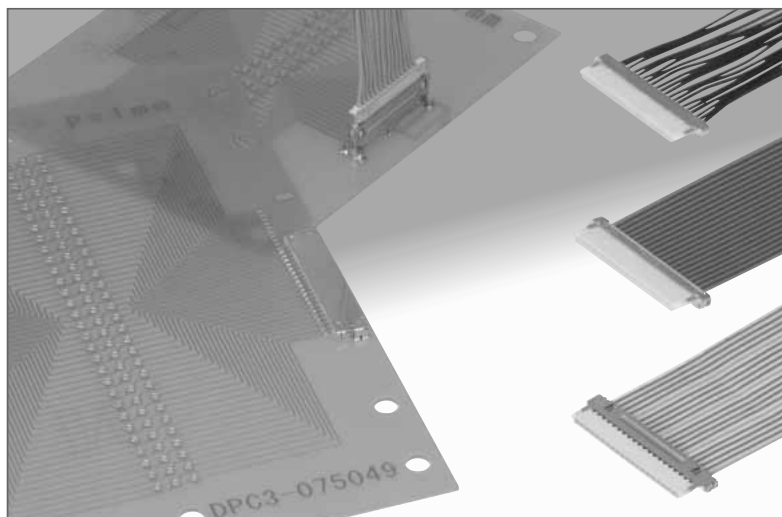


# 1 mm Contact Pitch, Board-to-Cable, Board-to-FPC, Board-to-Micro-coaxial Cable Connectors

## DF19 Series



### Overview

Industry and market accepted as "De facto" standard for LCD panel connections (panels under 12 inches).  
High-performance connectors for LVDS high-speed differential signals.

### Features

#### 1. Small configuration and board space

Thin design accepts discrete wire, thin micro-coaxial cable ( $\phi 1.5\text{mm}$ ,  $\phi 1.6\text{mm}$  max.) and FPC 1.7 mm maximum thick.

#### 2. Common use of receptacle

The same receptacle will accept plugs terminated with discrete wire, FPC or micro-coaxial cable.

#### 3. Uniform external dimensions

The plug assembly external dimensions remain the same when is terminated with discrete wire, FPC or micro-coaxial cable.

#### 4. Variety of mounting styles

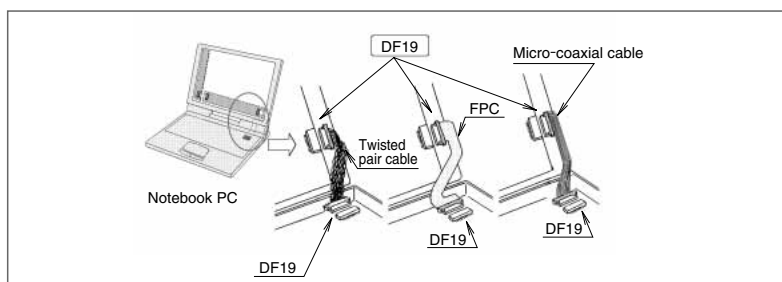
Device design engineers have a choice of mounting styles: top-board, offset, reverse mount offset and vertical.

#### 5. Ground connection

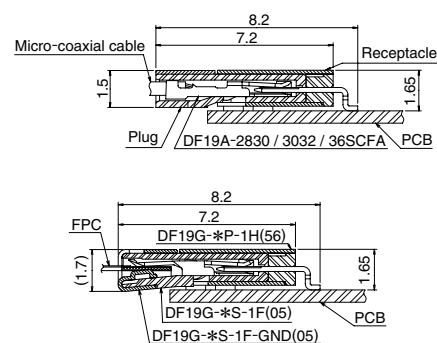
Metal grounding plates connect with the common ground line.

### Applications

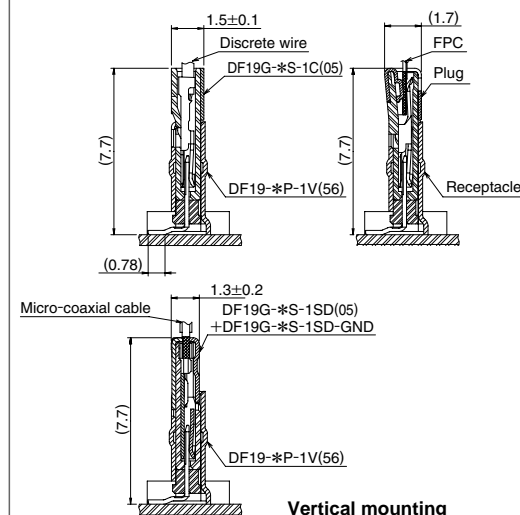
LCD connections in small consumer devices: digital cameras, notebook computers, PDA's. Any device requiring high-density interconnection for consistent high speed transmission data rates.



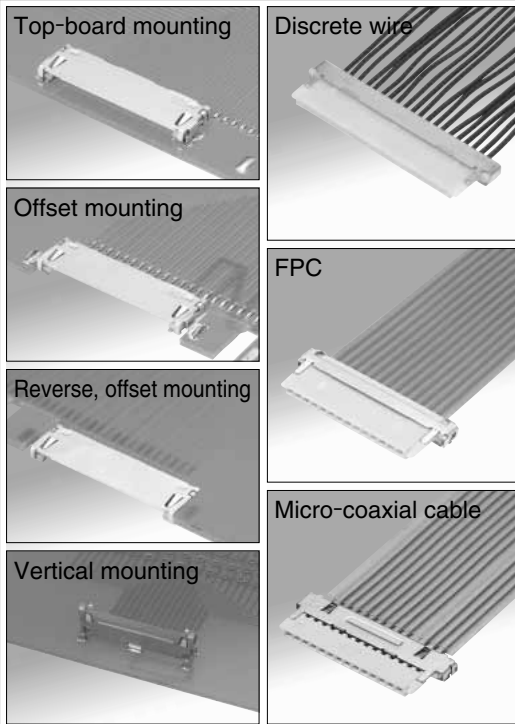
#### Small configuration and board space



#### Horizontal mounting



#### Vertical mounting



## ■Product Specifications

|        |                |   |                             |                                |                           |                      |
|--------|----------------|---|-----------------------------|--------------------------------|---------------------------|----------------------|
| Rating | Current rating | AWG#28 : 1A<br>AWG#30 : 0.9A<br>AWG#32 : 0.8A<br>AWG#36 : 0.5A<br>FPC : 0.5A<br>Micro-coaxial cable AWG# 40: 0.3A | Operating temperature range | -35°C to 85°C Note 1<br>Note 2 | Storage temperature range | -10°C to 60°C Note 2 |
|        | Voltage rating | 100V AC   | Operating humidity range    | 20% to 80%                     | Storage humidity range    | 40% to 70%           |

| Item  | Specification   | Conditions   |
|---|---|--|
| 1. Insulation resistance                    | 500 MΩ min.   | 100 V DC   |
| 2. Withstanding voltage                     | No flashover or insulation breakdown.   | 300 V AC / one minute  |
| 3. Contact resistance                       | 30 mΩ max. (50 mΩ max. for FPC)   | 100 mA   |
| 4. Insertion-Extraction force (per contact) | Min. 0.2N, Max. 3N  | Measured with a steel pin $\phi 0.2 \pm 0.005$   |
| 5. Vibration                                | No electrical discontinuity of 1 $\mu$ s or more.   | Frequency: 10 to 55 Hz, single amplitude of 0.75 mm, 2 hours in each of the 3 directions.  |
| 6. Humidity (Steady state)                  | Contact resistance: 30 mΩ max. (50 mΩ max. for FPC)<br>Insulation resistance: 500 MΩ min. | 96 hours at temperature of 40 $\pm$ 2°C and humidity of 90% to 95%   |
| 7. Temperature cycle                        | Contact resistance: 30 mΩ max. (50 mΩ max. for FPC)<br>Insulation resistance: 500 MΩ min. | Temperature: -55°C $\rightarrow$ +5°C to +35°C $\rightarrow$ +85°C $\rightarrow$ +5°C to +35°C<br>Time (Minutes): 30 $\rightarrow$ 10 $\rightarrow$ 30 $\rightarrow$ 10 5 cycles |
| 8. Durability (insertion/ withdrawal)       | Contact resistance: 30 mΩ max. (50 mΩ max. for FPC)                                       | 30 cycles  |
| 9. Resistance to soldering heat             | No deformation of the insulator parts affecting performance.                              | Re-flow soldering: At the recommended temperature profile<br>Manual soldering: Soldering iron temperature 300°C, 3 seconds   |

Note1: Includes temperature rise caused by current flow.

