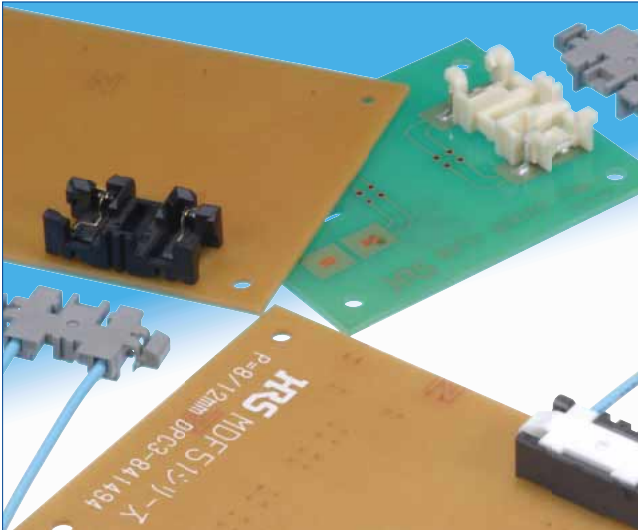


# High Voltage Wire-to-Board Connectors

## MDF51 Series



### ● Simple and secure mating with one push

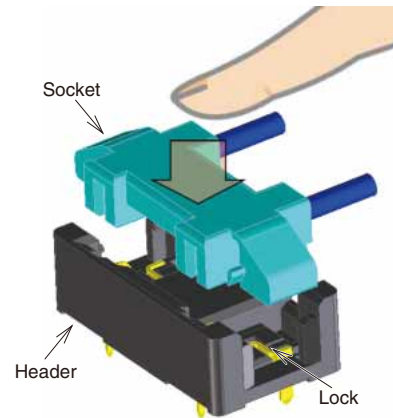


Fig.1

## ■ Features

### 1. Simple, one step mating

Built-in locks assure correct and complete mating with just a single, downward push on the plug.

### 2. Vertical mating style

The vertical mating style and built-in, self aligning features are efficient and eliminates the need for additional space that would be required with a horizontal mating style connector.

### 3. Designed for high voltage applications

Wide contact pitch and creepage distance maintain stable and safe performance at high voltage levels.

### 4. Secure attachment to the board

Four solder points are provided to keep the headers firmly secured to the PCB.

### 5. Secure hold during the soldering operation.

The 12 mm pitch version incorporates a built in hold-down feature that helps keep the connector aligned during the soldering operation.

### 6. UL, C-UL, and TÜV certified (12mm pitch only)

### 7. RoHS compliant

## ■ Applications

LCD TV backlights, FPD power supplies and other applications requiring small high-voltage connectors.

### ● Secure hold during the soldering operation

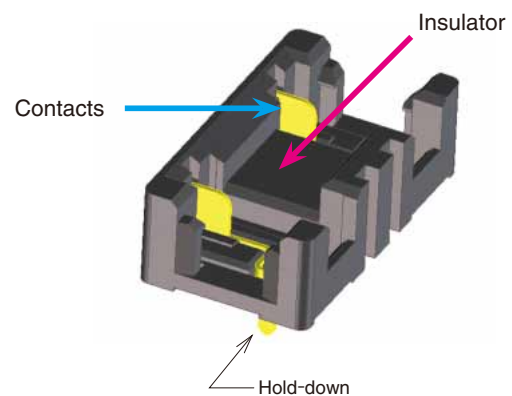


Fig.2

## ■ Product Specification

|         |                |             |                             |                         |
|---------|----------------|-------------|-----------------------------|-------------------------|
| Ratings | Current rating | 1A          | Operating temperature range | -35°C to +85°C (Note 1) |
|         | Voltage rating | 3000V AC/DC | Operating humidity range    | RH 20% to 80%           |
|         |                |             | Storage temperature range   | -10°C to +60°C (Note 2) |
|         |                |             | Storage humidity range      | RH 40% to 70% (Note 2)  |

|         |                | UL, C-UL    | TÜV         |
|---------|----------------|-------------|-------------|
| Ratings | Current rating | 1A          | 1A          |
|         | Voltage rating | 1000V AC/DC | 1000V AC/DC |

■ File and recognition numbers:

UL and C-UL : E52653

TÜV : R50085755

| Item                            | Specifications                                                                                             | Conditions                                                                                                                                                           |
|---------------------------------|------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Insulation resistance        | 1000MΩ min.                                                                                                | 500V DC                                                                                                                                                              |
| 2. Withstanding voltage         | No flashover or insulation breakdown                                                                       | 5000V AC / 1 minute                                                                                                                                                  |
| 3. Contact resistance           | 20mΩ max.                                                                                                  | 20mV max., at 1mA .                                                                                                                                                  |
| 4. Vibration                    | No electrical discontinuity of 1μs or longer<br>No damaged, cracked or loose parts.                        | Frequency: 10 to 55Hz, single amplitude of 0.75mm,<br>10 cycles, 3 axis                                                                                              |
| 5. Shock                        | No electrical discontinuity of 1μs or longer<br>No damaged, cracked or loose parts.                        | Acceleration of 490 m/s <sup>2</sup> , 11 ms duration, sine half-wave,<br>3 cycles in each of the 3 axis                                                             |
| 6. Humidity                     | Contact resistance: 40mΩ max.,<br>Insulation resistance: 500MΩ min.<br>No damaged, cracked or loose parts. | 96 hours at of 40 ±2°C, and humidity of 90 to 95%                                                                                                                    |
| 7. Temperature cycle            | Contact resistance: 40mΩ max.,<br>Insulation resistance: 500MΩ min.<br>No damaged, cracked or loose parts. | -55°C → 5 to 35°C → 85°C → 5 to 35°C<br>Times: 30 min. → 3 min. → 2 min. to 3 min. → 30 min. → 2 min. to 3 min.<br>5 cycles                                          |
| 8. Mating cycles                | Contact resistance: 40mΩ max.<br>No damaged, cracked or loose parts.                                       | 30 cycles                                                                                                                                                            |
| 9. Resistance to soldering heat | No deformation of components affecting performance                                                         | Reflow: At the recommended temperature profile (MDF51SU)<br>Flow: Solder temperature 260°C, 10 seconds (MDF51K and MDF51SY)<br>Manual soldering: 350°C for 3 seconds |

Note 1 : Includes temperature rise caused by current flow.

Note 2 : The term "storage" refers to products stored for a long period prior to mounting and use.

The operating temperature and humidity range covers the non-conducting condition of installed connectors in storage, shipment or during transportation.

## ■ Material / Finish

### ● Header

| Part      | Material            | Finish        | Remarks |
|-----------|---------------------|---------------|---------|
| Insulator | MDF51K PBT          | Color : Black | UL94V-0 |
|           | MDF51SU : Polyamide | Color : Beige |         |
|           | MDF51SY : Polyamide | Color : Black |         |
| Contact   | Brass               | Tin plating   | _____   |

### ● Crimp socket

| Part             | Material            | Finish        | Remarks |
|------------------|---------------------|---------------|---------|
| Socket Insulator | MDF51 : Polyamide   | Color : White | UL94V-0 |
|                  | MDF51SU : Polyamide | Color : Gray  |         |
| Crimp contact    | Phosphor bronze     | Tin plating   | _____   |

## ■ Product Number Structure

### ● Header

**MDF51** **#** **-** **\*** **P** **-** **12** **DSA**

①      ②      ③      ④      ⑤      ⑥

|                                                                                                                                                 |                                                                                 |
|-------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| ① Series name : MDF51                                                                                                                           | ③ No. of contacts : 2                                                           |
| ② Configuration type<br>K : Contact pitch 12mm, through hole<br>SU : Contact pitch 13mm, surface mount<br>SY : Contact pitch 13mm, through hole | ④ Connector type P : Header                                                     |
|                                                                                                                                                 | ⑤ Contact pitch 12mm or 13mm                                                    |
|                                                                                                                                                 | ⑥ Mounting style<br>DSA : Through hole, straight<br>V : Surface mount, straight |

### ● Crimp socket

**MDF51** **#** **-** **\*** **S** **-** **12** **C**

①      ②      ③      ④      ⑤      ⑥

|                                                                                                   |                                   |
|---------------------------------------------------------------------------------------------------|-----------------------------------|
| ① Series name : MDF51                                                                             | ③ No. of contacts : 2             |
| ② Configuration type<br>Blank : Contact pitch 12mm, standard<br>SU : Contact pitch 13mm, standard | ④ Connector type S : Crimp socket |
|                                                                                                   | ⑤ Contact pitch 12mm or 13mm      |
|                                                                                                   | ⑥ Termination C : Crimp           |

