

# Circular Connectors for Audio Equipment

## HA Series



### ■Features

#### 1. Circular connectors with lock mechanism for audio equipment

Additional grounding feature prevents external noise.

This series includes four different receptacle sizes and two types of cable clamping mechanisms used on the plugs. Receptacle selection will depend on your particular design and available mounting space.

### ■Product Specifications

| Ratings | No. of contacts | Rated voltage  | Rated current             | Operation temperature range | Storage temperature range |
|---------|-----------------|----------------|---------------------------|-----------------------------|---------------------------|
|         | 3               | AC130V, DC180V | 15A<br>3 A (PCB dip type) | -25 to +70°C                | -10 to +60°C              |
|         | 4               |                | 5A                        |                             |                           |
|         | 5               |                | 4A                        |                             |                           |

| Items                    | Specifications                                                                               | Conditions                                                                                                                            |
|--------------------------|----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| 1. Contact resistance    | 3 and 4 contacts: 5 mΩ max.<br>3 contacts (PCB dip type), 5 contacts: 10 mΩ min.             | Measured at DC 1 A                                                                                                                    |
| 2. Insulation resistance | 1,000 MΩ min.                                                                                | Measured at DC 500 V                                                                                                                  |
| 3. Withstanding voltage  | No flashover or dielectric breakdown.                                                        | AC 1,400 V for one minute                                                                                                             |
| 4. Vibration resistance  | No electrical discontinuity for 10 μs or greater                                             | 10 to 55 Hz/cycle, amplitude: 0.75 mm, in 3 axis directions, for 2 hours each direction                                               |
| 5. Shock resistance      | No electrical discontinuity for 10 μs or greater                                             | Acceleration: 490 m/s <sup>2</sup> , duration: 11 ms, 3 axis directions, 3 cycles each direction                                      |
| 6. Mating Cycles         | 3 and 4 contacts: a maximum of 10 mΩ<br>3 contacts (PCB dip style)<br>5 contacts: 20 mΩ max. | 1,000 times                                                                                                                           |
| 7. Temperature cycle     | Insulation resistance: 1,000 MΩ max.                                                         | -55°C: 30 minutes → Normal temperature: 10 to 15 minutes → 85°C: 30 minutes → Normal temperature: 10 to 15 minutes, left for 5 cycles |
| 8. Moisture resistance   | Insulation resistance: 10 MΩ (at high humidity) min.<br>100 MΩ (when dry) min.               | Temperature: 40°C, relative humidity: 90 to 95%, left for 96 hours                                                                    |

### ■Materials

| Parts     | Material                     | Finish                         | Remarks |
|-----------|------------------------------|--------------------------------|---------|
| Shell     | Aluminum alloy or zinc alloy | Matte finished, nickel plating | _____   |
| Insulator | Polyamide resin or PBT resin | _____                          | UL94V-0 |
| Contact   | Copper alloy                 | Silver plating                 | _____   |

■ Ordering information

● Plug and receptacle

HA 16 PR N - 3 S F - A (\*\*)

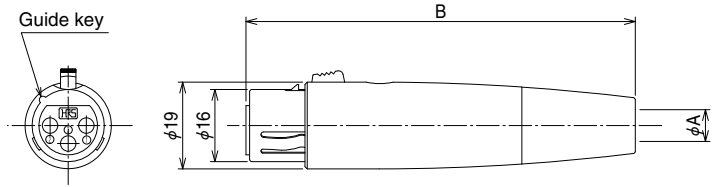
①    ②    ③    ④    ⑤    ⑥    ⑦    ⑧    ⑨

|                                                                                                                     |
|---------------------------------------------------------------------------------------------------------------------|
| ① Model name: HA Series                                                                                             |
| ② Shell size: Shell size is the outer diameter of the mating interface of the plug.                                 |
| ③ Connector shape:<br>P: Plug<br>R: Receptacle<br>PR: Plug receptacle<br>J: Jack                                    |
| ④ Shell variation: A, B, C, etc. is used to note exterior shell changes.                                            |
| ⑤ Number of contacts                                                                                                |
| ⑥ Contact form:<br>P: Male contact<br>S: Female contact                                                             |
| ⑦ Contact termination method or shape: A, B, C, etc. is used to note any changes to the termination method or type. |
| ⑧ Gang type: Notes a ganged arrangement of receptacles.                                                             |
| ⑨ Other specifications: A two-digit number is added to indicate other specifications.                               |

