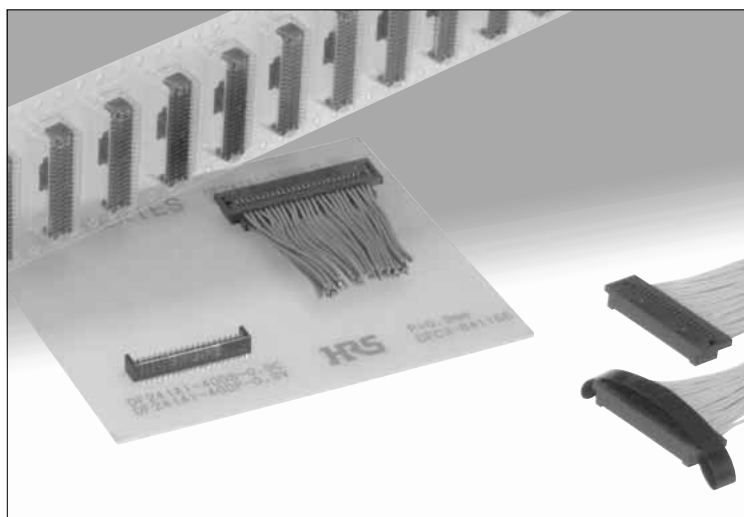


# 0.9 mm Pitch Vertical Mating Board-to-Wire Connectors

## DF24 Series



### ■ Features

#### 1. Space saving

Small contact pitch (0.9 mm) together with vertical mating direction allows high density mounting of the board components.

#### 2. Low profile

Two-level contact location and horizontal wire exits allow a low profile of 3.8 mm, when fully.

#### 3. Reliable mating/un-mating

Complete vertical mating, with both sides self-aligned, is confirmed with tactile "click" sensation.

#### 4. High contact reliability

2-point socket contact, with a long wipe (0.55 mm) assures highly reliable electrical and mechanical connection.

#### 5. Prevention of solder wicking

Despite its low-profile, solder wicking is prevented by the nickel barrier and solder collection areas.

#### 6. Self-alignment and side-pull protection

The walls of the double row socket assembly will self-align during the mating and protect header and socket assemblies from a accidental side-pull on the wires.

#### 7. Simplified un-mating

A pull strap for double row socket version may be selected for easier un-mating.

#### 8. Contact deformation protection

Flat contact blades on the headers are supported by the insulator's walls, protecting them from deformation during handling.

#### 9. Board placement with automatic equipment

Supplied on reels containing 1,000 assemblies.

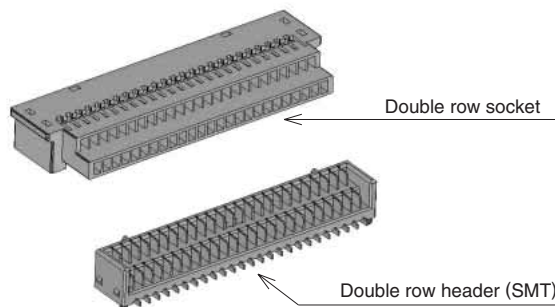
#### 10. RoHS compliant

All components and materials comply with the requirements of the EU Directive 2002/95/EC.

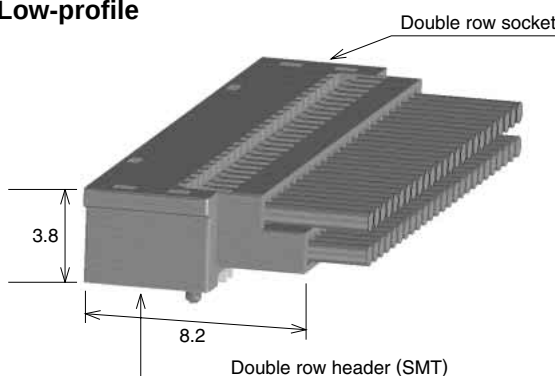
### ■ Applications

Notebook computers, miniature office automation devices, miniature consumer devices, cameras, recording devices and other devices requiring vertical mating reliable connectors.

