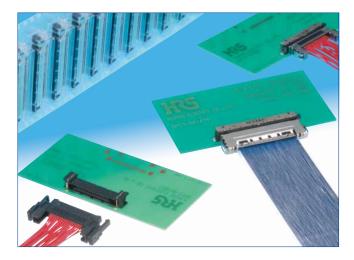
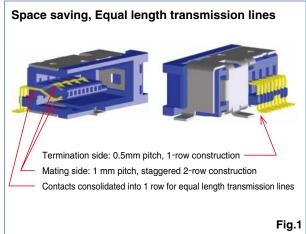
1mm Pitch Wire-to-Board Connectors supporting LVDS signal

FX15 Series





Features

1. Space-saving

Reduction in space is achieved by designing the contacts in 2-row staggered 1mm pitch on the mating side and on a single row 0.5mm pitch on the termination side (Fig.1).

2. Equal length transmission lines

Contact configuration provides equal length transmission lines, which prevents LVDS signal loss within the connector.

3. Variations

Availability of shielded and non-shielded types allows for design flexibility and cost reduction.

4. Self alignment and self-guiding

Built-in guide posts allow secure self-alignment within ± 1.5 mm (Fig.2).

5. Secure and complete mating / unmating

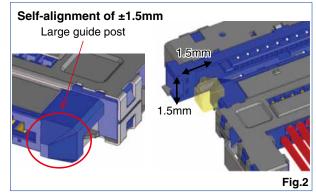
Side latch locking provides complete and secure mating, as well as easy unmating (Fig.3).

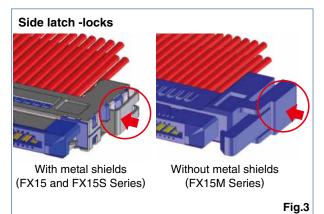
6. Enhanced shielding performance with FX15S

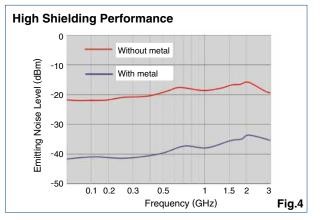
Enlarged metal shields prevent intrusion and emission of electromagnetic interference, which enhances the integrity of the LVDS signal (Fig.4).

7. RoHS compliant

All materials and substances used to produce this product comply with RoHS standards.







2015.103 **HS** 1

In cases where the application will demand a high level of reliability, such as automotive, please contact a company representative for further information.

Product Specifications

Ratings	Current rating Voltage rating	0.5A 100V AC	Operating temperature range Storage temperature range	-55°C to +80°C (Note 1) -10°C to +60°C (Note 2)		
Item	Specific	ation	Con	ditions		
1. Contact resistance	60mΩ max. (Note 3)		1mA			
2. Insulation resistance	500MΩ min.		100V DC			
3. Withstanding voltage	No flashover or insulation	n breakdown.	300V AC/one minute			
4. Insertion-Extraction for	ce 2N min., 30N max.		With corresponding connector			
5. Mating cycles	Contact resistance : 80m	Contact resistance : 80mΩ max.(Note 3)		50 cycles		
6. Vibration resistance	No electrical discontinuity	of 1μ s or more.	Frequency: 10 to 55 Hz, single amplitude of 0.75mm, 2 hours, 3 axis			
7. Shock resistance	No electrical discontinuity	of 1μ s or more.	Acceleration of 490m/s ² , 11ms durations, sine half-wave waveform, 3 cycles, 3axis.			
8. Humidity resistance	Contact resistance : 80m No damage, cracks, or par) 96 hours at 40°C, RH 90% to 95%	6		
9. Temperature cycle	Contact resistance : 80m Insulation resistance : 50	· ,	Temperature: -55°C \rightarrow +15°C to +35°C \rightarrow +85°C \rightarrow +15°C to +35°Time: 30 \rightarrow 5 \rightarrow 30 \rightarrow 5 (Minutes)5 cycles			
10. Salt spray	Contact resistance : 80m No corrosions	Ω max. (Note 3)	5% water solution for 48 hours.			

Note 1 : Includes temperature rise caused by current flow.

Note 2 : The term "storage" refers to products stored for long period of time prior to mounting and use. Operating temperature and humidity range includes non-conducting condition of installed connectors in storage, shipment or during transportation.

Note 3 : Includes wire conductor resistance (12mm long).

Materials / Finish

Receptacle

Component	Material	Finish	Remarks
Insulator	Polyamide	Color : Black	UL94V-0
Contact	Phosphor bronze	Contact area : Gold plated Termination area : Tin plated	
Metal shell (shielded version only)	FX15S : Nickel silver FX15SC : Stainless steel	FX15S : FX15SC : Tin plated	
Metal fittings (shielded version only)	Phosphor bronze	Selective gold flash plated	

●Plug

<u> </u>			
Component	Material	Finish	Remarks
Insulator	Polyamide	Color : Black	UL94V-0
Contact	Phosphor bronze	Contact area : Gold plated Termination area : Tin plated	
Metal shell (shielded version only)	Nickel silver		
Metal latch locks (shielded version only)	Stainless steel		
Metal shell, metal latch locks (on micro coax version only)	Stainless steel	Nickel plated	

