



MIL-DTL-38999 series III and range extension



SOURIAU
Connection Technology



SOURIAU

Connectors and interconnect systems for harsh environments

The company designs, manufactures and markets high performance interconnect solutions for severe environments from industrial broadline and universal ranges to complex system with integrated functions:

filtering, high speed data transmission, hermetic seal, separation mechanism, remote handling, underwater mating, ...



Industrial



Aeronautical



Equipment & system

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Geophysics
Manufacturing environment
Instrumentation
Automation & process



Civil & military aircraft
Helicopter
Weapon delivery system
Avionics



Military marine
Communications
Satellites
Launcher & missile

SOURIAU was established in 1917 and has been created by successive acquisitions of the industrial, aeronautical, defense and space activities of SOURIAU, JUPITER and BURNDY.

The Group's products are engineered and manufactured in the USA and Dominican Republic, Europe and Morocco, Japan and India, and sold by a worldwide sales and marketing organization, and in addition to SOURIAU's offices, a large network of licensed distributors and agents.

SOURIAU complies with most of national and international Quality Assurance Standards, production unit with ISO 14001.

**Quality Certificate
Management System**

ISO 9001

**Environment Certificate
Management System**

ISO 14001

**Quality Certificate
Management System**

Aeronautic Industry : EN 9100

MIL-DTL 38999 Series III



Introduction

This product family is in accordance with MIL-DTL-38999 K Serie III , EN 3645 and CECC standard for bronze shell

Proposed in aluminium, composite, stainless steel, titanium and bronze versions.

This family gives :

- A high contact density up to 128 contacts #22D.
- A quick screw coupling with self locking mechanism.
- 100% scoop proof offering polarising options by angular positioning of keys.
- EMI enhanced protection by shielding ring and shell to shell bottoming.

Moreover, composite connectors reach high performance in terms of:

- Resistance to salt spray (> 2000 hours)
- Endurance : (> 1500 mating / Unmating operations with specific contacts)

Its choice is recommended wherever weight is critical (typically –30% versus aluminium version) or particularly in harsh climatic and mechanical environments.

8D Titanium version is characterized by a very high and mechanical resistance:

- Weight saving as compared to stainless steel
- Unplated and nickel plated version available

8D / D38999 family has applications in:

- Aeronautics and military
- Marine and offshore
- Industrial.

For more informations or questions, please contact us to:

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MIL-DTL 38999 Series III



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MIL-DTL 38999 Series III



Overview



MIL-DTL 38999 Series III



Technical characteristics

Characteristics

• **Shell:**
Aluminium, composite, stainless steel, bronze

• **Shells plating:**

Aluminium shell:

- Cadmium olive drab (W)
- Nickel (F)
- Black zinc nickel (Z)
- Green zinc cobalt (ZC)

Composite shell:

- Cadmium olive drab (J)
- Nickel (M)
- Without plating (X)

Stainless steel shell:

- Passivated (K)
- Nickel (S)

Titanium shell:

- Without plating (TT)
- Nickel (TF)

Boîtier bronze:

- Without plating

• **Insulator:** Thermoplastic or thermoset.

• **Grommet and interfacial seal:**

- Silicone elastomer

• **Contacts:** Copper alloy

• **Contacts plating:** Gold over nickel plated

• **Endurance:**

- 500 mating / unmating operations whatever the material used
- 1500 mating / unmating operations with composite connectors + specifics contacts

• **Shock:**

300g, 3 ms according EN 2591-D2 method A

• **Vibration:**

Sinus:

- 10 à 2000 Hz, 3x12 hrs (60g, 140 – 2000 Hz) with temperature cycling

Random:

- 50 to 2000 Hz, 2x8 Hrs (1g²/ Hz, 100 – 2000Hz) at T° max.
- 25 to 2000 Hz, 2x8 Hrs (5g²/ Hz, 100 – 300Hz) (at ambient T°)

Test with accessories in acc with EN 2591-D3

• **Contacts retention:**

| Contacts size | 22 | 20 | 16 | 12 | 8 | 4 |
|----------------|----|----|-----|-----|-----|-----|
| Min force in N | 44 | 67 | 111 | 111 | 111 | 200 |

Weight comparison

Example for a plug shell size 15

| Materials | Weight |
|-----------------|-----------|
| Stainless steel | 58.80 grs |
| Titanium | 33.90 grs |
| Aluminium | 20.35 grs |
| Composite | 14.30 grs |

40% lighter (Aluminium vs Stainless steel)
42% lighter (Composite vs Stainless steel)
30% lighter (Composite vs Titanium)

Electrical

• **Test voltage rating (Vrms):**

| Service | At sea level | At 21000 m |
|---------|--------------|------------|
| M | 1 300 | 800 |
| N | 1 000 | 600 |
| I | 1 800 | 1 000 |
| II | 2 300 | 1 000 |

For Quadrax see page 70

• **Contact resistance:**

| Contacts size | 22 | 20 | 16 | 12 | 8 | 4 |
|---------------------|------|-----|-----|-----|---|---|
| Cts resistance (mΩ) | 14.6 | 7.3 | 3.8 | 3.5 | 3 | 2 |

• **Insulation resistance:**

≥ 5 000 MΩ (under 500 Vdc).

• **Contact rating:**

| Contacts size | 22 | 20 | 16 | 12 | 8 | 4 |
|--------------------|----|-----|----|----|----|----|
| Contact rating (A) | 5 | 7,5 | 13 | 23 | 45 | 80 |

• **Shell continuity**

Aluminium shell:

- Cadmium olive drab (W): 2.5 mΩ
- Nickel (F): 1 mΩ
- Black zinc nickel (Z): 2.5 mΩ
- Green zinc nickel (ZC): 2.5 mΩ

Composite shell:

- Cadmium olive drab (J): 3 mΩ
- Nickel (M): 3 mΩ

Stainless steel shell:

- Passivated (K) : 10 mΩ
- Nickel (S) : 1 mΩ

Titanium shell:

- Without plating (TT) : 10 mΩ
- Nickel (TF): 1 mΩ

Bronze shell:

Without plating: 5 mΩ

• **Shielding:**

Aluminium shell:

- 65 db at 10 GHz (F) – 50 db at 10 GHz (W)
- 85 db at 1 GHz (F)
- (Z & ZC): Consult us

Composite shell:

- 90 db at 10 GHz
- 85 db at 1 GHz

Stainless steel shell:

- 45 db at 10 GHz (K)
- 65 db at 10 GHz (S)

Titanium shell:

- 45 db at 10 GHz (TT)
- 65 db at 10 GHz (TF)

Bronze shell: 85 db at 10 GHz

MIL-DTL 38999 Series III



Technical characteristics

Climatics

- **Temperature range:**

- **Aluminium shell:**

- Cadmium olive drab (W): -65°C +175°C
 - Nickel (F): -65°C +200°C
 - Black zinc nickel (Z): -65°C +200°C
 - Green zinc nickel (ZC): -65°C +200°C

- **Composite shell:**

- Cadmium olive drab plating (J): -65°C +175°C
 - Nickel (M): -65°C +200°C
 - Without plating (X): -65°C +175°C

- **Stainless steel shell:**

- Passivated (K): -65°C +200°C
 - Nickel (S): -65°C +200°C

- **Titanium shell:**

- Without plating (TT): -65°C +200°C
 - Nickel (TF): -65°C +200°C

- **Bronze shell:**

- No plating: -65°C +175°C

- **Sealing:**

- Mated connectors meet altitude immersion requirements of MIL-DTL-38999.

- **Salt spray:**

- **Aluminium shell:**

- Cadmium olive drab (W): 500 Hrs
 - Nickel (F): 48 Hrs
 - Black Zinc nickel (Z): 500 Hrs
 - Green Zinc cobalt (ZC): 250 Hrs

- **Composite shell:**

- Cadmium olive drab (J) : 2000 Hrs
 - Nickel (M): 2000 Hrs
 - Without plating (X): 2000 Hrs

- **Stainless steel shell:**

- Passivated (K): 500 Hrs
 - Nickel (S): 48 Hrs

- **Titanium shell:**

- Without plating (TT): 500 Hrs
 - Nickel (TF): 48 Hrs

- **Bronze shell:**

- No plating: 500 Hrs

Resistance to fluids

- **According to MIL-DTL-38999 standard.**

- Gasoline: JP5 (OTAN F44)
 - Mineral hydrolic fluid: MIL-H-5606 (OTAN H515)
 - Synthetic hydraulic fluid: Skydrol 500 B4

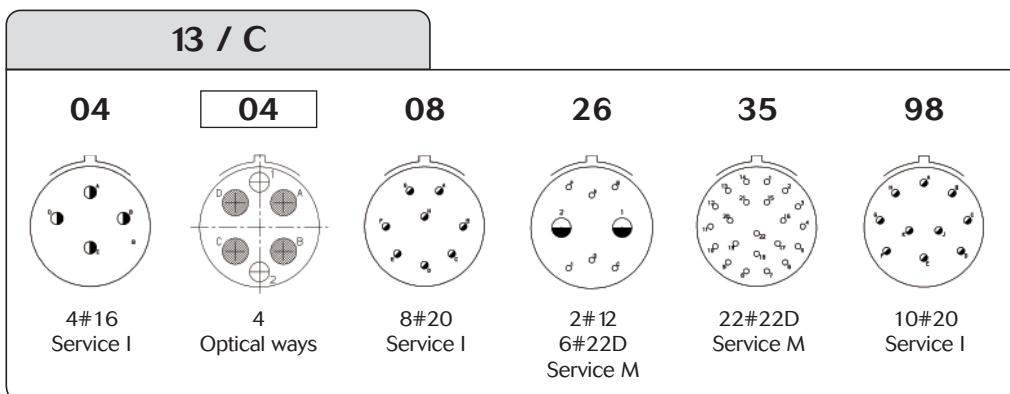
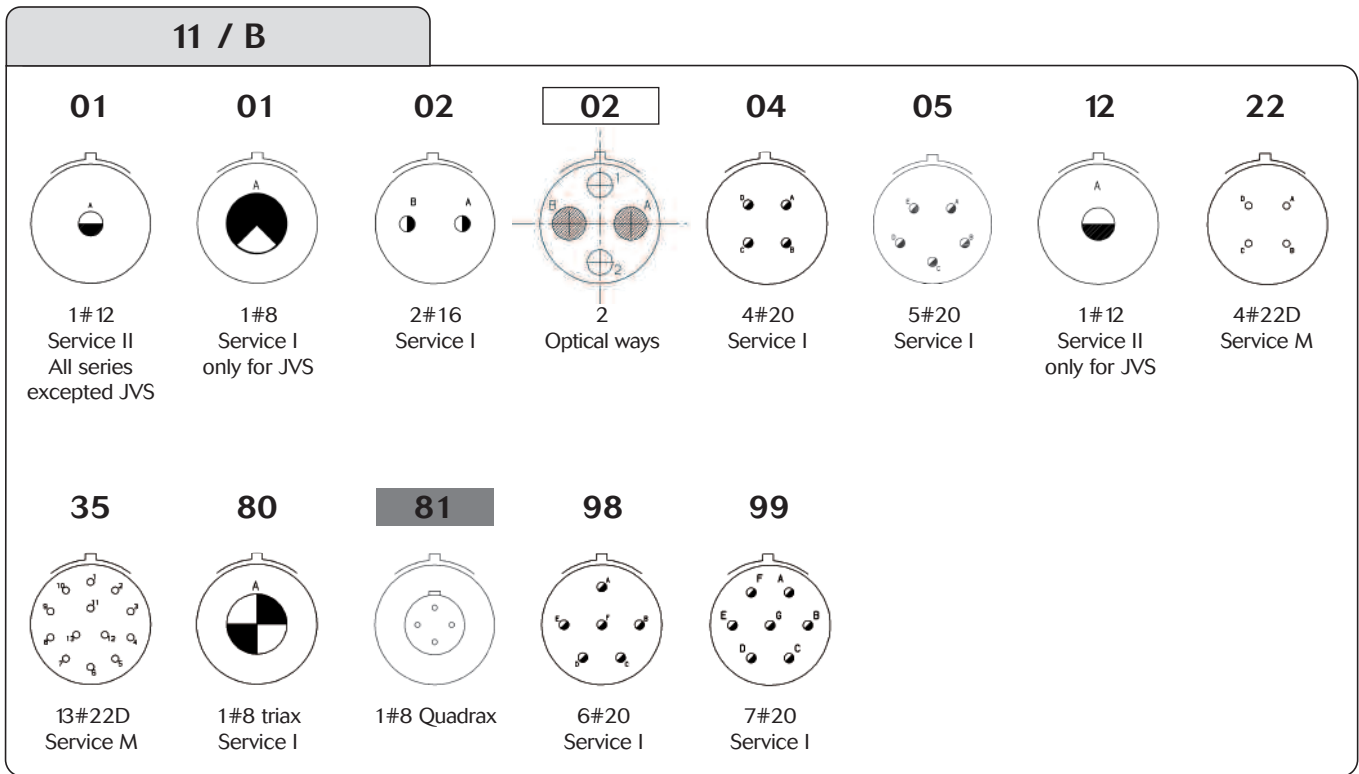
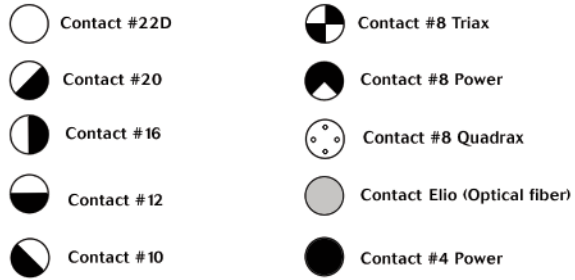
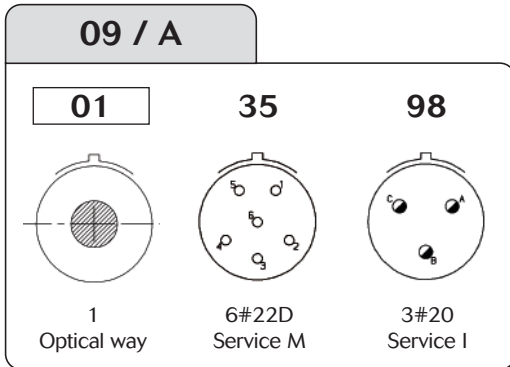
- **LD4 (SAE AS 1241).**

- Mineral lubricating: MIL-L-7870A (OTAN 0142)
 - Synthetic lubricating: MIL-L-23699 (OTAN 0156), MIL-L-7808.
 - Cleaning fluid: MIL-DTL-25769 dilué/diluted
 - De-icing fluid: MIL-A-8243.
 - Extinguishing fluid: Chlorobrométhane
 - Cooling fluid: Coolanol

MIL-DTL 38999 Series III



Contact layouts



MIL-DTL 38999 Series III



Contact layouts

15 / D

| | | | | | |
|-------------------------------------|---|-------------------------------------|-------------------------------------|--------------------------------------|--|
| 05 5#16 Service II | 15 1#16 14#20 Service I | 18 18#20 Service I | 19 19#20 Service I | 35 37#22D Service M | 97 4#16 8#20 Service I |
|-------------------------------------|---|-------------------------------------|-------------------------------------|--------------------------------------|--|

17 / E

| | | | | | | | |
|---|---|-------------------------------------|--|-------------------------------------|--------------------------------------|---|--|
| 02 38#22D 1#8 triax Service M | 06 6#12 Service I | 08 8#16 Service II | 20 4#12 16#22D Service M | 26 26#20 Service I | 35 55#22D Service M | 75 2#8 triax Service M | 81 38#22D 1#8 Quadrax |
| 82 2 Quadrax | 99 2#16 21#20 Service I | | | | | | |

19 / F

| | | | | |
|------------------------------------|--------------------------------------|---|-------------------------------------|--------------------------------------|
| 08 8 Optical ways | 11 11#16 Service II | 28 26#20 2#16 Service I | 32 32#20 Service I | 35 66#22D Service M |
|------------------------------------|--------------------------------------|---|-------------------------------------|--------------------------------------|

Elio fiber optics Ethernet Quadrax

MIL-DTL 38999 Series III



Contact layouts

| 21 / G | | | | 23 / H | | | | | | |
|--|--|--|---|--|---|--|--|--|--|--|
| <p>11</p> <p>11#12 Service I</p> | <p>16</p> <p>16#16 Service II</p> | <p>35</p> <p>79#22D Service M</p> | <p>39</p> <p>2#16 37#20 Service I</p> | <p>21</p> <p>21#16 Service II</p> | <p>35</p> <p>100#22D Service M</p> | <p>53</p> <p>53#20 Service I</p> | | | | |
| <p>41</p> <p>41#20 Service I</p> | <p>48</p> <p>4#8 power Service I</p> | <p>75</p> <p>4#8 triax Service M</p> | <p>84</p> <p>4 Quadrax</p> | <p>54</p> <p>4#12 9#16 40#22D Service M</p> | <p>55</p> <p>55#20 Service I</p> | | | | | |
| 25 / J | | | | | | | | | | |
| <p>04</p> <p>8#16 48#20 Service I</p> | <p>07</p> <p>2#8 triax 97#22D Service M</p> | <p>08</p> <p>8#8 triax Service M</p> | <p>11</p> <p>2#20 9#10 Service N</p> | <p>19</p> <p>19#12 Service I</p> | <p>20⁽¹⁾</p> <p>10#20 4#12 coax 13#16 3#8 triax Service N</p> | <p>24</p> <p>12#16 12#12 Service II</p> | <p>24</p> <p>24 Optical Ways</p> | <p>29</p> <p>29#16 Service I</p> | | |
| <p>35</p> <p>128#22D Service M</p> | <p>37</p> <p>37#16 Service I</p> | <p>41</p> <p>22#22D 3#20 11#16 2#12 3#8 triax Service M</p> | <p>43</p> <p>23#20 20#16 Service I</p> | <p>44</p> <p>4#4 power 4#16 Service I</p> | <p>46</p> <p>40#20 4#16 2#8 coax Service I</p> | <p>61</p> <p>61#20 Service I</p> | <p>82</p> <p>97#22D 2#8 Quadrax</p> | <p>80</p> <p>10#20 - 4#12 13#16 3#8 Quadrax</p> | | |
| <p>81</p> <p>22#22D - 3#20 11#16 - 2#12 3#8 Quadrax</p> | <p>86</p> <p>40#20 4#16 2#8 Quadrax</p> | <p>88</p> <p>8 Quadrax</p> | | | | | | | | |

(1) For classes F, W, K, S only.

Elio fiber optics
 Ethernet Quadrax

MIL-DTL 38999 Series III



Contact layouts

| Shell Size | Layout | Service | MIL - DTL - 38999 (QPL) | | | 8D Titanium | JVS (CECC) Bronze | Hermetics | Number of contacts | #22D | #20 | #16 | #12 | #10 | #8 | #4 Power | Optical Way |
|------------|------------|---------|-------------------------|-----------------|-----------|-------------|-------------------|-----------|--------------------|------|-----|-----|-----|-----------|-----------|----------|-------------|
| | | | Alu | Stainless steel | Composite | | | | | | | | | | | | |
| 09 / A | 09 - 01 | - | | | | | | 1 | | | | | | | | 1 | |
| | 09 - 35 | M | | | | | x | 6 | 6 | | | | | | | | |
| | 09 - 98 | I | | | | | x | 3 | | 3 | | | | | | | |
| 11 / B | 11 - 01 | II | | | | | | 1 | | | | 1 | | | | | |
| | 11 - 01 | II | | | | | x | 1 | | | | | | 1 Coax | | | |
| | 11 - 02 | I | | | | | x | 2 | | | 2 | | | | | | |
| | 11 - 02 | - | | | | | | 2 | | | | | | | | 2 | |
| | 11 - 04 | I | | | | | | 4 | | 4 | | | | | | | |
| | 11 - 05 | I | | | | | x | 5 | | 5 | | | | | | | |
| | 11 - 12 | I | | | | | x | 1 | | | | 1 | | | | | |
| | 11 - 22 | M | | | | | | 4 | 4 | | | | | | | | |
| | 11 - 35 | M | | | | | x | 13 | 13 | | | | | | | | |
| | 11 - 80 | I | | | | | | 1 | | | | | | | 1 Triax | | |
| | 11 - 81 | - | | | | | | 1 | | | | | | | 1 Quadrax | | |
| | 11 - 98 | I | | | | | x | 6 | | 6 | | | | | | | |
| 11 - 99 | I | | | | | x | 7 | | 7 | | | | | | | | |
| 13 / C | 13 - 04 | I | | | | | x | 4 | | | 4 | | | | | | |
| | 13 - 04 | - | | | | | | 4 | | | | | | | | 4 | |
| | 13 - 08 | I | | | | | x | 8 | | 8 | | | | | | | |
| | 13 - 26 | M | | | | | x | 8 | 6 | | | 2 | | | | | |
| | 13 - 35 | M | | | | | x | 22 | 22 | | | | | | | | |
| | 13 - 98 | I | | | | | x | 10 | | 10 | | | | | | | |
| 15 / D | 15 - 05 | II | | | | | x | 5 | | | 5 | | | | | | |
| | 15 - 15 | I | | | | | x | 15 | | 14 | 1 | | | | | | |
| | 15 - 18 | I | | | | | x | 18 | | 18 | | | | | | | |
| | 15 - 19 | I | | | | | x | 19 | | 19 | | | | | | | |
| | 15 - 35 | M | | | | | x | 37 | 37 | | | | | | | | |
| | 15 - 97 | I | | | | | x | 12 | | 8 | 4 | | | | | | |
| 17 / E | 17 - 02 | M | | | | | | 39 | 38 | | | | | | 1 Triax | | |
| | 17 - 06 | I | | | | | x | 6 | | 6 | | | | | | | |
| | 17 - 08 | II | | | | | x | 8 | | 8 | | | | | | | |
| | 17 - 20 | M | | | | | | 20 | 16 | | | 4 | | | | | |
| | 17 - 26 | I | | | | | x | 26 | | 26 | | | | | | | |
| | 17 - 35 | M | | | | | x | 55 | 55 | | | | | | | | |
| | 17 - 75 | M | | | | | x | 2 | | | | | | | 2 Triax | | |
| | 17 - 81 | - | | | | | | 39 | 38 | | | | | | 1 Quadrax | | |
| | 17 - 82 | - | | | | | | 2 | | | | | | | 2 Quadrax | | |
| | 17 - 99 | I | | | | | x | 23 | | 21 | 2 | | | | | | |
| 19 / F | 19 - 08 | - | | | | | | 8 | | | | | | | | 8 | |
| | 19 - 11 | II | | | | | x | 11 | | | 11 | | | | | | |
| | 19 - 28 | I | | | | | x | 28 | | 26 | 2 | | | | | | |
| | 19 - 32 | I | | | | | x | 32 | | 32 | | | | | | | |
| | 19 - 35 | M | | | | | x | 66 | 66 | | | | | | | | |
| 21 / G | 21 - 11 | I | | | | | x | 11 | | | | 11 | | | | | |
| | 21 - 16 | II | | | | | x | 16 | | | 16 | | | | | | |
| | 21 - 35 | M | | | | | x | 79 | 79 | | | | | | | | |
| | 21 - 39 | I | | | | | x | 39 | | 37 | 2 | | | | | | |
| | 21 - 41 | I | | | | | x | 41 | | 41 | | | | | | | |
| | 21 - 48 | I | | | | | x | 4 | | | | | | | 4 Power | | |
| | 21 - 59 | M | | | | | | 59 | 55 | | | 4 | | | | | |
| | 21 - 75 | - | | | | | x | 4 | | | | | | | 4 Triax | | |
| | 21 - 84 | - | | | | | | 4 | | | | | | | 4 Quadrax | | |
| 23 / H | 23 - 21 | II | | | | | x | 21 | | | 21 | | | | | | |
| | 23 - 35 | M | | | | | x | 100 | 100 | | | | | | | | |
| | 23 - 53 | I | | | | | x | 53 | | 53 | | | | | | | |
| | 23 - 54 | M | | | | | | 53 | 40 | | 9 | 4 | | | | | |
| | 23 - 55 | I | | | | | x | 55 | | 55 | | | | | | | |
| 25 / J | 25 - 04 | I | | | | | | 56 | | 48 | 8 | | | | | | |
| | 25 - 07 | M | | | | | | 99 | 97 | | | | | | 2 Triax | | |
| | 25 - 08 | - | | | | | x ⁽²⁾ | 8 | | | | | | | 8 Triax | | |
| | 25 - 11 | N | | | | | | 11 | | 2 | | | 9 | | | | |
| | 25 - 19 | I | | | | | x | 19 | | | | 19 | | | | | |
| | 25 - 20(1) | N | | | | | x | 30 | | 10 | 13 | 4 | | | 3 Triax | | |
| | 25 - 24 | II | | | | | x | 24 | | | 12 | 12 | | | | | |
| | 25 - 24 | - | | | | | | 24 | | | | | | | | 24 | |
| | 25 - 29 | I | | | | | x | 29 | | | 29 | | | | | | |
| | 25 - 35 | M | | | | | x | 128 | 128 | | | | | | | | |
| | 25 - 37 | I | | | | | | 37 | | | 37 | | | | | | |
| | 25 - 41 | N | | | | | | 41 | 22 | 3 | 11 | 2 | | | 3 Triax | | |
| | 25 - 43 | I | | | | | x | 43 | | 23 | 20 | | | | | | |
| | 25 - 44 | I | | | | | | 8 | | | 4 | | | | | 4 | |
| | 25 - 46 | I | | | | | x | 46 | | 40 | 4 | | | | 2 Coax | | |
| | 25 - 61 | I | | | | | x | 61 | | 61 | | | | | | | |
| | 25 - 80 | N | | | | | | 30 | | 10 | 13 | 4 | | | 3 Quadrax | | |
| | 25 - 81 | N | | | | | | 41 | 22 | 3 | 11 | 2 | | | 3 Quadrax | | |
| | 25 - 82 | M | | | | | | 99 | 97 | | | | | | 2 Quadrax | | |
| | 25 - 86 | I | | | | | | 46 | | 40 | 4 | | | | 2 Quadrax | | |
| 25 - 88 | - | | | | | | 8 | | | | | | | 8 Quadrax | | | |

(1) For classes F, W, S, K only

(2) For CECC, Layout 25 - 08 only delivery without contact



MIL-DTL 38999 Serie III Aluminium Series

8D - D38999 Aluminum Serie



Connector part numbers

| Basic Series | 8D | 0 | - | 11 | W | 35 | P | N | ** |
|--|----|---|---|----|---|----|---|---|----|
| Shell style: 0: Square flange receptacle 1: In line receptacle 7: Jam nut receptacle 5: Plug with RFI shielding. | | | | | | | | | |
| Type: -: Connectors with standard crimp contacts. L: Receptacle with long spill (male and female size #22D, #20). C: Receptacle with short spill (male and female #22D, #20, #16). S: Receptacle with specific spill (male et female #22D) W: Receptacle with male contacts #22D for wire wrap (3 wraps) T: Receptacle with male contacts #20 for wire wrap (2 wraps) | | | | | | | | | |
| Shell size: 09 - 11 - 13 - 15 - 17 - 19 - 21 - 23 - 25 | | | | | | | | | |
| Plating: W: Olive drab cadmium F: Nickel ZC: Green zinc cobalt Z: Black zinc nickel | | | | | | | | | |
| Contact layout: See page 8 to 11 | | | | | | | | | |
| Contact type: P: Pin. A: Connector supplied less pin contact or with specific contacts (connector marking: A + orientation). S: Socket. B: Connector supplied less socket contact or with specific contacts (connector marking: B + orientation). | | | | | | | | | |
| Orientation: N, A, B, C, D & E (see page 58) | | | | | | | | | |
| Specification: 046: Tinned straight spills 251: Connector provided with power contacts (layouts with contact #8) 022: Fuel tank L: For P or S contact type only, connectors delivered without contacts, connectors marking P or S plus orientation. | | | | | | | | | |

MIL-DTL-38999 part numbers*

| Basic Series | D38999 | 20 | W | B | 35 | P | N | L |
|--|--------|----|---|---|----|---|---|---|
| Shell style: 20: Square flange receptacle 24: Jam nut receptacle 26: Plug with RFI shielding. | | | | | | | | |
| Plating: W: Olive drab cadmium F: Nickel | | | | | | | | |
| Shell size: A - B - C - D - E - F - G - H - J | | | | | | | | |
| Contact layout: See page 11 for layout according to MIL-DTL-38999 | | | | | | | | |
| Contact type: P: Pin. A: Connector supplied less pin contact or with specific contacts (connector marking: A + orientation). S: Socket. B: Connector supplied less socket contact or with specific contacts (connector marking: B + orientation). | | | | | | | | |
| Orientation: N, A, B, C, D & E (see page 58) | | | | | | | | |
| L: For P or S contact type only, connector delivered without contacts, connector marking P or S (without L) | | | | | | | | |

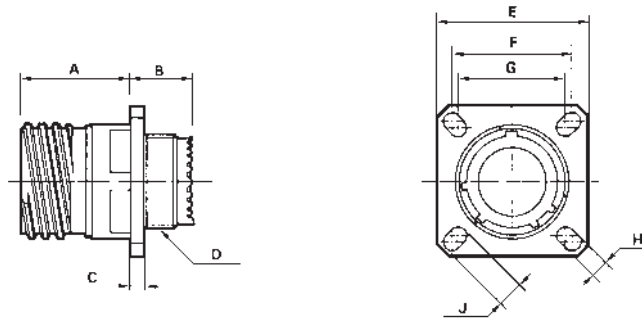
* Note: To place an order of MIL connectors delivered without MIL removable crimp contacts and keep P or S plus orientation marking, it must be specify clearly on the order (by adding a suffix L at the end of the P/N or specified in comment).

8D - D38999 Aluminium Series



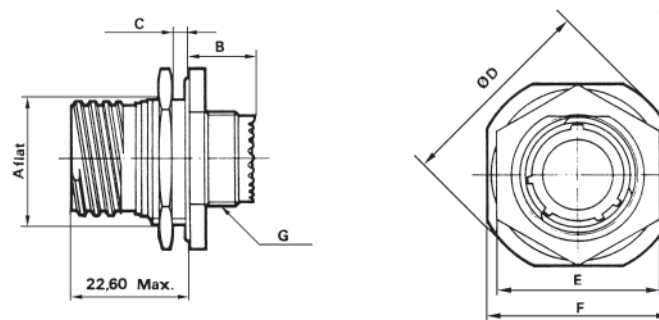
Dimensions

Receptacle type 0



| Shell size | A Max. | B Max. | C Max. | D thread | E $\pm 0,30$ | F | G | H $\pm 0,20$ | J $\pm 0,20$ |
|------------|--------|--------|--------|------------|--------------|-------|-------|--------------|--------------|
| 09 (A) | 20.90 | 10.60 | 2.50 | M12 x 1-6g | 23.80 | 18.26 | 15.09 | 3.25 | 5.49 |
| 11 (B) | 20.90 | 10.60 | 2.50 | M15 x 1-6g | 26.20 | 20.62 | 18.26 | 3.25 | 4.93 |
| 13 (C) | 20.90 | 10.60 | 2.50 | M18 x 1-6g | 28.60 | 23.01 | 20.62 | 3.25 | 4.93 |
| 15 (D) | 20.90 | 10.60 | 2.50 | M22 x 1-6g | 31.00 | 24.61 | 23.01 | 3.25 | 4.93 |
| 17 (E) | 20.90 | 10.60 | 2.50 | M25 x 1-6g | 33.30 | 26.97 | 24.61 | 3.25 | 4.93 |
| 19 (F) | 20.90 | 10.60 | 2.50 | M28 x 1-6g | 36.50 | 29.36 | 26.97 | 3.25 | 4.93 |
| 21 (G) | 20.10 | 11.40 | 3.20 | M31 x 1-6g | 39.70 | 31.75 | 29.36 | 3.25 | 4.93 |
| 23 (H) | 20.10 | 11.40 | 3.20 | M34 x 1-6g | 42.90 | 34.93 | 31.75 | 3.91 | 6.15 |
| 25 (J) | 20.10 | 11.40 | 3.20 | M37 x 1-6g | 46.00 | 38.10 | 34.93 | 3.91 | 6.15 |

Receptacle type 7



| Shell size | A + 0,10 - 0,15 | B Max. | C Max. | D Max. | E Max. | F $\pm 0,40$ | G thread |
|------------|-----------------|--------|--------|--------|--------|--------------|------------|
| 09 (A) | 16.53 | 9.90 | 3.20 | 30.50 | 23.00 | 27.00 | M12 x 1-6g |
| 11 (B) | 19.07 | 9.90 | 3.20 | 35.20 | 26.00 | 31.80 | M15 x 1-6g |
| 13 (C) | 23.82 | 9.90 | 3.20 | 38.40 | 31.00 | 34.90 | M18 x 1-6g |
| 15 (D) | 26.97 | 9.90 | 3.20 | 41.60 | 34.00 | 38.10 | M22 x 1-6g |
| 17 (E) | 30.15 | 9.90 | 3.20 | 44.80 | 37.00 | 41.30 | M25 x 1-6g |
| 19 (F) | 33.32 | 9.90 | 3.50 | 49.50 | 41.00 | 46.00 | M28 x 1-6g |
| 21 (G) | 36.50 | 9.90 | 3.50 | 52.70 | 46.00 | 49.20 | M31 x 1-6g |
| 23 (H) | 39.67 | 9.90 | 3.50 | 55.90 | 47.00 | 52.40 | M34 x 1-6g |
| 25 (J) | 42.85 | 9.90 | 3.50 | 59.00 | 52.00 | 55.60 | M37 x 1-6g |

8D - D38999 Aluminium Series

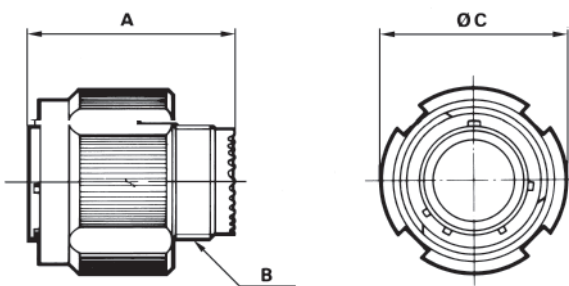


In line receptacle type 1



| Shell size | D thread | Ø F |
|------------|------------|-------|
| 09 (A) | M12 x 1-6g | 15.90 |
| 11 (B) | M15 x 1-6g | 19.05 |
| 13 (C) | M18 x 1-6g | 22.25 |
| 15 (D) | M22 x 1-6g | 25.40 |
| 17 (E) | M25 x 1-6g | 30.15 |
| 19 (F) | M28 x 1-6g | 31.75 |
| 21 (G) | M31 x 1-6g | 34.75 |
| 23 (H) | M34 x 1-6g | 37.10 |
| 25 (J) | M37 x 1-6g | 41.30 |

Plug type 5

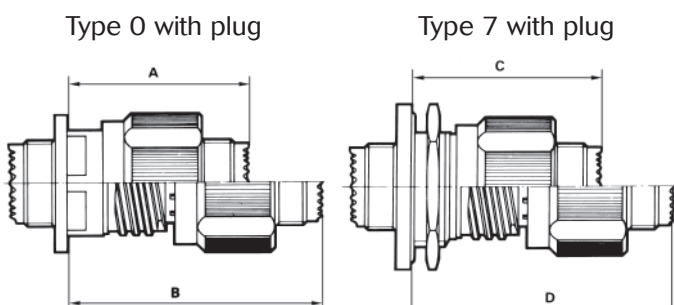


| Shell size | A Max. | B thread | C Max. |
|------------|--------|------------|--------|
| 09 (A) | 31.00 | M12 x 1-6g | 21.80 |
| 11 (B) | 31.00 | M15 x 1-6g | 25.00 |
| 13 (C) | 31.00 | M18 x 1-6g | 29.40 |
| 15 (D) | 31.00 | M22 x 1-6g | 32.50 |
| 17 (E) | 31.00 | M25 x 1-6g | 35.70 |
| 19 (F) | 31.00 | M28 x 1-6g | 38.50 |
| 21 (G) | 31.00 | M31 x 1-6g | 41.70 |
| 23 (H) | 31.00 | M34 x 1-6g | 44.90 |
| 25 (J) | 31.00 | M37 x 1-6g | 48.00 |

Maximum coupling torque on panel for jam nut receptacle (type 7)

| Shell | 09 (A) | 11 (B) | 13 (C) | 15 (D) | 17 (E) | 19 (F) | 21 (G) | 23 (H) | 25 (J) |
|-----------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Coupling torque (N.m) | 6 | 8 | 10 | 13 | 20 | 23 | 25 | 26 | 28 |

Mated connectors dimensions



| Shell size | A Max. | B Max. | C Max. | D Max. |
|------------|--------|--------|--------|--------|
| 09 (A) | 37.00 | 52.30 | 38.30 | 53.60 |
| 11 (B) | 37.00 | 52.30 | 38.30 | 53.60 |
| 13 (C) | 37.00 | 52.30 | 38.50 | 53.80 |
| 15 (D) | 37.00 | 52.30 | 38.50 | 53.80 |
| 17 (E) | 37.00 | 52.30 | 38.50 | 53.80 |
| 19 (F) | 37.00 | 52.30 | 38.50 | 53.80 |
| 21 (G) | 36.00 | 51.30 | 38.50 | 53.80 |
| 23 (H) | 36.00 | 51.30 | 38.50 | 53.80 |
| 25 (J) | 36.00 | 51.30 | 38.50 | 53.80 |

Dimensions in millimeters

8D - D38999 Aluminium Series



Receptacle with straight spill contacts



| | | Shell size | | | 09 (A) | 11 (B) | 13 (C) | 15 (D) | 17 (E) | 19 (F) | 21 (G) | 23 (H) | 25 (J) |
|-------------|-------------|--------------|--------------|------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| | | Contact size | Contact type | Spill type | | | | | | | | | |
| A | | # 22D | M & F | L & C | | | | | 0.70 | | | | |
| | | # 22D | M & F | S | | | | | 0.50 | | | | |
| | | # 20 | M & F | C | | | | | 0.70 | | | | |
| | | # 16 | M & F | C | | | | | 1.15 | | | | |
| L2 | Min. | # 22D | M | L & C | 10.52 | | | | | 10.34 | | | |
| | Max. | # 22D | M | L & C | 11.46 | | | | | 11.28 | | | |
| | Min. | # 22D | F | L & C | 10.19 | | | | | 10.01 | | | |
| | Max. | # 22D | F | L & C | 11.46 | | | | | 11.28 | | | |
| | Min. | # 22D | M | S | 10.19 | | | | | 10.01 | | | |
| | Max. | # 22D | M | S | 11.46 | | | | | 11.28 | | | |
| | Min. | # 22D | F | S | 10.69 | | | | | 10.51 | | | |
| | Max. | # 22D | F | S | 11.63 | | | | | 11.45 | | | |
| | Min. | # 20 | M | C | 10.36 | | | | | 10.18 | | | |
| | Max. | # 20 | M | C | 11.63 | | | | | 11.45 | | | |
| | Min. | # 20 | F | C | 10.69 | | | | | 10.51 | | | |
| | Max. | # 20 | F | C | 11.63 | | | | | 11.45 | | | |
| | Min. | # 16 | M | C | 10.69 | | | | | 10.51 | | | |
| | Max. | # 16 | M | C | 11.63 | | | | | 11.45 | | | |
| Min. | # 16 | F | C | 10.69 | | | | | 10.51 | | | | |
| Max. | # 16 | F | C | 11.63 | | | | | 11.45 | | | | |
| L3 | | # 22D | M & F | L | | | | | 8.50 | | | | |
| | | # 22D | M & F | C | | | | | 4.00 | | | | |
| | | # 22D | M & F | S | | | | | 5.10 | | | | |
| | | # 20 | M & F | C | | | | | 5.10 | | | | |
| | | # 16 | M & F | C | | | | | 5.10 | | | | |
| L4 | Min. | # 22D | M | L & C | | | | | 9.48 | | | | |
| | Max. | # 22D | M | L & C | | | 10.58 | | | | | 10.69 | |
| | Min. | # 22D | F | L & C | | | 9.15 | | | | | 9.26 | |
| | Max. | # 22D | F | L & C | | | 10.58 | | | | | 10.69 | |
| | Min. | # 22D | M | S | | | 9.65 | | | | | 9.76 | |
| | Max. | # 22D | M | S | | | 10.75 | | | | | 10.86 | |
| | Min. | # 22D | F | S | | | 9.15 | | | | | 9.26 | |
| | Max. | # 22D | F | S | | | 10.75 | | | | | 10.86 | |
| | Min. | # 20 | M | C | | | 9.65 | | | | | 9.76 | |
| | Max. | # 20 | M | C | | | 10.75 | | | | | 10.86 | |
| | Min. | # 20 | F | C | | | 9.65 | | | | | 9.76 | |
| | Max. | # 20 | F | C | | | 10.75 | | | | | 10.86 | |
| | Min. | # 16 | M | C | | | 9.65 | | | | | 9.76 | |
| | Max. | # 16 | M | C | | | 10.75 | | | | | 10.86 | |
| Min. | # 16 | F | C | | | 9.65 | | | | | 9.76 | | |
| Max. | # 16 | F | C | | | 10.75 | | | | | 10.86 | | |

M : Male contact F : Female contact L : Long spill C : Short spill S : Specific spill Dimensions in millimeters

8D - D38999 Aluminium Series



Souriau backshells part numbers

| Basic series | | | | | | | | | 8D | 102 | B | 02 |
|-------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|----|-----|---|----|
| Shell style: | | | | | | | | | | | | |
| 09 | 11 | 13 | 15 | 17 | 19 | 21 | 23 | 25 | | | | |
| 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | | | | |
| Plating: | | | | | | | | | | | | |
| B: Olive drab cadmium | | | | | | | | | | | | |
| F: Nickel | | | | | | | | | | | | |
| Backshell type: | | | | | | | | | | | | |
| 02: Straight cable clamp | | | | | | | | | | | | |
| 03: 90° cable clamp | | | | | | | | | | | | |
| 13: Backshell for heat shrink boots | | | | | | | | | | | | |

Cross reference table

| Backshell type | AS85049 Standard | SOURIAU part numbers |
|--|------------------|----------------------|
| Straight cable clamp | M85049/38-**-x | 8D101x02 |
| 90° cable clamp | M85049/39-**-x | 8D101x03 |
| Backshell for heat shrink boots | M85049/69-**-x | 8D101x13 |
| Backshell for screen termination and cable clamp | M85049/19**x** | N/A |

x: Plating **: Shell size (See page 19 to 21)

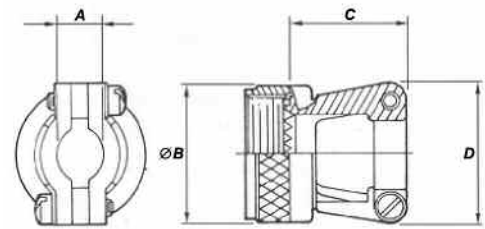
8D - D38999 Aluminium Series



Standard backshells part numbers

Straight cable clamp (M85049/38)

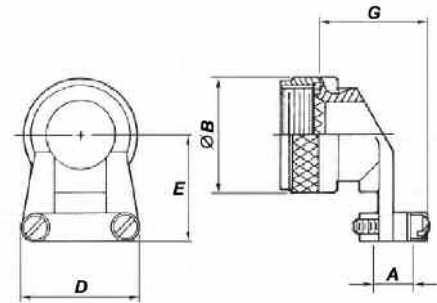
| | | | | | |
|--|---------------|-----------|----------|-----------|----------|
| Basic series | M85049 | 38 | - | 11 | W |
| Backshell type: 38: Straight cable clamp | | | | | |
| Nut type: -: Without self-locking S: With self-locking | | | | | |
| Shell size: 09 - 11 - 13 - 15 - 17 - 19 - 21 - 23 - 25 | | | | | |
| Plating (See table 3): A and W for 38 type W and N for 38S type | | | | | |



