3.6	4.23	4.93
FH35C-15S-0.3SHW(50)	CL580-2919-0-50	15	6.1	3.6	4.2	4.83	5.53
FH35C-17S-0.3SHW(50)	CL580-2916-1-50	17	6.7	4.2	4.8	5.43	6.13
FH35C-19S-0.3SHW(50)	CL580-2921-1-50	19	7.3	4.8	5.4	6.03	6.73
FH35C-21S-0.3SHW(50)	CL580-2922-4-50	21	7.9	5.4	6	6.63	7.33
FH35C-23S-0.3SHW(50)	CL580-2911-8-50	23	8.5	6	6.6	7.23	7.93
FH35C-25S-0.3SHW(50)	CL580-2912-0-50	25	9.1	6.6	7.2	7.83	8.53
FH35C-27S-0.3SHW(50)	CL580-2918-7-50	27	9.7	7.2	7.8	8.43	9.13
FH35C-31S-0.3SHW(50)	CL580-2923-7-50	31	10.9	8.4	9	9.63	10.33
FH35C-33S-0.3SHW(50)	CL580-2913-3-50	33	11.5	9	9.6	10.23	10.93
FH35C-35S-0.3SHW(50)	CL580-2926-5-50	35	12.1	9.6	10.2	10.83	11.53
FH35C-37S-0.3SHW(50)	CL580-2914-6-50	37	12.7	10.2	10.8	11.43	12.13
FH35C-39S-0.3SHW(50)	CL580-2915-9-50	39	13.3	10.8	11.4	12.03	12.73
FH35C-41S-0.3SHW(50)	CL580-2924-0-50	41	13.9	11.4	12	12.63	13.33
FH35C-45S-0.3SHW(50)	CL580-2909-6-50	45	15.1	12.6	13.2	13.83	14.53
FH35C-49S-0.3SHW(50)	————	49	16.3	13.8	14.4	15.03	15.73
FH35C-51S-0.3SHW(50)	CL580-2920-9-50	51	16.9	14.4	15	15.63	16.33

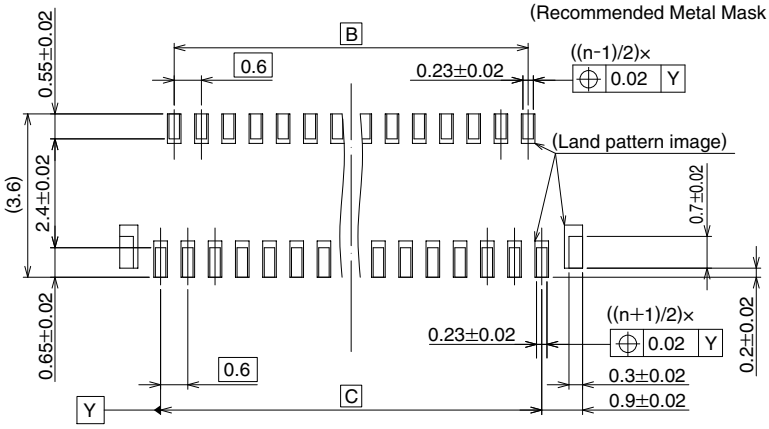
The products with no HRS No. are currently under planning. Please contact our sales representative for questions concerning the number of contacts.

■Recommended Land Dimensions



■Recommended Land and Metal Mask Dimensions

(Recommended Metal Mask Thickness: t = 0.1)