Note2: The term "storage" refers to connectors 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.

## ■Materials / Finish

| Product                                 | Component       | Material        | Finish/Color      | Remarks |
|---|-----------------|-----------------|-------------------|---------|
| Receptacle                              | Insulator       | Polyamide       | Beige             | UL94V-0 |
|   | Contacts        | Phosphor bronze | Gold plated       | ———     |
|   | Grounding plate | Phosphor bronze | Tin-copper plated | ———     |
| Plug                                    | Insulator       | Polyamide       | Beige             | ———     |
|   | Tin-lead plated | Stainless steel | Tin-copper plated | ———     |
| Crimp contact                           | Contact         | Phosphor bronze | Gold Plated       | ———     |
| Plug for PPC                            | Insulator       | Polyamide       | Beige             | UL94V-0 |
|   | Contact         | Phosphor bronze | Gold plated       | ———     |
| Grounding plate for PPC                 | Grounding plate | Stainless steel | Tin-copper plated | ———     |
| Plug for micro-coaxial cable            | Insulator       | LCP             | Beige             | UL94V-0 |
|   | Contact         | Phosphor bronze | Gold plated       | ———     |
|   | Grounding plate | Phosphor bronze | Tin plated        | ———     |
| Grounding plate for micro-coaxial cable | Grounding plate | Phosphor bronze | Tin plated        | ———     |

## ■ Ordering information

### ● Connector

**DF19 # - \* P - 1 H**  
①      ②      ③      ④      ⑤      ⑥  
**DF19 # - \* S - 1 F - GND**  
①      ②      ③      ④      ⑤      ⑥      ⑦

|  |  |
|--|--|
| ① Series Name : DF19                                       | ③ Number of contacts : 8,14,20,30 (Note 1) |
| ② Configuration  | ④ Connector type                           |
| ■ Receptacle   | S : Plug                                   |
| G : Top-board mounting (1.65mm high)                       | P : Receptacle                             |
| K : Offset mounting (1.0mm high)                           | ⑤ Contact pitch : 1mm                      |
| L : Offset mounting (1.1mm high)                           | ⑥ Mounting type/Termination type           |
| KR : Reverse offset mounting version of DF19K (1.0mm high) | H : Horizontal SMT                         |
| V : Vertical mounting                                      | C : Socket-discrete wire (crimp contact)   |
| ■ Plug   | F : Plug – FPC                             |
| Blank : No grounding plate                                 | SD : Plug – micro-coaxial cable            |
| G : With grounding plate                                   | GND : Separate grounding plate (loose)     |
| ■ Plug for FPC   | ⑦ Additional separate component            |
| G : With grounding plate                                   | GND : Ground plate (Note 2)                |
| ■ Grounding plate for FPC                                  |  |
| G : With grounding plate                                   |  |
| ■ Plug for micro-coaxial cable                             |  |
| G : With grounding plate                                   |  |
| ■ Grounding plate for micro-coaxial cable                  |  |
| G : With grounding plate                                   |  |

Note 1: Number of contacts will differ depending on the connector style.

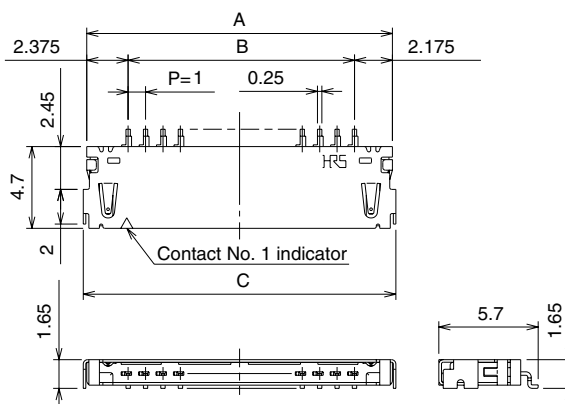
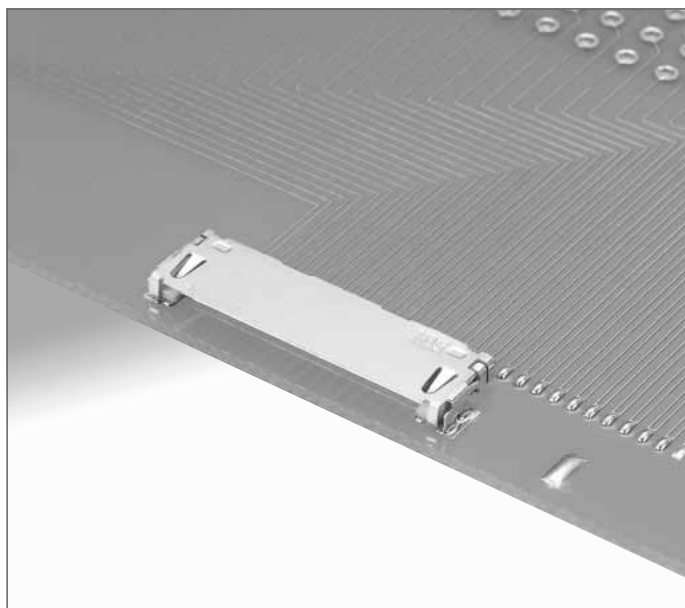
Note 2: Grounding plates are required when terminating with the FPC and micro-coaxial cable.

### ● Contact

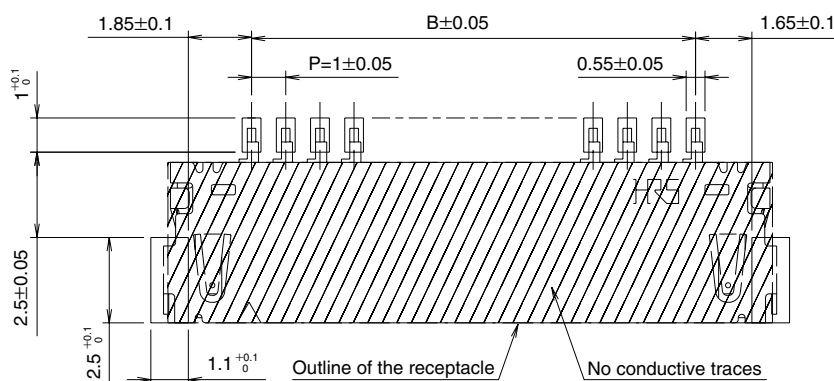
**DF19A - 2830 SCF A (\*\*)**  
①      ②      ③      ④

|   |  |
|---|--|
| ① Conductor size<br>2830 : AWG#28~30<br>3032 : AWG#30~32      | ③ Plating<br>A : Gold  |
| ② Contact type<br>SCF : Plug contact, tape and reel packaging | ④ Packaging<br>Blank : 10,000 pieces / reel<br>(41) : 20,000 pieces / reel |

