

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

## DF51K Series



### ■ 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

Straight and right angle types are available in single row and double row contact arrangements for flexible board design. Gold and Tin plating options support various application needs.

#### 3. Easy Lock Release

The width of the center lock lever increases as the pin count increases for easy extraction. Additionally, the center lock design does not need side-to-side spacing to un-mate the connector, which enables high density mounting. (Fig.2)

#### 4. Prevents incorrect mating

Visually and mechanically polarized design prevents reverse mating and incorrect mating between different number of positions. (Fig.3)

#### 5. Suitable for potting

Capable of being potted up to 3mm. (Fig.3)

#### 6. Uses the same crimp tools as DF11 Series

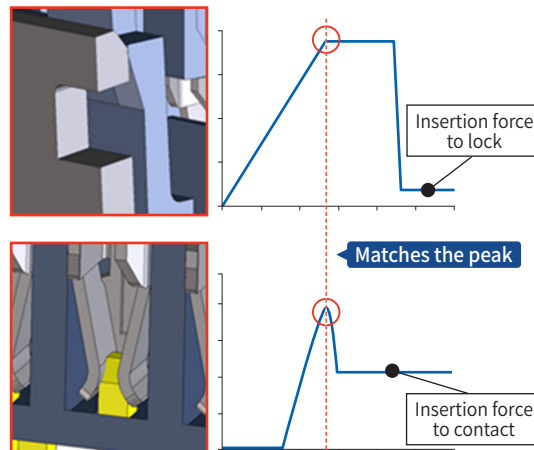
Wide applicable cable range : 22 to 30 AWG.  
(However, the crimp contact of DF51K and DF11 are not compatible with each other.)

#### 7. UL, C-UL certified

### ■ Applications

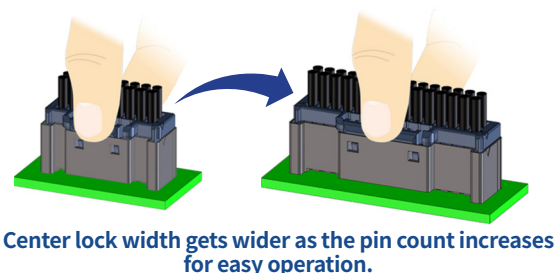
Office equipment, Industrial machinery,  
Industrial robots, Amusement equipment,  
Medical equipment.

#### Secure mating with clear tactile click

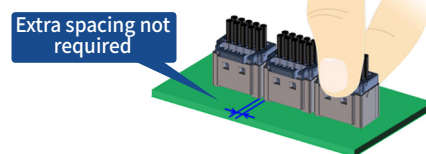


Matching peak insertion forces provides a clear click sound and tactile click

Fig.1



Center lock width gets wider as the pin count increases for easy operation.



High workability and high density mounting due to center lock design

Fig.2

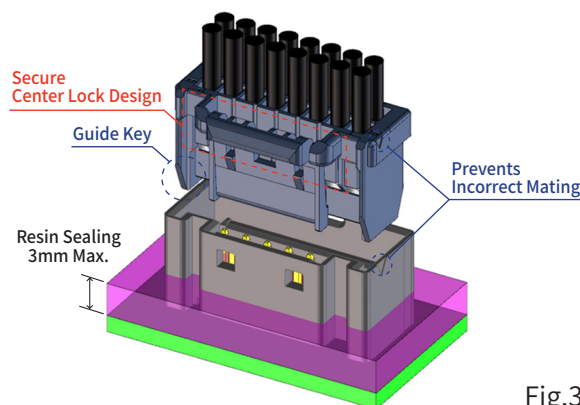


Fig.3

## Product Specifications

Ratings	Rated Current (Note 1)		Number of Contacts	22 AWG	24 AWG	26 AWG	28 AWG	30 AWG	Operating Temperature	-55 to +105°C (Note 2)
		Single Row	2	3A	2.5A	2A	1A	0.5A	Operating Humidity Range	20 to 80% (Note 3)
			3-6	2A	2A					
		Double Row	4	3A	2.5A				Storage Temperature	-10 to +60°C (Note 4)
			6-30	2A	2A	1.5A				
	Rated Voltage	250V AC/DC							Storage Humidity Range	40 to 70% (Note 4)