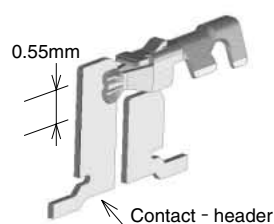
#### Space-saving



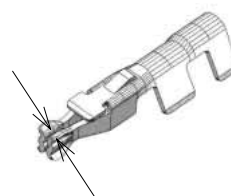
#### Low-profile



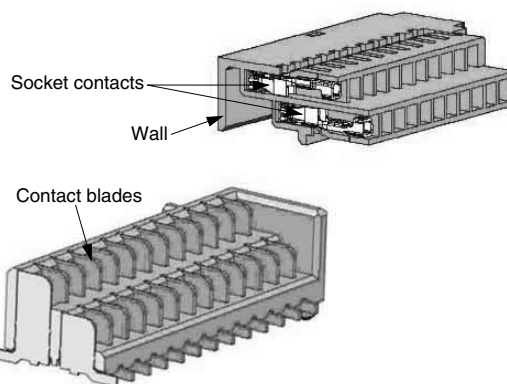
#### Long contact wipe



#### Two-point socket contact



#### Self-alignment and side-pull protection



#### Contact deformation protection

## DF24 Series 0.9 mm Pitch Vertical Mating Board-to-Wire Connectors

### Product Specifications

|        |                            |           |                                            |                                                         |                                                                  |
|--------|----------------------------|-----------|--------------------------------------------|---------------------------------------------------------|------------------------------------------------------------------|
| Rating | Current rating<br>(Note 1) | Wire size | AWG28 :1A<br>AWG30 :0.5A<br>AWG32~36 :0.3A | Operating temperature range<br>Operating humidity range | -35°C to +85°C (Note 2)<br>Relative humidity 20% to 80%          |
|        | Voltage rating             |           | 80V AC                                     | Storage temperature range<br>Storage humidity range     | -10°C to +60°C (Note 3)<br>Relative humidity 40% to 70% (Note 3) |

| Item                                        | Specification                                                        | Conditions                                                                                                       |
|---------------------------------------------|----------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| 1. Insulation resistance                    | 500 M ohms min.                                                      | 100V DC                                                                                                          |
| 2. Withstanding voltage                     | No flashover or insulation breakdown.                                | 250V AC/one minute                                                                                               |
| 3. Contact resistance                       | 30 mΩ max.                                                           | 1 mA, 20 mV max.                                                                                                 |
| 4. Insertion-Extraction force (per contact) | 0.12N min., 2N max.                                                  | Measured with a steel pin of 0.15mm thickness                                                                    |
| 5. Vibration                                | No electrical discontinuity of 1μs or more.                          | Frequency: 10 to 55 Hz, single amplitude of 0.75mm, 2 hours, 3 axis                                              |
| 6. Humidity                                 | Contact resistance: 30 mΩ max.<br>Insulation resistance: 250 MΩ min. | 96 hours at temperature of 40±2°C and humidity of 90% to 95%.                                                    |
| 7. Temperature cycle                        | Contact resistance: 30 mΩ max.<br>Insulation resistance: 500 MΩ min. | Temperature: -55°C → +5°C to +35°C → +85°C → +5°C to +35°C<br>Time: 30 → 2 to 3 → 30 → 2 to 3 (Minutes) 5 cycles |
| 8. Durability (mating / un-mating)          | Contact resistance: 30 mΩ max.                                       | 30 cycles                                                                                                        |
| 9. Resistance to soldering heat             | No deformation of components affecting performance.                  | Reflow: At the recommended temperature profile<br>Manual soldering: 350°C for 3 seconds                          |

Note 1: Current rating for header is 1A.

