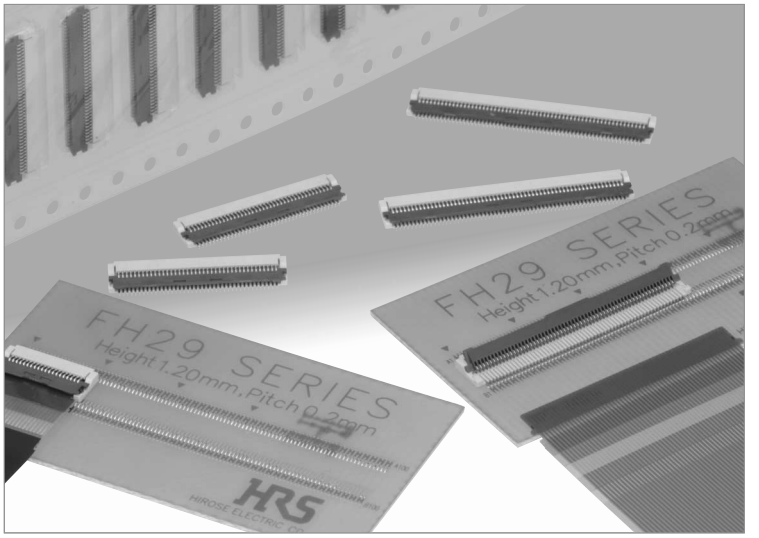
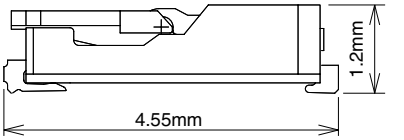
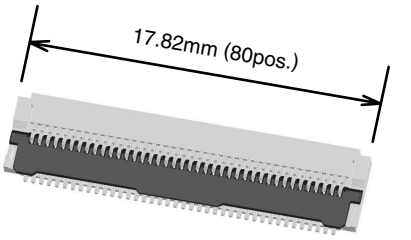
0.2mm Contact Pitch, 1.2mm above the board, Flexible Printed Circuit ZIF Connectors

FH29B Series



●Space saving (80 pos. shown)





■Features

1. Low profile, small PCB mounting area, weight reduction

Protruding only 1.2mm above the board connector occupies 40% less area than comparable type having contacts spaced on 0.3mm centers.

Creative design, coupled with high manufacturing capabilities resulted in extremely low weight on the connector.

2. Easy solderability on the PC board

The soldering leads are on 0.4mm pitch, exiting on front and back of the connector.

3. FPC temporary hold and verification of correct insertion

The connector has built-in FPC hold protrusions allowing the tactile feel of the correct FPC insertion and holding it in position before closing of the actuator.

4. Uses standard 0.2mm thick FPC

Proven Flip Lock actuator allows easy insertion of FPC. Tactile sensation when fully closed confirms complete electrical and mechanical connection.

5. One-finger operation of the actuator

Proven (in several other Hirose's connectors) Flip-Lock rotating actuator assures reliable mechanical and electrical connection with FPC, confirming it with a definite tactile feel.

6. Conductive traces on the PCB can run under the connector

No exposed contacts on the bottom of the connector.

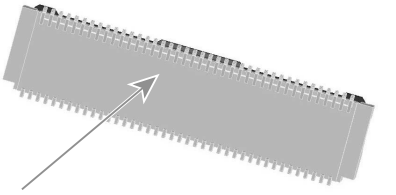
7. Board placement with automatic equipment

Flat top surface and packaging on the tape-and-reel allows the use of vacuum nozzles.
Standard reel contains 5,000 connectors.

8. Halogen Free

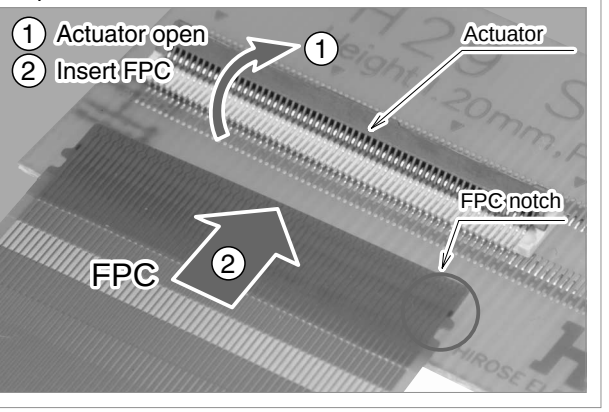
The connector does not use chlorine and bromine exceeding standard limits.(FH29BW Series)
*Defined in accordance with IEC61249-2-21
Br 900ppm or lower, Cl 900ppm or lower, Br + Cl 1,500ppm or lower

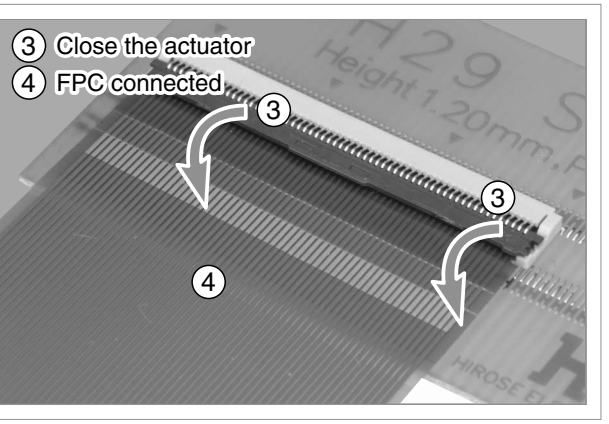
●Can be mounted over conductive traces.