Ratings	Rated Current (Note 1)	22 AWG	24 to 28 AWG	30 AWG	UL/C-UL File No., and Recognition No. UL, C-UL : E132750
		2A	1A	0.5A	
	Rated Voltage	30V AC/DC			

Items	Specifications	Conditions
1. Insulation Resistance	No less than 1,000MΩ	Measured at 500V DC
2. Withstanding Voltage	No flashover or breakdown	650V AC 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 to 55Hz, half amplitude 0.75mm, 10 times in each of the 3 directions
5. Shock Resistance	No electrical discontinuity of 1μs or greater	Acceleration velocity : 490m/s <sup>2</sup> for 11ms, half-sine wave in 3 directions, 3 times for each directions
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. Mating Durability	Contact resistance: no more than 30mΩ	Tin plated : 30 mating cycles, Gold plated : 50 mating cycles
9. Soldering 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 : The rated current varies based on the cable size used.

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.

## Material / Finish

Product	Part	Material	Finish	UL Regulation
Header	Insulator	Straight : PA66 Right Angle : 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 bronze	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

**DF51K** **#** **-** **\*** **P** **-** **2** **DSA**  
①      ②      ③      ④      ⑤      ⑥

### ● Crimp Contact

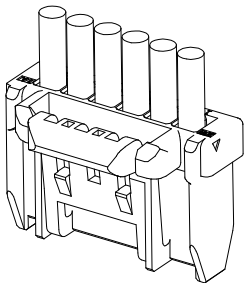
**DF51K** **-** **2428** **SCF** **A**  
①      ⑦      ⑧      ⑨

① Series Name : DF51K	⑥ Type of Housing DSA : Straight header DS : Right angle header C : Crimp socket
② Form Type Blank : Without guide-boss B : Guide-boss type	⑦ 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	⑧ Packaging SC : Socket contacts/pack SCF : Socket contacts/reel
④ Connector type P : Single-row pin header S : Single-row crimp socket DP : Double-row pin header DS : Double-row crimp socket	⑨ Plating Specifications Blank : Tin plated A : Gold plated
⑤ Contact Pitch : 2mm	

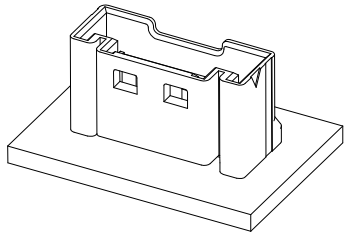
## Diagram of Connector Mating Combinations

### ● Single-row

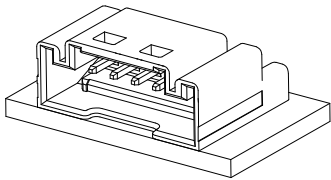
Crimp Socket	Socket Contact
DF51K-*S-2C	DF51K-22SC(F)(A)
	DF51K-2428SC(F)(A)
	DF51K-30SC(F)(A)



Straight Header
DF51K-*P-2DSA

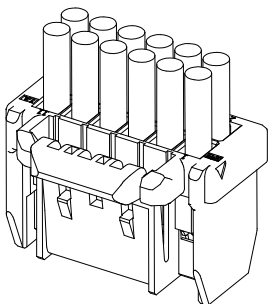


Right Angle Header
DF51K(B)-*P-2DS

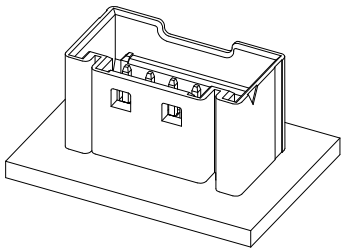


### ● Double-row

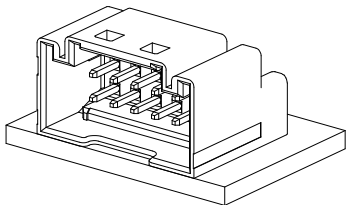
Crimp Socket	Socket Contact
DF51K-*DS-2C	DF51K-22SC(F)(A)
	DF51K-2428SC(F)(A)
	DF51K-30SC(F)(A)