## ■ Plug



**HA16PA-3S(71)**

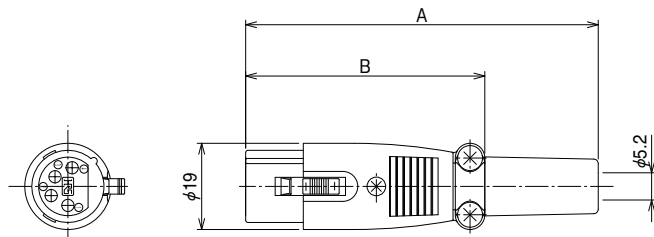


(Representative example)

| HRS No.       | Part No.      | No. of contacts | $\phi A$ | B  | Weight | Remarks |
|---------------|---------------|-----------------|----------|----|--------|---------|
| 104-0359-0 71 | HA16PA-3S(71) | 3               | 4.5      | 86 | 50 g   | —       |
| 104-0426-6 71 | HA16PK-4S(71) | 4               | 6        | 78 |        | —       |



**HA216P-4S(71)**



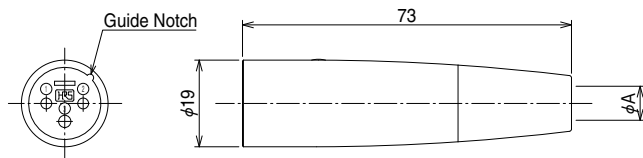
(Representative example)

| HRS No.       | Part No.      | No. of contacts | A    | B    | Weight | Remarks |
|---------------|---------------|-----------------|------|------|--------|---------|
| 104-0701-9 71 | HA216P-3S(71) | 3               | 78.5 | 53.5 | 40 g   | —       |
| 104-0702-1 71 | HA216P-4S(71) | 4               | 77.7 | 52.7 |        | —       |
| 104-0703-4 71 | HA216P-5S(71) | 5               | 78.5 | 53.5 |        | —       |

## ■ Jack



**HA16JA-3P(76)**

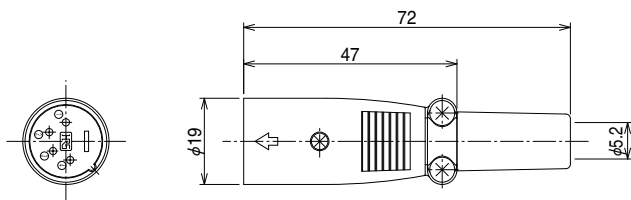


(Representative example)

| HRS No.       | Part No.      | No. of contacts | $\phi A$ | Weight | Remarks |
|---------------|---------------|-----------------|----------|--------|---------|
| 104-0358-8 76 | HA16JA-3P(76) | 3               | 4.5      | 40 g   | —       |



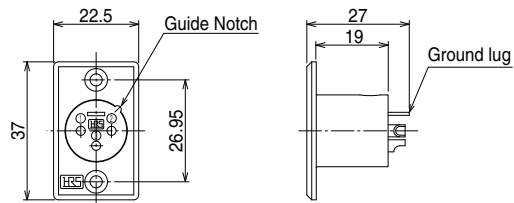
**HA216J-4P(76)**



(Representative example)

| HRS No.       | Part No.      | No. of contacts | Weight | Remarks |
|---------------|---------------|-----------------|--------|---------|
| 104-0704-7 76 | HA216J-3P(76) | 3               | 40 g   | —       |
| 104-0705-0 76 | HA216J-4P(76) | 4               |        | —       |
| 104-0706-2 76 | HA216J-5P(76) | 5               |        | —       |

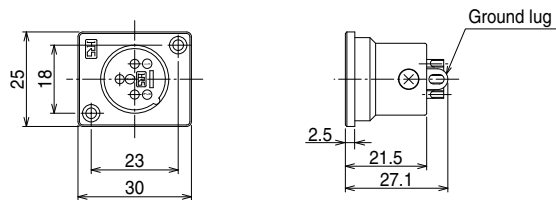
■Receptacle (Solder Type)  
(Large Flange Type)