No exposed contacts on the bottom of the connector

●Operation





■Product Specifications

Rating	Rated current 0.25 A DC(Note 1) Rated voltage 40 V AC/DC	Operating temperature range -55℃ to +85℃ (Note 2) Operating humidity range Relative humidity 90% max. (No condensation)	Storage temperature range -10℃ to +50℃(Note 3) Storage humidity range Relative humidity 90% max.

Recommended FPC	Thickness: = 0.2+/- 0.03mm gold plated

Item	Specification	Conditions
1.Insulation resistance	500 M ohms min.	100 V DC
2.Withstanding voltage	No flashover or insulation breakdown.	120 V AC / 1 minute
3.Contact resistance	100 m ohms max. ✻ Including FPC conductor resistance	1 mA
4.Durability (insertion/ withdrawal)	Contact resistance: 100 m ohms max. No damage, cracks, or parts dislocation.	20 cycles
5.Vibration	No electrical discontinuity of longer. Contact resistance: 100 m ohms max. No damage, cracks, or parts dislocation.	Frequency: 10 to 55 Hz, single amplitude of 0.75 mm, 10 cycles in each of the 3 directions.
6.Shock	No electrical discontinuity of longer. Contact resistance: 100 m ohms max. No damage, cracks, or parts dislocation.	Acceleration of 981 m/s², 6 ms duration, sine half-wave waveform, 3 cycles in each of the 3 axis
7.Humidity (Steady state)	Contact resistance: 100 m ohms max. Insulation resistance: 50 M ohms min. No damage, cracks, or parts dislocation.	96 hours at 40℃ and humidity of 90% to 95%.
8.Temperature cycle	Contact resistance: 100 m ohms max. Insulation resistance: 50 M ohms min. No damage, cracks, or parts dislocation.	Temperature: -55℃→+15℃ to +35℃→+85℃→+15℃ to +35℃ Time: 30 → 2 to 3 → 30 → 2 to 3 (Minutes) 5 cycles
9.Resistance to soldering heat	No deformation of components affecting performance.	Reflow: At the recommended temperature profile Manual soldering: 350℃ +/-10℃ for 5 seconds

Note 1: When passing the current through all of the contacts, use 70% of the rated current.
Note 2: Includes temperature rise caused by current flow.
Note 3: The term ”storage” refers to products stored for long period of time prior to mounting and use. Operating Temperature Range and Humidity range covers non- conducting condition of installed connectors in storage, shipment or during transportation.
Note 4: Information contained in this catalog represents general requirements for this Series. Contact us for the drawings and specifications for a specific part number shown.

■Materials

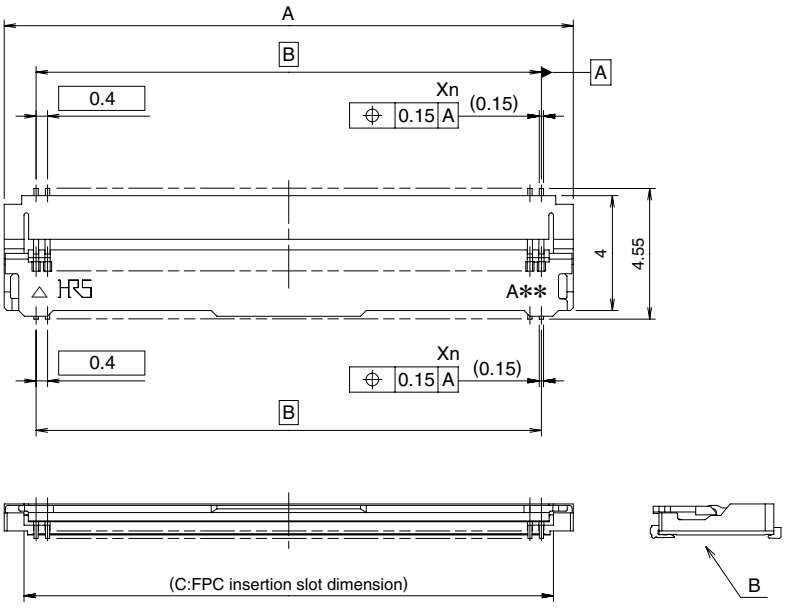
Part	Material	Finish	Remarks
Insulator	LCP	Color: Beige	UL94V-0
	PA	FH29B Series : Deep brown	
		FH29BW Series : Light brown	UL94HB
Contacts	Phosphor bronze	Gold plated	————

■Ordering information

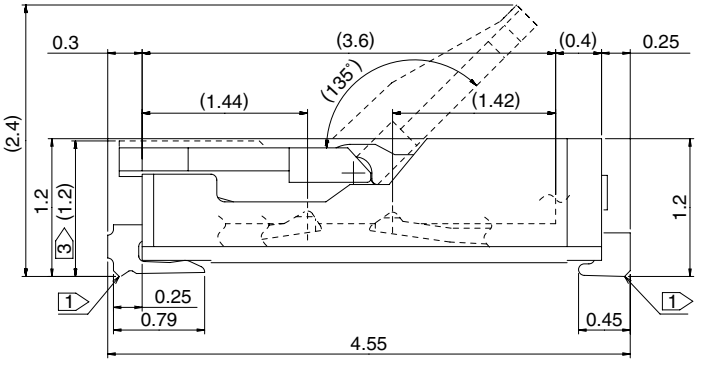
FH 29B W - 80S - 0.2 SHW (05)
❶ ❷ ❸ ❹ ❺ ❻ ❼

❶ Series name: FH	❺ Contact pitch: 0.2 mm
❷ Series No. : 29B	❻ Terminal type SHW: SMT horizontal mounting type
❸ Blank : Standard W : Satisfies Halogen-free requirements (Flame retardance UL94HB).	❼ Plating specifications (05): Gold plating with nickel barrier
❹ No. of contacts Number of contacts: 22 to 120	

■Connector Dimension



B



Notes 1 The coplanarity of each terminal lead is within 0.1 max.
2 Slight variations in color of the plastic compounds do not affect form, fit or function of the connector.
3 The form of the actuator is as depicted by the broken line in connectors having 92 or more contacts.
4 Packaged on tape and reel only. Check packaging specification.