### ● Contacts

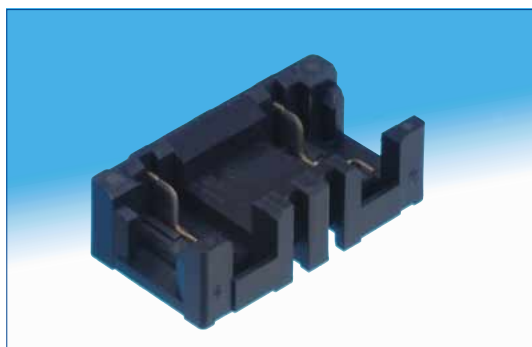
**MDF51** **-** **24** **SCF**

①      ②

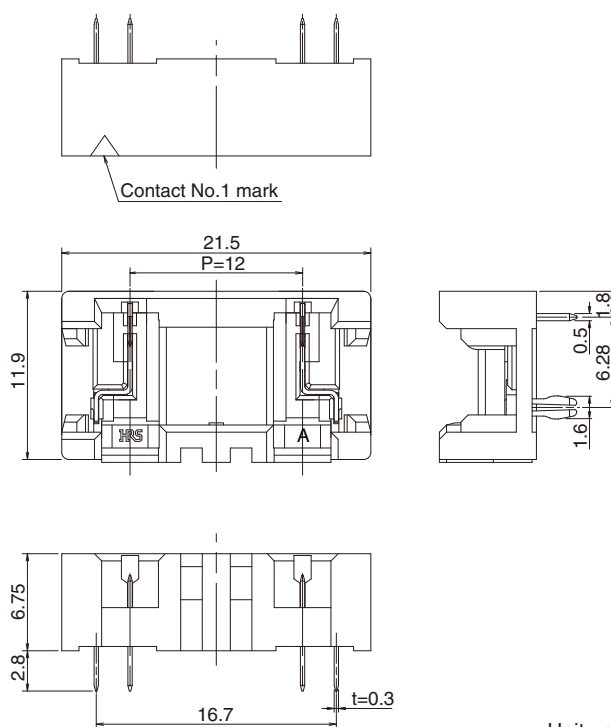
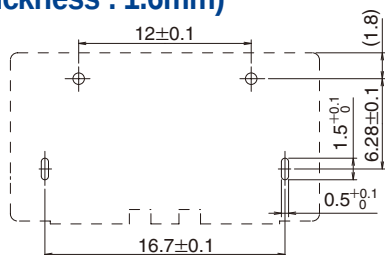
|                                       |                                                  |
|---------------------------------------|--------------------------------------------------|
| ① Applicable wire size<br>24 : 24 AWG | ② Packaging<br>SCF : Female crimp contact / reel |
|---------------------------------------|--------------------------------------------------|

## ■ Header (Contact pitch : 12 mm)

### ● Straight, through hole

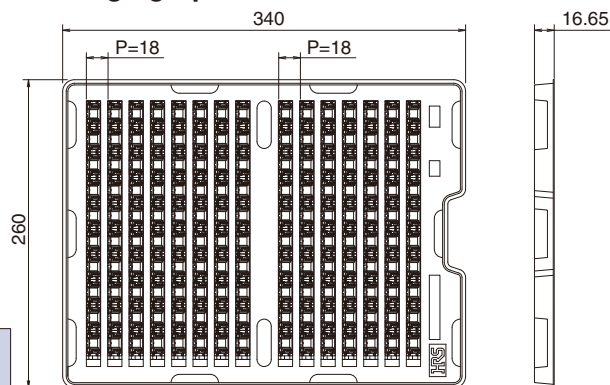


### ◆ Recommended PCB layout dimensions (Thickness : 1.6mm)



Unit : mm

### ● Packaging Specification



| Part No.            | HRS No.       | No. of contacts | Insulator Color | Packaging    |
|---------------------|---------------|-----------------|-----------------|--------------|
| MDF51K-2P-12DSA(20) | 547-2017-9 20 | 2               | Black           | 150 pcs/tray |

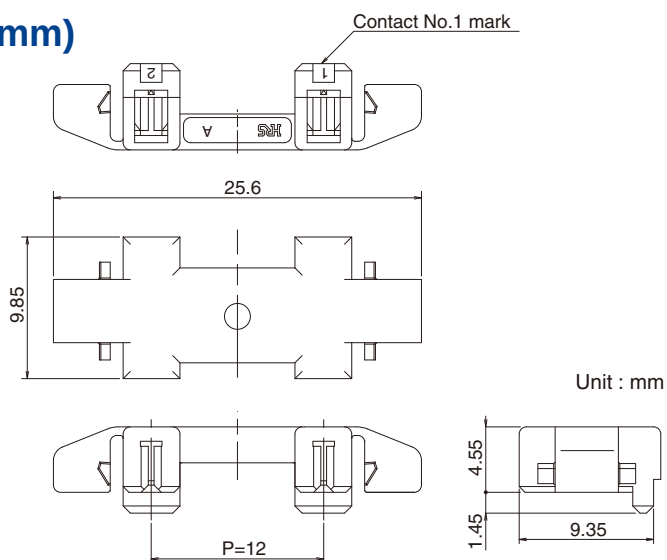
Please place orders in full tray increments.