## ■Right angle receptacle, top-board mounting



## ◆PCB mounting pattern



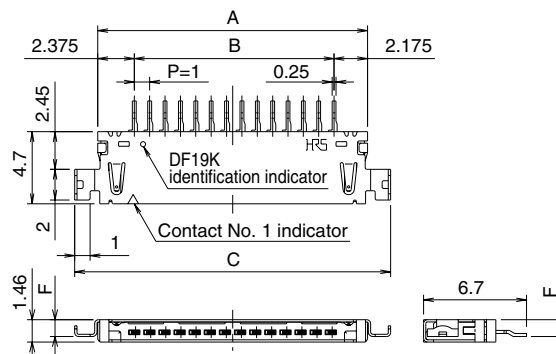
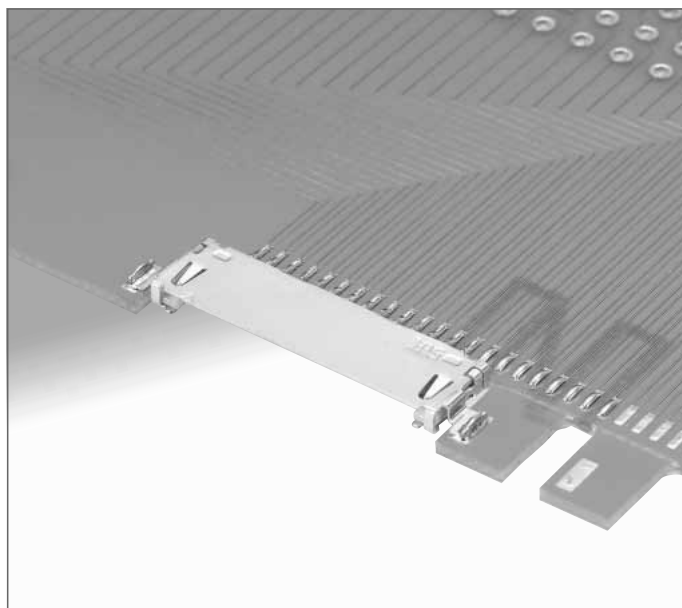
Specification  
(56): Tape & reel packaging  
(1,000 pieces per reel)

Unit: mm

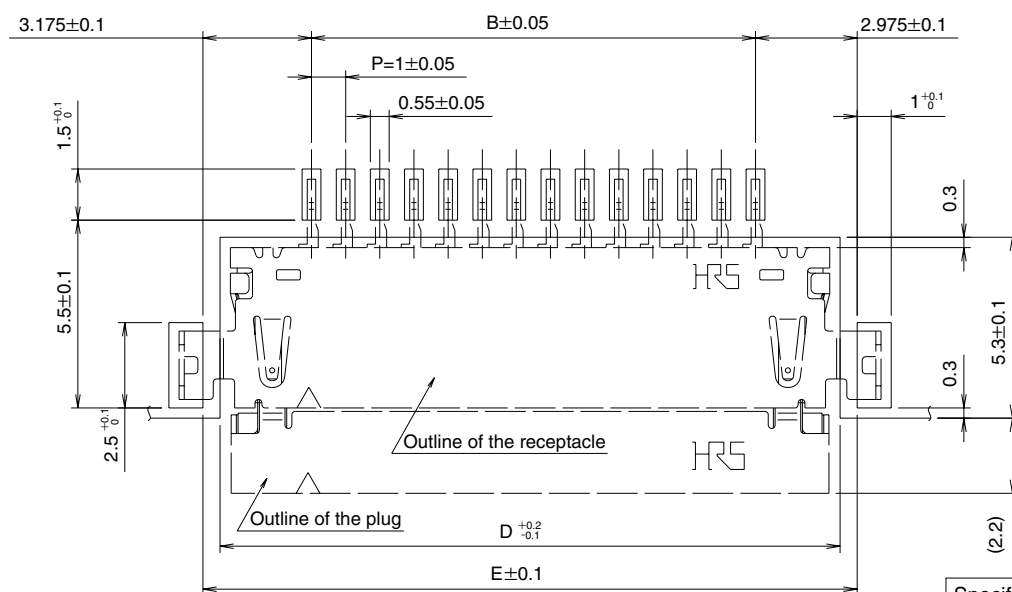
| Part number       | CL No.        | Number of contacts | A     | B  | C     | Remarks     | RoHS |
|-------------------|---------------|--------------------|-------|----|-------|-------------|------|
| DF19G- 8P-1H (56) | 685-0021-0-56 | 8                  | 11.55 | 7  | 11.95 | 1.65mm high | YES  |
| DF19G-14P-1H (56) | 685-0004-0-56 | 14                 | 17.55 | 13 | 17.95 |             |      |
| DF19G-20P-1H (56) | 685-0006-6-56 | 20                 | 23.55 | 19 | 23.95 |             |      |
| DF19G-30P-1H (56) | 685-0015-7-56 | 30                 | 33.55 | 29 | 33.95 |             |      |

Note: Order by number of reels.

## ■Right angle receptacle, offset mounting



## ◆PCB mounting pattern



Specification  
(56): Tape & reel packaging  
(1,000 pieces per reel)

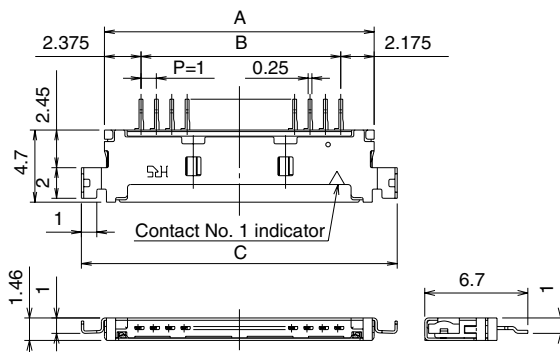
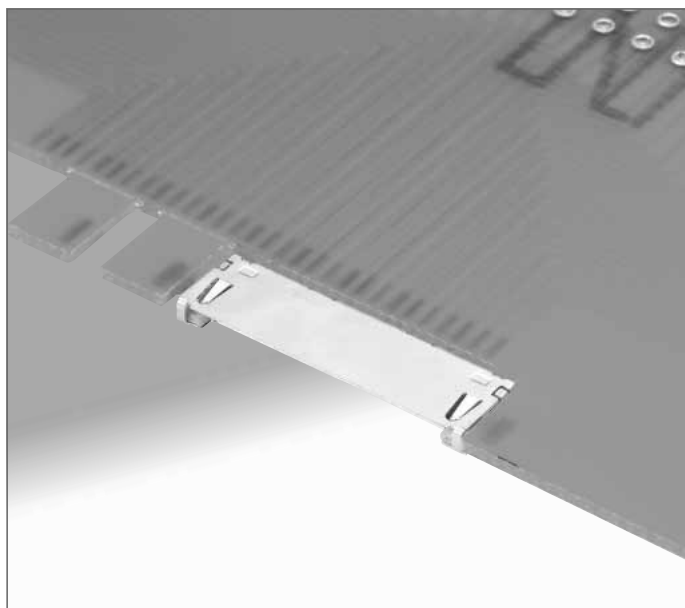
Unit: mm

| Part number       | CL No.        | Number of contacts | A     | B  | C     | D     | E     | F   | Remarks    | RoHS |
|-------------------|---------------|--------------------|-------|----|-------|-------|-------|-----|------------|------|
| DF19K-20P-1H (56) | 685-0008-1-56 | 20                 | 23.55 | 19 | 26.55 | 24.15 | 25.15 | 0.1 | 1.0mm high | YES  |
| DF19K-30P-1H (56) | 685-0032-6-56 | 30                 | 33.55 | 29 | 36.55 | 34.15 | 35.15 | 0.1 |            |      |

