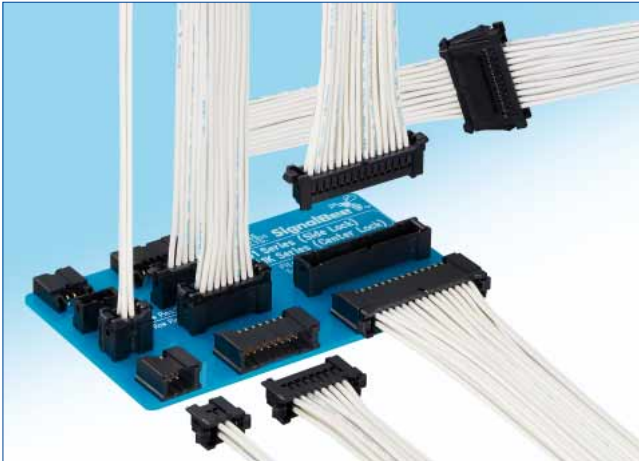
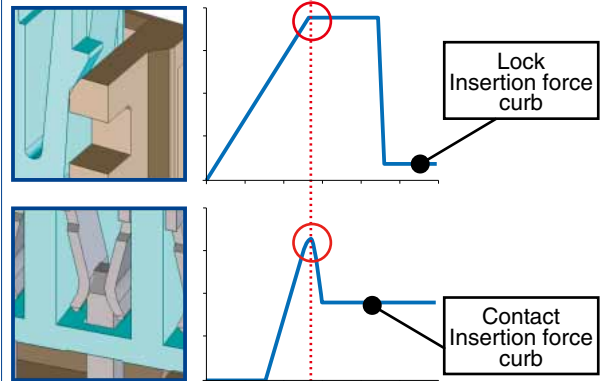


2mm Pitch, Positive Lock, Wire-to-Board Connector (UL, C-UL Listed)

DF51 Series



Secure Mating



Matches the peak of insertion force, provides clear click sound and tactile click

Fig.1

■ Features

1. Positive lock provides clear tactile click and secures reliable connection

The locking mechanism delivers a clear tactile click, which prevents incomplete mating. (Fig.1)

2. Wide variation

Each of Straight / Right angle / In-line configuration equipped with single row and dual row for flexible design. Gold and Tin plating options support various application needs.

3. Secure Side-locking design

Short depth straight type and low profile right angle type are well suited for compact / thin equipment. (Fig.3)

4. Prevents incorrect mating

Visually and mechanically polarized features prevent reverse mating and incorrect mating between different number of positions. (Fig.2)

5. Use common terminals and crimping tools with DF11 Series

Wide applicable cable range : 22 to 30 AWG.

6. Suitable for potting

Capable of being potted, up to 3mm.

7. UL, C-UL Certified

■ Applications

Office automation, Industrial machinery, Industrial robots, Amusement equipment, Medical equipment.

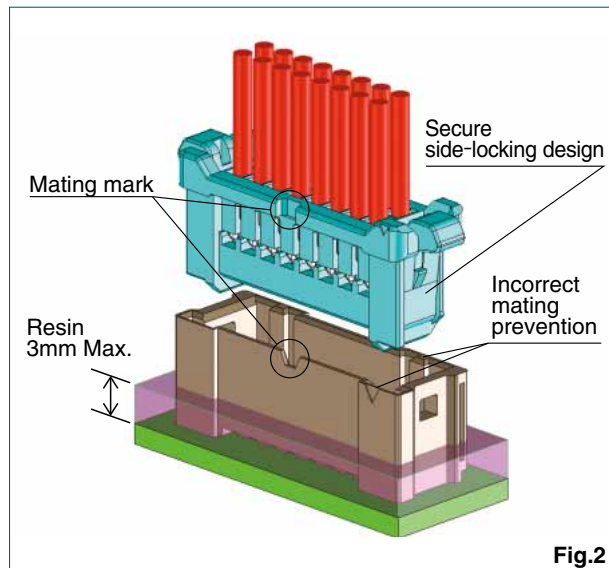
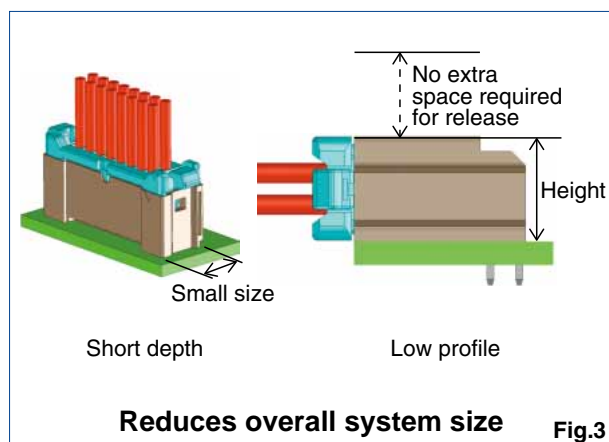


Fig.2



Reduces overall system size

Fig.3

Product Specifications

Ratings	Current Rating (Note 1)	22 to 24 AWG	26 AWG	28 AWG	30 AWG	Operating temperature range -55 to +105°C (Note 2)
		2A	1.5A	1A	0.5A	Operating humidity range 20 to 80% (Note 3)
	Voltage Rating	250V AC / DC				Storage temperature range -10 to +60°C (Note 4)
						Storage humidity range 40 to 70% (Note 4)

Ratings	Current Rating	22 AWG	24 to 28 AWG	30 AWG	UL/C-UL File No. and Recognition No. CL, C-UL : E52653
		2A	1A	0.5A	
	Voltage Rating	30V AC / DC			