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 and Finishes

| Product       | Component      | Material        | Finish        | Remarks |
|---------------|----------------|-----------------|---------------|---------|
| Socket        | Insulators     | Polyamide       | Color : Black | UL94V-0 |
| Crimp contact | Contact-socket | Phosphor bronze | Gold plated   | ————    |
| Header        | Insulator      | Polyamide       | Color : Black | UL94V-0 |
|               | Contact-blade  | Phosphor bronze | Gold plated   | ————    |
| Pull strap    | Pull strap     | PET             | ————          | ————    |

### Ordering information

#### Connectors

**DF24 # - \* DS - 0.9 C**

① ② ③ ④ ⑤ ⑥

|                                                                                                         |                                                                                           |
|---------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| ① Series Name : DF24                                                                                    | ④ Connector type<br>DS : Double-row socket<br>DP : Double-row header                      |
| ② Form type<br>Pin headers A : Standard type<br>Sockets Blank : Standard type<br>A : Pull strap version | ⑤ Contact pitch : 0.9 mm                                                                  |
| ③ Number of contacts : 40, 50                                                                           | ⑥ Housing type<br>C : Crimp housing<br>V : Straight SMT header<br>PTB : Pull strap (Note) |

Note: The pull strap is an optional.

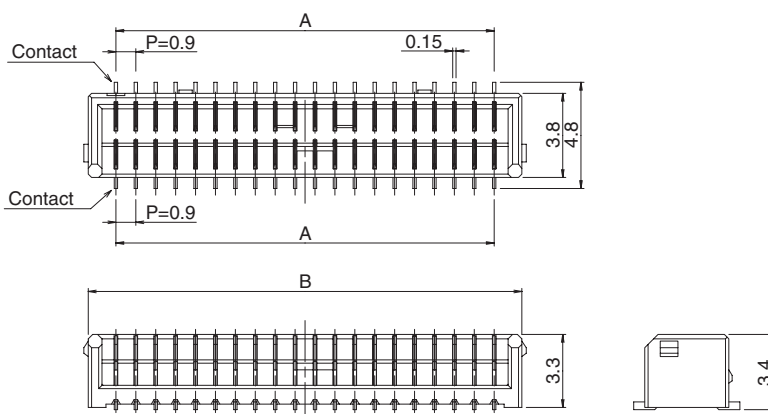
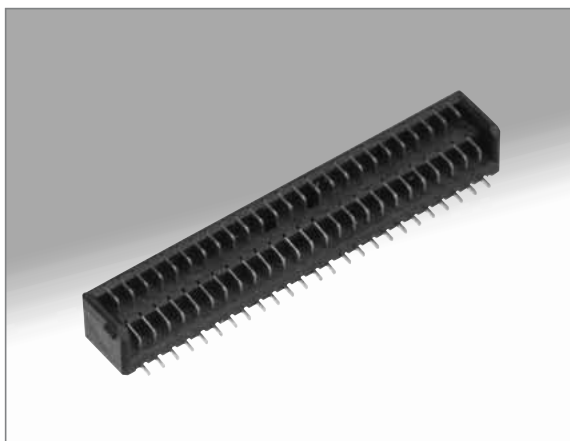
#### Contacts

**DF24 - 2830 SCF A**

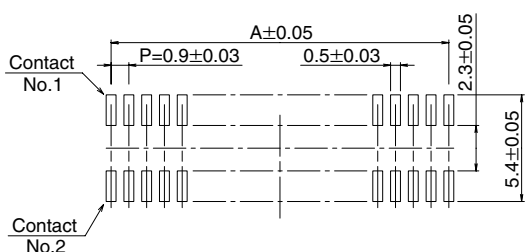
① ② ③

|                                                                                     |                                            |
|-------------------------------------------------------------------------------------|--------------------------------------------|
| ① Applicable conductor<br>2830 : AWG 28 to 30<br>3234 : AWG 32 to 34<br>36 : AWG 36 | ② Packaging<br>SCF : Socket contact / reel |
|                                                                                     | ③ Plating<br>A : Gold plated               |