Product Number Structure

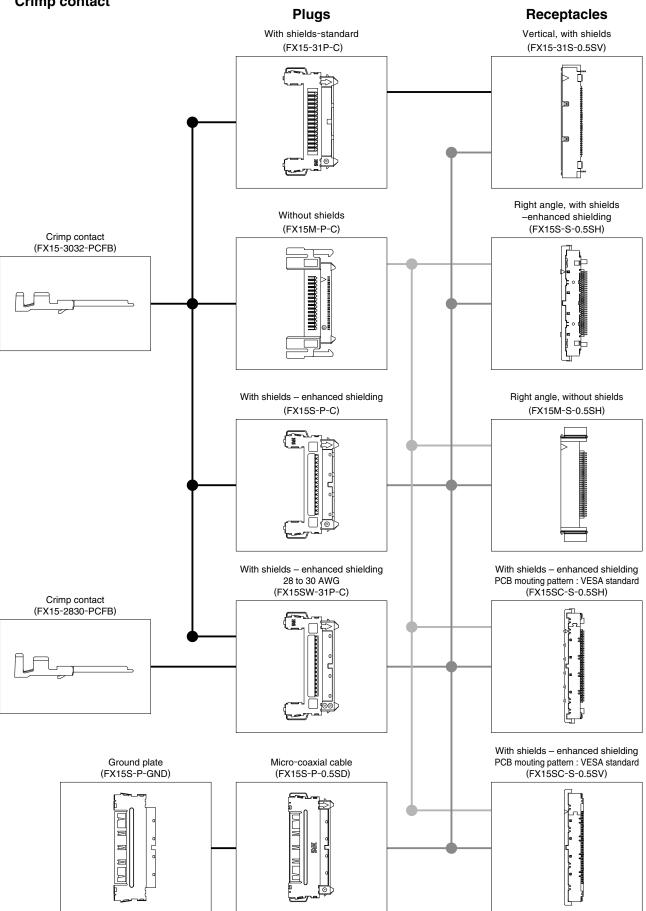


- $\frac{\mathsf{FX15}}{\bullet} \frac{\mathsf{S}}{\diamond} \frac{\mathsf{31}}{\bullet} \frac{\mathsf{P}}{\diamond} \frac{\mathsf{C}}{\diamond}$

Series Name		: FX15
Configuration	Blank 15S 15SC 15M	: With shields (or crimp contact) : With shields – enhanced shielding : With shields – enhanced shielding (PCB mounting pattern : VESA standard) : Without shields
3Number of contacts		
Connector type	P S	: Male contact : Female contact
5Contact pitch		: 0.5 mm
6Housing configuration	SH SV	: Right angle : Straight
Termination	C 0.5SD GND	: Crimp : Micro-coaxial cable : Separate ground plate
8 Applicable conductor	2830 3032	: 28 to 30 AWG : 30 to 32 AWG
Packaging	PCF	: Male contact / reel
Plating (contact area)	В	: Gold plated
Packaging	Blank (30)	: Embossed Packaging (1,000 pcs/reel) : Embossed Packaging (100 pcs/reel)

■FX15 Series – Functional Diagram

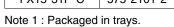
Crimp contact



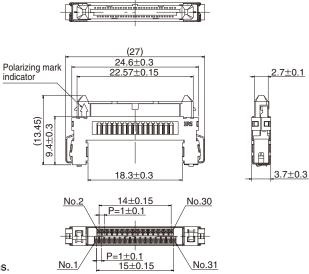
Plugs

With shields (FX15-31P-C) Image: Part No. HRS No. No. of contacts Ro

Part No.	HRS No.	No. of contacts	RoHS
FX15-31P-C	575-2101-2	31	Yes

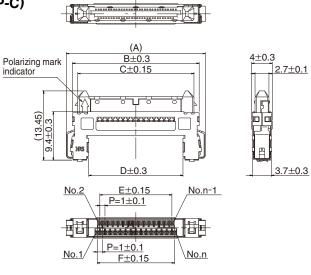


Note 2 : Dimensions in parenthesis () are reference dimensions.



With shields, enhanced shielding (FX15S-**P-C)





Part No.	HRS No.	No. of contacts	А	В	С	D	E	F	RoHS
FX15S-31P-C	575-2106-6	31	27	24.6	22.6	18.3	14	15	
FX15S-41P-C	575-2107-9	41	32	29.6	27.6	23.3	19	20	Yes
FX15S-51P-C	575-2103-8	51	37	34.6	32.6	28.3	24	25	

Note 1 : Packaged in trays.

Note 2 : Dimensions in parenthesis () are reference dimensions.

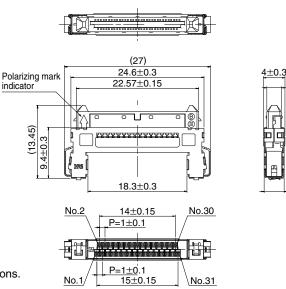
With shields – enhanced shielding 28 to 30 AWG (FX15SW-31P-C)

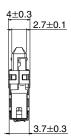


Part No.	HRS No.	No. of contacts	RoHS
FX15SW-31P-C	575-2113-1	31	Yes

Note 1 : Packaged in trays.

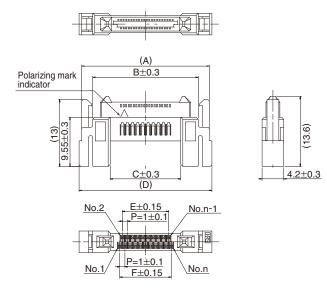
Note 2 : Dimensions in parenthesis () are reference dimensions.





•Without shields (FX15M-**P-C)





Part No.	HRS No.	No. of contacts	А	В	С	D	E	F	RoHS
FX15M-21P-C	575-2109-4	21	24.8	20.5	13.7	25.8	9	10	Yes
FX15M-31P-C	575-2108-1	31	29.8	25.5	18.7	30.8	14	15	165

Note 1 : Sold in 100 piece packages. Please order in full package quantities.

Note 2 : Dimensions in parenthesis () are reference dimensions.

