

Waterproof Circular Connectors

JR-W Series



■ Features

1. Waterproof

The JR-W series is a rugged, waterproof connector series that is IP67 and IP68 rated in the mated condition.

IP67 : Left in water at a depth of 1m for 30 minutes

IP68 : Left in water at a depth of 2m for 14 days

2. Corrosion resistance

The outer shell is plated to improve corrosion resistance, allowing this connector to be used in various environments.

■ Product Specifications

| | | | | |
|---------|-----------------------------|--------------|------------------|------------------|
| Ratings | Current rating | Shell size | No. of contacts | Current rating |
| | | 13 | 5 | 5A |
| | | 16 | 7 | 10A |
| | | | 10 | 5A |
| 25 | 4 | 30A | | |
| | 24 | 5A | | |
| Ratings | Voltage rating | Shell size | No. of contacts | Voltage rating |
| | | 13 | 5 | 100V AC, 140V DC |
| | | | 7 | |
| | | 16 | 10 | 100V AC, 140V DC |
| | | | 4 | |
| | | 25 | 24 | 300V AC, 420V DC |
| | | | 100V AC, 140V DC | |
| Ratings | Operating temperature range | -25 to +85°C | | |
| | Storage temperature range | -10 to +60°C | | |

| Item | Specifications | Conditions |
|--------------------------|---|--|
| 1. Contact resistance | 5mΩ max. JR16-10 contact crimping type : 10mΩ max. | Measured at DC 1A |
| 2. Insulation resistance | 1,000MΩ min. JR25-4 contacts : 10,000MΩ min. | Measured at DC 500V |
| 3. Withstanding voltage | No flashover or dielectric breakdown. | AC 1,000V for 1 minute JR25-4 contacts : AC 3,000V for one minute |
| 4. Vibration resistance | No electrical discontinuity for 10μs or greater. | 10 to 55Hz/cycle, amplitude : 0.75mm, 3 axis directions, 2 hours each. |
| 5. Shock resistance | No electrical discontinuity for 10μs or greater. | Acceleration : 490m/s ² , duration : 11ms 6 directions, 3 times each. |
| 6. Mating cycles | Contact resistance : 5mΩ max. JR16-10 contact crimping type : 10mΩ max. | 500 times |
| 7. Temperature cycle | Insulation resistance : 1,000MΩ min. JR25-4 contacts : 10,000MΩ min. | -40°C : 30 minute → Normal temperature : 10 to 15 minutes → 100°C : 30 minutes → Normal temperature : 10 to 15 minutes, left for 5 cycles |
| 8. Moisture resistance | Insulation resistance: 10MΩ min. (at high humidity) 100MΩ min. (when dry) JR25-4 contacts: 100MΩ min. (at high humidity) 1,000MΩ min. (when dry) | Temperature : 40°C, relative humidity : 90 to 95%, leave 96 hours |
| 9. Waterproof | No water penetration into the connector. | Mated connectors left in water at a depth of 1.8m for 48 hours. |

Materials / Finish

| Parts | Material | Finish | Remarks |
|--------------------|---------------------------------|------------------------|---------|
| Outer shell | Aluminium alloy, brass | Black chromium plating | ———— |
| Insulator | Phenol resin, PPS resin | ———— | UL94V-0 |
| Contact | Copper alloy | Silver plating | ———— |
| Waterproof packing | Nitrile rubber, silicone rubber | ———— | ———— |

Product Number Structure

Refer to the chart below when determining the product specifications from the product number.
Please select from the product numbers listed in this catalog when placing orders.