See table 1 for dimensions

90° cable clamp (M85049/39)

| | | | | | |
|--|---------------|-----------|----------|-----------|----------|
| Basic series | M85049 | 39 | - | 11 | W |
| Backshell type: 39: 90° cable clamp | | | | | |
| Nut type: -: Without self-locking S: With self-locking | | | | | |
| Shell size: 09 - 11 - 13 - 15 - 17 - 19 - 21 - 23 - 25 | | | | | |
| Plating (See table 3): A and W for 39 type W and N for 39S type | | | | | |



See table 1 for dimensions

Table 1

| Shell size | A | | ØB Max. | C Max. | D Max. | E | G |
|------------|-------|-------|------------|-----------|-----------|-------|-------|
| | Min | Max. | | | | | |
| 09 | 2.50 | 5.90 | 21.80 | 23.10 | 21.60 | 25.40 | 25.70 |
| 11 | 3.90 | | 25.00 | | 22.90 | | |
| 13 | 4.80 | 8.30 | 29.40 | 25.70 | 27.90 | 30.70 | |
| 15 | 6.60 | 11.60 | 32.50 | 26.90 | 29.20 | 31.80 | 32.00 |
| 17 | 7.20 | 15.60 | 35.70 | 29.50 | 33.00 | 33.00 | 35.80 |
| 19 | 8.30 | 16.10 | 38.50 | 35.80 | 38.10 | 34.30 | 38.40 |
| 21 | 8.70 | 17.70 | 41.70 | 38.40 | 40.60 | 40.60 | 42.20 |
| 23 | 9.70 | 20.90 | 44.90 | 42.20 | 43.20 | 44.50 | 44.70 |
| 25 | 10.60 | 21.70 | 48.00 | 44.70 | 45.70 | 47.00 | 48.50 |

Dimensions in millimeters

8D - D38999 Aluminium Series



Backshell for heat shrink boots (M85049/69)

Basic series **M85049** **69** **11** **A** **D**

Backshell type:

69: Straight backshell for heat shrink boot

Shell size:

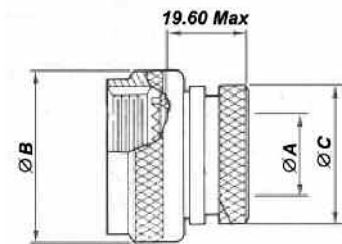
09 - 11 - 13 - 15 - 17 - 19 - 21 - 23 - 25

Plating:

A: see table 3

Option:

Nothing: Without drain hole
D: With drain hole



See table 2 for dimensions

Table 2

| Shell size | ØB Max. | ØA Max. | ØC Max. |
|------------|---------|---------|---------|
| 09 | 19.10 | 6.35 | 13.55 |
| 11 | 21.60 | 9.50 | 15.40 |
| 13 | 25.40 | 12.70 | 19.70 |
| 15 | 29.20 | 15.90 | 21.30 |
| 17 | 31.80 | 19.00 | 24.50 |
| 19 | 35.60 | 20.60 | 26.50 |
| 21 | 39.40 | 23.80 | 30.90 |
| 23 | 41.90 | 27.00 | 34.40 |
| 25 | 47.00 | 30.20 | 36.65 |

Dimensions in millimeters

Table 3

| Plating | Description | Salt spray |
|-------------|--------------------------------|------------|
| A | Black anodise | 500 Hrs |
| N, F | Nickel | 48 Hrs |
| W, B | Olive drab cadmium over nickel | 500 Hrs |

8D - D38999 Aluminium Series



Backshell for screen termination and cable clamp (M85049/19)

Basic Series

M85049/ 19 11 W 03

Shell style:

19: Backshell for screen termination and cable clamp

Shell size:

09 - 11 - 13 - 15 - 17 - 19 - 21 - 23 - 25

Plating:

W: Olive drab cadmium

N: Nickel

Clamp size indicator:

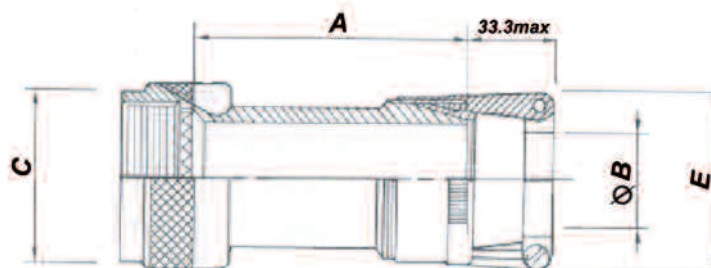
See table 4 and 5

Table 4

| Shell size | A Max. | C Max. | Clamp indicator base on shell size |
|------------|--------|--------|------------------------------------|
| 09 | | 19.10 | 01 - 02 |
| 11 | | 21.60 | 01 - 02 - 03 |
| 13 | | 25.40 | 02 - 03 - 04 |
| 15 | | 27.90 | 02 - 03 - 04 - 05 |
| 17 | 38.10 | 31.80 | 02 - 03 - 04 - 05 - 06 |
| 19 | | 35.60 | 03 - 04 - 05 - 06 - 07 |
| 21 | | 38.10 | 03 - 04 - 05 - 06 - 07 - 08 |
| 23 | | 41.90 | 03 - 04 - 05 - 06 - 07 - 09 |
| 25 | | 44.50 | 04 - 05 - 06 - 07 - 08 - 10 |

Table 5

| Clamp size indicator | B | | E |
|----------------------|-------|-------|-------|
| | Min. | Max. | |
| 01 | 1.60 | 3.20 | 20.30 |
| 02 | 3.20 | 6.35 | 25.40 |
| 03 | 6.35 | 9.50 | 27.90 |
| 04 | 7.90 | 12.70 | 30.50 |
| 05 | 11.10 | 15.90 | 31.80 |
| 06 | 14.30 | 19.00 | 35.60 |
| 07 | 17.45 | 22.20 | 38.10 |
| 08 | 20.60 | 24.40 | 41.90 |
| 09 | 23.80 | 28.60 | 44.50 |
| 10 | 27.00 | 31.75 | 48.30 |



See table 4 & 5 for dimensions

8D - D38999 Aluminium Series



Caps

Caps for receptacle (D38999/33 - S2453)

With stainless steel rope and eyelet



| Shell size | Part numbers | |
|------------|-----------------|---------------------|
| | Plating ** | Olive green plating |
| 9 | S2453-09W-**-** | D38999/33 W 09 R |
| 11 | S2453-11W-**-** | D38999/33 W 11 R |
| 13 | S2453-13W-**-** | D38999/33 W 13 R |
| 15 | S2453-15W-**-** | D38999/33 W 15 R |
| 17 | S2453-17W-**-** | D38999/33 W 17 R |
| 19 | S2453-19W-**-** | D38999/33 W 19 R |
| 21 | S2453-21W-**-** | D38999/33 W 21 R |
| 23 | S2453-23W-**-** | D38999/33 W 23 R |
| 25 | S2453-25W-**-** | D38999/33 W 25 R |

With stainless steel rope and ring



| Shell size | Part numbers | |
|------------|----------------|---------------------|
| | Plating ** | Olive green plating |
| 9 | S2453-09W-**-1 | D38999/33 W 09 N |
| 11 | S2453-11W-**-1 | D38999/33 W 11 N |
| 13 | S2453-13W-**-1 | D38999/33 W 13 N |
| 15 | S2453-15W-**-1 | D38999/33 W 15 N |
| 17 | S2453-17W-**-1 | D38999/33 W 17 N |
| 19 | S2453-19W-**-1 | D38999/33 W 19 N |
| 21 | S2453-21W-**-1 | D38999/33 W 21 N |
| 23 | S2453-23W-**-1 | D38999/33 W 23 N |
| 25 | S2453-25W-**-1 | D38999/33 W 25 N |

Caps for plug (D38999/32 - S2454)

With stainless steel rope and eyelet



| Shell size | Part numbers | |
|------------|----------------|---------------------|
| | Plating ** | Olive green plating |
| 9 | S2454-09F-**-S | D38999/32 W 09 R |
| 11 | S2454-11F-**-S | D38999/32 W 11 R |
| 13 | S2454-13F-**-S | D38999/32 W 13 R |
| 15 | S2454-15F-**-S | D38999/32 W 15 R |
| 17 | S2454-17F-**-S | D38999/32 W 17 R |
| 19 | S2454-19F-**-S | D38999/32 W 19 R |
| 21 | S2454-21F-**-S | D38999/32 W 21 R |
| 23 | S2454-23F-**-S | D38999/32 W 23 R |
| 25 | S2454-25F-**-S | D38999/32 W 25 R |

With stainless steel rope and ring



| Shell size | Part numbers | |
|------------|----------------|---------------------|
| | Plating ** | Olive green plating |
| 9 | S2454-09W-**-S | D38999/32 W 09 N |
| 11 | S2454-11W-**-S | D38999/32 W 11 N |
| 13 | S2454-13W-**-S | D38999/32 W 13 N |
| 15 | S2454-15W-**-S | D38999/32 W 15 N |
| 17 | S2454-17W-**-S | D38999/32 W 17 N |
| 19 | S2454-19W-**-S | D38999/32 W 19 N |
| 21 | S2454-21W-**-S | D38999/32 W 21 N |
| 23 | S2454-23W-**-S | D38999/32 W 23 N |
| 25 | S2454-25W-**-S | D38999/32 W 25 N |

Plating - 34: Olive green cadmium - Plating - 12: Nickel. Note: caps available with nylon ropes. Consult us.

8D - D38999 Aluminium Series



Connectors weight

| | With contacts | | | | | | Without contact | | | | | |
|---------|---------------|--------|---------------------|--------|---------------------|--------|-----------------|--------|---------------------|--------|---------------------|--------|
| | Plug (type 5) | | Receptacle (type 0) | | Receptacle (type 7) | | Plug (type 5) | | Receptacle (type 0) | | Receptacle (type 7) | |
| | Male | Female | Male | Female | Male | Female | Male | Female | Male | Female | Male | Female |
| 09 – 35 | 11.47 | 13.05 | 9.15 | 10.73 | 13.91 | 15.49 | 11.05 | 11.55 | 8.73 | 9.23 | 13.49 | 13.99 |
| 09 – 98 | 11.47 | 12.77 | 9.15 | 10.45 | 13.91 | 15.21 | 11.05 | 11.57 | 8.73 | 9.25 | 13.49 | 14.01 |
| 11 – 01 | 14.98 | 17.92 | 12.01 | 14.95 | 18.17 | 21.11 | 14.32 | 16.32 | 11.35 | 13.35 | 17.51 | 19.51 |
| 11 – 02 | 14.61 | 17.15 | 11.64 | 14.18 | 17.80 | 20.34 | 13.99 | 15.59 | 11.02 | 12.62 | 17.18 | 18.78 |
| 11 – 04 | 14.80 | 17.86 | 11.83 | 14.89 | 17.99 | 21.05 | 14.24 | 16.26 | 11.27 | 13.29 | 17.43 | 19.45 |
| 11 – 05 | 14.83 | 18.04 | 11.86 | 15.07 | 19.48 | 21.23 | 14.13 | 16.04 | 11.16 | 13.07 | 17.32 | 19.23 |
| 11 – 22 | 14.47 | 16.89 | 11.50 | 13.92 | 17.66 | 20.08 | 14.19 | 15.89 | 11.22 | 12.92 | 17.38 | 19.08 |
| 11 – 35 | 14.73 | 18.20 | 11.76 | 15.23 | 17.68 | 21.39 | 13.82 | 14.95 | 10.85 | 11.98 | 17.01 | 18.14 |
| 11 – 80 | 18.30 | 21.90 | 15.30 | 18.90 | 21.50 | 28.39 | 13.80 | 14.90 | 10.80 | 11.90 | 17.00 | 18.10 |
| 11 – 98 | 14.70 | 17.46 | 11.73 | 14.49 | 17.89 | 20.65 | 13.86 | 15.06 | 10.89 | 12.09 | 17.05 | 18.25 |
| 11 – 99 | 14.87 | 18.09 | 11.90 | 15.12 | 18.06 | 21.28 | 13.89 | 15.29 | 10.92 | 12.32 | 17.08 | 18.48 |
| 13 – 04 | 21.04 | 24.82 | 15.71 | 19.49 | 24.14 | 27.92 | 19.80 | 21.70 | 14.47 | 16.37 | 22.90 | 24.80 |
| 13 – 08 | 21.42 | 26.60 | 16.09 | 21.27 | 24.52 | 29.70 | 20.30 | 23.40 | 14.97 | 18.07 | 23.40 | 26.50 |
| 13 – 26 | 21.79 | 27.44 | 16.46 | 22.11 | 24.89 | 30.54 | 20.05 | 22.74 | 14.72 | 17.41 | 23.15 | 25.84 |
| 13 – 35 | 21.22 | 26.99 | 15.89 | 21.66 | 24.32 | 30.09 | 19.68 | 21.49 | 14.35 | 16.16 | 22.78 | 24.59 |
| 13 – 98 | 21.08 | 25.70 | 15.75 | 20.37 | 24.18 | 28.80 | 19.68 | 21.70 | 14.35 | 16.37 | 22.78 | 24.80 |
| 15 – 05 | 26.04 | 31.38 | 19.54 | 24.88 | 29.62 | 34.96 | 24.49 | 27.48 | 17.99 | 20.98 | 28.07 | 31.06 |
| 15 – 15 | 26.84 | 34.00 | 20.34 | 27.50 | 30.42 | 37.58 | 24.57 | 27.62 | 18.07 | 21.12 | 28.15 | 31.20 |
| 15 – 18 | 27.05 | 35.93 | 20.55 | 29.43 | 30.63 | 39.51 | 24.53 | 28.73 | 18.03 | 22.23 | 28.11 | 32.31 |
| 15 – 19 | 26.58 | 34.31 | 20.08 | 27.81 | 30.16 | 37.89 | 23.92 | 26.71 | 17.42 | 20.21 | 27.50 | 30.29 |
| 15 – 35 | 26.68 | 35.92 | 20.18 | 29.42 | 30.26 | 39.50 | 24.09 | 26.67 | 17.59 | 20.17 | 27.67 | 30.25 |
| 15 – 97 | 26.51 | 33.56 | 20.01 | 27.06 | 30.09 | 37.14 | 24.15 | 27.24 | 17.65 | 20.74 | 27.73 | 30.82 |
| 17 – 02 | 32.96 | 46.30 | 31.26 | 44.60 | 42.06 | 55.40 | 25.80 | 29.80 | 24.10 | 28.10 | 34.90 | 38.90 |
| 17 – 06 | 29.90 | 39.50 | 28.21 | 37.81 | 39.00 | 48.60 | 25.94 | 29.90 | 24.25 | 28.21 | 35.04 | 39.00 |
| 17 – 08 | 28.89 | 37.62 | 27.20 | 35.93 | 37.99 | 46.72 | 26.41 | 31.38 | 24.72 | 29.69 | 35.51 | 40.48 |
| 17 – 26 | 29.47 | 40.26 | 27.78 | 38.57 | 38.57 | 49.36 | 25.83 | 29.86 | 24.14 | 28.17 | 34.93 | 38.96 |
| 17 – 35 | 29.71 | 43.26 | 28.02 | 41.57 | 38.81 | 52.36 | 25.86 | 29.51 | 24.17 | 27.82 | 34.96 | 38.61 |
| 17 – 75 | 35.31 | 46.60 | 33.62 | 44.91 | 44.41 | 55.70 | 26.31 | 32.60 | 24.62 | 30.91 | 35.41 | 41.70 |
| 17 – 99 | 29.52 | 40.08 | 27.83 | 38.39 | 38.62 | 49.18 | 25.96 | 30.12 | 24.27 | 28.43 | 35.06 | 39.22 |
| 19 – 11 | 37.77 | 51.36 | 31.07 | 44.66 | 44.62 | 58.21 | 34.36 | 42.78 | 27.66 | 46.43 | 30.86 | 49.63 |
| 19 – 32 | 36.98 | 50.38 | 30.28 | 43.68 | 43.83 | 57.23 | 32.50 | 37.58 | 25.80 | 41.23 | 29.00 | 44.43 |
| 19 – 35 | 37.29 | 53.74 | 30.59 | 47.04 | 44.14 | 44.09 | 32.67 | 37.24 | 25.97 | 40.89 | 29.17 | 44.09 |
| 21 – 11 | 45.51 | 65.35 | 39.31 | 59.15 | 53.19 | 73.03 | 38.25 | 47.75 | 32.05 | 51.93 | 35.55 | 55.43 |
| 21 – 16 | 42.61 | 57.89 | 36.41 | 51.69 | 50.29 | 65.57 | 37.65 | 45.41 | 31.45 | 49.59 | 34.95 | 53.09 |
| 21 – 35 | 42.89 | 63.55 | 36.69 | 57.35 | 50.57 | 71.23 | 37.36 | 43.80 | 31.16 | 47.98 | 34.66 | 51.48 |
| 21 – 39 | 44.27 | 64.60 | 38.07 | 58.40 | 51.95 | 72.28 | 38.47 | 48.24 | 32.27 | 52.42 | 35.77 | 55.92 |
| 21 – 41 | 42.81 | 60.18 | 36.61 | 64.36 | 50.49 | 67.86 | 37.07 | 43.78 | 30.87 | 47.96 | 34.37 | 51.46 |
| 21 – 48 | 49.59 | 49.93 | 43.39 | 43.73 | 55.27 | 57.61 | 36.48 | 43.38 | 30.28 | 37.18 | 44.16 | 51.06 |
| 21 – 75 | 54.48 | 71.38 | 48.28 | 65.18 | 62.16 | 79.06 | 36.48 | 43.38 | 30.28 | 37.18 | 44.16 | 51.06 |
| 23 – 21 | 50.49 | 73.74 | 44.19 | 67.44 | 59.23 | 82.48 | 43.98 | 57.36 | 37.68 | 62.20 | 41.58 | 66.10 |
| 23 – 35 | 48.85 | 75.00 | 42.55 | 68.70 | 57.59 | 83.74 | 41.85 | 50.00 | 35.55 | 54.84 | 39.45 | 58.74 |
| 23 – 53 | 48.91 | 71.10 | 42.61 | 64.80 | 57.65 | 79.84 | 41.49 | 49.90 | 35.19 | 54.74 | 39.09 | 58.64 |
| 23 – 55 | 49.66 | 72.73 | 43.36 | 66.43 | 58.40 | 81.47 | 41.96 | 50.73 | 35.66 | 55.57 | 39.56 | 59.47 |
| 25 – 07 | 61.89 | 90.70 | 55.73 | 85.10 | 71.15 | 99.10 | 46.41 | 56.20 | 40.25 | 61.26 | 44.45 | 65.46 |
| 25 – 11 | 54.48 | 71.38 | 48.28 | 65.18 | 62.16 | 79.06 | 36.48 | 43.38 | 42.94 | 55.94 | 58.36 | 71.36 |
| 25 – 19 | 59.76 | 91.77 | 53.60 | 85.61 | 69.02 | 101.03 | 47.22 | 61.37 | 41.06 | 66.43 | 45.26 | 70.63 |
| 25 – 24 | 59.26 | 90.62 | 53.10 | 84.46 | 68.52 | 99.88 | 47.62 | 62.06 | 41.46 | 67.12 | 45.66 | 71.32 |
| 25 – 29 | 57.58 | 86.55 | 51.42 | 80.39 | 66.84 | 95.81 | 48.59 | 63.93 | 42.43 | 68.99 | 46.63 | 73.19 |
| 25 – 35 | 55.37 | 88.20 | 49.21 | 82.04 | 64.63 | 97.46 | 46.41 | 56.20 | 40.25 | 61.26 | 44.45 | 65.46 |
| 25 – 37 | 57.57 | 89.86 | 51.41 | 59.36 | 66.83 | 90.06 | 46.10 | 61.00 | 39.94 | 60.50 | 55.36 | 61.20 |
| 25 – 44 | 52.80 | 67.61 | 46.53 | 65.39 | 62.05 | 83.39 | 44.40 | 59.22 | 38.14 | 57.00 | 53.66 | 75.00 |
| 25 – 43 | 57.62 | 88.30 | 51.46 | 82.14 | 66.88 | 97.56 | 48.20 | 63.50 | 42.04 | 68.56 | 46.24 | 72.76 |
| 25 – 46 | 59.92 | 83.76 | 53.76 | 77.60 | 69.18 | 93.02 | 45.28 | 55.44 | 39.12 | 60.50 | 43.32 | 64.70 |
| 25 – 61 | 54.67 | 81.42 | 48.51 | 75.26 | 63.93 | 90.68 | 46.13 | 57.02 | 39.97 | 62.08 | 44.17 | 66.28 |
| 25 – 08 | 81.00 | 112.83 | 74.84 | 106.67 | 90.26 | 122.09 | 45.00 | 56.83 | 38.84 | 61.69 | 43.04 | 66.09 |
| 25 – 20 | 66.02 | 96.24 | 59.86 | 90.08 | 75.28 | 105.50 | 44.45 | 54.70 | 38.29 | 59.76 | 42.49 | 63.96 |
| 25 – 04 | 58.42 | 88.27 | 52.26 | 82.11 | 67.68 | 97.53 | 49.22 | 62.83 | 43.06 | 67.89 | 47.26 | 72.09 |

Weight in gram



MIL-DTL-38999 Serie III Composite Series

8D - D38999 Composite Series



Connector part numbers

| | | | | | | | | | | | |
|---|-----------|----------|----------|-----------|----------|-----------|----------|----------|----------|----------|----------|
| Basic Series | 8D | 0 | - | 11 | J | 35 | P | N | - | - | L |
| Shell style: | | | | | | | | | | | |
| 0: Square flange receptacle | | | | | | | | | | | |
| 5: Plug with RFI shielding | | | | | | | | | | | |
| Type: | | | | | | | | | | | |
| None: Connectors with standard crimp contacts. | | | | | | | | | | | |
| L: Receptacle with long spill (male and female size #22D, #20). | | | | | | | | | | | |
| C: Receptacle with short spill (male and female #22D, #20, #16). | | | | | | | | | | | |
| S: Receptacle with specific spill (male et female #22D) | | | | | | | | | | | |
| W: Receptacle with male contacts #22D for wire wrap (3 wraps) | | | | | | | | | | | |
| T: Receptacle with male contacts #20 for wire wrap (2 wraps) | | | | | | | | | | | |
| P: Receptacle with solder cup (male and female size #22D; male #16 & #12; female #16 & #12 and male female #20 please consult us) | | | | | | | | | | | |
| Shell size: 09 - 11 - 13 - 15 - 17 - 19 - 21 - 23 - 25 | | | | | | | | | | | |
| Plating: | | | | | | | | | | | |
| J: Olive drab cadmium | | | | | | | | | | | |
| M: Nickel | | | | | | | | | | | |
| X: Without plating | | | | | | | | | | | |
| Contact layout: See page 10 to 13 | | | | | | | | | | | |
| Contact type: | | | | | | | | | | | |
| P: Pin (500 mating/unmating) | | | | | | | | | | | |
| H: Pin (1500 mating/unmating) | | | | | | | | | | | |
| A: Connector supplied less pin contact or with specific contacts (connector marking: A + orientation) | | | | | | | | | | | |
| S: Socket (500 mating/unmating) | | | | | | | | | | | |
| J: Socket (1500 mating/unmating) | | | | | | | | | | | |
| B: Connector supplied less socket contact or with specific contacts (connector marking: B + orientation) | | | | | | | | | | | |
| Orientation: N, A, B, C, D & E (see page 63) | | | | | | | | | | | |
| Specification: | | | | | | | | | | | |
| 046: Tinned straight spills | | | | | | | | | | | |
| 251: Connector provided with power contacts (layouts with contact #8) | | | | | | | | | | | |
| 022: Fuel tank | | | | | | | | | | | |
| Special custom: | | | | | | | | | | | |
| None: Standard plastic cap | | | | | | | | | | | |
| M: Antistatic plastic cap | | | | | | | | | | | |
| L: For P or S contact type only, connectors delivered without contacts, connectors marking P or S plus orientation. | | | | | | | | | | | |

MIL-DTL-38999 part numbers*

| | | | | | | | | |
|---|---------------|-----------|----------|----------|-----------|----------|----------|----------|
| Basic Series | D38999 | 20 | M | B | 35 | P | N | L |
| Shell style: | | | | | | | | |
| 20: Square flange receptacle | | | | | | | | |
| 26: Plug with RFI shielding. | | | | | | | | |
| Plating: | | | | | | | | |
| J: Olive drab cadmium | | | | | | | | |
| M: Nickel | | | | | | | | |
| Shell size: A - B - C - D - E - F - G - H - J | | | | | | | | |
| Contact layout: See page 14 for layout according to MIL-DTL-38999 | | | | | | | | |
| Contact type: | | | | | | | | |
| P: Pin (500 mating/unmating) | | | | | | | | |
| H: Pin (1500 mating/unmating) | | | | | | | | |
| A: Connector supplied less pin contact or with specific contacts (connector marking: A + orientation) | | | | | | | | |
| S: Socket (500 mating/unmating) | | | | | | | | |
| J: Socket (1500 mating/unmating) | | | | | | | | |
| B: Connector supplied less socket contact or with specific contacts (connector marking: B + orientation) | | | | | | | | |
| Orientation: N, A, B, C, D & E (see page 63) | | | | | | | | |
| L: For P or S contact type only, connector delivered without contacts, connector marking P or S (without L) | | | | | | | | |

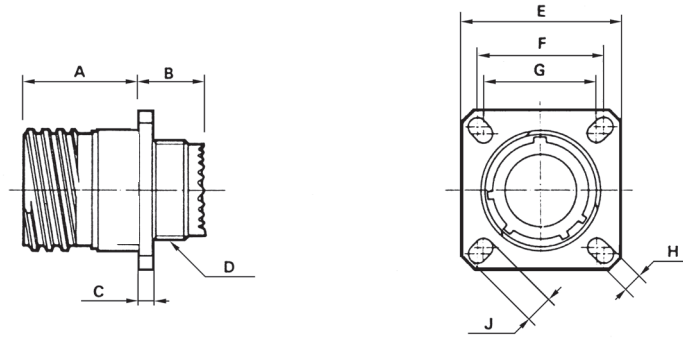
* Note: To place an order of MIL connectors delivered without MIL removable crimp contacts and keep P or S plus orientation marking, it must be specify clearly on the order (by adding a suffix L at the end of the P/N or specified in comment).

8D - D38999 Composite Series



Dimensions

Receptacle type 0



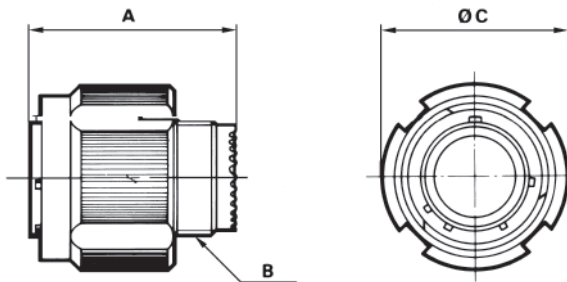
| Shell size | A Max. | B Max. | C Max. | D thread | E ± 0,30 | F | G | H ± 0,20 | J ± 0,20 |
|------------|--------|--------|--------|------------|----------|-------|-------|----------|----------|
| 09 (A) | 19.65 | 11.96 | 3.65 | M12 x 1-6g | 23.80 | 18.26 | 15.09 | 3.25 | 5.49 |
| 11 (B) | 19.65 | 11.96 | 3.65 | M15 x 1-6g | 26.20 | 20.62 | 18.26 | 3.25 | 4.93 |
| 13 (C) | 19.65 | 11.96 | 3.65 | M18 x 1-6g | 28.60 | 23.01 | 20.62 | 3.25 | 4.93 |
| 15 (D) | 19.65 | 11.96 | 3.65 | M22 x 1-6g | 31.00 | 24.61 | 23.01 | 3.25 | 4.39 |
| 17 (E) | 19.65 | 11.96 | 3.65 | M25 x 1-6g | 33.30 | 26.97 | 24.61 | 3.25 | 4.93 |
| 19 (F) | 19.65 | 11.96 | 3.65 | M28 x 1-6g | 36.50 | 29.36 | 26.97 | 3.25 | 4.93 |
| 21 (G) | 18.85 | 12.76 | 4.35 | M31 x 1-6g | 39.70 | 31.75 | 29.36 | 3.25 | 4.93 |
| 23 (H) | 18.85 | 12.76 | 4.35 | M34 x 1-6g | 42.90 | 34.93 | 31.75 | 3.91 | 6.15 |
| 25 (J) | 18.85 | 12.76 | 4.35 | M37 x 1-6g | 46.00 | 38.10 | 34.93 | 3.91 | 6.15 |

Dimensions in millimeters

8D - D38999 Composite Series



Plug type 5



| Shell size | A Max. | B thread | C Max. |
|------------|--------|------------|--------|
| 09 (A) | 31.00 | M12 x 1-6g | 21.80 |
| 11 (B) | 31.00 | M15 x 1-6g | 25.00 |
| 13 (C) | 31.00 | M18 x 1-6g | 29.40 |
| 15 (D) | 31.00 | M22 x 1-6g | 32.50 |
| 17 (E) | 31.00 | M25 x 1-6g | 35.70 |
| 19 (F) | 31.00 | M28 x 1-6g | 38.50 |
| 21 (G) | 31.00 | M31 x 1-6g | 41.70 |
| 23 (H) | 31.00 | M34 x 1-6g | 44.90 |
| 25 (J) | 31.00 | M37 x 1-6g | 48.00 |

Mated connectors dimensions



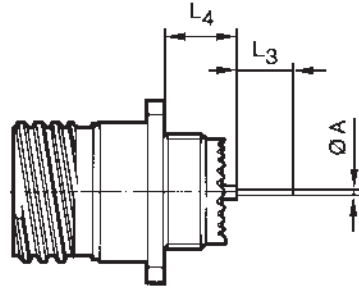
| Shell size | A Max. | B Max. |
|------------|--------|--------|
| 09 (A) | 37.00 | 52.30 |
| 11 (B) | 37.00 | 52.30 |
| 13 (C) | 37.00 | 52.30 |
| 15 (D) | 37.00 | 52.30 |
| 17 (E) | 37.00 | 52.30 |
| 19 (F) | 37.00 | 52.30 |
| 21 (G) | 36.00 | 51.30 |
| 23 (H) | 36.00 | 51.30 |
| 25 (J) | 36.00 | 51.30 |

Dimensions in millimeters

8D - D38999 Composite Series



Receptacle with straight spill contacts



| | | Shell size | | | 09 | 11 | 13 | 15 | 17 | 19 | 21 | 23 | 25 |
|-----------|-------------|--------------|--------------|------------|-----|-----|-------|-----|------|-----|-------|-----|-----|
| | | Contact size | Contact type | Spill type | (A) | (B) | (C) | (D) | (E) | (F) | (G) | (H) | (J) |
| A | | # 22D | M & F | L & C | | | | | 0.70 | | | | |
| | | # 22D | M & F | S | | | | | 0.50 | | | | |
| | | # 20 | M & F | C | | | | | 0.70 | | | | |
| | | # 16 | M & F | C | | | | | 1.15 | | | | |
| L3 | | # 22D | M & F | L | | | | | 8.50 | | | | |
| | | # 22D | M & F | C | | | | | 4.00 | | | | |
| | | # 22D | M & F | S | | | | | 5.00 | | | | |
| | | # 20 | M & F | C | | | | | 5.00 | | | | |
| | | # 16 | M & F | C | | | | | 5.00 | | | | |
| L4 | Min. | # 22D | M | L & C | | | | | 9.48 | | | | |
| | Max. | # 22D | M | L & C | | | 10.38 | | | | 10.48 | | |
| | Min. | # 22D | F | L & C | | | 9.15 | | | | 9.26 | | |
| | Max. | # 22D | F | L & C | | | 10.58 | | | | 10.69 | | |
| | Min. | # 22D | M | S | | | 9.65 | | | | 9.76 | | |
| | Max. | # 22D | M | S | | | 10.55 | | | | 10.65 | | |
| | Min. | # 22D | F | S | | | 9.65 | | | | 9.76 | | |
| | Max. | # 22D | F | S | | | 10.55 | | | | 10.65 | | |
| | Min. | # 20 | M | C | | | 9.65 | | | | 9.76 | | |
| | Max. | # 20 | M | C | | | 10.55 | | | | 10.65 | | |
| | Min. | # 20 | F | C | | | 9.65 | | | | 9.76 | | |
| | Max. | # 20 | F | C | | | 10.55 | | | | 10.65 | | |
| | Min. | # 16 | M | C | | | 9.65 | | | | 9.76 | | |
| | Max. | # 16 | M | C | | | 10.55 | | | | 10.65 | | |
| | Min. | # 16 | F | C | | | 9.65 | | | | 9.76 | | |
| | Max. | # 16 | F | C | | | 10.55 | | | | 10.65 | | |

M : Male contact F: Female contact L: Long spill C : Short spill S: Specific spill

Dimensions in millimeters

8D - D38999 Composite Series



Standard backshells part numbers

Straight cable clamp (M85049/91)

Basic series M85049 91 11 M

Backshell type:

91: Straight cable clamp

Shell size:

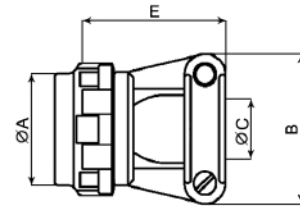
09 - 11 - 13 - 15 - 17 - 19 - 21 - 23 - 25

Plating:

J: Cadmium olive drab over electroless nickel

M: Electroless nickel

T: Without plating



See table 1 for dimensions

90° cable clamp (M85049/92)

Basic series M85049 92 11 M

Backshell type:

92: 90° cable clamp

Shell size:

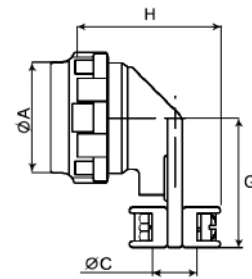
09 - 11 - 13 - 15 - 17 - 19 - 21 - 23 - 25

Plating:

J: Cadmium olive drab over electroless nickel

M: Electroless nickel

T: Without plating



See table 1 for dimensions

Table 1

| Shell size | ØA Max. | B Max. | ØC Max. | E Max. | G | H |
|------------|---------|--------|---------|--------|-------|-------|
| 09 | 21.80 | 24.90 | 5.55 | 21.25 | 22.20 | 26.95 |
| 11 | 25.00 | 26.0 | 6.70 | 24.30 | 23.80 | 27.95 |
| 13 | 29.40 | 30.50 | 8.75 | 27.95 | 26.20 | 30.00 |
| 15 | 32.50 | 33.00 | 11.70 | | 28.60 | 33.00 |
| 17 | 35.70 | 36.10 | 13.85 | 31.25 | 33.30 | 35.05 |
| 19 | 38.50 | 38.60 | 15.60 | 35.80 | 34.95 | 36.85 |
| 21 | 41.50 | 41.65 | 17.75 | 38.35 | 38.10 | 39.15 |
| 23 | 44.90 | 45.00 | 19.80 | 42.15 | 41.30 | 41.15 |
| 25 | 48.00 | 48.00 | 21.60 | 44.70 | 44.45 | 42.95 |

8D - D38999 Composite Series



Straight backshell for heat shrink boots accommodation (M85049/88)

Basic series **M85049** **88** **11** **M** **02**

Backshell type:

88: Straight backshell for heat shrink boots

Shell size:

09 - 11 - 13 - 15 - 17 - 19 - 21 - 23 - 25

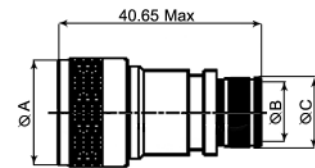
Plating:

J: Cadmium olive drab over electroless nickel

M: Electroless nickel

Entry size:

02 ou **03:** see table 2



See tableau 2 for dimensions

Table 2

| Shell size | ØA Max. | ØB +/- 0.10 Entry size | | ØC | |
|------------|------------|------------------------|-------|-------|-------|
| | | 02 | 03 | 02 | 03 |
| 09 | 21.79 | N/A | 6.35 | N/A | 10.03 |
| 11 | 24.99 | N/A | 7.92 | N/A | 11.61 |
| 13 | 29.39 | 7.92 | 11.13 | 11.61 | 14.81 |
| 15 | 32.49 | 11.13 | 14.27 | 14.81 | 17.96 |
| 17 | 35.71 | 12.70 | 15.88 | 16.38 | 19.56 |
| 19 | 38.51 | 15.88 | 19.05 | 19.56 | 22.73 |
| 21 | 41.71 | 15.88 | 20.62 | 19.56 | 24.30 |
| 23 | 44.91 | 17.47 | 23.83 | 21.06 | 27.51 |
| 25 | 47.98 | 19.05 | 25.40 | 22.73 | 29.08 |

Dimensions in millimeters

8D - D38999 Composite Series



Connectors weight

| | With contacts | | | | Without contact | | | |
|-------|---------------|--------|---------------------|--------|-----------------|--------|---------------------|--------|
| | Plug (type 5) | | Receptacle (type 0) | | Plug (type 5) | | Receptacle (type 0) | |
| | Male | Female | Male | Female | Male | Female | Male | Female |
| 09-35 | 8.5 | 10.1 | 7.8 | 9.4 | 8.1 | 8.6 | 7.4 | 7.9 |
| 09-98 | 8.5 | 9.8 | 7.8 | 9.1 | 8.1 | 8.6 | 7.4 | 7.9 |
| 11-01 | 12.8 | 15.7 | 10.4 | 13.3 | 12.1 | 14.1 | 9.7 | 11.7 |
| 11-02 | 11.5 | 14.1 | 09.3 | 11.8 | 10.9 | 12.5 | 08.7 | 10.3 |
| 11-04 | 12.6 | 15.7 | 10.2 | 13.3 | 12.0 | 14.1 | 9.7 | 11.7 |
| 11-05 | 12.6 | 15.8 | 10.2 | 13.4 | 11.9 | 13.8 | 9.5 | 11.5 |
| 11-22 | 11.4 | 13.8 | 09.1 | 11.6 | 11.1 | 12.8 | 08.8 | 10.6 |
| 11-35 | 12.5 | 16.0 | 10.1 | 13.6 | 11.6 | 12.8 | 9.2 | 10.4 |
| 11-80 | 15.25 | 18.6 | 13.40 | 10.4 | 10.75 | 11.63 | 08.90 | 09.4 |
| 11-98 | 12.5 | 15.3 | 10.1 | 12.9 | 11.7 | 12.8 | 9.3 | 10.5 |
| 11-99 | 11.8 | 15.0 | 09.6 | 12.8 | 10.8 | 12.2 | 08.6 | 10.0 |
| 13-04 | 17.2 | 20.9 | 13.7 | 17.5 | 15.6 | 17.9 | 12.4 | 14.3 |
| 13-08 | 17.6 | 22.8 | 14.1 | 19.2 | 16.5 | 19.6 | 12.9 | 16.1 |
| 13-26 | 17.9 | 23.6 | 14.4 | 20.1 | 16.2 | 18.9 | 12.7 | 15.4 |
| 13-35 | 17.4 | 23.1 | 13.8 | 19.6 | 15.8 | 17.6 | 12.3 | 14.1 |
| 13-98 | 17.2 | 21.8 | 13.7 | 18.3 | 15.8 | 17.9 | 12.3 | 14.3 |
| 15-05 | 21.4 | 26.7 | 16.6 | 21.9 | 19.8 | 22.8 | 15.0 | 18.0 |
| 15-15 | 22.2 | 29.3 | 17.4 | 24.5 | 19.9 | 23.0 | 15.1 | 18.1 |
| 15-18 | 22.4 | 31.3 | 17.6 | 26.5 | 19.9 | 24.0 | 15.0 | 19.2 |
| 15-19 | 22.0 | 29.6 | 17.1 | 24.8 | 19.2 | 22.0 | 14.5 | 17.2 |
| 15-35 | 22.0 | 31.3 | 17.2 | 26.5 | 19.4 | 22.0 | 14.6 | 17.2 |
| 15-97 | 21.8 | 28.9 | 17.1 | 24.1 | 19.4 | 22.6 | 14.7 | 17.8 |
| 17-02 | 26.51 | 38.85 | 25.23 | 37.57 | 19.35 | 22.35 | 18.07 | 21.07 |
| 17-06 | 25.9 | 35.5 | 23.2 | 32.8 | 21.9 | 25.9 | 19.2 | 23.2 |
| 17-08 | 24.9 | 33.6 | 22.2 | 30.1 | 22.4 | 27.4 | 19.7 | 24.7 |
| 17-26 | 25.5 | 36.3 | 22.8 | 33.6 | 21.8 | 25.9 | 19.2 | 23.1 |
| 17-35 | 25.7 | 39.3 | 23.0 | 36.6 | 21.9 | 25.5 | 19.2 | 22.8 |
| 17-75 | 31.3 | 42.6 | 28.6 | 39.9 | 22.3 | 28.6 | 19.6 | 25.9 |
| 17-99 | 25.5 | 36.1 | 22.8 | 33.4 | 22.0 | 26.1 | 19.3 | 23.4 |
| 19-11 | 32.1 | 45.7 | 26.1 | 39.7 | 28.7 | 37.1 | 22.7 | 31.1 |
| 19-32 | 31.3 | 44.7 | 25.3 | 38.7 | 26.8 | 31.9 | 20.8 | 25.9 |
| 19-35 | 31.6 | 48.1 | 25.6 | 42.0 | 27.1 | 31.6 | 21.0 | 25.6 |
| 21-11 | 38.0 | 57.9 | 32.8 | 52.6 | 30.8 | 40.3 | 25.5 | 35.1 |
| 21-16 | 35.1 | 50.4 | 29.9 | 45.2 | 30.2 | 37.9 | 24.9 | 32.7 |
| 21-35 | 35.4 | 56.1 | 30.1 | 50.8 | 29.9 | 36.3 | 24.6 | 31.1 |
| 21-39 | 36.8 | 57.1 | 31.5 | 51.9 | 31.0 | 40.8 | 25.7 | 35.5 |
| 21-41 | 35.3 | 52.7 | 30.1 | 47.5 | 29.6 | 36.3 | 24.3 | 31.0 |
| 21-48 | 42.41 | 62.40 | 37.71 | 57.70 | 29.3 | 36.2 | 24.6 | 31.5 |
| 21-75 | 47.3 | 64.2 | 42.6 | 59.50 | 29.3 | 36.2 | 24.6 | 31.5 |
| 23-21 | 43.1 | 66.3 | 38.0 | 61.2 | 36.5 | 49.9 | 31.5 | 44.8 |
| 23-35 | 41.4 | 67.5 | 36.3 | 62.5 | 34.4 | 42.5 | 29.3 | 37.5 |
| 23-53 | 41.5 | 63.6 | 36.4 | 58.6 | 34.1 | 42.4 | 29.0 | 37.4 |
| 23-55 | 42.2 | 65.3 | 42.2 | 60.2 | 34.5 | 43.3 | 29.4 | 38.2 |
| 25-07 | 53.6 | 90.05 | 49.0 | 84.85 | 37.8 | 51.8 | 33.2 | 46.6 |
| 25-11 | 59.08 | 81.60 | 54.48 | 77.00 | 40.8 | 53.8 | 36.2 | 49.2 |
| 25-19 | 51.7 | 83.7 | 46.6 | 78.6 | 39.2 | 53.3 | 34.0 | 48.2 |
| 25-24 | 51.2 | 82.5 | 46.1 | 77.4 | 39.6 | 54.0 | 34.4 | 48.9 |
| 25-29 | 49.5 | 78.5 | 44.4 | 73.4 | 40.5 | 55.9 | 35.4 | 50.7 |
| 25-35 | 47.3 | 80.1 | 42.2 | 75.0 | 38.4 | 48.1 | 33.2 | 43.0 |
| 25-37 | 49.27 | 80.36 | 45.47 | 76.16 | 37.8 | 51.50 | 34.0 | 47.30 |
| 25-44 | 69.64 | 93.70 | 65.04 | 94.65 | 36.1 | 45.80 | 31.5 | 46.75 |
| 25-43 | 49.6 | 80.2 | 44.4 | 75.1 | 40.1 | 55.4 | 35.0 | 50.3 |
| 25-46 | 51.9 | 75.7 | 46.7 | 70.1 | 37.2 | 47.4 | 32.1 | 42.2 |
| 25-61 | 46.6 | 73.4 | 41.5 | 68.2 | 38.1 | 48.9 | 32.9 | 43.8 |
| 25-08 | 72.9 | 104.8 | 67.8 | 99.6 | 36.9 | 48.8 | 31.8 | 43.6 |
| 25-20 | 57.9 | 88.2 | 52.8 | 83.0 | 36.4 | 46.6 | 31.3 | 41.5 |
| 25-04 | 50.4 | 80.2 | 45.3 | 75.0 | 41.2 | 54.8 | 36.1 | 49.6 |

8D - D38999 Stainless steel



MIL-DTL-38999 Serie III
Stainless steel

8D - D38999 Stainless steel



Connector part numbers

| Basic Series | 8D | 0 | - | 11 | K | 35 | P | N | ** |
|---|----|---|---|----|---|----|---|---|----|
| Shell style: | | | | | | | | | |
| 0: Square flange receptacle | | | | | | | | | |
| 1: In line receptacle | | | | | | | | | |
| 7: Jam nut receptacle | | | | | | | | | |
| 5: Plug with RFI shielding. | | | | | | | | | |
| Type: | | | | | | | | | |
| -: Connectors with standard crimp contacts. | | | | | | | | | |
| L: Receptacle with long spill (male and female size #22D, #20). | | | | | | | | | |
| C: Receptacle with short spill (male and female #22D, #20, #16). | | | | | | | | | |
| S: Receptacle with specific spill (male et female #22D) | | | | | | | | | |
| W: Receptacle with male contacts #22D for wire wrap (3 wraps) | | | | | | | | | |
| T: Receptacle with male contacts #20 for wire wrap (2 wraps) | | | | | | | | | |
| Shell size: 09 - 11 - 13 - 15 - 17 - 19 - 21 - 23 - 25 | | | | | | | | | |
| Plating: | | | | | | | | | |
| K: Passivated S: Nickel | | | | | | | | | |
| Contact layout: See page 8 to 11 | | | | | | | | | |
| Contact type: | | | | | | | | | |
| P: Pin A: Connector supplied less pin contact or with specific contacts (Connector marking: A+ orientation) | | | | | | | | | |
| S: Socket B: Connector supplied less socket contact or with specific contacts (Connector marking: B+ orientation) | | | | | | | | | |
| Orientation: N, A, B, C, D & E (See page 58) | | | | | | | | | |
| Spécification: | | | | | | | | | |
| 046: Tinned straight spills | | | | | | | | | |
| 251: Connector provided with power contacts (layouts with contacts #8) | | | | | | | | | |
| 022: Fuel tank | | | | | | | | | |
| L: For P or S contact type only, connectors delivered without contacts, connectors marking P or S plus orientation. | | | | | | | | | |

MIL-DTL 38999 part numbers*

| Basic Series | D38999 | 20 | K | B | 35 | P | N | L |
|---|--------|----|---|---|----|---|---|---|
| Shell style: | | | | | | | | |
| 20: Square flange receptacle | | | | | | | | |
| 24: Jam nut receptacle | | | | | | | | |
| 26: Plug with RFI shielding. | | | | | | | | |
| Plating: | | | | | | | | |
| K: Passivated | | | | | | | | |
| S: Nickel | | | | | | | | |
| Shell size: A - B - C - D - E - F - G - H - J | | | | | | | | |
| Contact layout: See page 11 for layout according to MIL-DTL-38999 | | | | | | | | |
| Contact type: | | | | | | | | |
| P: Pin A: Connector supplied less pin contact or with specific contacts (connector marking: A + orientation). | | | | | | | | |
| S: Socket B: Connector supplied less socket contact or with specific contacts (connector marking: B + orientation). | | | | | | | | |
| Orientation: N, A, B, C, D & E (see page 58) | | | | | | | | |
| L: For P or S contact type only, connector delivered without contacts, connector marking P or S (without L) | | | | | | | | |

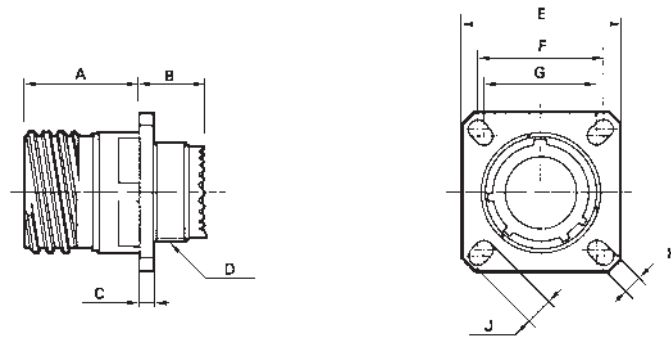
* **Note:** To place an order of MIL connectors delivered without MIL removable crimp contacts and keep P or S plus orientation marking, it must be specify clearly on the order (by adding a suffix L at the end of the P / N or specified in comment).

