



# MIL-DTL-38999 series III and range extension



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Connection Technology



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### Connectors and interconnect systems for harsh environments

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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

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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



## Summary

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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 (1g<sup>2</sup>/ Hz, 100 – 2000Hz) at T° max.
- 25 to 2000 Hz, 2x8 Hrs (5g<sup>2</sup>/ 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°

- **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.

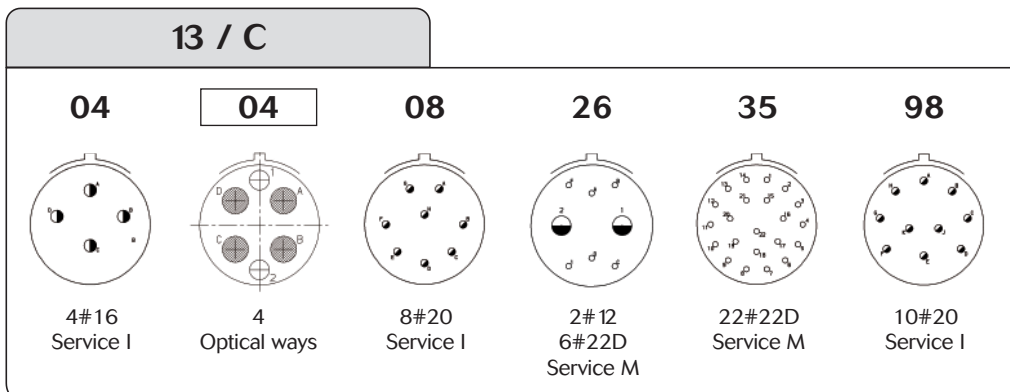
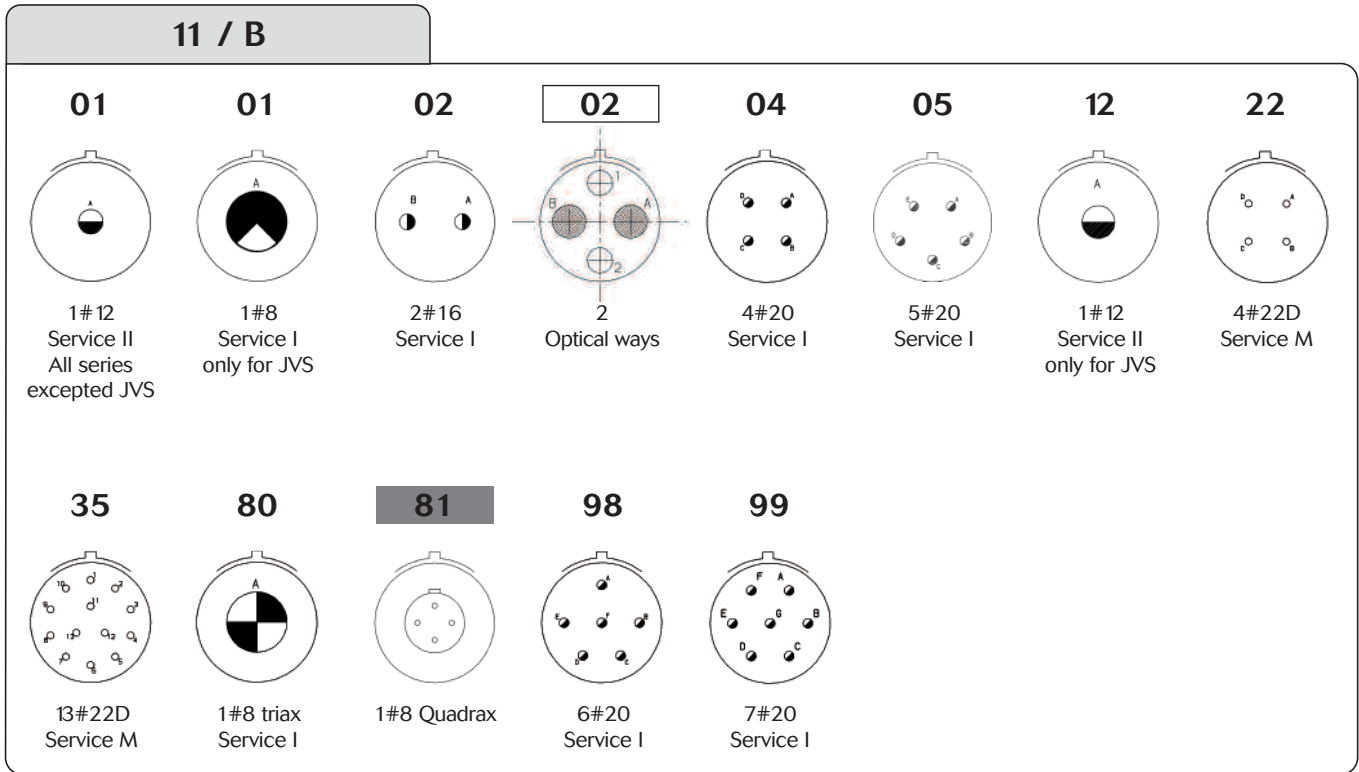
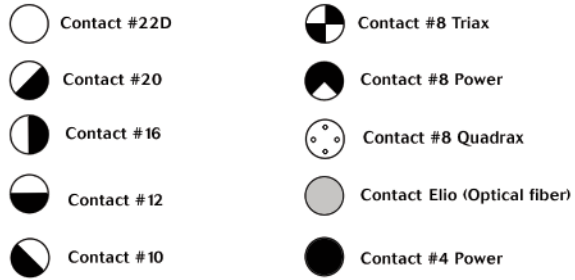
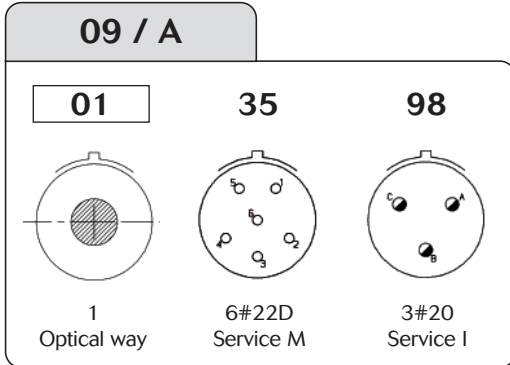
- Extinguishing fluid: Chlorobrométhane

- Cooling fluid: Coolanol

# MIL-DTL 38999 Series III



## Contact layouts





# MIL-DTL 38999 Series III



## Contact layouts

**15 / D**

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

**17 / E**

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

**19 / F**

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

Elio fiber optics
  Ethernet Quadrax

# MIL-DTL 38999 Series III



## Contact layouts

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

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

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  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 <sup>(2)</sup>  | 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 | ** |
|-------------------------------------------------------------------------------------------------------------------------|----|---|---|----|---|----|---|---|----|
| <b>Shell style:</b>                                                                                                     |    |   |   |    |   |    |   |   |    |
| 0: Square flange receptacle                                                                                             |    |   |   |    |   |    |   |   |    |
| 1: In line receptacle                                                                                                   |    |   |   |    |   |    |   |   |    |
| 7: Jam nut receptacle                                                                                                   |    |   |   |    |   |    |   |   |    |
| 5: Plug with RFI shielding.                                                                                             |    |   |   |    |   |    |   |   |    |
| <b>Type:</b>                                                                                                            |    |   |   |    |   |    |   |   |    |
| -: 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)                                                            |    |   |   |    |   |    |   |   |    |
| <b>Shell size:</b> 09 - 11 - 13 - 15 - 17 - 19 - 21 - 23 - 25                                                           |    |   |   |    |   |    |   |   |    |
| <b>Plating:</b>                                                                                                         |    |   |   |    |   |    |   |   |    |
| W: Olive drab cadmium                                                                                                   |    |   |   |    |   |    |   |   |    |
| F: Nickel                                                                                                               |    |   |   |    |   |    |   |   |    |
| ZC: Green zinc cobalt                                                                                                   |    |   |   |    |   |    |   |   |    |
| Z: Black zinc nickel                                                                                                    |    |   |   |    |   |    |   |   |    |
| <b>Contact layout:</b> See page 8 to 11                                                                                 |    |   |   |    |   |    |   |   |    |
| <b>Contact type:</b>                                                                                                    |    |   |   |    |   |    |   |   |    |
| 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). |    |   |   |    |   |    |   |   |    |
| <b>Orientation:</b> N, A, B, C, D & E (see page 58)                                                                     |    |   |   |    |   |    |   |   |    |
| <b>Specification:</b>                                                                                                   |    |   |   |    |   |    |   |   |    |
| 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 |
|-------------------------------------------------------------------------------------------------------------------------|--------|----|---|---|----|---|---|---|
| <b>Shell style:</b>                                                                                                     |        |    |   |   |    |   |   |   |
| 20: Square flange receptacle                                                                                            |        |    |   |   |    |   |   |   |
| 24: Jam nut receptacle                                                                                                  |        |    |   |   |    |   |   |   |
| 26: Plug with RFI shielding.                                                                                            |        |    |   |   |    |   |   |   |
| <b>Plating:</b>                                                                                                         |        |    |   |   |    |   |   |   |
| W: Olive drab cadmium                                                                                                   |        |    |   |   |    |   |   |   |
| F: Nickel                                                                                                               |        |    |   |   |    |   |   |   |
| <b>Shell size:</b> A - B - C - D - E - F - G - H - J                                                                    |        |    |   |   |    |   |   |   |
| <b>Contact layout:</b> See page 11 for layout according to MIL-DTL-38999                                                |        |    |   |   |    |   |   |   |
| <b>Contact type:</b>                                                                                                    |        |    |   |   |    |   |   |   |
| 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). |        |    |   |   |    |   |   |   |
| <b>Orientation:</b> 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).