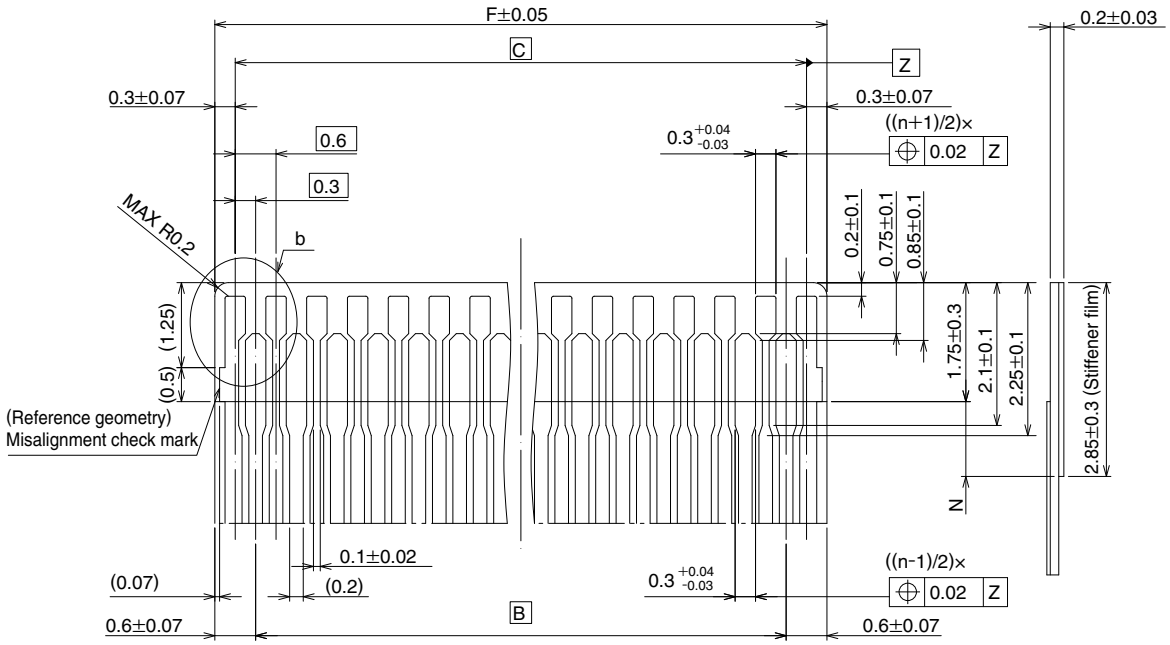
Note 5: 'n' represents the number of contacts.

■Recommended Land and Metal Mask Dimensions

Unit: mm

Product No.	HRS No.	No. of Contacts	B	C
FH35C-9S-0.3SHW(50)	CL580-2910-5-50	9	1.8	2.4
FH35C-11S-0.3SHW(50)	CL580-2917-4-50	11	2.4	3
FH35C-13S-0.3SHW(50)	CL580-2925-2-50	13	3	3.6
FH35C-15S-0.3SHW(50)	CL580-2919-0-50	15	3.6	4.2
FH35C-17S-0.3SHW(50)	CL580-2916-1-50	17	4.2	4.8
FH35C-19S-0.3SHW(50)	CL580-2921-1-50	19	4.8	5.4
FH35C-21S-0.3SHW(50)	CL580-2922-4-50	21	5.4	6
FH35C-23S-0.3SHW(50)	CL580-2911-8-50	23	6	6.6
FH35C-25S-0.3SHW(50)	CL580-2912-0-50	25	6.6	7.2
FH35C-27S-0.3SHW(50)	CL580-2918-7-50	27	7.2	7.8
FH35C-31S-0.3SHW(50)	CL580-2923-7-50	31	8.4	9
FH35C-33S-0.3SHW(50)	CL580-2913-3-50	33	9	9.6
FH35C-35S-0.3SHW(50)	CL580-2926-5-50	35	9.6	10.2
FH35C-37S-0.3SHW(50)	CL580-2914-6-50	37	10.2	10.8
FH35C-39S-0.3SHW(50)	CL580-2915-9-50	39	10.8	11.4
FH35C-41S-0.3SHW(50)	CL580-2924-0-50	41	11.4	12
FH35C-45S-0.3SHW(50)	CL580-2909-6-50	45	12.6	13.2
FH35C-49S-0.3SHW(50)	————	49	13.8	14.4
FH35C-51S-0.3SHW(50)	CL580-2920-9-50	51	14.4	15

■Recommended FPC Dimensions



Note 6: FPC should be designed so that the dimension of N is 0.5 mm or more.