## ■ Crimp socket (Contact pitch : 12 mm)



### ● With crimp contacts assembled

### • Contacts supplied separately



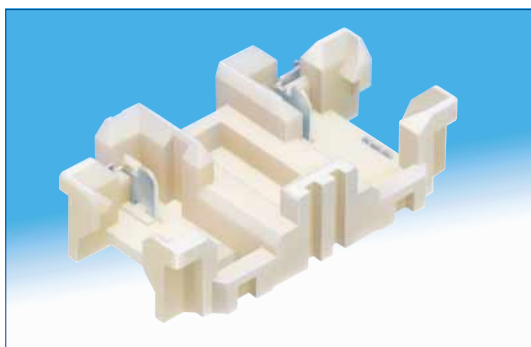
Unit : mm

| Part No.     | HRS No.       | No. of contacts | Insulator Color | Packaging    |
|--------------|---------------|-----------------|-----------------|--------------|
| MDF51-2S-12C | 547-2004-7 00 | 2               | White           | 100 pcs/pack |

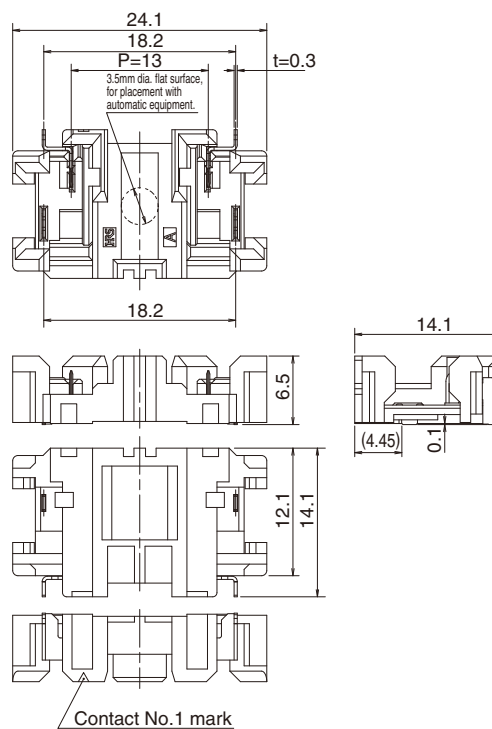
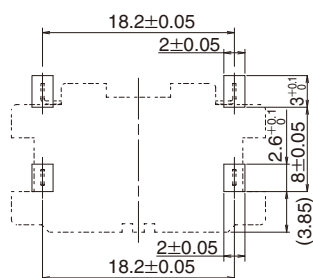
Please place orders in full pack increments.

## Header (Contact pitch : 13 mm)

### ●Straight, surface mount

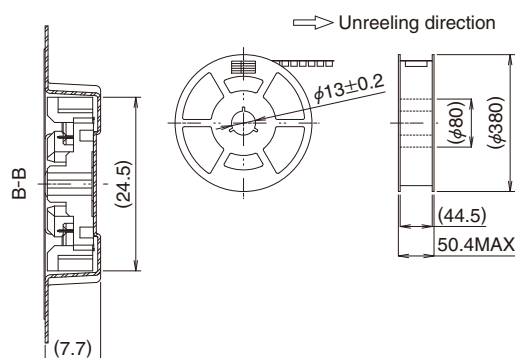
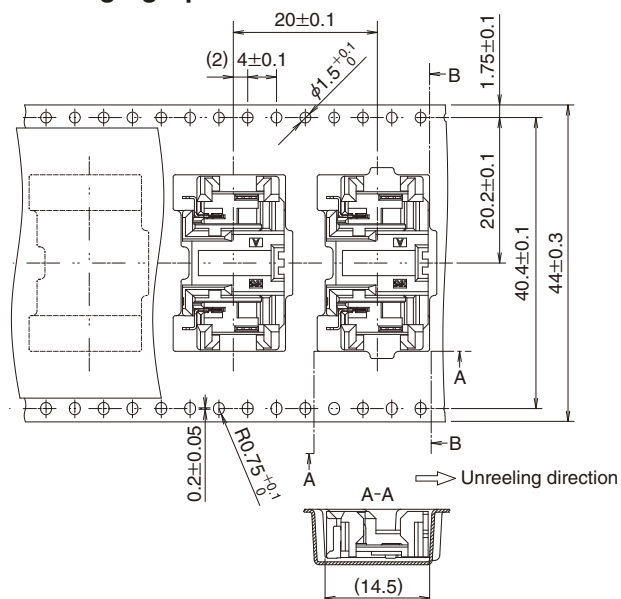


### ◆Recommended PCB layout dimensions



Unit : mm

### ●Packaging Specification

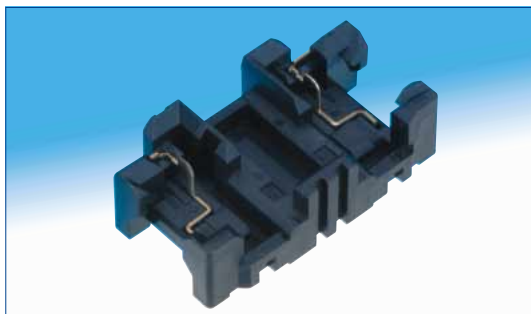


| Part No.           | HRS No.       | No. of contacts | Insulator Color | Packaging    |
|--------------------|---------------|-----------------|-----------------|--------------|
| MDF51SU-2P-13V(23) | 547-2016-6 23 | 2               | Beige           | 600 pcs/reel |