8D - D38999 Stainless steel



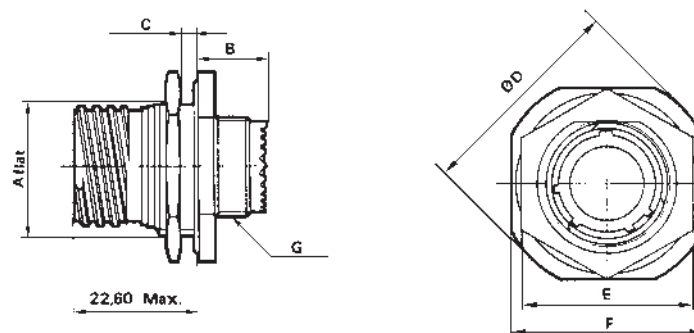
Dimensions

Receptacle type 0



| Shell size | A Max. | B Max. | C Max. | D thread | E ± 0,30 | F | G | H ± 0,20 | J ± 0,20 |
|------------|--------|--------|--------|------------|----------|-------|-------|----------|----------|
| 09 (A) | 20.90 | 10.60 | 2.50 | M12 x 1-6g | 23.80 | 18.26 | 15.09 | 3.25 | 5.49 |
| 11 (B) | 20.90 | 10.60 | 2.50 | M15 x 1-6g | 26.20 | 20.62 | 18.26 | 3.25 | 4.93 |
| 13 (C) | 20.90 | 10.60 | 2.50 | M18 x 1-6g | 28.60 | 23.01 | 20.62 | 3.25 | 4.93 |
| 15 (D) | 20.90 | 10.60 | 2.50 | M22 x 1-6g | 31.00 | 24.61 | 23.01 | 3.25 | 4.93 |
| 17 (E) | 20.90 | 10.60 | 2.50 | M25 x 1-6g | 33.30 | 26.97 | 24.61 | 3.25 | 4.93 |
| 19 (F) | 20.90 | 10.60 | 2.50 | M28 x 1-6g | 36.50 | 29.36 | 26.97 | 3.25 | 4.93 |
| 21 (G) | 20.10 | 11.40 | 3.20 | M31 x 1-6g | 39.70 | 31.75 | 29.36 | 3.25 | 4.93 |
| 23 (H) | 20.10 | 11.40 | 3.20 | M34 x 1-6g | 42.90 | 34.93 | 31.75 | 3.91 | 6.15 |
| 25 (J) | 20.10 | 11.40 | 3.20 | M37 x 1-6g | 46.00 | 38.10 | 34.93 | 3.91 | 6.15 |

Receptacle type 7

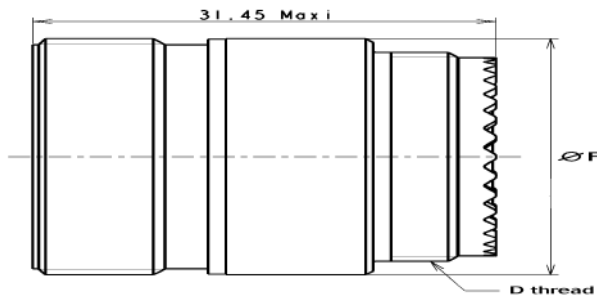


| Shell size | A + 0.10 - 0.15 | B Max. | C Max. | D Max. | E Max. | F ± 0.4 | G thread |
|------------|-----------------|--------|--------|--------|--------|---------|------------|
| 09 (A) | 16.53 | 9.90 | 3.20 | 30.50 | 23.00 | 27.00 | M12 x 1-6g |
| 11 (B) | 19.07 | 9.90 | 3.20 | 35.20 | 26.00 | 31.80 | M15 x 1-6g |
| 13 (C) | 23.82 | 9.90 | 3.20 | 38.40 | 31.00 | 34.90 | M18 x 1-6g |
| 15 (D) | 26.97 | 9.90 | 3.20 | 41.60 | 34.00 | 38.10 | M22 x 1-6g |
| 17 (E) | 30.15 | 9.90 | 3.20 | 44.80 | 37.00 | 41.30 | M25 x 1-6g |
| 19 (F) | 33.32 | 9.90 | 3.20 | 49.50 | 41.00 | 46.00 | M28 x 1-6g |
| 21 (G) | 36.50 | 9.90 | 3.20 | 52.70 | 46.00 | 49.20 | M31 x 1-6g |
| 23 (H) | 39.67 | 9.90 | 3.20 | 55.90 | 47.00 | 52.40 | M34 x 1-6g |
| 25 (J) | 42.85 | 9.90 | 3.20 | 59.00 | 52.00 | 55.60 | M37 x 1-6g |

8D - D38999 Stainless steel

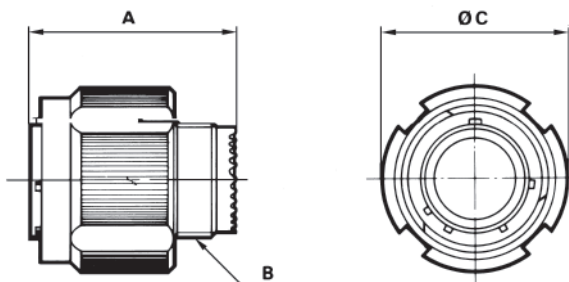


In line receptacle type 1



| Shell size | D thread | Ø F |
|------------|------------|-------|
| 09 (A) | M12 x 1-6g | 15.90 |
| 11 (B) | M15 x 1-6g | 19.05 |
| 13 (C) | M18 x 1-6g | 22.25 |
| 15 (D) | M22 x 1-6g | 25.40 |
| 17 (E) | M25 x 1-6g | 30.15 |
| 19 (F) | M28 x 1-6g | 31.75 |
| 21 (G) | M31 x 1-6g | 34.75 |
| 23 (H) | M34 x 1-6g | 37.10 |
| 25 (J) | M37 x 1-6g | 41.30 |

Plug type 5

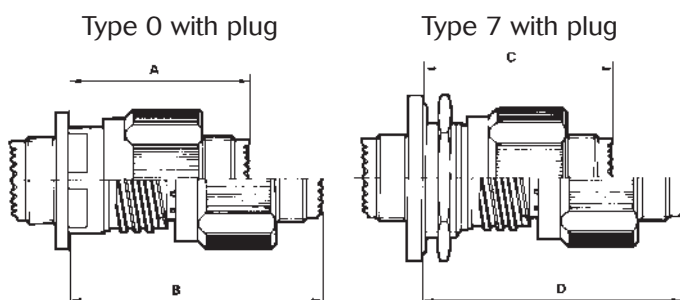


| Shell size | A Max. | B thread | C Max. |
|------------|--------|------------|--------|
| 09 (A) | 31.00 | M12 x 1-6g | 21.80 |
| 11 (B) | 31.00 | M15 x 1-6g | 25.00 |
| 13 (C) | 31.00 | M18 x 1-6g | 29.40 |
| 15 (D) | 31.00 | M22 x 1-6g | 32.50 |
| 17 (E) | 31.00 | M25 x 1-6g | 35.70 |
| 19 (F) | 31.00 | M28 x 1-6g | 38.50 |
| 21 (G) | 31.00 | M31 x 1-6g | 41.70 |
| 23 (H) | 31.00 | M34 x 1-6g | 44.90 |
| 25 (J) | 31.00 | M37 x 1-6g | 48.00 |

Maximum coupling torque on panel for jam nut receptacle (type 7)

| Shell | 09 (A) | 11 (B) | 13 (C) | 15 (D) | 17 (E) | 19 (F) | 21 (G) | 23 (H) | 25 (J) |
|-----------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Coupling torque (N.m) | 6 | 8 | 10 | 13 | 20 | 23 | 25 | 26 | 28 |

Mated connectors dimensions



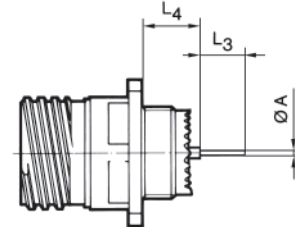
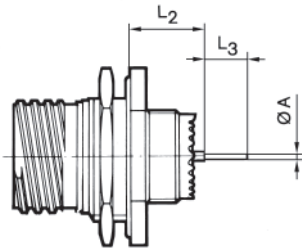
| Shell size | A Max. | B Max. | C Max. | D Max. |
|------------|--------|--------|--------|--------|
| 09 (A) | 37.00 | 52.30 | 38.30 | 53.60 |
| 11 (B) | 37.00 | 52.30 | 38.30 | 53.60 |
| 13 (C) | 37.00 | 52.30 | 38.50 | 53.80 |
| 15 (D) | 37.00 | 52.30 | 38.50 | 53.80 |
| 17 (E) | 37.00 | 52.30 | 38.50 | 53.80 |
| 19 (F) | 37.00 | 52.30 | 38.50 | 53.80 |
| 21 (G) | 36.00 | 51.30 | 38.50 | 53.80 |
| 23 (H) | 36.00 | 51.30 | 38.50 | 53.80 |
| 25 (J) | 36.00 | 51.30 | 38.50 | 53.80 |

Dimensions in millimeters

8D - D38999 Stainless steel



Receptacle with straight spill contacts



| | | Shell size | | | 09 (A) | 11 (B) | 13 (C) | 15 (D) | 17 (E) | 19 (F) | 21 (G) | 23 (H) | 25 (J) |
|-------------|-------------|--------------|--------------|------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| | | Contact size | Contact type | Spill type | | | | | | | | | |
| A | | # 22D | M & F | L & C | | | | | 0,70 | | | | |
| | | # 22D | M & F | S | | | | | 0.50 | | | | |
| | | # 20 | M & F | C | | | | | 0.70 | | | | |
| | | # 16 | M & F | C | | | | | 1.15 | | | | |
| L2 | Min. | # 22D | M | L & C | 10.52 | | | | | 10.34 | | | |
| | Max. | # 22D | M | L & C | 11.46 | | | | | 11.28 | | | |
| | Min. | # 22D | F | L & C | 10.19 | | | | | 10.01 | | | |
| | Max. | # 22D | F | L & C | 11.46 | | | | | 11.28 | | | |
| | Min. | # 22D | M | S | 10.69 | | | | | 10.51 | | | |
| | Max. | # 22D | M | S | 11.63 | | | | | 11.45 | | | |
| | Min. | # 22D | F | S | 10.36 | | | | | 10.18 | | | |
| | Max. | # 22D | F | S | 11.63 | | | | | 11.45 | | | |
| | Min. | # 20 | M | C | 10.69 | | | | | 10.51 | | | |
| | Max. | # 20 | M | C | 11.63 | | | | | 11.45 | | | |
| | Min. | # 20 | F | C | 10.69 | | | | | 10.51 | | | |
| | Max. | # 20 | F | C | 11.63 | | | | | 11.45 | | | |
| | Min. | # 16 | M | C | 10.69 | | | | | 10.51 | | | |
| | Max. | # 16 | M | C | 11.63 | | | | | 11.45 | | | |
| Min. | # 16 | F | C | 10.69 | | | | | 10.51 | | | | |
| Max. | # 16 | F | C | 11.63 | | | | | 11.45 | | | | |
| L3 | | # 22D | M & F | L | | | | | 8.50 | | | | |
| | | # 22D | M & F | C | | | | | 4.00 | | | | |
| | | # 22D | M & F | S | | | | | 5.10 | | | | |
| | | # 20 | M & F | C | | | | | 5.10 | | | | |
| | | # 16 | M & F | C | | | | | 5.10 | | | | |
| L4 | Min. | # 22D | M | L & C | | | 9.48 | | | | | 9.59 | |
| | Max. | # 22D | M | L & C | | | 10.58 | | | | | 10.69 | |
| | Min. | # 22D | F | L & C | | | 9.15 | | | | | 9.26 | |
| | Max. | # 22D | F | L & C | | | 10.58 | | | | | 10.69 | |
| | Min. | # 22D | M | S | | | 9.65 | | | | | 9.76 | |
| | Max. | # 22D | M | S | | | 10.75 | | | | | 10.86 | |
| | Min. | # 22D | F | S | | | 9.15 | | | | | 9.26 | |
| | Max. | # 22D | F | S | | | 10.75 | | | | | 10.86 | |
| | Min. | # 20 | M | C | | | 9.65 | | | | | 9.76 | |
| | Max. | # 20 | M | C | | | 10.75 | | | | | 10.86 | |
| | Min. | # 20 | F | C | | | 9.65 | | | | | 9.76 | |
| | Max. | # 20 | F | C | | | 10.75 | | | | | 10.86 | |
| | Min. | # 16 | M | C | | | 9.65 | | | | | 9.76 | |
| | Max. | # 16 | M | C | | | 10.75 | | | | | 10.86 | |
| Min. | # 16 | F | C | | | 9.65 | | | | | 9.76 | | |
| Max. | # 16 | F | C | | | 10.75 | | | | | 10.86 | | |

M : Male contact F: Female contact L: Long spill C : Short spill S: Specific spill

Dimensions in millimeters

8D - D38999 Stainless steel



Connectors weight

| | With contacts | | | | | | Without contact | | | | | |
|--------------|---------------|--------|---------------------|--------|---------------------|--------|-----------------|--------|---------------------|--------|---------------------|--------|
| | Plug (type 5) | | Receptacle (type 0) | | Receptacle (type 7) | | Plug (type 5) | | Receptacle (type 0) | | Receptacle (type 7) | |
| | Male | Female | Male | Female | Male | Female | Male | Female | Male | Female | Male | Female |
| 09-35 | 30.63 | 32.21 | 23.93 | 25.51 | 33.93 | 35.51 | 30.21 | 30.71 | 23.51 | 24.01 | 33.51 | 34.01 |
| 09-98 | 30.63 | 31.93 | 23.93 | 25.23 | 33.93 | 35.23 | 30.21 | 30.73 | 23.51 | 24.03 | 33.51 | 34.03 |
| 11-01 | 38.13 | 41.07 | 29.53 | 32.47 | 42.43 | 45.37 | 37.47 | 39.47 | 28.87 | 30.87 | 41.77 | 43.77 |
| 11-02 | 37.76 | 40.30 | 39.36 | 30.12 | 46.98 | 49.52 | 37.14 | 38.74 | 28.56 | 30.16 | 46.36 | 47.96 |
| 11-04 | 37.95 | 41.01 | 29.35 | 32.41 | 42.25 | 45.31 | 37.39 | 39.41 | 28.79 | 30.81 | 41.69 | 43.71 |
| 11-05 | 37.98 | 41.19 | 29.38 | 32.59 | 42.04 | 45.49 | 37.28 | 39.19 | 28.68 | 30.59 | 41.58 | 43.49 |
| 11-22 | 37.48 | 39.54 | 28.90 | 130.86 | 46.70 | 48.76 | 37.34 | 39.04 | 28.76 | 30.36 | 46.56 | 48.26 |
| 11-35 | 37.88 | 41.35 | 29.28 | 32.75 | 41.94 | 45.65 | 36.97 | 38.10 | 28.37 | 29.50 | 41.27 | 42.40 |
| 11-80 | 38.12 | 44.84 | 29.73 | 36.26 | 47.78 | 54.06 | 34.86 | 37.84 | 26.45 | 29.26 | 44.51 | 47.06 |
| 11-98 | 37.85 | 40.61 | 29.25 | 32.01 | 42.15 | 44.91 | 37.01 | 38.21 | 28.41 | 29.61 | 41.31 | 42.51 |
| 11-99 | 38.02 | 41.24 | 29.44 | 32.66 | 47.24 | 50.46 | 37.04 | 38.44 | 28.46 | 29.86 | 46.26 | 47.66 |
| 13-04 | 53.34 | 57.12 | 37.94 | 41.72 | 56.24 | 60.02 | 52.10 | 54.00 | 36.70 | 38.60 | 55.00 | 56.90 |
| 13-08 | 53.72 | 58.90 | 38.32 | 43.50 | 56.62 | 61.80 | 52.60 | 55.70 | 37.20 | 40.30 | 55.50 | 58.60 |
| 13-26 | 54.09 | 59.74 | 38.69 | 44.34 | 56.99 | 62.64 | 52.35 | 55.04 | 36.95 | 39.64 | 55.25 | 57.94 |
| 13-35 | 53.52 | 59.29 | 38.12 | 43.89 | 56.42 | 62.19 | 51.98 | 53.79 | 36.58 | 38.39 | 54.88 | 56.69 |
| 13-98 | 53.38 | 58.00 | 37.98 | 42.60 | 56.28 | 60.90 | 51.98 | 54.00 | 36.58 | 38.60 | 54.88 | 56.90 |
| 15-05 | 64.49 | 69.83 | 45.69 | 51.03 | 67.59 | 72.93 | 62.94 | 65.93 | 44.14 | 47.13 | 66.04 | 69.03 |
| 15-15 | 65.29 | 72.45 | 46.49 | 53.65 | 68.39 | 75.55 | 63.02 | 66.07 | 44.22 | 47.27 | 66.12 | 69.17 |
| 15-18 | 65.50 | 74.38 | 46.70 | 55.58 | 68.60 | 77.48 | 62.98 | 67.18 | 44.18 | 48.38 | 66.08 | 70.28 |
| 15-19 | 65.03 | 72.76 | 46.23 | 53.96 | 68.13 | 75.86 | 62.37 | 65.16 | 43.57 | 46.36 | 65.47 | 68.26 |
| 15-35 | 65.13 | 74.37 | 46.33 | 55.57 | 68.23 | 77.47 | 62.54 | 65.12 | 43.74 | 46.32 | 65.64 | 68.22 |
| 15-97 | 64.96 | 72.01 | 46.16 | 53.21 | 68.06 | 75.11 | 62.60 | 65.69 | 43.80 | 46.89 | 65.70 | 68.79 |
| 17-02 | 77.80 | 92.64 | 72.89 | 87.73 | 104.09 | 118.95 | 74.53 | 86.09 | 69.62 | 81.18 | 100.82 | 112.38 |
| 17-06 | 69.07 | 78.67 | 64.17 | 73.77 | 87.27 | 96.87 | 65.11 | 69.07 | 60.21 | 64.17 | 83.31 | 87.27 |
| 17-08 | 68.06 | 76.79 | 63.16 | 71.89 | 86.26 | 94.99 | 65.58 | 70.55 | 60.68 | 65.65 | 83.78 | 88.75 |
| 17-26 | 68.64 | 79.43 | 63.74 | 74.53 | 86.84 | 97.63 | 65.00 | 69.03 | 60.10 | 64.13 | 83.20 | 87.23 |
| 17-35 | 68.88 | 82.43 | 63.98 | 77.53 | 87.08 | 100.63 | 65.03 | 68.68 | 60.13 | 63.78 | 83.23 | 86.88 |
| 17-75 | 74.48 | 85.77 | 69.58 | 80.87 | 92.68 | 103.97 | 65.48 | 71.77 | 60.58 | 66.87 | 83.68 | 89.97 |
| 17-99 | 68.69 | 79.25 | 63.79 | 74.35 | 86.89 | 97.45 | 65.13 | 69.29 | 60.23 | 64.39 | 83.33 | 87.49 |
| 19-11 | 87.04 | 100.63 | 67.69 | 81.28 | 97.59 | 111.18 | 83.63 | 92.05 | 64.28 | 73.45 | 94.18 | 103.35 |
| 19-32 | 86.25 | 99.65 | 66.90 | 80.30 | 96.80 | 110.20 | 81.77 | 86.85 | 62.42 | 67.50 | 92.32 | 97.40 |
| 19-35 | 86.56 | 103.01 | 67.21 | 83.66 | 97.11 | 113.56 | 81.94 | 86.51 | 62.59 | 67.16 | 92.49 | 97.06 |
| 21-11 | 99.71 | 119.55 | 81.81 | 101.65 | 111.81 | 131.65 | 92.45 | 101.95 | 74.55 | 84.05 | 104.55 | 114.05 |
| 21-16 | 96.81 | 112.09 | 78.91 | 94.19 | 108.91 | 124.19 | 91.85 | 99.61 | 73.95 | 81.71 | 103.95 | 111.71 |
| 21-35 | 97.09 | 117.75 | 79.19 | 99.85 | 109.19 | 129.85 | 91.56 | 98.00 | 73.66 | 80.10 | 103.66 | 110.10 |
| 21-39 | 98.47 | 118.80 | 80.57 | 100.90 | 110.57 | 130.90 | 92.67 | 102.44 | 74.77 | 84.54 | 104.77 | 114.54 |
| 21-41 | 97.01 | 114.38 | 79.11 | 126.48 | 109.11 | 126.48 | 91.27 | 97.98 | 73.37 | 80.08 | 103.37 | 80.08 |
| 21-48 | 103.84 | 123.82 | 85.93 | 105.91 | 126.02 | 146.02 | 90.72 | 97.62 | 72.81 | 79.71 | 112.92 | 119.82 |
| 21-75 | 108.72 | 125.62 | 90.81 | 107.71 | 130.92 | 147.82 | 90.72 | 97.62 | 72.81 | 79.71 | 112.92 | 119.82 |
| 23-21 | 108.81 | 132.06 | 90.61 | 113.86 | 122.81 | 146.06 | 102.30 | 115.68 | 84.10 | 97.48 | 116.30 | 129.68 |
| 23-35 | 107.17 | 133.32 | 88.97 | 115.12 | 121.17 | 147.32 | 100.17 | 108.32 | 81.97 | 90.12 | 114.17 | 122.32 |
| 23-53 | 107.23 | 129.42 | 89.03 | 111.22 | 121.23 | 143.42 | 99.81 | 108.22 | 81.61 | 90.02 | 113.81 | 122.22 |
| 23-55 | 107.98 | 131.05 | 89.78 | 112.85 | 121.98 | 145.05 | 100.28 | 109.05 | 82.08 | 90.85 | 114.28 | 123.05 |
| 25-07 | 133.3 | 157.7 | 115.5 | 172.25 | 160.06 | 172.25 | 108.51 | 119.45 | 90.71 | 101.65 | 135.27 | 101.65 |
| 25-11 | 132.31 | 152.31 | 114.51 | 134.51 | 159.71 | 179.07 | 111.51 | 124.51 | 93.71 | 106.71 | 138.91 | 151.27 |
| 25-19 | 122.14 | 154.15 | 104.34 | 136.35 | 136.74 | 168.75 | 109.60 | 123.75 | 91.80 | 105.95 | 124.20 | 138.35 |
| 25-24 | 121.64 | 153.00 | 103.84 | 135.20 | 136.24 | 167.60 | 110.00 | 124.44 | 92.20 | 106.64 | 124.60 | 139.04 |
| 25-29 | 119.96 | 148.93 | 102.16 | 131.13 | 134.56 | 163.53 | 110.97 | 126.31 | 93.17 | 108.51 | 125.57 | 140.91 |
| 25-35 | 117.75 | 150.58 | 99.95 | 132.78 | 132.35 | 165.18 | 108.79 | 118.58 | 90.99 | 100.78 | 123.39 | 133.18 |
| 25-37 | 119.98 | 148.26 | 102.18 | 162.67 | 146.74 | 162.67 | 108.51 | 119.40 | 90.71 | 101.60 | 135.27 | 101.60 |
| 25-44 | 140.35 | 164.98 | 122.55 | 179.58 | 167.11 | 179.71 | 106.81 | 117.08 | 89.01 | 99.28 | 133.57 | 99.41 |
| 25-43 | 120.00 | 150.68 | 102.20 | 132.88 | 134.60 | 165.28 | 110.58 | 125.88 | 92.78 | 108.08 | 125.18 | 140.48 |
| 25-46 | 122.30 | 146.14 | 104.50 | 128.34 | 136.90 | 160.74 | 107.66 | 117.82 | 89.86 | 100.02 | 122.26 | 132.42 |
| 25-61 | 117.05 | 143.80 | 99.25 | 126.00 | 131.65 | 158.40 | 108.51 | 119.40 | 90.71 | 101.60 | 123.11 | 155.51 |
| 25-08 | 143.38 | 175.21 | 125.58 | 157.41 | 157.98 | 189.81 | 107.38 | 119.21 | 89.58 | 101.41 | 121.98 | 133.81 |
| 25-20 | 128.40 | 158.62 | 110.60 | 140.82 | 143.00 | 173.22 | 106.83 | 117.08 | 89.03 | 99.28 | 121.43 | 131.68 |
| 25-04 | 120.80 | 150.65 | 103.00 | 132.85 | 135.40 | 165.25 | 111.60 | 125.21 | 93.80 | 107.41 | 126.20 | 139.81 |

Weight in gram

8D Titanium Series



Derived from:
MIL-DTL-38999 Serie III

8D Titanium Series



Connector part numbers

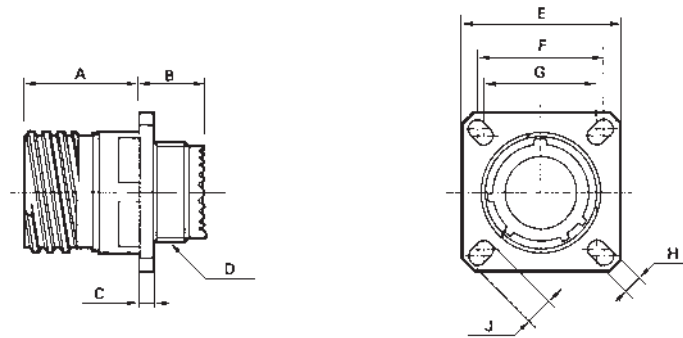
| Basic Series | 8D | 0 | - | 11 | TT | 35 | S | N | ** |
|---|----|---|---|----|----|----|---|---|----|
| Shell style: 0: Square flange receptacle 1: In line receptacle 7: Jam nut receptacle 77: Specific receptacle (please consult us) 5: Plug with RFI shielding. | | | | | | | | | |
| Type: -: Connectors with standard crimp contacts. L: Receptacle with long spill (male and female size #22D, #20). C: Receptacle with short spill (male and female #22D, #20, #16). S: Receptacle with specific spill (male et female #22D) W: Receptacle with male contacts #22D for wire wrap (3 wraps) T: Receptacle with male contacts #20 for wire wrap (2 wraps) | | | | | | | | | |
| Shell size: 09 - 11 - 13 - 15 - 17 - 19 - 21 - 23 - 25 | | | | | | | | | |
| Plating: TT: Unplated TF: Nickel plated | | | | | | | | | |
| Contact layout: See page 8 to 11 | | | | | | | | | |
| Contact type: P: Pin A: Connector supplied less pin contact or with specific contacts (Connector marking: A+ orientation) S: Socket B: Connector supplied less socket contact or with specific contacts (Connector marking: B+ orientation) | | | | | | | | | |
| Orientation: N, A, B, C, D & E (See page 58) | | | | | | | | | |
| Spécification: 046: tinned straight spills 251: Connector provided with power contacts (layouts with contacts #8) 022: Fuel Tank L: For P or S contact only, connectors delivered without contacts, connectors marking P or S plus orientation. | | | | | | | | | |

8D Titanium Series



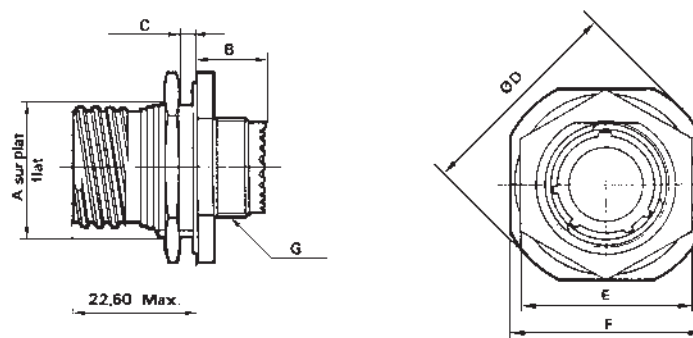
Dimensions

Receptacle type 0



| Shell size | A Max. | B Max. | C Max. | D thread | E ± 0,30 | F | G | H ± 0,20 | J ± 0,20 |
|------------|--------|--------|--------|------------|----------|-------|-------|----------|----------|
| 09 | 20.90 | 10.60 | 2.50 | M12 x 1-6g | 23.80 | 18.26 | 15.09 | 3.25 | 5.49 |
| 11 | 20.90 | 10.60 | 2.50 | M15 x 1-6g | 26.20 | 20.62 | 18.26 | 3.25 | 4.93 |
| 13 | 20.90 | 10.60 | 2.50 | M18 x 1-6g | 28.60 | 23.01 | 20.62 | 3.25 | 4.93 |
| 15 | 20.90 | 10.60 | 2.50 | M22 x 1-6g | 31.00 | 24.61 | 23.01 | 3.25 | 4.93 |
| 17 | 20.90 | 10.60 | 2.50 | M25 x 1-6g | 33.30 | 26.97 | 24.61 | 3.25 | 4.93 |
| 19 | 20.90 | 10.60 | 2.50 | M28 x 1-6g | 36.50 | 29.36 | 26.97 | 3.25 | 4.93 |
| 21 | 20.10 | 11.40 | 3.20 | M31 x 1-6g | 39.70 | 31.75 | 29.36 | 3.25 | 4.93 |
| 23 | 20.10 | 11.40 | 3.20 | M34 x 1-6g | 42.90 | 34.93 | 31.75 | 3.91 | 6.15 |
| 25 | 20.10 | 11.40 | 3.20 | M37 x 1-6g | 46.00 | 38.10 | 34.93 | 3.91 | 6.15 |

Receptacle type 7



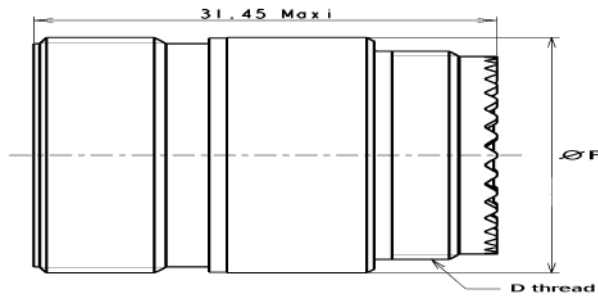
| Shell size | A + 0.10 - 0.15 | B Max. | C Max. | D Max. | E Max. | F ± 0.4 | G thread |
|------------|-----------------|--------|--------|--------|--------|---------|------------|
| 09 | 16.53 | 9.90 | 3.20 | 30.50 | 23.00 | 27.00 | M12 x 1-6g |
| 11 | 19.07 | 9.90 | 3.20 | 35.20 | 26.00 | 31.80 | M15 x 1-6g |
| 13 | 23.82 | 9.90 | 3.20 | 38.40 | 31.00 | 34.90 | M18 x 1-6g |
| 15 | 26.97 | 9.90 | 3.20 | 41.60 | 34.00 | 38.10 | M22 x 1-6g |
| 17 | 30.15 | 9.90 | 3.20 | 44.80 | 37.00 | 41.30 | M25 x 1-6g |
| 19 | 33.32 | 9.90 | 3.50 | 49.50 | 41.00 | 46.00 | M28 x 1-6g |
| 21 | 36.50 | 9.90 | 3.50 | 52.70 | 46.00 | 49.20 | M31 x 1-6g |
| 23 | 39.67 | 9.90 | 3.50 | 55.90 | 47.00 | 52.40 | M34 x 1-6g |
| 25 | 42.85 | 9.90 | 3.50 | 59.00 | 52.00 | 55.60 | M37 x 1-6g |

Dimensions in millimeters

8D Titanium Series

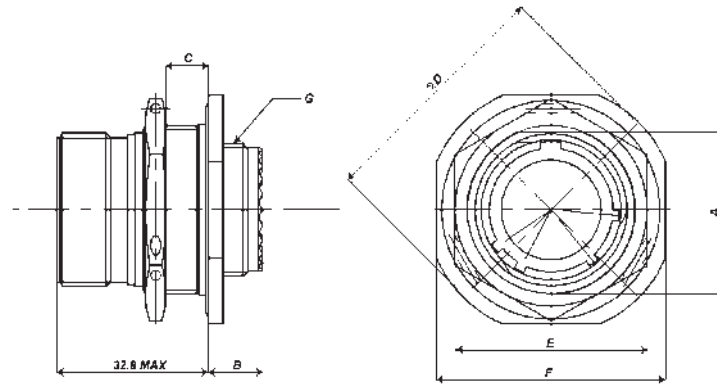


In line receptacle type 1



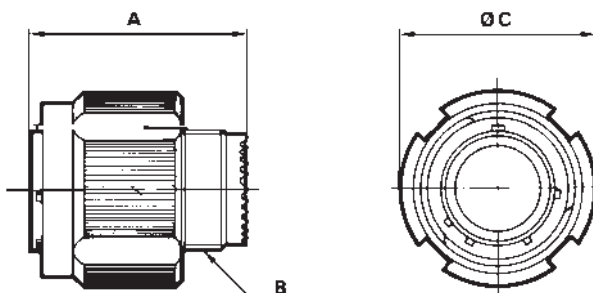
| Shell size | D thread | Ø F |
|------------|------------|-------|
| 09 | M12 x 1-6g | 15.90 |
| 11 | M15 x 1-6g | 19.05 |
| 13 | M18 x 1-6g | 22.25 |
| 15 | M22 x 1-6g | 25.40 |
| 17 | M25 x 1-6g | 30.15 |
| 19 | M28 x 1-6g | 31.75 |
| 21 | M31 x 1-6g | 34.75 |
| 23 | M34 x 1-6g | 37.10 |
| 25 | M37 x 1-6g | 41.30 |

Receptacle type 77



| Shell size | A + 0.10 - 0.15 | B Max. | C Max. | D Max. | E Max. | F ± 0.4 | G thread |
|------------|--------------------|-----------|-----------|-----------|-----------|------------|-------------|
| 09 | 16.53 | 9.90 | 9.60 | 30.50 | 23.00 | 27.00 | M12 x 1-6g |
| 11 | 19.07 | 9.90 | 9.60 | 35.20 | 26.00 | 31.80 | M15 x 1-6g |
| 13 | 23.82 | 9.90 | 9.60 | 38.40 | 31.00 | 34.90 | M18 x 1-6g |
| 15 | 26.97 | 9.90 | 9.60 | 41.60 | 34.00 | 38.10 | M22 x 1-6g |
| 17 | 30.15 | 9.90 | 9.60 | 44.80 | 37.00 | 41.30 | M25 x 1-6g |
| 19 | 33.32 | 9.90 | 9.60 | 49.50 | 41.00 | 46.00 | M28 x 1-6g |
| 21 | 36.50 | 9.90 | 9.60 | 52.70 | 46.00 | 49.20 | M31 x 1-6g |
| 23 | 39.67 | 9.90 | 9.60 | 55.90 | 47.00 | 52.40 | M34 x 1-6g |
| 25 | 42.85 | 9.90 | 9.60 | 59.00 | 52.00 | 55.60 | M37 x 1-6g |

Plug type 5



| Shell size | A Max. | B thread | C Max. |
|------------|-----------|-------------|-----------|
| 09 | 31.00 | M12 x 1-6g | 21.80 |
| 11 | 31.00 | M15 x 1-6g | 25.00 |
| 13 | 31.00 | M18 x 1-6g | 29.40 |
| 15 | 31.00 | M22 x 1-6g | 32.50 |
| 17 | 31.00 | M25 x 1-6g | 35.70 |
| 19 | 31.00 | M28 x 1-6g | 38.50 |
| 21 | 31.00 | M31 x 1-6g | 41.70 |
| 23 | 31.00 | M34 x 1-6g | 44.90 |
| 25 | 31.00 | M37 x 1-6g | 48.00 |

8D Titanium Series

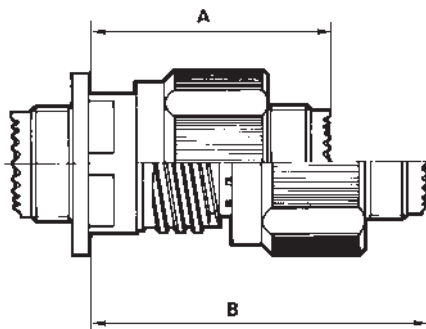


Maximum coupling torque on panel for jam nut receptacle (type 7)

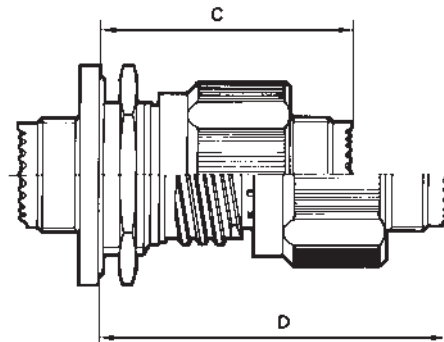
| Shell | 09 | 11 | 13 | 15 | 17 | 19 | 21 | 23 | 25 |
|-----------------------|----|----|----|----|----|----|----|----|----|
| Coupling torque (N.m) | 6 | 8 | 10 | 13 | 20 | 23 | 25 | 26 | 28 |

Mated connectors dimensions

Type 0 with plug



Type 7 with plug



| Shell size | A Max. | B Max. | C Max. | D Max. |
|------------|--------|--------|--------|--------|
| 09 | 37.00 | 52.30 | 38.30 | 53.60 |
| 11 | 37.00 | 52.30 | 38.30 | 53.60 |
| 13 | 37.00 | 52.30 | 38.50 | 53.80 |
| 15 | 37.00 | 52.30 | 38.50 | 53.80 |
| 17 | 37.00 | 52.30 | 38.50 | 53.80 |
| 19 | 37.00 | 52.30 | 38.50 | 53.80 |
| 21 | 36.00 | 51.30 | 38.50 | 53.80 |
| 23 | 36.00 | 51.30 | 38.50 | 53.80 |
| 25 | 36.00 | 51.30 | 38.50 | 53.80 |