(Representative example)

| HRS No.       | Part No.     | No. of contacts | Weight | Remarks |
|---------------|--------------|-----------------|--------|---------|
| 104-0349-7 76 | HA16R-3P(76) | 3               | 13 g   | —       |

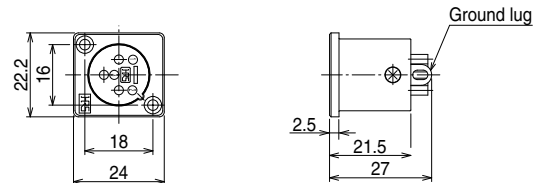
(Medium Flange Type)



(Representative example)

| HRS No.       | Part No.      | No. of contacts | Weight | Remarks |
|---------------|---------------|-----------------|--------|---------|
| 104-0393-9 76 | HA16RD-3P(76) | 3               | 14 g   | —       |
| 104-0402-8 76 | HA16RD-4P(76) | 4               |        | —       |

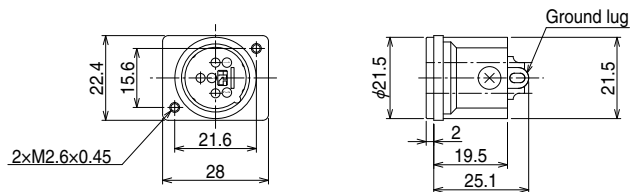
(Small Flange Type)



(Representative example)

| HRS No.       | Part No.      | No. of contacts | Weight | Remarks |
|---------------|---------------|-----------------|--------|---------|
| 104-0382-2 76 | HA16RA-3P(76) | 3               | 11 g   | —       |
| 104-0408-4 76 | HA16RA-4P(76) | 4               |        | —       |
| 104-0383-5 76 | HA16RA-5P(76) | 5               |        | —       |

■Receptacle (Solder Type)  
(Inside Mount Type)



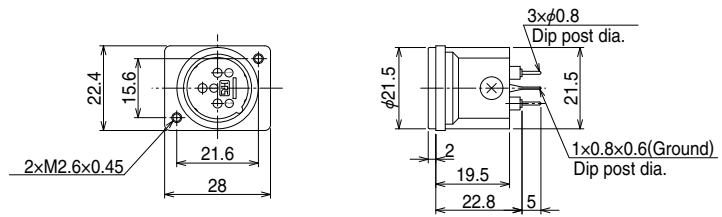
| HRS No.       | Part No.      | No. of contacts | Weight | Remarks |
|---------------|---------------|-----------------|--------|---------|
| 104-0431-6 76 | HA16RM-3P(76) | 3               | 14 g   | —       |

## ■Receptacle (PCB Through Hole Type)

(Inside Mount Type, Straight Dip)



HA16RM-3PE(76)



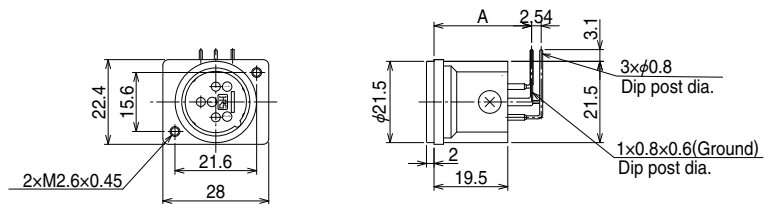
(Representative example)

| HRS No.       | Part No.       | No. of contacts | Weight | Remarks |
|---------------|----------------|-----------------|--------|---------|
| 104-0420-0 76 | HA16RM-3PE(76) | 3               | 14g    | —       |

(Inside Mount Type, Right Angle Dip)



HA16RM-3PB(76)



(The above shapes are examples. The left bend type is shown in this figure.)