● Plug and receptacle

JR 13 WP A - 3 P C ()**

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

● Cord clamp

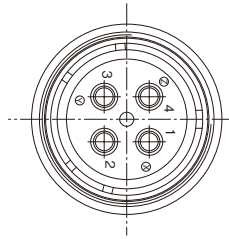
JR 13 WCC A - 4 ()**

① ② ③ ④ ⑧ ⑨

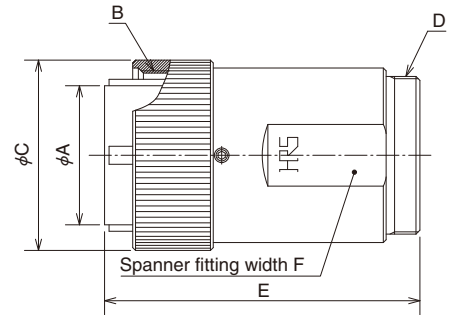
| |
|--|
| ① Model name : JR Series |
| ② Shell size : Shell size is the outer shell diameter of the mating end of the plug. |
| ③ Shell type WP : Waterproof plug WR : Waterproof receptacle WCC : Waterproof clamp |
| ④ Shell variation : Connectors are distinguished by A, B, or C if a shell variation is applied in the same form. |
| ⑤ Number of contacts. |
| ⑥ Contact form P : Male Contact S : Female Contact |
| ⑦ Contact termination method None : Solder termination C : Crimp termination |
| ⑧ Applicable cable diameter |
| ⑨ Other specifications : A two-digit number is added to indicate other specifications. |

■ Soldering type

● Plug



(Representative example)

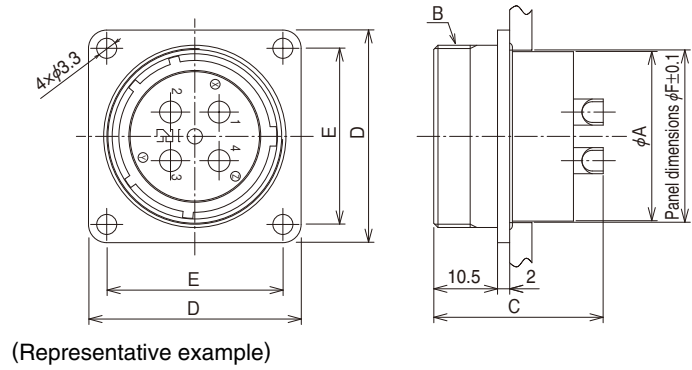


| Part No. | HRS No. | No. of contacts | φA | B | φC | D | E | F | Remarks |
|----------------|---------------|-----------------|------|-------|------|----------|------|----|---------|
| JR13WP-5P(31) | 114-2002-8 31 | 5 | 12.7 | M18×1 | 21.8 | M16×0.75 | 44.7 | 17 | |
| JR16WP-7P(31) | 114-2003-0 31 | 7 | 16.3 | M22×1 | 25.8 | M20×0.75 | 46.5 | 21 | |
| JR25WPH-4P | 114-2185-0 | 4 | 24.7 | M30×1 | 33.8 | M28×0.75 | 56 | 29 | ☆ |
| JR25WP-24P(31) | 114-2011-9 31 | 24 | | | | | | | |
| JR13WP-5S(31) | 114-2013-4 31 | 5 | 12.7 | M18×1 | 21.8 | M16×0.75 | 44.7 | 17 | |
| JR16WP-7S(31) | 114-2014-7 31 | 7 | 16.3 | M22×1 | 25.8 | M20×0.75 | 46.5 | 21 | |
| JR25WPH-4S | 114-2183-4 | 4 | 24.7 | M30×1 | 33.8 | M28×0.75 | 56 | 29 | ☆ |
| JR25WP-24S(31) | 114-2022-5 31 | 24 | | | | | | | |

Note 1 : Plugs must be used with cord clamps.

Note 2 : ☆ : Denotes waterproof gaskets with a silicone rubber specification

● Receptacle (Flange type)