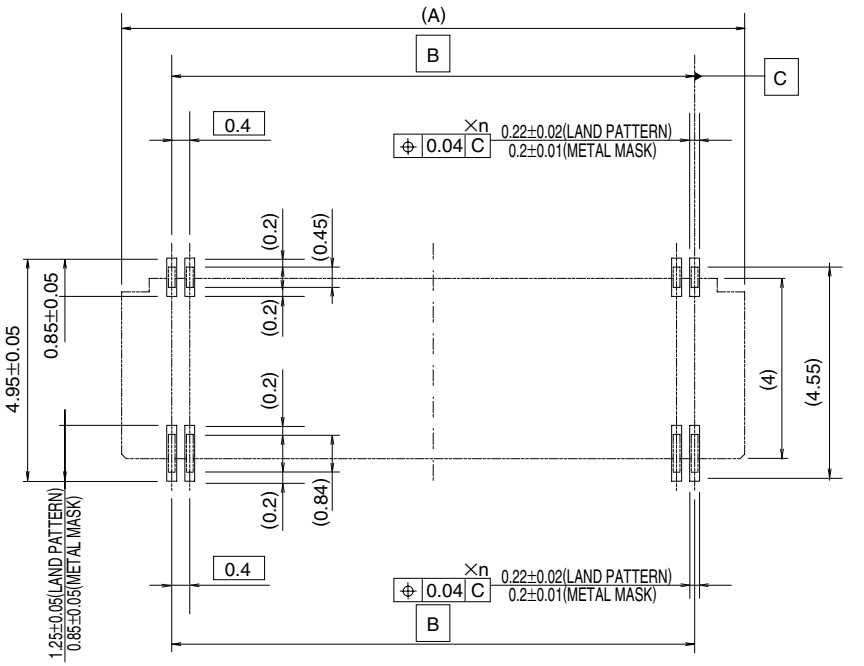
Unit: mm

Part Number	CL No.	Number of Contacts	A	B	C	n
FH29BW-22S-0.2SHW(05)	580-0325-4-05	22	6.22	4	4.84	11
FH29BW-24S-0.2SHW(05)	580-0323-9-05	24	6.62	4.4	5.24	12
FH29B-34S-0.2SHW(05)	580-0312-2-05	34	8.62	6.4	7.24	17
FH29B-40S-0.2SHW(05)	580-0313-5-05	40	9.82	7.6	8.44	20
FH29B-44S-0.2SHW(05)	580-0314-8-05	44	10.62	8.4	9.24	22
FH29BW-44S-0.2SHW(05)	580-0324-1-05					
FH29B-50S-0.2SHW(05)	580-0315-0-05	50	11.82	9.6	10.44	25
FH29B-60S-0.2SHW(05)	580-0316-3-05	60	13.82	11.6	12.44	30
FH29B-70S-0.2SHW(05)	580-0317-6-05	70	15.82	13.6	14.44	35
FH29B-80S-0.2SHW(05)	580-0318-9-05	80	17.82	15.6	16.44	40
FH29BW-80S-0.2SHW(05)	580-0326-7-05					
FH29B-90S-0.2SHW(05)	580-0319-1-05	90	19.82	17.6	18.44	45
FH29B-100S-0.2SHW(05)	580-0320-0-05	100	21.82	19.6	20.44	50
FH29B-120S-0.2SHW(05)	580-0321-3-05	120	25.82	23.6	24.44	60

Tape and packaging (5,000 pieces/reel).
Order by number of reels.

■Recommended PCB mounting pattern and metal mask dimensions

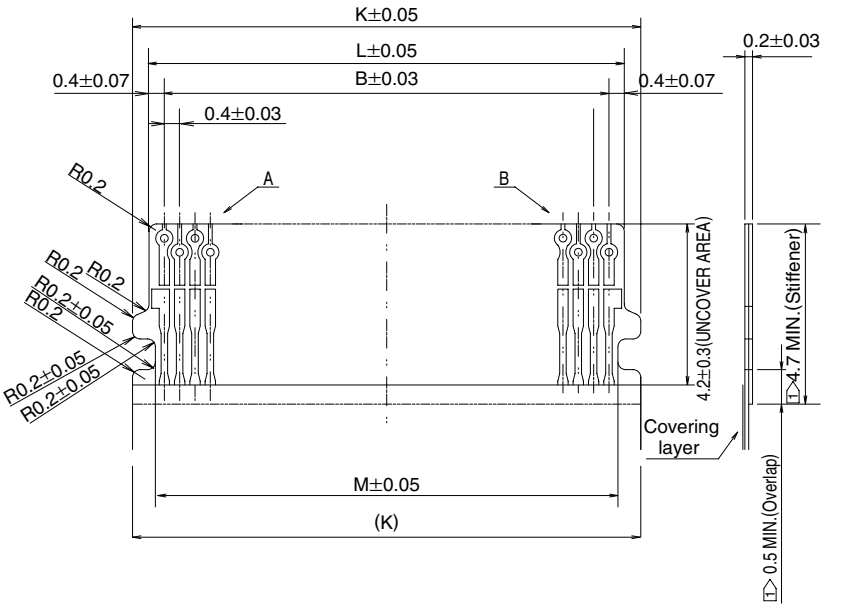
●Recommended metal mask thickness: 0.12mm