Dimensions in millimeters

8D Titanium Series



Receptacle with straight spill contacts



| | Shell size | | | 09 | 11 | 13 | 15 | 17 | 19 | 21 | 23 | 25 | |
|-----------|--------------|--------------|------------|-------|-------|----|----|-------|-------|----|----|------|-------|
| | Contact size | Contact type | Spill type | | | | | | | | | | |
| A | # 22D | M & F | L & C | 0,70 | | | | | | | | | |
| | # 22D | M & F | S | 0.50 | | | | | | | | | |
| | # 20 | M & F | C | 0.70 | | | | | | | | | |
| | # 16 | M & F | C | 1.15 | | | | | | | | | |
| L2 | Min. | # 22D | M | L & C | 10.52 | | | | 10.34 | | | | |
| | Max. | # 22D | M | L & C | 11.46 | | | | 11.28 | | | | |
| | Min. | # 22D | F | L & C | 10.19 | | | | 10.01 | | | | |
| | Max. | # 22D | F | L & C | 11.46 | | | | 11.28 | | | | |
| | Min. | # 22D | M | S | 10.19 | | | | 10.01 | | | | |
| | Max. | # 22D | M | S | 11.46 | | | | 11.28 | | | | |
| | Min. | # 22D | F | S | 10.69 | | | | 10.51 | | | | |
| | Max. | # 22D | F | S | 11.63 | | | | 11.45 | | | | |
| | Min. | # 20 | M | C | 10.36 | | | | 10.18 | | | | |
| | Max. | # 20 | M | C | 11.63 | | | | 11.45 | | | | |
| | Min. | # 20 | F | C | 10.69 | | | | 10.51 | | | | |
| | Max. | # 20 | F | C | 11.63 | | | | 11.45 | | | | |
| | Min. | # 16 | M | C | 10.69 | | | | 10.51 | | | | |
| | Max. | # 16 | M | C | 11.63 | | | | 11.45 | | | | |
| | Min. | # 16 | F | C | 10.69 | | | | 10.51 | | | | |
| | Max. | # 16 | F | C | 11.63 | | | | 11.45 | | | | |
| L3 | # 22D | M & F | L | | | | | | 8.50 | | | | |
| | # 22D | M & F | C | | | | | | 4.00 | | | | |
| | # 22D | M & F | S | | | | | | 5.10 | | | | |
| | # 20 | M & F | C | | | | | | 5.10 | | | | |
| | # 16 | M & F | C | | | | | | 5.10 | | | | |
| L4 | Min. | # 22D | M | L & C | | | | | | | | 9.48 | |
| | Max. | # 22D | M | L & C | | | | 10.58 | | | | | 10.69 |
| | Min. | # 22D | F | L & C | | | | 9.15 | | | | | 9.26 |
| | Max. | # 22D | F | L & C | | | | 10.58 | | | | | 10.69 |
| | Min. | # 22D | M | S | | | | 9.65 | | | | | 9.76 |
| | Max. | # 22D | M | S | | | | 10.75 | | | | | 10.86 |
| | Min. | # 22D | F | S | | | | 9.15 | | | | | 9.26 |
| | Max. | # 22D | F | S | | | | 10.75 | | | | | 10.86 |
| | Min. | # 20 | M | C | | | | 9.65 | | | | | 9.76 |
| | Max. | # 20 | M | C | | | | 10.75 | | | | | 10.86 |
| | Min. | # 20 | F | C | | | | 9.65 | | | | | 9.76 |
| | Max. | # 20 | F | C | | | | 10.75 | | | | | 10.86 |
| | Min. | # 16 | M | C | | | | 9.65 | | | | | 9.76 |
| | Max. | # 16 | M | C | | | | 10.75 | | | | | 10.86 |
| | Min. | # 16 | F | C | | | | 9.65 | | | | | 9.76 |
| | Max. | # 16 | F | C | | | | 10.75 | | | | | 10.86 |

M : Male contact F : Female contact L : Long spill C : Short spill S : Specific spill

Dimensions in millimeters

8D Titanium Series



Connectors weight*

| | With contacts | | | | | | Without contact | | | | | |
|-------|---------------|--------|---------------------|--------|---------------------|--------|-----------------|--------|---------------------|--------|---------------------|--------|
| | Plug (type 5) | | Receptacle (type 0) | | Receptacle (type 7) | | Plug (type 5) | | Receptacle (type 0) | | Receptacle (type 7) | |
| | Male | Female | Male | Female | Male | Female | Male | Female | Male | Female | Male | Female |
| 09-35 | 18.23 | 19.81 | 14.37 | 15.95 | 20.14 | 21.72 | 17.81 | 18.31 | 13.95 | 14.45 | 19.72 | 20.22 |
| 09-98 | 18.23 | 19.53 | 14.37 | 15.67 | 20.14 | 21.44 | 17.81 | 18.33 | 13.95 | 14.47 | 19.72 | 20.24 |
| 11-01 | 23.15 | 26.09 | 18.19 | 21.13 | 25.63 | 28.57 | 22.49 | 24.49 | 17.53 | 19.53 | 24.97 | 26.97 |
| 11-02 | 22.78 | 25.32 | 17.82 | 20.36 | 28.1 | 30.64 | 22.16 | 23.76 | 17.2 | 18.8 | 27.48 | 29.08 |
| 11-04 | 22.97 | 26.03 | 18.01 | 21.07 | 25.45 | 28.51 | 22.41 | 24.43 | 17.45 | 19.47 | 24.89 | 26.91 |
| 11-05 | 23.00 | 26.21 | 18.04 | 21.25 | 25.24 | 28.69 | 22.30 | 24.21 | 17.34 | 19.25 | 24.78 | 26.69 |
| 11-22 | 22.64 | 25.06 | 17.68 | 20.10 | 27.96 | 30.38 | 22.36 | 24.06 | 17.40 | 19.10 | 27.68 | 29.38 |
| 11-35 | 22.90 | 26.37 | 17.94 | 21.41 | 25.14 | 28.85 | 21.99 | 23.12 | 17.03 | 18.16 | 24.47 | 25.60 |
| 11-80 | 25.38 | 29.86 | 20.08 | 24.88 | 30.66 | 35.78 | 22.10 | 22.86 | 16.80 | 17.88 | 27.38 | 28.78 |
| 11-98 | 22.87 | 25.63 | 17.91 | 20.67 | 25.35 | 28.11 | 22.03 | 23.23 | 17.07 | 18.27 | 24.51 | 25.71 |
| 11-99 | 23.04 | 26.26 | 18.06 | 21.28 | 25.53 | 28.75 | 22.06 | 23.46 | 17.08 | 18.48 | 24.55 | 25.95 |
| 13-04 | 32.44 | 36.22 | 23.56 | 27.34 | 34.11 | 37.89 | 31.20 | 33.10 | 22.32 | 24.22 | 32.87 | 34.77 |
| 13-08 | 32.82 | 38.00 | 23.94 | 29.12 | 34.49 | 39.67 | 31.70 | 34.80 | 22.82 | 25.92 | 33.37 | 36.47 |
| 13-26 | 33.19 | 38.84 | 24.31 | 29.96 | 34.86 | 40.51 | 31.45 | 34.14 | 22.57 | 25.26 | 33.12 | 35.81 |
| 13-35 | 32.62 | 38.39 | 23.74 | 29.51 | 34.29 | 40.06 | 31.08 | 32.89 | 22.20 | 24.01 | 32.75 | 34.56 |
| 13-98 | 32.48 | 37.10 | 23.60 | 28.22 | 34.15 | 38.77 | 31.08 | 33.10 | 22.20 | 24.22 | 32.75 | 34.77 |
| 15-05 | 39.61 | 44.95 | 28.77 | 34.11 | 41.40 | 46.74 | 38.06 | 41.05 | 27.22 | 30.21 | 39.85 | 42.84 |
| 15-15 | 40.41 | 47.57 | 29.57 | 36.73 | 42.20 | 49.36 | 38.14 | 41.19 | 27.30 | 30.35 | 39.93 | 42.98 |
| 15-18 | 40.62 | 49.50 | 29.78 | 38.66 | 42.41 | 51.29 | 38.10 | 42.30 | 27.26 | 31.46 | 39.89 | 44.09 |
| 15-19 | 40.15 | 47.88 | 29.31 | 37.04 | 41.94 | 49.67 | 37.49 | 40.28 | 26.65 | 29.44 | 39.28 | 42.07 |
| 15-35 | 40.25 | 49.49 | 29.41 | 38.65 | 42.04 | 51.28 | 37.66 | 40.24 | 26.82 | 29.40 | 39.45 | 42.03 |
| 15-97 | 40.08 | 47.13 | 29.24 | 36.29 | 41.87 | 48.92 | 37.72 | 40.81 | 26.88 | 29.97 | 39.51 | 42.60 |
| 17-02 | 48.16 | 58.40 | 45.20 | 55.44 | 63.99 | 74.23 | 44.89 | 51.85 | 41.93 | 48.89 | 60.72 | 67.68 |
| 17-06 | 43.73 | 53.33 | 40.90 | 50.50 | 54.23 | 63.83 | 39.77 | 43.73 | 36.94 | 40.90 | 50.27 | 54.23 |
| 17-08 | 42.72 | 51.45 | 39.89 | 48.62 | 53.22 | 61.95 | 40.24 | 45.21 | 37.41 | 42.38 | 50.74 | 55.71 |
| 17-26 | 43.30 | 54.09 | 40.47 | 51.26 | 53.80 | 64.59 | 39.66 | 43.69 | 36.83 | 40.86 | 50.16 | 54.19 |
| 17-35 | 43.54 | 57.09 | 40.71 | 54.26 | 54.04 | 67.59 | 39.69 | 43.34 | 36.86 | 40.51 | 50.19 | 53.84 |
| 17-75 | 49.14 | 60.43 | 46.31 | 57.60 | 59.64 | 70.93 | 40.14 | 46.43 | 37.31 | 43.60 | 50.64 | 56.93 |
| 17-99 | 43.35 | 53.91 | 40.52 | 51.08 | 53.85 | 64.41 | 39.79 | 43.95 | 36.96 | 41.12 | 50.29 | 54.45 |
| 19-11 | 55.16 | 68.75 | 44.00 | 57.59 | 61.25 | 74.84 | 51.75 | 60.17 | 40.59 | 66.26 | 40.59 | 66.26 |
| 19-32 | 54.37 | 67.77 | 43.21 | 56.61 | 60.46 | 73.86 | 49.89 | 54.97 | 38.73 | 61.06 | 38.73 | 61.06 |
| 19-35 | 54.68 | 71.13 | 43.52 | 59.97 | 60.77 | 77.22 | 50.06 | 54.63 | 38.90 | 60.72 | 38.90 | 60.72 |
| 21-11 | 64.64 | 84.48 | 54.31 | 74.15 | 71.62 | 91.46 | 57.38 | 66.88 | 47.05 | 73.86 | 47.05 | 73.86 |
| 21-16 | 61.74 | 77.02 | 51.41 | 66.69 | 68.72 | 84.00 | 56.78 | 64.54 | 46.45 | 71.52 | 46.45 | 71.52 |
| 21-35 | 62.02 | 82.68 | 51.69 | 72.35 | 69.00 | 89.66 | 56.49 | 62.93 | 46.16 | 69.91 | 46.16 | 69.91 |
| 21-39 | 63.40 | 83.73 | 53.07 | 73.40 | 70.38 | 90.71 | 57.60 | 67.37 | 47.27 | 74.35 | 47.27 | 74.35 |
| 21-41 | 61.94 | 79.31 | 51.61 | 86.29 | 68.92 | 86.29 | 56.20 | 62.91 | 45.87 | 69.89 | 45.87 | 69.89 |
| 21-48 | 68.73 | 88.71 | 58.4 | 78.38 | 81.56 | 101.54 | 55.61 | 62.51 | 45.28 | 52.18 | 68.44 | 75.34 |
| 21-75 | 73.61 | 90.51 | 63.28 | 80.18 | 86.44 | 103.34 | 55.61 | 62.51 | 45.28 | 52.18 | 68.44 | 75.34 |
| 23-21 | 71.07 | 94.32 | 60.57 | 83.82 | 79.15 | 102.40 | 64.56 | 77.94 | 54.06 | 86.02 | 54.06 | 86.02 |
| 23-35 | 69.43 | 95.58 | 58.93 | 85.08 | 77.51 | 103.66 | 62.43 | 70.58 | 51.93 | 78.66 | 51.93 | 78.66 |
| 23-53 | 69.49 | 91.68 | 58.99 | 81.18 | 77.57 | 99.76 | 62.07 | 70.48 | 51.57 | 78.56 | 51.57 | 78.56 |
| 23-55 | 70.24 | 93.31 | 59.74 | 82.81 | 78.32 | 101.39 | 62.54 | 71.31 | 52.04 | 79.39 | 52.04 | 79.39 |
| 25-07 | 83.91 | 117.09 | 73.64 | 123.58 | 99.34 | 121.8 | 68.12 | 78.84 | 57.85 | 85.33 | 83.55 | 83.55 |
| 25-11 | 91.92 | 111.92 | 81.65 | 101.65 | 94.65 | 127.35 | 71.12 | 84.12 | 60.85 | 73.85 | 86.55 | 99.55 |
| 25-19 | 81.78 | 113.79 | 71.51 | 103.52 | 90.20 | 122.21 | 69.24 | 83.39 | 58.97 | 91.81 | 58.97 | 91.81 |
| 25-24 | 81.28 | 112.64 | 71.01 | 102.37 | 89.70 | 121.06 | 69.64 | 84.08 | 59.37 | 92.50 | 59.37 | 92.50 |
| 25-29 | 79.60 | 108.57 | 69.33 | 98.30 | 88.02 | 116.99 | 70.61 | 85.95 | 60.34 | 94.37 | 60.34 | 94.37 |
| 25-35 | 77.39 | 110.22 | 67.12 | 99.95 | 85.81 | 118.64 | 68.43 | 78.22 | 58.16 | 86.64 | 58.16 | 86.64 |
| 25-37 | 79.59 | 107.09 | 69.32 | 116.12 | 95.02 | 113.36 | 68.12 | 79.04 | 57.85 | 87.26 | 83.55 | 84.50 |
| 25-44 | 99.96 | 127.50 | 89.69 | 134.23 | 115.39 | 134.44 | 66.42 | 77.85 | 56.15 | 86.33 | 81.85 | 84.54 |
| 25-43 | 79.64 | 110.32 | 69.37 | 100.05 | 88.06 | 118.74 | 70.22 | 85.52 | 59.95 | 93.94 | 59.95 | 93.94 |
| 25-46 | 81.94 | 105.78 | 71.67 | 95.51 | 90.36 | 114.20 | 67.30 | 77.46 | 57.03 | 85.88 | 57.03 | 85.88 |
| 25-61 | 76.69 | 103.44 | 66.42 | 93.17 | 85.11 | 111.86 | 68.15 | 79.04 | 57.88 | 87.46 | 57.88 | 87.46 |
| 25-08 | 103.02 | 134.85 | 92.75 | 124.58 | 111.44 | 143.27 | 67.02 | 78.85 | 56.75 | 87.27 | 56.75 | 87.27 |
| 25-20 | 88.04 | 118.26 | 77.77 | 107.99 | 96.46 | 126.68 | 66.47 | 76.72 | 56.20 | 85.14 | 56.20 | 85.14 |
| 25-04 | 80.44 | 110.29 | 70.17 | 100.02 | 88.86 | 118.71 | 71.24 | 84.85 | 60.97 | 93.27 | 60.97 | 93.27 |

Weight in gram

* Please, consult us for weight of receptacles type 77.



CECC 75.201.00
JVS Bronze Series

JVS Bronze Series



Connector part numbers

| | | | | | | | | |
|--|------------|-----------|----------|-----------|-----------|----------|----------|-----------|
| Basic series | JVS | 16 | A | 11 | 35 | P | N | ** |
| Shell style: | | | | | | | | |
| 00: Square flange receptacle | | | | | | | | |
| 07: Jam nut receptacle | | | | | | | | |
| 16: Plug with RFI Shielding | | | | | | | | |
| Material: | | | | | | | | |
| A: Bronze housing material. | | | | | | | | |
| Shell size 09 - 11 - 13 - 15 - 17 - 19 - 21 - 23 - 25 | | | | | | | | |
| Contact layout: See page 8 to 11 | | | | | | | | |
| Contact type: | | | | | | | | |
| P: Pin A: Connector supplied less pin contact or with specific contacts (Connector marking: A+ orientation) | | | | | | | | |
| S: Socket B: Connector supplied less socket contact or with specific contacts (Connector marking: B+ orientation) | | | | | | | | |
| Orientations: N, A, B, C, D & E (See page 58) | | | | | | | | |
| Specification: | | | | | | | | |
| 251: Connector provides with power contacts (layouts with contacts #8) | | | | | | | | |
| CI: Printed board mounting contacts. | | | | | | | | |
| LI: Receptacle with long spill (pin or socket #22D) | | | | | | | | |
| MW: Wire wrap contacts | | | | | | | | |
| 022: Fuel tank | | | | | | | | |
| L: For P or S contact type only, connectors delivered without contacts, connectors marking P or S plus orientation. | | | | | | | | |

CECC part numbers

| | | | | | | | | | | |
|--|------------------------|----------|------------|----------|----------|----------|----------|----------|----------|----------|
| Basic series | CECC 75 201-002 | B | B98 | M | C | N | A | 0 | 1 | G |
| Shell style: | | | | | | | | | | |
| A: Plug | | | | | | | | | | |
| B: Square flange receptacle. | | | | | | | | | | |
| C: Jam nut receptacle. | | | | | | | | | | |
| Shell size & layout: | | | | | | | | | | |
| A=09, B=11, C=13, D=15, E=17, F=19, G=21, H=23, J=25 | | | | | | | | | | |
| (B=Shell size 11) (Layouts: see page 8 to 11) | | | | | | | | | | |
| Contact type: | | | | | | | | | | |
| M: Pin | | | | | | | | | | |
| F: Socket | | | | | | | | | | |
| Type of contact termination: | | | | | | | | | | |
| C: Crimp contact | | | | | | | | | | |
| Orientations N, A, B, C, D & E (See page 58) | | | | | | | | | | |
| Shell material: | | | | | | | | | | |
| A: Aluminium bronze | | | | | | | | | | |
| Supply code: | | | | | | | | | | |
| 0= Connectors supplied with contacts | | | | | | | | | | |
| 1= Connectors supplied without contacts | | | | | | | | | | |
| Assessment level: | | | | | | | | | | |
| 1: Level 1 | | | | | | | | | | |
| Performance level: | | | | | | | | | | |
| G: Level G | | | | | | | | | | |

Example :
Abbreviated version :

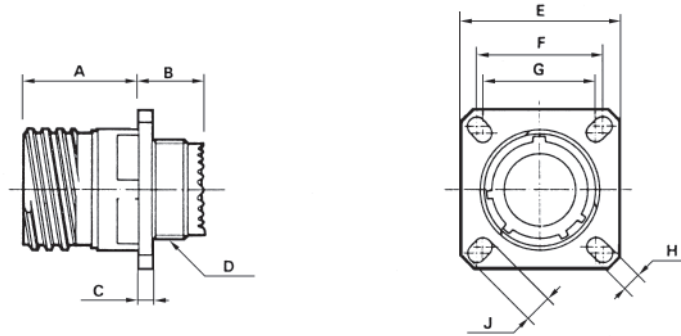
| | | | | | | | | | |
|------------------|----------|------------|----------|----------|----------|----------|----------|----------|----------|
| C 752 002 | B | B98 | M | C | N | A | 0 | 1 | G |
|------------------|----------|------------|----------|----------|----------|----------|----------|----------|----------|

JVS Bronze Series



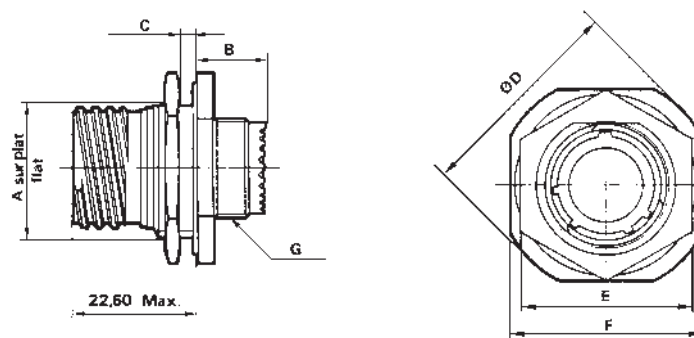
Dimensions

Receptacle type 00



| Shell size | A Max. | B Max. | C Max. | D thread | E ± 0,30 | F | G | H | J |
|------------|--------|--------|--------|------------|----------|-------|-------|------|------|
| 09 (A) | 20.90 | 10.60 | 2.50 | M12 x 1-6g | 23.80 | 18.26 | 15.09 | 3.25 | 5.49 |
| 11 (B) | 20.90 | 10.60 | 2.50 | M15 x 1-6g | 26.20 | 20.62 | 18.26 | 3.25 | 4.93 |
| 13 (C) | 20.90 | 10.60 | 2.50 | M18 x 1-6g | 28.60 | 23.01 | 20.62 | 3.25 | 4.93 |
| 15 (D) | 20.90 | 10.60 | 2.50 | M22 x 1-6g | 31.00 | 24.61 | 23.01 | 3.25 | 4.93 |
| 17 (E) | 20.90 | 10.60 | 2.50 | M25 x 1-6g | 33.30 | 26.97 | 24.61 | 3.25 | 4.93 |
| 19 (F) | 20.90 | 10.60 | 2.50 | M28 x 1-6g | 36.50 | 29.36 | 26.97 | 3.25 | 4.93 |
| 21 (G) | 20.10 | 11.40 | 3.20 | M31 x 1-6g | 39.70 | 31.75 | 29.36 | 3.25 | 4.93 |
| 23 (H) | 20.10 | 11.40 | 3.20 | M34 x 1-6g | 42.90 | 34.93 | 31.75 | 3.91 | 6.15 |
| 25 (J) | 20.10 | 11.40 | 3.20 | M37 x 1-6g | 46.00 | 38.10 | 34.93 | 3.91 | 6.15 |

Receptacle type 07



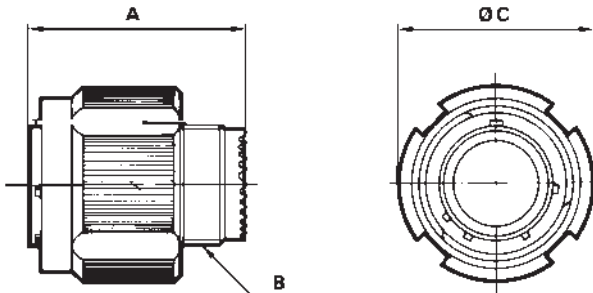
| Shell size | A + 0.10 - 0.15 | B Max. | C Max. | D Max. | E Max. | F ± 0.4 | G thread |
|------------|-----------------|--------|--------|--------|--------|---------|------------|
| 09 (A) | 16.53 | 9.90 | 3.20 | 30.50 | 23.00 | 27.00 | M12 x 1-6g |
| 11 (B) | 19.07 | 9.90 | 3.20 | 35.20 | 26.00 | 31.80 | M15 x 1-6g |
| 13 (C) | 23.82 | 9.90 | 3.20 | 38.40 | 31.00 | 34.90 | M18 x 1-6g |
| 15 (D) | 26.97 | 9.90 | 3.20 | 41.60 | 34.00 | 38.10 | M22 x 1-6g |
| 17 (E) | 30.15 | 9.90 | 3.20 | 44.80 | 37.00 | 41.30 | M25 x 1-6g |
| 19 (F) | 33.32 | 9.90 | 3.20 | 49.50 | 41.00 | 46.00 | M28 x 1-6g |
| 21 (G) | 36.50 | 9.90 | 3.20 | 52.70 | 46.00 | 49.20 | M31 x 1-6g |
| 23 (H) | 39.67 | 9.90 | 3.20 | 55.90 | 47.00 | 52.40 | M34 x 1-6g |
| 25 (J) | 42.85 | 9.90 | 3.20 | 59.00 | 52.00 | 55.60 | M37 x 1-6g |

Dimensions in millimeters

JVS Bronze Series



Plug type 16



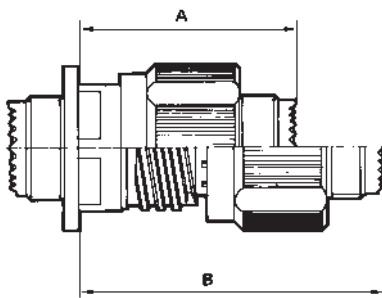
| Shell size | A Max. | B thread | C Max. |
|------------|--------|------------|--------|
| 09 (A) | 31.00 | M12 x 1-6g | 21.10 |
| 11 (B) | 31.00 | M15 x 1-6g | 23.80 |
| 13 (C) | 31.00 | M18 x 1-6g | 28.20 |
| 15 (D) | 31.00 | M22 x 1-6g | 31.40 |
| 17 (E) | 31.00 | M25 x 1-6g | 36.50 |
| 19 (F) | 31.00 | M28 x 1-6g | 39.30 |
| 21 (G) | 31.00 | M31 x 1-6g | 42.50 |
| 23 (H) | 31.00 | M34 x 1-6g | 45.30 |
| 25 (J) | 31.00 | M37 x 1-6g | 48.40 |

Maximum coupling torque on panel for jam nut receptacle (type 7)

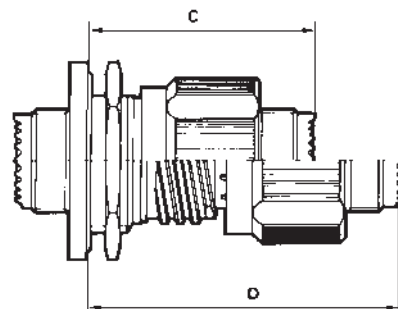
| Shell | 09 (A) | 11 (B) | 13 (C) | 15 (D) | 17 (E) | 19 (F) | 21 (G) | 23 (H) | 25 (J) |
|-----------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Coupling torque (N.m) | 6 | 8 | 10 | 13 | 20 | 23 | 25 | 26 | 28 |

Mated connectors dimensions

Type 00 with plug



Type 7 with plug



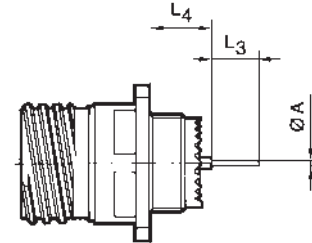
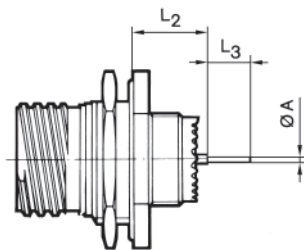
| Shell size | A Max. | B Max. | C Max. | D Max. |
|------------|--------|--------|--------|--------|
| 09 (A) | 37.00 | 52.30 | 38.30 | 53.60 |
| 11 (B) | 37.00 | 52.30 | 38.30 | 53.60 |
| 13 (C) | 37.00 | 52.30 | 38.30 | 53.60 |
| 15 (D) | 37.00 | 52.30 | 38.30 | 53.60 |
| 17 (E) | 37.00 | 52.30 | 38.30 | 53.60 |
| 19 (F) | 37.00 | 52.30 | 38.30 | 53.60 |
| 21 (G) | 36.00 | 51.30 | 38.30 | 53.60 |
| 23 (H) | 36.00 | 51.30 | 38.30 | 53.60 |
| 25 (J) | 36.00 | 51.30 | 38.30 | 53.60 |

Dimensions in millimeters

JVS Bronze Series



Receptacle with straight spill contacts



| | | Shell size | | | 09 (A) | 11 (B) | 13 (C) | 15 (D) | 17 (E) | 19 (F) | 21 (G) | 23 (H) | 25 (J) |
|------|------|--------------|--------------|------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| | | Contact size | Contact type | Spill type | | | | | | | | | |
| A | | # 22D | M & F | Li | | | | | 0.70 | | | | |
| | | # 22D | M & F | Ci | | | | | 0.50 | | | | |
| | | # 20 | M & F | Ci | | | | | 0.70 | | | | |
| | | # 16 | M & F | Ci | | | | | 1.15 | | | | |
| L2 | Min. | # 22D | M | Li | 10.52 | | | | 10.34 | | | | |
| | Max. | # 22D | M | Li | 11.46 | | | | 11.28 | | | | |
| | Min. | # 22D | F | Li | 10.19 | | | | 10.01 | | | | |
| | Max. | # 22D | F | Li | 11.46 | | | | 11.28 | | | | |
| | Min. | # 22D | M | Ci | 10.19 | | | | 10.01 | | | | |
| | Max. | # 22D | M | Ci | 11.46 | | | | 11.28 | | | | |
| | Min. | # 22D | F | Ci | 10.69 | | | | 10.51 | | | | |
| | Max. | # 22D | F | Ci | 11.63 | | | | 11.45 | | | | |
| | Min. | # 20 | M | Ci | 10.36 | | | | 10.18 | | | | |
| | Max. | # 20 | M | Ci | 11.63 | | | | 11.45 | | | | |
| | Min. | # 20 | F | Ci | 10.69 | | | | 10.51 | | | | |
| | Max. | # 20 | F | Ci | 11.63 | | | | 11.45 | | | | |
| | Min. | # 16 | M | Ci | 10.69 | | | | 10.51 | | | | |
| | Max. | # 16 | M | Ci | 11.63 | | | | 11.45 | | | | |
| L3 | | # 22D | M & F | Li | | | | | 8.50 | | | | |
| | | # 22D | M & F | Ci | | | | | 5.10 | | | | |
| | | # 20 | M & F | Ci | | | | | 5.10 | | | | |
| | | # 16 | M & F | Ci | | | | | 5.10 | | | | |
| L4 | Min. | # 22D | M | Li | | | | | 9.48 | | | | |
| | Max. | # 22D | M | Li | | | 10.58 | | | | | 10.69 | |
| | Min. | # 22D | F | Li | | | 9.15 | | | | | 9.26 | |
| | Max. | # 22D | F | Li | | | 10.58 | | | | | 10.69 | |
| | Min. | # 22D | M | Ci | | | 9.65 | | | | | 9.76 | |
| | Max. | # 22D | M | Ci | | | 10.75 | | | | | 10.86 | |
| | Min. | # 22D | F | Ci | | | 9.15 | | | | | 9.26 | |
| | Max. | # 22D | F | Ci | | | 10.75 | | | | | 10.86 | |
| | Min. | # 20 | M | Ci | | | 9.65 | | | | | 9.76 | |
| | Max. | # 20 | M | Ci | | | 10.75 | | | | | 10.86 | |
| | Min. | # 20 | F | Ci | | | 9.65 | | | | | 9.76 | |
| | Max. | # 20 | F | Ci | | | 10.75 | | | | | 10.86 | |
| | Min. | # 16 | M | Ci | | | 9.65 | | | | | 9.76 | |
| | Max. | # 16 | M | Ci | | | 10.75 | | | | | 10.86 | |
| Min. | # 16 | F | Ci | | | 9.65 | | | | | 9.76 | | |
| Max. | # 16 | F | Ci | | | 10.75 | | | | | 10.86 | | |

M: Male contact F: Female contact Ci: Short spill Li: Long spill

Dimensions in millimeters

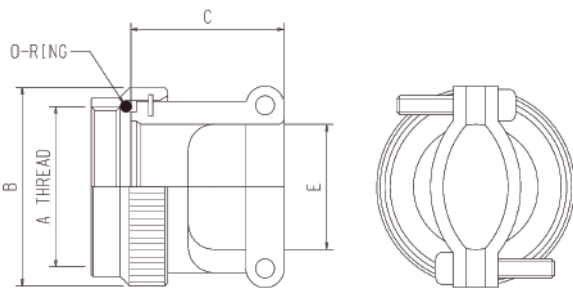
JVS Bronze Series



Bronze backshell part numbers (JVS)

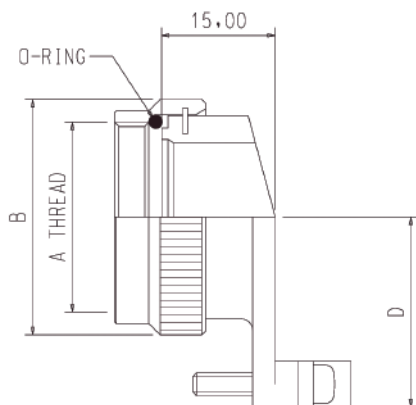
| | | | | | | |
|--|------------|----------|-----------|----------|-----------|----------|
| Basic series | JVS | A | 09 | B | 00 | A |
| Accessory style: | | | | | | |
| A: Rear accessories (backshells) | | | | | | |
| Shell size: | | | | | | |
| 09 - 11 - 13 - 15 - 17 - 19 - 21 - 23 - 25 | | | | | | |
| Accessory variant: | | | | | | |
| B, C, P, X (See below) | | | | | | |
| Sub variant: | | | | | | |
| Not applicable: 00 | | | | | | |
| Matière: | | | | | | |
| A: Bronze | | | | | | |

Straight cable clamp (type B)



| Shell size | A Thread | B Max. | C Max. | E Max. |
|------------|-----------|--------|--------|--------|
| 09 | M12 x 1.0 | 18.0 | 21.5 | 7.0 |
| 11 | M15 x 1.0 | 21.0 | 21.5 | 10.5 |
| 13 | M18 x 1.0 | 24.5 | 23.5 | 13.4 |
| 15 | M22 x 1.0 | 27.5 | 23.5 | 16.5 |
| 17 | M25 x 1.0 | 31.0 | 24.5 | 19.7 |
| 19 | M28 x 1.0 | 34.0 | 27.5 | 22.2 |
| 21 | M31 x 1.0 | 37.0 | 34.5 | 25.6 |
| 23 | M34 x 1.0 | 40.0 | 37.5 | 28.5 |
| 25 | M37 x 1.0 | 43.5 | 37.5 | 31.7 |

90° cable clamp (type C)

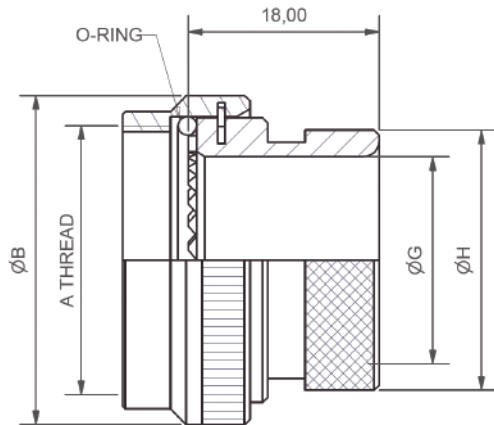


| Shell size | A Thread | B Max. | D Max. |
|------------|-----------|--------|--------|
| 09 | M12 x 1.0 | 18.0 | 20.00 |
| 11 | M15 x 1.0 | 21.0 | 21.0 |
| 13 | M18 x 1.0 | 24.5 | 22.0 |
| 15 | M22 x 1.0 | 27.5 | 23.0 |
| 17 | M25 x 1.0 | 31.0 | 25.0 |
| 19 | M28 x 1.0 | 34.0 | 27.5 |
| 21 | M31 x 1.0 | 37.0 | 30.0 |
| 23 | M34 x 1.0 | 40.0 | 31.5 |
| 25 | M37 x 1.0 | 43.5 | 34.5 |

Dimensions in millimeters

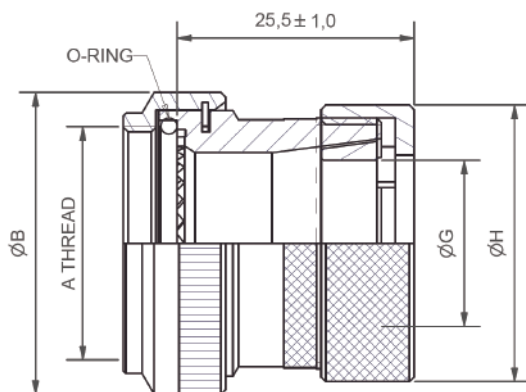


Backshell for heat shrink boot (type P)



| Shell size | A Thread | B Max. | G Max. | H Max. |
|------------|-----------|--------|--------|--------|
| 09 | M12 x 1.0 | 18.0 | 7.0 | 13.5 |
| 11 | M15 x 1.0 | 21.0 | 10.5 | 15.4 |
| 13 | M18 x 1.0 | 24.5 | 13.8 | 19.7 |
| 15 | M22 x 1.0 | 29.0 | 16.5 | 21.3 |
| 17 | M25 x 1.0 | 32.5 | 19.7 | 24.5 |
| 19 | M28 x 1.0 | 35.5 | 22.1 | 26.5 |
| 21 | M31 x 1.0 | 37.0 | 25.4 | 31.0 |
| 23 | M34 x 1.0 | 40.0 | 28.5 | 34.4 |
| 25 | M37 x 1.0 | 43.5 | 31.7 | 36.6 |

Screened adaptor with cone screen clamp (type X)



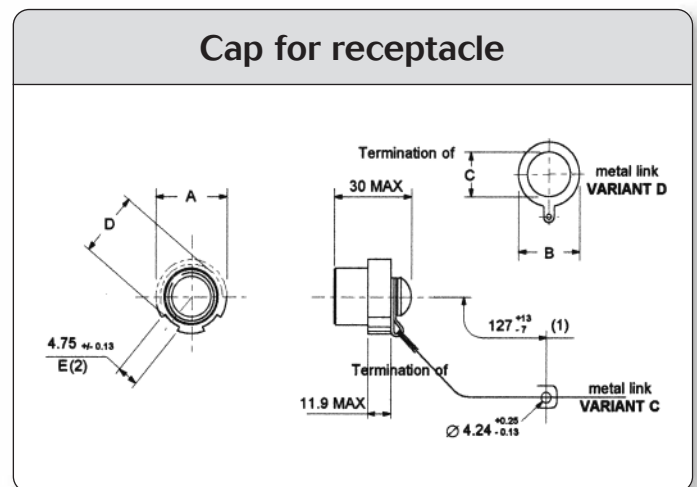
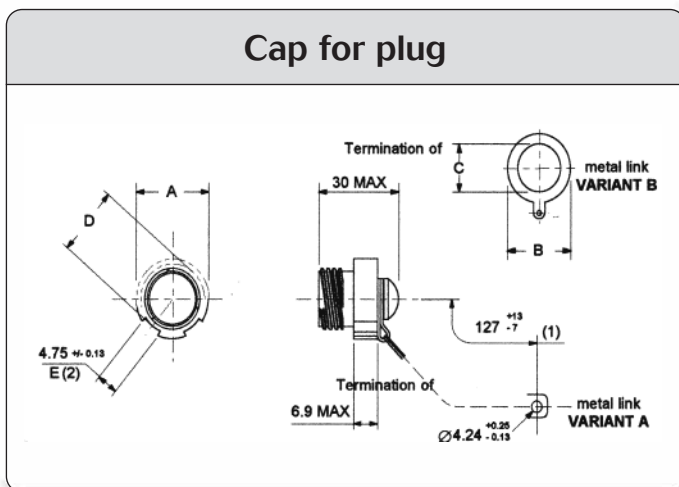
| Shell size | A Thread | B Max. | G | H Max. |
|------------|-----------|--------|------|--------|
| 09 | M12 x 1.0 | 18.0 | 6.8 | 16.0 |
| 11 | M15 x 1.0 | 21.0 | 9.5 | 19.0 |
| 13 | M18 x 1.0 | 24.5 | 12.8 | 22.0 |
| 15 | M22 x 1.0 | 29.0 | 14.8 | 25.4 |
| 17 | M25 x 1.0 | 32.5 | 17.9 | 28.5 |
| 19 | M28 x 1.0 | 35.5 | 20.0 | 32.0 |
| 21 | M31 x 1.0 | 37.0 | 23.0 | 35.0 |
| 23 | M34 x 1.0 | 40.0 | 26.4 | 38.0 |
| 25 | M37 x 1.0 | 43.5 | 29.3 | 41.0 |

JVS Bronze Series



Caps for bronze connectors (JVS)

| | | | | | | |
|--|------------|----------|-----------|----------|-----------|----------|
| Basic series | JVS | B | 09 | B | 00 | A |
| Accessory style: B: Protective cap | | | | | | |
| Shell size: 09 - 11 - 13 - 15 - 17 - 19 - 21 - 23 - 25 | | | | | | |
| Cap type: A or B: Cap for plug (See drawing below) C or D: Cap for receptacle (See drawing below) | | | | | | |
| Sub variant: Not applicable | | | | | | |
| Matière: A: Bronze | | | | | | |



- (1) Flexible metal link
- (2) Number of notch on A diameter

| Shell size | A Max. | Variant B | | Variant D | | D Max. | E |
|------------|--------|-----------|--------|-----------|--------|--------|----|
| | | B Max. | C Min. | B Max. | C Min. | | |
| 09 | 21.1 | 24.20 | 13.50 | 26.80 | 18.40 | 19.20 | 8 |
| 11 | 23.8 | 26.80 | 18.40 | 31.60 | 23.00 | 21.80 | |
| 13 | 28.2 | 30.50 | 19.80 | 36.90 | 26.20 | 26.10 | 10 |
| 15 | 31.4 | 31.60 | 23.00 | 40.10 | 29.40 | 29.30 | |
| 17 | 36.5 | 36.90 | 26.20 | 43.20 | 32.50 | 34.40 | 12 |
| 19 | 39.3 | 40.10 | 29.40 | 46.40 | 35.70 | 37.20 | |
| 21 | 42.5 | 43.20 | 32.50 | 49.20 | 39.10 | 40.50 | 16 |
| 23 | 45.3 | 46.40 | 35.70 | 52.80 | 42.10 | 43.10 | |
| 25 | 48.4 | 49.20 | 39.10 | 55.50 | 45.30 | 46.10 | 18 |