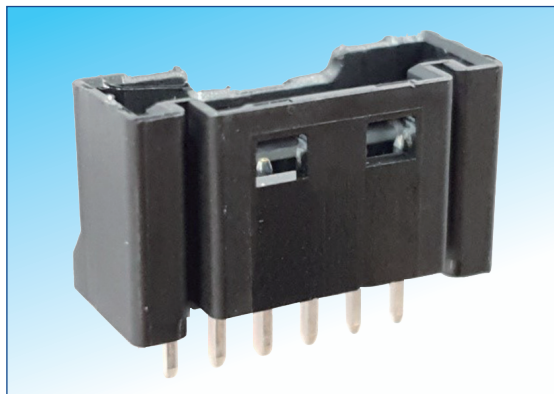
Straight Header
DF51K-*DP-2DSA



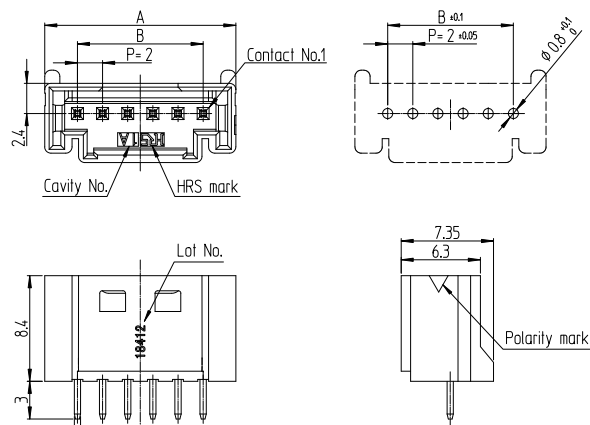
Right Angle Header
DF51K(B)-*DP-2DS



## Single-row Straight Header



Recommended PCB Layout (t=1.6mm)

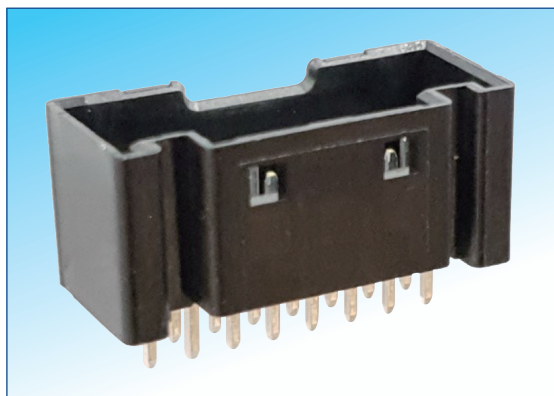


[Specification number] - \*\*, (8\*\*)  
00 : Tin plated  
05 : Gold plated

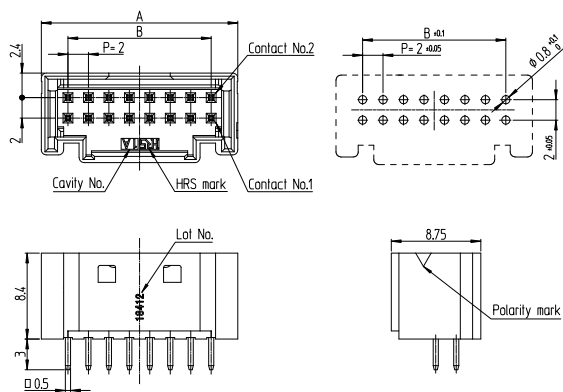
Part No.	HRS No.	No. of Contacts	A	B
DF51K-2P-2DSA(8**)	480-0542-0 **	2	7.2	2.0
DF51K-3P-2DSA(8**)	480-0543-0 **	3	9.2	4.0
DF51K-4P-2DSA(8**)	480-0544-0 **	4	11.2	6.0
DF51K-5P-2DSA(8**)	480-0545-0 **	5	13.2	8.0
DF51K-6P-2DSA(8**)	480-0546-0 **	6	15.2	10.0

Note : The sales unit is one pack(100pcs/pack). Order by number of packs.