Item	Specifications	Conditions
1. Insulation Resistance	No less than 1,000MΩ	Measured at DC 500V
2. Withstand Voltage	No flashover or breakdown	AC 650V is applied for 1 minute.
3. Contact Resistance	No more than 30mΩ	Measured at 1mA and no higher than 20mV
4. Vibration Resistance	No electrical discontinuity of 1μs or greater	Frequency 10-55Hz, half amplitude 0.75mm, 10 times in each of the 3 directions
5. Shock Resistance	No electrical discontinuity of 1μs or greater	Accelerated velocity : 490 m/s ² for 11ms, half-sine wave in 3 directions, 3 times for each direction
6. Moisture-resistance	Contact resistance : no more than 30mΩ Insulation resistance : no less than 500MΩ	Temperature : 40±2°C ; humidity : 90 to 95%, left as it is for 96 hours
7. Temperature cycles	Contact resistance : no more than 30mΩ Insulation resistance : no less than 1,000MΩ	-55°C : 30 minutes → 105°C : 30 minutes 5 cycles
8. Durability	Contact resistance : no more than 30mΩ	Tin plated : 30 mating cycles, Gold plated : 50 mating cycles
9. Solder heat resistance	The resin parts should withstand the temperature and resist melting.	Flow : 260°C, 5 sec Hand soldering : temperature of soldering iron at 270°C for 3 seconds

Note 1 : Current rating of header is 2A.

Note 2 : Includes temperature rise caused by current flow.

Note 3 : Use without condensation on parts.

Note 4 : The storage condition refers to long-term storage of the product on the shelf before assembly. Please use the operating temperature for temporary storage such as pre-assembly and during shipping.

Materials / Finish

Product	Part	Material	Finish	Specification
Header	Insulator	PBT (glass-reinforced)	Black	UL94V-0
	Contact	Brass	Tin plated or Gold plated	—
Crimp socket	Insulator	PBT (glass-reinforced)	Black	UL94V-0
Socket contact	Contact	Phosphor copper	Tin plated or Gold plated	—
In-line plug	Insulator	PBT (glass-reinforced)	Black	UL94V-0
In-line plug contact	Contact	Phosphor copper	Tin plated or Gold plated	—

Product Number Structure

Refer to the chart below when determining the product specifications from the product number.

Please select from the product numbers listed in this catalog when placing orders.

Connector

DF51 # - * P - 2 DSA

① ② ③ ④ ⑤ ⑥

Crimp contact

DF11 - EP 2428 PCF A

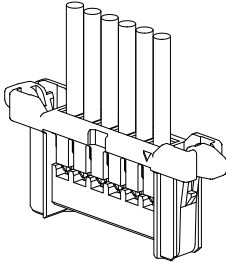
⑦ ⑧ ⑨ ⑩

① Series name : DF51	⑦ Contact Type EP : In-line plug
② Form Type Blank : Guide-boss type A : Without guide-boss	⑧ Applicable Conductor 22 : 22 AWG 2428 : 24 to 28 AWG 30 : 30 AWG
③ Number of Contacts Single-row : 2 to 6 Double-row : 4 to 30	⑨ Packaging Style SCF : Socket contacts-Reel SC : Socket contacts-Pack PCF : In-line plug contacts-Reel PC : In-line plug contacts-Pack
④ Connector Type P : Single-row pin header EP : In-line plug S : Single-row crimp socket DEP : Double-row in-line plug DP : Double-row pin header DS : Double-row crimp socket	⑩ Plating Specifications Blank : Tin plated A : Gold plated
⑤ Contact Pitch : 2mm	
⑥ Type of Housing DSA : Straight header DS : Right angle header C : Crimp socket	

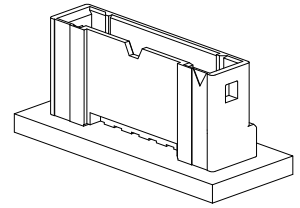
■ Diagram of Connector Mating Combinations

● Single-row

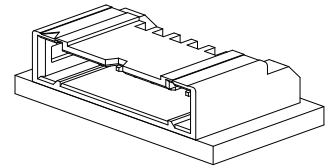
Crimp socket	Socket contact
DF51-*S-2C	DF11-22SC(F)(A)
	DF11-2428SC(F)(A)
	DF11-30SC(F)(A)



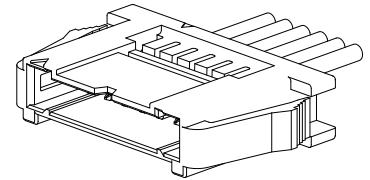
Straight header
DF51A-*P-2DSA



Right angle header
DF51(A)-*P-2DS

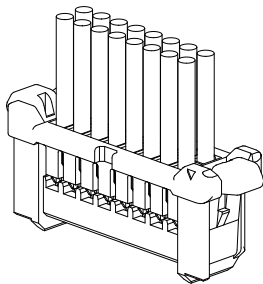


In-line plug	In-line plug contact
DF51-*EP-2C	DF11-EP2428PC(F)(A)

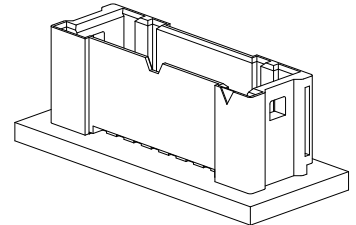


● Double-row

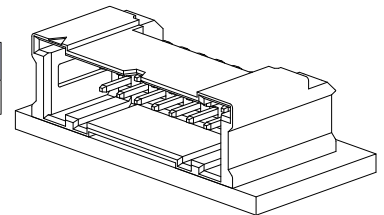
Crimp socket	Socket contact
DF51-*DS-2C	DF11-22SC(F)(A)
	DF11-2428SC(F)(A)
	DF11-30SC(F)(A)