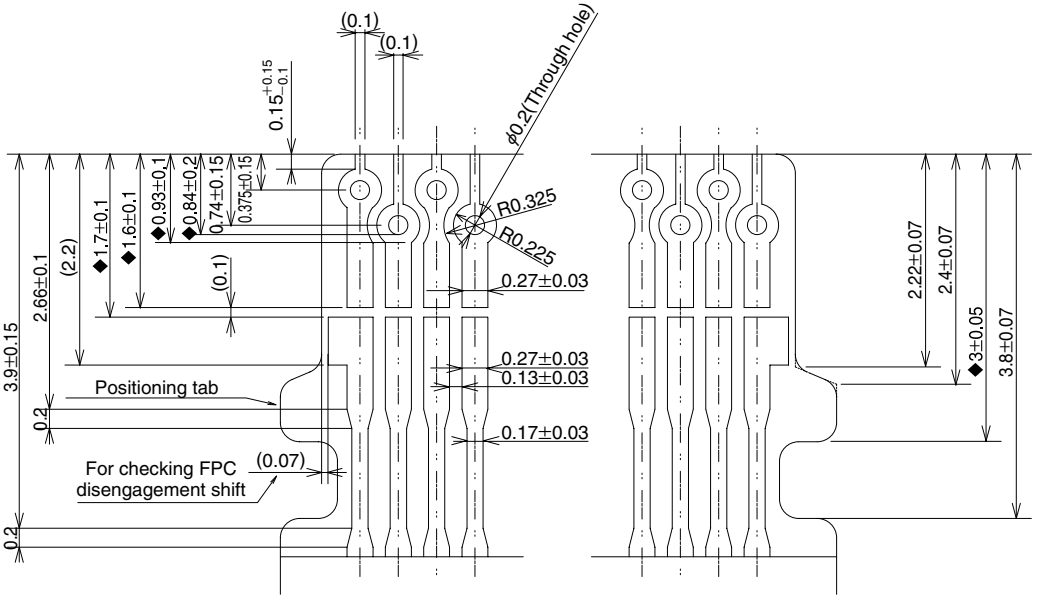


Unit: mm

Part Number	CL No.	Number of Contacts	A	B	n
FH29BW-22S-0.2SHW(05)	580-0325-4-05	22	6.22	4	11
FH29BW-24S-0.2SHW(05)	580-0323-9-05	24	6.62	4.4	12
FH29B-34S-0.2SHW(05)	580-0312-2-05	34	8.62	6.4	17
FH29B-40S-0.2SHW(05)	580-0313-5-05	40	9.82	7.6	20
FH29B-44S-0.2SHW(05)	580-0314-8-05	44	10.62	8.4	22
FH29BW-44S-0.2SHW(05)	580-0324-1-05				
FH29B-50S-0.2SHW(05)	580-0315-0-05	50	11.82	9.6	25
FH29B-60S-0.2SHW(05)	580-0316-3-05	60	13.82	11.6	30
FH29B-70S-0.2SHW(05)	580-0317-6-05	70	15.82	13.6	35
FH29B-80S-0.2SHW(05)	580-0318-9-05	80	17.82	15.6	40
FH29BW-80S-0.2SHW(05)	580-0326-7-05				
FH29B-90S-0.2SHW(05)	580-0319-1-05	90	19.82	17.6	45
FH29B-100S-0.2SHW(05)	580-0320-0-05	100	21.82	19.6	50
FH29B-120S-0.2SHW(05)	580-0321-3-05	120	25.82	23.6	60

■FPC Recommended Dimensions Diagram





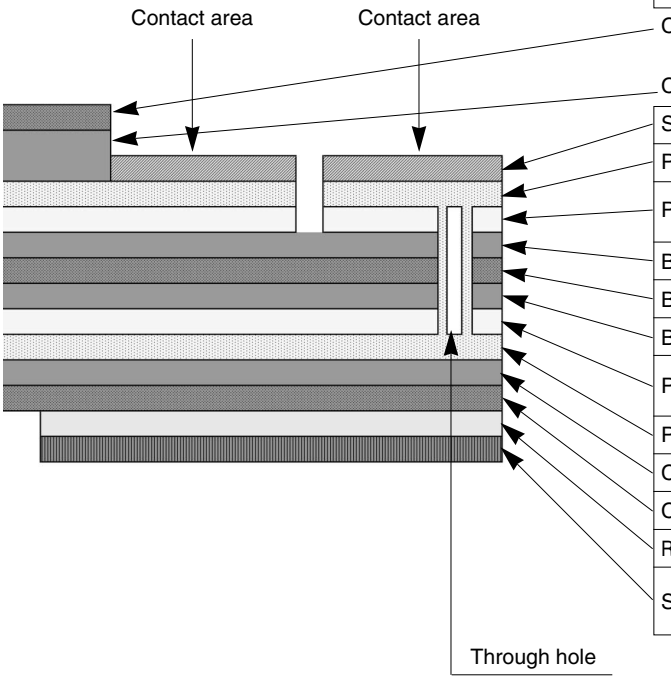
1 To prevent pattern cutting, when 4.7 mm or more of reinforecement film cannot be secured, make the overlap amount 0.5 mm or greater.