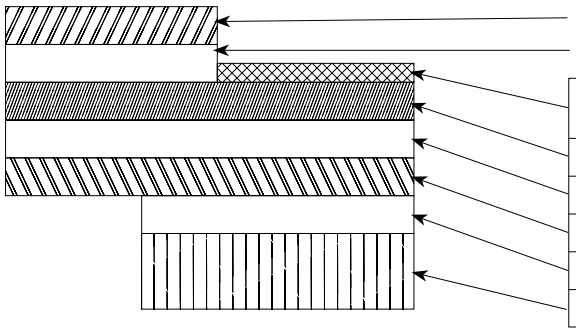
■Recommended FPC Dimensions

Unit: mm

Product No.	HRS No.	No. of Contacts	B	C	F
FH35C-9S-0.3SHW(50)	CL580-2910-5-50	9	1.8	2.4	3
FH35C-11S-0.3SHW(50)	CL580-2917-4-50	11	2.4	3	3.6
FH35C-13S-0.3SHW(50)	CL580-2925-2-50	13	3	3.6	4.2
FH35C-15S-0.3SHW(50)	CL580-2919-0-50	15	3.6	4.2	4.8
FH35C-17S-0.3SHW(50)	CL580-2916-1-50	17	4.2	4.8	5.4
FH35C-19S-0.3SHW(50)	CL580-2921-1-50	19	4.8	5.4	6
FH35C-21S-0.3SHW(50)	CL580-2922-4-50	21	5.4	6	6.6
FH35C-23S-0.3SHW(50)	CL580-2911-8-50	23	6	6.6	7.2
FH35C-25S-0.3SHW(50)	CL580-2912-0-50	25	6.6	7.2	7.8
FH35C-27S-0.3SHW(50)	CL580-2918-7-50	27	7.2	7.8	8.4
FH35C-31S-0.3SHW(50)	CL580-2923-7-50	31	8.4	9	9.6
FH35C-33S-0.3SHW(50)	CL580-2913-3-50	33	9	9.6	10.2
FH35C-35S-0.3SHW(50)	CL580-2926-5-50	35	9.6	10.2	10.8
FH35C-37S-0.3SHW(50)	CL580-2914-6-50	37	10.2	10.8	11.4
FH35C-39S-0.3SHW(50)	CL580-2915-9-50	39	10.8	11.4	12
FH35C-41S-0.3SHW(50)	CL580-2924-0-50	41	11.4	12	12.6
FH35C-45S-0.3SHW(50)	CL580-2909-6-50	45	12.6	13.2	13.8
FH35C-49S-0.3SHW(50)	————	49	13.8	14.4	15
FH35C-51S-0.3SHW(50)	CL580-2920-9-50	51	14.4	15	15.6

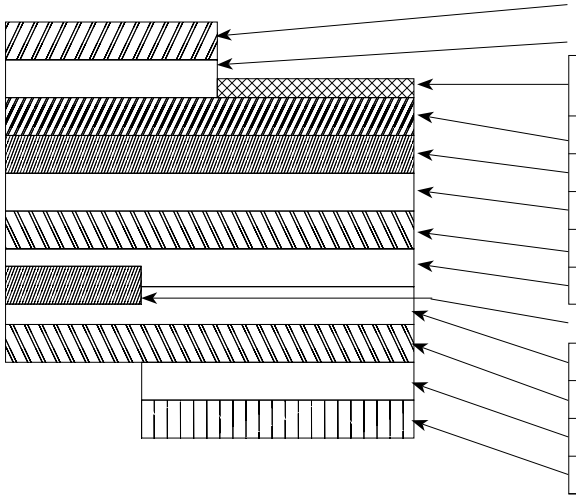
◆FPC material composition (Recommended specifications)

1.Single-Sided FPC



Name of material	Material property	Thickness (μm)
Cover lay film	Polyimide 1 mil	(25)
Cover adhesive		(25)
Surface treatment	Nickel undercoat 1 to 5μm+ Gold plating 0.2μm	3
Copper foil	Cu 1 oz	35
Base adhesive	Heat hardened adhesive	25
Base film	Polyimide 1 mil	25
Reinforcement material adhesive	Heat hardened adhesive	40
Stiffener film	Polyimide 3 mil	75
	Total	203