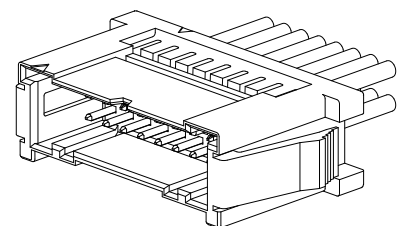
Straight header
DF51A-*DP-2DSA



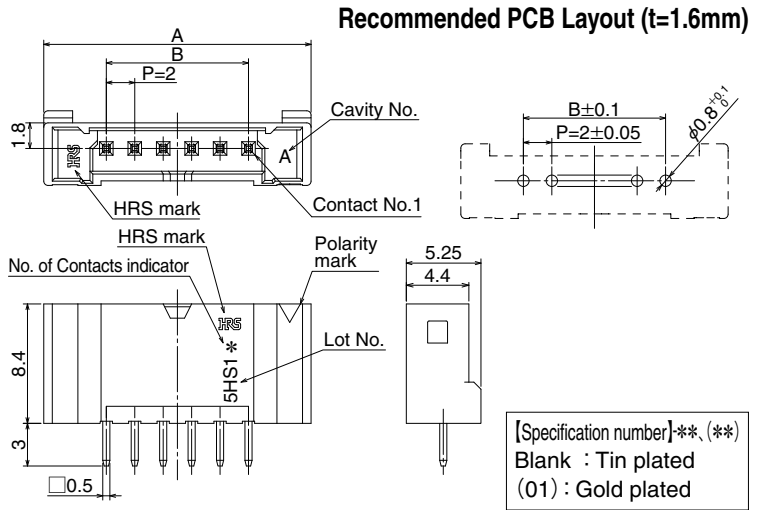
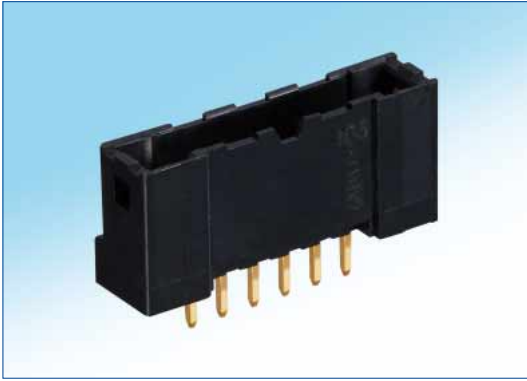
Right angle header
DF51(A)-*DP-2DS



In-line plug	In-line plug contact
DF51-*DEP-2C	DF11-EP2428PC(F)(A)



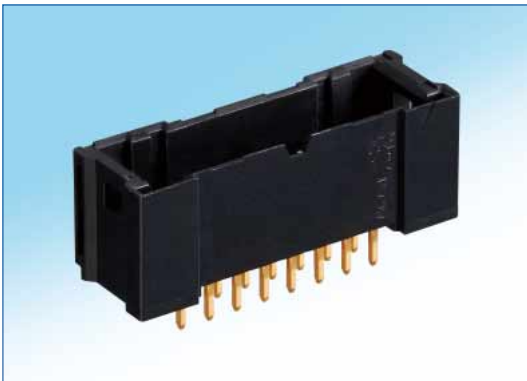
Single-row Straight Header



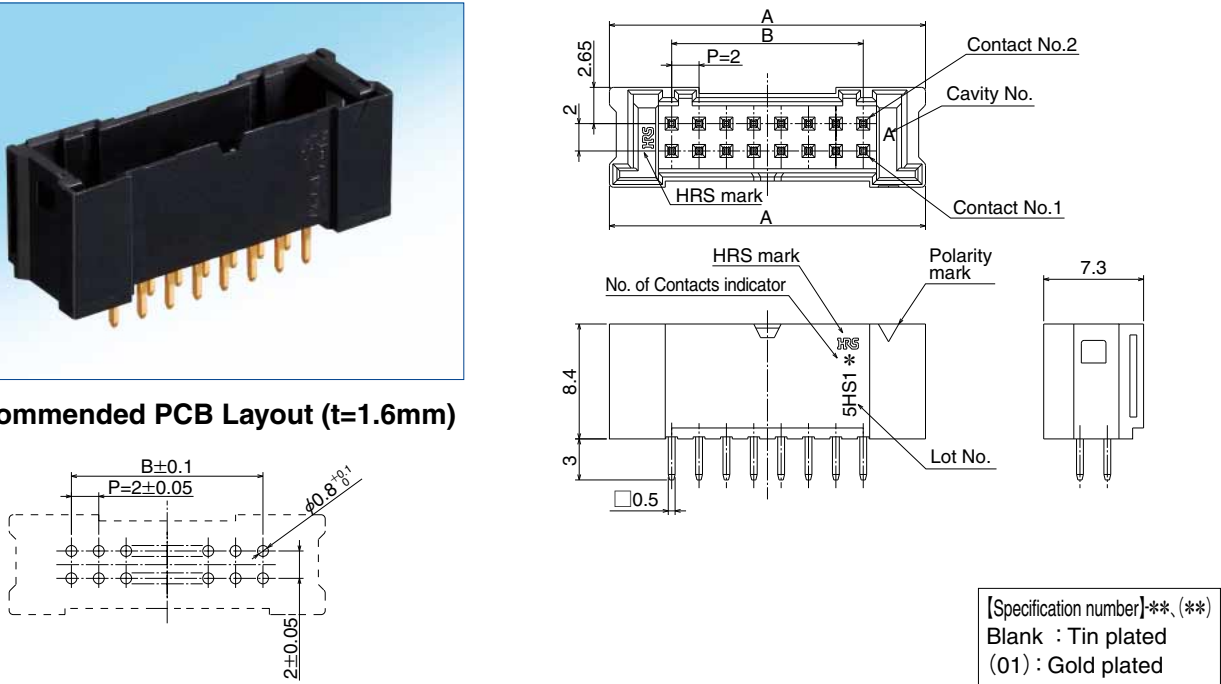
Part No.	HRS No.	No. of Contacts	A	B
DF51A-2P-2DSA(**)	543-5105-0 **	2	10.8	2
DF51A-3P-2DSA(**)	543-5106-0 **	3	12.8	4
DF51A-4P-2DSA(**)	543-5107-0 **	4	14.8	6
DF51A-5P-2DSA(**)	543-5108-0 **	5	16.8	8
DF51A-6P-2DSA(**)	543-5109-0 **	6	18.8	10

Note : Bag packaging (100pcs/pack). Order by number of packs.