## Double-row header (SMT)



## PCB mounting pattern

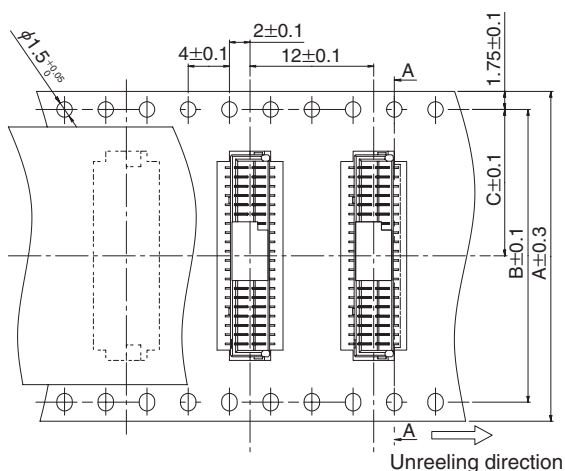


Specification number  
 (51): Embossed tape packaging (1,000 pieces per reel).

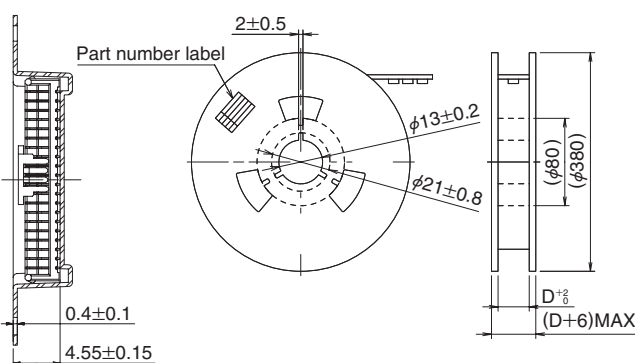
Unit: mm

| Part number         | CL No.         | Number of contacts | A    | B    | Packaging         | RoHS |
|---------------------|----------------|--------------------|------|------|-------------------|------|
| DF24A-40DP-0.9V(**) | 687-3208-0-**- | 40                 | 17.1 | 19.6 | 1,000 pcs. / reel | YES  |
| DF24A-50DP-0.9V(**) | 687-3209-2-**- | 50                 | 21.6 | 24.1 | 1,000 pcs. / reel |      |

## Packaging specifications



Section A-A

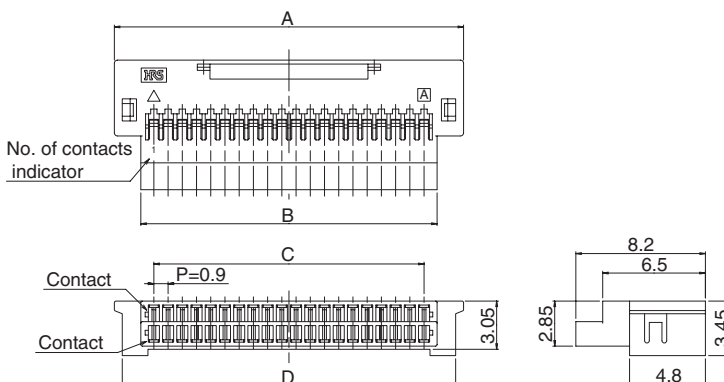
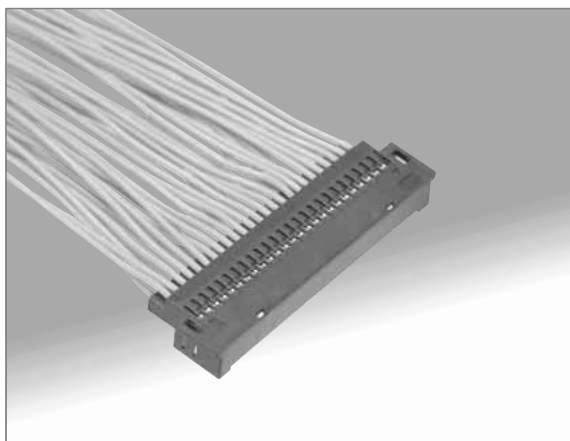


Unit: mm

| Part number         | Number of contacts | A  | B    | C    | D    |
|---------------------|--------------------|----|------|------|------|
| DF24A-40DP-0.9V(**) | 40                 | 32 | 28.4 | 14.2 | 32.4 |
|                     | 50                 | 44 | 40.4 | 20.2 | 44.4 |