2.Double-Sided FPC



Name of material	Material property	Thickness (μm)
Cover lay film	Polyimide 1 mil	(25)
Cover adhesive		(25)
Surface treatment	Nickel undercoat 1 to 5 μm+ Gold plating 0.2 μm	3
Through-hole copper plating	Cu	15
Copper foil	Cu ½ oz	18
Base adhesive	Thermoset adhesive	18
Base film	Polyimide 1 mil	25
Base adhesive	Thermoset adhesive	18
Copper foil	Cu ½ oz	(18)
Cover adhesive	Thermoset adhesive	25
Cover lay film	Polyimide 1 mil	25
Reinforcement material adhesive	Thermoset adhesive	25
Stiffener film	Polyimide 1 mil	25
	Total	197

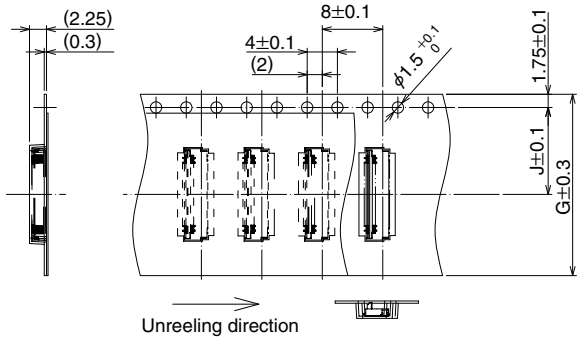
*When using Double-Sided FPC, the copper foil on the back side of the FPC should be eliminated. This is to prevent any unintentional unlocking due to bent or deformed FPC.

3.Additional notes on FPC

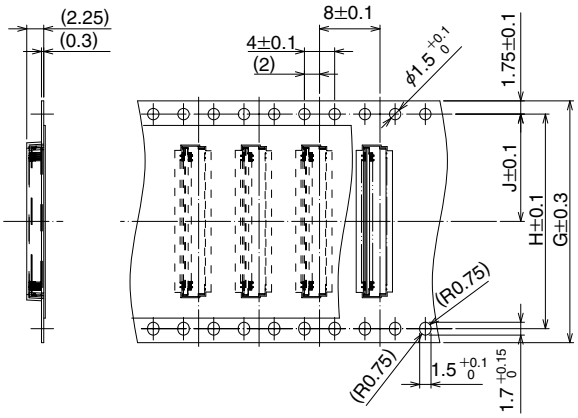
1. The FPC material composition is to be used as a reference example. Please make sure that the thickness of the FPC mating area is 0.2± 0.03 mm as previously referred to in the product specification section.
2. Please contact the FPC manufacturer for the details on its material composition.

◆Packaging Specifications

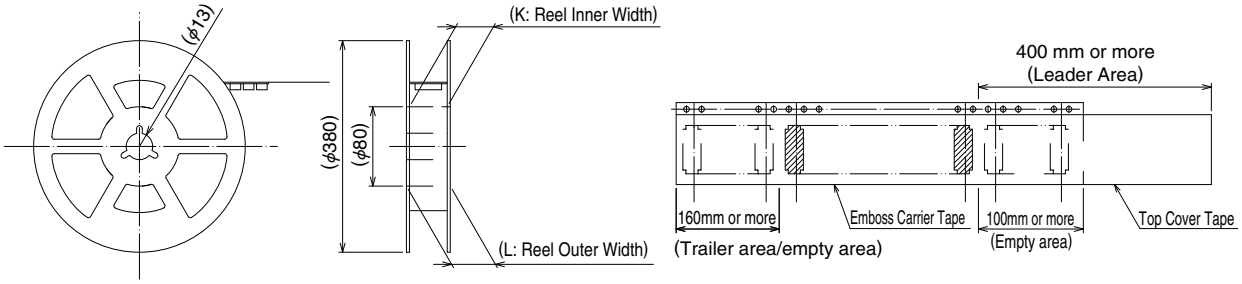
●Emboss Carrier Tape Dimensions (with tape width of 24 mm or less)



●Emboss Carrier Tape Dimensions (with tape width of 32 mm or more)