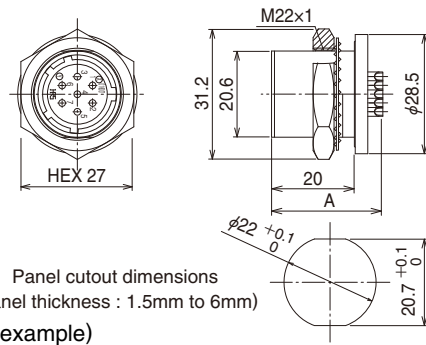


| Part No. | HRS No. | No. of contacts | φA | B | C | D | E | φF | Remarks |
|----------------|---------------|-----------------|------|-------|------|----|----|------|---------|
| JR13WR-5P(31) | 114-2024-0 31 | 5 | 15.9 | M18×1 | 26.1 | 26 | 20 | 16.3 | |
| JR16WR-7P(31) | 114-2025-3 31 | 7 | 19.9 | M22×1 | 26.6 | 29 | 23 | 20.3 | |
| JR25WRH-4P | 114-2184-7 | 4 | 27.9 | M30×1 | 28 | 35 | 29 | 28.3 | ☆ |
| JR25WR-24P(31) | 114-2033-1 31 | 24 | | | 26.1 | | | | |
| JR13WR-5S(31) | 114-2035-7 31 | 5 | 15.9 | M18×1 | 27 | 26 | 20 | 16.3 | |
| JR16WR-7S(31) | 114-2036-0 31 | 7 | 19.9 | M22×1 | 28 | 29 | 23 | 20.3 | |
| JR25WRH-4S | 114-2186-2 | 4 | 27.9 | M30×1 | 28 | 35 | 29 | 28.3 | ☆ |
| JR25WR-24S(31) | 114-2044-8 31 | 24 | | | 27 | | | | |

Note 1 : ☆ : Denotes waterproof gaskets with a silicone rubber specification

■ Soldering type

● Receptacle (Front nut-tightening type)

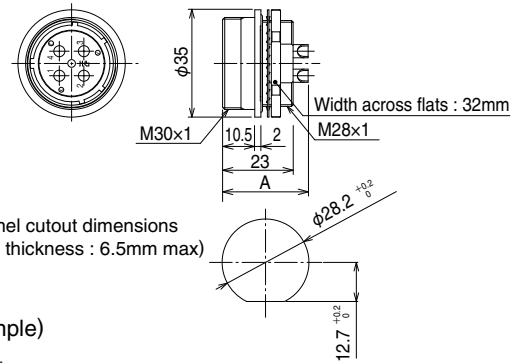


Panel cutout dimensions
(Panel thickness : 1.5mm to 6mm)

(Representative example)

| Part No. | HRS No. | No. of contacts | A |
|----------------|---------------|-----------------|------|
| JR16WRA-7P(31) | 114-2143-0 31 | 7 | 26.6 |

● Receptacle (Rear nut-tightening type with hex nut)



Panel cutout dimensions
(Panel thickness : 6.5mm max)

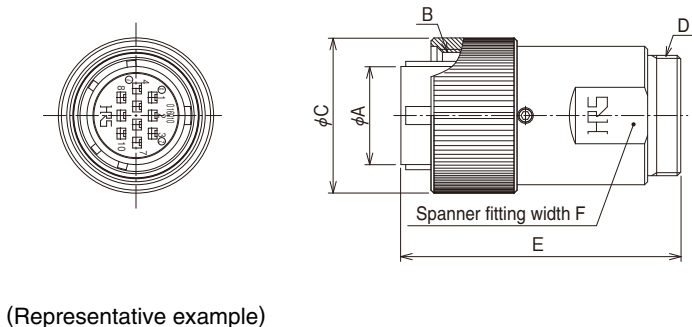
(Representative example)

| Part No. | HRS No. | No. of contacts | A | Remarks |
|-------------|------------|-----------------|----|---------|
| JR25WRHA-4P | 114-1136-9 | 4 | 28 | ☆ |
| JR25WRHA-4S | 114-1135-6 | | | |