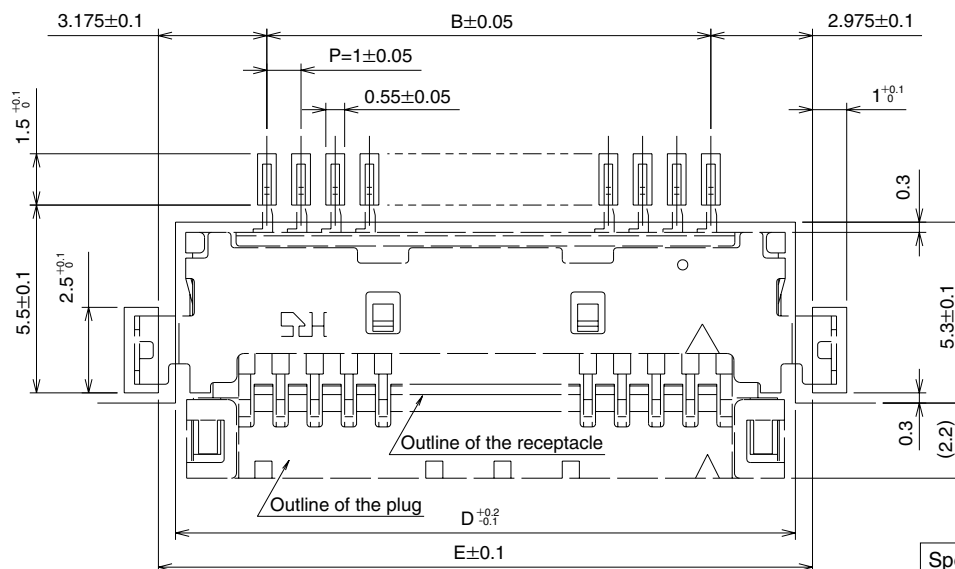
| Part number       | CL No.        | Number of contacts | A     | B  | C     | D     | E     | F   | Remarks    | RoHS |
|-------------------|---------------|--------------------|-------|----|-------|-------|-------|-----|------------|------|
| DF19L-14P-1H (56) | 685-0003-8-56 | 14                 | 17.55 | 13 | 20.55 | 18.15 | 19.15 | 1.1 | 1.1mm high | YES  |
| DF19L-20P-1H (56) | 685-0019-8-56 | 20                 | 23.55 | 19 | 26.55 | 24.15 | 25.15 | 1.1 |            |      |
| DF19L-30P-1H (56) | 685-0016-0-56 | 30                 | 33.55 | 29 | 36.55 | 34.15 | 35.15 | 1.1 |            |      |

Note: Order by number of reels.

## ■ Right angle receptacle, reverse offset mounting



## ◆ PCB mounting pattern



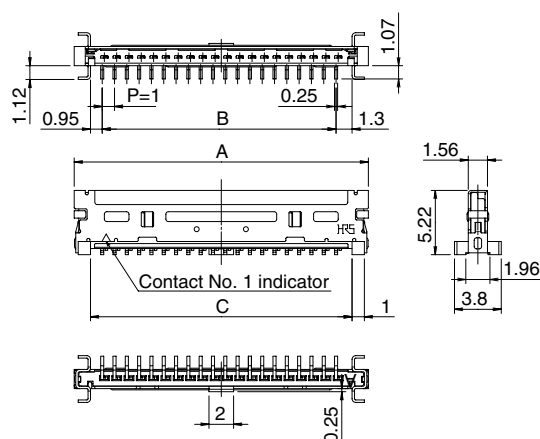
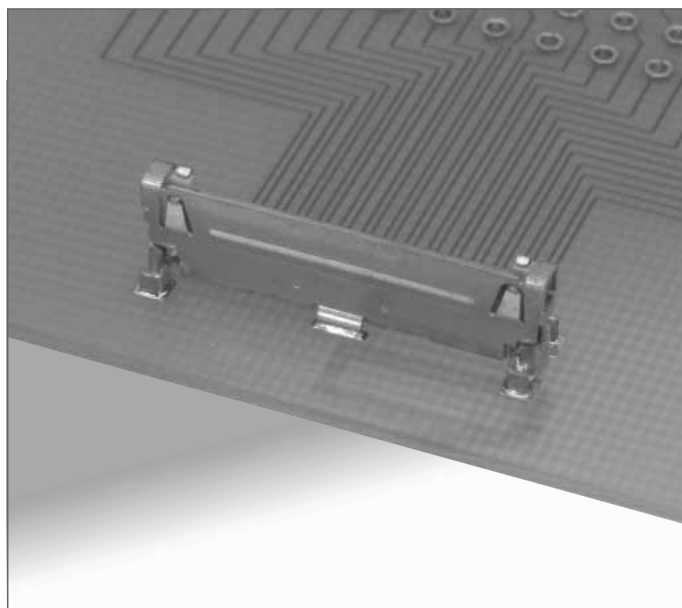
Specification  
(56): Tape & reel packaging  
(1,000 pieces per reel)

Unit: mm

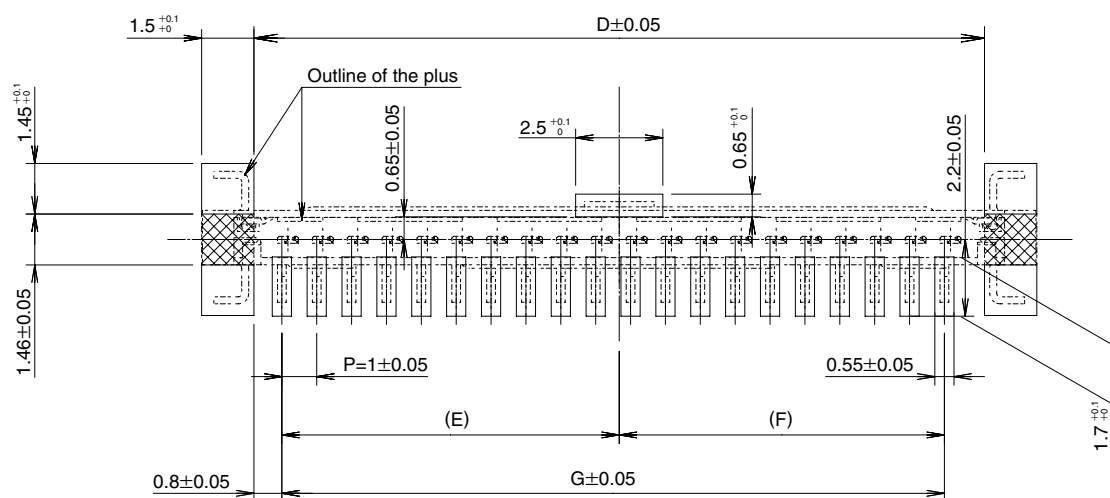
| Part number        | CL No.        | Number of contacts | A     | B  | C     | D     | E     | Remarks    | RoHS |
|--------------------|---------------|--------------------|-------|----|-------|-------|-------|------------|------|
| DF19KR-14P-1H (56) | 685-0024-8-56 | 14                 | 17.55 | 13 | 20.55 | 18.15 | 19.15 | 1.0mm high | YES  |
| DF19KR-20P-1H (56) | 685-0023-5-56 | 20                 | 23.55 | 19 | 26.55 | 24.15 | 25.15 |            |      |

Note: Order by number of reels.