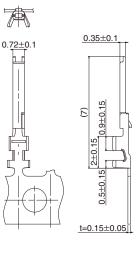
Plug crimp contacts

Part No.	HRS No.	Packaging	Quantity	Finish	RoHS
FX15-2830PCFB	575-2002-0	Pool	20,000 pcs/reel	Gold plated	Yes
FX15-3032PCFB	575-2003-3	Reel	20,000 pcs/reel	Gold plated	168

•Applicable cable (Tin plated, annealed copper wire)

FX15-2830PCFB

Applicable wire size	Jacket diameter	UL No.	
(Stranded wire conductor)			
28 AWG (7/0.127mm)	40 56 to 0 72mm	1517	
30 AWG (7/0.1mm)	- φ0.56 to 0.72mm	1571	
FX15-3032PCFB			
Applicable wire size	Jacket diameter	UL No.	
(Stranded wire conductor)		OL NO.	
30 AWG (7/0.1mm)	40 E to 0 6mm	1516, 1571 (Note)	
32 AWG (7/0.08mm)	- φ0.5 to 0.6mm	1571	



•Wire strip length: 1.1 to 1.8mm

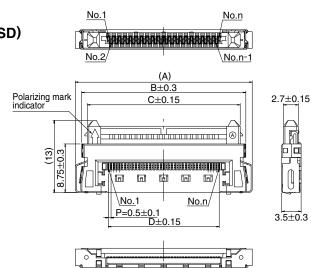
Note : When using wires other than those noted above, please contact Hirose for asistance.

Tools

Item	Part No.	HRS No.	Applicable crimp contact
Applicator	AP105-FX15-2830	901-4036-0	FX15-2830PCFB
	AP105-FX15-3032	901-4033-1	FX15-3032PCFB
Press unit	CM-105C	901-0001-0	

●Plug – Micro-coaxial cable (FX15S-**P-0.5SD)



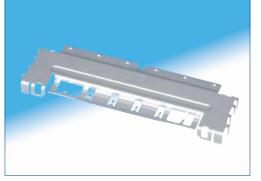


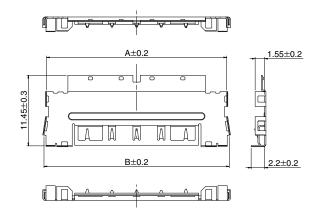
						i		
Part No.	HRS No.	No. of contacts	А	В	С	D	RoHS	
FX15S-41P-0.5SD	575-2110-3	41	31.9	29.6	27.57	20	Vac	
FX15S-51P-0.5SD	575-2118-5	51	36.9	34.6	32.57	25	Yes	
	•							

Note 1 : Packaged in trays.

Note 2 : Dimensions in parenthesis () are reference dimensions.

•Ground plate for micro-coaxial cable type





Part No.	HRS No.	No. of contacts	A	В	RoHS
FX15S-41P-GND	575-2111-6	41	29.2	30.06	Yes
FX15S-51P-GND	575-2117-2	51	34.2	35.06	res

Note 1 : Packaged in trays.

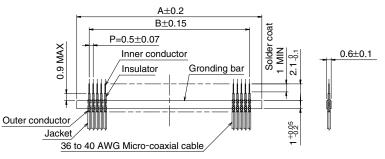
Note 2 : Dimensions in parenthesis () are reference dimensions.

Applicable cable (Micro-coaxial cable)

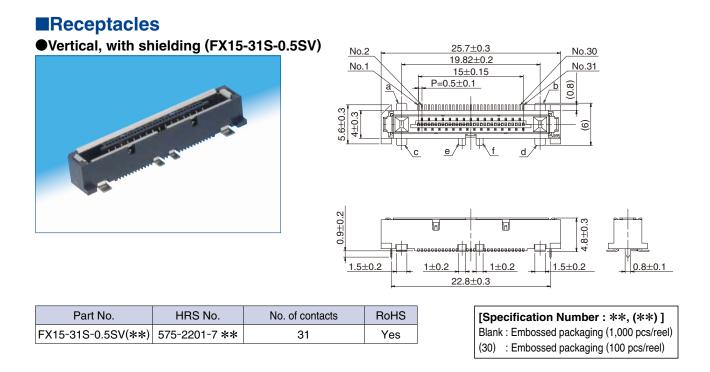
Wire size	Jacket diameter
(Standed wire inner conductor)	Jacket ulameter
36 AWG (7/0.05mm)	
38 AWG (7/0.04mm)	0.3mm to 0.5mm
40 AWG (7/0.03mm)	

No. of contacts	А	В
41	23.1	20
51	28.1	25

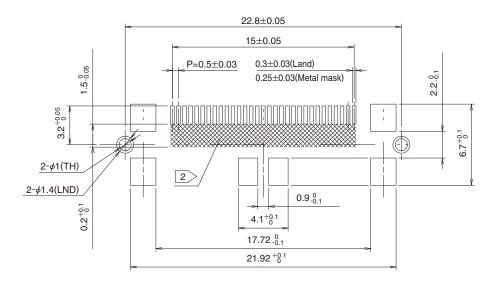
Cable preparation



HS 7



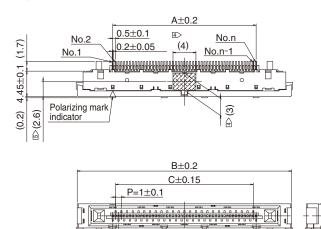
Recommended PCB mounting pattern and metal mask dimensions



- Note 1 : The co-planarity of the terminal leads is as follows:
 - All signals and shield leads "c" and "d": 0.1mm max.
 - Shield leads "a", "b", "e" and "f": 0.15mm max.
 - 2: Area indicated by the crosshatched lines must be free of conductive traces or the conductive traces must be covered by resist film.
 - 3 : Packaged on tape-and-reel.
 - 4 : Dimensions in parenthesis () are reference dimensions.