## DF24 Series 0.9 mm Pitch Vertical Mating Board-to-Wire Connectors

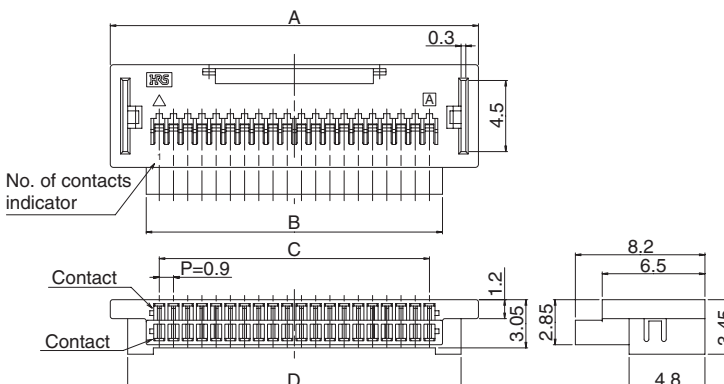
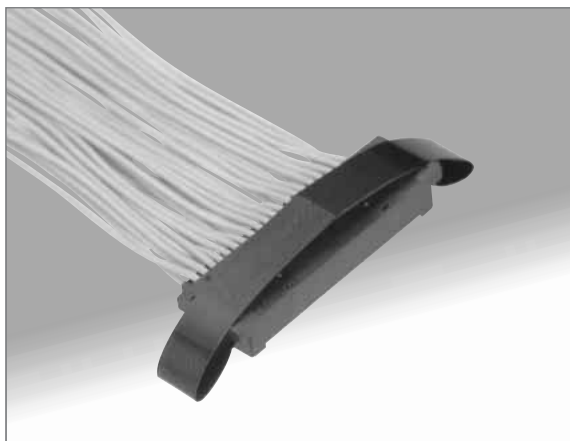
### Double-row socket



Unit: mm

| Part number     | CL No.     | Number of contacts | A    | B     | C    | D    | Packaging      | RoHS |
|-----------------|------------|--------------------|------|-------|------|------|----------------|------|
| DF24B-40DS-0.9C | 687-3301-5 | 40                 | 22.1 | 18.75 | 17.1 | 21.1 | 100 pcs. / bag | YES  |
| DF24B-50DS-0.9C | 687-3302-8 | 50                 | 26.2 | 23.25 | 21.6 | 25.2 | 100 pcs. / bag |      |

### Double-row socket (Pull strap)

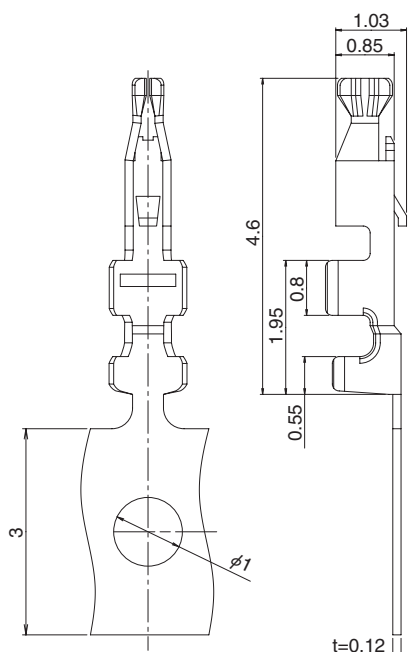


Unit: mm

| Part number      | CL No.     | Number of contacts | A    | B     | C    | D    | Packaging      | RoHS |
|------------------|------------|--------------------|------|-------|------|------|----------------|------|
| DF24BA-50DS-0.9C | 687-3304-3 | 50                 | 27.4 | 23.25 | 21.6 | 25.2 | 100 pcs. / bag | YES  |

Note: Refer to page 5 for pull strap tab.