●Packaging Specification Dimensions

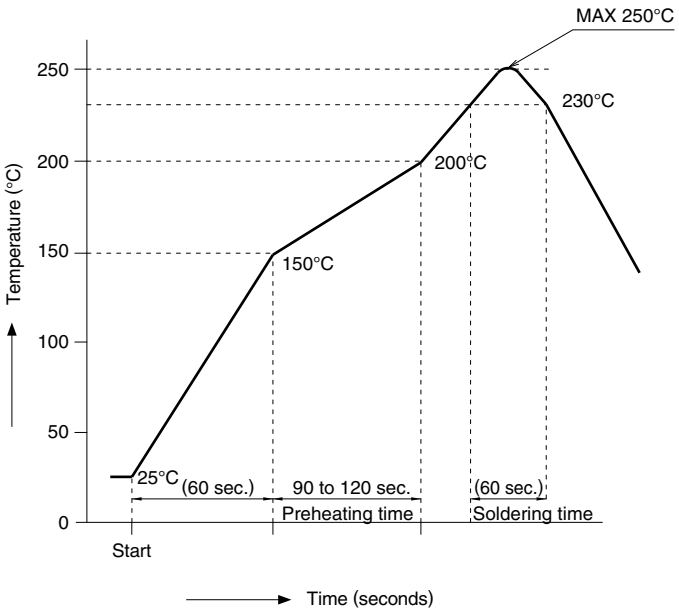


■Reel Dimensions

Unit: mm

Product No.	HRS No.	No. of Contacts	G	H	J	K	L
FH35C-9S-0.3SHW(50)	CL580-2910-5-50	9	16	-	7.5	17.4	21.4
FH35C-11S-0.3SHW(50)	CL580-2917-4-50	11	16	-	7.5	17.4	21.4
FH35C-13S-0.3SHW(50)	CL580-2925-2-50	13	16	-	7.5	17.4	21.4
FH35C-15S-0.3SHW(50)	CL580-2919-0-50	15	16	-	7.5	17.4	21.4
FH35C-17S-0.3SHW(50)	CL580-2916-1-50	17	16	-	7.5	17.4	21.4
FH35C-19S-0.3SHW(50)	CL580-2921-1-50	19	16	-	7.5	17.4	21.4
FH35C-21S-0.3SHW(50)	CL580-2922-4-50	21	24	-	11.5	25.4	29.4
FH35C-23S-0.3SHW(50)	CL580-2911-8-50	23	24	-	11.5	25.4	29.4
FH35C-25S-0.3SHW(50)	CL580-2912-0-50	25	24	-	11.5	25.4	29.4
FH35C-27S-0.3SHW(50)	CL580-2918-7-50	27	24	-	11.5	25.4	29.4
FH35C-31S-0.3SHW(50)	CL580-2923-7-50	31	24	-	11.5	25.4	29.4
FH35C-33S-0.3SHW(50)	CL580-2913-3-50	33	24	-	11.5	25.4	29.4
FH35C-35S-0.3SHW(50)	CL580-2926-5-50	35	24	-	11.5	25.4	29.4
FH35C-37S-0.3SHW(50)	CL580-2914-6-50	37	24	-	11.5	25.4	29.4
FH35C-39S-0.3SHW(50)	CL580-2915-9-50	39	24	-	11.5	25.4	29.4
FH35C-41S-0.3SHW(50)	CL580-2924-0-50	41	24	-	11.5	25.4	29.4
FH35C-45S-0.3SHW(50)	CL580-2909-6-50	45	24	-	11.5	25.4	29.4
FH35C-49S-0.3SHW(50)	-	49	32	28.4	14.2	33.4	37.4
FH35C-51S-0.3SHW(50)	CL580-2920-9-50	51	32	28.4	14.2	33.4	37.4

■Temperature Profile



Applicable Conditions

Reflow System : Far-infrared, hot-air reflow
Reflow chamber atmosphere : Air
Solder : Paste type Sn/3.0 Ag/0.5 Cu (M705-GRN360-K2-V; Senju Metal Industry Co., Ltd.)
Test PCB : PCB material and size
Glass epoxy 25 × 50 × 0.8 mm
Land dimensions
0.3 × 0.65, 0.3 × 0.8 mm
Metal Mask : Thickness : 0.1 mm
Opening dimension
0.23 × 0.55, 0.23 × 0.65 mm

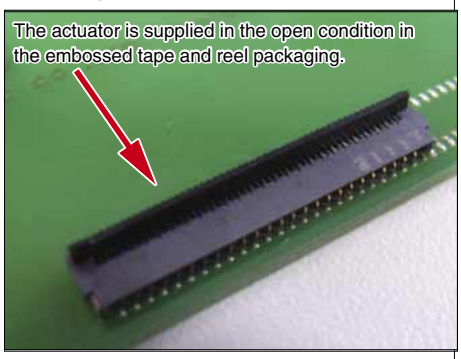
The provided temperature profile shown is based on the conditions described above.
Variations may occur due to the changing conditions such as solder paste types, different manufacturers, PCB size, and other soldering materials. Please check the mounting conditions before use.