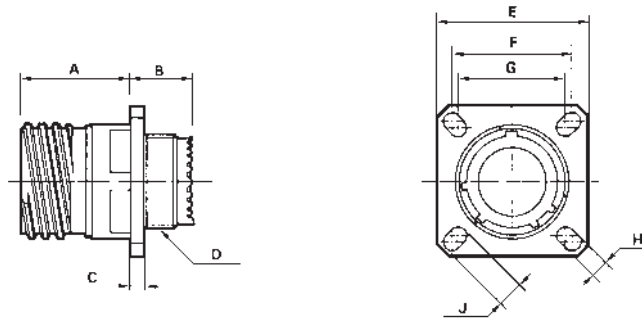


# 8D - D38999 Aluminium Series



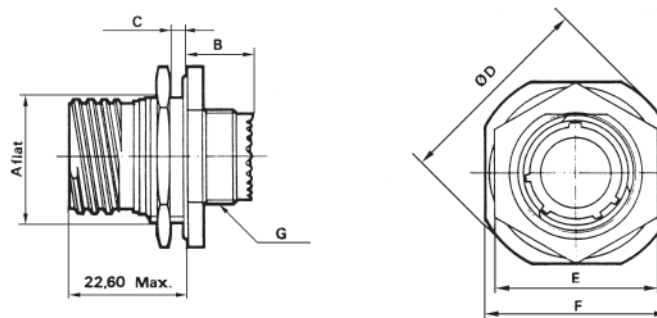
## Dimensions

### 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

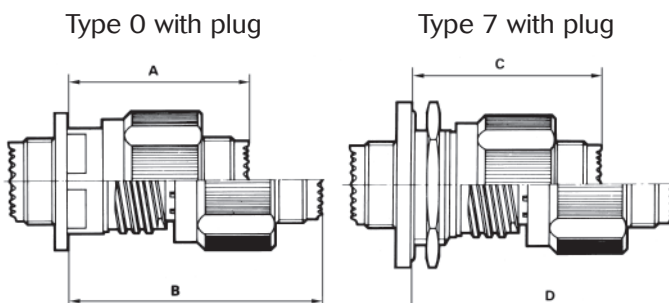


| Shell size | A Max. | B thread   | C Max. |
|------------|--------|------------|--------|
| 09 (A)     | 31.00  | M12 x 1-6g | 21.80  |
| 11 (B)     | 31.00  | M15 x 1-6g | 25.00  |
| 13 (C)     | 31.00  | M18 x 1-6g | 29.40  |
| 15 (D)     | 31.00  | M22 x 1-6g | 32.50  |
| 17 (E)     | 31.00  | M25 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<br>(A) | 11<br>(B) | 13<br>(C) | 15<br>(D) | 17<br>(E) | 19<br>(F) | 21<br>(G) | 23<br>(H) | 25<br>(J) |
|-------------|-------------|--------------|--------------|------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
|             |             | Contact size | Contact type | Spill type |           |           |           |           |           |           |           |           |           |
| <b>A</b>    |             | # 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      |           |           |           |           |
| <b>L2</b>   | <b>Min.</b> | # 22D        | M            | L & C      | 10.52     |           |           |           |           | 10.34     |           |           |           |
|             | <b>Max.</b> | # 22D        | M            | L & C      | 11.46     |           |           |           |           | 11.28     |           |           |           |
|             | <b>Min.</b> | # 22D        | F            | L & C      | 10.19     |           |           |           |           | 10.01     |           |           |           |
|             | <b>Max.</b> | # 22D        | F            | L & C      | 11.46     |           |           |           |           | 11.28     |           |           |           |
|             | <b>Min.</b> | # 22D        | M            | S          | 10.19     |           |           |           |           | 10.01     |           |           |           |
|             | <b>Max.</b> | # 22D        | M            | S          | 11.46     |           |           |           |           | 11.28     |           |           |           |
|             | <b>Min.</b> | # 22D        | F            | S          | 10.69     |           |           |           |           | 10.51     |           |           |           |
|             | <b>Max.</b> | # 22D        | F            | S          | 11.63     |           |           |           |           | 11.45     |           |           |           |
|             | <b>Min.</b> | # 20         | M            | C          | 10.36     |           |           |           |           | 10.18     |           |           |           |
|             | <b>Max.</b> | # 20         | M            | C          | 11.63     |           |           |           |           | 11.45     |           |           |           |
|             | <b>Min.</b> | # 20         | F            | C          | 10.69     |           |           |           |           | 10.51     |           |           |           |
|             | <b>Max.</b> | # 20         | F            | C          | 11.63     |           |           |           |           | 11.45     |           |           |           |
|             | <b>Min.</b> | # 16         | M            | C          | 10.69     |           |           |           |           | 10.51     |           |           |           |
|             | <b>Max.</b> | # 16         | M            | C          | 11.63     |           |           |           |           | 11.45     |           |           |           |
| <b>L3</b>   |             | # 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      |           |           |           |           |
| <b>L4</b>   | <b>Min.</b> | # 22D        | M            | L & C      |           |           |           |           | 9.48      |           |           |           |           |
|             | <b>Max.</b> | # 22D        | M            | L & C      |           |           | 10.58     |           |           |           |           | 10.69     |           |
|             | <b>Min.</b> | # 22D        | F            | L & C      |           |           | 9.15      |           |           |           |           | 9.26      |           |
|             | <b>Max.</b> | # 22D        | F            | L & C      |           |           | 10.58     |           |           |           |           | 10.69     |           |
|             | <b>Min.</b> | # 22D        | M            | S          |           |           | 9.65      |           |           |           |           | 9.76      |           |
|             | <b>Max.</b> | # 22D        | M            | S          |           |           | 10.75     |           |           |           |           | 10.86     |           |
|             | <b>Min.</b> | # 22D        | F            | S          |           |           | 9.15      |           |           |           |           | 9.26      |           |
|             | <b>Max.</b> | # 22D        | F            | S          |           |           | 10.75     |           |           |           |           | 10.86     |           |
|             | <b>Min.</b> | # 20         | M            | C          |           |           | 9.65      |           |           |           |           | 9.76      |           |
|             | <b>Max.</b> | # 20         | M            | C          |           |           | 10.75     |           |           |           |           | 10.86     |           |
|             | <b>Min.</b> | # 20         | F            | C          |           |           | 9.65      |           |           |           |           | 9.76      |           |
|             | <b>Max.</b> | # 20         | F            | C          |           |           | 10.75     |           |           |           |           | 10.86     |           |
|             | <b>Min.</b> | # 16         | M            | C          |           |           | 9.65      |           |           |           |           | 9.76      |           |
|             | <b>Max.</b> | # 16         | M            | C          |           |           | 10.75     |           |           |           |           | 10.86     |           |
| <b>Min.</b> | # 16        | F            | C            |            |           | 9.65      |           |           |           |           | 9.76      |           |           |
| <b>Max.</b> | # 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 |
|-------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|----|-----|---|----|
| <b>Shell style:</b>                 |     |     |     |     |     |     |     |     |    |     |   |    |
| 09                                  | 11  | 13  | 15  | 17  | 19  | 21  | 23  | 25  |    |     |   |    |
| 101                                 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 |    |     |   |    |
| <b>Plating:</b>                     |     |     |     |     |     |     |     |     |    |     |   |    |
| B: Olive drab cadmium               |     |     |     |     |     |     |     |     |    |     |   |    |
| F: Nickel                           |     |     |     |     |     |     |     |     |    |     |   |    |
| <b>Backshell type:</b>              |     |     |     |     |     |     |     |     |    |     |   |    |
| 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)

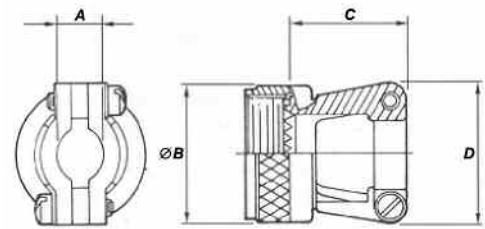
**Basic series**      **M85049**   **38**   -   **11**   **W**