## ■ Vertical receptacle



## ◆ PCB mounting pattern



Conductive traces in this area must be covered by dielectric compound.

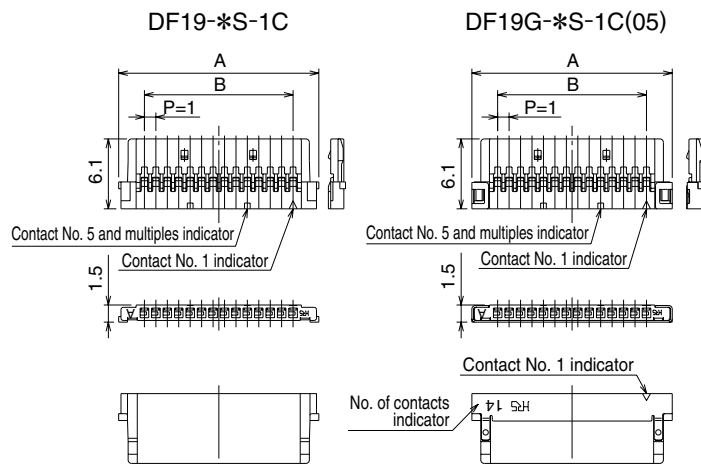
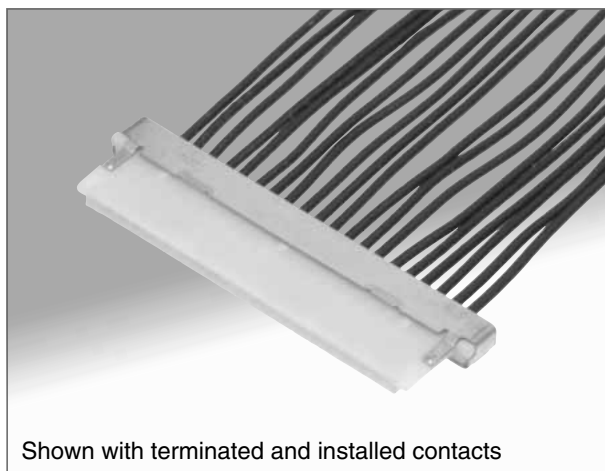
Specification  
(56): Tape & reel packaging  
(1,000 pieces per reel)

Unit: mm

| Part number      | CL No.        | Number of contacts | A    | B  | C     | D     | E     | F     | G  | RoHS |
|------------------|---------------|--------------------|------|----|-------|-------|-------|-------|----|------|
| DF19-14P-1V (56) | 685-0036-7-56 | 14                 | 17.9 | 13 | 15.25 | 14.95 | 6.675 | 6.325 | 13 | YES  |
| DF19-20P-1V (56) | 685-0037-0-56 | 20                 | 23.9 | 19 | 21.25 | 20.95 | 9.675 | 9.325 | 19 |      |

Note: Order by number of reels.

## ■Plug (Discrete wire)



Specification  
Blank, (05): Bag packaging  
(100 pieces per bag)

Unit: mm

| Part number  | CL No.     | Number of contacts | A    | B  | RoHS |
|--------------|------------|--------------------|------|----|------|
| DF19 - 8S-1C | 685-0029-1 | 8                  | 11.5 | 7  | YES  |
| DF19 -14S-1C | 685-0012-9 | 14                 | 17.5 | 13 |      |
| DF19 -20S-1C | 685-0011-6 | 20                 | 23.5 | 19 |      |
| DF19 -30S-1C | 685-0013-1 | 30                 | 33.5 | 29 |      |

| Part number       | CL No.        | Number of contacts | A    | B  | RoHS |
|-------------------|---------------|--------------------|------|----|------|
| DF19G - 8S-1C(05) | 685-0022-2-05 | 8                  | 11.5 | 7  | YES  |
| DF19G -14S-1C(05) | 685-0005-3-05 | 14                 | 17.5 | 13 |      |
| DF19G -20S-1C(05) | 685-0007-9-05 | 20                 | 23.5 | 19 |      |
| DF19G -30S-1C(05) | 685-0014-4-05 | 30                 | 33.5 | 29 |      |

Note: Order by number of bags.

## ■Crimp contacts

| Part number          | CL No.       | Packaging   | Quantity                           | Finish      | RoHS |
|----------------------|--------------|-------------|------------------------------------|-------------|------|
| DF19A-2830SCFA (* *) | 685-0048-6-* | Tape & reel | See Specifications<br>number below | Gold plated | YES  |
| DF19A-3032SCFA (* *) | 685-0046-0-* |             |                                    |             |      |
| DF19A- 36SCFA (* *)  | 685-0047-3-* |             |                                    |             |      |

Specification number \* (\* \*)  
Blank: Tape & reel packaging (10,000 pieces per reel)  
(41) : Tape & reel packaging (20,000 pieces per reel)

### ●Applicable cable (Tin plated annealed conductor)

| Wire size (stranded wire conductor) | Jacket diameter |
|-------------------------------------|-----------------|
| AWG#28 (7/ 0.127 mm)                | 0.5mm to 0.6mm  |
| AWG#30 (7/ 0.1 mm)                  |                 |
| AWG#32 (7/ 0.08 mm)                 |                 |
| AWG#36 (7/ 0.05 mm)                 | 0.27mm          |

### ●Applicable UL style UL1571 (Note2)

### ●Strip length 1.2mm to 1.9mm

Note 1: When using other than the recommended wire, contact your Hirose sales representative.

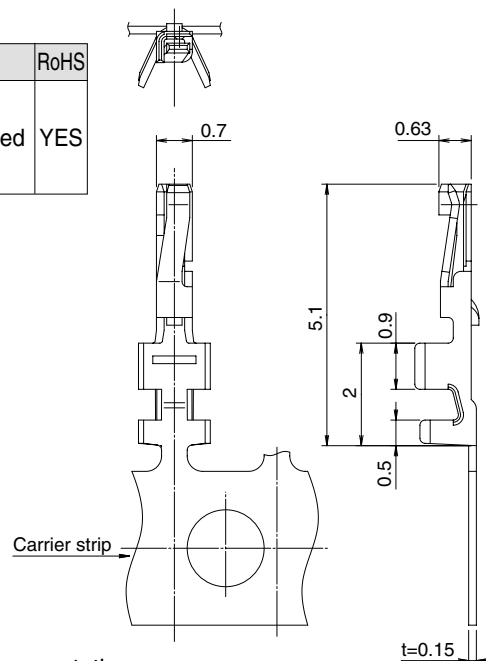
Note 2: Contact your Hirose sales representative when using AWG#36.

### ●Tools

| Part       | Part number | CL No.     |
|------------|-------------|------------|
| Applicator | AP105-DF19S | 901-4571-3 |
| Press unit | CM-105      | 901-0005-4 |

Note 1: Use of other than Hirose Electric approved tools will void the product warranties.