◆Connector Handling and Precautions

[Operational Method]

These connectors are small and thin, so care needs to be used when handling this product. Please refer to this section after confirming the following points:

1. Initial mounted status (before inserting FPC)



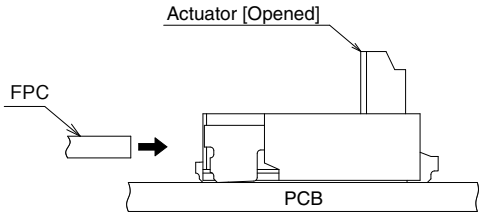
❶ These connectors are delivered with the actuator in an open position,removing the need to operate the actuator before inserting the FPC.

[Caution]
- •Do not close the actuator if the FPC has not been inserted yet.
- •If the actuator is closed without the FPC, it can narrow the contact gap and increases the insertion force.

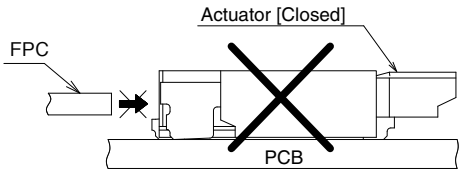
2. FPC insertion method

❶ Ensure that the FPC is held parallel to the surface of the PCB and is then completely inserted into the connector.

[Caution]
- •Do not insert the FPC if actuator is closed.
- •If the actuator is closed and if the FPC is twisted during insertion, it can cause contact deformation and / or contact failure.



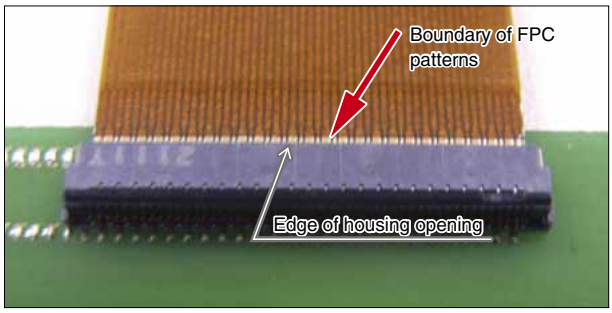
-Proper insertion-

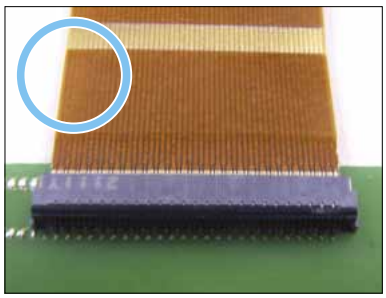


-Improper insertion-

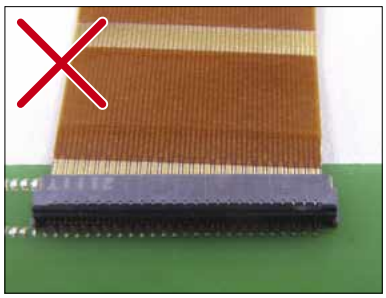
3. Confirmation of inserted FPC (when the top contact is used)

❶ By visually comparing the edge of the connector housing opening with the exposed FPC pattern, faulty insertion conditions such as a skewed or shallow insertion can be prevented.