**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)

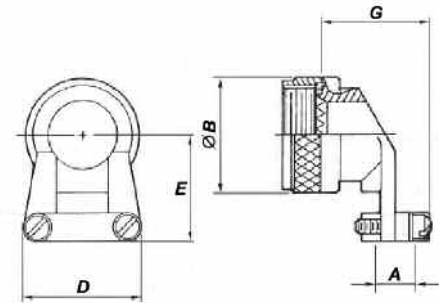
**Basic series**      **M85049**   **39**   -   **11**   **W**

**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<br>Max. | C<br>Max. | D<br>Max. | E     | G     |
|------------|-------|-------|------------|-----------|-----------|-------|-------|
|            | Min   | Max.  |            |           |           |       |       |
| <b>09</b>  | 2.50  | 5.90  | 21.80      | 23.10     | 21.60     | 25.40 | 25.70 |
| <b>11</b>  | 3.90  |       | 25.00      |           | 22.90     |       |       |
| <b>13</b>  | 4.80  | 8.30  | 29.40      | 25.70     | 27.90     | 30.70 |       |
| <b>15</b>  | 6.60  | 11.60 | 32.50      | 26.90     | 29.20     | 31.80 | 32.00 |
| <b>17</b>  | 7.20  | 15.60 | 35.70      | 29.50     | 33.00     | 33.00 | 35.80 |
| <b>19</b>  | 8.30  | 16.10 | 38.50      | 35.80     | 38.10     | 34.30 | 38.40 |
| <b>21</b>  | 8.70  | 17.70 | 41.70      | 38.40     | 40.60     | 40.60 | 42.20 |
| <b>23</b>  | 9.70  | 20.90 | 44.90      | 42.20     | 43.20     | 44.50 | 44.70 |
| <b>25</b>  | 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:**

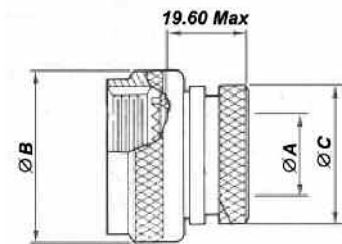
09 - 11 - 13 - 15 - 17 - 19 - 21 - 23 - 25

**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 |
|-------------|--------------------------------|------------|
| <b>A</b>    | Black anodise                  | 500 Hrs    |
| <b>N, F</b> | Nickel                         | 48 Hrs     |
| <b>W, B</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  | 30.28               | 37.18  | 44.16               | 51.06  |
| 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

|                                                                                                                                   |           |          |          |           |          |           |          |          |          |          |          |
|-----------------------------------------------------------------------------------------------------------------------------------|-----------|----------|----------|-----------|----------|-----------|----------|----------|----------|----------|----------|
| <b>Basic Series</b>                                                                                                               | <b>8D</b> | <b>0</b> | <b>-</b> | <b>11</b> | <b>J</b> | <b>35</b> | <b>P</b> | <b>N</b> | <b>-</b> | <b>-</b> | <b>L</b> |
| <b>Shell style:</b>                                                                                                               |           |          |          |           |          |           |          |          |          |          |          |
| 0: Square flange receptacle                                                                                                       |           |          |          |           |          |           |          |          |          |          |          |
| 5: Plug with RFI shielding                                                                                                        |           |          |          |           |          |           |          |          |          |          |          |
| <b>Type:</b>                                                                                                                      |           |          |          |           |          |           |          |          |          |          |          |
| 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) |           |          |          |           |          |           |          |          |          |          |          |
| <b>Shell size:</b> 09 - 11 - 13 - 15 - 17 - 19 - 21 - 23 - 25                                                                     |           |          |          |           |          |           |          |          |          |          |          |
| <b>Plating:</b>                                                                                                                   |           |          |          |           |          |           |          |          |          |          |          |
| J: Olive drab cadmium                                                                                                             |           |          |          |           |          |           |          |          |          |          |          |
| M: Nickel                                                                                                                         |           |          |          |           |          |           |          |          |          |          |          |
| X: Without plating                                                                                                                |           |          |          |           |          |           |          |          |          |          |          |
| <b>Contact layout:</b> See page 10 to 13                                                                                          |           |          |          |           |          |           |          |          |          |          |          |
| <b>Contact type:</b>                                                                                                              |           |          |          |           |          |           |          |          |          |          |          |
| 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)                          |           |          |          |           |          |           |          |          |          |          |          |
| <b>Orientation:</b> N, A, B, C, D & E (see page 63)                                                                               |           |          |          |           |          |           |          |          |          |          |          |
| <b>Specification:</b>                                                                                                             |           |          |          |           |          |           |          |          |          |          |          |
| 046: Tinned straight spills                                                                                                       |           |          |          |           |          |           |          |          |          |          |          |
| 251: Connector provided with power contacts (layouts with contact #8)                                                             |           |          |          |           |          |           |          |          |          |          |          |
| 022: Fuel tank                                                                                                                    |           |          |          |           |          |           |          |          |          |          |          |
| <b>Special custom:</b>                                                                                                            |           |          |          |           |          |           |          |          |          |          |          |
| 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\*

|                                                                                                             |               |           |          |          |           |          |          |          |
|-------------------------------------------------------------------------------------------------------------|---------------|-----------|----------|----------|-----------|----------|----------|----------|
| <b>Basic Series</b>                                                                                         | <b>D38999</b> | <b>20</b> | <b>M</b> | <b>B</b> | <b>35</b> | <b>P</b> | <b>N</b> | <b>L</b> |
| <b>Shell style:</b>                                                                                         |               |           |          |          |           |          |          |          |
| 20: Square flange receptacle                                                                                |               |           |          |          |           |          |          |          |
| 26: Plug with RFI shielding.                                                                                |               |           |          |          |           |          |          |          |
| <b>Plating:</b>                                                                                             |               |           |          |          |           |          |          |          |
| J: Olive drab cadmium                                                                                       |               |           |          |          |           |          |          |          |
| M: Nickel                                                                                                   |               |           |          |          |           |          |          |          |
| <b>Shell size:</b> A - B - C - D - E - F - G - H - J                                                        |               |           |          |          |           |          |          |          |
| <b>Contact layout:</b> See page 14 for layout according to MIL-DTL-38999                                    |               |           |          |          |           |          |          |          |
| <b>Contact type:</b>                                                                                        |               |           |          |          |           |          |          |          |
| 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)    |               |           |          |          |           |          |          |          |
| <b>Orientation:</b> 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).

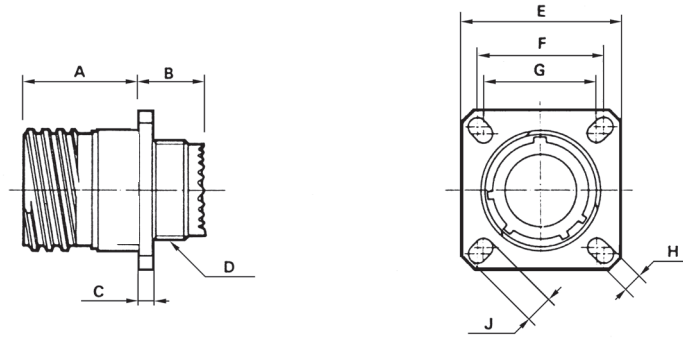


# 8D - D38999 Composite Series



## Dimensions

### Receptacle type 0



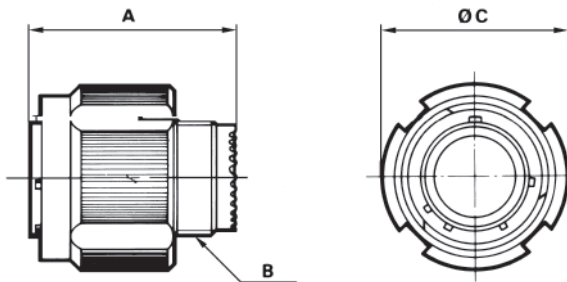
| Shell size | A Max. | B Max. | C Max. | D thread   | E $\pm 0,30$ | F     | G     | H $\pm 0,20$ | J $\pm 0,20$ |
|------------|--------|--------|--------|------------|--------------|-------|-------|--------------|--------------|
| 09 (A)     | 19.65  | 11.96  | 3.65   | M12 x 1-6g | 23.80        | 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