Double-row Straight Header



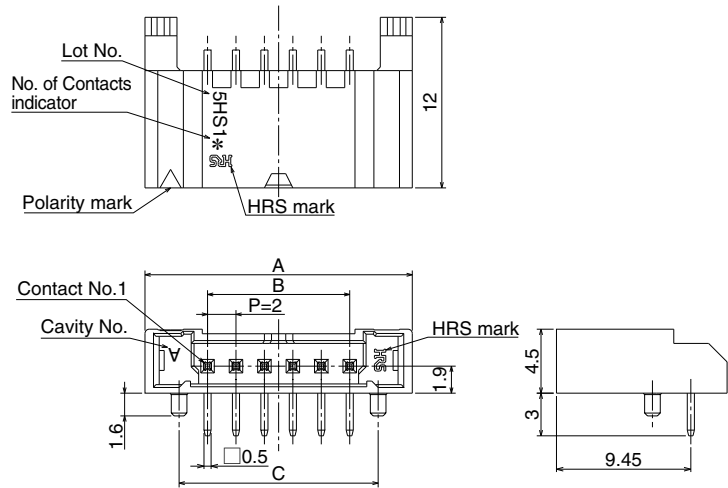
Recommended PCB Layout (t=1.6mm)



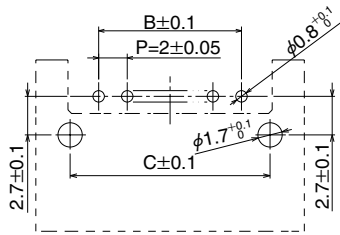
Part No.	HRS No.	No. of Contacts	A	B	Part No.	HRS No.	No. of Contacts	A	B
DF51A-4DP-2DSA(**)	543-5015-0 **	4	11.1	2	DF51A-18DP-2DSA(**)	543-5050-0 **	18	25.1	16
DF51A-6DP-2DSA(**)	543-5044-0 **	6	13.1	4	DF51A-20DP-2DSA(**)	543-5051-0 **	20	27.1	18
DF51A-8DP-2DSA(**)	543-5045-0 **	8	15.1	6	DF51A-22DP-2DSA(**)	543-5052-0 **	22	29.1	20
DF51A-10DP-2DSA(**)	543-5046-0 **	10	17.1	8	DF51A-24DP-2DSA(**)	543-5053-0 **	24	31.1	22
DF51A-12DP-2DSA(**)	543-5047-0 **	12	19.1	10	DF51A-26DP-2DSA(**)	543-5054-0 **	26	33.1	24
DF51A-14DP-2DSA(**)	543-5048-0 **	14	21.1	12	DF51A-28DP-2DSA(**)	543-5055-0 **	28	35.1	26
DF51A-16DP-2DSA(**)	543-5049-0 **	16	23.1	14	DF51A-30DP-2DSA(**)	543-5056-0 **	30	37.1	28

Note : Bag packaging (100pcs/pack). Order by number of packs.

Single-row Right angle Header



Recommended PCB Layout (t=1.6mm)



※Above drawing is guide-boss type.

【Specification number】-**, (**)
 (20) : Tin plated, tray packaging
 (50) : Gold plated, tray packaging

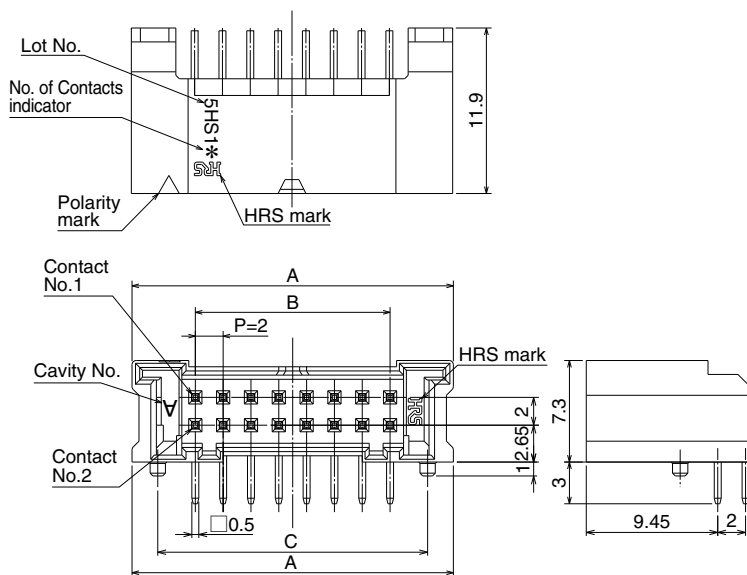
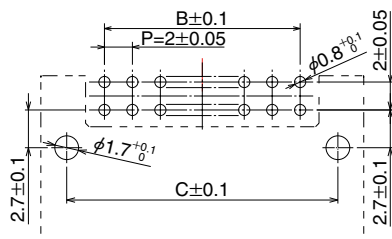
Part No.	HRS No.	Guide-boss	No. of Contacts	A	B	C	Quantity per package
DF51-2P-2DS(**)	543-5110-0 **	With boss	2	10.8	2	6	243
DF51-3P-2DS(**)	543-5111-0 **	With boss	3	12.8	4	8	207
DF51A-4P-2DS(**)	543-5117-0 **	Without boss	4	14.8	6	—	171
DF51A-5P-2DS(**)	543-5118-0 **	Without boss	5	16.8	8	—	153
DF51A-6P-2DS(**)	543-5119-0 **	Without boss	6	18.8	10	—	135

Note : Please place orders in full lot quantities.