Unit: mm

Part Number	CL No.	Number of Contacts	K	L	M
FH29BW-22S-0.2SHW(05)	580-0325-4-05	22	5.66	4.8	4.47
FH29BW-24S-0.2SHW(05)	580-0323-9-05	24	6.06	5.2	4.87
FH29B-34S-0.2SHW(05)	580-0312-2-05	34	8.06	7.2	6.87
FH29B-40S-0.2SHW(05)	580-0313-5-05	40	9.26	8.4	8.07
FH29B-44S-0.2SHW(05)	580-0314-8-05	44	10.06	9.2	8.87
FH29BW-44S-0.2SHW(05)	580-0324-1-05				
FH29B-50S-0.2SHW(05)	580-0315-0-05	50	11.26	10.4	10.07
FH29B-60S-0.2SHW(05)	580-0316-3-05	60	13.26	12.4	12.07
FH29B-70S-0.2SHW(05)	580-0317-6-05	70	15.26	14.4	14.07
FH29B-80S-0.2SHW(05)	580-0318-9-05	80	17.26	16.4	16.07
FH29BW-80S-0.2SHW(05)	580-0326-7-05				
FH29B-90S-0.2SHW(05)	580-0319-1-05	90	19.26	18.4	18.07
FH29B-100S-0.2SHW(05)	580-0320-0-05	100	21.26	20.4	20.07
FH29B-120S-0.2SHW(05)	580-0321-3-05	120	25.26	24.4	24.07

■FPC Construction (Recommended Specifications)

1.Using Double-sided FPC



Material Name	Material	Thickness(μm)	
		3-Layer CCL	2-Layer CCL
Covering layer film	Polyimide 3-Layer 1mil thick 2-Layer 1/2mil thick	(25)	(12.5)
Cover adhesive	Thermosetting adhesive	(30)	(25)
Surface treatment	Nickel base gold plated	3.5	3.5
Pattern copper plating	Cu	13	13
Pattern copper foil	Cu 3-Layer 1/2 02 2-Layer 1/3 02	18	12
Base adhesive	Thermosetting adhesive	10	———
Base film	Polyimide 1mil thick	25	25
Base adhesive	Thermosetting adhesive	10	———
Pattern copper foil	Cu 3-Layer 1/2 02 2-Layer 1/3 02	18	12
Pattern copper plating	Cu	13	13
Cover adhesive	Thermosetting adhesive	25	20
Covering layer film	Polyimide 0.5mil	12.5	12.5
Reinforecement material adhesive	Thermosetting adhesive	30	30
Stiffener	Polyimide 3-Layer 1mil thick 2-Layer 3mil thick	25	75
	Total	203	216

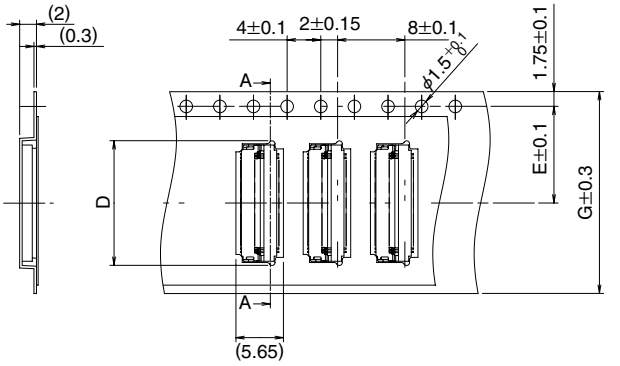
Note: Recommended FPC thickness: 0.2±0.03mm