Right angle with shields – enhanced shielding (FX15S-**S-0.5SH)



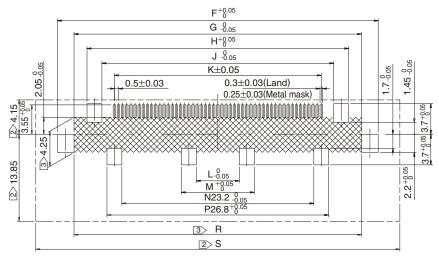


P=1±0.1

D±0.15 E±0.3

Part No.	HRS No.	No. of contacts	А	В	С	D	E	F	G	Н	
FX15S-31S-0.5SH(**)	575-2306-5 **	31	15	27.4	14	15	27.8	28.8	24.8	21.6	
FX15S-41S-0.5SH(**)	575-2307-8 **	41	20	32.4	19	20	32.8	33.8	29.8	26.6	
FX15S-51S-0.5SH(**)	575-2303-7 **	51	25	37.4	24	25	37.8	38.8	34.8	31.6	
			J	К	L	М	Ν	Р	R	S	RoHS
			18	15			13.2	16.8	24.8	40	
			23	20	5.2	8.8	18.2	21.8	29.8	45	Yes

Recommended PCB mounting pattern and metal mask dimensions



Note 1 : The coplanarity of the terminal leads is 0.1mm max. for all signal leads and 0.15mm max. for the shield leads.

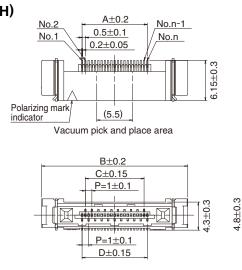
- 2: Do not place any components in the area indicated. Placement of components in this area may affect mating and latch lock operation.
- 3: Area indicated by the cross-hatched lines must be free of conductive traces or the conductive traces must be covered by resist film.
- 4: The area marked indicates vacuum pick-and-place area for board placement with automatic equipment.
- 5: Vacuum pick-up area
- 6 : Packaged on tape-and-reel.
- 7 : Dimensions in parenthesis () are reference dimensions.



H.4±0.3

●Right angle, without shielding (FX15M-**S-0.5SH)







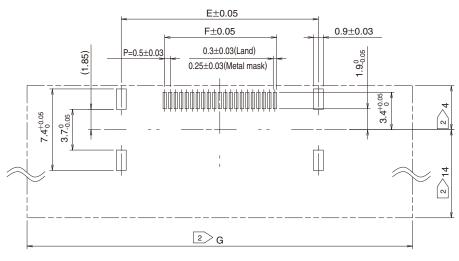


[Specification Number : **, (**)] Blank : Embossed packaging (1,000 pcs/reel)

(30) : Embossed packaging (100 pcs/reel)

Part No.	HRS No.	No. of contacts	А	В	С	D	E	F	G	RoHS
FX15M-21S-0.5SH(**)	575-2309-3 **	21	10	22.4	9	10	17.9	10	35	Yes
FX15M-31S-0.5SH(**)	575-2308-0 **	31	15	27.4	14	15	22.9	15	40	res

Recommended PCB mounting pattern and metal mask dimensions

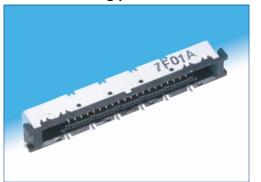


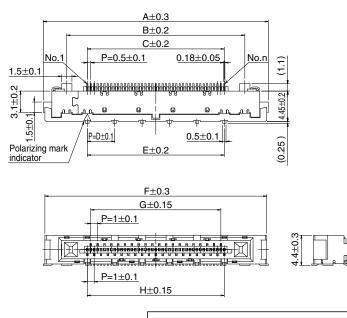
Note 1 : The co-planarity of all terminal leads is 0.1mm max.

- 2: Do not place any components in the area indicated. Placement of components in this area may affect mating and latch lock operation.
- 3 : Packaged on tape-and-reel.



Right angle with shields – enhanced shielding (FX15SC-**S-0.5SH) PCB mounting pattern : VESA standard

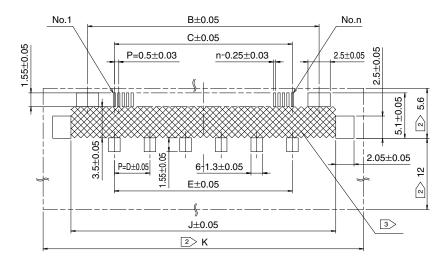




[Specification Number : **, (**)] Blank : Embossed packaging (1,000 pcs/reel) (30) : Embossed packaging (100 pcs/reel)

Part No.	HRS No.	No. of contacts	А	В	С	D	E	F	G	Н	J	К	RoHS
FX15SC-41S-0.5SH(**)	575-2310-2 **	41	32.85	26	20	4	20	32.4	19	20	29.75	45	Vaa
FX15SC-51S-0.5SH(**)	575-2311-5 **	51	37.85	31	25	5	25	37.4	24	25	34.75	50	Yes

Recommended PCB mounting pattern and metal mask dimensions

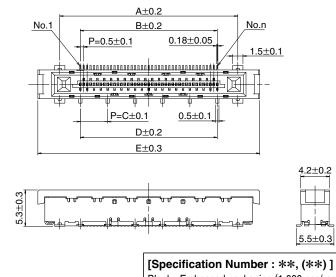


Note 1 : The coplanarity of the terminal leads is 0.1mm max.

- 2: Do not place any components in the area indicated. Placement of components in this area may affect mating and latch lock operation.
- 3: Area indicated by the cross-hatched lines must be free of conductive traces or the conductive traces must be covered by resist film.
- 4 : Packaged on tape-and-reel.
- 5 : Dimensions in parenthesis () are reference dimensions.