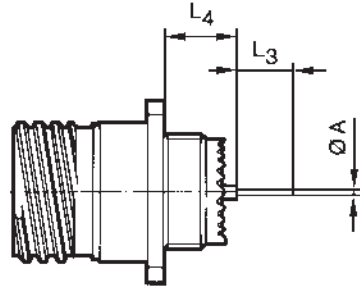
| Shell size | A Max. | B Max. |
|------------|--------|--------|
| 09 (A)     | 37.00  | 52.30  |
| 11 (B)     | 37.00  | 52.30  |
| 13 (C)     | 37.00  | 52.30  |
| 15 (D)     | 37.00  | 52.30  |
| 17 (E)     | 37.00  | 52.30  |
| 19 (F)     | 37.00  | 52.30  |
| 21 (G)     | 36.00  | 51.30  |
| 23 (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) |
| <b>A</b>  |             | # 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 |     |       |     |     |
| <b>L3</b> |             | # 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 |     |       |     |     |
| <b>L4</b> | <b>Min.</b> | # 22D        | M            | L & C      |     |     |       |     | 9.48 |     |       |     |     |
|           | <b>Max.</b> | # 22D        | M            | L & C      |     |     | 10.38 |     |      |     | 10.48 |     |     |
|           | <b>Min.</b> | # 22D        | F            | L & C      |     |     | 9.15  |     |      |     | 9.26  |     |     |
|           | <b>Max.</b> | # 22D        | F            | L & C      |     |     | 10.58 |     |      |     | 10.69 |     |     |
|           | <b>Min.</b> | # 22D        | M            | S          |     |     | 9.65  |     |      |     | 9.76  |     |     |
|           | <b>Max.</b> | # 22D        | M            | S          |     |     | 10.55 |     |      |     | 10.65 |     |     |
|           | <b>Min.</b> | # 22D        | F            | S          |     |     | 9.65  |     |      |     | 9.76  |     |     |
|           | <b>Max.</b> | # 22D        | F            | S          |     |     | 10.55 |     |      |     | 10.65 |     |     |
|           | <b>Min.</b> | # 20         | M            | C          |     |     | 9.65  |     |      |     | 9.76  |     |     |
|           | <b>Max.</b> | # 20         | M            | C          |     |     | 10.55 |     |      |     | 10.65 |     |     |
|           | <b>Min.</b> | # 20         | F            | C          |     |     | 9.65  |     |      |     | 9.76  |     |     |
|           | <b>Max.</b> | # 20         | F            | C          |     |     | 10.55 |     |      |     | 10.65 |     |     |
|           | <b>Min.</b> | # 16         | M            | C          |     |     | 9.65  |     |      |     | 9.76  |     |     |
|           | <b>Max.</b> | # 16         | M            | C          |     |     | 10.55 |     |      |     | 10.65 |     |     |
|           | <b>Min.</b> | # 16         | F            | C          |     |     | 9.65  |     |      |     | 9.76  |     |     |
|           | <b>Max.</b> | # 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:**

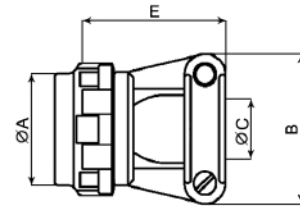
09 - 11 - 13 - 15 - 17 - 19 - 21 - 23 - 25

**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:**

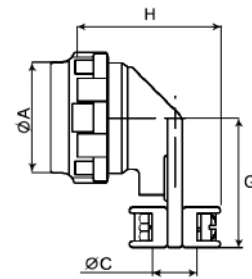
09 - 11 - 13 - 15 - 17 - 19 - 21 - 23 - 25

**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

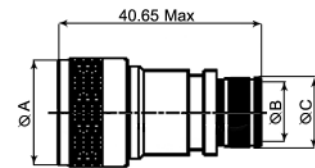
**Plating:**

**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<br>Max. | ØB +/- 0.10 Entry size |       | ØC    |       |
|------------|------------|------------------------|-------|-------|-------|
|            |            | 02                     | 03    | 02    | 03    |
| <b>09</b>  | 21.79      | N/A                    | 6.35  | N/A   | 10.03 |
| <b>11</b>  | 24.99      | N/A                    | 7.92  | N/A   | 11.61 |
| <b>13</b>  | 29.39      | 7.92                   | 11.13 | 11.61 | 14.81 |
| <b>15</b>  | 32.49      | 11.13                  | 14.27 | 14.81 | 17.96 |
| <b>17</b>  | 35.71      | 12.70                  | 15.88 | 16.38 | 19.56 |
| <b>19</b>  | 38.51      | 15.88                  | 19.05 | 19.56 | 22.73 |
| <b>21</b>  | 41.71      | 15.88                  | 20.62 | 19.56 | 24.30 |
| <b>23</b>  | 44.91      | 17.47                  | 23.83 | 21.06 | 27.51 |
| <b>25</b>  | 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 | ** |
|---------------------------------------------------------------------------------------------------------------------|----|---|---|----|---|----|---|---|----|
| <b>Shell style:</b>                                                                                                 |    |   |   |    |   |    |   |   |    |
| 0: Square flange receptacle                                                                                         |    |   |   |    |   |    |   |   |    |
| 1: In line receptacle                                                                                               |    |   |   |    |   |    |   |   |    |
| 7: Jam nut receptacle                                                                                               |    |   |   |    |   |    |   |   |    |
| 5: Plug with RFI shielding.                                                                                         |    |   |   |    |   |    |   |   |    |
| <b>Type:</b>                                                                                                        |    |   |   |    |   |    |   |   |    |
| -: 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)                                                        |    |   |   |    |   |    |   |   |    |
| <b>Shell size:</b> 09 - 11 - 13 - 15 - 17 - 19 - 21 - 23 - 25                                                       |    |   |   |    |   |    |   |   |    |
| <b>Plating:</b>                                                                                                     |    |   |   |    |   |    |   |   |    |
| K: Passivated S: Nickel                                                                                             |    |   |   |    |   |    |   |   |    |
| <b>Contact layout:</b> See page 8 to 11                                                                             |    |   |   |    |   |    |   |   |    |
| <b>Contact type:</b>                                                                                                |    |   |   |    |   |    |   |   |    |
| 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)   |    |   |   |    |   |    |   |   |    |
| <b>Orientation:</b> N, A, B, C, D & E (See page 58)                                                                 |    |   |   |    |   |    |   |   |    |
| <b>Spécification:</b>                                                                                               |    |   |   |    |   |    |   |   |    |
| 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 |
|---------------------------------------------------------------------------------------------------------------------|--------|----|---|---|----|---|---|---|
| <b>Shell style:</b>                                                                                                 |        |    |   |   |    |   |   |   |
| 20: Square flange receptacle                                                                                        |        |    |   |   |    |   |   |   |
| 24: Jam nut receptacle                                                                                              |        |    |   |   |    |   |   |   |
| 26: Plug with RFI shielding.                                                                                        |        |    |   |   |    |   |   |   |
| <b>Plating:</b>                                                                                                     |        |    |   |   |    |   |   |   |
| K: Passivated                                                                                                       |        |    |   |   |    |   |   |   |
| S: Nickel                                                                                                           |        |    |   |   |    |   |   |   |
| <b>Shell size:</b> A - B - C - D - E - F - G - H - J                                                                |        |    |   |   |    |   |   |   |
| <b>Contact layout:</b> See page 11 for layout according to MIL-DTL-38999                                            |        |    |   |   |    |   |   |   |
| <b>Contact type:</b>                                                                                                |        |    |   |   |    |   |   |   |
| 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). |        |    |   |   |    |   |   |   |
| <b>Orientation:</b> 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).

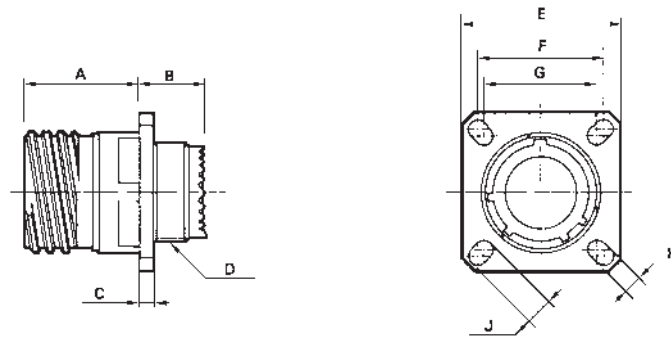


# 8D - D38999 Stainless steel



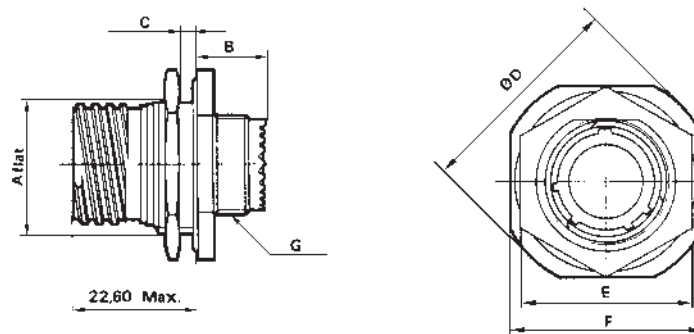
## Dimensions

### 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

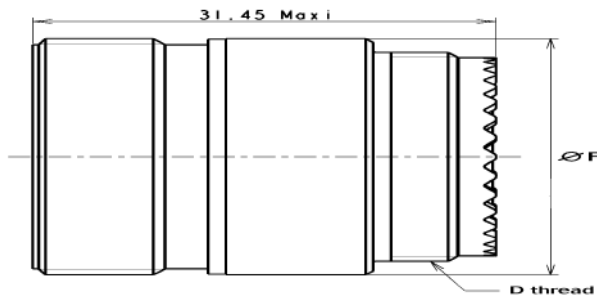


| Shell size | A + 0.10 - 0.15 | B Max. | C Max. | D Max. | E Max. | F ± 0.4 | G thread   |
|------------|-----------------|--------|--------|--------|--------|---------|------------|
| 09 (A)     | 16.53           | 9.90   | 3.20   | 30.50  | 23.00  | 27.00   | M12 x 1-6g |
| 11 (B)     | 19.07           | 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