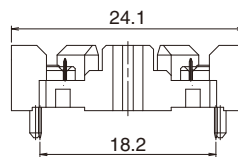
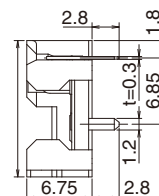
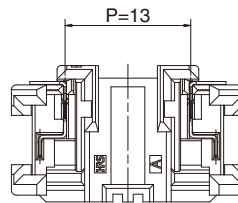
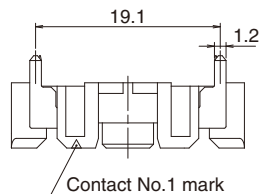
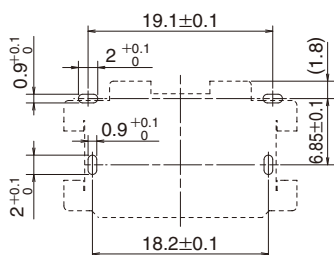
Please place orders in full reel increments.

## ■ Header (Contact pitch : 13 mm)

### ● Straight, through-hole

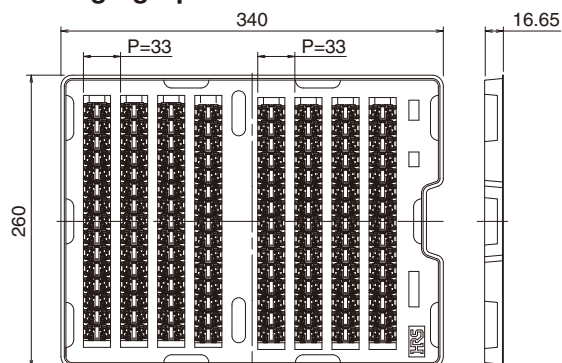


### ◆ Recommended PCB layout dimensions PCB thickness : 1.6mm



Unit : mm

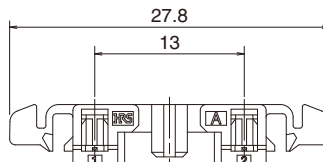
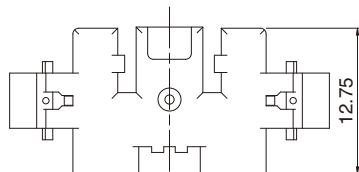
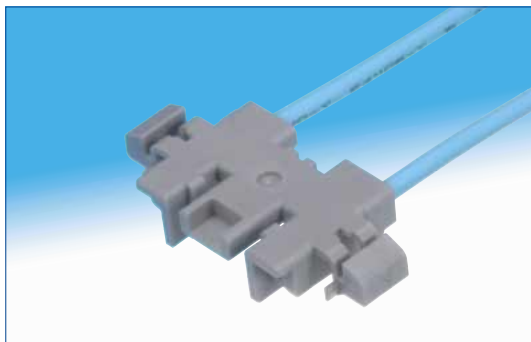
### ● Packaging Specification



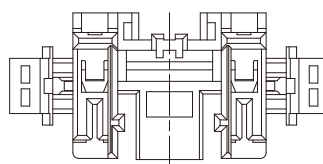
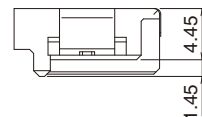
| Part No.             | HRS No.       | No. of contacts | Insulator Color | Packaging    |
|----------------------|---------------|-----------------|-----------------|--------------|
| MDF51SY-2P-13DSA(21) | 547-0920-3 21 | 2               | Black           | 120 pcs/tray |

Please place orders in full tray increments.

## ■ Crimp socket (Contact pitch : 13 mm)



Contact No.1 indicator

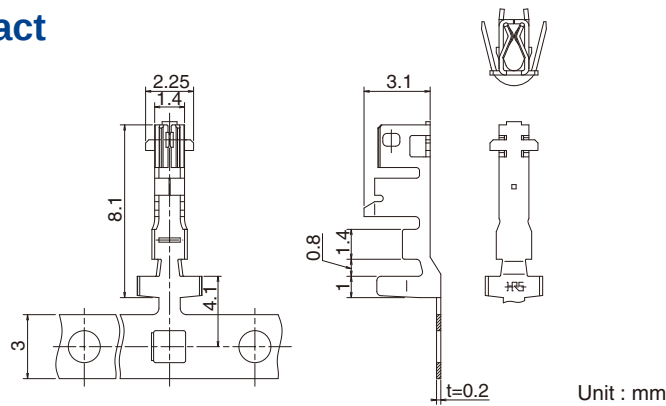


Unit : mm

| Part No.           | HRS No.       | No. of contacts | Insulator Color | Packaging    |
|--------------------|---------------|-----------------|-----------------|--------------|
| MDF51SU-2S-13C(03) | 547-2018-1 03 | 2               | Gray            | 100 pcs/pack |

Please place orders in full pack increments.