## Double-row Straight Header



Recommended PCB Layout (t=1.6mm)



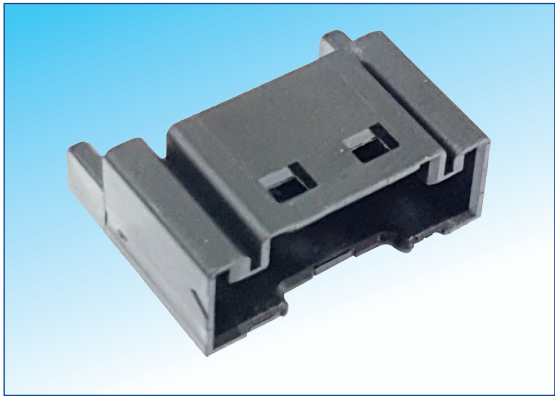
[Specification number] - \*\*, (8\*\*)  
00 : Tin plated  
05 : Gold plated

Part No.	HRS No.	No. of Contacts	A	B
DF51K-4DP-2DSA(8**)	480-0547-0 **	4	7.2	2.0
DF51K-6DP-2DSA(8**)	480-0548-0 **	6	9.2	4.0
DF51K-8DP-2DSA(8**)	480-0549-0 **	8	11.2	6.0
DF51K-10DP-2DSA(8**)	480-0550-0 **	10	13.2	8.0
DF51K-12DP-2DSA(8**)	480-0551-0 **	12	15.2	10.0
DF51K-14DP-2DSA(8**)	480-0552-0 **	14	17.2	12.0
DF51K-16DP-2DSA(8**)	480-0553-0 **	16	19.2	14.0

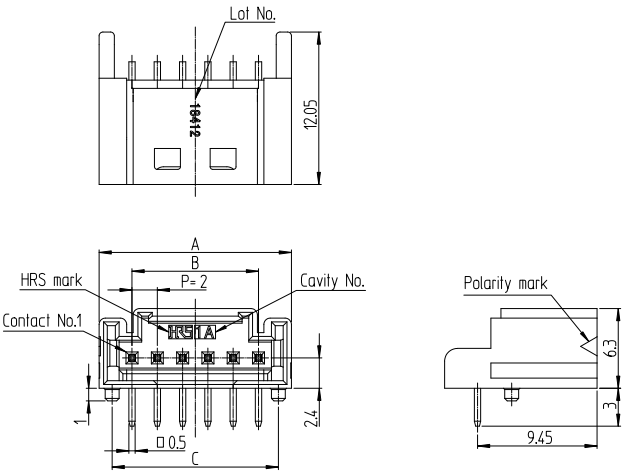
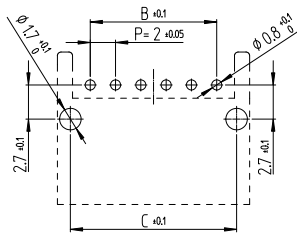
Part No.	HRS No.	No. of Contacts	A	B
DF51K-18DP-2DSA(8**)	480-0554-0 **	18	21.2	16.0
DF51K-20DP-2DSA(8**)	480-0555-0 **	20	23.2	18.0
DF51K-22DP-2DSA(8**)	480-0556-0 **	22	25.2	20.0
DF51K-24DP-2DSA(8**)	480-0557-0 **	24	27.2	22.0
DF51K-26DP-2DSA(8**)	480-0558-0 **	26	29.2	24.0
DF51K-28DP-2DSA(8**)	480-0559-0 **	28	31.2	26.0
DF51K-30DP-2DSA(8**)	480-0560-0 **	30	33.2	28.0

Note : The sales unit is one pack (100pcs/pack). Order by number of packs.