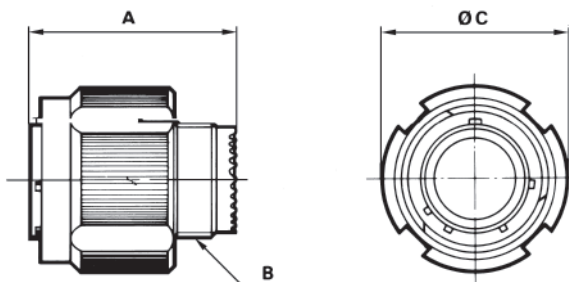


## In line receptacle type 1



| 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

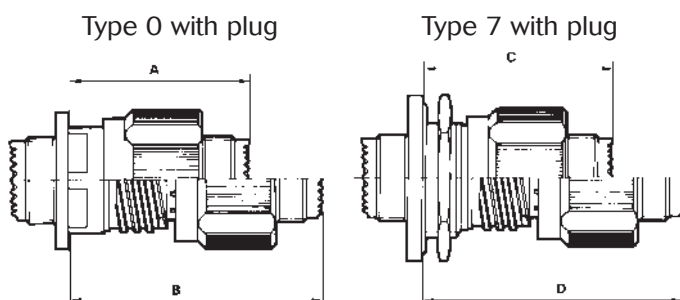


| Shell size | A Max. | B thread   | C Max. |
|------------|--------|------------|--------|
| 09 (A)     | 31.00  | M12 x 1-6g | 21.80  |
| 11 (B)     | 31.00  | M15 x 1-6g | 25.00  |
| 13 (C)     | 31.00  | M18 x 1-6g | 29.40  |
| 15 (D)     | 31.00  | M22 x 1-6g | 32.50  |
| 17 (E)     | 31.00  | M25 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



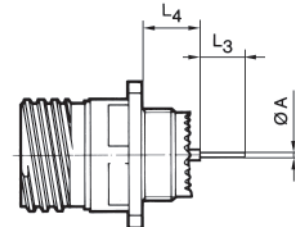
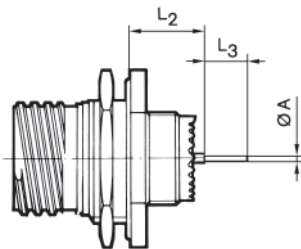
| Shell size | A Max. | B Max. | C Max. | D Max. |
|------------|--------|--------|--------|--------|
| 09 (A)     | 37.00  | 52.30  | 38.30  | 53.60  |
| 11 (B)     | 37.00  | 52.30  | 38.30  | 53.60  |
| 13 (C)     | 37.00  | 52.30  | 38.50  | 53.80  |
| 15 (D)     | 37.00  | 52.30  | 38.50  | 53.80  |
| 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<br>(A) | 11<br>(B) | 13<br>(C) | 15<br>(D) | 17<br>(E) | 19<br>(F) | 21<br>(G) | 23<br>(H) | 25<br>(J) |
|-------------|-------------|--------------|--------------|------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
|             |             | Contact size | Contact type | Spill type |           |           |           |           |           |           |           |           |           |
| <b>A</b>    |             | # 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      |           |           |           |           |
| <b>L2</b>   | <b>Min.</b> | # 22D        | M            | L & C      | 10.52     |           |           |           |           | 10.34     |           |           |           |
|             | <b>Max.</b> | # 22D        | M            | L & C      | 11.46     |           |           |           |           | 11.28     |           |           |           |
|             | <b>Min.</b> | # 22D        | F            | L & C      | 10.19     |           |           |           |           | 10.01     |           |           |           |
|             | <b>Max.</b> | # 22D        | F            | L & C      | 11.46     |           |           |           |           | 11.28     |           |           |           |
|             | <b>Min.</b> | # 22D        | M            | S          | 10.69     |           |           |           |           | 10.51     |           |           |           |
|             | <b>Max.</b> | # 22D        | M            | S          | 11.63     |           |           |           |           | 11.45     |           |           |           |
|             | <b>Min.</b> | # 22D        | F            | S          | 10.36     |           |           |           |           | 10.18     |           |           |           |
|             | <b>Max.</b> | # 22D        | F            | S          | 11.63     |           |           |           |           | 11.45     |           |           |           |
|             | <b>Min.</b> | # 20         | M            | C          | 10.69     |           |           |           |           | 10.51     |           |           |           |
|             | <b>Max.</b> | # 20         | M            | C          | 11.63     |           |           |           |           | 11.45     |           |           |           |
|             | <b>Min.</b> | # 20         | F            | C          | 10.69     |           |           |           |           | 10.51     |           |           |           |
|             | <b>Max.</b> | # 20         | F            | C          | 11.63     |           |           |           |           | 11.45     |           |           |           |
|             | <b>Min.</b> | # 16         | M            | C          | 10.69     |           |           |           |           | 10.51     |           |           |           |
|             | <b>Max.</b> | # 16         | M            | C          | 11.63     |           |           |           |           | 11.45     |           |           |           |
| <b>Min.</b> | # 16        | F            | C            | 10.69      |           |           |           |           | 10.51     |           |           |           |           |
| <b>Max.</b> | # 16        | F            | C            | 11.63      |           |           |           |           | 11.45     |           |           |           |           |
| <b>L3</b>   |             | # 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      |           |           |           |           |
| <b>L4</b>   | <b>Min.</b> | # 22D        | M            | L & C      |           |           | 9.48      |           |           |           |           | 9.59      |           |
|             | <b>Max.</b> | # 22D        | M            | L & C      |           |           | 10.58     |           |           |           |           | 10.69     |           |
|             | <b>Min.</b> | # 22D        | F            | L & C      |           |           | 9.15      |           |           |           |           | 9.26      |           |
|             | <b>Max.</b> | # 22D        | F            | L & C      |           |           | 10.58     |           |           |           |           | 10.69     |           |
|             | <b>Min.</b> | # 22D        | M            | S          |           |           | 9.65      |           |           |           |           | 9.76      |           |
|             | <b>Max.</b> | # 22D        | M            | S          |           |           | 10.75     |           |           |           |           | 10.86     |           |
|             | <b>Min.</b> | # 22D        | F            | S          |           |           | 9.15      |           |           |           |           | 9.26      |           |
|             | <b>Max.</b> | # 22D        | F            | S          |           |           | 10.75     |           |           |           |           | 10.86     |           |
|             | <b>Min.</b> | # 20         | M            | C          |           |           | 9.65      |           |           |           |           | 9.76      |           |
|             | <b>Max.</b> | # 20         | M            | C          |           |           | 10.75     |           |           |           |           | 10.86     |           |
|             | <b>Min.</b> | # 20         | F            | C          |           |           | 9.65      |           |           |           |           | 9.76      |           |
|             | <b>Max.</b> | # 20         | F            | C          |           |           | 10.75     |           |           |           |           | 10.86     |           |
|             | <b>Min.</b> | # 16         | M            | C          |           |           | 9.65      |           |           |           |           | 9.76      |           |
|             | <b>Max.</b> | # 16         | M            | C          |           |           | 10.75     |           |           |           |           | 10.86     |           |
| <b>Min.</b> | # 16        | F            | C            |            |           | 9.65      |           |           |           |           | 9.76      |           |           |
| <b>Max.</b> | # 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  | 29.36               | 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

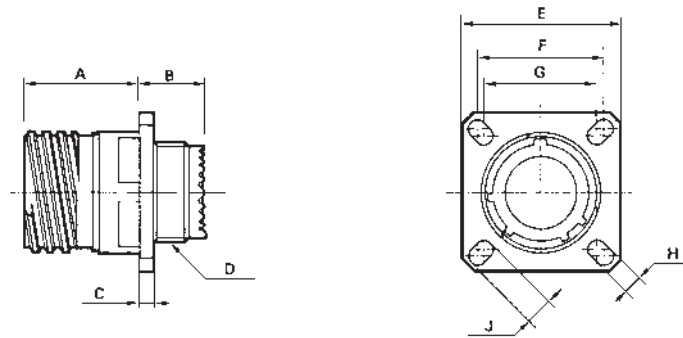
| Basic Series                                                                                                                                                                                                                                                                                              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