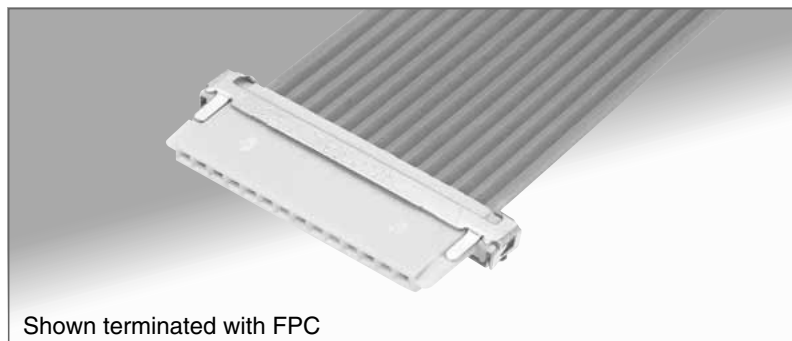
Note 2: Contact Hirose for the wire striping, contact crimp and contact insertion instructions.



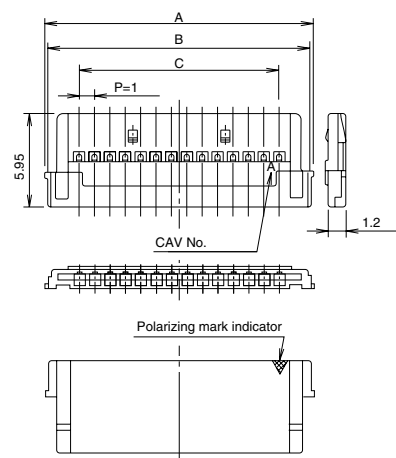
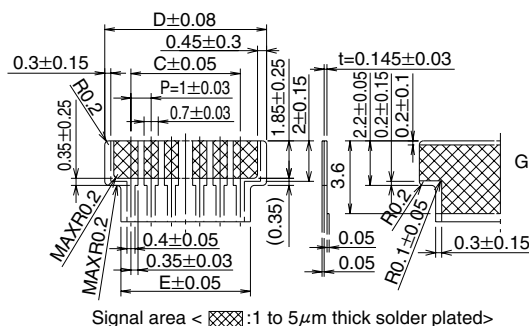


## ■Plug (Flat Printed Circuit)

Note: Socket and grounding plate is required.



Shown terminated with FPC



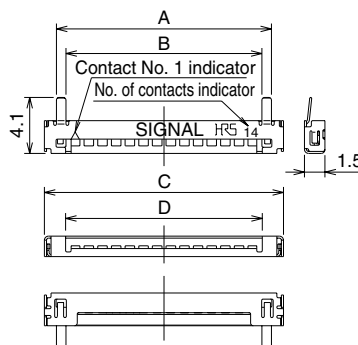
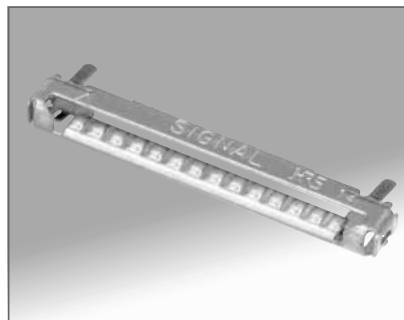
Unit: mm

| Part number      | CL No.        | Number of contacts | A    | B    | C  | D    | E  | RoHS |
|------------------|---------------|--------------------|------|------|----|------|----|------|
| DF19G-14S-1F(05) | 685-0017-2-05 | 14                 | 17.5 | 17.1 | 13 | 15.6 | 14 | YES  |
| DF19G-20S-1F(05) | 685-0009-4-05 | 20                 | 23.5 | 23.1 | 19 | 21.6 | 20 |      |
| DF19G-30S-1F(05) | 685-0033-9-05 | 30                 | 33.5 | 33.1 | 29 | 31.6 | 30 |      |

Specification  
(05): Bag packaging  
(100 pieces per bag)

Note: Order by number of bags.

## ■Ground plate for FPC



Unit: mm

| Part number          | CL No.        | Number of Contacts | A     | B     | C    | D    | RoHS |
|----------------------|---------------|--------------------|-------|-------|------|------|------|
| DF19G-14S-1F-GND(05) | 685-0018-5-05 | 14                 | 15.75 | 14.35 | 17.5 | 14.4 | YES  |
| DF19G-20S-1F-GND(05) | 685-0010-3-05 | 20                 | 21.75 | 20.35 | 23.5 | 20.4 |      |
| DF19G-30S-1F-GND(05) | 685-0034-1-05 | 30                 | 31.75 | 30.35 | 33.5 | 30.4 |      |

Specification  
(05): Bag packaging  
(100 pieces per bag)

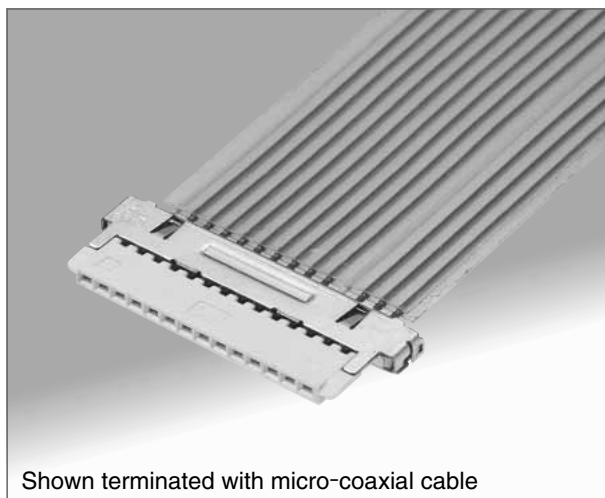
Note: Order by number of bags.

## ●Grounding plate installation tools

| Type                       | Part number      | CL No.     |
|----------------------------|------------------|------------|
| Desktop tool (for 14 pos.) | DF19G-14S/PR-MD2 | 902-4514-6 |
| Desktop tool (for 20 pos.) | DF19G-20S/PR-MD2 | 902-4513-3 |
| Desktop tool (for 30 pos.) | DF19G-30S/PR-MD2 | 902-4518-7 |

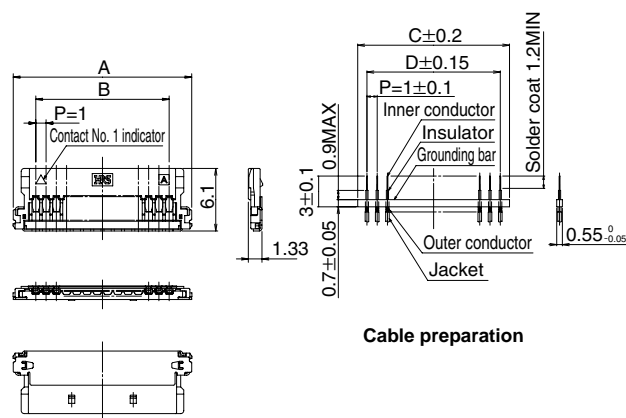
Note1: Product is not guaranteed unless Hirose approved tools are used.

## ■Plug (Micro-coaxial cable)



Shown terminated with micro-coaxial cable

Specification  
(05): Bag packaging  
(100 pieces per bag)



Note 1: Connectors are designed to allow termination without cutting of the pitch loss prevention tape.

Note 2: Required Solder coating for inner conductor.

Note 3: When using 2-conductor micro-coaxial cable some contact positions will not be used.

Contact your Hirose sales representative.