Single-row Right Angle Header



Recommended PCB Layout (t=1.6mm)



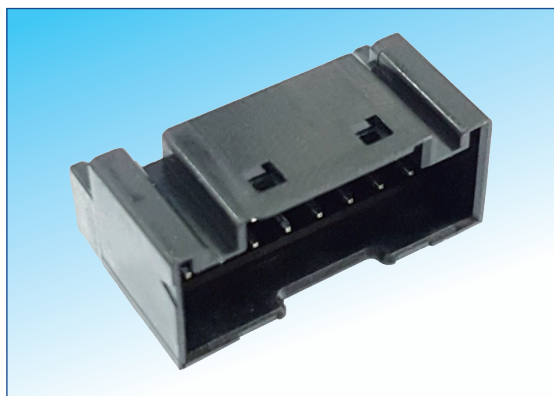
\*The above drawing is of guide-boss type.

[Specification number] - \*\*, (8\*\*)   
 00 : Tin plated, tray packaging   
 05 : Gold plated, tray packaging

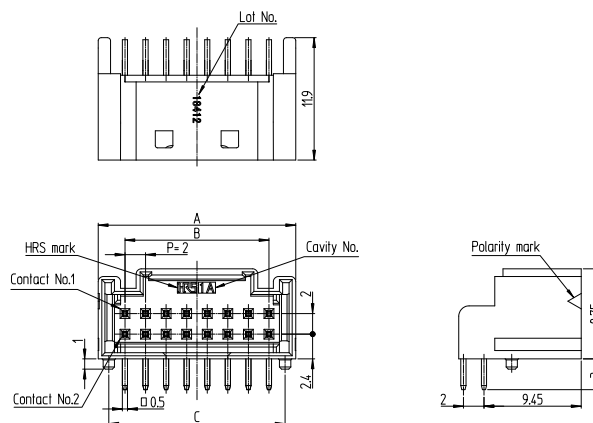
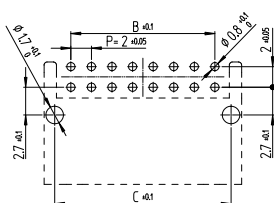
Part No.	HRS No.	Guide-Boss	No. of Contacts	A	B	C	Quantity per Package
DF51KB-2P-2DS(8**)	480-0587-0 **	With boss	2	7.2	2.0	5.14	420
DF51KB-3P-2DS(8**)	480-0588-0 **	With boss	3	9.2	4.0	7.14	330
DF51K-4P-2DS(8**)	480-0589-0 **	Without boss	4	11.2	6.0	—	270
DF51K-5P-2DS(8**)	480-0590-0 **	Without boss	5	13.2	8.0	—	230
DF51K-6P-2DS(8**)	480-0591-0 **	Without boss	6	15.2	10.0	—	200

Note : The sales unit is one tray. Order by number of trays.

## Double-row Right Angle Header



Recommended PCB Layout (t=1.6mm)



\*The above drawing is of guide-boss type.

[Specification number] - \*\*, (8\*\*)  
00 : Tin plated, tray packaging  
05 : Gold plated, tray packaging