Double-row Right angle Header



Recommended PCB Layout (t=1.6mm)



※Above drawing is guide-boss type.

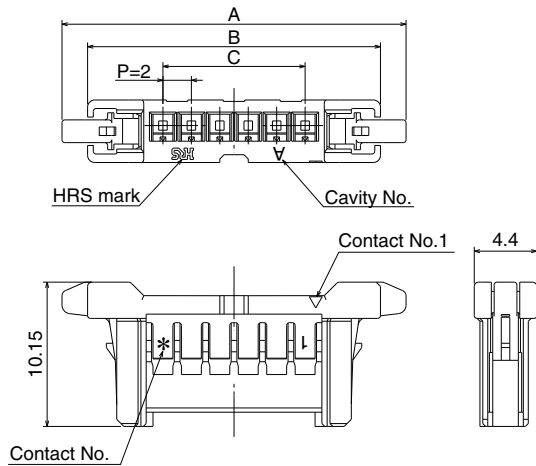
[Specification number]**, (**)
 (20) : Tin plated, tray packaging
 (50) : Gold plated, tray packaging

Part No.	HRS No.	Guide-boss	No. of Contacts	A	B	C	Quantity per package
DF51-4DP-2DS(**)	543-5016-7 **	With boss	4	11.1	2	7.4	234
DF51-6DP-2DS(**)	543-5017-0 **	With boss	6	13.1	4	9.4	198
DF51A-8DP-2DS(**)	543-5059-0 **	Without boss	8	15.1	6	—	171
DF51A-10DP-2DS(**)	543-5060-0 **	Without boss	10	17.1	8	—	153
DF51A-12DP-2DS(**)	543-5061-0 **	Without boss	12	19.1	10	—	135
DF51A-14DP-2DS(**)	543-5062-0 **	Without boss	14	21.1	12	—	126
DF51A-16DP-2DS(**)	543-5063-0 **	Without boss	16	23.1	14	—	108
DF51A-18DP-2DS(**)	543-5064-0 **	Without boss	18	25.1	16	—	99
DF51A-20DP-2DS(**)	543-5065-0 **	Without boss	20	27.1	18	—	90
DF51A-22DP-2DS(**)	543-5066-0 **	Without boss	22	29.1	20	—	90
DF51A-24DP-2DS(**)	543-5067-0 **	Without boss	24	31.1	22	—	81
DF51A-26DP-2DS(**)	543-5068-0 **	Without boss	26	33.1	24	—	72
DF51A-28DP-2DS(**)	543-5069-0 **	Without boss	28	35.1	26	—	72
DF51A-30DP-2DS(**)	543-5070-0 **	Without boss	30	37.1	28	—	72

Note : Please place orders in full lot quantities.

■Crimp Socket

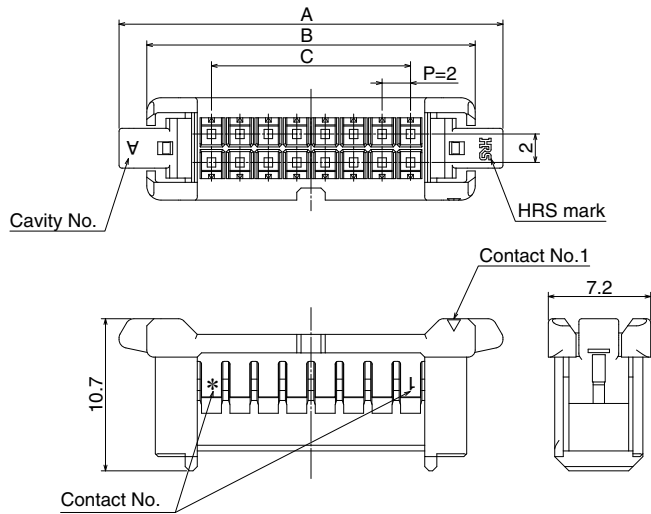
[Single-row]



Part No.	HRS No.	No. of Contacts	A	B	C
DF51-2S-2C	543-5120-0	2	16.2	12.6	2
DF51-3S-2C	543-5121-0	3	18.2	14.6	4
DF51-4S-2C	543-5122-0	4	20.2	16.6	6
DF51-5S-2C	543-5123-0	5	22.2	18.6	8
DF51-6S-2C	543-5124-0	6	24.2	20.6	10

Note : Bag packaging (100pcs/pack). Order by number of packs.