## ■Crimp contact



| Part number   | CL No.     | Applicable wire size | Packaging | Quantity | Finish      | RoHS |
|---------------|------------|----------------------|-----------|----------|-------------|------|
| DF24-2830SCFA | 687-3001-1 | 28 – 30              | Reel      | 20,000   | Gold plated | YES  |
| DF24-3234SCFA | 687-3004-0 | 32 – 34              |           |          |             |      |
| DF24-36SCFA   | 687-3003-7 | 36                   |           |          |             |      |

### ● Applicable wire (Tin plated annealed copper wire)

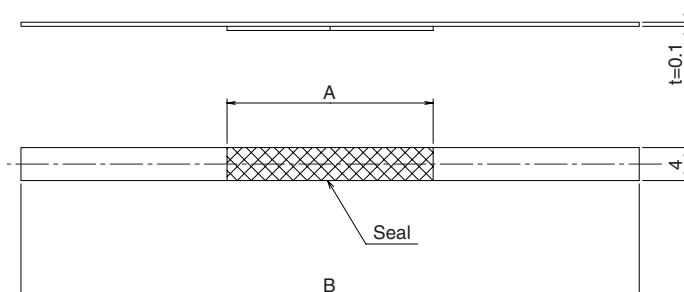
| Wire size (Stranded wire conductor) | Jacket diameter |
|-------------------------------------|-----------------|
| AWG28 (7 / 0.127mm)                 | 0.6mm max       |
| AWG30 (7 / 0.10 mm)                 |                 |
| AWG32 (7 / 0.08 mm)                 |                 |
| AWG36 (7 / 0.05 mm)                 | 0.4mm max       |

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

### ● Tools

| Type      | Description             | Part number      | CL No.     | Applicable contacts |
|-----------|-------------------------|------------------|------------|---------------------|
| Automatic | Applicator              | AP105-DF24-2830S | 901-4602-5 | DF24-2830SCFA       |
|           |                         | AP105-DF24-3234S | 901-4592-3 | DF24-3234SCFA       |
|           |                         | AP105-DF24-36S   | 901-4606-6 | DF24-36SCFA         |
|           | Press unit              | CM-105           | 901-0005-4 | _____               |
|           | Contact extraction tool | DF-C-PO(B)       | 550-0179-2 | DF24-****SCFA       |

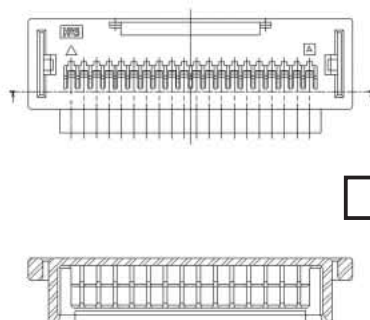
## ■Pull strap



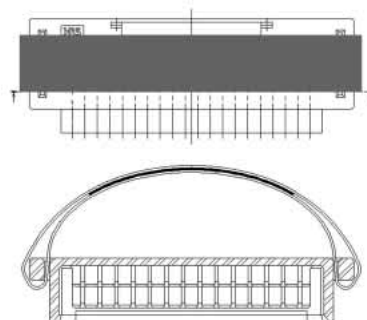
Applicable socket  
 ※ [DF24BA-50DS-0.9C]

Unit: mm

| Part number   | CL No.     | Number of contacts | A  | B  | Packaging      | RoHS |
|---------------|------------|--------------------|----|----|----------------|------|
| DF24-50DS-PTB | 687-3300-2 | 50                 | 25 | 75 | 500 pcs. / bag | YES  |