2.Precautions

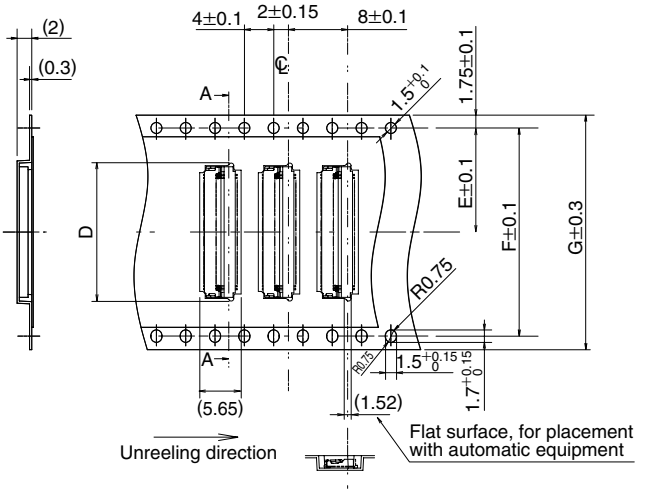
■Packaing Specifications

Embossed Carrier Tape Dimensions

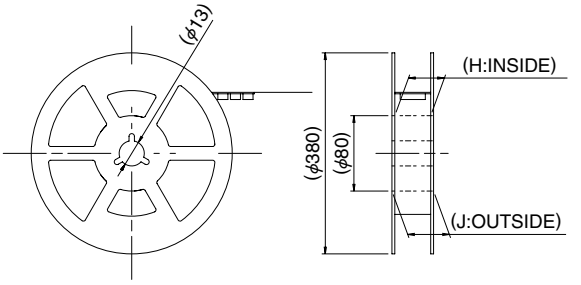
●Tape width up to 24mm

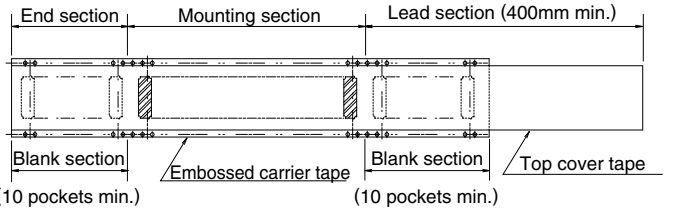


●Tape width 32mm and over



●Reel Dimensions



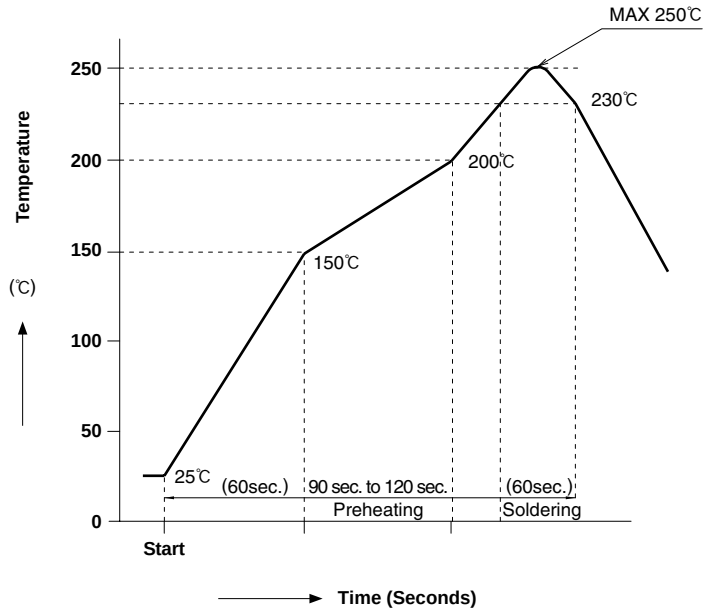


Unit: mm

Part Number	CL No.	Number of Contacts	D	E	F	G	H	J
FH29BW-22S-0.2SHW(05)	580-0325-4-05	22	7.22	7.5	———	16	17.4	21.4
FH29BW-24S-0.2SHW(05)	580-0323-9-05	24	7.62	11.5	———	24	25.4	29.4
FH29B-34S-0.2SHW(05)	580-0312-2-05	34	9.62	11.5	———	24	25.4	29.4
FH29B-40S-0.2SHW(05)	580-0313-5-05	40	10.82	11.5	———	24	25.4	29.4
FH29B-44S-0.2SHW(05)	580-0314-8-05	44	11.62	11.5	———	24	25.4	29.4
FH29BW-44S-0.2SHW(05)	580-0324-1-05							
FH29B-50S-0.2SHW(05)	580-0315-0-05	50	12.82	11.5	———	24	25.4	29.4
FH29B-60S-0.2SHW(05)	580-0316-3-05	60	14.82	11.5	———	24	25.4	29.4
FH29B-70S-0.2SHW(05)	580-0317-6-05	70	16.82	11.5	———	24	25.4	29.4
FH29B-80S-0.2SHW(05)	580-0318-9-05	80	18.82	14.2	28.4	32	33.4	37.4
FH29BW-80S-0.2SHW(05)	580-0326-7-05							
FH29B-90S-0.2SHW(05)	580-0319-1-05	90	20.82	20.2	40.4	44	45.4	49.4
FH29B-100S-0.2SHW(05)	580-0320-0-05	100	22.82	20.2	40.4	44	45.4	49.4
FH29B-120S-0.2SHW(05)	580-0321-3-05	120	26.82	20.2	40.4	44	45.4	49.4

■Recommended Temperature Profile

●Using Lead-free Solder Paste



HRS test condition

Solder method	: Reflow, IR/hot air
Environment	: Room air
Solder composition	: Paste, 96.5%Sn/3.0%Ag/0.5%Cu
	(Senju Metal Industry, Co., Ltd.'s Part Number: M705-221CM5-32-10.5)
Test board	: Glass epoxy 25mm×45mm×0.8mm thick
Land dimensions	: 0.22mm×0.85mm, 0.22mm×1.25mm
Metal mask	: 0.20×0.85×0.12mm thick

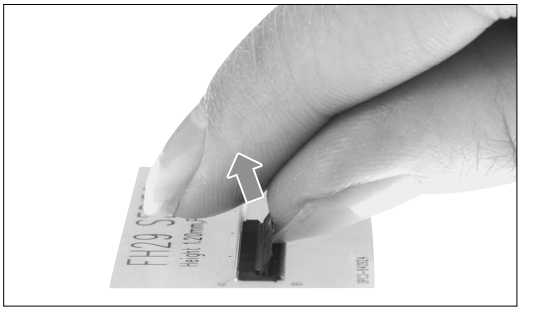
The temperature profiles are based on the above conditions.
In individual applications the actual temperature may vary, depending on solder paste type, volume/thickness and board size/thickness. Consult your solder paste and equipment manufacturer for specific recommendations.

■Operation and Precautions

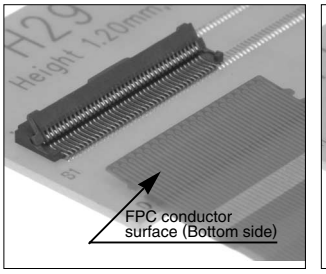
Operation

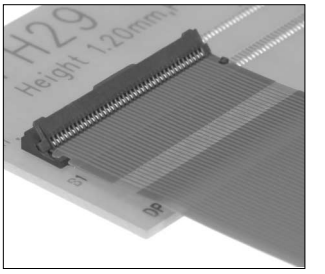
1.FPC insertion procedure. Connector installed on the board.

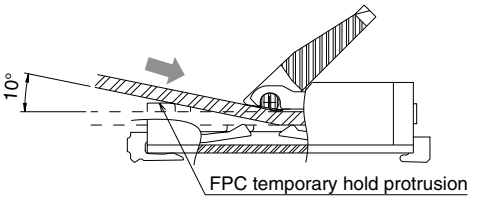
❶ Lift up the actuator. Use thumb or index finger.



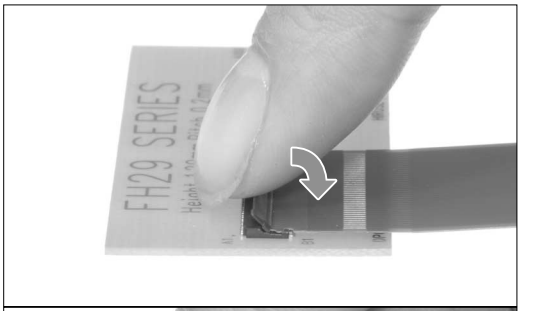
❷ Fully insert the FPC in the connector parallel to mounting surface, with the exposed conductive traces facing down.