[Double-row]

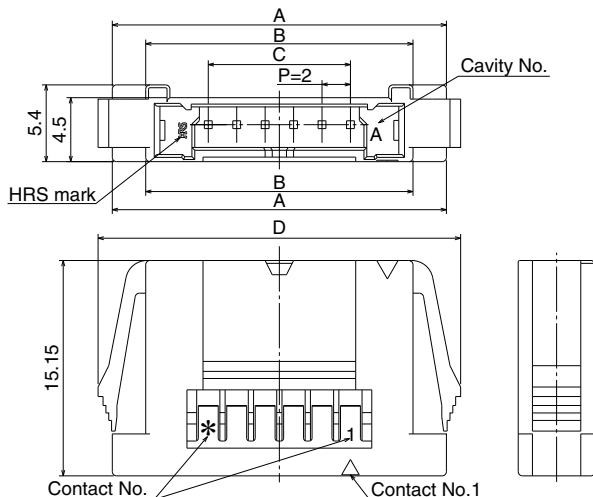


Part No.	HRS No.	No. of Contacts	A	B	C
DF51-4DS-2C	543-5030-8	4	15	11.1	2
DF51-6DS-2C	543-5031-0	6	17	13.1	4
DF51-8DS-2C	543-5032-3	8	19	15.1	6
DF51-10DS-2C	543-5033-6	10	21	17.1	8
DF51-12DS-2C	543-5034-9	12	23	19.1	10
DF51-14DS-2C	543-5035-1	14	25	21.1	12
DF51-16DS-2C	543-5036-4	16	27	23.1	14
DF51-18DS-2C	543-5037-7	18	29	25.1	16
DF51-20DS-2C	543-5038-0	20	31	27.1	18
DF51-22DS-2C	543-5039-2	22	33	29.1	20
DF51-24DS-2C	543-5040-1	24	35	31.1	22
DF51-26DS-2C	543-5041-4	26	37	33.1	24
DF51-28DS-2C	543-5042-7	28	39	35.1	26
DF51-30DS-2C	543-5043-0	30	41	37.1	28

Note : Bag packaging (100pcs/pack). Order by number of packs.

In-line Plug

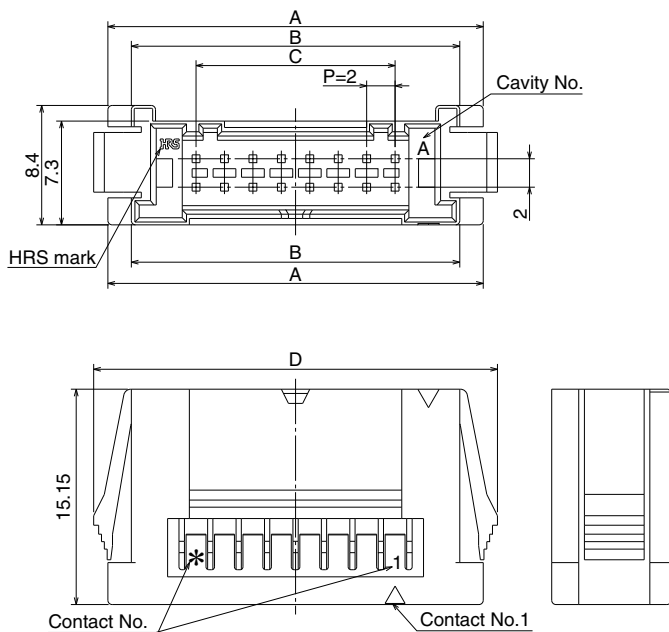
[Single-row]



Part No.	HRS No.	No. of Contacts	A	B	C	D
DF51-2EP-2C	543-5125-0	2	15.5	10.8	2	17.5
DF51-3EP-2C	543-5126-0	3	17.5	12.8	4	19.5
DF51-4EP-2C	543-5127-0	4	19.5	14.8	6	21.5
DF51-5EP-2C	543-5128-0	5	21.5	16.8	8	23.5
DF51-6EP-2C	543-5129-0	6	23.5	18.8	10	25.5

Note : Bag packaging (100pcs/pack). Order by number of packs.

[Double-row]

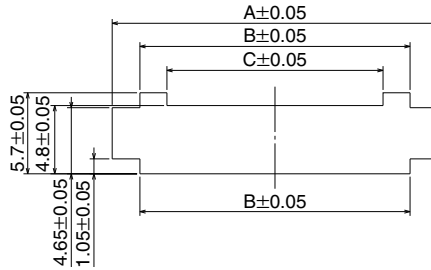


Part No.	HRS No.	No. of Contacts	A	B	C	D
DF51-4DEP-2C	543-5071-0	4	14.4	11.1	2	16.4
DF51-6DEP-2C	543-5072-0	6	16.4	13.1	4	18.4
DF51-8DEP-2C	543-5073-0	8	18.4	15.1	6	20.4
DF51-10DEP-2C	543-5074-0	10	20.4	17.1	8	22.4
DF51-12DEP-2C	543-5075-0	12	22.4	19.1	10	24.4
DF51-14DEP-2C	543-5076-0	14	24.4	21.1	12	26.4
DF51-16DEP-2C	543-5077-0	16	26.4	23.1	14	28.4
DF51-18DEP-2C	543-5078-0	18	28.4	25.1	16	30.4
DF51-20DEP-2C	543-5079-0	20	30.4	27.1	18	32.4
DF51-22DEP-2C	543-5080-0	22	32.4	29.1	20	34.4
DF51-24DEP-2C	543-5081-0	24	34.4	31.1	22	36.4
DF51-26DEP-2C	543-5082-0	26	36.4	33.1	24	38.4
DF51-28DEP-2C	543-5083-0	28	38.4	35.1	26	40.4
DF51-30DEP-2C	543-5084-0	30	40.4	37.1	28	42.4

Note : Bag packaging (100pcs/pack). Order by number of packs.