Note 1 : ☆ : Denotes waterproof gaskets with a silicone rubber specification

■ Crimp type

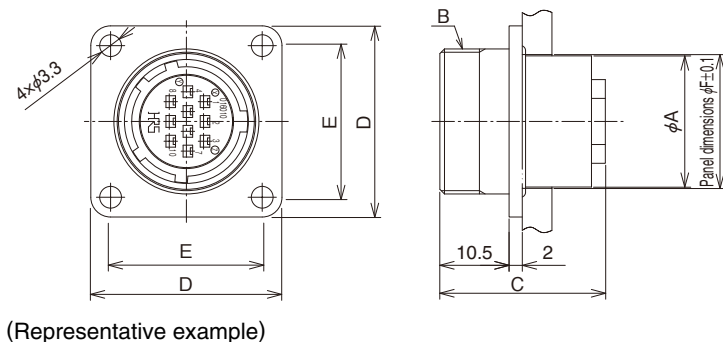
● Plug



| Part No. | HRS No. | No. of contacts | φA | B | φC | D | E | F | Contact dia. |
|-----------------|---------------|-----------------|------|-------|------|----------|------|----|--------------|
| JR16WP-10PC(31) | 114-2114-1 31 | 10 | 16.3 | M22×1 | 25.8 | M20×0.75 | 46.5 | 21 | 1 |
| JR16WP-10SC(31) | 114-2122-0 31 | | 16.3 | M22×1 | 25.8 | M20×0.75 | 46.5 | 21 | 1 |

Note 1 : Plugs must be used with cord clamps.

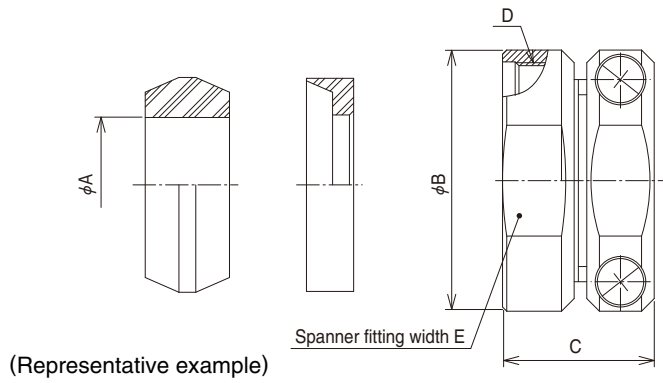
● Receptacle(Flange type)



| Part No. | HRS No. | No. of contacts | φA | B | C | D | E | φF | Contact dia. |
|-----------------|---------------|-----------------|------|-------|------|----|----|------|--------------|
| JR16WR-10PC(31) | 114-2130-8 31 | 10 | 19.9 | M22×1 | 25.1 | 29 | 23 | 20.3 | 1 |

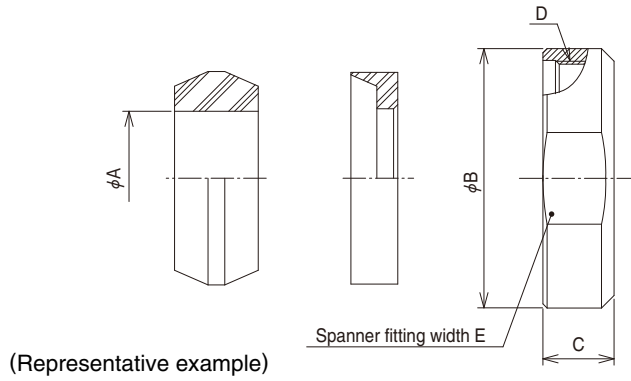
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● Cable clamp (Standard type)