Dimensions in millimeters

JVS Bronze Series



Connectors weight

| | With contacts | | | | | | Without contact | | | | | |
|-------|---------------|--------|---------------------|--------|---------------------|--------|-----------------|--------|---------------------|--------|---------------------|--------|
| | Plug (type 5) | | Receptacle (type 0) | | Receptacle (type 7) | | Plug (type 5) | | Receptacle (type 0) | | Receptacle (type 7) | |
| | Male | Female | Male | Female | Male | Female | Male | Female | Male | Female | Male | Female |
| 09-35 | 28.46 | 32.38 | 22.70 | 26.62 | 34.51 | 38.43 | 27.42 | 28.66 | 21.66 | 22.90 | 33.47 | 34.71 |
| 09-98 | 28.46 | 31.68 | 22.70 | 25.93 | 34.51 | 37.74 | 27.42 | 28.71 | 21.66 | 22.95 | 33.47 | 34.76 |
| 11-01 | 37.17 | 44.46 | 29.80 | 37.09 | 45.08 | 52.37 | 35.53 | 40.49 | 28.16 | 33.12 | 43.44 | 48.40 |
| 11-02 | 36.25 | 42.55 | 28.88 | 35.18 | 44.17 | 50.47 | 34.71 | 38.68 | 27.34 | 31.32 | 42.63 | 46.60 |
| 11-04 | 36.72 | 44.31 | 29.35 | 36.94 | 44.63 | 52.23 | 35.33 | 40.34 | 27.96 | 32.97 | 43.24 | 48.26 |
| 11-05 | 36.79 | 44.76 | 29.42 | 37.39 | 48.33 | 52.67 | 35.06 | 39.80 | 27.69 | 32.43 | 42.97 | 47.71 |
| 11-22 | 35.90 | 41.91 | 28.53 | 34.54 | 43.82 | 49.82 | 35.21 | 39.43 | 27.84 | 32.06 | 43.13 | 47.34 |
| 11-35 | 36.55 | 45.15 | 29.18 | 37.79 | 43.86 | 53.07 | 34.29 | 37.09 | 26.92 | 29.72 | 42.20 | 45.01 |
| 11-80 | 45.40 | 54.33 | 37.96 | 46.89 | 53.35 | 70.43 | 34.23 | 36.45 | 26.79 | 29.08 | 42.77 | 44.37 |
| 11-98 | 36.47 | 43.32 | 29.10 | 35.95 | 44.39 | 51.23 | 34.39 | 37.36 | 27.02 | 30.00 | 42.30 | 45.28 |
| 11-99 | 36.90 | 44.89 | 29.53 | 37.52 | 44.81 | 52.80 | 34.46 | 37.94 | 27.09 | 30.57 | 42.38 | 45.86 |
| 13-04 | 52.20 | 61.58 | 38.98 | 48.35 | 59.89 | 69.27 | 49.12 | 53.84 | 35.90 | 40.61 | 56.81 | 61.53 |
| 13-08 | 53.14 | 65.99 | 39.92 | 52.77 | 60.83 | 73.69 | 50.36 | 58.06 | 37.14 | 44.83 | 58.06 | 65.75 |
| 13-26 | 54.06 | 68.08 | 40.84 | 54.85 | 61.75 | 75.77 | 49.74 | 56.42 | 36.52 | 43.19 | 57.44 | 64.11 |
| 13-35 | 52.65 | 66.96 | 39.42 | 53.74 | 60.34 | 74.65 | 48.83 | 53.32 | 35.60 | 40.09 | 56.52 | 61.01 |
| 13-98 | 52.30 | 63.76 | 39.08 | 50.54 | 59.99 | 71.45 | 48.83 | 53.84 | 35.60 | 40.61 | 56.52 | 61.53 |
| 15-05 | 64.61 | 77.85 | 48.48 | 61.73 | 73.49 | 86.74 | 60.76 | 68.18 | 44.63 | 52.05 | 69.64 | 77.06 |
| 15-15 | 66.59 | 84.35 | 50.46 | 68.23 | 75.47 | 93.24 | 60.96 | 68.53 | 44.83 | 52.40 | 69.84 | 77.41 |
| 15-18 | 67.11 | 89.14 | 50.98 | 73.02 | 75.99 | 98.02 | 60.86 | 71.28 | 44.73 | 55.15 | 69.74 | 80.16 |
| 15-19 | 65.94 | 85.12 | 49.82 | 69.00 | 74.83 | 94.01 | 59.35 | 66.27 | 43.22 | 50.14 | 68.23 | 75.15 |
| 15-35 | 66.19 | 89.12 | 50.07 | 72.99 | 75.08 | 98.00 | 59.77 | 66.17 | 43.64 | 50.04 | 68.65 | 75.05 |
| 15-97 | 65.77 | 83.26 | 49.64 | 67.14 | 74.65 | 92.14 | 59.92 | 67.58 | 43.79 | 51.46 | 68.80 | 76.46 |
| 17-02 | 71.16 | 103.09 | 66.95 | 86.21 | 93.75 | 113.01 | 64.00 | 73.93 | 59.79 | 69.71 | 86.59 | 96.51 |
| 17-06 | 74.18 | 98.00 | 69.99 | 93.81 | 96.76 | 120.58 | 64.36 | 74.18 | 60.16 | 69.99 | 86.93 | 96.76 |
| 17-08 | 71.68 | 93.34 | 67.48 | 89.14 | 94.25 | 115.91 | 65.52 | 77.85 | 61.33 | 73.66 | 88.10 | 100.43 |
| 17-26 | 73.12 | 99.89 | 68.92 | 95.69 | 95.69 | 122.46 | 64.08 | 74.08 | 59.89 | 69.89 | 86.66 | 96.66 |
| 17-35 | 73.71 | 107.33 | 69.52 | 103.14 | 96.29 | 129.91 | 64.16 | 73.21 | 59.97 | 69.02 | 86.74 | 95.79 |
| 17-75 | 87.60 | 115.61 | 83.41 | 111.42 | 110.18 | 138.19 | 65.28 | 80.88 | 61.08 | 76.69 | 87.85 | 103.46 |
| 17-99 | 73.24 | 99.44 | 69.05 | 95.25 | 95.82 | 122.02 | 64.41 | 74.73 | 60.21 | 70.53 | 86.98 | 97.30 |
| 19-11 | 93.71 | 127.42 | 77.08 | 110.80 | 110.70 | 144.42 | 85.25 | 106.14 | 68.62 | 115.19 | 76.56 | 123.13 |
| 19-32 | 91.75 | 124.99 | 75.12 | 108.37 | 108.74 | 141.99 | 80.63 | 93.24 | 64.01 | 102.29 | 71.95 | 110.23 |
| 19-35 | 92.52 | 133.33 | 75.89 | 116.71 | 109.51 | 109.39 | 81.05 | 92.39 | 64.43 | 101.45 | 72.37 | 109.39 |
| 21-11 | 112.91 | 162.13 | 97.53 | 146.75 | 131.96 | 181.19 | 94.90 | 118.47 | 79.52 | 128.84 | 88.20 | 137.52 |
| 21-16 | 105.72 | 143.63 | 90.33 | 128.24 | 124.77 | 162.68 | 93.41 | 112.66 | 78.03 | 123.03 | 86.71 | 131.72 |
| 21-35 | 106.41 | 157.67 | 91.03 | 142.29 | 125.46 | 176.72 | 92.69 | 108.67 | 77.31 | 119.04 | 85.99 | 127.72 |
| 21-39 | 109.83 | 160.27 | 94.45 | 144.89 | 128.89 | 179.33 | 95.44 | 119.68 | 80.06 | 130.05 | 88.75 | 138.74 |
| 21-41 | 106.21 | 149.31 | 90.83 | 159.68 | 125.27 | 168.36 | 91.97 | 108.62 | 76.59 | 118.99 | 85.27 | 127.67 |
| 21-48 | 103.63 | 133.84 | 88.25 | 118.46 | 122.61 | 152.90 | 90.52 | 107.64 | 75.14 | 92.26 | 109.58 | 126.70 |
| 21-75 | 135.19 | 177.13 | 119.80 | 161.74 | 154.25 | 196.18 | 90.52 | 107.64 | 75.14 | 92.26 | 109.58 | 126.70 |
| 23-21 | 125.27 | 182.95 | 109.64 | 167.32 | 146.95 | 204.63 | 109.11 | 142.31 | 93.48 | 154.32 | 103.16 | 163.99 |
| 23-35 | 121.20 | 186.08 | 105.57 | 170.44 | 142.88 | 207.76 | 103.83 | 124.05 | 88.20 | 136.06 | 97.88 | 145.73 |
| 23-53 | 121.35 | 176.40 | 105.72 | 160.77 | 143.03 | 198.08 | 102.94 | 123.80 | 87.31 | 135.81 | 96.98 | 145.49 |
| 23-55 | 123.21 | 180.44 | 107.58 | 164.81 | 144.89 | 202.13 | 104.10 | 125.86 | 88.47 | 137.87 | 98.15 | 147.55 |
| 25-07 | 153.58 | 179.40 | 138.29 | 186.55 | 176.55 | 202.05 | 114.40 | 141.15 | 99.11 | 148.30 | 137.37 | 163.70 |
| 25-11 | 142.64 | 181.90 | 127.35 | 166.61 | 165.62 | 204.80 | 121.84 | 154.10 | 106.55 | 138.81 | 144.82 | 177.08 |
| 25-19 | 148.26 | 227.68 | 132.98 | 212.40 | 171.24 | 250.66 | 117.15 | 152.26 | 101.87 | 164.81 | 112.29 | 175.23 |
| 25-24 | 147.02 | 224.83 | 131.74 | 209.55 | 170.00 | 247.80 | 118.15 | 153.97 | 102.86 | 166.52 | 113.28 | 176.94 |
| 25-29 | 142.86 | 214.73 | 127.57 | 199.45 | 165.83 | 237.70 | 120.55 | 158.61 | 105.27 | 171.16 | 115.69 | 181.58 |
| 25-35 | 137.37 | 218.82 | 122.09 | 203.54 | 160.35 | 241.80 | 115.14 | 139.43 | 99.86 | 151.99 | 110.28 | 162.41 |
| 25-37 | 153.57 | 170.01 | 138.29 | 177.20 | 176.55 | 192.56 | 114.40 | 141.15 | 99.11 | 148.30 | 137.37 | 163.70 |
| 25-44 | 143.71 | 183.40 | 128.18 | 195.16 | 166.69 | 206.58 | 110.17 | 135.50 | 94.64 | 147.50 | 133.15 | 158.68 |
| 25-43 | 142.96 | 219.07 | 127.67 | 203.79 | 165.93 | 242.05 | 119.58 | 157.54 | 104.30 | 170.10 | 114.72 | 180.52 |
| 25-46 | 148.66 | 207.81 | 133.38 | 192.53 | 171.64 | 230.78 | 112.34 | 137.55 | 97.06 | 150.10 | 107.48 | 160.52 |
| 25-61 | 135.64 | 202.00 | 120.35 | 186.72 | 158.61 | 224.98 | 114.45 | 141.47 | 99.17 | 154.02 | 109.59 | 164.44 |
| 25-08 | 200.96 | 279.93 | 185.68 | 264.65 | 223.94 | 302.91 | 111.65 | 141.00 | 96.36 | 153.55 | 106.78 | 163.97 |
| 25-20 | 163.80 | 238.77 | 148.51 | 223.49 | 186.77 | 261.75 | 110.28 | 135.71 | 95.00 | 148.26 | 105.42 | 158.68 |
| 25-04 | 144.94 | 219.00 | 129.66 | 203.71 | 167.91 | 241.97 | 122.11 | 155.88 | 106.83 | 168.44 | 117.25 | 178.86 |

Weight in gram

Common section



Summary

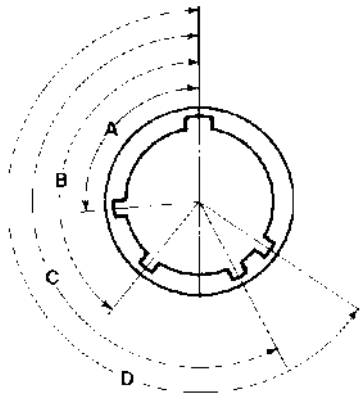
| | |
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Common section

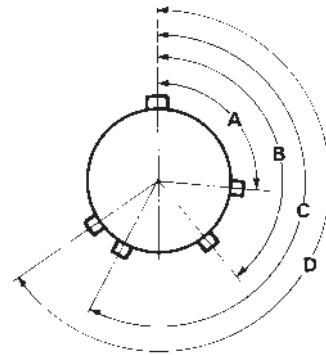


Orientations

Viewed from face of receptacle



Viewed from front of plug



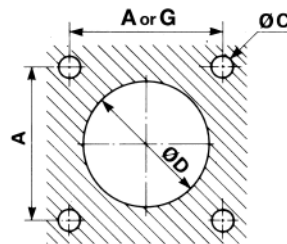
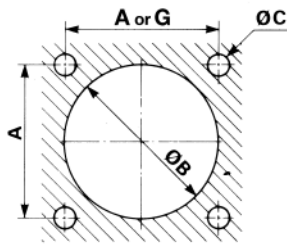
| Contact size | Angles | N | A | B | C | D | E |
|---------------|--------|-----|-----|-----|-----|-----|-----|
| 09 (A) | A° | 105 | 102 | 80 | 35 | 64 | 91 |
| | B° | 140 | 132 | 118 | 140 | 155 | 131 |
| | C° | 215 | 248 | 230 | 205 | 234 | 197 |
| | D° | 265 | 320 | 312 | 275 | 304 | 240 |
| 11 (B) | A° | 95 | 113 | 90 | 53 | 119 | 51 |
| | B° | 141 | 156 | 145 | 156 | 146 | 141 |
| | C° | 208 | 182 | 195 | 220 | 176 | 184 |
| | D° | 236 | 292 | 252 | 255 | 298 | 242 |
| 13 (C) | A° | 95 | 113 | 90 | 53 | 119 | 51 |
| | B° | 141 | 156 | 145 | 156 | 146 | 141 |
| | C° | 208 | 182 | 195 | 220 | 176 | 184 |
| | D° | 236 | 292 | 252 | 255 | 298 | 242 |
| 15 (D) | A° | 95 | 113 | 90 | 53 | 119 | 51 |
| | B° | 141 | 156 | 145 | 156 | 146 | 141 |
| | C° | 208 | 182 | 195 | 220 | 176 | 184 |
| | D° | 236 | 292 | 252 | 255 | 298 | 242 |
| 17 (E) | A° | 80 | 135 | 49 | 66 | 62 | 79 |
| | B° | 142 | 170 | 169 | 140 | 145 | 153 |
| | C° | 196 | 200 | 200 | 200 | 180 | 197 |
| | D° | 293 | 310 | 244 | 257 | 280 | 272 |
| 19 (F) | A° | 80 | 135 | 49 | 66 | 62 | 79 |
| | B° | 142 | 170 | 169 | 140 | 145 | 153 |
| | C° | 196 | 200 | 200 | 200 | 180 | 197 |
| | D° | 293 | 310 | 244 | 257 | 280 | 272 |
| 21 (G) | A° | 80 | 135 | 49 | 66 | 62 | 79 |
| | B° | 142 | 170 | 169 | 140 | 145 | 153 |
| | C° | 196 | 200 | 200 | 200 | 180 | 197 |
| | D° | 293 | 310 | 244 | 257 | 280 | 272 |
| 23 (H) | A° | 80 | 135 | 49 | 66 | 62 | 79 |
| | B° | 142 | 170 | 169 | 140 | 145 | 153 |
| | C° | 196 | 200 | 200 | 200 | 180 | 197 |
| | D° | 293 | 310 | 244 | 257 | 280 | 272 |
| 25 (J) | A° | 80 | 135 | 49 | 66 | 62 | 79 |
| | B° | 142 | 170 | 169 | 140 | 145 | 153 |
| | C° | 196 | 200 | 200 | 200 | 180 | 197 |
| | D° | 293 | 310 | 244 | 257 | 280 | 272 |

Common section

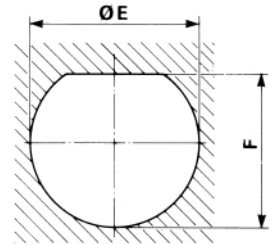


Panel cut-out

Square flange receptacle (type 0)



Jam nut receptacle (type 7)



| Shell size | 9 (A) | 11 (B) | 13 (C) | 15 (D) | 17 (E) | 19 (F) | 21 (G) | 23 (H) | 25 (J) |
|-----------------|-------|--------|--------|--------|--------|--------|--------|--------|--------|
| A | 18.26 | 20.62 | 23.01 | 24.61 | 26.97 | 29.36 | 31.75 | 34.93 | 38.10 |
| G | 15.09 | 18.26 | 20.62 | 23.01 | 24.61 | 26.97 | 29.36 | 31.75 | 34.94 |
| B min. | 16.66 | 20.22 | 23.42 | 26.59 | 30.96 | 32.94 | 36.12 | 39.29 | 42.47 |
| C ± 0.13 | 3.25 | 3.25 | 3.25 | 3.25 | 3.25 | 3.25 | 3.25 | 3.91 | 3.91 |
| D min. | 13.11 | 15.88 | 19.05 | 23.01 | 25.81 | 28.98 | 32.16 | 34.93 | 37.69 |
| E + 0.25 | 17.78 | 20.96 | 25.65 | 28.83 | 32.01 | 35.18 | 38.35 | 41.53 | 44.70 |
| F 0 | 17.02 | 19.59 | 24.26 | 27.56 | 30.73 | 33.91 | 37.08 | 40.26 | 43.43 |

Max. thickness panel for square flange receptacle - type 0: front mounting : 3,2 mm Max. - Rear mounting: 2,5 mm Max.

(Dimensions in millimeters).

Gaskets

| Shell size | Part numbers | |
|---------------|--|------------------------------|
| | Gasket for receptacles type 0* (ordered separately) | O ring for receptacle type 7 |
| 09 (A) | 8599-5541 | AS3582-019 |
| 11 (B) | 8599-5542 | AS3582-022 |
| 13 (C) | 8599-5543 | AS3582-024 |
| 15 (D) | 8599-5544 | AS3582-026 |
| 17 (E) | 8599-5545 | AS3582-028 |
| 19 (F) | 8599-5546 | AS3582-128 |
| 21 (G) | 8599-5547 | AS3582-130 |
| 23 (H) | 8599-5548 | AS3582-132 |
| 25 (J) | 8599-5549 | AS3582-134 |

* For rear mounting

Common section



Crimp contact

| Contact size | Contact type | Souriau P/N (without colour code) | MIL-DTL-38999 Contacts | |
|--------------------------------------|--------------|--------------------------------------|------------------------|--------------------------------|
| | | | Part number | Profile and colour code |
| #22D | Pin | 8599-0702 JJ | M39029/58 360 | |
| | Socket | 8599-0706 900 | M39029/56 348 | |
| #20 | Pin | 8599-0703 SA | M39029/58 363 | |
| | Socket | 8599-0707 900 | M39029/56 351 | |
| #16 | Pin | 8599-0704 MJ | M39029/58 364 | |
| | Socket | 8599-0708 900 | M39029/56 352 | |
| #16 Coaxial | Pin | - | M39029/76 424 | |
| | Socket | - | M39029/77 428 | |
| #12 | Pin | 8599-0705 MJ | M39029/58 365 | |
| | Socket | 8599-0709 900 | M39029/56 353 | |
| #12 Coaxial | Pin | - | M39029/102 558 | |
| | Socket | - | M39029/103 559 | |
| | Pin | - | M39029/28 211 | |
| | Socket | - | M39029/75 416 | |
| #10 Power | Pin | - | M39029/58 528 | |
| | Socket | - | M39029/56 527 | |
| #8 Power | Pin | 8599-7544 | - | |
| | Socket | 8599-7541 | - | |
| | Boot | 8599-4542 | - | For wire #8 |
| | | 8599-4547 | - | For wire #10 |
| Reductor | 8599-7645 | - | | |
| #8 Coaxial | Pin | - | M39029/60 367 | |
| | Socket | - | M39029/59 366 | |
| | Boot | 8590-4571 | - | |
| #8 Triaxial | Pin | - | M39029/90 529 | |
| | Socket | - | M39029/91 530 | |
| | Boot | 8590-4571 | - | |
| #4 Power | Pin | 8599-7598 900* | - | For wire 25 mm ² |
| | Socket | 8599-7599 900* | - | |
| | Pin | 8599-7534 | - | For wire 21.15 mm ² |
| | Socket | 8599-7535 | - | |
| | Boot | for Cable 16 mm ² | 8599-4594 | - |
| | | for Cable 10 mm ² | 8599-4593 | - |
| Reductor Cable 10 mm ² | 8400-2352A | - | | |
| #4 Power with reduced barrel | Pin | 8599-7528 900 | - | Mating part #4 / Barrel #6 |
| | Socket | 8599 7529 900 | - | |
| | Boot | 8599-4593 | - | |

* Not included in connector P/N. Must be ordered separately.

Common section



Crimp contact

| Contact size | Contact type | Contact Ø | Conductor section | | | | External Ø over insulator | |
|------------------------------------|---|-----------|---|-----|-----------------|-------|---------------------------|------|
| | | | AWG | | mm ² | | min | max |
| | | | min | max | min | max | | |
| #22D | Pin | 0.76 | 28 | 22 | 0.095 | 0.34 | 0.76 | 1.37 |
| | Socket | | | | | | | |
| #20 | Pin | 1.00 | 24 | 20 | 0.21 | 0.60 | 1.02 | 2.11 |
| | Socket | | | | | | | |
| #16 | Pin | 1.60 | 20 | 16 | 0.60 | 1.34 | 1.65 | 2.77 |
| | Socket | | | | | | | |
| #16 Coaxial | Pin | 1.60 | RG 174 RG 179 RG 316 | | | | 1.65 | 2.60 |
| | Socket | | | | | | | |
| #12 | Pin | 2.40 | 14 | 12 | 1.91 | 3.18 | 2.46 | 3.61 |
| | Socket | | | | | | | |
| #12 Coaxial | Pin | 2.40 | RG 174 RG 179 RG 316 | | | | 2.40 | 2.60 |
| | Socket | | | | | | | |
| | Pin | | | | | | | |
| | Socket | | | | | | | |
| #10 Power | Pin | 3.20 | Please consult us | | | | - | 2.95 |
| | Socket | | | | | | | |
| #8 Power | Pin | 3.64 | - | 8 | - | 8.98 | - | - |
| | Socket | | - | - | - | - | 4.50 | 6.5 |
| | Boot | | - | - | - | - | 2.50 | 4 |
| | Reductor | | - | - | - | - | - | - |
| #8 Coaxial | Pin | 5.50 | RG 188 A/U | | | | - | 2.80 |
| | Socket | | | | | | | |
| | Boot | | | | | | | |
| #8 Triaxial | Pin | 5.50 | 0,76MIL-C17/176 00002 FILECA F.2703/14 RAYCHEM CHEMINAX 10612 FILOTEX M 17/176 00002 | | | | 3.15 | 3.40 |
| | Socket | | | | | | | |
| | Boot | | | | | | | |
| #4 Power | Pin | 5.74 | - | (3) | - | 25 | - | - |
| | Socket | | 5 | 4 | 16 | 21.15 | - | - |
| | Pin | | - | - | - | - | 6.35 | 7.50 |
| | Socket | | - | - | - | - | 4 | 5.8 |
| | Available for Boot 8599-7534 and 7535 contacts | | - | - | - | - | - | - |
| | Reductor Cable 10 mm | | - | - | - | - | - | - |
| #4 Power with reduced barrel | Pin | 5.74 | 6 | | 13.3 | | - | - |
| | Socket | | - | | - | | 4 | 5.80 |
| | Boot | | - | | - | | 4 | 5.80 |

Common section



Straight spill contacts

| Contact size | Contact type | Spill type | Part number | Profile |
|----------------------|--------------|------------|-----------------|---------|
| # 22D | Pin | L | 8599 - 0720 900 | |
| | Pin | M | 8599 - 8018 JJ | |
| | Pin | C | 8599 - 0730 900 | |
| | Pin | C | 8599 - 0796 900 | |
| | Socket | L | 8599 - 0721 900 | |
| | Pin | M | 8599 - 8028 900 | |
| | Socket | C | 8599 - 0731 900 | |
| | Socket | S | 8599 - 0797 900 | |
| # 20 | Pin | M | 8599 - 0658 JJ | |
| | Socket | M | 8599 - 0759 900 | |
| | Pin | C | 8599 - 0724 900 | |
| | Socket | C | 8599 - 0725 900 | |
| | Pin | L | 8599 - 0771 900 | |
| | Socket | L | 8599 - 0772 900 | |
| # 16 | Pin | C | 8599 - 0726 900 | |
| | Socket | C | 8599 - 0727 900 | |
| Contact coaxial # 16 | Pin | C | 8599 - 1000 900 | |
| # 12 | Pin | C | 8599 - 7929 900 | |
| | Socket | C | 8599 - 7932 900 | |

S: Specific spill L: Long spill C: Short spill M: Medium spill

Plastic protective caps*

| Shell size | Part numbers | | |
|------------|----------------------|----------------|---|
| | Caps for receptacles | Caps for plugs | Caps for composite plugs only(J and M) |
| 9 (A) | 70777 | 8500-5587 A | 70205 |
| 11 (B) | 70205 | 70198 | 8500-5598 |
| 13 (C) | 70206 | 8500-5600 | 8500-5600 |
| 15 (D) | 70207 | 8500-5601 | 8500-5601 |
| 17 (E) | 70201 | 8500-5602 | 8500-5602 |
| 19 (F) | 70209 | 8500-5592 A | 8500-5592 A |
| 21 (G) | 70210 | 8500-5593 A | 8500-5593 A |
| 23 (H) | 70211 | 8500-5593 A | 70472 |
| 25 (J) | 8500-5593 A | J599ABC6009A00 | J599ABC6009A00 |

*Excepted 8D composite version (X): supplied without cap

Common section



Crimp contacts: 1500 mating

| Contact size | MIL-DTL-38999 contacts | | |
|--------------|------------------------|----------------|-------------------------|
| | Contact type | Part number | Profile and colour code |
| #22 D | Pin (H) | M39029/107 620 | Blue - Red - Black |
| | Socket (J) | M39029/106 614 | Blue - Brown - Yellow |
| #20 | Pin (H) | M39029/107 621 | Blue - Red - Brown |
| | Socket (J) | M39029/106 615 | Blue - Brown - Green |
| #16 | Pin (H) | M39029/107 622 | Blue - Red - Red |
| | Socket (J) | M39029/106 616 | Blue - Brown - Blue |
| #12 | Pin (H) | M39029/107 623 | Blue - Red - orange |
| | Socket (J) | M39029/106 617 | Blue - Brown - Gray |

Wire wrap contact

| Contact size | Contact type | Part number | Profile |
|--------------|--------------|-----------------|---------|
| # 22D | Pin | 8599 - 0790 JJ | |
| # 20 | Pin | 8599 - 0791 900 | |

| Contact size | Contact type | Contact Ø (mm) | mm |
|--------------|--------------|----------------|------|
| # 22D | Pin | 0.76 | 0.86 |
| # 20 | Pin | 1 | 0.86 |

Thermocouple contacts

| Contact size | Contact type | Souriau part numbers (without color code) | MIL-DTL-38999 contacts | |
|----------------|--------------|---|------------------------|--|
| | | | Part numbers | Profile and colour code |
| # 22 D Chromel | Pin | - | M39029/87-472 | |
| | Socket | - | M39029/88-484 | |
| # 22 D Alumel | Pin | - | M39029/87-471 | |
| | Socket | - | M39029/88-483 | |
| # 20 Chromel | Pin | 8599-0749 900 | 8599-0949 900 | jaune - yellow violet bleu - blue |
| | Socket | 8599-0753 900 | 8599-0953 900 | jaune - yellow gris - grey gris - grey |
| # 20 Alumel | Pin | 8599-0761 900 | 8599-0961 900 | jaune - yellow violet vert - green |
| | Socket | 8599-0765 900 | 8599-0965 900 | jaune - yellow gris - grey violet |

| Contact size | Ø Contact (mm) | Wire section | | | | | Ø Over insulation mm | | |
|-----------------------|----------------|--------------|-----|-----|-------|-----------------|----------------------|------|------|
| | | min | Awg | max | min | mm ² | max | min | max |
| # 22 D Chromel Alumel | 0.75 | 28 | | 22 | 0.095 | 0.34 | | 0.76 | 1.37 |
| # 20 Chromel Alumel | 1 | 24 | | 20 | 0.21 | 0.6 | | 1.02 | 2.11 |

Common section



Crimping tools

| Contact size | Contact type | Pliers | | | | | | |
|--------------|--------------|---|---------|---|---------|--------------------------------|--------------------|---------------------|
| | | M22520/1-01 (Souriau 8365) Turret part number | | M22520/2-01 (Souriau 8476-01) Locator part number | | M300 BT Locator part number | M22520/23-01 | |
| | | Norme | Souriau | Norme | Souriau | | Turret part number | Locator part number |
| # 22D | Pin | - | - | M22520/2-09 | 8476-09 | - | - | - |
| | Socket | - | - | M22520/2-07 | 8476-07 | - | - | - |
| # 20 | Pin | M22520/1-04 | 8365-04 | M22520/2-10 | 8476-10 | - | - | - |
| | Socket | | | | 8476-10 | - | - | - |
| # 16 | Pin | M22520/1-04 | 8365-04 | - | - | - | - | - |
| | Socket | | | - | - | - | - | - |
| # 12 | Pin | M22520/1-04 | 8365-04 | - | - | - | - | - |
| | Socket | | | - | - | - | - | - |
| # 8 Power | Pin | - | - | - | - | SP 593 | M22520/23-02 | 8599-9601 |
| | Socket | - | - | - | - | | | |
| # 4 Power | Pin | - | - | - | - | - | M22520/23-04 | M22520/23-11 |
| | Socket | - | - | - | - | - | | |

| Contact size | Contact type | Pliers | | |
|-----------------|--------------|---|------------------------------------|------------------------------------|
| | | M22520/2-01 (Souriau 8476-01) Locator part number | M22520/4-01 Locator part number | M22520/5-01 Locator part number |
| # 12 Coaxial | Inner | - | - | M22520/5-03 |
| | Outer | - | - | |
| # 16 Coaxial | Inner | M22520/2-35 | - | - |
| | Outer | - | M22520/4-02 | - |
| # 8 Coaxial | Inner | M22520/2-31 | - | - |
| | Outer | - | - | M22520/5-05 |
| # 8 Triaxial | Inner | K709 | - | - |
| | Middle | - | - | Y631 closure B |
| | Ferrule | - | - | Y631 closure A |

* Pneumatic pliers

Nota: for the #10 contact's plier and locator, please consult us.

Insertion and extraction tools & Filler plugs

| Contact size | Material | Part number | | Insertion/extraction tools | | Filter plugs | |
|--------------|----------|--------------|-----------|----------------------------|------------|--------------|--------|
| | | Spec | Souriau | Insertion | Extraction | Part number | Color |
| # 22D | Plastic | M81969/14-01 | - | Green | White | MS27488-22 | Black |
| # 20 | Plastic | M81969/14-10 | - | Red | Orange | MS27488-20 | Red |
| # 16 | Plastic | M81969/14-03 | - | Blue | | MS27488-16 | Blue |
| # 12 | Plastic | M81969/14-04 | - | Yellow | White | MS27488-12 | Yellow |
| # 10 | Plastic | M81969/14-05 | - | Grey | | - | - |
| | | | | | | | |
| # 8 | Plastic | M81969/14-12 | - | - | Red | - | - |
| | Metallic | - | 8660-197 | - | - | - | - |
| # 4 | Plastic | M81969/14-07 | - | - | Blue | - | - |
| | Metallic | - | 8533-8175 | - | - | - | - |

Dummy contact size 8

Part number: 8599-0308

Dummy contact size 4

Part number: 8599-0310

Filler plugs

Direction of introduction in grommet





Wiring instruction

Cable preparation and wire stripping

| Contact size | L min. | L Max. | |
|--------------|-------------|-------------|--|
| # 22D | 3,58 .14 | 3,99 .16 | |
| # 20 | 5,31 .21 | 5,82 .23 | |
| # 16 | 5,31 .21 | 5,82 .23 | |
| # 12 | 5,31 .21 | 5,82 .23 | |
| # 8 | 12,5 .49 | 13 .51 | |
| # 4 | 12,5 .49 | 13 .51 | |

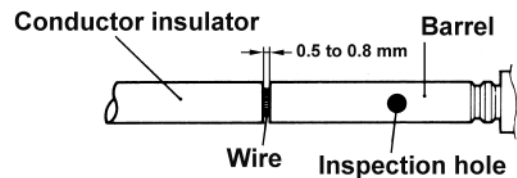
L = Length of wire stripping

Insertion of wire in contact barrel

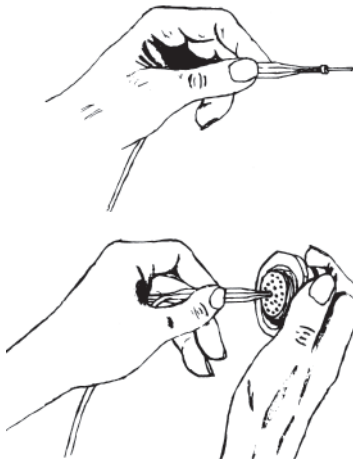
When inserting the stripped wire into the contact barrel check that no strands are left outside and that the wire is visible through the wire inspection hole in the barrel.

Important:

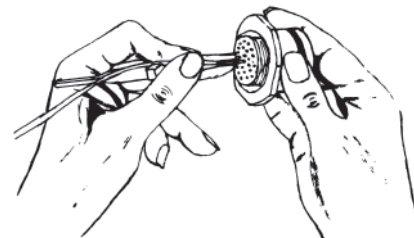
- Slide any accessories over wire strands before carrying out the following operations.
- Contacts are inserted and extracted from the rear of the connector.



Insertion of the contacts



- 1 Engage the crimp cable/contact assembly into the longitudinal slot of the plastic tool (coloured tip). Slide the tool down the cable until the tip of the tool touches the contact retention shoulder.



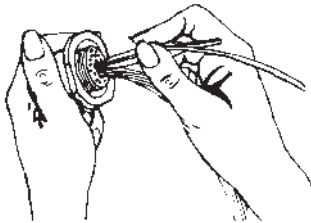
- 2 Introduce the contact into the required contact cavity in the insulator, pushing tool axially, until the contact snaps into position in clip.

- 3 Withdraw the tool (from rear). Check that the contact is firmly locked by pulling wire gently. When connector is fully loaded, check the position of contact tips. They should all be in the same plane.

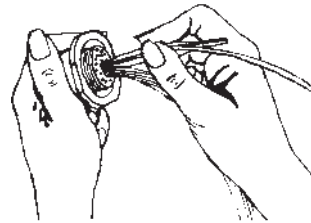
Nota: For larger sizes of cable which are stiff enough manual insertion without tool is preferable.



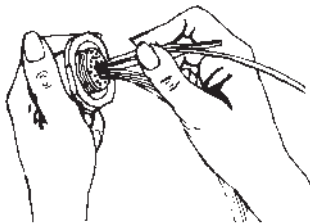
Extraction of the contacts



- 1 Engage the appropriate cable into the longitudinal slot of the tool with the white tip towards connector.



- 2 Slide the tool down towards the contact. Insert the tool in the insulator until it touches the contact shoulder.



- 3 Holding the tool-contact and cable assembly together, remove them simultaneously.

Backshell tightening and slacking tools

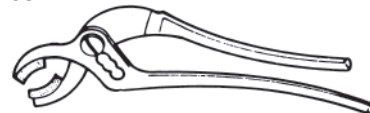
Backshell tightening pliers, part number: 8498-03

Square jaws, part number: 8500-1015 (order 2 jaws).

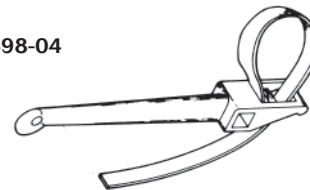
Strap clamp, part number: 8498-04

Spare strap, part number: 8498-103

8498-03



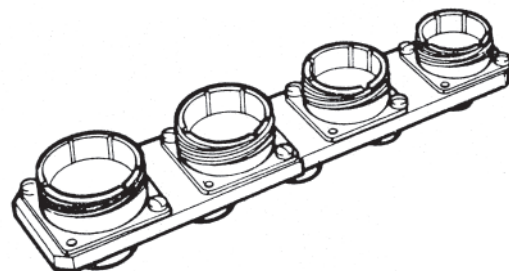
8498-04



Tightening support

Part number: 8599-0831

This tool is made up of dummy receptable housings of all 9 sizes for all key polarisation, and locates free connectors during wiring and fitting of rear accessories.



8D-JVS Series with quadrax contacts



Derived from:
MIL-DTL-38999 Serie III

8D-JVS Series with quadrax contacts



Description

- Size 8 outer contact with 4 #24 inner contacts forming two 100 or 150 matched impedance pairs with excellent 360° shielding.
- Replace 2 twinax contacts with:
 - better performances (reduced cross talk)
 - shorter cabling time
 - compact profile, lighter weight
- One contact complete a full duplex 100 mbps ethernet link
- Ground connection of the cable braid possibility trough electrical continuity with the connector shell
- Standard 38999 shells and inserts

Characteristics

Applications

- Quadrax connector for network applications in severe climatic and/or mechanical environments.

Mechanical

See page 6

Climatics

See page 7

| Contact | Rated current (A) | Max contact resistance (mΩ) | | |
|-----------------|-------------------|-----------------------------|-------------|-------------|
| | | 23°C | | 200°C |
| | | Initial | After tests | After tests |
| Signal contacts | 1 | 15 | 30 | 45 |
| Outer body | 12 | 3 | 4 | 6 |

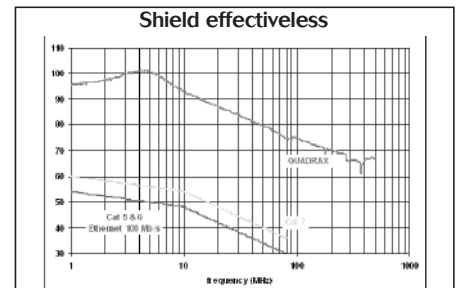
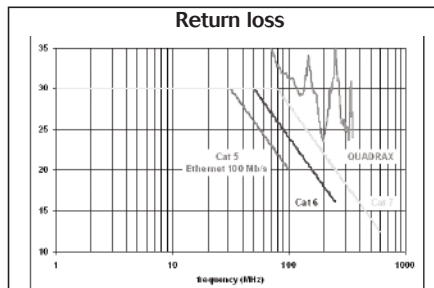
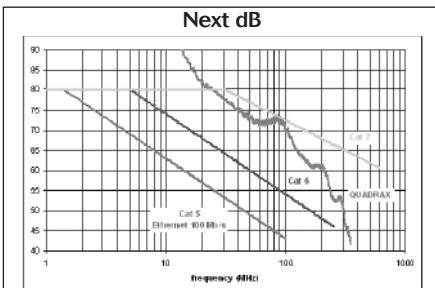
Electrical

- **ISO/IEC 11801 category 6 compliant:**
 - Next (Cross talk): > 46 dB at 250 MHz
 - Return loss: > 16 dB at 250 MHz
 - Shield effectiveness: > 36 dB at 250 MHz
- **Contact to shell continuity: 10 mΩ max.**
- **Contact resistance (low level):**
 - Initial: 15 mΩ
 - After tests: 30 mΩ

- **Test voltage rating:**
 - Sea level: 500 Vrms
 - At 21000 m = 125 Vrms
- **Insulation resistance: > 5000 mΩ**
- **# 24 contact for cable wire:** AWG 22 à 7 to AWG 26

Mechanical :

- **Operating temperature:** -65°C to +200°C
- **# 24 contacts:** copper alloy
- **Contact # 8 body:** copper alloy
- **Insulator:** thermoplastic
- **Contact plating:** Gold over nickel



8D-JVS Series with quadrax contacts



Connector part numbers

| Basic Series | 8D | 0 | C | 11 | W | 81 | P | N | 284 |
|--|----|---|---|----|---|----|---|---|-----|
| Shell style: | | | | | | | | | |
| 0: Square flange receptacle | | | | | | | | | |
| 7: Jam nut receptacle | | | | | | | | | |
| 5: Plug | | | | | | | | | |
| Type: | | | | | | | | | |
| C: Receptacle with Quadrax PC tail contacts* | | | | | | | | | |
| Q: Connectors with Quadrax crimp contacts | | | | | | | | | |
| Shell size: 11 - 17 - 21 - 25 | | | | | | | | | |
| Plating: | | | | | | | | | |
| W: Olive green cadmium (aluminium) | | | | | | | | | |
| F: Nickel (aluminium) | | | | | | | | | |
| K: Passivated (stainless steel) | | | | | | | | | |
| S: Nickel (stainless steel) | | | | | | | | | |
| J: Olive green cadmium (composite) | | | | | | | | | |
| M: Nickel (composite) | | | | | | | | | |
| X: Without plating (composite) | | | | | | | | | |
| TF: Nickel (Titanium) | | | | | | | | | |
| TT: Without plating (Titanium) | | | | | | | | | |
| Contact layout: See page 8 to 11 | | | | | | | | | |
| Contact type: | | | | | | | | | |
| P: Pin A: Connector supplied less pin contact | | | | | | | | | |
| S: Socket B: Connector supplied less socket contact | | | | | | | | | |
| Orientation: N, A, B, C, D & E (See page 58) | | | | | | | | | |
| Specification: | | | | | | | | | |
| 284: Grounded (cts 100 Ω)* | | | | | | | | | |
| 308: Not grounded (cts 100 Ω) | | | | | | | | | |
| 384: Grounded (cts 150 Ω)* | | | | | | | | | |
| 408: Not grounded (cts 150 Ω) | | | | | | | | | |

Bronze connectors part numbers

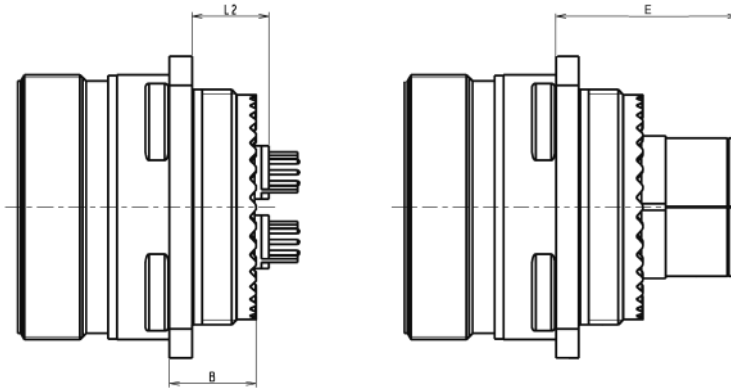
| Basic Series | JVS | C | 00A | 09 | 35 | P | N | 284 |
|---|-----|---|-----|----|----|---|---|-----|
| Shell style: | | | | | | | | |
| C: Receptacle with Quadrax PC tail contacts* | | | | | | | | |
| Q: Connectors with Quadrax crimp contacts | | | | | | | | |
| Shell style: | | | | | | | | |
| 00A: Square flange receptacle | | | | | | | | |
| 16A: Plug | | | | | | | | |
| 07A: Jam nut receptacle | | | | | | | | |
| Shell size: 11 - 17 - 21 - 25 | | | | | | | | |
| Contact layout: See page 8 to 11 | | | | | | | | |
| Contact type: | | | | | | | | |
| P: Pin A: Connector supplied less pin contact | | | | | | | | |
| S: Femelle B: Connector supplied less socket contact | | | | | | | | |
| Orientation: N, A, B, C, D & E (See page 58) | | | | | | | | |
| Specification: | | | | | | | | |
| 284: Grounded (cts 100 Ω)* | | | | | | | | |
| 308: Not grounded (cts 100Ω) | | | | | | | | |
| 384: Grounded (cts 150 Ω)* | | | | | | | | |
| 408: Not grounded (cts 150 Ω) | | | | | | | | |

* Excepted mixte versions (17-81, 25-80, 25-81, 25-82, 25-86)

8D-JVS Series with quadrax contacts

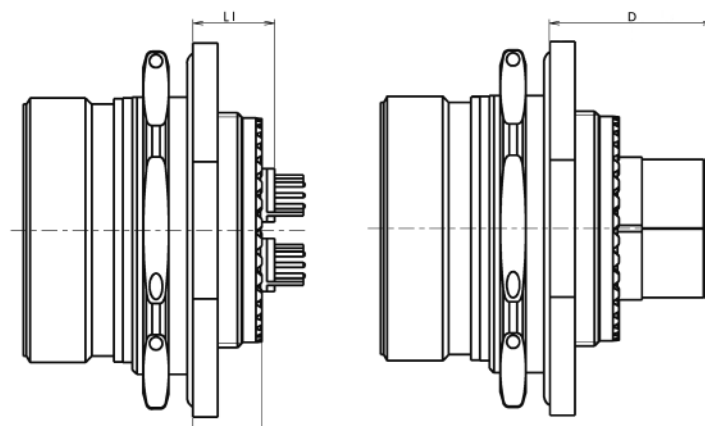


Square flange receptacle – Type 0



| Shell size | PC tail contacts | Contacts to crimp | L2 Max. | L2 Min. |
|------------|------------------|-------------------|---------|---------|
| | B Max. | E Max. | | |
| 11 | 37.00 | 52.30 | 38.30 | 53.60 |
| 17 | 37.00 | 52.30 | 38.30 | 53.60 |
| 21 | 36.00 | 51.30 | 38.50 | 53.80 |
| 25 | 36.00 | 51.30 | 38.50 | 53.80 |

Jam nut receptacle – Type 7



| Shell size | PC tail contacts | Contacts to crimp | L1 Max. | L1 Min. |
|------------|------------------|-------------------|---------|---------|
| | B Max. | D Max. | | |
| 11 | 9.90 | 22.40 | 11.45 | 10.50 |
| 17 | 9.90 | 22.20 | 11.30 | 10.35 |
| 21 | 9.90 | 22.20 | 11.30 | 10.35 |
| 25 | 9.90 | 22.20 | 11.30 | 10.35 |

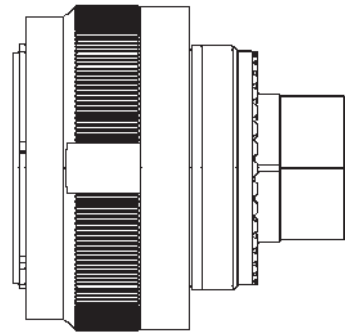
Dimensions in millimeters)

8D-JVS Series with quadrax contacts

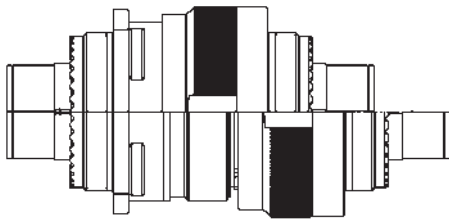


Plug - Type 5

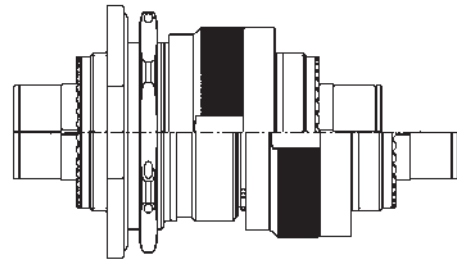
| Shell size | C max. size. |
|------------|--------------|
| 11 | 44.00 |
| 17 | 44.00 |
| 21 | 44.00 |
| 25 | 44.00 |