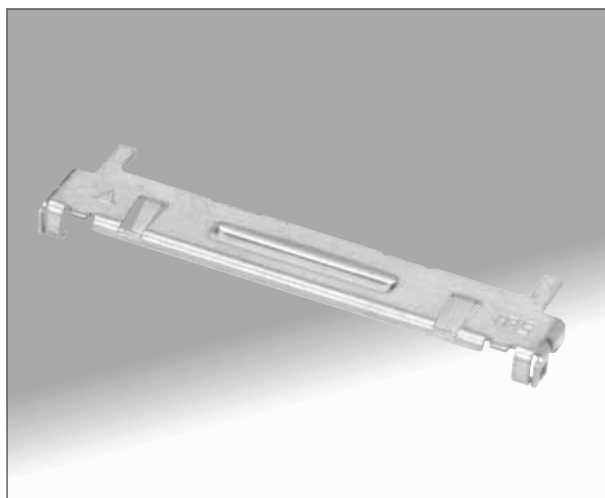
| Part number       | CL No.        | Number of contacts | A    | B  | C    | D  | RoHS |
|-------------------|---------------|--------------------|------|----|------|----|------|
| DF19G-14S-1SD(05) | 685-0026-3-05 | 14                 | 17.4 | 13 | 14.8 | 13 | YES  |
| DF19G-20S-1SD(05) | 685-0025-0-05 | 20                 | 23.4 | 19 | 20.8 | 19 |      |

Note: Order by number of bags.

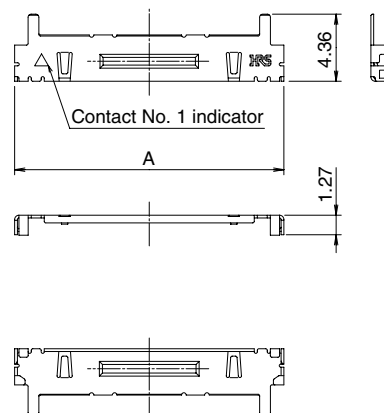
## ●Applicable cable (Micro-coaxial cable)

| Wire size (stranded wire center conductor) | Jacket diameter |
|--|-----------------|
| AWG#40 (7/ 0.03mm)                         | 0.3mm to 0.4mm  |

## ■Grounding plate for micro-coaxial cable



Specification  
Blank: Bag packaging  
(100 pieces per bag)

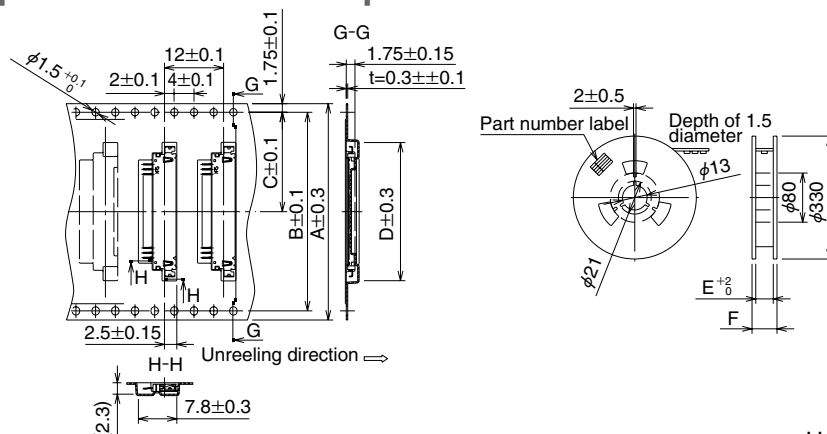


Unit: mm

| Part number       | CL No.     | Number of contacts | A    | RoHS |
|-------------------|------------|--------------------|------|------|
| DF19F-14S-1SD-GND | 685-0028-9 | 14                 | 17.5 | YES  |
| DF19G-20S-1SD-GND | 685-0027-6 | 20                 | 23.5 |      |

## ◆ Embossed Carrier Tape Dimensions Receptacles

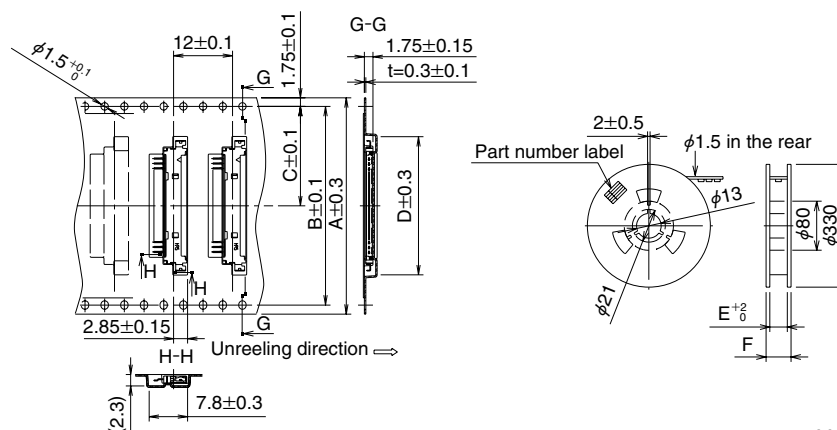
- DF19G-**\*P-1H(56)**
- DF19K-**\*P-1H(56)**
- DF19L-**\*P-1H(56)**



Unit: mm

| Connector        | Number of contacts | A  | B    | C    | D    | E    | F    | Remarks                             |
|------------------|--------------------|----|------|------|------|------|------|-------------------------------------|
| DF19G- 8P-1H(56) | 8                  | 24 | —    | 11.5 | 16.1 | 24.4 | 30.4 | Top-board mounting<br>(1.65mm high) |
| DF19G-14P-1H(56) | 14                 | 44 | 40.4 | 20.2 | 22.1 | 44.4 | 50.4 |                                     |
| DF19G-20P-1H(56) | 20                 | 44 | 40.4 | 20.2 | 28.1 | 44.4 | 50.4 |                                     |
| DF19G-30P-1H(56) | 30                 | 56 | 50.2 | 26.2 | 38.1 | 56.4 | 62.4 |                                     |
| DF19K-20P-1H(56) | 20                 | 44 | 40.4 | 20.2 | 28.1 | 44.4 | 50.4 | Offset mounting<br>(1.0mm high)     |
| DF19K-30P-1H(56) | 30                 | 56 | 52.4 | 26.2 | 38.1 | 56.4 | 62.4 |                                     |
| DF19L-14P-1H(56) | 14                 | 44 | 40.4 | 20.2 | 22.1 | 44.4 | 50.4 | Offset mounting<br>(1.1mm high)     |
| DF19L-20P-1H(56) | 20                 | 44 | 40.4 | 20.2 | 28.1 | 44.4 | 50.4 |                                     |
| DF19L-30P-1H(56) | 30                 | 56 | 52.4 | 26.2 | 38.1 | 56.4 | 62.4 |                                     |

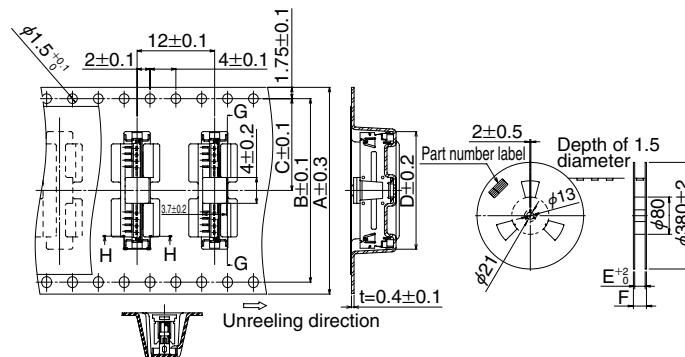
- DF19KR-**\*P-1H(56)**



Unit: mm

| Connector         | Number of contacts | A  | B    | C    | D    | E    | F    | Remarks                      |
|-------------------|--------------------|----|------|------|------|------|------|------------------------------|
| DF19KR-14P-1H(56) | 14                 | 44 | 40.4 | 20.2 | 22.1 | 44.4 | 50.4 | Reverse type of DF19K        |
| DF19KR-20P-1H(56) | 20                 | 44 | 40.4 | 20.2 | 28.1 | 44.4 | 50.4 | Offset mounting (1.0mm high) |