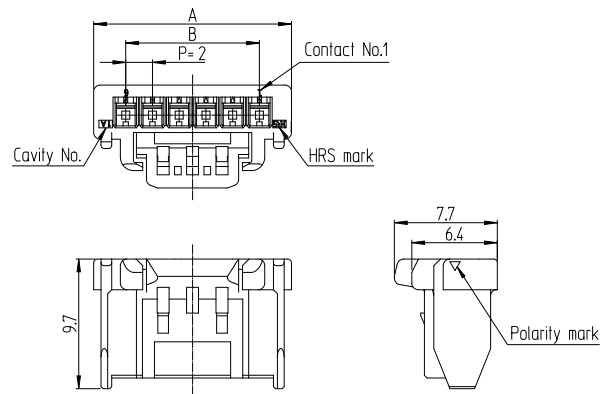
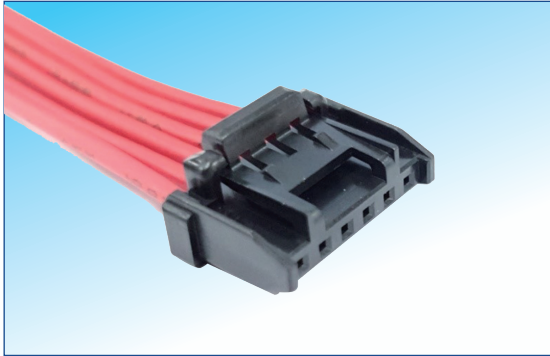
Part No.	HRS No.	Guide-Boss	No. of Contacts	A	B	C	Quantity per Package
DF51KB-4DP-2DS(8**)	480-0592-0 **	With boss	4	7.2	2.0	5.14	420
DF51KB-6DP-2DS(8**)	480-0593-0 **	With boss	6	9.2	4.0	7.14	330
DF51K-8DP-2DS(8**)	480-0594-0 **	Without boss	8	11.2	6.0	—	270
DF51K-10DP-2DS(8**)	480-0595-0 **	Without boss	10	13.2	8.0	—	230
DF51K-12DP-2DS(8**)	480-0596-0 **	Without boss	12	15.2	10.0	—	200
DF51K-14DP-2DS(8**)	480-0597-0 **	Without boss	14	17.2	12.0	—	170
DF51K-16DP-2DS(8**)	480-0598-0 **	Without boss	16	19.2	14.0	—	150
DF51K-18DP-2DS(8**)	480-0599-0 **	Without boss	18	21.2	16.0	—	140
DF51K-20DP-2DS(8**)	480-0600-0 **	Without boss	20	23.2	18.0	—	130
DF51K-22DP-2DS(8**)	480-0601-0 **	Without boss	22	25.2	20.0	—	120
DF51K-24DP-2DS(8**)	480-0602-0 **	Without boss	24	27.2	22.0	—	110
DF51K-26DP-2DS(8**)	480-0603-0 **	Without boss	26	29.2	24.0	—	100
DF51K-28DP-2DS(8**)	480-0604-0 **	Without boss	28	31.2	26.0	—	90
DF51K-30DP-2DS(8**)	480-0605-0 **	Without boss	30	33.2	28.0	—	90

Note : The sales unit is one tray. Order by number of trays.



## ■ Crimp Socket

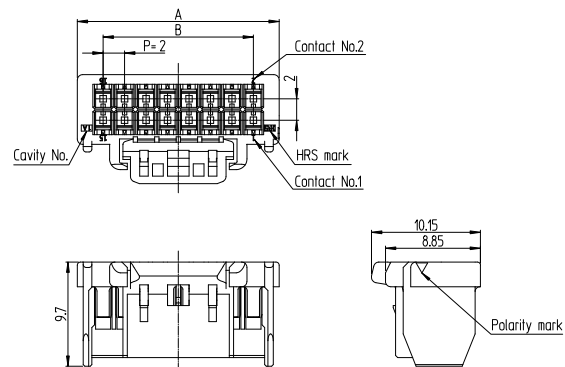
### ● Single-row



Part No.	HRS No.	No. of Contacts	A	B
DF51K-2S-2C(800)	480-0561-0 00	2	6.8	2.0
DF51K-3S-2C(800)	480-0562-0 00	3	8.8	4.0
DF51K-4S-2C(800)	480-0563-0 00	4	10.8	6.0
DF51K-5S-2C(800)	480-0564-0 00	5	12.8	8.0
DF51K-6S-2C(800)	480-0565-0 00	6	14.8	10.0

Note : The sales unit is one pack (100pcs/pack). Order by number of packs.