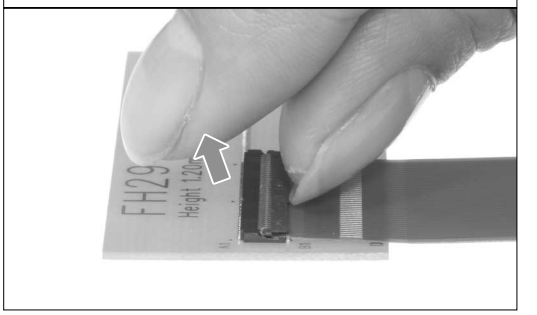


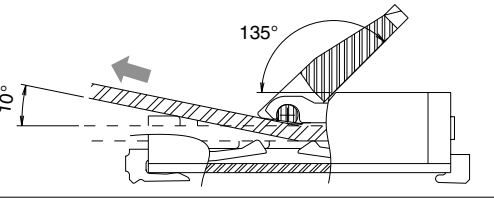
❸ Rotate down the actuator until firmly closed. It is critical that the inserted FPC is not moved and remains fully inserted.



2. FPC removal

❶ Lift up the actuator. Carefully withdraw the FPC.





Precautions

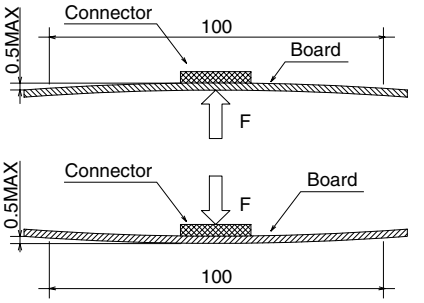
These connectors are of a miniature and thin design and must be handled with care. Please check the following matters and use accordingly.

Precautions When Board Mounting

◆Amount of board flexing
The amount of board flexing should be kept to a minimum.
The degree of flatness of these connectors is 0.1 mm or less; however, a large amount of flexing may give rise to solder faults.
✻ Various factors can contribute to flexing and we ask that you conduct a check beforehand.

◆Connector Load
Do not apply an external force of 0.5 N or greater to the connector before mounting. Doing so could damage the connector. Before mounting, do not insert FPC and do not operate the connector.

◆ Board Load
Be careful that a load is not applied to the board during an assembly process such as when dividing boards into a number of smaller ones, or when fastening boards with screws.
Doing so may damage the connector.



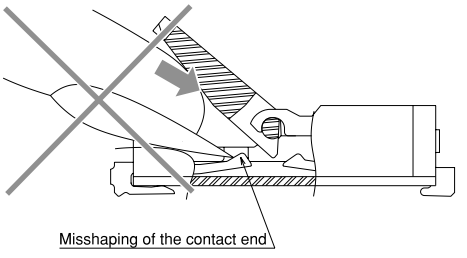
Precautions When Inserting or Coupling FPC

Pay attention to the following points when inserting or coupling FPC.

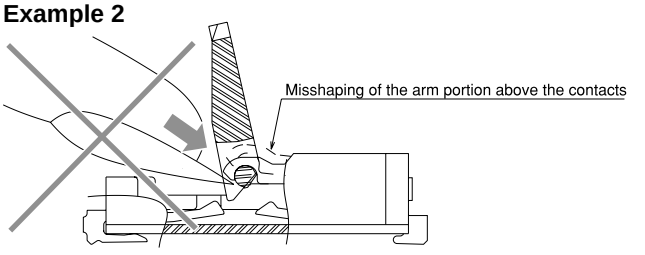
◆Actuator Operation

❶Be careful not to apply excessive force when opening the actuator from the initial condition (prior to FPC insertion). Also note that the deep insertion of a fingernail, finger, or something else could misshape the contacts as indicated the diagrams below.

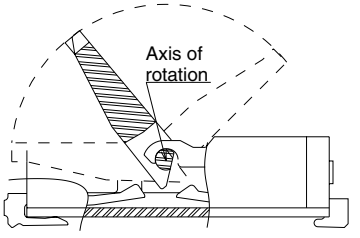
Example 1



Example 2

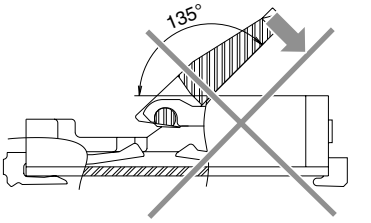


❷As illustrated in the diagram below, the actuator rotates centered on an axis of rotation and the actuator should be operated so that it rotates.

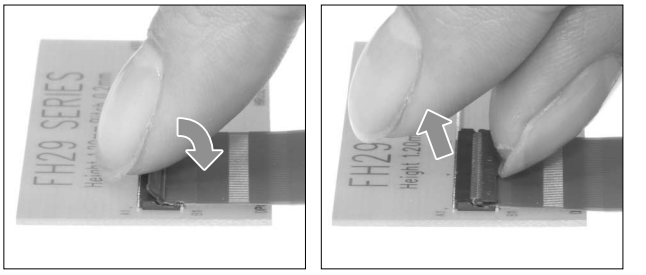


Precautions

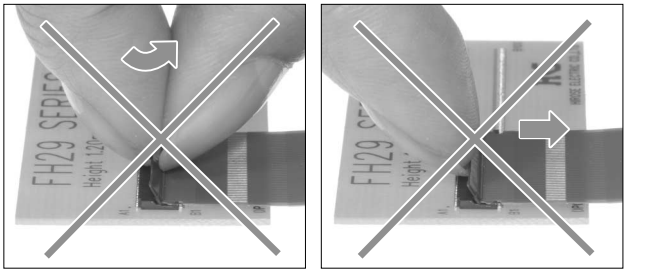
❸The actuator is designed so that it does not open more than 135 degrees. Do not apply force to make it move back further. (Refer to the diagrams below.) Excessive force will cause the lock lever to bend or break. (Force should be 1 N or less.)