## ◆ Crimp contact



| Part No.        | HRS No.       | Packaging     | Finish      |
|-----------------|---------------|---------------|-------------|
| MDF51-24SCF(40) | 547-2005-0 40 | 10,000 / reel | Tin plating |

Please place orders in full reel increments.

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

| Wire size (Stranded wire conductor) | Jacket diameter |
|-------------------------------------|-----------------|
| AWG#24 (19 / $\phi$ 0.127mm)        | $\phi$ 1.74mm   |

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

● UL style : UL3239

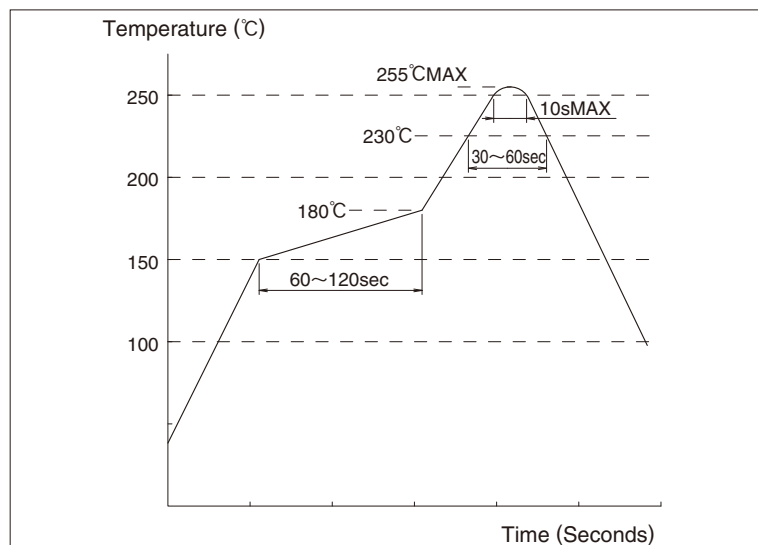
● Strip length  
1.8 to 2.6mm

## ◆ Tools

| Type                    | Part No.        | HRS No.       | Applicable contact |
|-------------------------|-----------------|---------------|--------------------|
| Applicator              | AP105-MDF51-24S | 901-4607-9 00 | MDF51-24SCF        |
| Press                   | CM-105          | 901-0005-4 00 | —                  |
| Contact extraction tool | DF-C-PO (B)     | 550-0179-2 00 | MDF51-24SCF        |

## ◆ Usage Recommendations

### 1. Recommended temperature profile



Note 1 : Up to 2 cycles of Reflow soldering are possible under the same conditions, provided that there is a return to normal temperature between the first and second cycle.

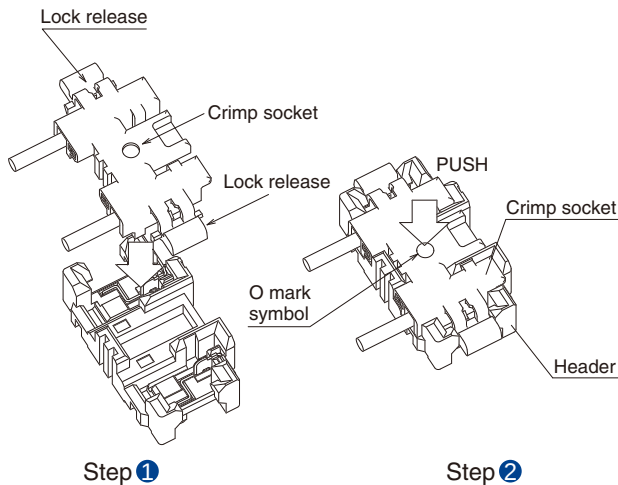
Note 2 : The temperature profile indicates the board surface temperature at the point of contact with the connector terminals.

|                                                                          |                                                                                                                                                                                                                                                           |
|--------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2. Recommended flow temperature                                          | Peak temperature : 260°C for 10 seconds max.                                                                                                                                                                                                              |
| 3. Recommended manual soldering                                          | Manual soldering : 350°C for 3 seconds max.                                                                                                                                                                                                               |
| 4. Recommended screen thickness and open area ratio (Pattern area ratio) | Thickness : 0.15mm<br>Open area ratio : 100%                                                                                                                                                                                                              |
| 5. Board warpage                                                         | Maximum of 0.03mm at the connector center, with both ends of the connector as reference points.                                                                                                                                                           |
| 6. Cleaning conditions                                                   | Refer to "Board to cable connectors Use Handbook".                                                                                                                                                                                                        |
| 7. Wire preparation and contact crimping                                 | Refer to "Board to cable connectors Use Handbook".<br>The crimp contact termination must be performed using specified tools.<br>All dimensions and crimp conditions are listed in applicable Crimp Condition Table and Crimping Quality Standards Manual. |