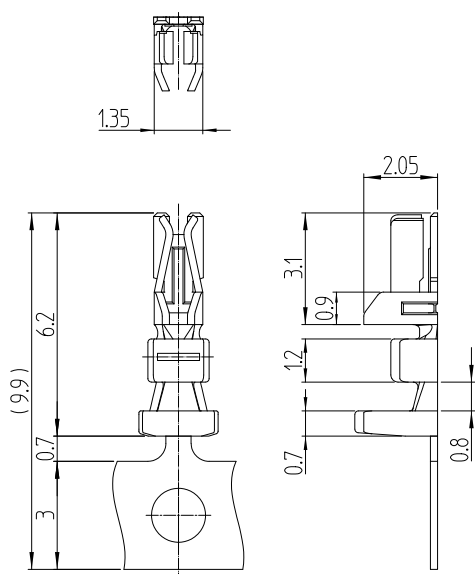
### ● Double-row



Part No.	HRS No.	No. of Contacts	A	B
DF51K-4DS-2C(800)	480-0567-0 00	4	6.8	2.0
DF51K-6DS-2C(800)	480-0568-0 00	6	8.8	4.0
DF51K-8DS-2C(800)	480-0569-0 00	8	10.8	6.0
DF51K-10DS-2C(800)	480-0570-0 00	10	12.8	8.0
DF51K-12DS-2C(800)	480-0571-0 00	12	14.8	10.0
DF51K-14DS-2C(800)	480-0572-0 00	14	16.8	12.0
DF51K-16DS-2C(800)	480-0573-0 00	16	18.8	14.0
DF51K-18DS-2C(800)	480-0574-0 00	18	20.8	16.0
DF51K-20DS-2C(800)	480-0575-0 00	20	22.8	18.0
DF51K-22DS-2C(800)	480-0576-0 00	22	24.8	20.0
DF51K-24DS-2C(800)	480-0577-0 00	24	26.8	22.0
DF51K-26DS-2C(800)	480-0578-0 00	26	28.8	24.0
DF51K-28DS-2C(800)	480-0579-0 00	28	30.8	26.0
DF51K-30DS-2C(800)	480-0580-0 00	30	32.8	28.0

Note : The sales unit is one pack (100pcs/pack). Order by number of packs.

## ■ Socket Contact



Part No.	HRS No.	Packaging	Finish
DF51K-22SCF(800)	480-0581-0 00	10,000/reel	Tin plated
DF51K-22SC(800)	480-0582-0 00	100/pack	
DF51K-2428SCF(800)	480-0583-0 00	10,000/reel	
DF51K-2428SC(800)	480-0584-0 00	100/pack	
DF51K-30SCF(800)	480-0585-0 00	10,000/reel	
DF51K-30SC(800)	480-0586-0 00	100/pack	
DF51K-22SCFA(800)	480-0612-0 00	10,000/reel	Gold plated
DF51K-22SCA(800)	480-0613-0 00	100/pack	
DF51K-2428SCFA(800)	480-0614-0 00	10,000/reel	
DF51K-2428SCA(800)	480-0615-0 00	100/pack	
DF51K-30SCFA(800)	480-0616-0 00	10,000/reel	
DF51K-30SCA(800)	480-0617-0 00	100/pack	

### ● Applicable wire (Tinned, Annealed copper wire)

UL	Wire Size (Stranded Wire Structure)	Jacket Diameter
1061	22 AWG (17 pieces / 0.16mm)	Ø1.2 to Ø1.45mm
1007	24 AWG (11 pieces / 0.16mm)	Ø0.9 to Ø1.45mm
	26 AWG (7 pieces / 0.16mm)	
	28 AWG (7 pieces / 0.127mm)	
1061	30 AWG (7 pieces / 0.1mm)	Ø0.8mm

Note 1 : Applicable Tool : Applicator

Note 2 : Contact your Hirose representative when considering usage of non-applicable wires.