| Part No. | HRS No. | φA | φB | C | D | E |
|----------------|---------------|----|----|------|----------|----|
| JR13WCC-4(31) | 114-2045-0 31 | 4 | 20 | 17 | M16×0.75 | 17 |
| JR13WCC-5(31) | 114-2046-3 31 | 5 | | | | |
| JR13WCC-6(71) | 114-2047-6 71 | 6 | | | | |
| JR13WCC-7(31) | 114-2048-9 31 | 7 | | | | |
| JR13WCC-8(31) | 114-2049-1 31 | 8 | | | | |
| JR13WCC-9(31) | 114-2050-0 31 | 9 | | | | |
| JR13WCC-10(31) | 114-2051-3 31 | 10 | | | | |
| JR16WCC-4(71) | 114-2052-6 71 | 4 | 23 | 17.5 | M20×0.75 | 21 |
| JR16WCC-6(71) | 114-2053-9 71 | 6 | | | | |
| JR16WCC-8(71) | 114-2054-1 71 | 8 | | | | |
| JR16WCC-10(71) | 114-2055-4 71 | 10 | | | | |
| JR16WCC-12(71) | 114-2056-7 71 | 12 | | | | |
| JR25WCC-8(71) | 114-2063-2 71 | 8 | 31 | 18 | M28×0.75 | 29 |
| JR25WCC-10(71) | 114-2064-5 71 | 10 | | | | |
| JR25WCC-12(31) | 114-2065-8 31 | 12 | | | | |
| JR25WCC-14(31) | 114-2066-0 31 | 14 | | | | |
| JR25WCC-16(31) | 114-2067-3 31 | 16 | | | | |
| JR25WCC-18(71) | 114-2068-6 71 | 18 | | | | |

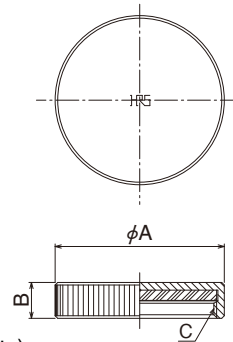
● Cable clamp (Simple type)



| Part No. | HRS No. | ϕA | ϕB | C | D | E |
|-----------------|---------------|----------|----------|-----|----------|----|
| JR13WCCA-4(31) | 114-2069-9 31 | 4 | 19 | 7.5 | M16×0.75 | 17 |
| JR13WCCA-5(31) | 114-2070-8 31 | 5 | | | | |
| JR13WCCA-6(71) | 114-2071-0 71 | 6 | | | | |
| JR13WCCA-7(31) | 114-2072-3 31 | 7 | | | | |
| JR13WCCA-8(31) | 114-2073-6 31 | 8 | | | | |
| JR13WCCA-9(31) | 114-2074-9 31 | 9 | | | | |
| JR13WCCA-10(31) | 114-2075-1 31 | 10 | 23 | 8 | M20×0.75 | 21 |
| JR16WCCA-4(71) | 114-2076-4 71 | 4 | | | | |
| JR16WCCA-6(71) | 114-2077-7 71 | 6 | | | | |
| JR16WCCA-8(71) | 114-2078-0 71 | 8 | | | | |
| JR16WCCA-10(71) | 114-2079-2 71 | 10 | | | | |
| JR16WCCA-12(71) | 114-2080-1 71 | 12 | | | | |
| JR25WCCA-8(71) | 114-2087-0 71 | 8 | 31 | 8.5 | M28×0.75 | 29 |
| JR25WCCA-10(71) | 114-2088-3 71 | 10 | | | | |
| JR25WCCA-12(31) | 114-2089-6 31 | 12 | | | | |
| JR25WCCA-14(31) | 114-2090-5 31 | 14 | | | | |
| JR25WCCA-16(31) | 114-2091-8 31 | 16 | | | | |
| JR25WCCA-18(71) | 114-2092-0 71 | 18 | | | | |

Note : The simple cord clamp does not have the cable clamping ability as the standard cable clamp does. We recommend that you make sure that the clamping capability of the simple cord clamp is sufficient for your application.

●Cap (Without a chain)

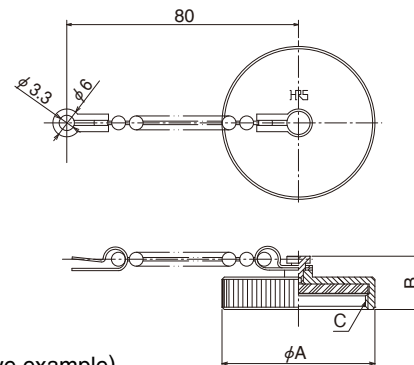


(Representative example)

| Part No. | HRS No. | φA | B | C | Remarks |
|-------------|---------------|----|-----|-------|------------------|
| JR13WRC4 | 114-2192-5 | 21 | 7 | M18×1 | ☆ |
| JR13WRC5 | 114-2105-0 | | 7.5 | | ☆, Plastic shell |
| JR16WRC(31) | 114-2162-4 31 | 25 | 7 | M22×1 | ☆ |
| JR16WRC(75) | 114-2162-4 75 | | | | ☆ |
| JR25WRC(31) | 114-2163-7 31 | 33 | 7.5 | M30×1 | ☆ |
| JR25WRC(75) | 114-2163-7 75 | | | | ☆ |
| JR25WRC5 | 114-2175-6 | | | | ☆, Plastic shell |