# 8D Titanium Series



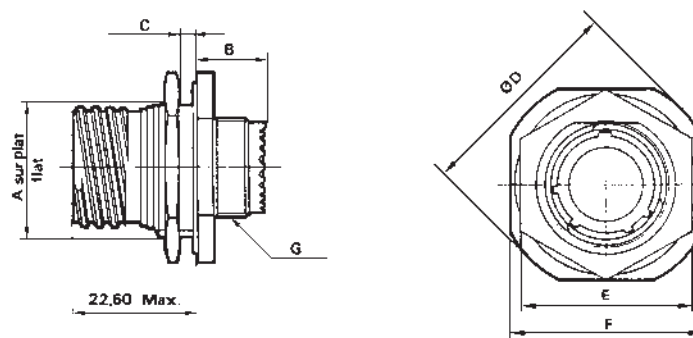
## Dimensions

### 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



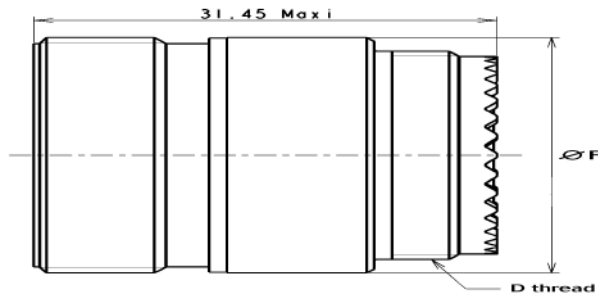
| Shell size | A + 0.10 - 0.15 | B Max. | C Max. | D Max. | E Max. | F ± 0.4 | G thread   |
|------------|-----------------|--------|--------|--------|--------|---------|------------|
| 09         | 16.53           | 9.90   | 3.20   | 30.50  | 23.00  | 27.00   | M12 x 1-6g |
| 11         | 19.07           | 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

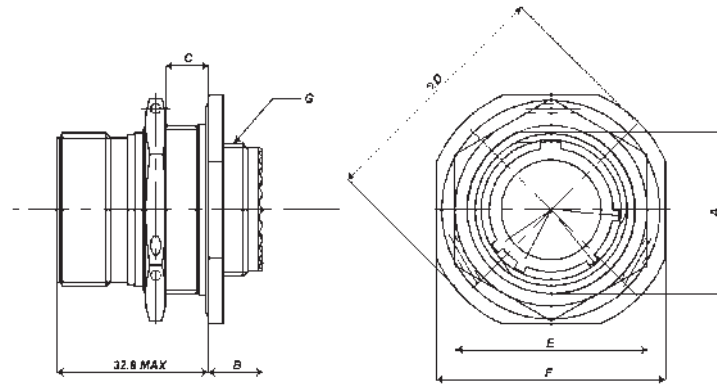


## In line receptacle type 1



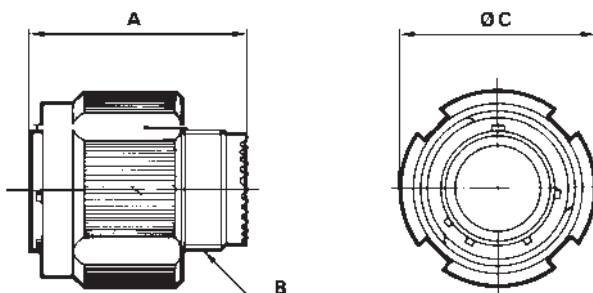
| Shell size | D thread   | Ø F   |
|------------|------------|-------|
| 09         | M12 x 1-6g | 15.90 |
| 11         | M15 x 1-6g | 19.05 |
| 13         | M18 x 1-6g | 22.25 |
| 15         | M22 x 1-6g | 25.40 |
| 17         | M25 x 1-6g | 30.15 |
| 19         | M28 x 1-6g | 31.75 |
| 21         | 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<br>- 0.15 | B<br>Max. | C<br>Max. | D<br>Max. | E<br>Max. | F<br>± 0.4 | G<br>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<br>Max. | B<br>thread | C<br>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

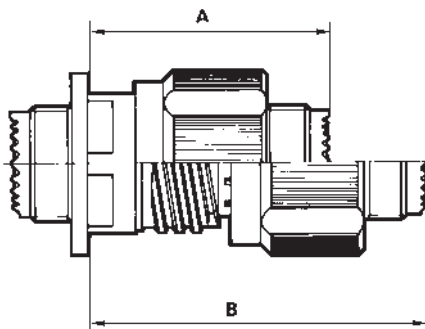


## Maximum coupling torque on panel for jam nut receptacle (type 7)

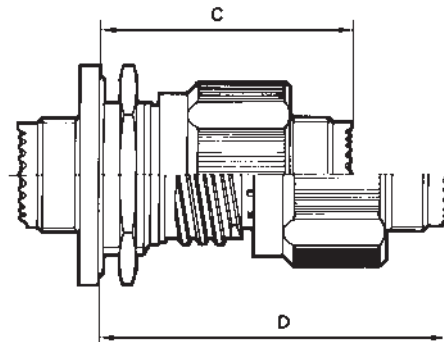
| Shell                 | 09 | 11 | 13 | 15 | 17 | 19 | 21 | 23 | 25 |
|-----------------------|----|----|----|----|----|----|----|----|----|
| Coupling torque (N.m) | 6  | 8  | 10 | 13 | 20 | 23 | 25 | 26 | 28 |

## 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 |       |       |    |       |      |       |    |       |    |
| <b>A</b>  | # 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 |       |    |       |    |
| <b>L2</b> | <b>Min.</b>  | # 22D        | M          | L & C | 10.52 |    |       |      | 10.34 |    |       |    |
|           | <b>Max.</b>  | # 22D        | M          | L & C | 11.46 |    |       |      | 11.28 |    |       |    |
|           | <b>Min.</b>  | # 22D        | F          | L & C | 10.19 |    |       |      | 10.01 |    |       |    |
|           | <b>Max.</b>  | # 22D        | F          | L & C | 11.46 |    |       |      | 11.28 |    |       |    |
|           | <b>Min.</b>  | # 22D        | M          | S     | 10.19 |    |       |      | 10.01 |    |       |    |
|           | <b>Max.</b>  | # 22D        | M          | S     | 11.46 |    |       |      | 11.28 |    |       |    |
|           | <b>Min.</b>  | # 22D        | F          | S     | 10.69 |    |       |      | 10.51 |    |       |    |
|           | <b>Max.</b>  | # 22D        | F          | S     | 11.63 |    |       |      | 11.45 |    |       |    |
|           | <b>Min.</b>  | # 20         | M          | C     | 10.36 |    |       |      | 10.18 |    |       |    |
|           | <b>Max.</b>  | # 20         | M          | C     | 11.63 |    |       |      | 11.45 |    |       |    |
|           | <b>Min.</b>  | # 20         | F          | C     | 10.69 |    |       |      | 10.51 |    |       |    |
|           | <b>Max.</b>  | # 20         | F          | C     | 11.63 |    |       |      | 11.45 |    |       |    |
|           | <b>Min.</b>  | # 16         | M          | C     | 10.69 |    |       |      | 10.51 |    |       |    |
|           | <b>Max.</b>  | # 16         | M          | C     | 11.63 |    |       |      | 11.45 |    |       |    |
|           | <b>Min.</b>  | # 16         | F          | C     | 10.69 |    |       |      | 10.51 |    |       |    |
|           | <b>Max.</b>  | # 16         | F          | C     | 11.63 |    |       |      | 11.45 |    |       |    |
| <b>L3</b> | # 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 |       |    |       |    |
| <b>L4</b> | <b>Min.</b>  | # 22D        | M          | L & C |       |    |       | 9.48 |       |    |       |    |
|           | <b>Max.</b>  | # 22D        | M          | L & C |       |    | 10.58 |      |       |    | 10.69 |    |
|           | <b>Min.</b>  | # 22D        | F          | L & C |       |    | 9.15  |      |       |    | 9.26  |    |
|           | <b>Max.</b>  | # 22D        | F          | L & C |       |    | 10.58 |      |       |    | 10.69 |    |
|           | <b>Min.</b>  | # 22D        | M          | S     |       |    | 9.65  |      |       |    | 9.76  |    |
|           | <b>Max.</b>  | # 22D        | M          | S     |       |    | 10.75 |      |       |    | 10.86 |    |
|           | <b>Min.</b>  | # 22D        | F          | S     |       |    | 9.15  |      |       |    | 9.26  |    |
|           | <b>Max.</b>  | # 22D        | F          | S     |       |    | 10.75 |      |       |    | 10.86 |    |
|           | <b>Min.</b>  | # 20         | M          | C     |       |    | 9.65  |      |       |    | 9.76  |    |
|           | <b>Max.</b>  | # 20         | M          | C     |       |    | 10.75 |      |       |    | 10.86 |    |
|           | <b>Min.</b>  | # 20         | F          | C     |       |    | 9.65  |      |       |    | 9.76  |    |
|           | <b>Max.</b>  | # 20         | F          | C     |       |    | 10.75 |      |       |    | 10.86 |    |
|           | <b>Min.</b>  | # 16         | M          | C     |       |    | 9.65  |      |       |    | 9.76  |    |
|           | <b>Max.</b>  | # 16         | M          | C     |       |    | 10.75 |      |       |    | 10.86 |    |
|           | <b>Min.</b>  | # 16         | F          | C     |       |    | 9.65  |      |       |    | 9.76  |    |
|           | <b>Max.</b>  | # 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