❹When operating the actuator, do so from the center portion.

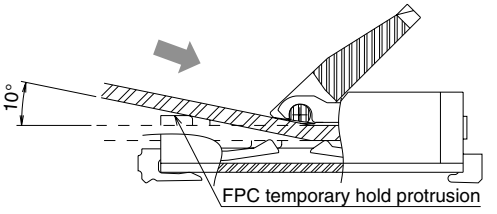


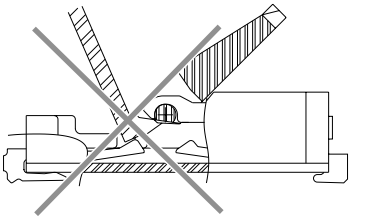
❺As illustrated in the diagrams below, do not take the actuator with your fingers and lift it or pick it.
Doing so may cause damage. (Do not perform any operations other than the rotation operation previously described in Step ❷ .)



◆ Contact Orientation
This connector is a bottom-contact connector and the FPC conductor exposed surface is inserted facing downward.

◆ FPC Insertion
❶There is an FPC positioning tab that requires the FPC to be inserted at an angle of about 10° with respect to the board surface and perpendicular to the connector, and the FPC should be inserted firmly all the way to the back.
Diagonal insertion of the FPC will result in a short-circuit fault due to a shift of the pitch, and the corner of the FPC may catch on the contacts and cause the contacts to become misshapen.



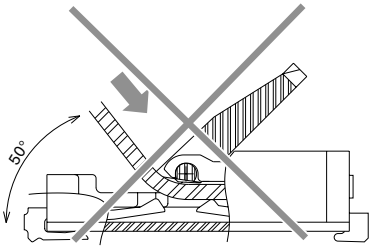


Precautions

◆FPC Insertion②

❷Do not insert the FPC on an angle from above.

As illustrated in the diagram below, when the FPC has been inserted on an angle during the FPC insertion procedure, the FPC will bend and the pattern may break, or the FPC may not be inserted sufficiently which will cause a conduction fault.



✻To avert insertion of the FPC on an angle, consideration should be given to securing FPC insertion space at the time of board layout. Also note that insertion will be difficult when the FPC is too short and we ask that due consideration be given to a suitable parts layout.

✻Please contact the FPC manufacturer for information about the FPC bending qualities and breakage.

◆ Checking the Locked Condition

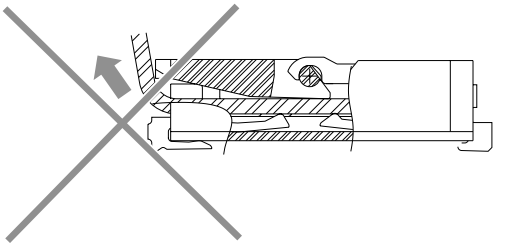
When locking, check that the actuator is level with the board surface as illustrated in the diagram below. Note that when the actuator is oriented in the vicinity of 0 degrees, measures should be taken so that an excessive load is not applied. Such a load may cause contact misshaping. (Force should be 1 N or less.)

Precautions When Routing the FPC After FPC Coupling

◆FPC Load

Be careful not to apply a load to the FPC after FPC mounting. Doing so may release the lock of the connector or cause FPC disconnection or damage. Especially if a load is applied to the FPC in a continuous manner, measures should be taken to anchor the FPC.

Also, with regard to routing the FPC, take measures not to abruptly bend the FPC in the vicinity of the insertion area.

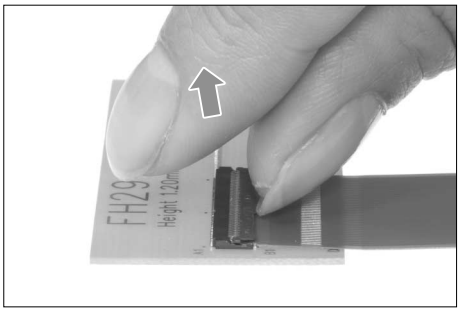


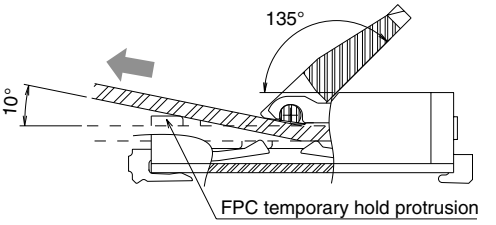
Precautions

Precautions When Removing the FPC

◆When releasing the actuator, release it in the vicinity of the center portion.
When the lock is closed with the FPC inserted, rotating the actuator from the tip could result in actuator damage.

◆To pull out the FPC, first release the actuator, then pull out the FPC.
There is an FPC positioning tab that requires the FPC to be pulled out at an angle of about 10° with respect to the board surface.
Pulling out the FPC level with the board (at about 0˚), or applying a load of 5 N or greater to the connector (FPC positioning cutout), introduces the possibility that the connector (FPC positioning cutout) will be damaged.





Other Precautions

◆Hand Soldering Precautions
When hand soldering for repair or at other times, pay attention to the following matters.
❶Do not perform reflow or hand soldering with the FPC inserted in the connector.
❷Be careful not to apply excessive heat or touch the soldering iron anywhere other than the connector leads. Doing so will cause the connector to become misshapen or melt.
❸Do not supply excessive solder (flux).
Supplying excessive solder (flux) to the contacts will cause the flux to adhere to the contacts or the rotating portion of the actuator. This will cause a contact fault or trouble with the rotation operation of the actuator. Also note that application of excessive solder to the reinforcement fittings will give rise to breakdown of the rotation operation of the lock lever and will cause connector damage.