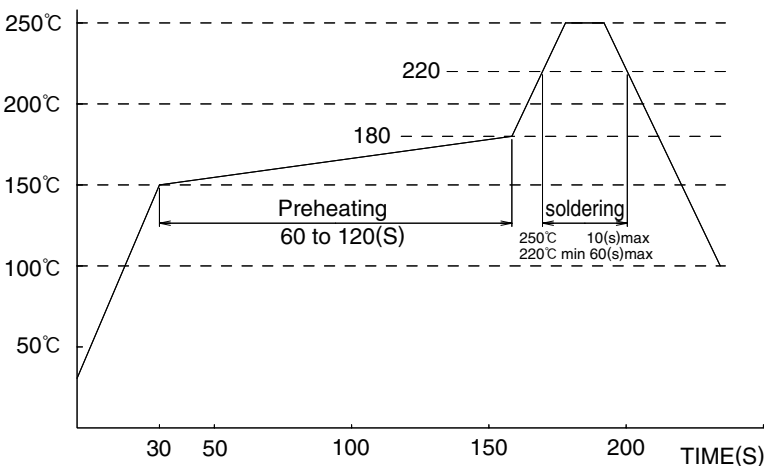
- DF19-**\*P-1V(56)**



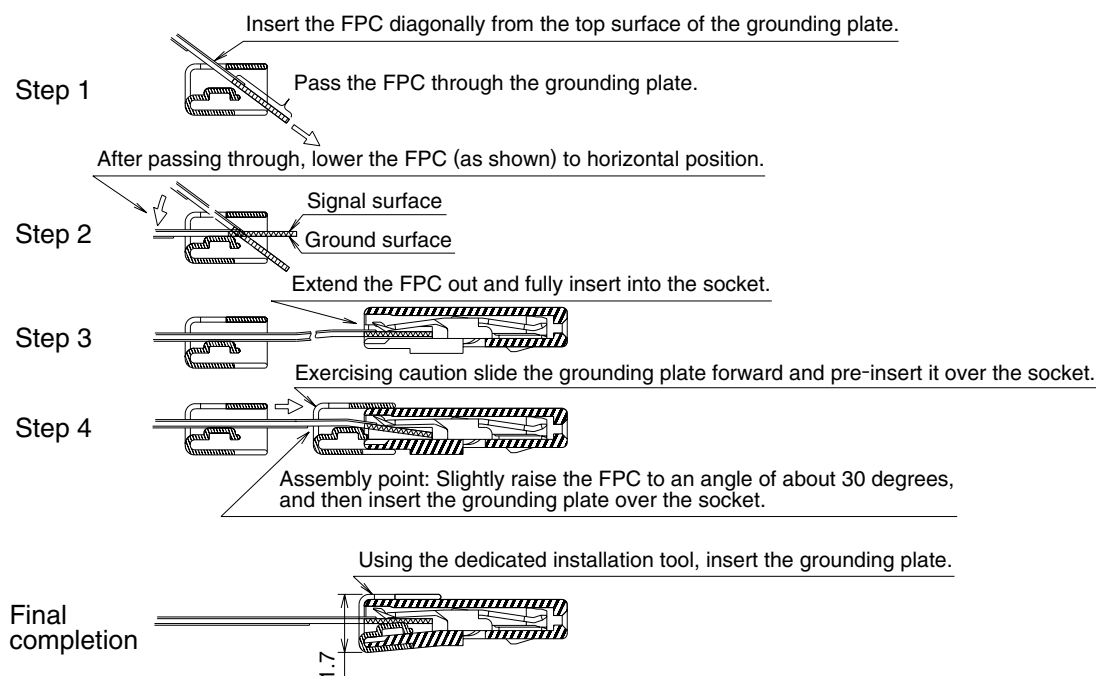
Unit: mm

| Connector       | Number of contacts | A  | B    | C    | D    | E    | F    | Remarks             |
|-----------------|--------------------|----|------|------|------|------|------|---------------------|
| DF19-14P-1V(56) | 14                 | 32 | 28.4 | 14.2 | 18.2 | 32.4 | 38.4 | Vertical receptacle |
| DF19-20P-1H(56) | 20                 | 44 | 40.4 | 20.2 | 24.2 | 44.4 | 50.4 |                     |

## ◆ Use recommendations

|                                    |   |
|------------------------------------|---|
| 1. Recommended temperature profile | <p>Temperature(°C)</p>  <p>Note 1: Up to 2 cycles of reflow soldering are allowed under the same specified conditions, provided that there is a return to ambient temperature between the first and second cycle.</p> <p>Note 2: The temperature profile indicates the board surface temperature at the point of contacts with the connector terminals (for surface mounted receptacle).<br/>         The product can be used without trouble though the surface of a grounding plate might discolor.</p> |
| 2. Manual soldering                | Manual soldering: 290±10°C for 3 seconds  |
| 3. Screen thickness                | 0.15mm  |
| 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. Termination conditions          | Refer to “Nylon Connector Use Handbook.”  |
| 7. Precautions                     | ■ Do not twist when mating/un-mating.   |
| 8. Precautions                     | Refer to “Nylon Connector Use Handbook.”  |

## ◆Plug (FPC Type) Termination Procedures (Dedicated Assembly Tooling is required.)



Note 1: The grounding plate and the plug are supplied as separate components.

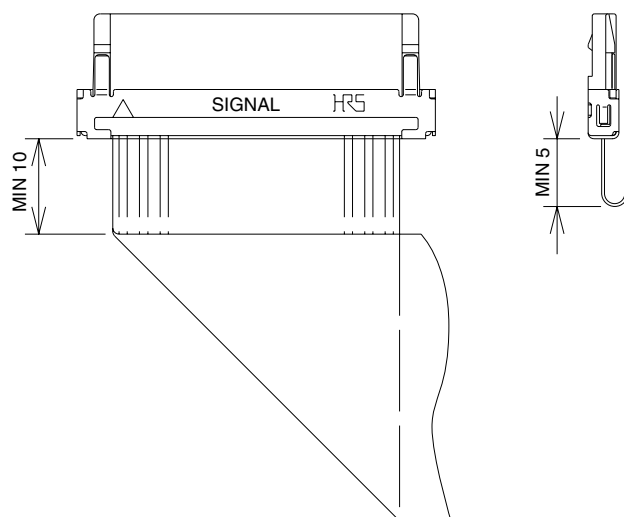
Note 2: Dedicated assembly fixtures are required at each stage of the termination process. For detail, refer to the instruction manual supplied with the tools.

Note 3: Do not apply excessive forces to FPC (Bending or twisting) as it may introduce cracks in the copper foil (on the cover film edge).

Note 4: To protect the FPC, insertion and disconnection of the connectors should be performed parallel to the mating direction.

Note 5: Do not apply excessive tension to FPC.

Note 6: Refer to FPC manufacturer for bend radius and other specific recommendation. Distance should be allowed for the bending position, as illustrated below.



Note 7: Follow the instruction manuals for the termination and assembly fixtures and tools.

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