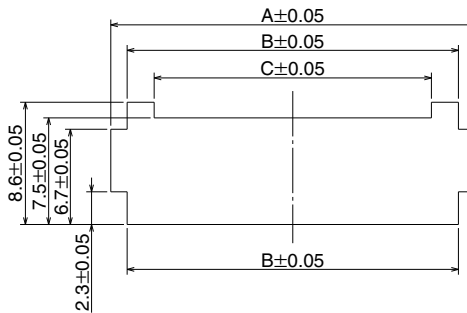
In-line Plug Panel Cutouts

[Single-row]



Part No.	HRS No.	No. of Contacts	A				B	C
			Panel board thickness (Note 1)					
			0.5 to 0.8	0.9 to 1.3	1.4 to 1.8	1.9 to 2.3		
DF51-2EP-2C	543-5125-0	2	14.9	15.2	15.6	16	11	7.2
DF51-3EP-2C	543-5126-0	3	16.9	17.2	17.6	18	13	9.2
DF51-4EP-2C	543-5127-0	4	18.9	19.2	19.6	20	15	11.2
DF51-5EP-2C	543-5128-0	5	20.9	21.2	21.6	22	17	13.2
DF51-6EP-2C	543-5129-0	6	22.9	23.2	23.6	24	19	15.2

[Double-row]

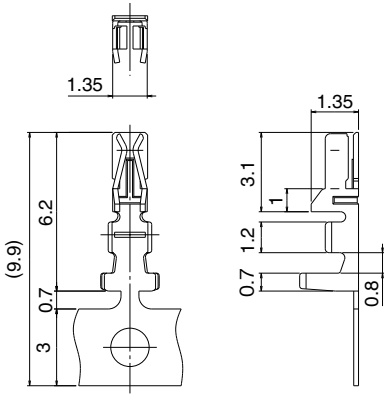


Part No.	HRS No.	No. of Contacts	A				B	C
			Panel board thickness (Note 1)					
			0.5 to 0.8	0.9 to 1.3	1.4 to 1.8	1.9 to 2.3		
DF51-4DEP-2C	543-5071-0	4	13.6	14.1	14.5	14.9	11.3	7.5
DF51-6DEP-2C	543-5072-0	6	15.6	16.1	16.5	16.9	13.3	9.5
DF51-8DEP-2C	543-5073-0	8	17.6	18.1	18.5	18.9	15.3	11.5
DF51-10DEP-2C	543-5074-0	10	19.6	20.1	20.5	20.9	17.3	13.5
DF51-12DEP-2C	543-5075-0	12	21.6	22.1	22.5	22.9	19.3	15.5
DF51-14DEP-2C	543-5076-0	14	23.6	24.1	24.5	24.9	21.3	17.5
DF51-16DEP-2C	543-5077-0	16	25.6	26.1	26.5	26.9	23.3	19.5
DF51-18DEP-2C	543-5078-0	18	27.6	28.1	28.5	28.9	25.3	21.5
DF51-20DEP-2C	543-5079-0	20	29.6	30.1	30.5	30.9	27.3	23.5
DF51-22DEP-2C	543-5080-0	22	31.6	32.1	32.5	32.9	29.3	25.5
DF51-24DEP-2C	543-5081-0	24	33.6	34.1	34.5	34.9	31.3	27.5
DF51-26DEP-2C	543-5082-0	26	35.6	36.1	36.5	36.9	33.3	29.5
DF51-28DEP-2C	543-5083-0	28	37.6	38.1	38.5	38.9	35.3	31.5
DF51-30DEP-2C	543-5084-0	30	39.6	40.1	40.5	40.9	37.3	33.5

Note 1 : The installation hole size A according to panel board thickness.

Note 2 : At the panel tab portion, use the surface that will not be rounded.

Socket Contact



Part No.	HRS No.	Packaging	Finish	
DF11-22SCF	543-0601-0	10,000/reel	Tin plated	
DF11-22SC	543-0602-2	100/pack		
DF11-2428SCF	543-0500-2	10,000/reel		
DF11-2428SC	543-0501-5	100/pack		
DF11A-2428SCF	543-0634-9	10,000/reel		
DF11A-2428SC	543-0635-1	100/pack		
DF11-30SCF	543-0605-0	10,000/reel		
DF11-30SC	543-0606-3	100/pack		
DF11-22SCFA(04)	543-0603-5 04	10,000/reel		Gold plated
DF11-22SCA	543-0604-8	100/pack		
DF11-2428SCFA(04)	543-0550-0 04	10,000/reel		
DF11-2428SCA	543-0551-3	100/pack		
DF11-30SCFA(04)	543-0607-6 04	10,000/reel		
DF11-30SCA	543-0608-9	100/pack		

Note : DF11A-2428SCF/SC is of tin plated low insertion/extraction type.

●Applicable Wire (Tinned, Annealed Copper Wire)

Wire size (Stranded wire conductor)	Jacket diameter
22 AWG (17/0.16)	ϕ 1.2 to ϕ 1.45mm
24 AWG (11/0.16)	ϕ 0.9 to ϕ 1.45mm
26 AWG (7/0.16)	
28 AWG (7/0.127)	
30 AWG (7/0.1)	ϕ 0.75 to ϕ 1.2mm

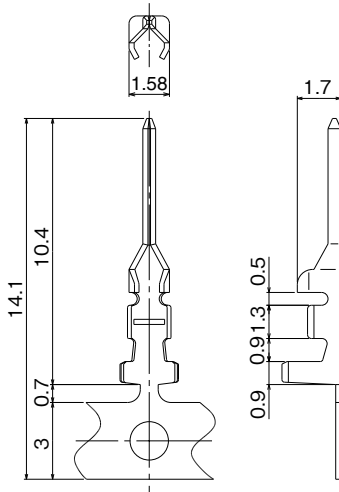
●Recommended wire
UL1061, UL1007 (Note 2)

●Strip length
1.7 to 2.3mm

Note 1 : When using other than the applicable wire, contact your nearest Hirose representative.

Note 2 : DF11-22SCF/SC/SCFA/SCA is for UL1061.