Vertical with shields – enhanced shielding (FX15SC-**S-0.5SV) PCB mounting pattern : VESA standard

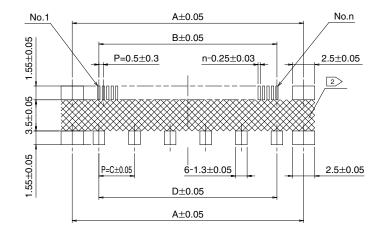




[Specification Number : **, (**)] Blank : Embossed packaging (1,000 pcs/reel) (30) : Embossed packaging (100 pcs/reel)

Part No.	HRS No.	No. of contacts	А	В	С	D	E	RoHS
FX15SC-41S-0.5SV(**)	575-2205-8 **	41	26	20	4	20	32.4	Yes
FX15SC-51S-0.5SV(**)	575-2204-5 **	51	31	25	5	25	37.4	res

Recommended PCB layout and metal mask dimensions

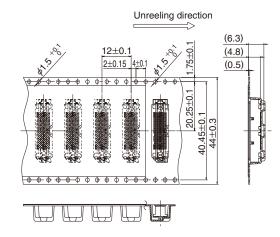


Note 1 : The coplanarity of the terminal leads is 0.1mm max.

- 2: Area indicated by the cross-hatched lines must be free of conductive traces or the conductive traces must be covered by resist film.
- 3 : Packaged on tape-and-reel.

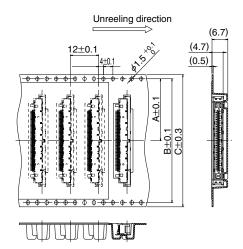
Packaging Specifications

Vertical, with shields (FX15-31S-0.5SV)



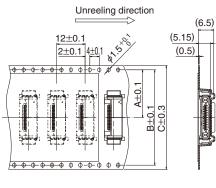
Part No.	HRS No.	No. of contacts	D
FX15-31S-0.5SV(**)	575-2201-7 **	31	44.5

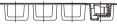
Right angle, with shields-enhanced shielding (FX15S-**S-0.5SH)



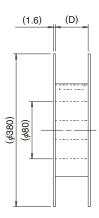
Part No.	HRS No.	No. of contacts	А	В	С	D
FX15S-31S-0.5SH(**)	575-2306-5 **	31	20.3	40.5	44	44.5
FX15S-41S-0.5SH(**)	575-2307-8 **	41	<u></u>	E 0 E	FG	EC E
FX15S-51S-0.5SH(**)	575-2303-7 **	51	20.3	52.5	56	5.00

Right angle, without shields (FX15M-**S-0.5SH)



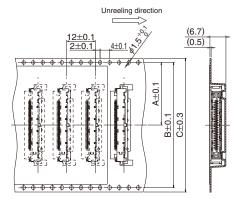


Reel dimensions



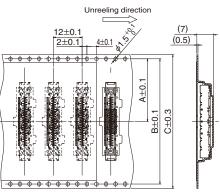
Part No.	HRS No.	No. of contacts	А	В	С	D
FX15M-21S-0.5SH(**)	575-2309-3 **	21	20.0	40.4	4.4	44.5
FX15M-31S-0.5SH(**)	575-2308-0 **	31	20.2	40.4	44	44.5

(FX15SC-**S-0.5SH)



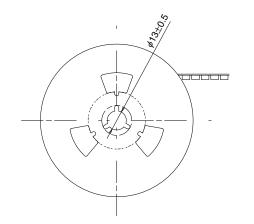
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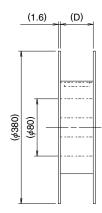
● Right angle with shields – enhanced shielding ● Vertical with shields – enhanced shielding (FX15SC-**S-0.5SV)



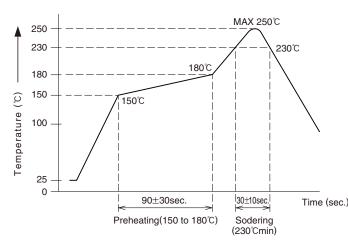
Part No.	HRS No.	No. of contacts	A	В	С	D	RoHS	Part No.	HRS No.	No. of contacts	A	В	С	D	RoHS
FX15SC-41S-0.5SH(**)	575-2310-2 **	41	06.0	52.4	56	E 6 E	Vaa	FX15SC-41S-0.5SV(**)	575-2205-8 **	41	06.0	52.4	EG	56 F	Vaa
FX15SC-51S-0.5SH(**)	575-2311-5 **	51	20.2	52.4	00	56.5	Yes	FX15SC-51S-0.5SV(**)	575-2204-5 **	51	20.2	52.4	56	56.5	Yes

Reel dimensions





Recommended temperature profile



HRS test conditions

Test board Glass epoxy 40mm×30mm×1mm thick Solder method : Reflow Solder composition : Paste 96.5%Sn/3%Ag/0.5%Cu Metal mask : 0.12mm thick Reflow cycles : 2 cycles

The temperature profile is based on the above conditions.

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

Note : The temperature profile indicates the maximum temperature of the connector surfaces at the highest point from the PCB mounting surface.

Washing Conditions

Organic Solvent Washing

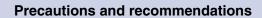
Solvent type	Room temperature washing	Heated washing
IPA (Isoporopyl alcohol)	Yes	Yes

Water Type Washing

When using water type cleaning agents (e.g., terpene, and alkali saponifiers), select the cleaning agent based on the documentation issued by the various manufacturers of cleaning agents which describes the effects on metals and resins. Be careful that parts are not left with moisture remaining on them.

Washing Precautions

Residual flux or cleaning agent on the contacts when washing with organic solvents or water type cleaners can give rise to the deterioration of electrical performance. In this regard it is important to check whether a thorough washing has been performed.