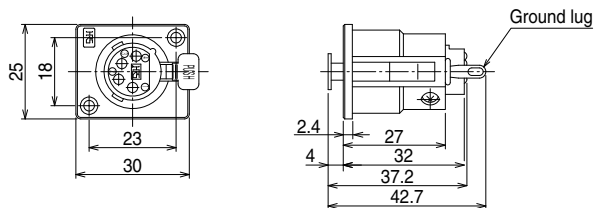
| HRS No.       | Part No.       | No. of contacts | A    | Weight | Remarks            |
|---------------|----------------|-----------------|------|--------|--------------------|
| 104-0416-2 76 | HA16RM-3PB(76) | 3               | 23.2 | 14 g   | Dip post down bent |
| 104-0418-8 76 | HA16RM-3PD(76) |                 | 25.8 |        | Dip post left bent |

## ■Plug-Receptacle (Solder Type)

(Small Flange Type)



HA16PRH-3S HA16PRK-4S



(Representative example)

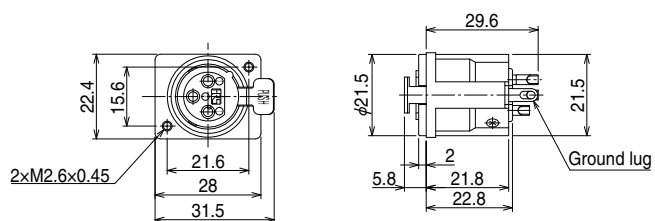
| HRS No.    | Part No.   | No. of contacts | Weight | Remarks            |
|------------|------------|-----------------|--------|--------------------|
| 104-0395-4 | HA16PRH-3S | 3               | 26 g   | Without ground lug |
| 104-0403-0 | HA16PRH-4S | 4               |        |                    |
| 104-0404-3 | HA16PRH-5S | 5               |        | With ground lug    |
| 104-0411-9 | HA16PRK-3S | 3               |        |                    |
| 104-0427-9 | HA16PRK-4S | 4               |        |                    |

## ■Plug-Receptacle (Solder Type)

(Inside Mount Type)



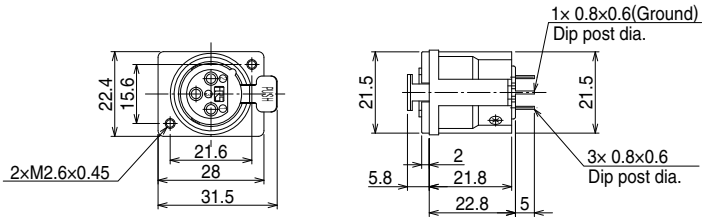
HA16PRM-3S(05)



(Representative example)

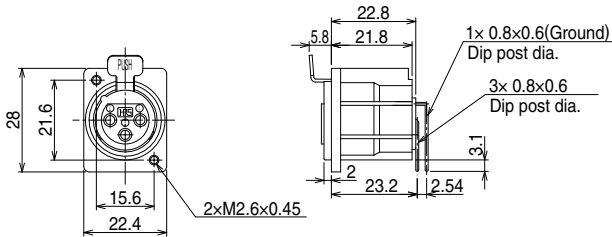
| HRS No.       | Part No.       | No. of contacts | Weight | Remarks |
|---------------|----------------|-----------------|--------|---------|
| 104-0432-9 05 | HA16PRM-3S(05) | 3               | 18 g   | —       |

■Plug-Receptacle (PCB Through Hole Type)  
(Inside Mount Type, Straight Dip)



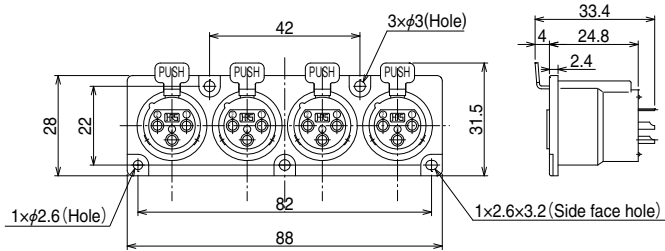
| HRS No.       | Part No.        | No. of contacts | Weight | Remarks |
|---------------|-----------------|-----------------|--------|---------|
| 104-0421-2 71 | HA16PRM-3SE(71) | 3               | 18 g   | —       |

(Inside Mount Type, Right Angle Dip)