Note 1 : ☆ : Denotes waterproof gaskets with a silicone rubber specification

●Cap (With a chain)



(Representative example)

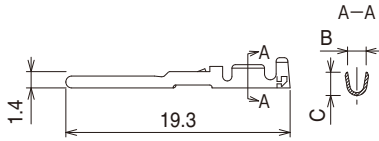
| Part No. | HRS No. | φA | B | C | Remarks |
|----------|------------|----|------|-------|---------|
| JR13WRC3 | 114-2170-2 | 21 | 11.5 | M18×1 | ☆ |
| JR16WRC3 | 114-2171-5 | 25 | | M22×1 | |
| JR25WRC3 | 114-2172-8 | 33 | | M30×1 | |

Note 1 : ☆ : Denotes waterproof gaskets with a silicone rubber specification

◆ Crimp contacts

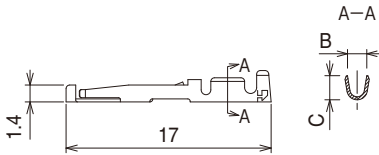
■ Contact diameter $\phi 1.0\text{mm}$

● Male contact



| Type | Part No. | HRS No. | B | C | Applicable wire |
|----------------|-------------|------------|------|-----|-----------------|
| Loose contacts | JRC-PC2-112 | 114-0243-3 | 1.6 | 2.0 | 20 to 24 AWG |
| | JRC-PC2-122 | 114-0244-6 | 1.45 | 1.5 | 24 to 28 AWG |
| Reel contacts | JRC-PC2-212 | 114-0245-9 | 1.6 | 2.0 | 20 to 24 AWG |
| | JRC-PC2-222 | 114-0246-1 | 1.45 | 1.5 | 24 to 28 AWG |

● Female contact



| Type | Part No. | HRS No. | B | C | Applicable wire |
|----------------|-------------|------------|------|-----|-----------------|
| Loose contacts | JRC-SC2-112 | 114-0247-4 | 1.6 | 2.0 | 20 to 24 AWG |
| | JRC-SC2-122 | 114-0248-7 | 1.45 | 1.5 | 24 to 28 AWG |
| Reel contacts | JRC-SC2-212 | 114-0249-0 | 1.6 | 2.0 | 20 to 24 AWG |
| | JRC-SC2-222 | 114-0250-9 | 1.45 | 1.5 | 24 to 28 AWG |

Note : Loose contacts come in packages of 100 pcs.

Reel contacts come in reels of 8,000 pcs.