## 8. Precautions

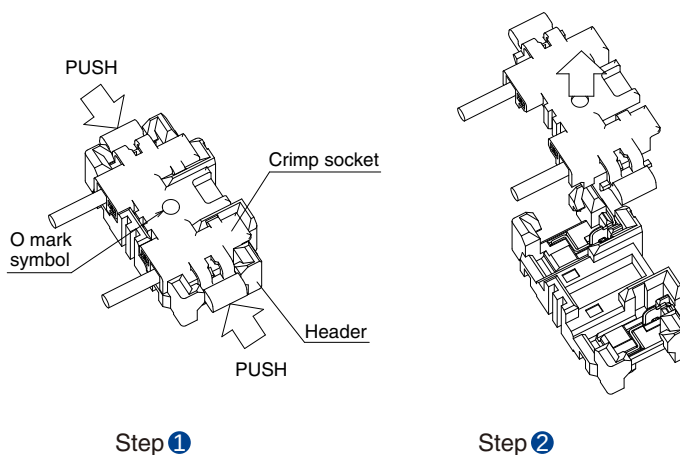
## ■ Mating

- ① Socket will self-align in the header.
- ② Align the Socket over the header and firmly push-down at the “O” symbol until both locks are fully engaged.  
Tactile “click” sensation will confirm fully locked condition.



## ■ Unmating

- ① Compress both locks evenly, toward each other.
- ② While compressing the lock releases pull the socket straight up until free of the header.



- The crimped contacts must be fully inserted in the crimp socket horizontally and will self-guide itself in the proper position
- The header must be mounted on the PC board when mating with the corresponding socket.
- Differences in colors shade of the molded components will not affect form, fit or function.
- Contact HRS if additional information is required.

MEMO :

Handwriting practice area consisting of 30 horizontal dashed lines.

MEMO :

Handwriting practice area consisting of 30 horizontal dashed lines.

MEMO :

Handwriting practice area consisting of 30 horizontal dashed lines.

**USA:**

**HIROSE ELECTRIC (U.S.A.), INC. HEADQUARTERS**  
 2688 Westhills Court, Simi Valley, CA 93065-6235  
 Phone : +1-805-522-7958  
 Fax : +1-805-522-3217  
<http://www.hirose.com/us/>

**USA:**

**HIROSE ELECTRIC (U.S.A.), INC. DETROIT OFFICE (AUTOMOTIVE)**  
 17197 N. Laurel Park Drive, Suite 253, Livonia, MI 48152  
 Phone : +1-734-542-9963  
 Fax : +1-734-542-9964  
<http://www.hirose.com/us/>

**GERMANY:**

**HIROSE ELECTRIC EUROPE B.V. NUERNBERG OFFICE**  
 Muggenhofer Str. 136 90429 Nuernberg  
 Phone : +49-911 32 68 89 63  
 Fax : +49-911 32 68 89 69  
<http://www.hirose.com/eu/>

**UNITED KINGDOM:**

**HIROSE ELECTRIC EUROPE BV (UK BRANCH)**  
 4 Newton Court, Kelvin Drive, Knowlhill, Milton Keynes, MK5 8NH  
 Phone : +44-1908 202050  
 Fax : +44-1908 202058  
<http://www.hirose.com/eu/>

**CHINA:**

**HIROSE ELECTRIC TECHNOLOGIES (SHENZHEN) CO., LTD.**  
 Room 09-13, 19/F, Office Tower Shun Hing Square, Di Wang Commercial Centre, 5002 Shen Nan Dong Road, Shenzhen City, Guangdong Province, 518008  
 Phone : +86-755-8207-0851  
 Fax : +86-755-8207-0873  
<http://www.hirose.com/cn/>

**KOREA:**

**HIROSE KOREA CO., LTD.**  
 250, Huimanggongwon-ro, Siheung-si, Gyeonggi-do, Korea, 429-849  
 Phone : +82-31-496-7000, 7124  
 Fax : +82-31-496-7100  
<http://www.hirose.co.kr/>

**INDIA:**

**HIROSE ELECTRIC SINGAPORE PTE. LTD. BANGALORE LIAISON OFFICE**  
 Unit No-403, 4th Floor, No-84, Barton Centre, Mahatma Gandhi (MG) Road, Bangalore 560 001, Karnataka, India  
 Phone : +91-80-4120 1907  
 Fax : +91-80-4120 9908  
<http://www.hirose.com/sg/>

**USA:**

**HIROSE ELECTRIC (U.S.A.), INC. SAN JOSE OFFICE**  
 3255 Scott Boulevard, Building 7, Suite 101 Santa Clara, CA 95054  
 Phone : +1-408-253-9640  
 Fax : +1-408-253-9641  
<http://www.hirose.com/us/>