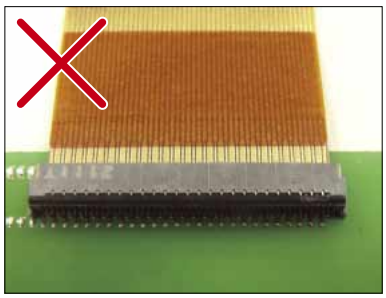




Proper insertion



Skewed insertion



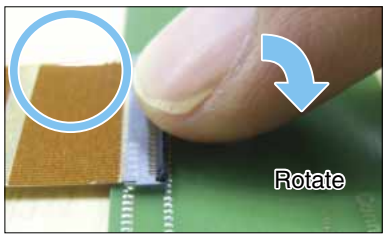
Shallow insertion

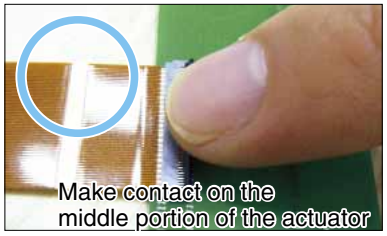
◆Connector Handling and Precautions

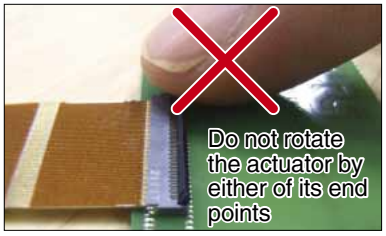
[Operational Method]

4. Locking method

❶ Operate the actuator in a rotational manner and press it down.
Rotate and push down on the middle portion or the entire width of the actuator using the finger tip.
Be sure to distribute the pressure evenly across the actuator, pressing down on only one side of the actuator may damage the actuator. Excessive force on the housing can also lead to damage or malfunction.



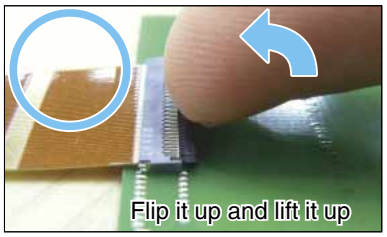


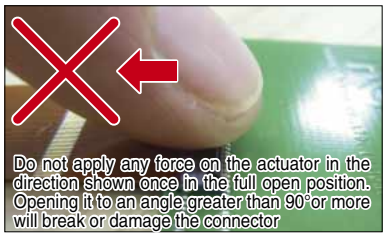


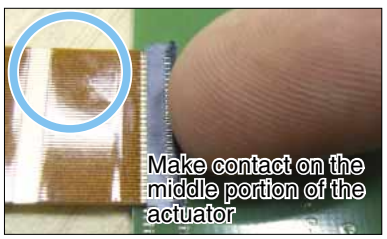
5. Removing the FPC

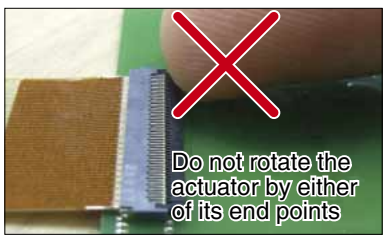
❶ Slowly rotate the actuator in an upward motion. After it is unlocked, the FPC can be removed.

❷ When unlocking the actuator, always touch the middle portion of the actuator.
Again, be sure to distribute the pressure evenly across the actuator, pressing down on only one side may damage the actuator. The actuator has a maximum opening of 90°. Trying to open it more than that or applying any unnecessary force to the actuator will cause damage and possibly failure of the connector.









This connector uses a back flip type structure. The direction of the FPC insertion and that of the actuator are different from front flip type connectors. Do not to try to open the actuator from the FPC side.

◆Connector Handling and Precautions

[Operational Method]

6. FPC Routing

❶ FPC should be routed in a manner that no strain or load is exerted onto the FPC. Disregarding this note may result in unintentional disconnection or damage to the FPC, which can lead to defects such as contact failure.