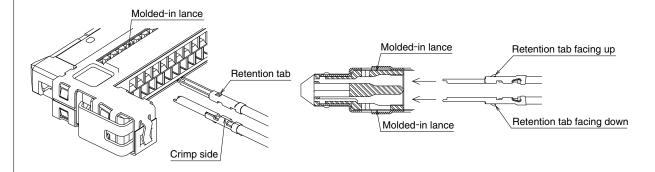


Wire termination

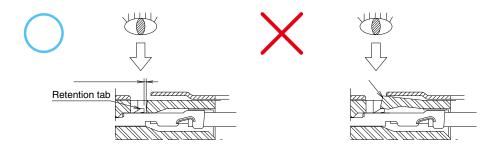
- The following documents will be needed in order to perform the cable terminations.
- (Basic cable termination and crimp requirements (general explanations).
- ②Contact crimp termination machine instruction manual (Explanation of the press)
- ③Applicator parts installation table (Applicator installation explanation)
- (Crimp conditions table (Crimp height/Tensile strength standard values)
- ⑤Crimp quality fundamentals manual (Bell-mouth dimensions, bent up, bent down, rolling, etc.)
- * Correct cable preparation and crimp termination is based on understanding and following the procedures in the above documents.
- Insertion of the crimp contacts in the housing
- Crimp contacts are inserted in the housing as illustrated below.

Exercising caution when inserting, align the retention tab of the contact with the corresponding molded-in lance in the housing's contact cavity and push the contacts in.

Make sure that the contact is fully inserted and the retention tab clears the molded-in lance.



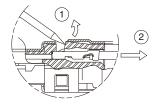
•Verify that the retention tabs clear the molded-in lances as shown on the illustration below.

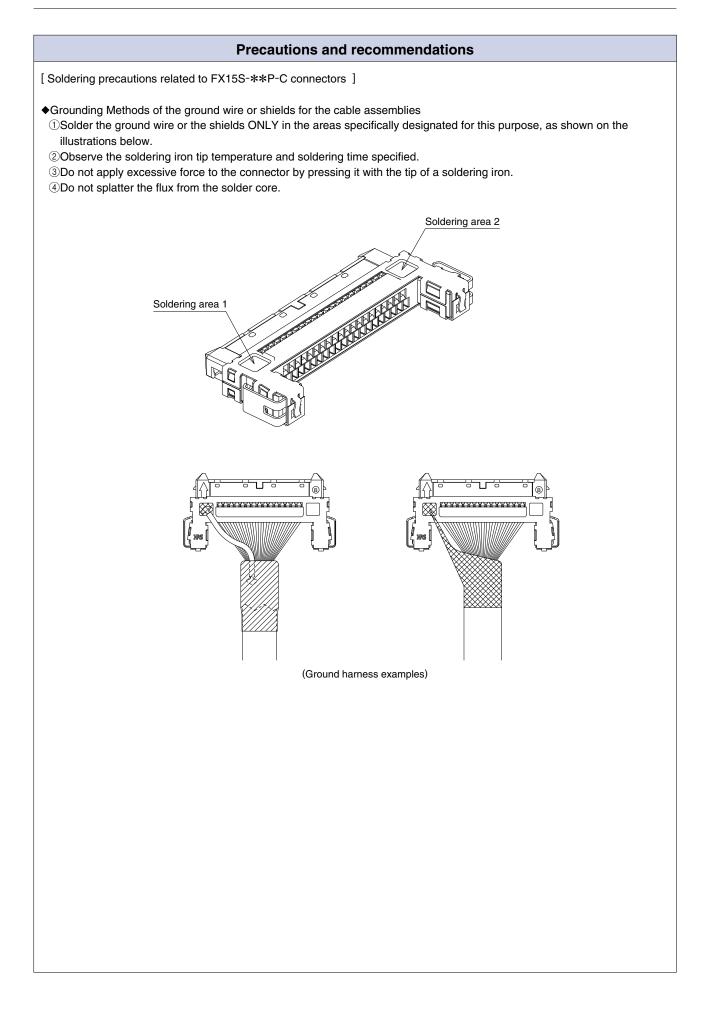


Light pull on the wire, with force NOT EXCEEDING 3N will also verify the correct contact insertion.

Removal of the contacts

Using sharp-pointed tool of appropriate size gently lift the molded-in tab and pull-out the terminated contacts. Excersize caution as NOT to damage the molded-in lance. Should the damage occur, the entire housing will need to be replaced.





Precautions and recommendations

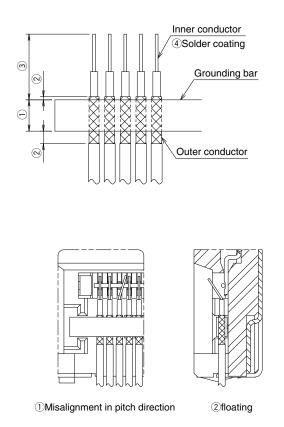
◆Plug – micro-coaxial cable

Cautions for soldering

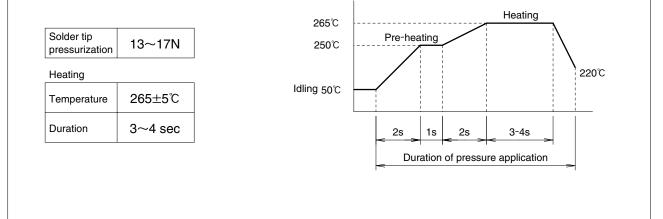
- 1. For the micro coaxial cable assembled to this connector, cable alignment process as shown in "Recommended cable" on the page 1 is required before assembly.
 - ①Width of ground bar shall be 1.05mm Max. including misalignment of overlapping, flush by cutting, side drop or soldering. Using an inadequate cable will interfere the assembly to the connector. Forceful assembly and soldering could cause mis-soldering and damage the product.
 - ②Minimize the length of outer conductor beyond the ground the bar.
 - ③Length of cutting the extra cable should be 2.1mm Max. Any longer cable may cause contact with the connector during assembly and could damage the product. Recommended minimum length is 2.0mm, but this can be altered as long as good soldering ability is maintained.
- ⁽⁴⁾Pre-solder and coat the inner conductor at the cable end.
- Recommended solder for the assembly is flux cored solder with 0.2mm dia. (Lead-free: Sn-3Ag-0.5Cu), 21mm length. If additional flux is used, make sure to prevent wicking onto the contact area.