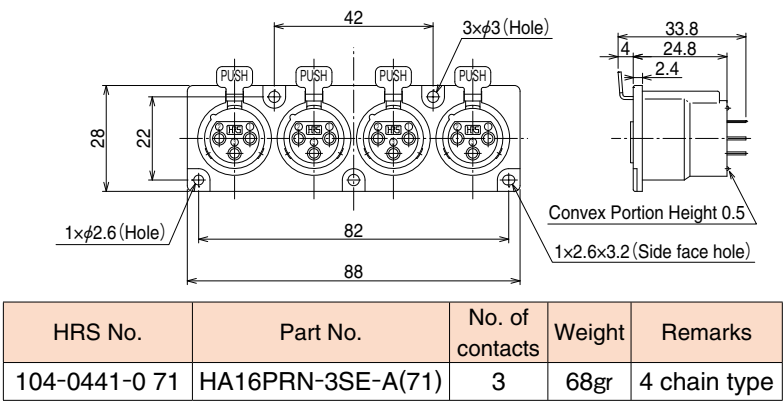
| HRS No.       | Part No.        | No. of contacts | Weight | Remarks            |
|---------------|-----------------|-----------------|--------|--------------------|
| 104-0417-5 71 | HA16PRM-3SB(71) | 3               | 18 g   | Dip post down bent |

■Gang Type  
(Plug-Receptacle Solder Type)



| HRS No.       | Part No.          | No. of contacts | Weight | Remarks      |
|---------------|-------------------|-----------------|--------|--------------|
| 104-0423-8 71 | HA16PRN-3SF-A(71) | 3               | 80 g   | 4 chain type |

(Plug-Receptacle PCB Through Hole Type)

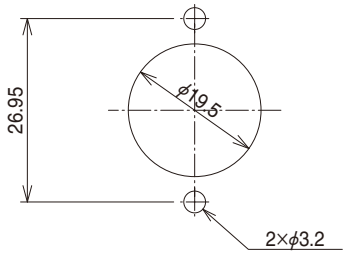


Dip post down bent type

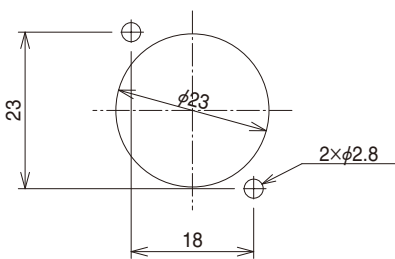
◆ Panel Cutout

○ Receptacle

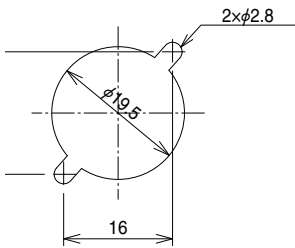
(Large Flange Type)



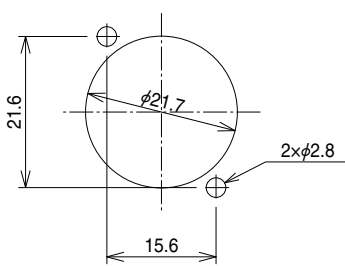
(Middle Flange Type)



(Small Flange Type)

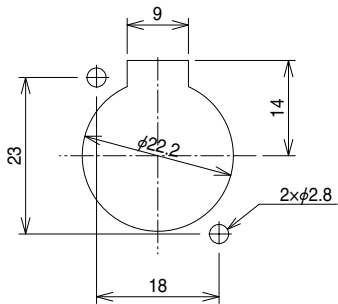


● HA16RM

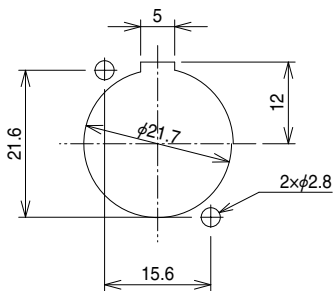


○ Plug Receptacle Type

(Small Flange Type)



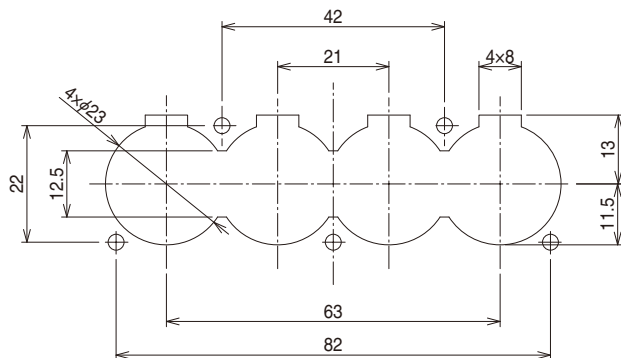
(Inside Mount Type)