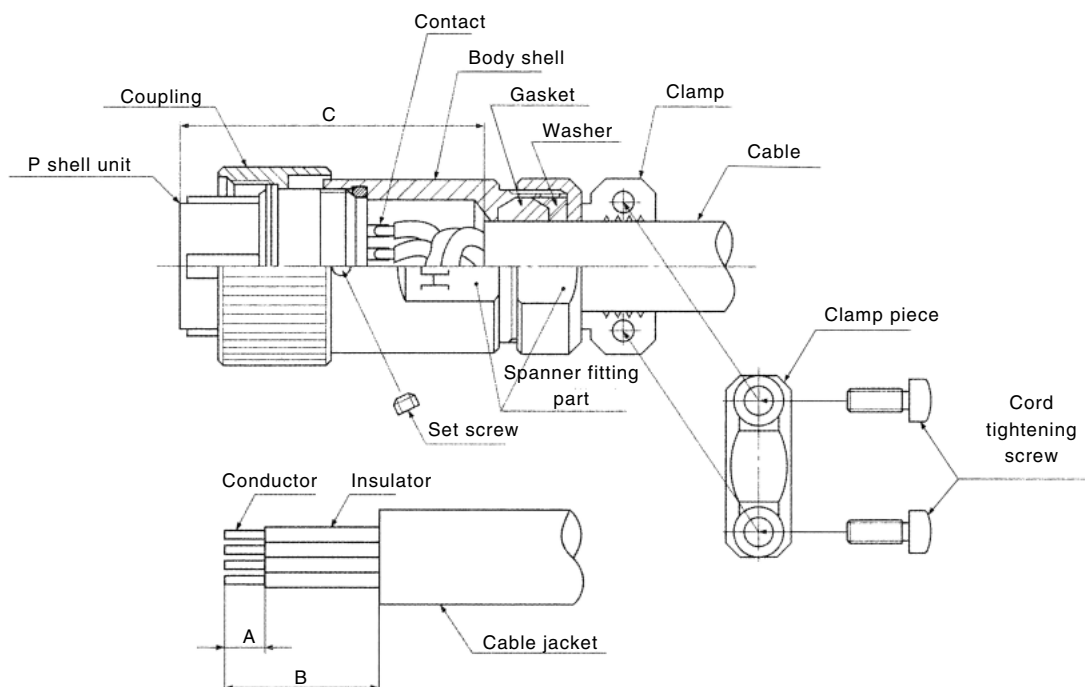
◆ Tools

| Contact dia. | Type | Item | Part No. | HRS No. | Applicable contact | Applicable wire | |
|--------------|-----------|---------------------------------|---------------|--------------|----------------------------|----------------------------|--------------|
| $\phi 1$ | Manual | Manual crimping tool | HT802 / RM-11 | 150-0401-6 | JRC-PC2-112 JRC-SC2-112 | 20 to 24 AWG | |
| | | | HT802 / RM-12 | 150-0402-9 | JRC-PC2-122 JRC-SC2-122 | 24 to 28 AWG | |
| | Automatic | Automatic crimping machine body | CM-105C | 901-0001-0 | — | — | |
| | | | Applicator | AP105-JRC2-1 | 901-2037-1 | JRC-PC2-212 JRC-SC2-212 | 20 to 24 AWG |
| | | | | AP105-JRC2-2 | 901-2038-4 | JRC-PC2-222 JRC-SC2-222 | 24 to 28 AWG |
| | Extractor | RM-TP | 150-0008-7 | — | — | | |

◆ Plug assemblies procedure

○ The receptacle side is omitted because no special procedures are required.

● Diagrammatical view



○ Work procedure

1. Disassembly of connector

- (1) To remove the plug, remove the set screw, fit a receptacle adaptive to the P shell unit to fix, and remove the cord tube.
- (2) To remove the cord clamp, remove the cord tightening screws. (Note 1)

2. Connection

2.1 Soldering type

- (1) Use the cable so that the conductor can be soldered properly into the solder pot with the cable sheath diameter adaptive to each cord clamp.
- (2) After the terminal treatment of the cable with a size given in Table 1, thread on the cable the clamp, washer, gasket, cord tube and coupling in this order and direction as shown above.
- (3) Solder to connect the conductors to the terminals of the P shell unit. Shrinkable tube is recommended to be used at the connecting part because insulating performance might deteriorate due to solder whiskers or dewing. After connecting, adjust to meet the C size. (Note 2)

2.2 For crimping type connectors

- (1) Please make sure to use a cable with the correct outer diameter for the cord clamp. It is also important that the wire and its outer diameter are appropriate for the crimp contacts.
- (2) Pass the cables in order through the 1) tightening fitting, 2) washer, 3) gasket, 4) cord tube, and 5) coupling in the direction shown on the above figure, following terminal treatment as shown in Table-2.
- (3) After crimping the applicable crimping contacts onto the conductor, insert the crimping contacts into the contact holes of the P-shell unit. After inserting, please make adjustments so that the dimension for Section C shall be satisfied. Note 2)

3. Assembly of connector

- (1) Fit the connected P shell unit to the receptacle fixed with a vice or the like. Torque the cord tube to the level as given in Table-3.
- (2) Fit the gasket, washer and clamp. Torque the clamp to the level as given in Table-3 while preventing the cable from being rotated. And, Loctite Japan Co Ltd. is recommended to be applied as locking. (Note 3)
- (3) Torque the set screw to 0.2 to 0.25N·m.
- (4) Torque the cord tightening screw (two positions) to 0.65 to 0.7N·m. (Note 1, 3)

Note 1 : Not required if a simple type cord clamp is used.