Mated connector - Type 0 & type 5

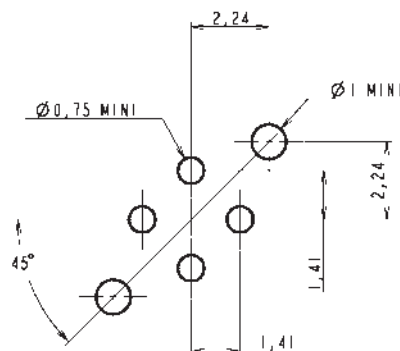


Mated connector - Type 7 & type 5



| Shell size | B Max. | D Max. | L1 Max. | L1 Min. |
|------------|--------|--------|---------|---------|
| 11 | 64.90 | 66.60 | 49.60 | 51.30 |
| 17 | 64.90 | 66.60 | 49.60 | 51.30 |
| 21 | 64.10 | 66.60 | 48.80 | 51.30 |
| 25 | 64.10 | 66.60 | 48.80 | 51.30 |

Drill dimensions for PCB mount

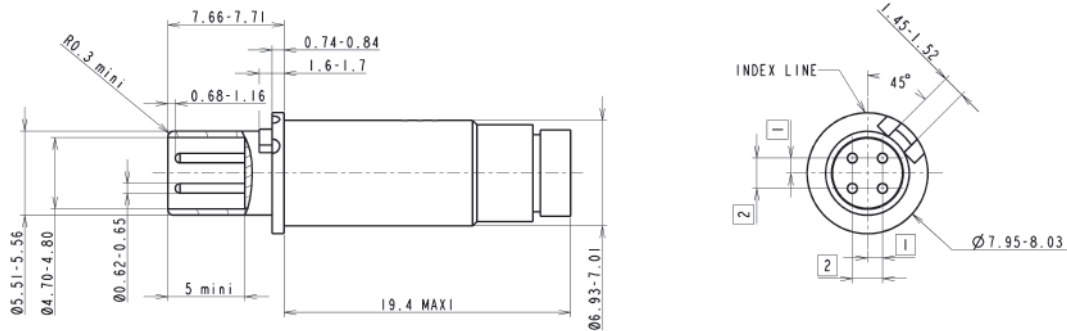


(Dimensions in millimeters)

8D-JVS Series with quadrax contacts

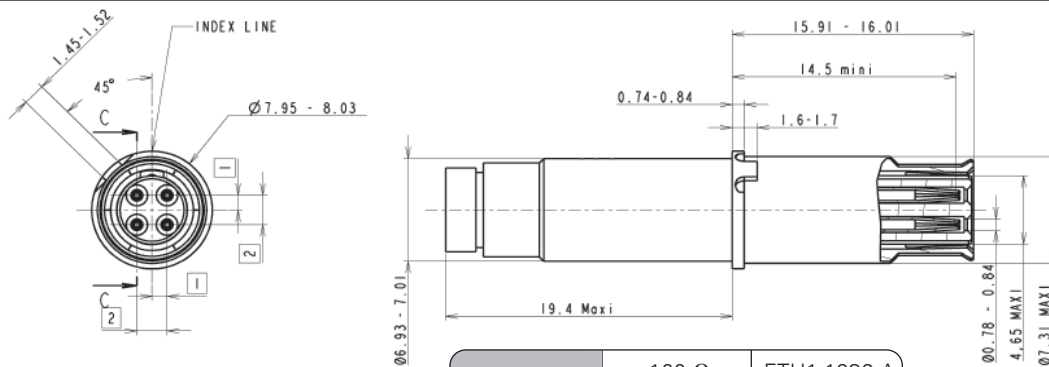


Crimp pin contact



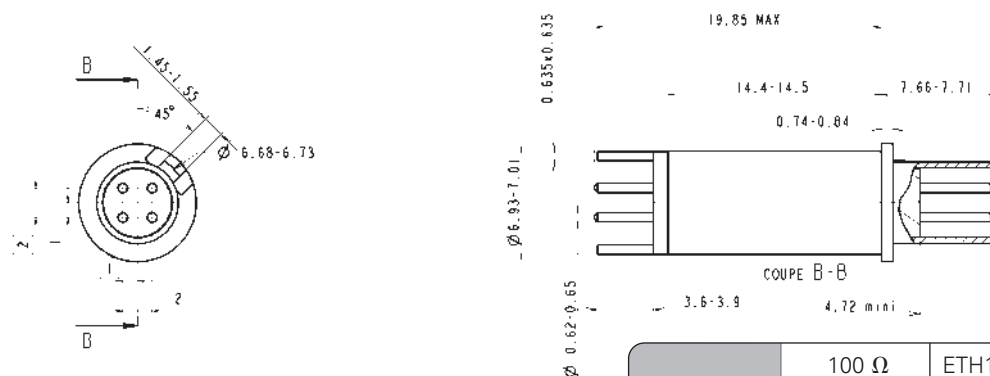
| | | |
|-------------|--------------|-------------|
| Part number | 100 Ω | ETH1-1235 A |
| | 150 Ω | ETH1-1503 A |

Crimp socket contact



| | | |
|-------------|--------------|-------------|
| Part number | 100 Ω | ETH1-1236 A |
| | 150 Ω | ETH1-1504 A |

Pin contact for PCB mount



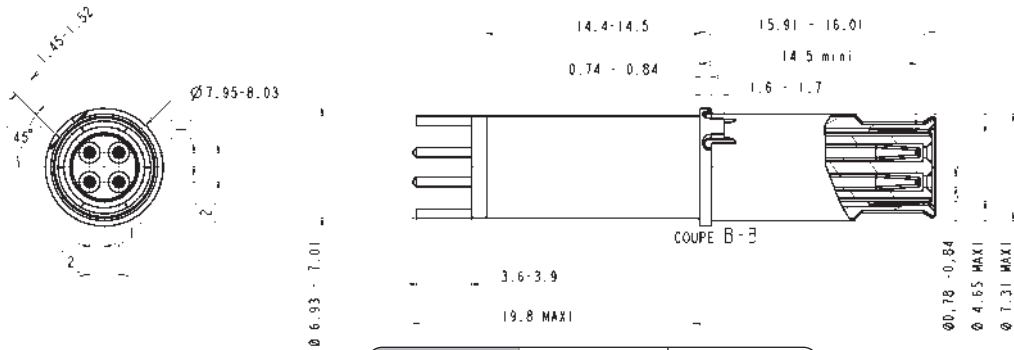
| | | |
|-------------|--------------|-------------|
| Part number | 100 Ω | ETH1-1237 A |
| | 150 Ω | ETH1-1501 A |

(Dimensions in millimeters)

8D-JVS Series with quadrax contacts



Socket contact for PCB mount

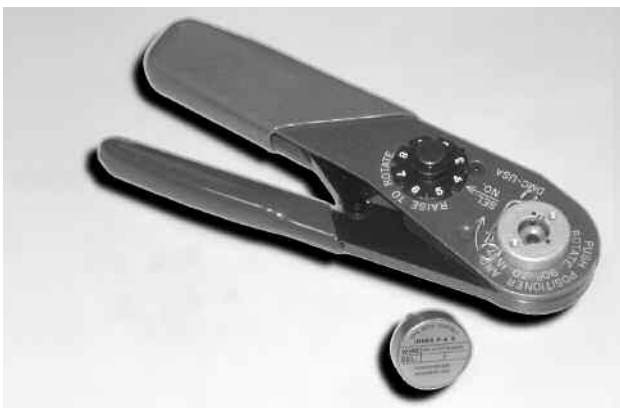


| | | |
|-------------|--------------|-------------|
| Part number | 100 Ω | ETH1-1238 A |
| | 150 Ω | ETH1-1502 A |

(Dimensions in millimeters)

Tooling

Crimping tools



Ref: M22520/2-01 and K709

Insertion and extraction tools



Ref: 8660-197



Ref: M22520/5-01 et / and M22520/5-45B

8D - JVS Series with optical Elio contacts



Derived from:
MIL-DTL-38999 Serie III

8D - JVS Series with optical Elio contacts



Description

- Optical Elio contact qualified according to Arinc 801 EN4531 and ABS1379 fitting in standard 38999 shell with specific inserts.
- Easy insertion and extraction of the contact, without tool (bayonet locking system).
- Individual contact sealing (rear sealing boot integrated on contact).
- Contact easy to clean (no need to remove the contacts, levelling contacts on receptacle side).
- Robust and high vibration with standing solution.

Characteristics

Applications

- Fiber optic connector for industrial, military and aeronautical application in severe climatic or mechanical environment.

Mechanical

- See page 6.

Climatics

- See page 7.

Optical

- Typical insertion loss multimode: 0.3 dB at 1300 nm.
- Typical return loss multimode: - 30 dB at 1300 nm.
- Maximum IL during and after climatic tests at 1300 nm and 850 nm for multimode 62.5 / 125 fiber: 0.7 dB.

8D - JVS Series with optical Elio contacts



Connector part numbers

| Basic series | 8D | 0 | E | 11 | W | 02 | A | N |
|---|----|---|---|----|---|----|---|---|
| Shell style: | | | | | | | | |
| 0: Square flange receptacle (Female insert B only) | | | | | | | | |
| 7: Jam nut receptacle (Excepted composite version) (Female insert B only) | | | | | | | | |
| 5: Plug with RFI shielding (Male insert A only) | | | | | | | | |
| Designation: | | | | | | | | |
| E: ELIO™ optical connector | | | | | | | | |
| Shell size: 09 - 11 - 13 - 19 - 25 | | | | | | | | |
| Plating: | | | | | | | | |
| W: Olive green cadmium (aluminium) | | | | | | | | |
| F: Nickel (aluminium) | | | | | | | | |
| K: Passivated (stainless steel) | | | | | | | | |
| S: Nickel (stainless steel) | | | | | | | | |
| J: Olive green cadmium (composite) | | | | | | | | |
| M: Nickel (composite) | | | | | | | | |
| X: Without protection (composite) | | | | | | | | |
| TF: Nickel plated (Titanium) | | | | | | | | |
| TT: Unplated (Titanium) | | | | | | | | |
| Contact layout: | | | | | | | | |
| See page 8 to 11) | | | | | | | | |
| Insert type: | | | | | | | | |
| A: Male insert (plug) | | | | | | | | |
| B: Female insert with ceramic alignment sleeves (receptacle) | | | | | | | | |
| Orientation: N, A, B, C, D & E (See page 58) | | | | | | | | |

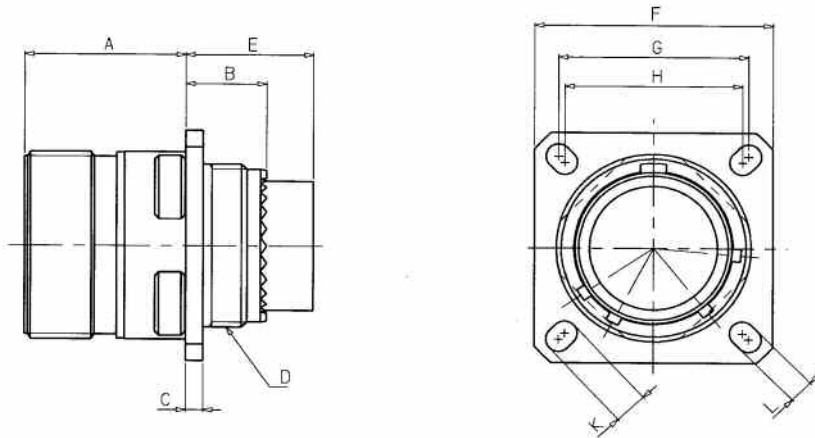
Connector part numbers Bronze

| Basic series | JVS | E | 0 | A | 11 | 02 | A | N |
|--|-----|---|---|---|----|----|---|---|
| Designation: | | | | | | | | |
| E: ELIO™ connecteur optique / optical connector | | | | | | | | |
| Shell style: | | | | | | | | |
| 0: Square flange receptacle (Female insert B only) | | | | | | | | |
| 7: Jam nut receptacle (Female insert B only) | | | | | | | | |
| 6: Plug with RFI shielding (Male insert A only) | | | | | | | | |
| Material: | | | | | | | | |
| A: Bronze | | | | | | | | |
| Shell size: 09 - 11 - 13 - 19 - 25 | | | | | | | | |
| Insert arrangement: (see page 8 to 11) | | | | | | | | |
| Insert type: | | | | | | | | |
| A: Male insert (plug) | | | | | | | | |
| B: Female insert with ceramic alignment sleeves (receptacle) | | | | | | | | |
| Orientation: N, A, B, C, D & E (See page 58) | | | | | | | | |

8D - JVS Series with optical Elio contacts

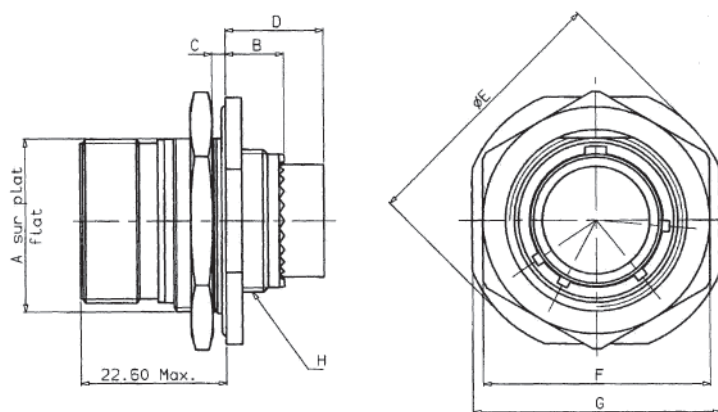


Receptacle type 0



| Shell size | A Max. | B Max. | C Max. | D thread | E Max. | F ± 0.30 | G | H | K ± 0.20 | L ± 0.20 |
|------------|--------|--------|--------|------------|--------|----------|-------|-------|----------|----------|
| 09 | 20.90 | 10.60 | 2.50 | M12 x 1-6g | 17.10 | 23.80 | 18.30 | 15.10 | 5.50 | 3.25 |
| 11 | 20.90 | 10.60 | 2.50 | M15 x 1-6g | 17.10 | 26.20 | 20.62 | 18.26 | 4.93 | 3.25 |
| 13 | 20.90 | 10.60 | 2.50 | M18 x 1-6g | 17.10 | 28.60 | 23.01 | 20.62 | 4.93 | 3.25 |
| 19 | 20.90 | 11.60 | 2.50 | M28 x 1-6g | 17.10 | 36.50 | 29.36 | 26.97 | 4.93 | 3.25 |
| 25 | 20.10 | 11.40 | 3.20 | M37 x 1-6g | 17.90 | 46.00 | 38.10 | 34.93 | 6.15 | 3.25 |

Receptacle type 7



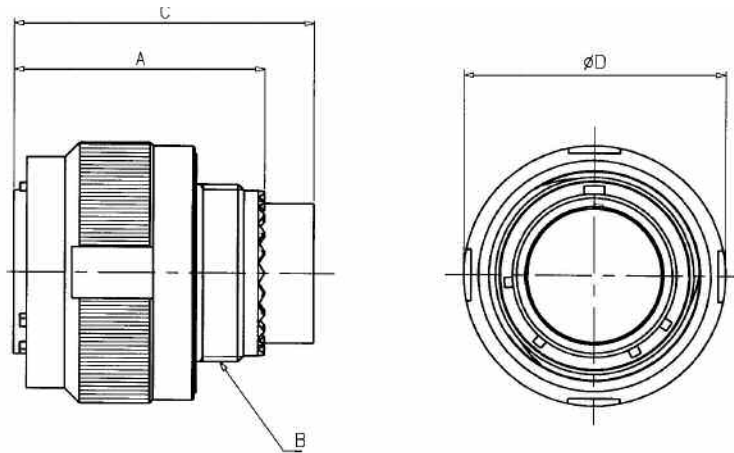
| Shell size | A Max. | B Max. | C Max. | D Max. | E Max. | F Max. | G ± 0.40 | H Thread |
|------------|--------|--------|--------|--------|--------|--------|----------|------------|
| 09 | 16.55 | 9.90 | 3.20 | 16.40 | 32.50 | 23.00 | 27.00 | M12 x 1-6g |
| 11 | 19.07 | 9.90 | 3.20 | 16.40 | 35.20 | 27.00 | 31.80 | M15 x 1-6g |
| 13 | 23.82 | 9.90 | 3.20 | 16.40 | 38.40 | 32.00 | 34.90 | M18 x 1-6g |
| 19 | 33.32 | 9.90 | 3.50 | 16.40 | 49.50 | 41.00 | 46.00 | M28 x 1-6g |
| 25 | 42.85 | 9.90 | 3.50 | 16.40 | 59.00 | 55.60 | 55.60 | M37 x 1-6g |

Dimensions in millimeters

8D - JVS Series with optical Elio contacts

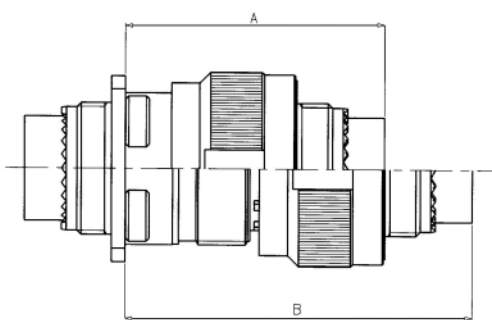


Plug type 5

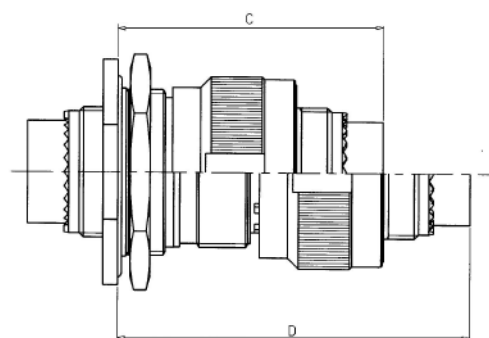


| Shell size | A Max. | B Thread | C Max. | D Max. |
|------------|--------|------------|--------|--------|
| 09 | 31.00 | M12 x 1-6g | 37.50 | 21.80 |
| 11 | 31.00 | M15 x 1-6g | 37.50 | 25.00 |
| 13 | 31.00 | M18 x 1-6g | 37.50 | 29.40 |
| 19 | 31.00 | M18 x 1-6g | 37.50 | 38.50 |
| 25 | 31.00 | M37 x 1-6g | 37.50 | 48.00 |

Mated connectors dimensions



Square flange receptacle type 0 with plug



Jam nut receptacle type 7 with plug

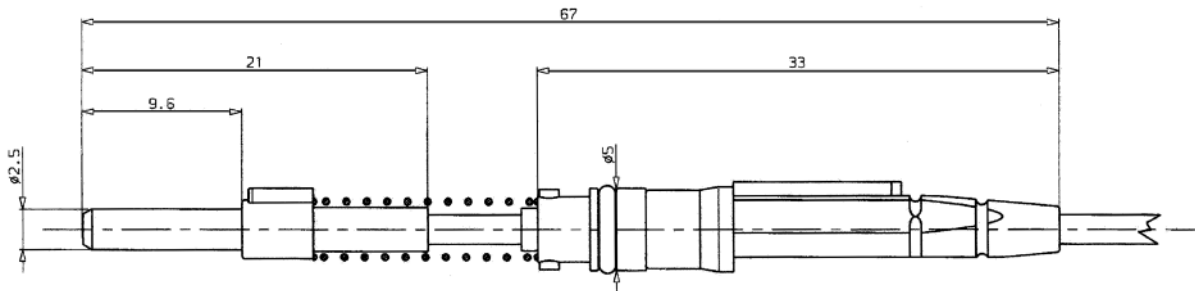
| Shell size | A Max. | B Max. | C Max. | D Max. |
|------------|--------|--------|--------|--------|
| 09 | 43.50 | 58.80 | 44.80 | 60.10 |
| 11 | 43.50 | 58.80 | 44.80 | 60.10 |
| 13 | 43.50 | 58.80 | 45.00 | 60.30 |
| 19 | 43.50 | 58.80 | 45.00 | 60.30 |
| 25 | 43.50 | 58.80 | 45.00 | 60.30 |

Dimensions in millimeters

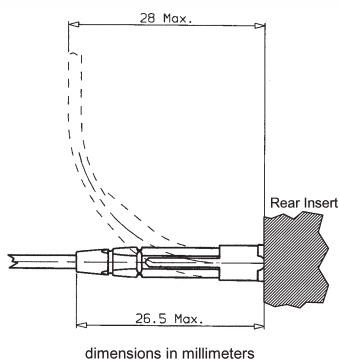
8D - JVS Series with optical Elio contacts



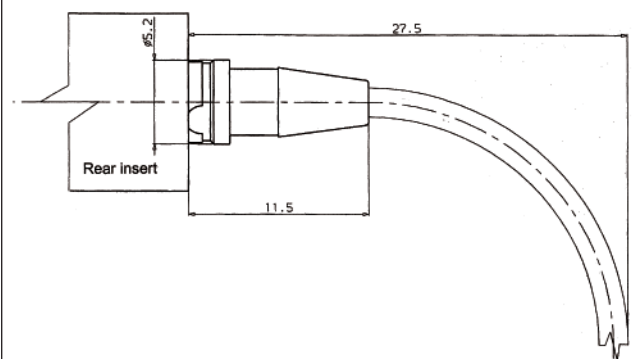
Dimensions of ELIO™ Termini - Straight long boot version (L)



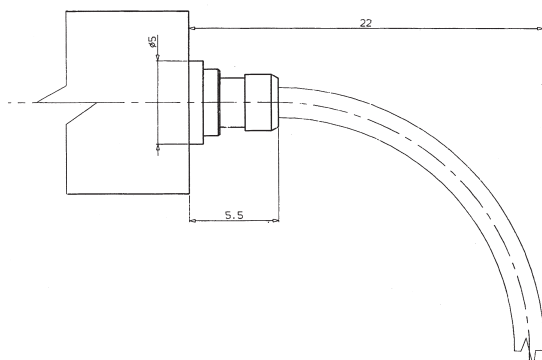
Rear dimensions of the straight long boot version of the ELIO™ Termini



Rear dimensions of the straight short boot version of the ELIO™ Termini



Rear dimensions of the ELIO™ Termini without boot



Dimensions in millimeters

Ordering information

| Elio™ | 18 S | G | L |
|---|------|---|---|
| Cable diameter wider: | | | |
| SBN for 980 µm jacket cable or cable wider than 2 mm with 900 µm fiber - without sealing joint | | | |
| SCN from 1.5 mm up to 1.9 mm cable - without sealing joint | | | |
| 18S for 1.8 mm cable | | | |
| Fiber type: | | | |
| G for 50/125 or 62.5/125 fiber (PC shape ferrule) | | | |
| D for 100/140 fiber | | | |
| J for POF 1.0 mm fiber - with sealing joint | | | |
| Boot shape: | | | |
| L Straight long | | | |
| S Straight short | | | |
| N Without boot (unsealed version only) | | | |

8D - JVS Series with optical Elio contacts



Adaptor for standard backshells

Elio - ABA

Shell size:

09 - 11 - 13 - 25

XX

XX

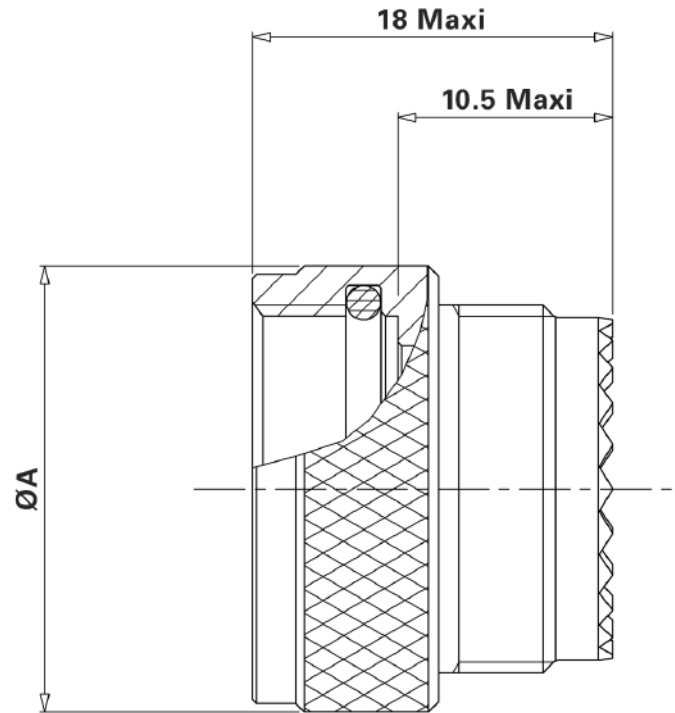
Plating:

W: Olive drab cadmium

F: Nickel

Note : Backshells adaptor is placed between connector and standard backshell.

| Shell size | Ø A Maxi | B Thread |
|------------|----------|------------|
| 09 | 20 | M12 x 1-6g |
| 11 | 20 | M15 x 1-6g |
| 13 | 23 | M18 x 1-6g |
| 25 | 48 | M37 x 1-6g |



Tooling data

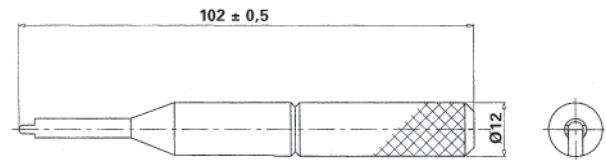
Insertion and extraction tool

For the terminus with boot



P/N : ELI1-0231A

For the terminus without boot



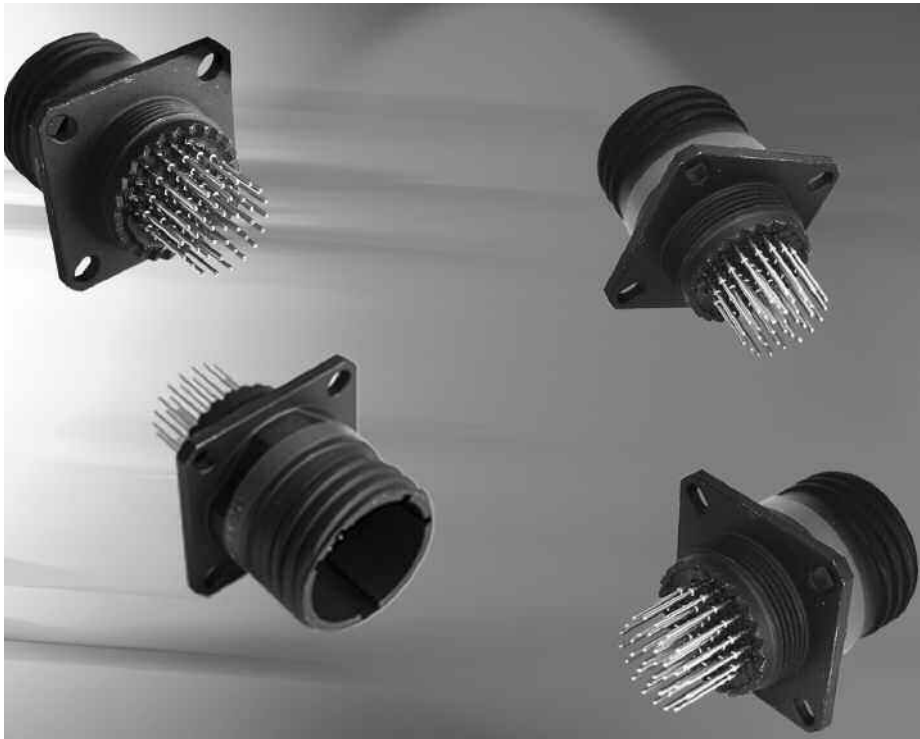
P/N : 80WV0049A

8D reinforced sealing series



Derived from:
MIL-DTL-38999 Serie III

8D reinforced sealing series



Description

- Reinforced sealing receptacle with male or female straight spill contacts.
- High hermeticity performance: 10^{-7} atm.cm³/s
- 100 % scoop proof.
- High density connectors.
- Lower profile for compactness.
- Weight saving compared to hermetic version.
- Reinforced sealing for harsh environments.
- Good shock resistance.

Layouts

Arrangements / Layouts

All 8D layouts can be manufactured with Resin sealed (except power).

Ordering information

After the basic series "8D", related to the digit "R" (8D+R...).

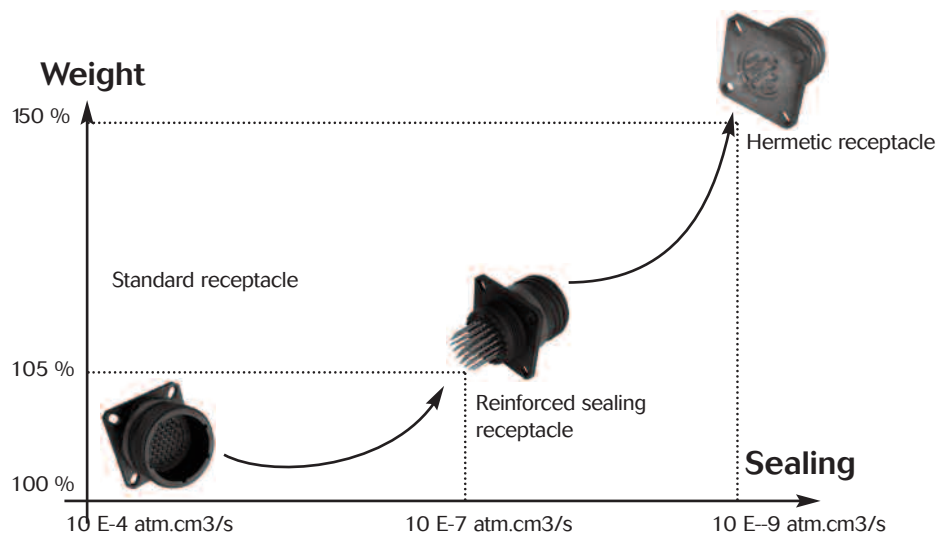
Don't forget the digit related to the spill length (C, M, L, S).

Examples:

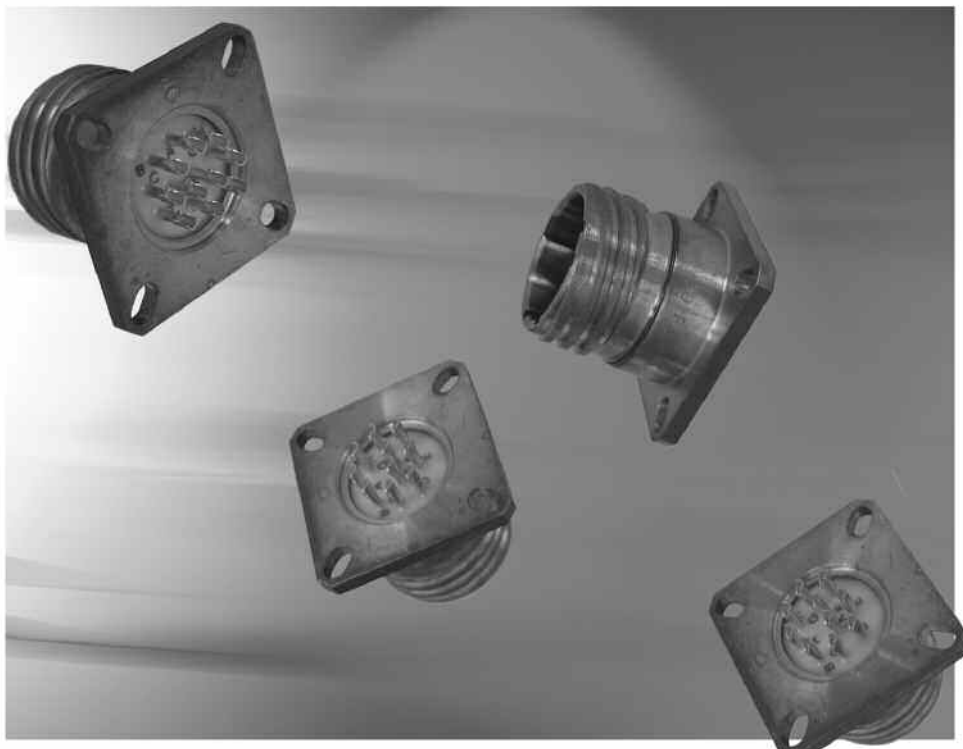
8D (Alu) = 8DR 0 C 13 W 35 PN

8D (Titane) = 8DR 7 L 13 TT 35 PN

Comparison between standard, reinforced sealing and hermetic version

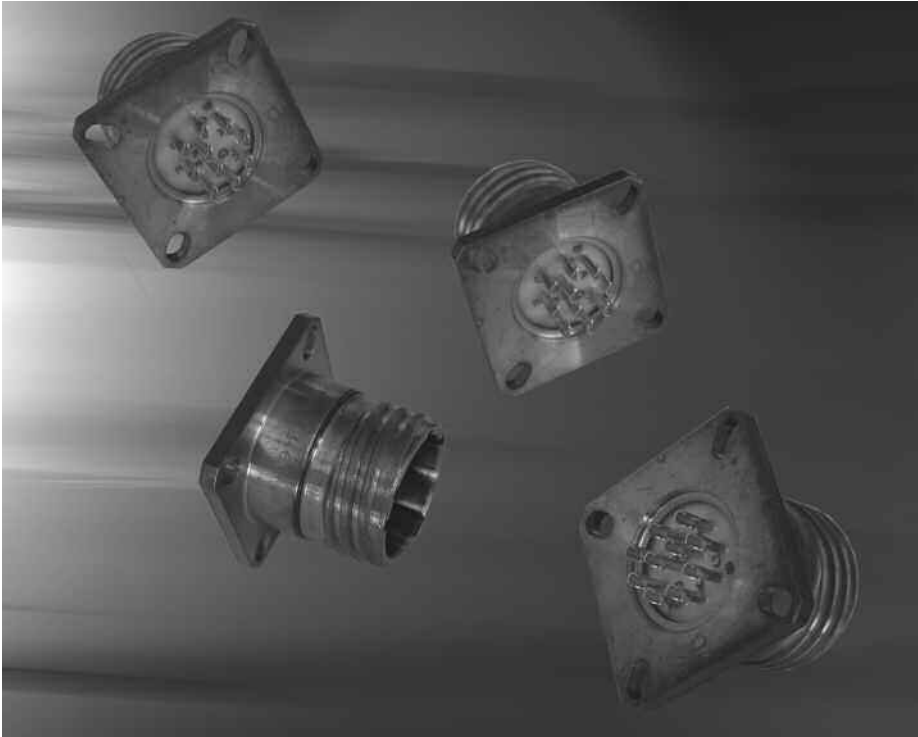


F 38999 Hermetic



Derived from:
MIL-DTL-38999 Serie III

F 38999 Hermetic



Description

As per MIL-DTL 38999

- Glass insulator
- High hermeticity performance
- Ideal for high pressure environments
- Low profile

Technical features

Mechanical

- **Shell:** stainless steel
- **Shell plating:** passivated
- **Interfacial seal:** silicone elastomer
- **Contacts:** gold
- **Endurance:** 500 operations
- **Hermeticity:**
no leakage in excess of 10^{-7} cm³/s

Electrical

- **Test voltage rating:**

| Service | Sea level | At 2100 m |
|---------|-----------|-----------|
| M | 1 300 | 800 |
| I | 1 800 | 1 000 |

- **Shielding:** 45 dB at 10 GHz
- **Insulation resistance:**
5000 m Ω (under 500 Vdc)
- **Current rating:**

| Contact size | Rating (A) |
|--------------|------------|
| # 22 D | 3 |
| # 20 | 5 |
| # 16 | 10 |
| # 12 | 17 |

Environmental

- **Temperature:** -65°C at 200°C
- **Salt spray:** per MIL DTL 38999

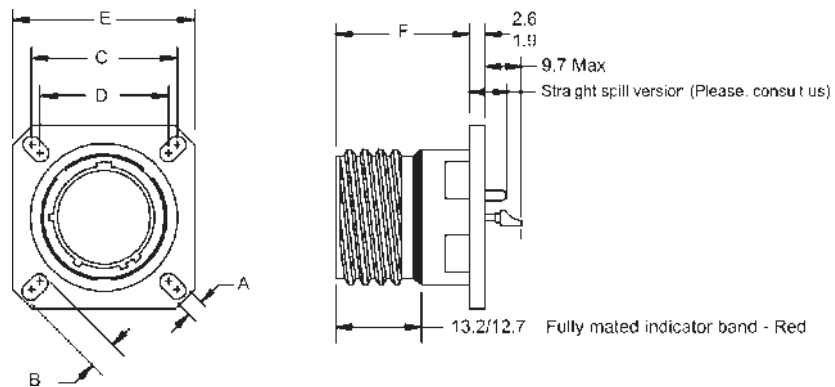
F 38999 Hermetic



Ordering information

| | | | | | | | | | |
|---|---------------|-----------|----------|----------|-----------|----------|----------|-----------|----------|
| Basic Series | F38999 | 21 | Y | A | 35 | P | N | WF | - |
| Shell style: | | | | | | | | | |
| 21: Box mounting flange receptacle | | | | | | | | | |
| 23: Jam nut receptacle | | | | | | | | | |
| 25: Solder mounting receptacle | | | | | | | | | |
| Class: | | | | | | | | | |
| Y: Passivated stainless steel | | | | | | | | | |
| Shell size: | | | | | | | | | |
| A: 09 B: 11 C: 13 D: 15 E: 17 F: 19 G: 21 H: 23 J: 25 | | | | | | | | | |
| Layout: | | | | | | | | | |
| See page 11 | | | | | | | | | |
| Contact types: | | | | | | | | | |
| P: Male solder cup | | | | | | | | | |
| C: Male straight spill (please consult us) | | | | | | | | | |
| Orientation: | | | | | | | | | |
| N, A, B, C, D, E (See page 58) | | | | | | | | | |
| WF: Mandatory suffix | | | | | | | | | |
| Specification: | | | | | | | | | |
| None for standard product | | | | | | | | | |

Box mounting flange receptacle (type 21)



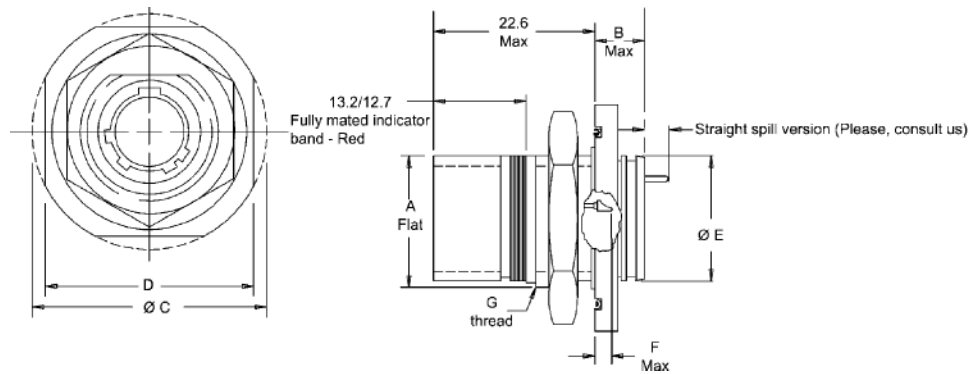
| Shell size | A ± 0.20 | B ± 0.20 | C | D | E ± 0.30 | F Max. |
|------------|-------------|-------------|-------|-------|-------------|-----------|
| A (9) | 3.25 | 5.49 | 18.26 | 15.09 | 23.80 | 21.40 |
| B (11) | 3.25 | 4.93 | 20.62 | 18.26 | 26.20 | 21.40 |
| C (13) | 3.25 | 4.93 | 23.01 | 20.62 | 28.60 | 21.40 |
| D (15) | 3.25 | 4.93 | 24.61 | 23.01 | 31.00 | 21.40 |
| E (17) | 3.25 | 4.93 | 26.97 | 24.61 | 33.30 | 21.40 |
| F (19) | 3.25 | 4.93 | 29.36 | 26.97 | 36.50 | 21.40 |
| G (21) | 3.25 | 4.93 | 31.75 | 29.36 | 39.70 | 21.40 |
| H (23) | 3.91 | 6.15 | 34.93 | 31.75 | 42.90 | 21.40 |
| J (25) | 3.91 | 6.15 | 38.10 | 34.93 | 46.00 | 21.40 |

Dimensions in millimeters

F 38999 Hermetic

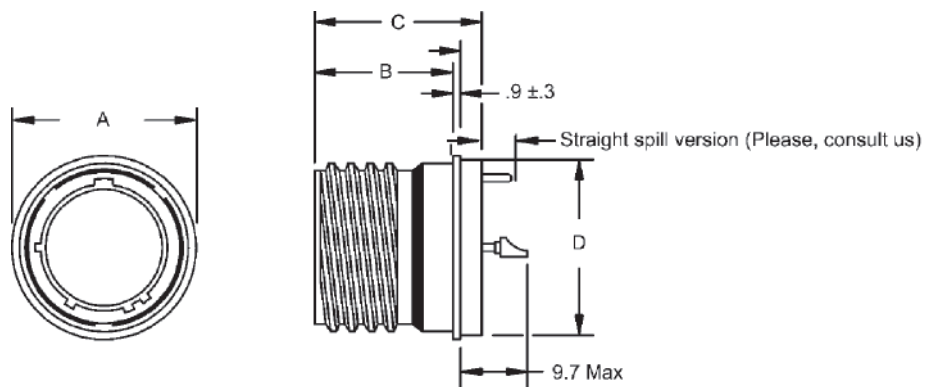


Jam nut receptacle type 23



| Shell size | A flat $+ .10$ $- .15$ | B Max. | $\text{Ø C} \pm .3$ | $\text{Ø D} \pm .4$ | $\text{Ø E} \pm .3/0$ | F Max. | G thread |
|---------------|---------------------------|--------|---------------------|---------------------|-----------------------|--------|------------|
| A (9) | 16.53 | 9.10 | 30.20 | 27.00 | 16.30 | 5.30 | M17 x 1-6g |
| B (11) | 19.07 | 9.10 | 34.90 | 31.80 | 19.40 | 5.30 | M20 x 1-6g |
| C (13) | 23.82 | 9.10 | 38.10 | 34.90 | 22.70 | 5.10 | M25 x 1-6g |
| D (15) | 26.97 | 9.10 | 41.30 | 38.10 | 25.90 | 5.10 | M28 x 1-6g |
| E (17) | 30.15 | 9.10 | 44.50 | 41.30 | 29.00 | 5.10 | M32 x 1-6g |
| F (19) | 33.32 | 9.70 | 49.20 | 46.00 | 32.20 | 5.10 | M35 x 1-6g |
| G (21) | 36.50 | 9.70 | 52.40 | 49.20 | 35.40 | 5.10 | M38 x 1-6g |
| H (23) | 39.67 | 9.70 | 55.60 | 52.40 | 38.60 | 5.10 | M41 x 1-6g |
| J (25) | 42.85 | 9.70 | 58.70 | 55.60 | 41.70 | 5.10 | M44 x 1-6g |

Solder mounting receptacle (type 25)



| Shell size | Ø A Max. | B Max. | C Max. | D Max. |
|---------------|-------------------|--------|--------|--------|
| A (9) | 19.40 | 17.20 | 23.80 | 17.10 |
| B (11) | 21.80 | 17.20 | 23.80 | 19.90 |
| C (13) | 24.90 | 17.20 | 23.80 | 23.10 |
| D (15) | 28.10 | 17.20 | 23.80 | 26.20 |
| E (17) | 31.30 | 17.20 | 23.80 | 29.40 |
| F (19) | 33.60 | 17.20 | 23.80 | 31.80 |
| G (21) | 36.80 | 17.20 | 23.80 | 35.00 |
| H (23) | 40.00 | 17.20 | 24.60 | 38.20 |
| J (25) | 43.20 | 17.20 | 24.60 | 41.30 |

8D Series with RJ45 USB



Derived from:
MIL-DTL-38999 Serie III

8D Series with RJ45 USB



Description

- Derived from MIL-DTL-38999 Serie III
- True ruggedized RJ45 & USB A solution
- High vibration resistance
- Shock resistant
- IP67
- Shielded
- No tools for cabling

Application

- Data transmission using standard interface.
- Flight data transmissions.