|                                                                                                                      |            |           |          |           |           |          |          |           |
|----------------------------------------------------------------------------------------------------------------------|------------|-----------|----------|-----------|-----------|----------|----------|-----------|
| <b>Basic series</b>                                                                                                  | <b>JVS</b> | <b>16</b> | <b>A</b> | <b>11</b> | <b>35</b> | <b>P</b> | <b>N</b> | <b>**</b> |
| <b>Shell style:</b>                                                                                                  |            |           |          |           |           |          |          |           |
| 00: Square flange receptacle                                                                                         |            |           |          |           |           |          |          |           |
| 07: Jam nut receptacle                                                                                               |            |           |          |           |           |          |          |           |
| 16: Plug with RFI Shielding                                                                                          |            |           |          |           |           |          |          |           |
| <b>Material:</b>                                                                                                     |            |           |          |           |           |          |          |           |
| A: Bronze housing material.                                                                                          |            |           |          |           |           |          |          |           |
| <b>Shell size</b> 09 - 11 - 13 - 15 - 17 - 19 - 21 - 23 - 25                                                         |            |           |          |           |           |          |          |           |
| <b>Contact layout:</b> See page 8 to 11                                                                              |            |           |          |           |           |          |          |           |
| <b>Contact type:</b>                                                                                                 |            |           |          |           |           |          |          |           |
| 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) |            |           |          |           |           |          |          |           |
| <b>Orientations:</b> N, A, B, C, D & E (See page 58)                                                                 |            |           |          |           |           |          |          |           |
| <b>Specification:</b>                                                                                                |            |           |          |           |           |          |          |           |
| 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

|                                                      |                        |          |            |          |          |          |          |          |          |          |
|------------------------------------------------------|------------------------|----------|------------|----------|----------|----------|----------|----------|----------|----------|
| <b>Basic series</b>                                  | <b>CECC 75 201-002</b> | <b>B</b> | <b>B98</b> | <b>M</b> | <b>C</b> | <b>N</b> | <b>A</b> | <b>0</b> | <b>1</b> | <b>G</b> |
| <b>Shell style:</b>                                  |                        |          |            |          |          |          |          |          |          |          |
| A: Plug                                              |                        |          |            |          |          |          |          |          |          |          |
| B: Square flange receptacle.                         |                        |          |            |          |          |          |          |          |          |          |
| C: Jam nut receptacle.                               |                        |          |            |          |          |          |          |          |          |          |
| <b>Shell size &amp; layout:</b>                      |                        |          |            |          |          |          |          |          |          |          |
| 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)        |                        |          |            |          |          |          |          |          |          |          |
| <b>Contact type:</b>                                 |                        |          |            |          |          |          |          |          |          |          |
| M: Pin                                               |                        |          |            |          |          |          |          |          |          |          |
| F: Socket                                            |                        |          |            |          |          |          |          |          |          |          |
| <b>Type of contact termination:</b>                  |                        |          |            |          |          |          |          |          |          |          |
| C: Crimp contact                                     |                        |          |            |          |          |          |          |          |          |          |
| <b>Orientations</b> N, A, B, C, D & E (See page 58)  |                        |          |            |          |          |          |          |          |          |          |
| <b>Shell material:</b>                               |                        |          |            |          |          |          |          |          |          |          |
| A: Aluminium bronze                                  |                        |          |            |          |          |          |          |          |          |          |
| <b>Supply code:</b>                                  |                        |          |            |          |          |          |          |          |          |          |
| 0= Connectors supplied with contacts                 |                        |          |            |          |          |          |          |          |          |          |
| 1= Connectors supplied without contacts              |                        |          |            |          |          |          |          |          |          |          |
| <b>Assessment level:</b>                             |                        |          |            |          |          |          |          |          |          |          |
| 1: Level 1                                           |                        |          |            |          |          |          |          |          |          |          |
| <b>Performance level:</b>                            |                        |          |            |          |          |          |          |          |          |          |
| G: Level G                                           |                        |          |            |          |          |          |          |          |          |          |

Example :  
Abbreviated version :

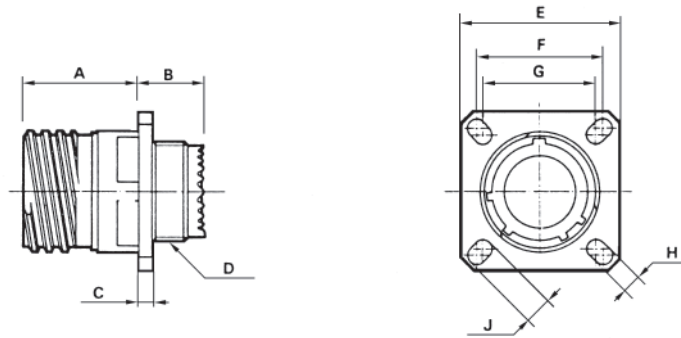
|                  |          |            |          |          |          |          |          |          |          |
|------------------|----------|------------|----------|----------|----------|----------|----------|----------|----------|
| <b>C 752 002</b> | <b>B</b> | <b>B98</b> | <b>M</b> | <b>C</b> | <b>N</b> | <b>A</b> | <b>0</b> | <b>1</b> | <b>G</b> |
|------------------|----------|------------|----------|----------|----------|----------|----------|----------|----------|

# JVS Bronze Series



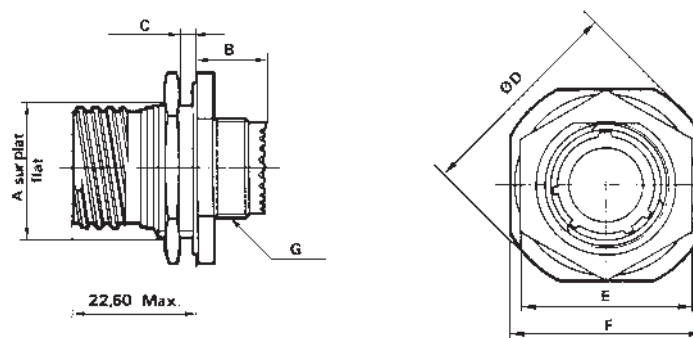
## Dimensions

### Receptacle type 00



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

### Receptacle type 07



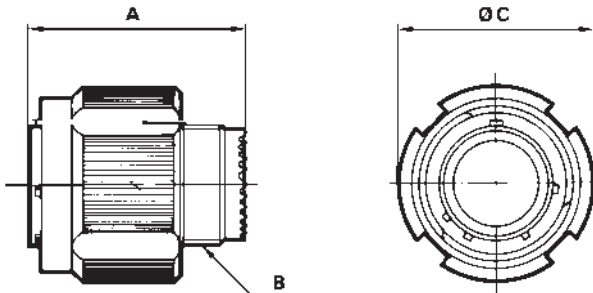
| Shell size    | A + 0.10 - 0.15 | B Max. | C Max. | D Max. | E Max. | F $\pm 0.4$ | G thread   |
|---------------|-----------------|--------|--------|--------|--------|-------------|------------|
| <b>09 (A)</b> | 16.53           | 9.90   | 3.20   | 30.50  | 23.00  | 27.00       | M12 x 1-6g |
| <b>11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



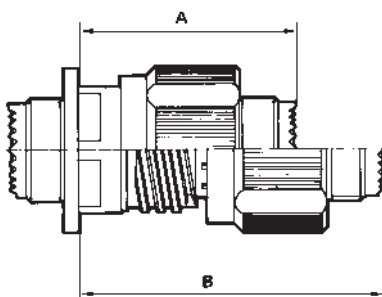
| Shell size | A Max. | B thread   | C Max. |
|------------|--------|------------|--------|
| 09 (A)     | 31.00  | M12 x 1-6g | 21.10  |
| 11 (B)     | 31.00  | M15 x 1-6g | 23.80  |
| 13 (C)     | 31.00  | M18 x 1-6g | 28.20  |
| 15 (D)     | 31.00  | M22 x 1-6g | 31.40  |
| 17 (E)     | 31.00  | M25 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)