**THE NETHERLANDS:**

**HIROSE ELECTRIC EUROPE B.V.**  
 Hogehillweg #8 1101 CC Amsterdam Z-O  
 Phone : +31-20-6557460  
 Fax : +31-20-6557469  
<http://www.hirose.com/eu/>

**GERMANY:**

**HIROSE ELECTRIC EUROPE B.V. HANOVER OFFICE**  
 Bayernstr. 3, Haus C 30855 Langenhagen, Germany  
 Phone : +49-511 97 82 61 30  
 Fax : +49-511 97 82 61 35  
<http://www.hirose.com/eu/>

**CHINA:**

**HIROSE ELECTRIC (SHANGHAI) CO., LTD.**  
 1601, Henderson Metropolitan, NO.300, East Nanjing Road, Huangpu District, Shanghai, China 200001  
 Phone : +86-21-6391-3355  
 Fax : +86-21-6391-3335  
<http://www.hirose.com/cn/>

**HONG KONG:**

**HIROSE ELECTRIC HONGKONG TRADING CO., LTD.**  
 Room 1001, West Wing, Tsim Sha Tsui Centre, 66 Mody Road, Tsim Sha Tsui East, Kowloon, Hong Kong  
 Phone : +852-2803-5338  
 Fax : +852-2591-6560  
<http://www.hirose.com/hk/>

**SINGAPORE:**

**HIROSE ELECTRIC SINGAPORE PTE. LTD.**  
 10 Anson Road #26-16, International Plaza 079903, Singapore  
 Phone : +65-6324-6113  
 Fax : +65-6324-6123  
<http://www.hirose.com/sg/>

**MALAYSIA:**

**HIROSE ELECTRIC SINGAPORE PTE. LTD.**  
 1-10-07, Suntech @ Penang Cybercity (1164), Lintang Mayang Pasir 3, 11950, Bayan Baru, Penang, Malaysia.  
 Phone : +604-619-2564  
 Fax : +604-619-2574  
<http://www.hirose.com/sg/>

**USA:**

**HIROSE ELECTRIC (U.S.A.), INC. CHICAGO OFFICE**  
 580 Waters Edge Lane, Suite 205 Lombard IL 60148  
 Phone : +1-630-282-6701  
 Mail : [inquiries@hirose.com](mailto:inquiries@hirose.com)  
<http://www.hirose.com/us/>

**GERMANY:**

**HIROSE ELECTRIC EUROPE B.V. GERMAN BRANCH**  
 Herzog-Carl-Strasse 4 D-73760 Ostfildern (Scharnhäuser Park)  
 Phone : +49-711-4560-02-1  
 Fax : +49-711-4560-02-299  
<http://www.hirose.com/eu/>

**FRANCE:**

**HIROSE ELECTRIC EUROPE B.V. PARIS OFFICE**  
 Regus La Garenne Colombes, Place de La Belgique, 71 Boulevard National La Garenne Colombes, 92250, France  
 Phone : +33 (0) 1 7082 3170  
 Fax : +33 (1) 7082 3101  
<http://www.hirose.com/eu/>

**CHINA:**

**HIROSE ELECTRIC (SHANGHAI) CO., LTD. BEIJING BRANCH**  
 A1001, Ocean International Center, Building 56# East 4th Ring Middle Road, ChaoYang District, Beijing, 100025  
 Phone : +86-10-5165-9332  
 Fax : +86-10-5908-1381  
<http://www.hirose.com/cn/>

**TAIWAN:**

**HIROSE ELECTRIC TAIWAN CO., LTD.**  
 103 8F, No.87, Zhengzhou Rd., Taipei  
 Phone : +886-2-2555-7377  
 Fax : +886-2-2555-7350  
<http://www.hirose.com/tw/>

**INDIA:**

**HIROSE ELECTRIC SINGAPORE PTE. LTD. DELHI LIAISON OFFICE**  
 Office NO.519, Regus-Green Boulevard, Level5, Tower C, Sec62, Plot B-9A, Block B, Noida, 201301, Uttar Pradesh, India  
 Phone : +91-12-660-8018  
 Fax : +91-120-4804949  
<http://www.hirose.com/sg/>

**THAILAND:**

**HIROSE ELECTRIC SINGAPORE PTE. LTD. BANGKOK OFFICE (REPRESENTATIVE OFFICE)**  
 Unit 4703, 47th FL., 1 Empire Tower, South Sathorn Road, Yannawa, Sathorn, Bangkok 10120 Thailand  
 Phone : +66-2-686-1255  
 Fax : +66-2-686-3433  
<http://www.hirose.com/sg/>



## HIROSE ELECTRIC CO.,LTD.

2-6-3, Nakagawa Chuoh, Tsuzuki-Ku, Yokohama-Shi 224-8540, JAPAN  
 TEL: +81-45-620-3526 Fax: +81-45-591-3726  
<http://www.hirose.com>  
<http://www.hirose-connectors.com>