Technical features

Mechanical

- **Aluminium:**
- **Composite:**
- **Shell:** aluminium alloy or carbon reinforced thermoplastic
- **Shell plating:**
 - nickel or olive green cadmium
 - composite no protection
- **Insert:** thermoplastic
- **Endurance:** 500 matings
- **Vibration:** 10-500 Hz 20 g

- **RJ 45 receptacle jack:**
- **USB A jack receptacle:**

Electrical

- **RJ45:** - 10 BaseT, 100 BaseTX and 1000 BaseT Networks cat 5^e per TIA/EIA 568 A/B
- **USB serie A:** meet all requirement of the "Universal serial bus specification" (revision 2)

Environmental

- **Meets MIL-DTL-38999 Excepted:**
- **Sealing:** IP67 with cap MIL-DTL-38999
- **Temperature:** -40°C at 85°C

Fluid resistance

- **Meets MIL-DTL-38999 Excepted:**
with a cap
Backshells and caps
Per AS85049 or equivalent sold separately

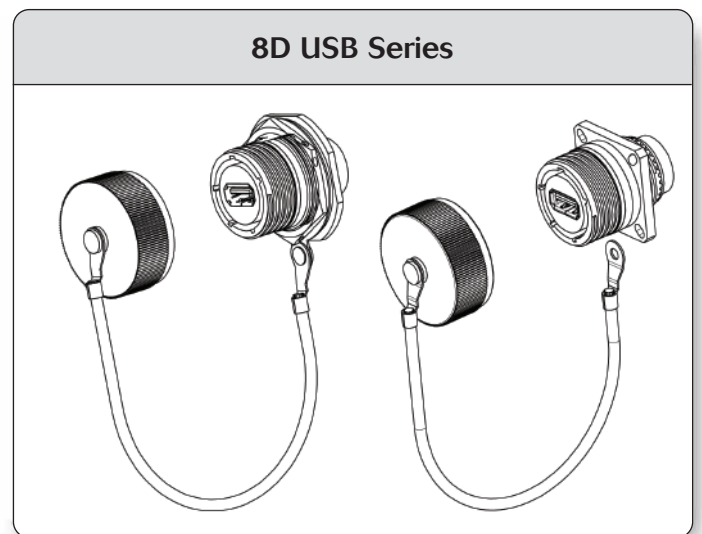
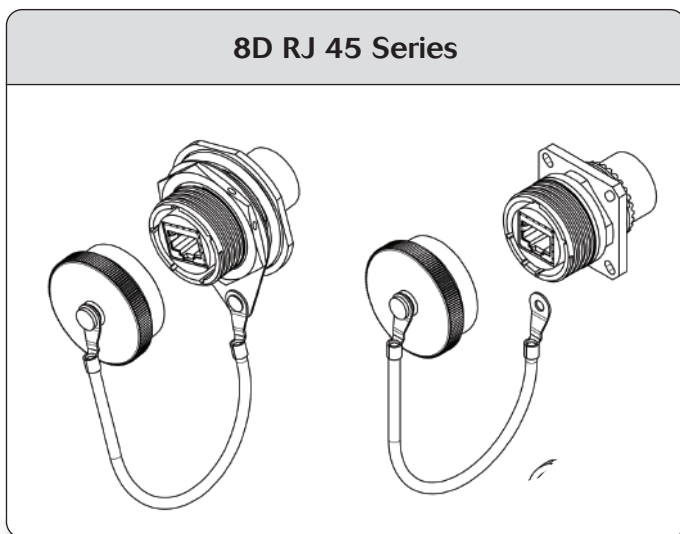
NB: No tools for cabling

8D Series with RJ45 USB



Ordering information

| | | | | | | | | | |
|---|-----------|----------|----------|-----------|----------|-----------|----------|----------|------------|
| Basic Series | 8D | 0 | F | 19 | W | RJ | S | N | *** |
| Shell style: 0: square flange receptacle 5: plug 7: jam nut receptacle (Aluminium only) | | | | | | | | | |
| Designator: F: feedthrough S: solder out C: Pigtail cable receptacle P: Pigtail cable plug | | | | | | | | | |
| Shell size: 17: USB 19: RJ 45 | | | | | | | | | |
| Plating: W: cadmium / olive drab cadmium (Aluminium) F: nickel (Aluminium) X: no plating (composite) J: cadmium / olive drab cadmium (composite) M: nickel / nickel (composite) L: black zinc (Aluminium) - Please, consult us | | | | | | | | | |
| Insert: RJ: RJ 45 UA: USB type A | | | | | | | | | |
| Contact style: S: receptacle P: plug | | | | | | | | | |
| Keying: N, A, B, C, D, E (See page 58) | | | | | | | | | |
| Cable length: inches required for type C Please, consult us for cable lengths & end connectors | | | | | | | | | |

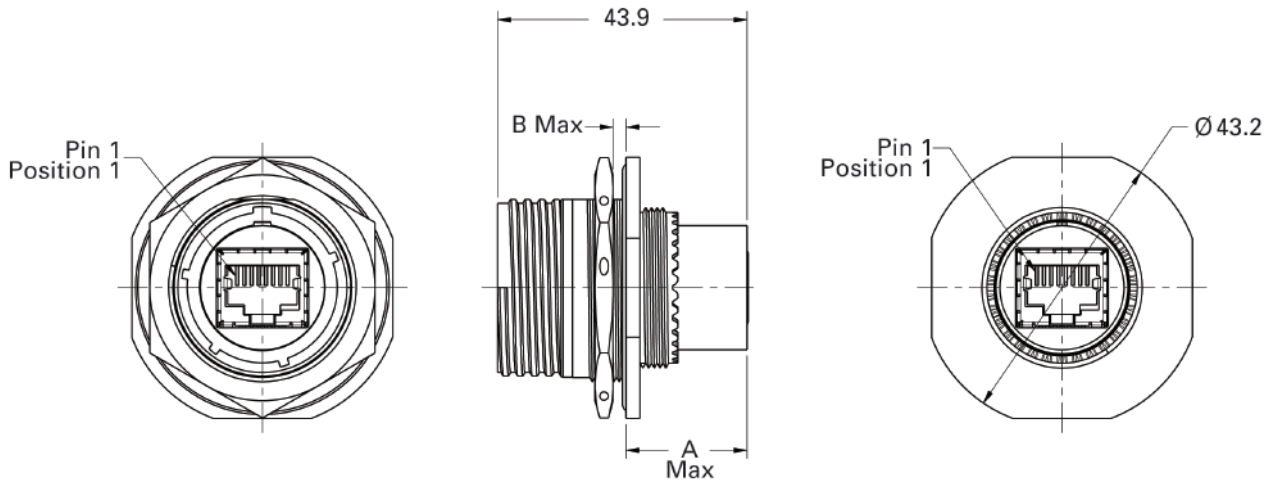


8D Series with RJ45 USB



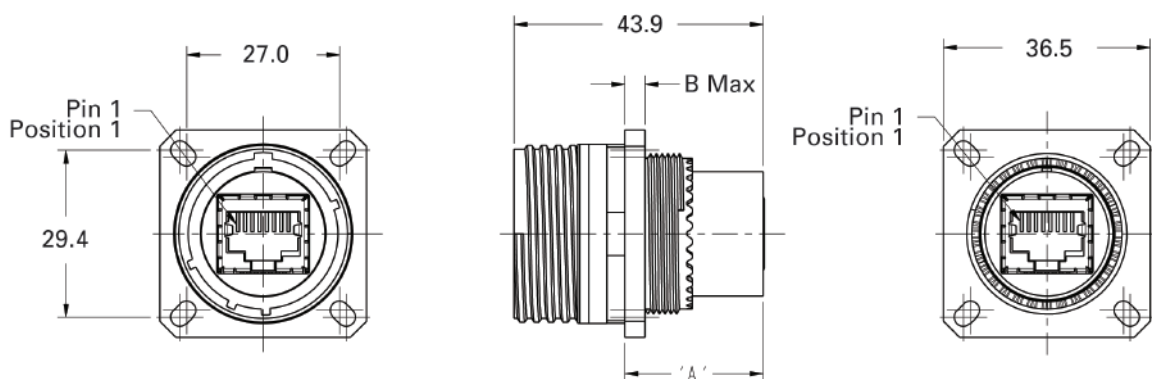
RJ 45 Feedthrough serie

Jam nut receptacle



| Shell type | A Max. | B Max. |
|------------|--------|--------|
| Aluminium | 21.34 | 3.20 |

Square flange receptacle



| Shell type | A Max. | B Max. |
|------------|--------|--------|
| Aluminium | 21.34 | 3.20 |
| Composite | 21.34 | 3.20 |

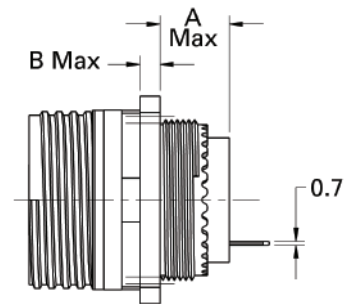
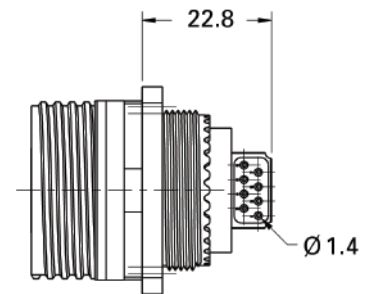
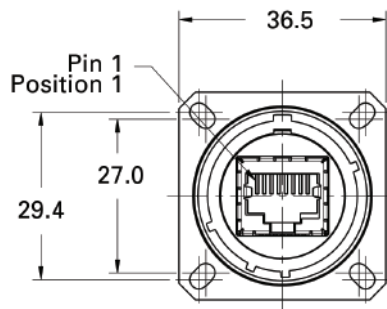
8D Series with RJ45 USB



RJ45 Solder out serie

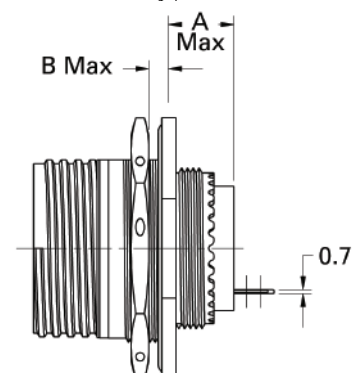
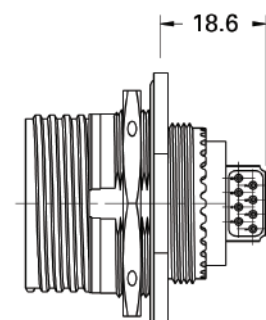
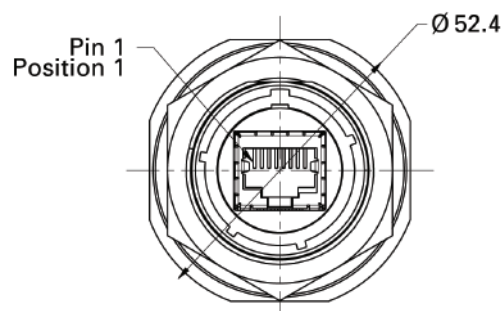
Suare flange receptacle

| Shell type | A Max. | B Max. |
|------------|--------|--------|
| Aluminium | 11.91 | 2.50 |
| Composite | 12.14 | 3.65 |



Jam nut receptacle

| Shell type | A Max. | B Max. |
|------------|--------|--------|
| Aluminium | 12.70 | 3.20 |

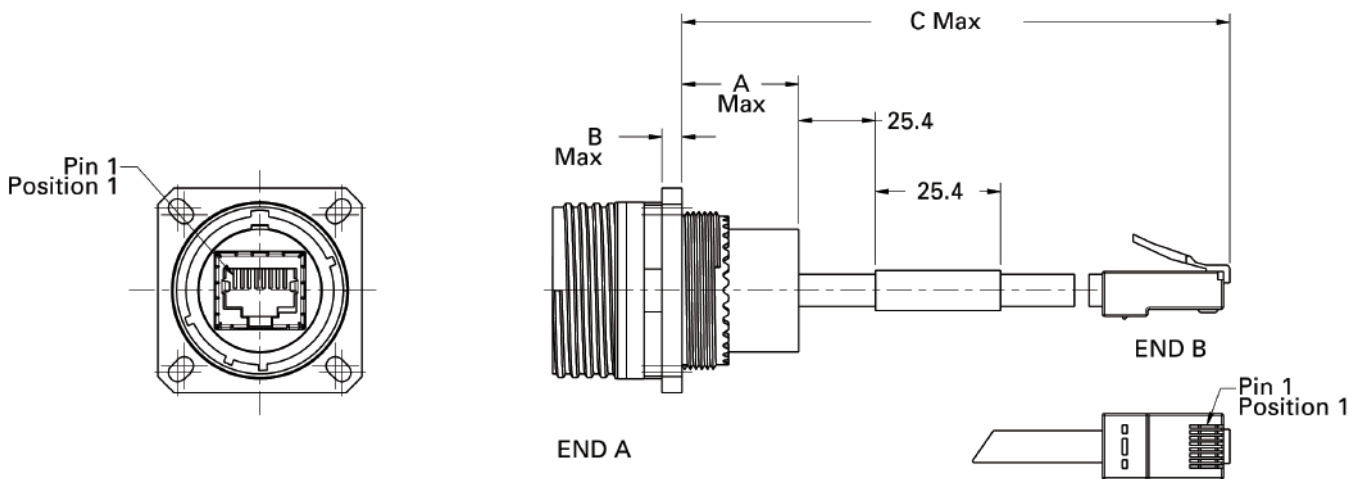


8D Series with RJ45 USB



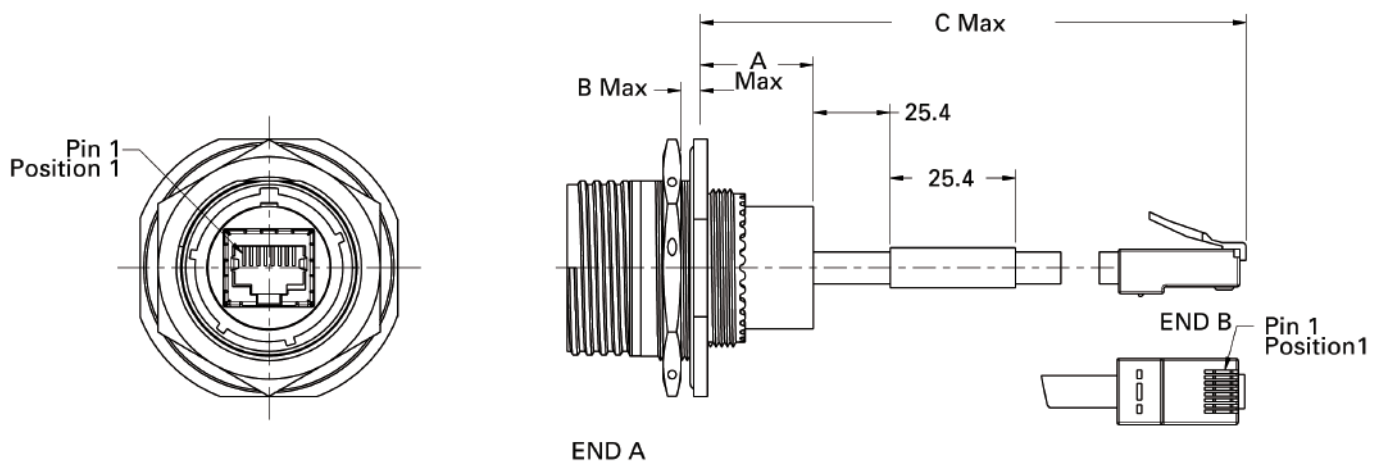
RJ45 Pigtail serie

Suare flange receptacle



| Shell type | A Max. | B Max. | C Max. |
|------------|--------|--------|--------------|
| Aluminium | 20.78 | 2.50 | 304.80 ±25.4 |
| Composite | 20.78 | 3.65 | 304.80 ±25.4 |

Jam nut receptacle



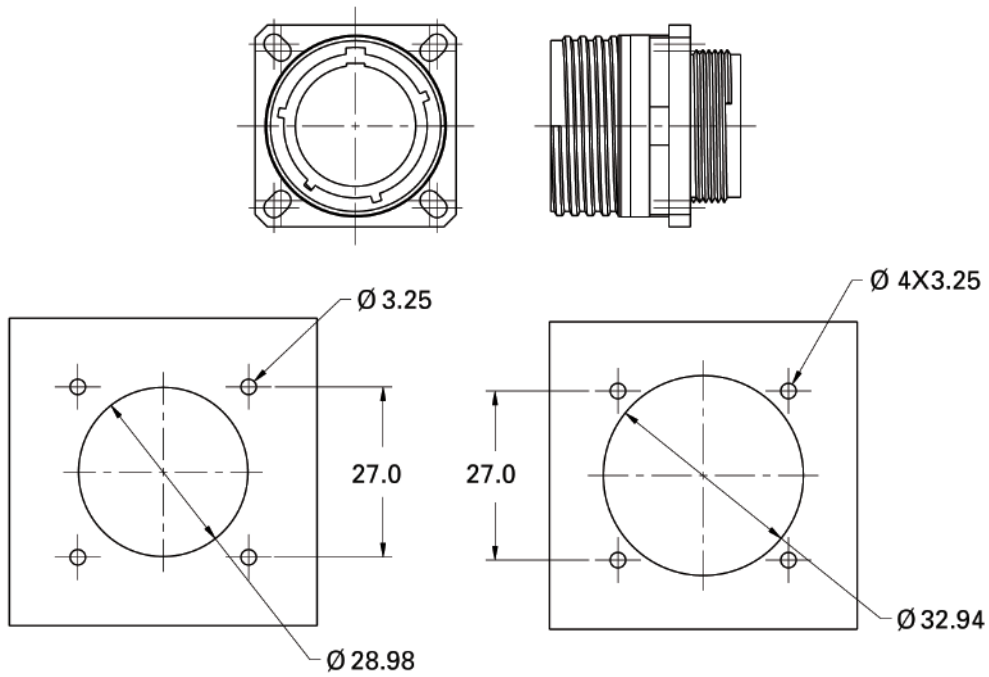
| Shell type | A Max. | B Max. | C Max. |
|------------|--------|--------|--------------|
| Aluminium | 21.34 | 3.20 | 304.80 ±25.4 |

8D Series with RJ45 USB

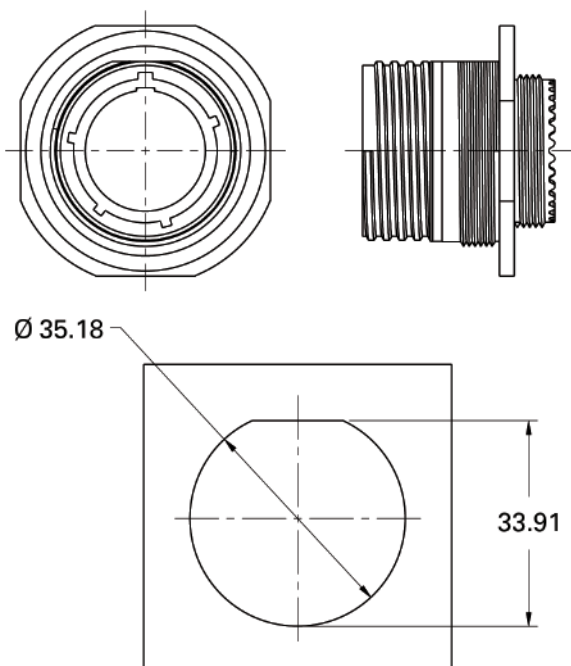


Panel cut out for RJ45 serie

Suare flange receptacle



Jam nut receptacle

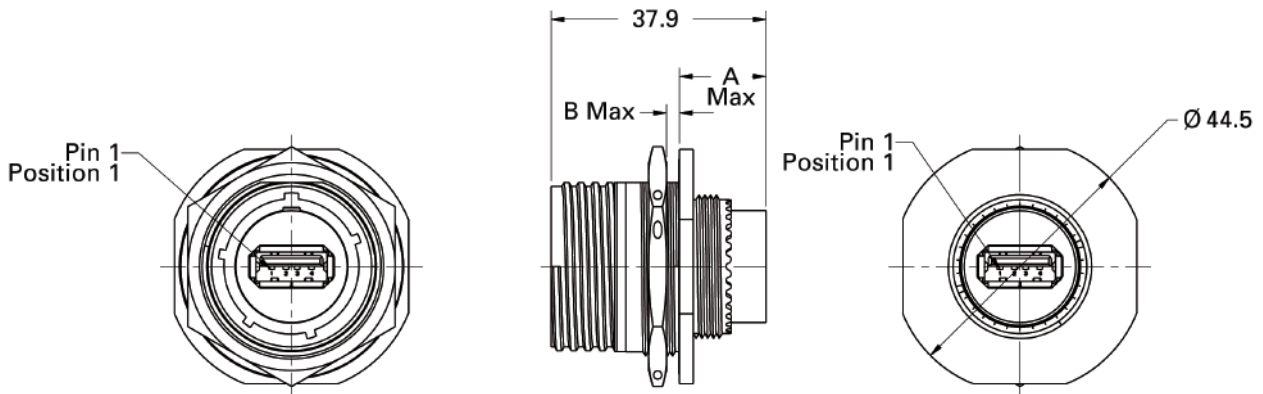


8D Series with RJ45 USB



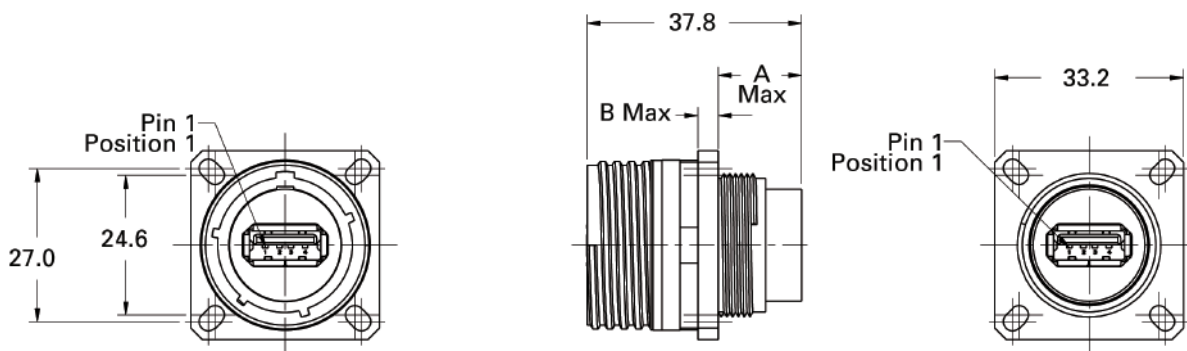
USB Feedthrough serie

Jam nut receptacle



| Shell type | A Max. | B Max. |
|------------|--------|--------|
| Aluminium | 15.24 | 3.20 |

Square flange receptacle



| Shell type | A Max. | B Max. |
|------------|--------|--------|
| Aluminium | 4.45 | 2.50 |
| Composite | 4.88 | 3.85 |

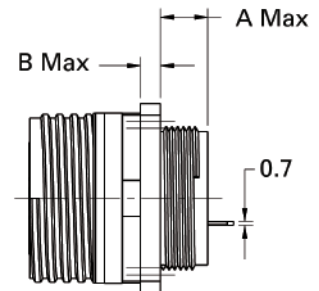
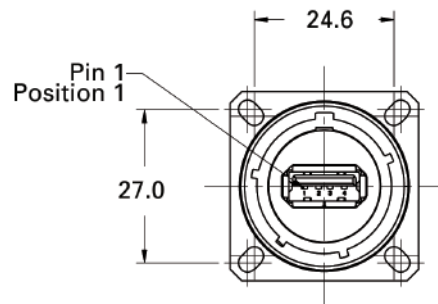
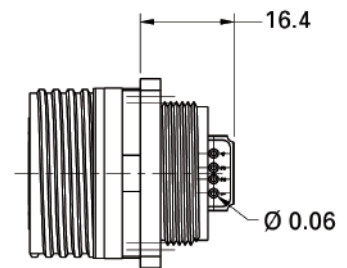
8D Series with RJ45 USB



USB Solder out serie

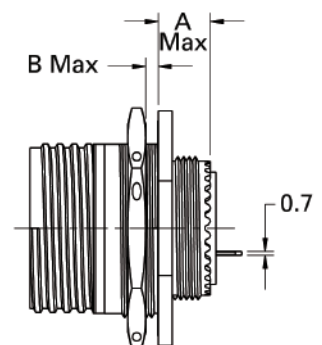
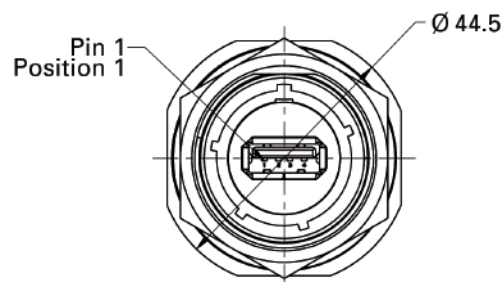
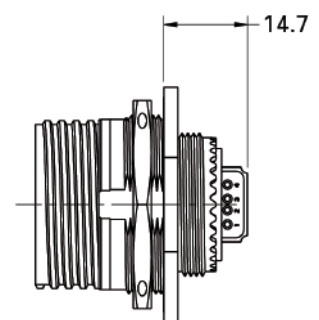
Suare flange receptacle

| Shell type | A Max. | B Max. |
|------------|--------|--------|
| Aluminium | 8.10 | 2.50 |
| Composite | 8.33 | 3.65 |



Jam nut receptacle

| Shell type | A Max. | B Max. |
|------------|--------|--------|
| Aluminium | 11.94 | 3.20 |

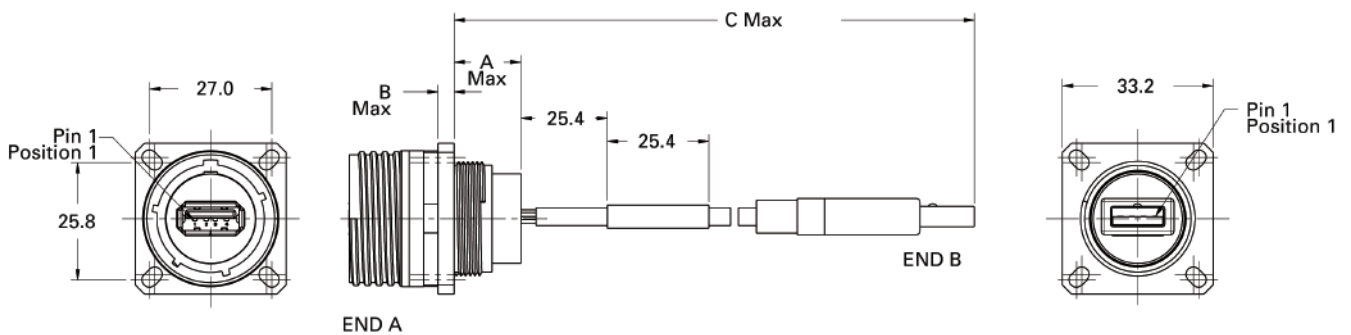


8D Series with RJ45 USB



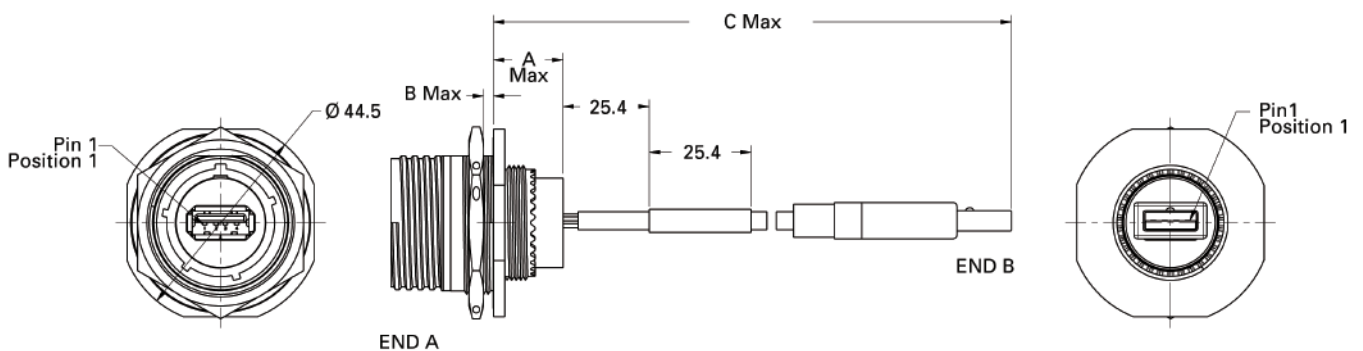
USB Pigtail serie

Suare flange receptacle



| Shell type | A Max. | B Max. | C Max. |
|------------|--------|--------|--------------|
| Aluminium | 14.45 | 2.50 | 304.80 ±25.4 |
| Composite | 14.68 | 3.65 | 304.80 ±25.4 |

Jam nut receptacle



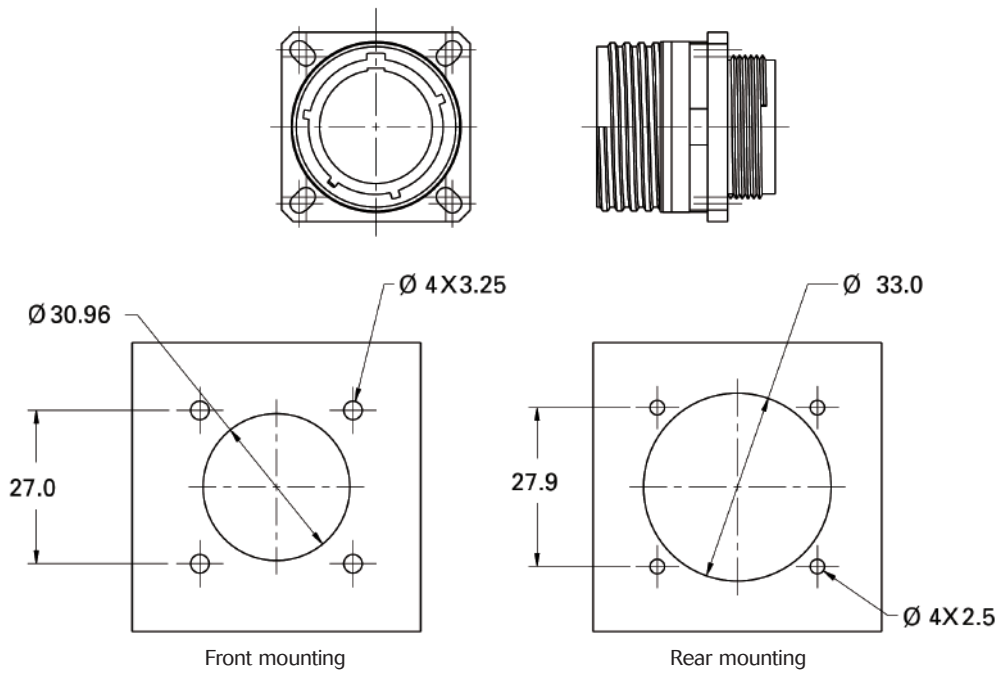
| Shell type | A Max. | B Max. | C Max. |
|------------|--------|--------|--------------|
| Aluminium | 15.24 | 3.20 | 304.80 ±25.4 |

8D Series with RJ45 USB

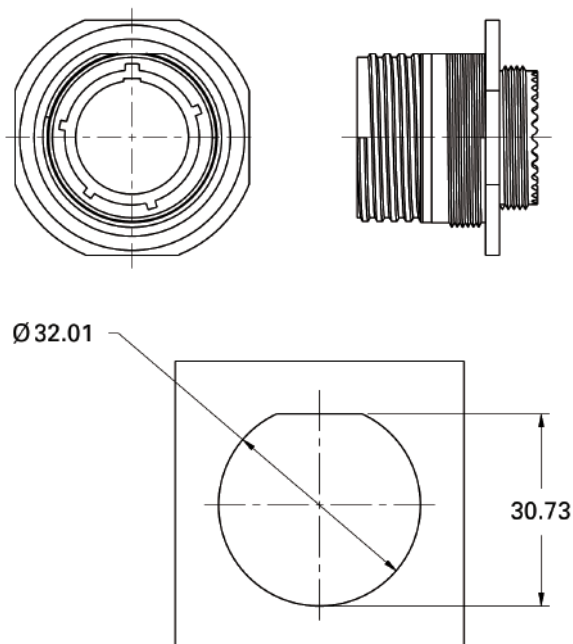


Panel cut out for USB serie

Suare flange receptacle



Jam nut receptacle



Coordinates for straight spill terminations



Cavity identification – Viewed from front face of male insulator

Hole sizes: 1 mm min. (#22 and 20 contacts) and 1,3 mm min. (# 16 contact) coordinates in mm.

9

35

98

| Contact | Coordinates | |
|---------|-------------|-------|
| | X | Y |
| 1 | +1.14 | +1.98 |
| 2 | +1.98 | -1.14 |
| 3 | 0.00 | -2.29 |
| 4 | -1.98 | -1.14 |
| 5 | -1.14 | +1.98 |
| 6 | 0.00 | 0.00 |

| Contact | Coordinates | |
|---------|-------------|-------|
| | X | Y |
| 1 | +1.65 | +0.97 |
| 2 | 0.00 | -1.90 |
| 3 | -1.65 | +0.97 |

11

02

35

98

99

| Contact | Coordinates | |
|---------|-------------|-------|
| | X | Y |
| 1 | 0.00 | +2.41 |
| 2 | 0.00 | -2.41 |

| Contact | Coordinates | |
|---------|-------------|-------|
| | X | Y |
| 1 | 0.00 | +3.71 |
| 2 | +2.16 | +3.00 |
| 3 | +3.50 | +1.14 |
| 4 | +3.50 | -1.14 |
| 5 | +2.16 | -2.99 |
| 6 | 0.00 | -3.71 |
| 7 | -2.16 | -2.99 |

| Contact | Coordinates | |
|---------|-------------|-------|
| | X | Y |
| 8 | -3.50 | -1.14 |
| 9 | -3.50 | +1.14 |
| 10 | -2.16 | +2.99 |
| 11 | 0.00 | +1.42 |
| 12 | +1.24 | -0.89 |
| 13 | -1.24 | -0.89 |

| Contact | Coordinates | |
|---------|-------------|-------|
| | X | Y |
| A | 0.00 | +3.30 |
| B | +3.30 | 0.00 |
| C | +1.65 | -2.87 |
| D | -1.65 | -2.87 |
| E | -3.30 | 0.00 |
| F | 0.00 | 0.00 |

| Contact | Coordinates | |
|---------|-------------|-------|
| | X | Y |
| A | +1.65 | +2.85 |
| B | +3.30 | 0.00 |
| C | +1.65 | -2.87 |
| D | -1.65 | -2.87 |
| E | -3.30 | 0.00 |
| F | -1.65 | +2.87 |
| G | 0.00 | 0.00 |

05

04

| Contact | Coordinates | |
|---------|-------------|-------|
| | X | Y |
| A | +1.65 | +1.42 |
| B | +2.86 | -1.65 |
| C | 0.00 | -3.30 |
| D | -2.86 | -1.65 |
| E | -1.65 | +1.42 |

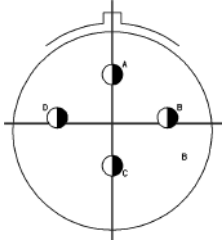
| Contact | Coordinates | |
|---------|-------------|-------|
| | X | Y |
| A | +1.65 | +1.65 |
| B | +1.65 | -1.65 |
| C | -1.65 | -1.65 |
| D | -1.65 | +1.65 |

Coordinates for straight spill terminations



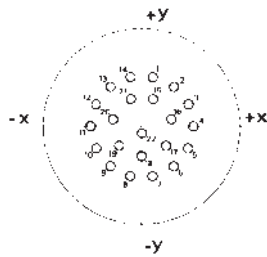
13

04



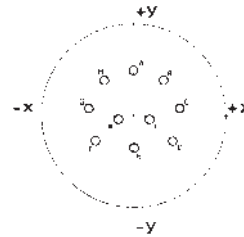
| Contact | Coordinates | |
|---------|-------------|-------|
| | X | Y |
| A | 0.00 | +3.81 |
| B | +3.71 | +0.89 |
| C | 0.00 | -2.11 |
| D | -3.71 | -0.89 |

35



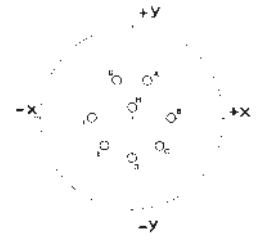
| Contact | Coordinates | |
|---------|-------------|-------|
| | X | Y |
| 1 | +1.14 | +5.00 |
| 2 | +3.20 | +4.01 |
| 3 | +4.62 | +2.24 |
| 4 | +5.15 | 0.00 |
| 5 | +4.62 | -2.24 |
| 6 | +3.20 | -4.01 |
| 7 | +1.14 | -5.00 |
| 8 | -1.14 | -5.00 |
| 9 | -3.20 | -4.01 |
| 10 | -4.62 | -2.24 |
| 11 | -5.15 | 0.00 |

98



| Contact | Coordinates | |
|---------|-------------|-------|
| | X | Y |
| 12 | -4.62 | +2.24 |
| 13 | -3.20 | +4.01 |
| 14 | -1.14 | +5.00 |
| 15 | +1.14 | +2.72 |
| 16 | +2.97 | +0.66 |
| 17 | +2.36 | -1.91 |
| 18 | 0.00 | -3.05 |
| 19 | -2.36 | -1.91 |
| 20 | -2.97 | +0.66 |
| 21 | -1.14 | +2.72 |
| 22 | 0.00 | -0.76 |

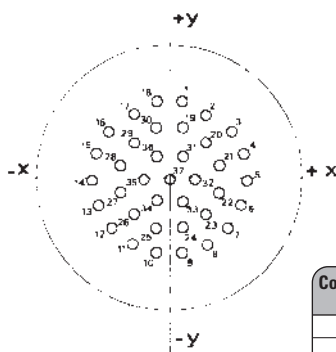
08



| Contact | Coordinates | |
|---------|-------------|-------|
| | X | Y |
| A | +1.65 | +3.99 |
| B | +4.32 | 0.00 |
| C | +3.05 | -3.05 |
| D | 0.00 | -4.32 |
| E | -3.05 | -3.05 |
| F | -4.32 | 0.00 |
| G | -1.65 | +3.99 |
| H | 0.00 | +1.12 |

15

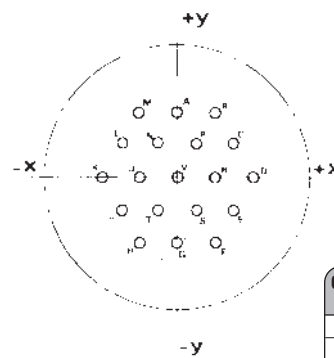
35



| Contact | Coordinates | |
|---------|-------------|-------|
| | X | Y |
| 1 | +1.14 | +6.65 |
| 2 | +3.12 | +5.51 |
| 3 | +5.36 | +4.06 |
| 4 | +6.45 | +2.03 |
| 5 | +6.76 | -0.25 |
| 6 | +6.27 | -2.49 |
| 7 | +5.08 | -4.44 |
| 8 | +3.30 | -5.89 |
| 9 | +1.14 | -6.65 |
| 10 | -1.14 | -6.65 |
| 11 | -3.30 | -5.89 |
| 12 | -5.08 | -4.44 |
| 13 | -6.27 | -2.49 |
| 14 | -6.76 | -0.25 |
| 15 | -6.45 | +2.03 |
| 16 | -5.36 | +4.06 |

| Contact | Coordinates | |
|---------|-------------|-------|
| | X | Y |
| 17 | -3.12 | +5.51 |
| 18 | -1.14 | +6.65 |
| 19 | +1.14 | +4.37 |
| 20 | +3.12 | +3.02 |
| 21 | +4.32 | +1.02 |
| 22 | +4.32 | -1.27 |
| 23 | +3.12 | -3.23 |
| 24 | +1.14 | -4.37 |
| 25 | -1.14 | -4.37 |
| 26 | -3.12 | -3.23 |
| 27 | -4.32 | -1.27 |
| 28 | -4.32 | +1.02 |
| 29 | -3.12 | +3.02 |
| 30 | -1.14 | +4.37 |
| 31 | +1.14 | +1.88 |
| 32 | +2.29 | -0.10 |
| 33 | +1.14 | -2.08 |
| 34 | -1.14 | -2.08 |
| 35 | -2.29 | -0.10 |
| 36 | -1.14 | +1.88 |
| 37 | 0.00 | -0.10 |

19



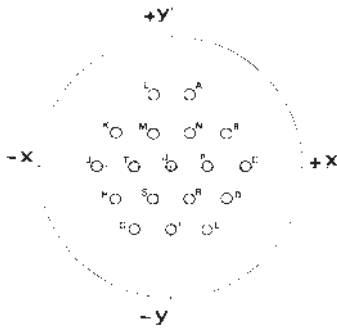
| Contact | Coordinates | |
|---------|-------------|-------|
| | X | Y |
| A | 0.00 | +5.72 |
| B | +3.30 | +5.72 |
| C | +4.95 | +2.72 |
| D | +6.60 | 0.00 |
| E | +4.95 | -2.87 |
| F | +3.30 | -5.72 |
| G | 0.00 | -5.72 |
| H | -3.30 | -5.72 |
| J | -4.95 | -2.87 |
| K | -6.60 | 0.00 |
| L | -4.95 | +2.87 |
| M | -3.30 | +5.72 |
| N | -1.65 | +2.87 |
| P | +1.65 | +2.87 |
| R | +3.30 | 0.00 |
| S | +1.65 | -2.87 |
| T | -1.65 | -2.87 |
| U | -3.30 | 0.00 |
| V | 0.00 | 0.00 |

Coordinates for straight spill terminations



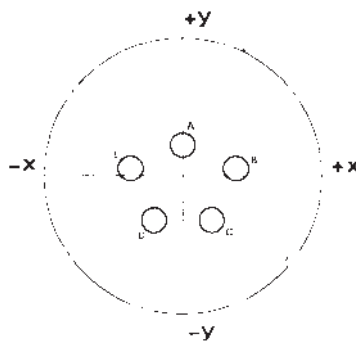
15

18



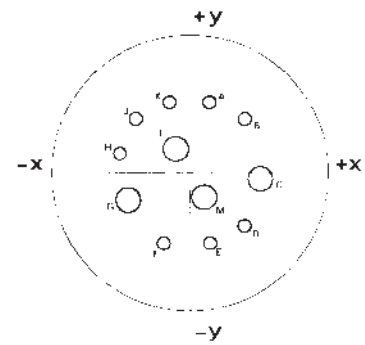
| Contact | Coordinates | | Contact | Coordinates | |
|---------|-------------|-------|---------|-------------|-------|
| | X | Y | | X | Y |
| A | +1.65 | +6.40 | K | -4.95 | +2.87 |
| B | +4.95 | +2.87 | L | -1.65 | +6.40 |
| C | +6.60 | 0.00 | M | -1.65 | +2.87 |
| D | +4.95 | -2.87 | N | +1.65 | +2.87 |
| E | +3.30 | -5.72 | P | +3.30 | 0.00 |
| F | 0.00 | -5.72 | R | +1.65 | -2.87 |
| G | -3.30 | -5.72 | S | -1.65 | -2.87 |
| H | -4.95 | -2.87 | T | -3.30 | 0.00 |
| J | -6.60 | 0.00 | U | 0.00 | 0.00 |

05



| Contact | Coordinates | |
|---------|-------------|-------|
| | X | Y |
| A | 0 | +2.54 |
| B | +4.42 | +0.61 |
| C | +2.39 | +3.76 |
| D | -2.39 | -3.76 |
| E | -4.42 | +0.61 |