In-line Plug Contact



Part No.	HRS No.	Packaging	Finish
DF11-EP2428PCF	543-0615-4	10,000/reel	Tin plated
DF11-EP2428PC	543-0616-7	100/pack	
DF11-EP2428PCFA	543-0617-0	10,000/reel	Gold plated
DF11-EP2428PCA	543-0618-2	100/pack	

●Applicable Wire (Tinned, Annealed Copper Wire)

Wire size (Stranded wire conductor)	Jacket diameter
24 AWG (11/0.16)	ϕ 0.9 to ϕ 1.45mm
26 AWG (7/0.16)	
28 AWG (7/0.127)	

●Recommended wire
UL1061, UL1007

●Strip length
1.9 to 2.3mm

Note : When using other than the applicable wire, contact your nearest Hirose representative.

◆ Applicable Crimping Tool

Type	Part No.	HRS No.	Wire Type	Applicable Contacts
Applicator	AP105-DF11-22S	901-4529-7	UL1061 (Note 3, 5)	DF11-22SCF/SCFA(04)
	AP105-DF11-2428S	901-4511-1	UL1007 (Note 3) UL1061 (Note 3)	DF11-2428SCF/SCFA(04) DF11A-2428SCF
	AP105-DF11-30S	901-4532-1	UL1007 (Note 3) UL1061 (Note 3)	DF11-30SCF/SCFA(04)
	AP105-DF11-EP2428P	901-4528-4	UL1007 (Note 3) UL1061 (Note 3)	DF11-EP2428PCF/PCFA
Press Unit	CM-105C	901-0001-0	—————	—————
Hand Tool	DF11-TA22HC	550-0228-6	UL1061 (Note 4, 5)	DF11-22SC/SCA
	DF11-TA2428HC	550-0197-4	UL1007 (Note 4) UL1061 (Note 4)	DF11-2428SC/SCA DF11A-2428SC
	DF11-TA30HC	550-0230-8	UL1007 (Note 4) UL1061 (Note 4)	DF11-30SC/SCA
	DF11EP-TA2428HC	550-0227-3	UL1007 (Note 4) UL1061 (Note 4)	DF11-EP2428PC/PCA
Contact Extraction Tool	DF-C-PO(B)	550-0179-2	—————	DF11-*****SCF DF11-EP*****PCF

Note 1 : Please conduct crimping work according to the "Crimping work standards" and "Crimping condition table".

Note 2 : Any problems that occur from using tools other than those specified by Hirose, are not covered by warranty.

Note 3 : Applicator dies can be switched to crimp the other wire size and type. The additional dies are sold separately.

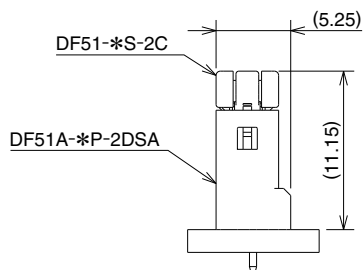
Note 4 : Hand tool dies cannot be switched.

Note 5 : The compatible wire is limited to UL1061, 22 AWG

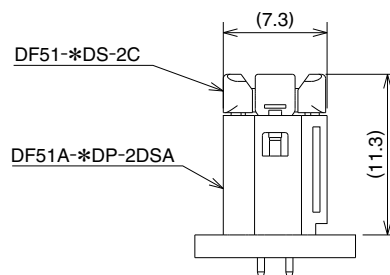
◆ Mated Dimensions

● Board-to-Wire Connection using the straight pin header

【Single-row】

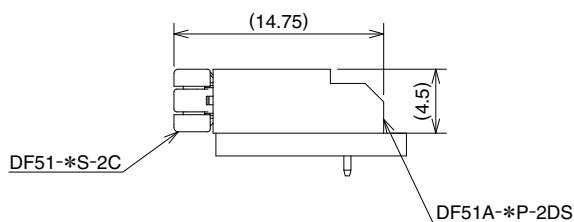


【Duble-row】

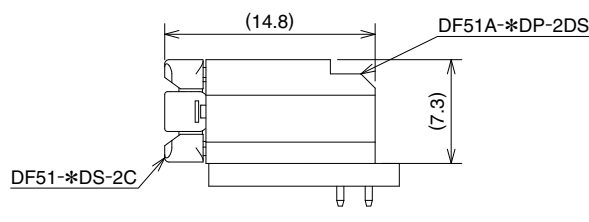


● Socket to Right Angle Header Connection

【Single-row】

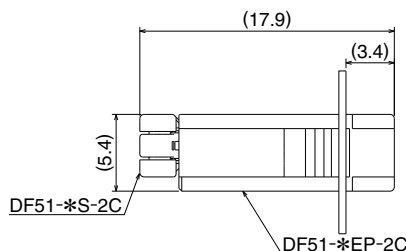


【Duble-row】

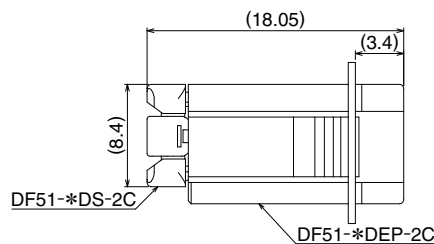


● Socket to In-line Plug Connection

【Single-row】



【Duble-row】



◆ Precautions for use

1. The connector could be damaged if it is pulled out forcibly. When it is hard to pull out, push it in slightly first and then depress the lock and un-mate.
Please refer to "DF51 mating and unmating Procedure Document (ETAD-H0847-00)" for points in handling regarding mating operations.
2. When fitting a crimped contact into a socket, please refrain from oblique insertion for keeping performance reliability.
Please refer to "Harness procedure manual (ETAD-H0923-00)" for points in harness operations.

◆ Operating environment

Please contact us if you are designing this connector into environmental conditions where high and low temperatures are repeated.



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