Before attachment of the pull strap

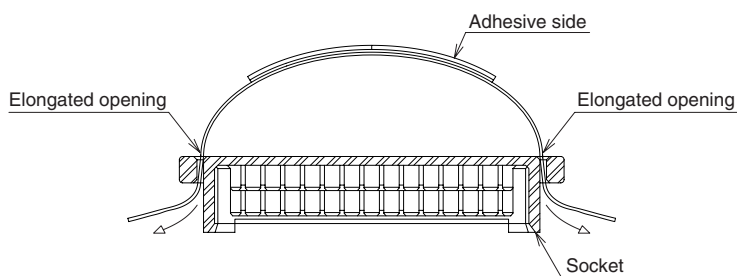


Pull strap attached

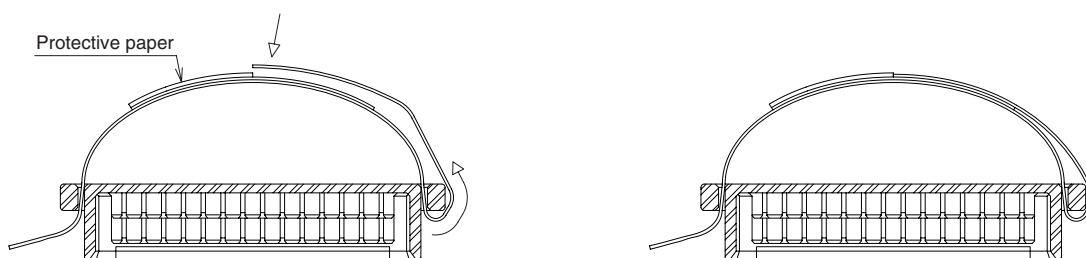
## DP24 Series 0.9 mm Pitch Vertical Mating Board-to-Wire Connectors

### ■ Pull Strap Attachment Procedure

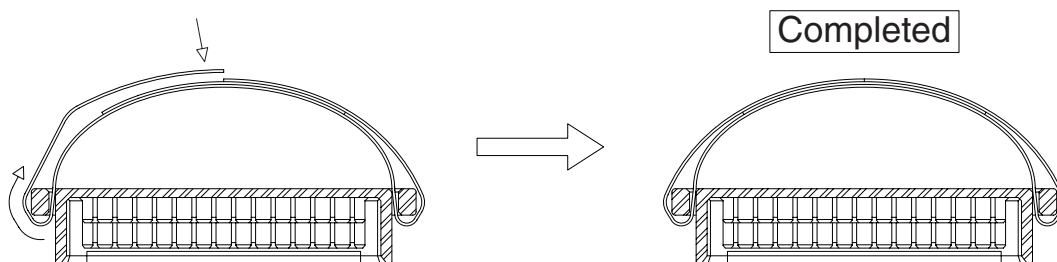
- ① With the adhesive side of the pull strap facing upward, pass both ends of the strap through the elongated openings at both ends of the socket.



- ② Peel-off the protective paper on one side and place one end of the strap over exposed adhesive (as illustrated below), using the remaining paper side as the alignment guide.



- ③ Peel-off the remaining protective paper and place the other end of the strap over the adhesive, using the already attached end as the alignment guide.



## ■ Usage recommendations and Precautions

|                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Recommended temperature profile<br>(Including Lead-free solder)          | <div><div><div>Temperature(℃)</div><div><div>240<br/>220</div><div>190<br/>170</div><div>Preheating</div><div>Soldering</div><div>Time(S)</div></div></div><div><div>Reflow conditions</div><div>Preheating:<br/>180±10℃ 60~20sec.</div><div>Soldering:<br/>250℃ max.<br/>240℃min. 20sec. max.<br/>220℃min. 60sec. max.</div></div><div><div>Note 1: Up to 2 cycles of Reflow soldering are possible under the same conditions, providing that there is a return to normal temperature between the first and second cycle.</div><div>Note 2: The temperature profile indicates the board surface at the point of contacts with the connector terminals.</div></div></div>                                         |
| 2. Recommended manual soldering                                             | Manual soldering: 300±10℃ for 3 seconds                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 3. Recommended screen thickness and opening area ratio (Pattern area ratio) | Thickness: 0.12mm<br>Opening area ratio: 80%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 4. Board warpage                                                            | Maximum of 0.03mm at the connector center, with both ends of the connector as reference points.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 5. Cleaning conditions                                                      | Refer to “Nylon Connector Use Handbook”.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 6. Wire preparation and contact crimping                                    | Refer to “Nylon Connector Use Handbook”.<br>The crimp contacts are of a very small form and because of this, crimping should be performed carefully based on the content of the Crimping Conditions Table and the Crimping Quality Standards Manual.                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 7. Precautions                                                              | <div><div>■ Removal of the inserted socket contacts</div><div><div>* Using the socket contact extraction tool (DF-C-PO(B) ) carefully lift the contact retention tab on the insulator housing, as shown on the Fig.1 and pull-out the wire.</div><div><div>* Lift the tab ONLY enough to remove the contact. Exercise caution NOT to deflect too much.</div><div>The tab should return to its original position after the contact is removed.</div><div>The tab must be in its original position before inserting the new socket contact.</div></div></div><div><div><div>Contact retention tab</div><div>Contact extraction tool DF-C-PO(B)</div><div></div></div></div><div>Fig. 1. Contact Removal</div></div> |