● HA16PRM

## ◆ Panel Cutout

### ○ Gang Type (Plug-Receptacle)

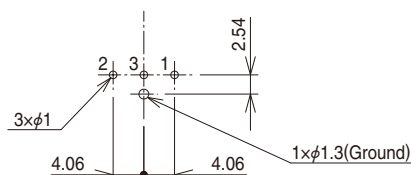


## ◆ Receptacle Dip Post Layout

(The figure below shows the board surface in which connector terminal dip posts are to be inserted.)

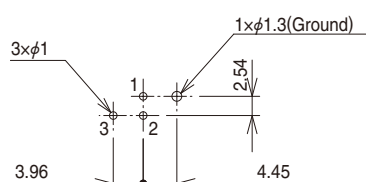
### ○ Dip post down bent type

#### ● HA16RM-3PB(76)



### ○ Dip post left bent type

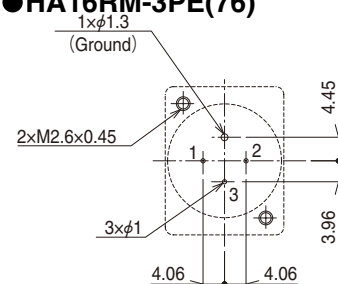
#### ● HA16RM-3PD(76)



### ○ Dip post straight type

(As viewed from the mating surface)

#### ● HA16RM-3PE(76)

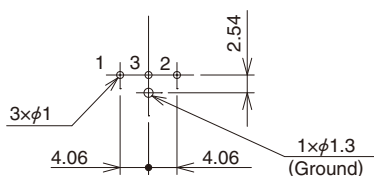


## ◆ Plug-Receptacle Dip Post Layout

(The figure below shows the board surface in which connector terminal dip posts are to be inserted.)

### ○ Dip post down bent type

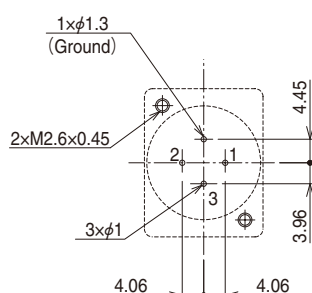
#### HA16PRM-3SB(71)



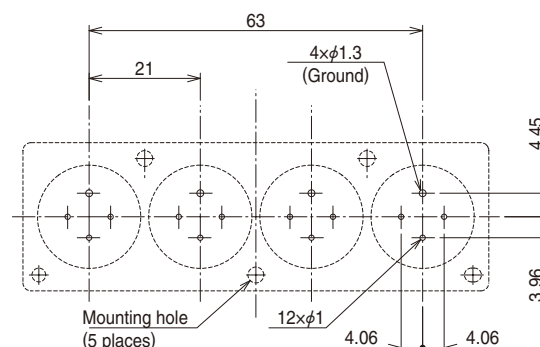
### ○ Dip post straight type

(As viewed from the mating surface)

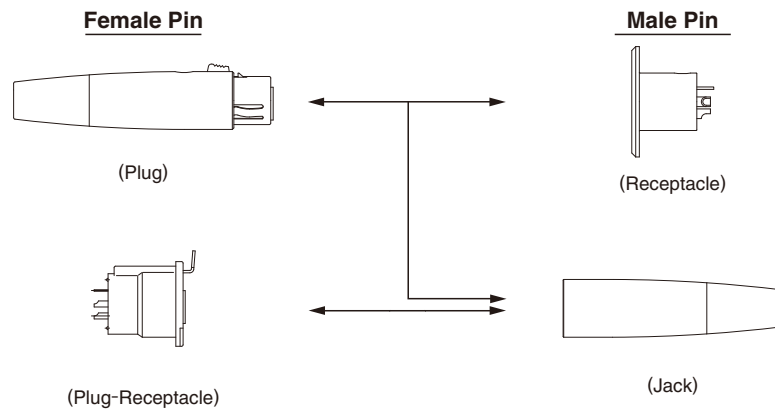
#### ● HA16PRM-3SE(71)