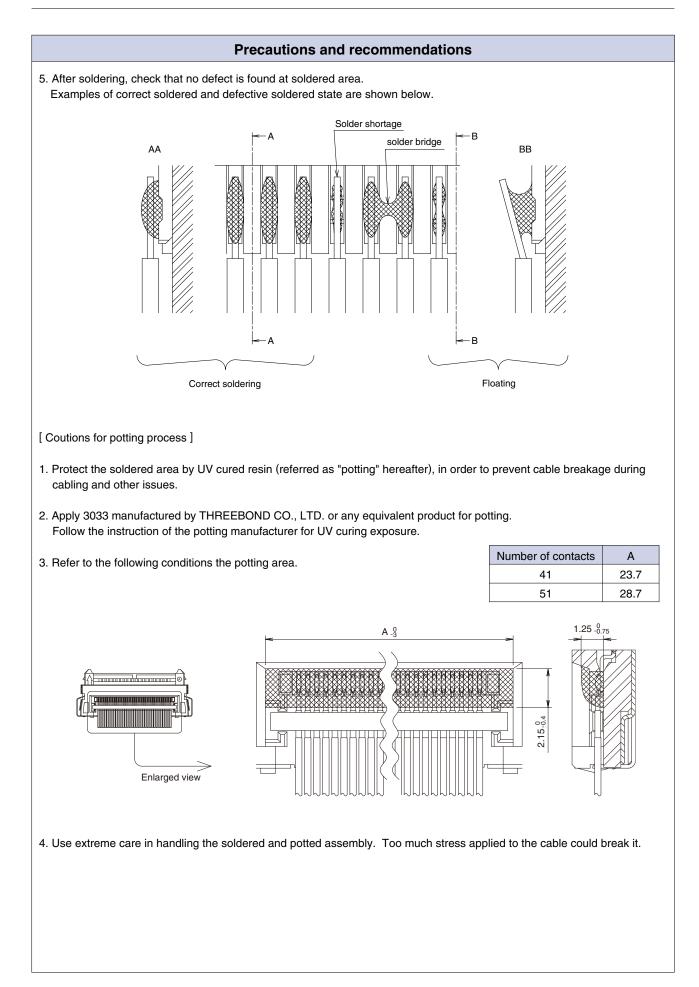
Wicking onto the contact area will cause the contacts to fail.

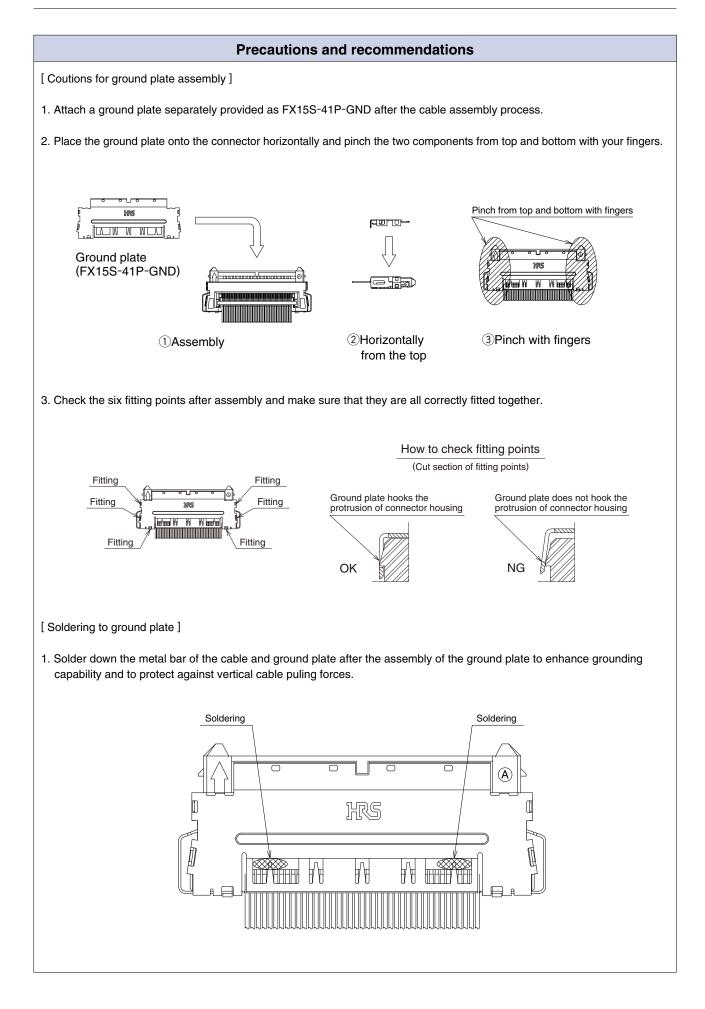
- 3. Before soldering the cable and connector with a cable assembly machine, check the points to avoid below.
 - ①Misalinment of cable end to the terminals in pitch direction ②Excessive floating of cable end
- 4. Follow the recommended temperature profile shown below for the soldering.



The optimum conditions for soldering can vary depending on cable type and length, and solder type. Be sure to check the recommended temperate profile and adjust the conditions accordingly.







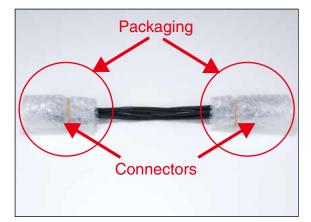
Precautions and recommendations

Packaging of the complete cable assemblies

Exercise caution as not to tangle, twist or deform the complete cable assemblies when packaging. Special care should be taken NOT to apply any excessive stress to the individual wires.