## 7. Precautions

### ■ Connector Mating/Un-mating

- \* Hold the socket at both ends (as illustrated on Fig.2) when mating or un-mating. The mating/un-mating of the connectors must be within the indicated angle of 20° on both axis.

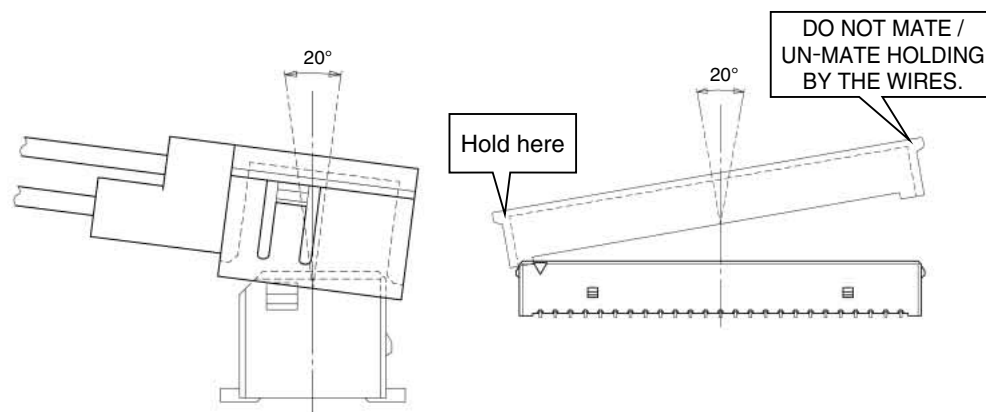


Fig. 2. Mating / Un-mating

### ■ Bundling of the Wires

- \* To avoid wire damage or termination faults bundling of the wires should be at the distance of 20 mm min. from the socket (Fig. 3-1)
- \* When bundling at the distance less than the recommended 20 mm, it is critical to avoid sharp bend radius (Fig. 3-2) or apply stretching or twisting forces (Fig. 3-3)

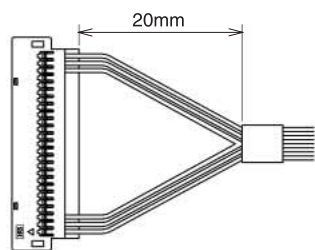


Fig. 3-1

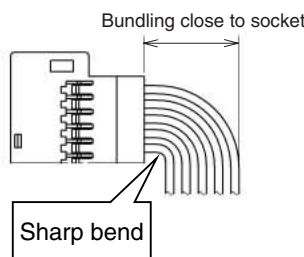


Fig. 3-2

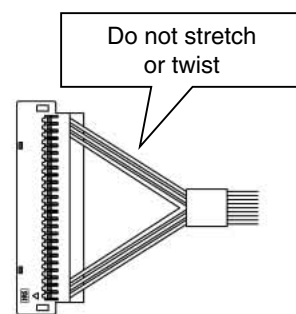


Fig. 3-3

Fig. 3. Bundling requirements

- \* Do not mate/un-mate connectors when not mounted on the board.
- \* Do not use connector as the only support for the board.
- \* Do not use flux compounds when hand soldering.
- \* Slight color shade difference of the insulator bodies will not affect the form, fit or function of the connectors.