#### ● HA16PRN-3SE-A(71)

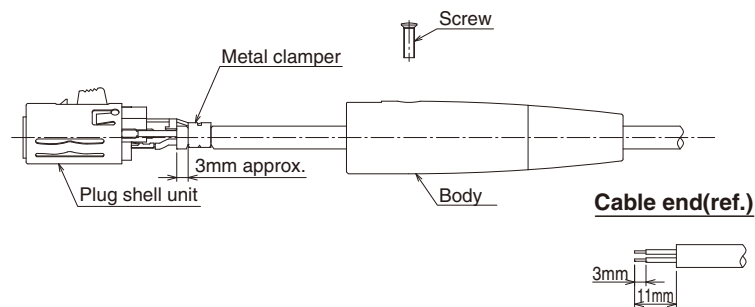


## ◆ Coupling Combination



## ◆ Termination procedure

● Plug side (HA16 type, jack side connector follows the same assembly procedure)



## ○ Operation procedure

1. Please choose a cable of which the outside diameter is 4-6mm.
2. Strip insulation of the cable end in the size as shown above.
3. Solder the cable to plug shell.
4. Crimp cable clammer, which holds cable, with a tool.
5. Fit the P shell unit to the cord tube, and tighten the locking screw with a Torque of 0.3-0.4N·m(3.5-4kg·cm) to complete the work.

For details, contact our sales or engineering department before using the model HA16 plugs.

### ● Receptacle side

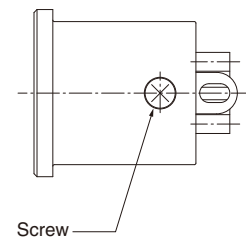
## ○ Precautions

If heat shrink tubing is applied to the solder terminating section for insulation purposes, overheating could reduce the torque of the screw tightness.

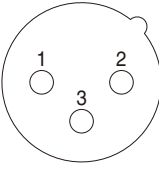
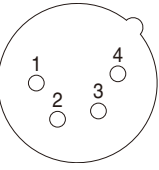
Such overheating may result in loosening and possible loss of the screw. It is advised to confirm that a minimum torque of at least 0.1 N·m is obtained after termination.

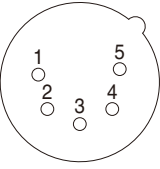
If a torque of at least 0.1 N·m is not realized, the screw should be tightened to between 0.3 and 0.4 N·m.

For details on usage, please contact our Sales or Engineering Department.



◆Terminal arrangement and major specifications

|                       |                                                                                   |                    |                                                                                     |
|-----------------------|-----------------------------------------------------------------------------------|--------------------|-------------------------------------------------------------------------------------|
| Terminal arrangement  |  |                    |  |
| No. of contacts       | 3                                                                                 |                    | 4                                                                                   |
| Withstanding voltage  | AC1,400V a minute                                                                 |                    | AC1,400V a minute                                                                   |
| Current rating        | 15A                                                                               | 3A(Board dip type) | 5A                                                                                  |
| Insulation resistance | 1,000MΩ MIN.                                                                      |                    | 1,000 MΩ MIN.                                                                       |
| Contact resistance    | 5 mΩ MAX.                                                                         | 10 mΩ MAX.         | 5 mΩ MAX.                                                                           |

|                       |                                                                                   |
|-----------------------|-----------------------------------------------------------------------------------|
| Terminal arrangement  |  |
| No. of contacts       | 5                                                                                 |
| Withstanding voltage  | AC1,400V a minute                                                                 |
| Current rating        | 4A                                                                                |
| Insulation resistance | 1,000 MΩ MIN.                                                                     |
| Contact resistance    | 10 mΩ MAX.                                                                        |

- Note 1. The above figures show the receptacle as viewed from the mating side.  
2. The withstand voltages show test voltages.  
3. The insulation resistances show the values at 500V DC.  
4. The contact resistance show the values at 1A DC.

MEMO :

Handwriting practice area consisting of 30 horizontal dashed lines.

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