Note 2 : Please maintain this dimension until assembly is complete.

Note 3 : Cable clamping force, cable rotation force, and others aspects may differ depending on the cable construction.

We recommend that you verify the suitability of the cable assembly before use or production.

Table 1 (Solder type) [unit : mm]

| Shell size | A | B | C |
|------------|-----|------|---------|
| 13 | (3) | (12) | 37 MAX. |
| 16 | (3) | (14) | 39 MAX. |
| 25 | (3) | (20) | 45 MAX. |

Table 2 (Crimp type) [unit : mm]

| Shell size | No. of contacts | A | B | C |
|------------|-----------------|----------|------|---------|
| 16 | 10 | 3.5 to 4 | (19) | 39 MAX. |

Table 3 [unit : N·m]

| Shell size | Tightning torque |
|------------|------------------|
| 13 | 2 to 2.5 |
| 16 | 3 to 3.5 |
| 25 | 5 to 5.5 |

◆ Contact position arrangement

| Shell size 13, 16 | 13 | 16 | |
|--------------------------|------------------------|------------|------------|
| | | | |
| No. of contacts | 5 | 7 | 10 |
| Withstand voltage | 1,000V AC for 1 minute | | |
| Current capacity | 5A | 10A | 5A |
| Insulation resistance | 1,000MΩ MIN. | | |
| Contact resistance | 5mΩ MAX. | | |
| Solderpot inner diameter | 1.1mm dia. | 1.7mm dia. | 1.1mm dia. |

| Shell size 25 | 25 | |
|--------------------------|------------------------|------------------------|
| | | |
| No. of contacts | 4 | 24 |
| Withstand voltage | 3,000V AC for 1 minute | 1,000V AC for 1 minute |
| Current capacity | 30A | 5A |
| Insulation resistance | 10,000MΩ MIN. | 1,000MΩ MIN. |
| Contact resistance | 5mΩ MAX. | 5mΩ MAX. |
| Solderpot inner diameter | 3.4mm dia. | 1.1mm dia. |

Remarks 1. Figures are views of contact arrays of the mating end of male connectors.
 2. The withstand voltage indicates the test voltage value.

◆ Precautions

1. Switch off the power of the circuit before disconnecting or plugging-in the connectors.
2. Use connectors with socket contacts at the power side of the circuit.
3. Make sure that the coupling is in completely cocked position.
4. Use the connector as the combination of water-proof types.
5. This product series uses silver plated contacts. Silver reacts easily to exposure to sulfur gas so the below conditions may cause tarnishing.
 - Dusty environments
 - Area with a high concentration area of gases such as sulfur dioxide gas, hydrogen sulfide gas, nitrogen dioxide gas and so on.
 Example; In close proximity to factory exhaust, automotive emissions, etc.
 - Close to heaters, or in other areas marked by extreme temperature differences or high humidity.
 - Close to rubber products includes rubber adhesives.

The Electrical connection is not affected by tarnishing on a silver surface due to the wiping effect of the contact pins.

Storage

Packing state; Packed in original packing or equivalent container

Temperature -10 to +60°C

Humidity 85% Max

(It is recommended that the product be stored in an area of normal level of temperature and humidity, and free of any temperature fluctuation)

Please use this products within 6 months of delivery.

(After 6 month, please check the solderability before use)

“Storage” means long-term storage of the unused products in sealed packaging, prior to assembly to PCB.

HIROSE ELECTRIC CO.,LTD.

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