## ◆ Applicable Crimping Tool

Type	Part No.	HRS No.	Wire Type	Applicable Contacts
Applicator	AP105-DF11-22S	901-4529-7 00	UL1061 (22 AWG)	DF51K-22SCF/SCFA
	AP105-DF11-2428S	901-4511-1 00	UL1007 (24 to 28 AWG)	DF51K-2428SCF/SCFA
	AP105-DF11-30S	901-4532-1 00	UL1061 (30 AWG)	DF51K-30SCF/SCFA
Press Unit	CM-105C	901-0001-0 00		
Hand Tool	HT801/DF11-22S(A)	550-0407-5 00	UL1061 (22 AWG)	DF51K-22SC/SCA
	HT801/DF11-2428S(A)	550-0403-4 00	UL1007 (24 to 28 AWG)	DF51K-2428SC/SCA
	HT801/DF11-30S(A)	550-0408-8 00	UL1061 (30 AWG)	DF51K-30SC/SCA
Contact Extraction Tool	DF-C-PO(B)	550-0179-2 00		DF51K-****SCF/SCFA

Note 3 : Please conduct crimping work according to the "Crimping work standards" and "Crimping condition table".

Note 4 : Any problems that occur from using tools other than those specified by Hirose are not covered by warranty.

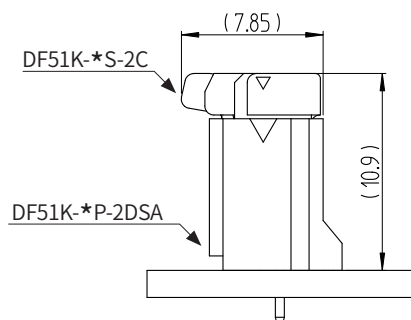
Note 5 : Please contact Hirose for information about hand tooling.



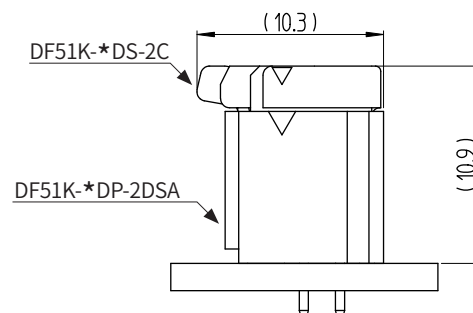
## ◆ Mated Dimensions

### ● Wire-to-Board connection using the straight header

[Single-row]

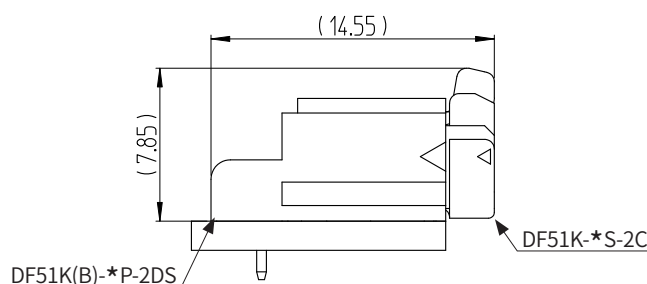


[Double-row]

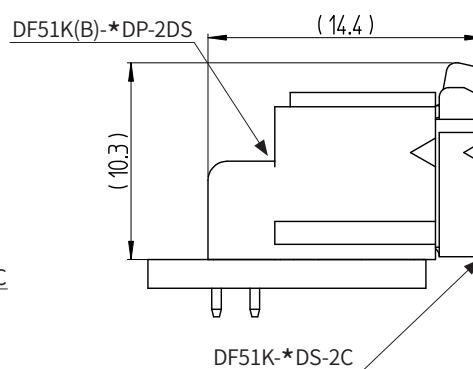


### ● Wire-to-Board connection using the right angle header

[Single-row]



[Double-row]



## ◆ Precautions for use

1. The connector could be damaged if 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 "DF51K mating and unmating Procedure Document (DOC180208-010)" for points in handling regarding mating operations.
2. When mating a crimped contact into a socket, please refrain from inserting it diagonally in order to maintain performance reliability.  
Please refer to the "Harness procedure manual (DOC180330-002)" for points in harness operations.

## ◆ Operating Environment

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

## ◆ While taking in consideration

Specifications mentioned in this catalog are reference values.

When considering to order or use this product, please confirm 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 assurance will not be given.

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.

MEMO

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