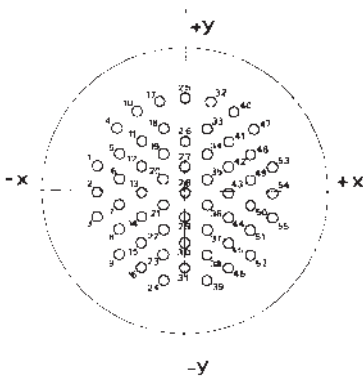
97



| Contact | Coordinates | | Contact | Coordinates | |
|---------|-------------|-------|---------|-------------|-------|
| | X | Y | | X | Y |
| A | +1.65 | +5.94 | G | -5.26 | -2.41 |
| B | +4.52 | +4.52 | H | -5.94 | +1.65 |
| C | +5.84 | -0.58 | J | -4.52 | +4.52 |
| D | +4.52 | -4.52 | K | -1.65 | +5.94 |
| E | +1.65 | -5.94 | L | -1.19 | +2.06 |
| F | -2.26 | -5.97 | M | +1.19 | -2.06 |

17

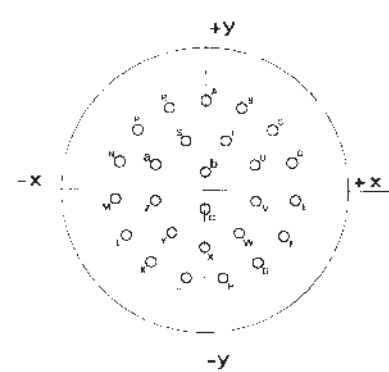
35



| Contact | Coordinates | | Contact | Coordinates | |
|---------|-------------|-------|---------|-------------|-------|
| | X | Y | | X | Y |
| 1 | -7.92 | +2.18 | 14 | -3.96 | -2.39 |
| 2 | -7.92 | -0.10 | 15 | -3.96 | -4.67 |
| 3 | -7.92 | -2.39 | 16 | -3.96 | -6.96 |
| 4 | -6.15 | +5.61 | 17 | -2.26 | +8.03 |
| 5 | -5.94 | +3.33 | 18 | -1.98 | +5.61 |
| 6 | -5.94 | +1.04 | 19 | -1.98 | +3.33 |
| 7 | -5.94 | +1.24 | 20 | -1.98 | +1.04 |
| 8 | -5.94 | -3.53 | 21 | -1.98 | -1.24 |
| 9 | -5.94 | -5.82 | 22 | -1.98 | -3.53 |
| 10 | -4.37 | +7.09 | 23 | -1.98 | -5.82 |
| 11 | -3.96 | +4.47 | 24 | -1.98 | +8.10 |
| 12 | -3.96 | +2.18 | 25 | 0.00 | +8.36 |
| 13 | -3.96 | -0.10 | 26 | 0.00 | +4.47 |

| Contact | Coordinates | |
|---------|-------------|-------|
| | X | Y |
| 27 | 0.00 | +2.18 |
| 28 | 0.00 | -0.10 |
| 29 | 0.00 | -2.39 |
| 30 | 0.00 | -4.67 |
| 31 | 0.00 | -6.96 |
| 32 | +2.26 | +8.03 |
| 33 | +1.98 | +5.61 |
| 34 | +1.98 | +3.33 |
| 35 | +1.98 | +1.04 |
| 36 | +1.98 | -1.24 |
| 37 | +1.98 | -3.53 |
| 38 | +1.98 | -5.82 |
| 39 | +1.98 | -8.10 |
| 40 | +4.37 | +7.09 |
| 41 | +3.96 | +4.47 |
| 42 | +3.96 | +2.18 |
| 43 | +3.96 | -0.10 |
| 44 | +3.96 | -2.39 |
| 45 | +3.96 | -4.67 |
| 46 | +3.96 | -6.96 |
| 47 | -6.15 | +5.61 |
| 48 | +5.94 | +3.33 |
| 49 | +5.94 | +1.04 |
| 50 | +5.94 | -1.24 |
| 51 | +5.94 | -3.53 |
| 52 | +5.94 | -5.82 |
| 53 | +7.92 | +2.18 |
| 54 | +7.92 | -0.10 |
| 55 | +7.92 | -2.39 |

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| Contact | Coordinates | | Contact | Coordinates | |
|---------|-------------|-------|---------|-------------|-------|
| | X | Y | | X | Y |
| A | 0.00 | +8.15 | P | -6.07 | +5.44 |
| B | +3.33 | +7.44 | R | -3.33 | +7.44 |
| C | +6.07 | +5.44 | S | -1.78 | +4.50 |
| D | +7.75 | +2.51 | T | +1.78 | +4.50 |
| E | +8.10 | -0.86 | U | +4.45 | +2.39 |
| F | +7.06 | -4.09 | V | +4.53 | +0.91 |
| G | +4.80 | -6.60 | W | +3.02 | -3.84 |
| H | +1.70 | -7.98 | X | 0.00 | -5.16 |
| J | -1.70 | -7.98 | Y | -3.02 | -3.84 |
| K | -4.80 | -6.60 | Z | -4.53 | -0.91 |
| L | -7.06 | -4.09 | a | -4.45 | +2.39 |
| M | -8.10 | -0.86 | b | 0.00 | +1.65 |
| N | -7.75 | +2.51 | c | 0.00 | -1.65 |

Coordinates for straight spill terminations



17

08

| Contact | Coordinates | |
|---------|-------------|-------|
| | X | Y |
| A | 0.00 | +5.99 |
| B | +3.25 | +2.18 |
| C | +5.84 | -1.98 |
| D | +2.39 | -5.49 |
| E | -2.39 | -5.49 |
| F | -5.84 | -1.98 |
| G | -3.25 | +2.18 |
| H | 0.00 | -1.32 |

99

| Contact | Coordinates | |
|---------|-------------|-------|
| | X | Y |
| A | 0.00 | +8.15 |
| B | +3.33 | +7.44 |
| C | +6.07 | +5.44 |
| D | +7.75 | +2.51 |
| E | +8.10 | -0.86 |
| F | +7.06 | -4.09 |
| G | +4.80 | -6.60 |
| H | +1.70 | -7.96 |
| J | -1.70 | -7.96 |
| K | -4.80 | -6.60 |
| L | -7.06 | -4.09 |
| M | -8.10 | -0.86 |
| N | -7.75 | +2.51 |
| P | -6.07 | +5.44 |
| R | -3.33 | +7.44 |
| S | -1.78 | +4.50 |
| T | +1.78 | +4.50 |
| U | +4.45 | +2.39 |
| V | +3.81 | -1.91 |
| W | 0.00 | -4.09 |
| X | -3.81 | -1.91 |
| Y | -4.45 | +2.39 |
| Z | 0.00 | +0.64 |

19

35

| Contact | Coordinates | |
|---------|-------------|-------|
| | X | Y |
| 35 | +1.14 | +6.86 |
| 36 | +1.14 | +4.57 |
| 37 | +1.14 | +2.29 |
| 38 | +1.14 | 0.00 |
| 39 | +1.14 | -2.29 |
| 40 | +1.14 | -4.57 |
| 41 | +1.14 | -6.86 |
| 42 | +1.14 | -9.14 |
| 43 | +3.12 | +8.00 |
| 44 | +3.12 | +5.72 |
| 45 | +3.12 | +3.43 |
| 46 | +3.12 | +1.14 |
| 47 | +3.12 | -1.14 |
| 48 | +3.12 | -3.43 |
| 49 | +3.12 | -5.72 |
| 50 | +3.12 | -8.00 |
| 51 | +5.11 | +6.86 |
| 52 | +5.11 | +4.57 |
| 53 | +5.11 | +2.29 |
| 54 | +5.11 | 0.00 |
| 55 | +5.11 | -2.29 |
| 56 | +5.11 | -4.57 |
| 57 | +5.11 | -6.86 |
| 58 | +7.09 | +5.72 |
| 59 | +7.09 | +3.43 |
| 60 | +7.09 | +1.14 |
| 61 | +7.09 | 0.00 |
| 62 | +7.09 | -3.43 |
| 63 | +7.09 | -5.72 |
| 64 | +9.07 | +2.29 |
| 65 | +9.07 | 0.00 |
| 66 | +9.07 | -2.29 |

32

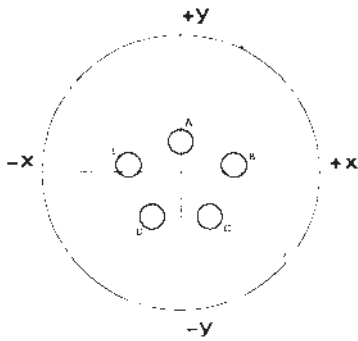
| Contact | Coordinates | |
|---------|-------------|-------|
| | X | Y |
| A | +1.68 | +8.97 |
| B | +4.80 | +7.75 |
| C | +7.26 | +5.51 |
| D | +8.76 | +2.49 |
| E | +9.07 | -0.84 |
| F | +8.15 | -4.06 |
| G | +6.15 | -6.73 |
| H | +3.30 | -8.51 |
| J | 0.00 | -9.12 |
| K | -3.30 | -8.51 |
| L | -6.15 | -6.73 |
| M | -8.15 | -4.06 |
| N | -9.07 | -0.84 |
| P | -8.76 | +2.49 |
| R | -7.26 | +5.51 |
| S | -4.80 | +7.75 |
| T | -1.68 | +8.97 |
| U | 0.00 | +5.84 |
| V | +3.15 | +4.90 |
| W | +5.31 | +2.41 |
| X | +5.79 | -0.84 |
| Y | +4.42 | -3.84 |
| Z | +1.65 | -5.61 |
| a | -1.65 | -5.61 |
| b | -4.42 | -3.84 |
| c | -5.79 | -0.84 |
| d | -5.31 | +2.41 |
| e | -3.15 | +4.90 |
| f | 0.00 | +2.44 |
| g | +2.44 | 0.00 |
| h | 0.00 | -2.44 |
| j | -2.44 | 0.00 |

Coordinates for straight spill terminations



19

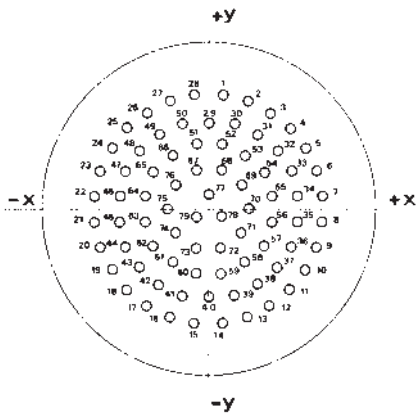
11



| Contact | Coordinates | |
|---------|-------------|-------|
| | X | Y |
| A | +2.67 | +6.60 |
| B | +6.35 | +3.35 |
| C | +6.99 | -1.35 |
| D | +4.55 | -5.46 |
| E | 0.00 | -7.14 |
| F | -4.55 | -5.46 |
| G | -6.99 | -1.35 |
| H | -6.35 | +3.35 |
| J | -2.67 | +6.60 |
| K | 0.00 | +2.67 |
| L | 0.00 | -2.34 |

21

35

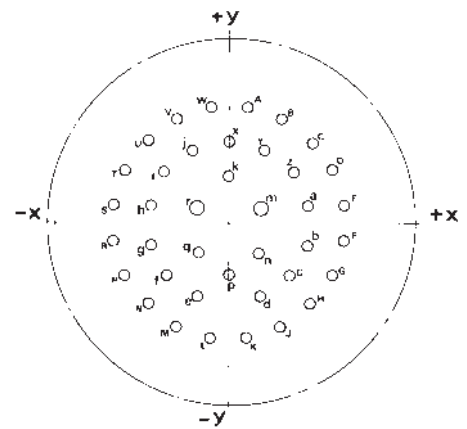


| Contact | Coordinates | |
|---------|-------------|-------|
| | X | Y |
| 41 | -2.49 | -8.18 |
| 42 | -4.67 | -7.11 |
| 43 | -6.55 | -5.59 |
| 44 | -7.90 | -3.58 |
| 45 | -8.43 | -1.22 |
| 46 | -8.43 | +1.22 |
| 47 | -7.90 | +3.58 |
| 48 | -6.55 | +5.59 |
| 49 | -4.67 | +7.11 |
| 50 | -2.49 | +8.18 |
| 51 | -1.22 | +6.12 |
| 52 | +1.22 | +6.12 |
| 53 | +3.40 | +5.05 |
| 54 | +5.28 | +3.53 |
| 55 | +6.02 | +1.22 |
| 56 | +6.02 | -1.22 |
| 57 | +5.28 | -3.53 |
| 58 | +3.40 | -5.05 |
| 59 | +1.22 | -6.12 |
| 60 | -1.22 | -6.12 |
| 61 | -3.40 | -5.05 |
| 62 | -5.28 | -3.53 |
| 63 | -6.02 | -1.22 |
| 64 | -6.02 | +1.22 |
| 65 | -5.28 | +3.53 |
| 66 | -3.40 | +5.05 |
| 67 | -1.22 | +3.71 |
| 68 | +1.22 | +3.71 |
| 69 | +3.18 | +2.29 |
| 70 | +3.94 | 0.00 |
| 71 | +3.18 | -2.29 |
| 72 | +1.22 | -3.71 |
| 73 | -1.22 | -3.71 |
| 74 | -3.18 | -2.29 |
| 75 | -3.94 | 0.00 |
| 76 | -3.18 | +2.29 |
| 77 | 0.00 | +1.35 |
| 78 | +1.22 | -0.74 |
| 79 | -1.22 | -0.74 |

| Contact | Coordinates | |
|---------|-------------|--------|
| | X | Y |
| 1 | +1.35 | +10.82 |
| 2 | +3.71 | +10.26 |
| 3 | +5.89 | +9.19 |
| 4 | +7.77 | +7.67 |
| 5 | +9.27 | +5.77 |
| 6 | +10.31 | +3.58 |
| 7 | +10.85 | +1.22 |
| 8 | +10.85 | -1.22 |
| 9 | +10.31 | -3.58 |
| 10 | +9.27 | -5.77 |
| 11 | +7.77 | -7.67 |
| 12 | +5.89 | -9.19 |
| 13 | +3.71 | -10.26 |
| 14 | +1.35 | -10.82 |
| 15 | -1.35 | -10.82 |
| 16 | -3.71 | -10.26 |
| 17 | -5.89 | -9.19 |
| 18 | -7.77 | -7.67 |
| 19 | -9.27 | -5.77 |
| 20 | -10.31 | -3.58 |

| Contact | Coordinates | |
|---------|-------------|--------|
| | X | Y |
| 21 | -10.85 | -1.22 |
| 22 | -10.85 | +1.22 |
| 23 | -10.31 | +3.58 |
| 24 | -9.27 | +5.77 |
| 25 | -7.77 | +7.67 |
| 26 | -5.89 | +9.19 |
| 27 | -3.71 | +10.26 |
| 28 | -1.35 | +10.82 |
| 29 | 0.00 | +8.20 |
| 30 | +2.49 | +8.18 |
| 31 | +4.67 | +7.11 |
| 32 | +6.55 | +5.59 |
| 33 | +7.90 | +3.58 |
| 34 | +8.43 | +1.22 |
| 35 | +8.43 | -1.22 |
| 36 | +7.90 | -3.58 |
| 37 | +6.55 | -5.59 |
| 38 | +4.67 | -7.11 |
| 39 | +2.49 | -8.18 |
| 40 | 0.00 | -8.81 |

39



| Contact | Coordinates | |
|---------|-------------|--------|
| | X | Y |
| A | +1.65 | +10.44 |
| B | +4.80 | +9.42 |
| C | +7.47 | +7.47 |
| D | +9.42 | +4.80 |
| E | +10.44 | +1.65 |
| F | +10.44 | -1.65 |
| G | +9.42 | -4.80 |
| H | +7.47 | -7.47 |
| J | +4.80 | -9.42 |
| K | +1.65 | -10.44 |
| L | -1.65 | -10.44 |
| M | -4.80 | -9.42 |
| N | -7.47 | -7.47 |
| P | -9.42 | -4.80 |
| R | -10.44 | -1.65 |
| S | -10.44 | +1.65 |
| T | -9.42 | +4.80 |
| U | -7.47 | +7.47 |
| V | -4.80 | +9.42 |
| W | -1.65 | +10.44 |

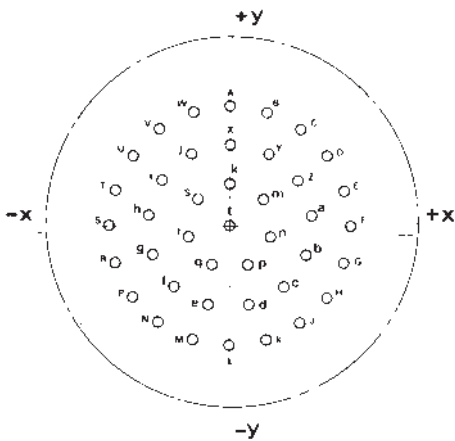
| Contact | Coordinates | |
|---------|-------------|-------|
| | X | Y |
| X | 0.00 | +7.49 |
| Y | +3.20 | +6.50 |
| Z | +5.89 | +4.55 |
| a | +7.11 | +1.45 |
| b | +7.11 | -1.88 |
| c | +5.51 | -4.80 |
| d | +2.84 | -6.73 |
| e | -2.84 | -6.73 |
| f | -5.51 | -4.80 |
| g | -7.11 | -1.88 |
| h | -7.11 | +1.45 |
| i | -5.89 | +4.55 |
| j | -3.20 | +6.50 |
| k | 0.00 | +4.17 |
| m | +2.90 | +1.22 |
| n | +2.69 | -2.72 |
| p | 0.00 | -4.80 |
| q | -2.69 | -2.72 |
| r | -2.90 | +1.22 |

Coordinates for straight spill terminations



21

41

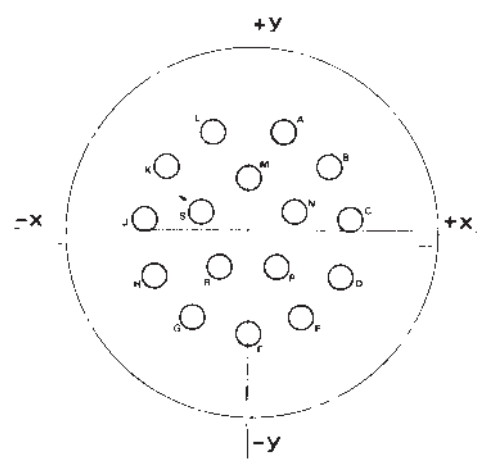


| Contact | Coordinates | |
|---------|-------------|--------|
| | X | Y |
| T | -10.09 | +3.28 |
| U | -8.58 | +6.23 |
| V | -6.23 | +8.58 |
| W | -3.28 | +10.09 |
| X | 0.00 | +7.20 |
| Y | +3.35 | +6.38 |
| Z | +5.92 | +4.09 |
| a | +7.15 | +0.87 |
| b | +6.73 | -2.55 |
| c | +4.78 | -5.39 |
| d | +1.73 | -6.99 |
| e | -1.73 | -6.99 |
| f | -4.78 | -5.39 |
| g | -6.73 | -2.55 |
| h | -7.15 | +0.87 |
| i | -5.92 | +4.09 |
| j | -3.35 | +6.38 |
| k | 0.00 | +3.81 |
| m | +2.98 | +2.38 |
| n | +3.71 | -0.85 |
| p | -1.66 | -3.43 |
| q | +1.66 | -3.43 |
| r | -3.71 | -0.85 |
| s | -2.98 | +2.38 |
| t | 0.00 | 0.00 |

| Contact | Coordinates | |
|---------|-------------|--------|
| | X | Y |
| A | 0.00 | +10.60 |
| B | +3.28 | +10.09 |
| C | +6.23 | +8.58 |
| D | +8.58 | +6.23 |
| E | +10.09 | +3.28 |
| F | +10.60 | 0.00 |
| G | +10.09 | -3.28 |
| H | +8.58 | -6.23 |

| Contact | Coordinates | |
|---------|-------------|--------|
| | X | Y |
| J | +6.23 | -8.58 |
| K | +3.28 | -10.09 |
| L | 0.00 | -10.60 |
| M | -3.28 | -10.09 |
| N | -6.23 | -8.58 |
| P | -8.58 | -6.23 |
| R | -10.09 | -3.28 |
| S | -10.60 | 0.00 |

16



| Contact | Coordinates | |
|---------|-------------|--------|
| | X | Y |
| A | +3.00 | +8.18 |
| B | +6.88 | +5.36 |
| C | +8.66 | +0.914 |
| D | +7.82 | -3.81 |
| E | +4.62 | -7.37 |
| F | 0.00 | -8.71 |
| G | -4.62 | -7.37 |
| H | -7.82 | -3.81 |

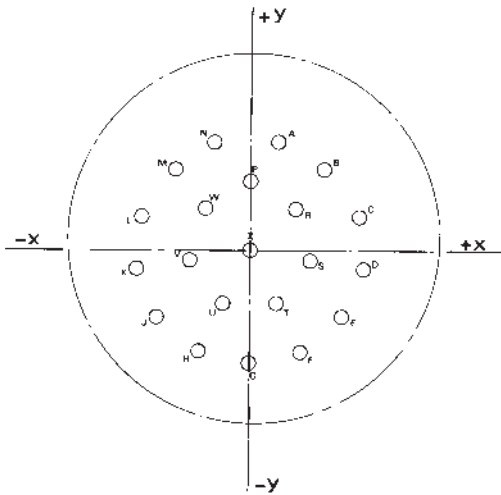
| Contact | Coordinates | |
|---------|-------------|-------|
| | X | Y |
| J | -8.66 | +0.91 |
| K | -6.88 | +5.36 |
| L | -3.00 | +8.18 |
| M | 0.00 | +4.45 |
| N | +3.91 | +1.57 |
| P | +2.39 | -3.10 |
| R | -2.39 | -3.10 |
| S | -3.91 | +1.57 |

Coordinates for straight spill terminations



23

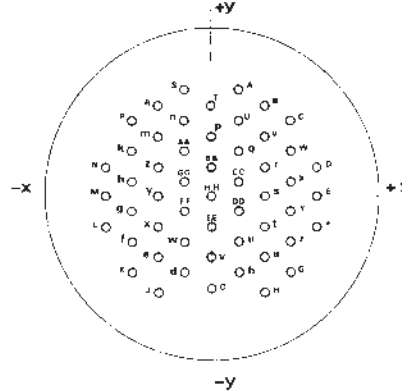
21



| Contact | Coordinates | |
|---------|-------------|--------|
| | X | Y |
| A | +3.25 | +9.78 |
| B | +7.34 | +7.24 |
| C | +9.80 | +3.12 |
| D | +10.16 | -1.65 |
| E | +8.33 | -6.07 |
| F | +4.65 | -9.19 |
| G | 0.00 | -10.31 |
| H | -4.65 | -9.19 |
| J | -8.33 | -6.07 |
| K | -10.16 | -1.65 |
| L | -9.80 | +3.12 |

| Contact | Coordinates | |
|---------|-------------|-------|
| | X | Y |
| M | -7.34 | +7.24 |
| N | -3.25 | +9.78 |
| P | 0.00 | +6.22 |
| R | +4.06 | +3.71 |
| S | +5.44 | -0.89 |
| T | +2.39 | -4.93 |
| U | -2.39 | -4.93 |
| V | -5.44 | -0.89 |
| W | -4.06 | +3.71 |
| X | 0.00 | 0.00 |

53



| Contact | Coordinates | |
|---------|-------------|--------|
| | X | Y |
| A | +4.98 | +12.70 |
| B | +7.98 | +11.05 |
| C | +10.49 | +8.71 |
| D | +12.32 | +5.84 |
| E | +13.39 | +2.57 |
| F | +13.61 | -0.76 |
| G | +12.98 | -4.17 |
| H | +11.53 | -7.29 |
| J | +9.35 | -9.93 |
| K | +6.58 | -11.94 |
| L | +3.40 | 13.18 |
| M | 0.00 | -13.64 |

| Contact | Coordinates | |
|---------|-------------|--------|
| | X | Y |
| N | -3.40 | -13.18 |
| P | -6.58 | -11.94 |
| R | -9.35 | -9.93 |
| S | -11.53 | -7.29 |
| T | -12.98 | -4.17 |
| U | -13.61 | -0.76 |
| V | -13.39 | +2.57 |
| W | -12.32 | +5.84 |
| X | -10.49 | +8.71 |
| Y | -7.98 | +11.05 |
| Z | -4.98 | 12.70 |

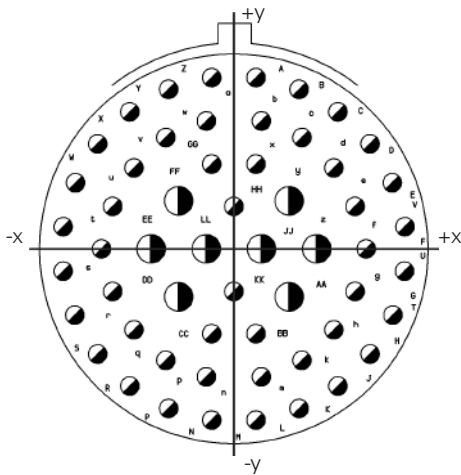
| Contact | Coordinates | |
|---------|-------------|--------|
| | X | Y |
| a | -1.73 | +11.53 |
| b | +1.73 | +11.53 |
| c | +4.39 | +9.22 |
| d | +7.24 | +7.19 |
| e | +9.19 | +4.45 |
| f | +10.13 | +1.17 |
| g | +9.96 | -2.24 |
| h | +8.66 | -5.41 |
| i | +6.38 | -7.98 |
| j | +3.38 | -9.63 |
| k | 0.00 | -10.21 |
| m | -3.38 | -9.63 |
| n | -6.38 | -7.98 |
| p | -8.66 | -5.41 |
| q | -9.96 | -2.24 |
| r | -10.13 | +1.17 |
| s | -9.19 | +4.45 |
| t | -7.24 | +7.19 |
| u | -4.39 | +9.22 |
| v | 0.00 | +8.59 |
| w | +3.73 | +5.66 |
| x | +6.02 | +3.10 |
| y | +6.78 | -0.25 |
| z | +5.79 | -3.53 |
| AA | +3.33 | -5.92 |
| BB | 0.00 | -6.78 |
| CC | -3.33 | -5.92 |
| DD | -5.79 | -3.53 |
| EE | -6.78 | -0.25 |
| FF | -6.02 | +3.10 |
| GG | -3.73 | +5.66 |
| HH | 0.00 | +5.08 |
| JJ | +2.67 | +2.39 |
| KK | +3.43 | -1.04 |
| LL | 0.00 | -3.35 |
| MM | -3.43 | -1.04 |
| NN | -2.67 | +2.39 |
| PP | 0.00 | 0.00 |

Coordinates for straight spill terminations



25

04

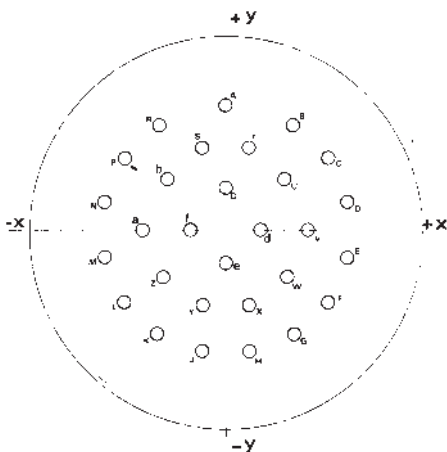


| Contact | Coordinates | |
|---------|-------------|--------|
| | X | Y |
| A | +1.75 | +13.49 |
| B | +5.49 | +12.57 |
| C | +8.23 | +10.80 |
| D | +10.77 | +8.28 |
| E | +12.52 | +5.21 |
| F | +13.49 | +1.75 |
| G | +13.49 | -1.75 |
| H | +12.52 | -5.21 |
| J | +10.77 | -8.28 |
| K | +8.23 | -10.80 |
| L | +5.16 | -12.57 |
| M | +1.75 | -13.49 |
| N | -1.75 | -13.49 |
| P | -5.16 | -12.57 |
| R | -8.23 | -10.80 |
| S | -10.77 | -8.28 |
| T | -12.52 | -5.21 |
| U | -13.49 | -1.75 |
| V | -13.49 | +1.75 |
| W | -12.52 | +5.21 |
| X | -10.77 | +8.28 |
| Y | -8.23 | +10.80 |
| Z | -5.16 | +12.57 |

| Contact | Coordinates | |
|---------|-------------|--------|
| | X | Y |
| a | -1.75 | +13.49 |
| b | +2.18 | +10.08 |
| c | +5.38 | +8.78 |
| d | +7.90 | +6.38 |
| e | +9.58 | +3.35 |
| f | +10.46 | 0.00 |
| g | +9.58 | -3.35 |
| h | +7.90 | -6.38 |
| k | +5.38 | -8.78 |
| m | +2.18 | -10.08 |
| n | -2.18 | -10.08 |
| p | -5.38 | -8.78 |
| q | -7.90 | -6.38 |
| r | -9.58 | -3.35 |
| s | -10.46 | 0.00 |
| t | -9.58 | +3.35 |
| u | -7.90 | +6.38 |
| v | -5.38 | +8.78 |
| w | -2.18 | +10.08 |
| x | +1.75 | +6.66 |
| y | +4.37 | +3.78 |
| z | +6.55 | 0.00 |

| Contact | Coordinates | |
|---------|-------------|-------|
| | X | Y |
| AA | +4.37 | -3.78 |
| BB | +1.75 | -6.66 |
| CC | -1.75 | -6.66 |
| DD | -4.37 | +3.78 |
| EE | -6.55 | 0.00 |
| FF | -4.37 | +3.78 |
| GG | -1.75 | +6.66 |
| HH | 0.00 | +3.35 |
| JJ | +2.18 | 0.00 |
| KK | 0.00 | -3.35 |
| LL | +2.18 | 0.00 |

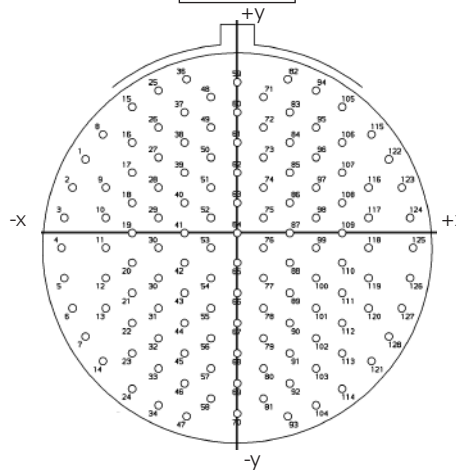
29



| Contact | Coordinates | |
|---------|-------------|--------|
| | X | Y |
| A | 0.00 | -12.22 |
| B | +6.55 | +10.31 |
| C | +10.03 | +7.04 |
| D | +11.91 | +2.77 |
| E | +11.91 | -2.77 |
| F | +10.03 | -7.04 |
| G | +6.68 | -10.31 |
| H | +2.31 | -11.99 |
| J | -2.31 | -11.99 |
| K | -6.68 | -10.31 |
| L | -10.03 | -7.04 |
| M | -11.91 | -2.77 |
| N | -11.91 | +2.77 |
| P | -10.03 | +7.04 |

| Contact | Coordinates | |
|---------|-------------|--------|
| | X | Y |
| R | -6.55 | +10.31 |
| S | -2.31 | +8.15 |
| T | +2.31 | +8.15 |
| U | +5.79 | +4.93 |
| V | +8.10 | 0.00 |
| W | +6.10 | -4.60 |
| X | +2.31 | -7.37 |
| Y | -2.31 | -7.37 |
| Z | -6.10 | -4.60 |
| a | -8.10 | 0.00 |
| b | -5.79 | +4.93 |
| c | 0.00 | +4.09 |
| d | +3.40 | 0.00 |
| e | 0.00 | -3.30 |
| f | -3.40 | 0.00 |

35



| Contact | Coordinates | |
|---------|-------------|--------|
| | X | Y |
| A | +4.98 | +12.70 |
| B | +7.98 | +11.05 |
| C | +10.49 | +8.71 |
| D | +12.32 | +5.84 |
| E | +13.39 | +2.57 |
| F | +13.61 | -0.76 |
| G | +12.98 | -4.17 |
| H | +11.53 | -7.29 |
| J | +9.35 | -9.93 |
| K | +6.58 | -11.94 |
| L | +3.40 | 13.18 |

| Contact | Coordinates | |
|---------|-------------|--------|
| | X | Y |
| M | 0.00 | -13.64 |
| N | -3.40 | -13.18 |
| P | -6.58 | -11.94 |
| R | -9.35 | -9.93 |
| S | -11.53 | -7.29 |
| T | -12.98 | -4.17 |
| U | -13.61 | -0.76 |
| V | -13.39 | +2.57 |
| W | -12.32 | +5.84 |
| X | -10.49 | +8.71 |
| Y | -7.98 | +11.05 |
| Z | -4.98 | +12.70 |

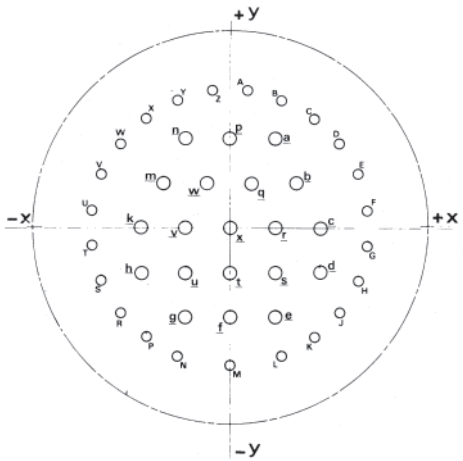
| Contact | Coordinates | |
|---------|-------------|--------|
| | X | Y |
| a | -1.73 | +11.53 |
| b | +1.73 | +11.53 |
| c | +4.39 | +9.22 |
| d | +7.24 | +7.19 |
| e | +9.19 | +4.45 |
| f | +10.13 | +1.17 |
| g | +9.96 | -2.24 |
| h | +8.66 | -5.41 |
| i | +6.38 | -7.98 |
| j | +3.38 | -9.63 |
| k | 0.00 | -10.21 |
| m | -3.38 | -9.63 |
| n | -6.38 | -7.98 |
| p | -8.66 | -5.41 |
| q | -9.96 | -2.24 |
| r | -10.13 | +1.17 |
| s | -9.19 | +4.45 |
| t | -7.24 | +7.19 |
| u | -4.39 | +9.22 |
| v | 0.00 | +8.59 |
| w | +3.73 | +5.66 |
| x | +6.02 | +3.10 |
| y | +6.78 | -0.25 |
| z | +5.79 | -3.53 |
| AA | +3.33 | -5.92 |
| BB | 0.00 | -6.78 |
| CC | -3.33 | -5.92 |
| DD | -5.79 | -3.53 |
| EE | -6.78 | -0.25 |
| FF | -6.02 | +3.10 |
| GG | -3.73 | +5.66 |
| HH | 0.00 | +5.08 |
| JJ | +2.67 | +2.39 |
| KK | +3.43 | -1.04 |
| LL | 0.00 | -3.35 |
| MM | -3.43 | -1.04 |
| NN | -2.67 | +2.39 |
| PP | 0.00 | 0.00 |

Coordinates for straight spill terminations



25

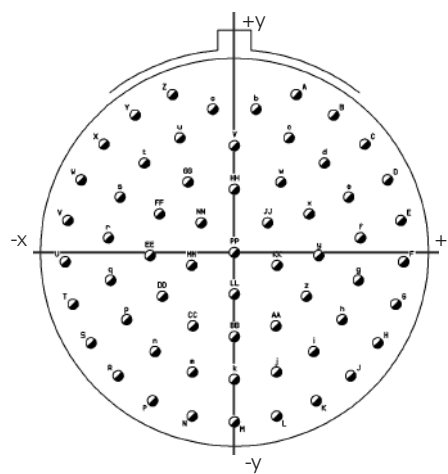
43



| Contact | Coordinates | |
|---------|-------------|--------|
| | X | Y |
| A | +1.75 | +13.49 |
| B | +5.16 | +12.57 |
| C | +8.23 | +10.80 |
| D | +10.77 | +8.28 |
| E | +12.52 | +5.21 |
| F | +13.49 | +1.75 |
| G | +13.49 | -1.75 |
| H | +12.52 | -5.21 |
| J | +10.77 | -8.28 |
| K | +8.23 | -10.80 |
| L | +5.16 | -12.57 |
| M | 0.00 | -13.49 |
| N | -5.16 | -12.57 |
| P | -8.23 | -10.80 |
| R | -10.77 | -8.28 |
| S | -12.52 | -5.21 |
| T | -13.49 | -1.75 |
| U | -13.49 | +1.75 |
| V | -12.52 | +5.21 |
| W | -10.77 | +8.28 |
| X | -8.23 | +10.80 |
| Y | -5.16 | +12.57 |
| Z | -1.75 | +13.49 |

| Contact | Coordinates | |
|---------|-------------|-------|
| | X | Y |
| a | +4.37 | +8.74 |
| b | +6.55 | +4.37 |
| c | +8.74 | 0.00 |
| d | +8.74 | -4.37 |
| e | +4.37 | -8.74 |
| f | 0.00 | -8.74 |
| g | -4.37 | -8.74 |
| h | -8.74 | -4.37 |
| k | -8.74 | 0.00 |
| m | -6.55 | +4.37 |
| n | -4.37 | +8.74 |
| p | 0.00 | +8.74 |
| q | +2.18 | +4.37 |
| r | +4.37 | 0.00 |
| s | +4.37 | -4.37 |
| t | 0.00 | -4.37 |
| u | -4.37 | -4.37 |
| v | -4.37 | 0.00 |
| w | -2.18 | +4.37 |
| x | 0.00 | 0.00 |

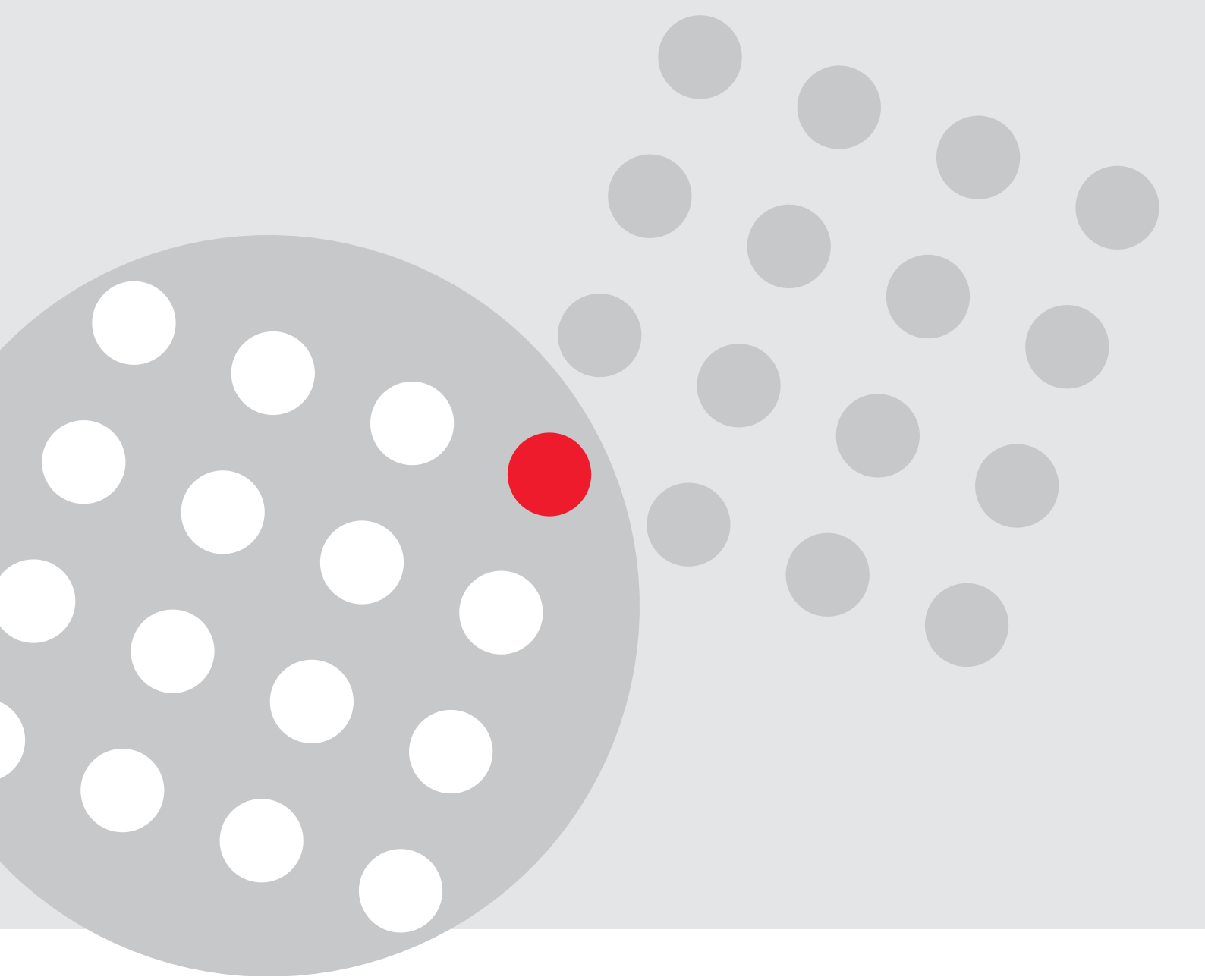
61



| Contact | Coordinates | |
|---------|-------------|--------|
| | X | Y |
| A | +4.98 | +12.70 |
| B | +7.98 | +11.05 |
| C | +10.49 | +8.71 |
| D | +12.32 | +5.84 |
| E | +13.39 | +2.57 |
| F | +13.61 | -0.76 |
| G | +12.98 | -4.17 |
| H | +11.53 | -7.29 |
| J | +9.35 | -9.93 |
| K | +6.58 | -11.94 |
| L | +3.40 | -13.18 |
| M | 0.00 | -13.64 |
| N | -3.40 | -13.18 |
| P | -6.58 | -11.94 |
| R | -9.35 | -9.93 |
| S | -11.53 | -7.29 |
| T | -12.98 | -4.17 |
| U | -13.61 | -0.76 |
| V | -13.39 | +2.57 |
| W | -12.32 | +5.84 |
| X | -10.49 | +8.71 |
| Y | -7.98 | +11.05 |
| Z | -4.98 | +12.70 |

| Contact | Coordinates | |
|---------|-------------|--------|
| | X | Y |
| a | -1.73 | +11.53 |
| b | +1.73 | +11.53 |
| c | +4.39 | +9.22 |
| d | +7.24 | +7.19 |
| e | +9.19 | +4.45 |
| f | +10.13 | +1.17 |
| g | +9.96 | -2.24 |
| h | +8.66 | -5.41 |
| i | +6.38 | -7.98 |
| k | 0.00 | -10.21 |
| m | -3.38 | -9.63 |
| n | -6.38 | -7.98 |
| p | -8.66 | -5.41 |
| q | -9.96 | -2.24 |
| r | -10.13 | +1.17 |
| s | -9.19 | +4.45 |
| t | -7.24 | +7.19 |
| u | -4.39 | +9.22 |
| v | 0.00 | +8.59 |
| w | +3.73 | +5.66 |
| x | +6.02 | +3.10 |
| y | +6.78 | -0.25 |
| z | +5.79 | -3.53 |
| AA | +3.33 | -5.92 |
| BB | 0.00 | -6.78 |
| CC | -3.33 | -5.92 |
| DD | -5.79 | -3.53 |
| EE | -6.78 | -0.25 |
| FF | -6.02 | +3.10 |
| GG | -3.73 | +5.66 |
| HH | 0.00 | +5.08 |
| JJ | +2.67 | +2.39 |
| KK | +3.43 | -1.04 |
| LL | 0.00 | -3.35 |
| MM | -3.43 | -1.04 |
| NN | -2.67 | +2.39 |
| PP | 0.00 | 0.00 |





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