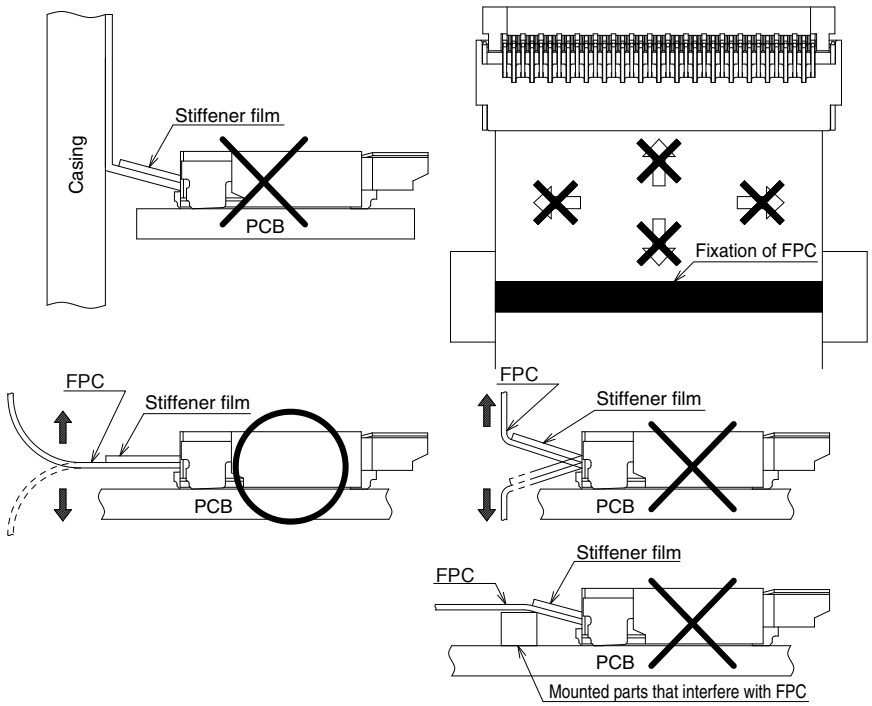
Caution:

•Do not allow the FPC or stiffener to touch the casings, housings or any other items.

•When routing the FPC, make sure that no strain or load is applied to the connector in a pulling, pushing or side-to-side motion. Additionally, make sure that no excessive upward or downward force is applied to the connector.

•When routing the FPC, make sure that the routing provides a stress free path for the FPC and keep the stiffener parallel to the PCB. Observe proper bend radiuses.

•Do not place or mount any parts that will interfere with the FPC routing.



◆Connector Handling and Precautions

[Precautions for mounting the connectors onto PCB]

◆PCB Warpage

Minimize PCB warpage. Although the coplanarity of this connector is 0.1 mm or less, mounting problems and defects may occur when excess PCB warpage is present.

◆Mounting onto FPC

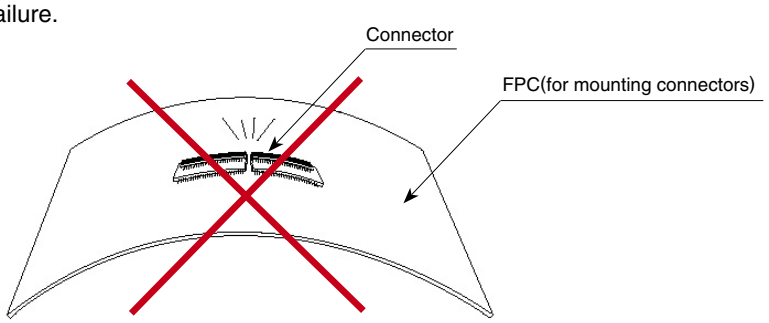
When mounting the connector on FPC, be sure to use a reinforcing board as it will make it easier to handle and more reliable. We recommend that you use glass epoxy, 0.3 mm thickness or more.

◆Load to Connector

Do not apply any external force of 0.5 N or more to the connector before mounting it. Excessive forces may cause the connector to break. Do not insert the FPC or operate the actuator before mounting the connector.

◆Load to board

•Divide the base material for multiple PCBs
•Fasten the PCBs with screws
Care should be taken so that the load is not exerted on the PCBs during the assembly process when conducting operations including those previously described. Failure to adhere to these precautions may result in connector damage and ultimately failure.



◆Hand Soldering Precautions

When performing repairs and hand soldering is being used, please take note of the following precautions:

❶Do not perform reflow or hand soldering while the FPC is inserted into the connector.

❷Do not apply excessive heat to the connector and make sure that the soldering iron only makes contact with the connector lead. This precaution prevents connector deformation or melting.

❸ Do not apply excessive amounts of solder or flux. Using excessive amounts of solder or flux on the contacts may cause the solder to wick into the contact areas or the shaft of the actuator. This can result in contact failure and/or rotational problems with the actuator.
Additionally, if excessive solder or flux is applied to the reinforcing metal fittings, problems may develop to the rotation function of the actuator and could lead to connector damage and ultimately lead to failure.