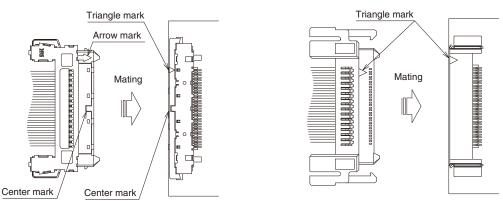
When removing the cable assemblies from the packaging do not pull on the wires. Make sure that the latch-locks are not interfering with packaging.





Mating of the connectors

These connectors have a built in polarizing feature and will NOT mate when reversed. Do NOT try and force tem together. Align the connectors as shown on the illustration below and fully insert the plug into the receptacle. Confirm that both latchlocks are fully engaged.



Additionally, this connector is equipped with reverse-insertion preventing mechanism, but a forced mating with a minimum force of 25N could damage the connector.

Avoid any inappropriate mating, and perform the mating operation after checking the above-mentioned polarity indication.

Treatment after mating has been completed

After mating, please take care to prevent any stress or load on the connector during the routing of cables. If a load of a minimum of 5N is applied on the cable, the cable (crimp contact) could come off. Further, if the entire cable is pulled with a minimum force of 20N, the connector could be broken.

Please take extra care not to pull the cable and cause cable disconnection.

If you use a small gauge coaxial plug, a repeated rotation could also cause cable disconnection. Do not use the cable by rotating it repeatedly. The rotation times should be limited to a maximum of 10 even if rotation is required for routing. If your use requires folding back of the cable over the base of the connector, make sure to maintain a large turn-back radius away from the connector base.



Pulling in the horizontal direction: Not acceptable



Pulling in the vertical direction: Not acceptable

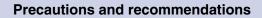
Rotation in the vertical direction: Up to a maximum of 10 times

Take a large radius

⇒प्स ा eep the turn-back position away

/Keep the turn-back position away from the root of the connector.

When you use the cable by turning it back

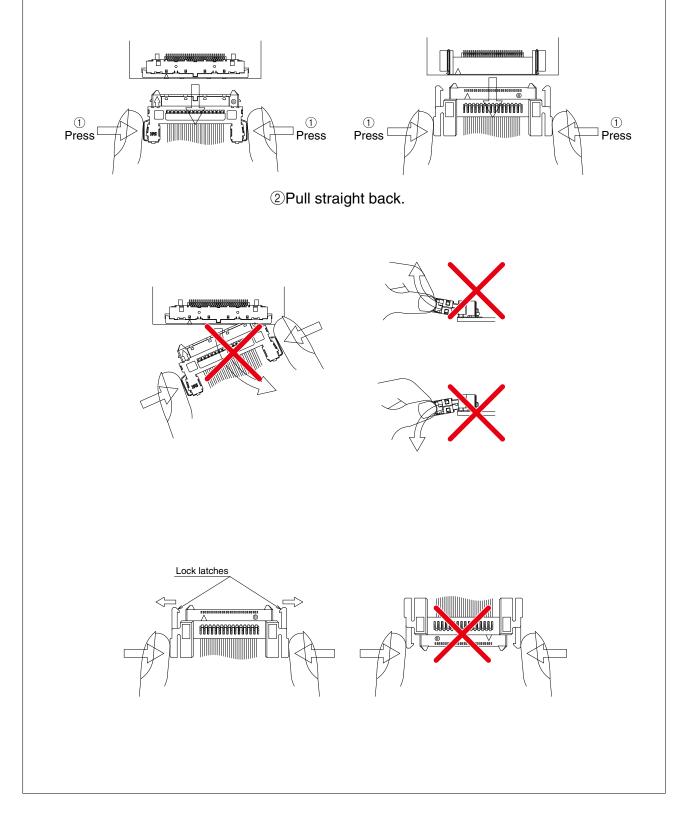


Handling of Connectors after Mating

Do not to apply excessive force to the connectors when routing the cable after mating. Pulling on the entire cable with a force of 20N or greater can damage the connector. Please take care not to pull the cable.

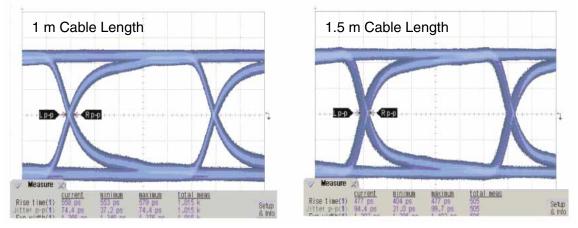
Un-mating of the connectors

Equally depress both sides of the latch-locks as shown on the illustration and pull the plug straight out. Do not pull on the cables!



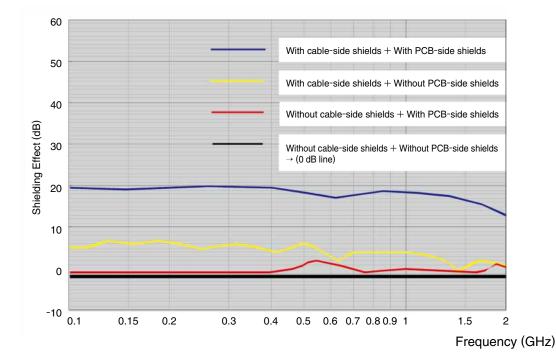
Technical Information (FX15S Series)

Eye Pattern Waveforms (700MHz)



Shielding Effectiveness (Shielding Characteristics Comparison Using a 2-chamber Shielded Room)

Measured shielding effectiveness for frequencies from 100MHz to 2GHz. Shielded connectors show noise suppression of 10db to 20dB, when compared with connectors without the shields.



Notes :The measurement value of "Without plug-side shields + Without receptacle-side shields" are taken as the zero level of the graph vertical axis dB.

The respective results express the noise suppression effect (dB) as a relative comparison value to the "without shields" condition as the reference.

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