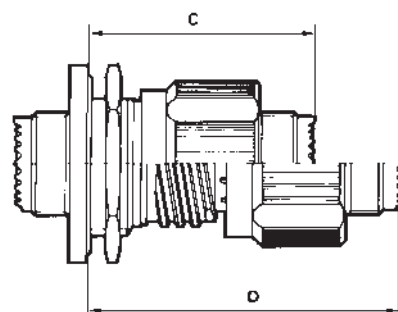
| Shell                 | 09 (A) | 11 (B) | 13 (C) | 15 (D) | 17 (E) | 19 (F) | 21 (G) | 23 (H) | 25 (J) |
|-----------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Coupling torque (N.m) | 6      | 8      | 10     | 13     | 20     | 23     | 25    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

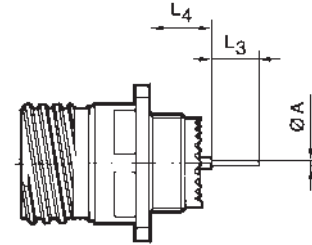
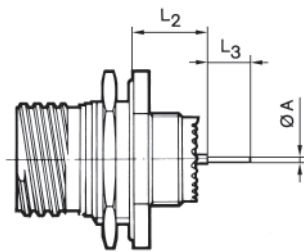
Dimensions in millimeters



# JVS Bronze Series



## Receptacle with straight spill contacts



|      |      | Shell size   |              |            | 09<br>(A) | 11<br>(B) | 13<br>(C) | 15<br>(D) | 17<br>(E) | 19<br>(F) | 21<br>(G) | 23<br>(H) | 25<br>(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

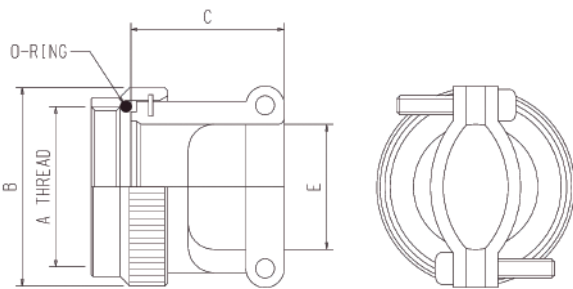
# JVS Bronze Series



## Bronze backshell part numbers (JVS)

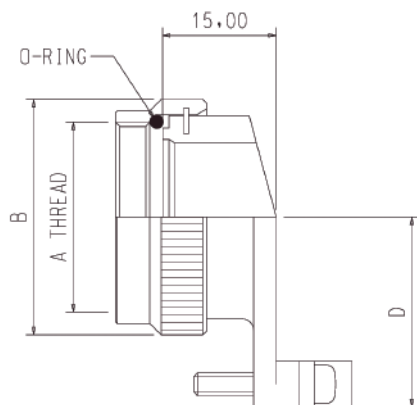
|                                                                  |            |          |           |          |           |          |
|------------------------------------------------------------------|------------|----------|-----------|----------|-----------|----------|
| <b>Basic series</b> 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

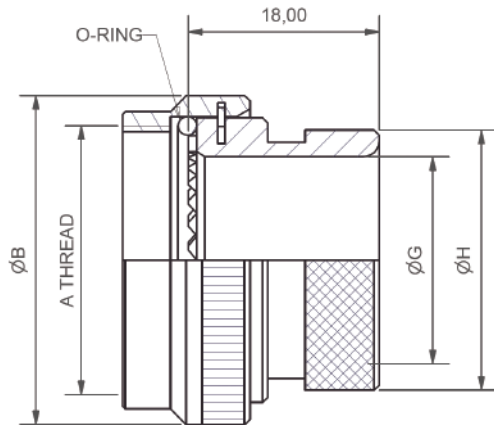


| Shell size | A Thread  | B Max. | D Max. |
|------------|-----------|--------|--------|
| 09         | M12 x 1.0 | 18.0   | 20.00  |
| 11         | M15 x 1.0 | 21.0   | 21.0   |
| 13         | M18 x 1.0 | 24.5   | 22.0   |
| 15         | M22 x 1.0 | 27.5   | 23.0   |
| 17         | M25 x 1.0 | 31.0   | 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

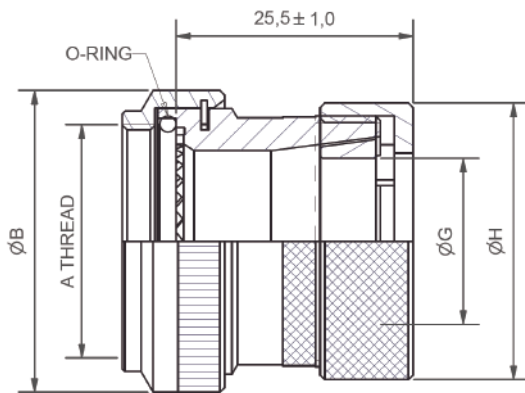


## Backshell for heat shrink boot (type P)



| 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)



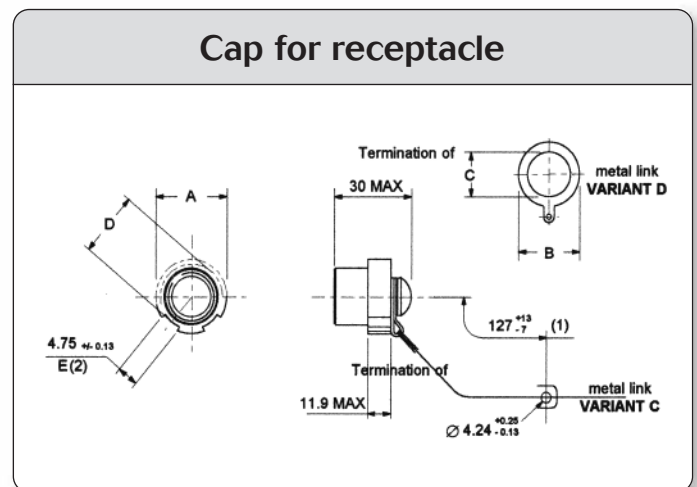
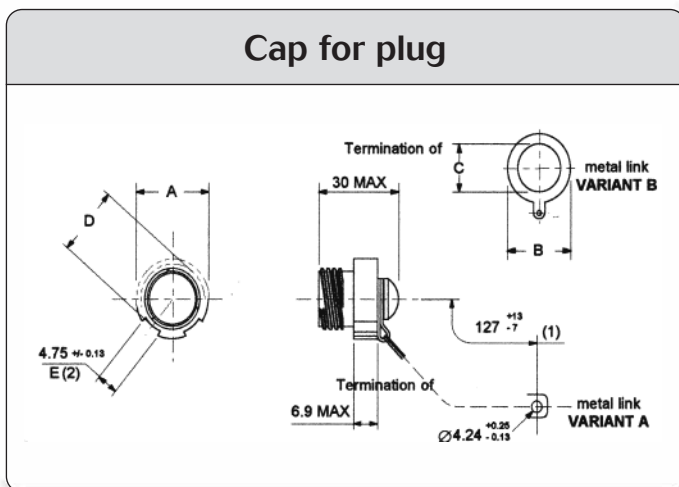
| Shell size | A Thread  | B Max. | G    | H Max. |
|------------|-----------|--------|------|--------|
| 09         | M12 x 1.0 | 18.0   | 6.8  | 16.0   |
| 11         | M15 x 1.0 | 21.0   | 9.5  | 19.0   |
| 13         | M18 x 1.0 | 24.5   | 12.8 | 22.0   |
| 15         | M22 x 1.0 | 29.0   | 14.8 | 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)

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

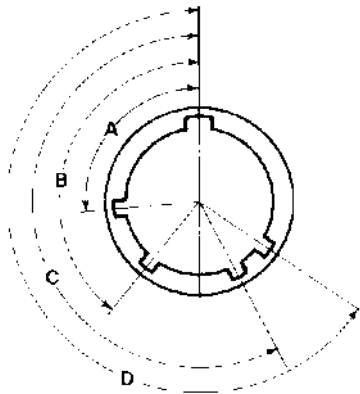
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# Common section

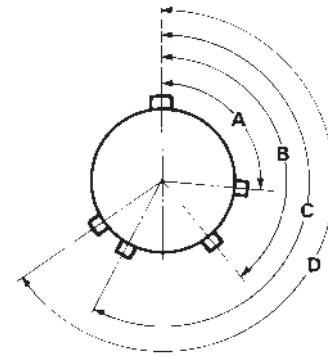


## Orientations

Viewed from face of receptacle



Viewed from front of plug



| Contact size  | Angles | N   | A   | B   | C   | D   | E   |
|---------------|--------|-----|-----|-----|-----|-----|-----|
| <b>09 (A)</b> | 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 |
| <b>11 (B)</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 |
| <b>13 (C)</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 |
| <b>15 (D)</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 |
| <b>17 (E)</b> | 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 |
| <b>19 (F)</b> | 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 |
| <b>21 (G)</b> | 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 |
| <b>23 (H)</b> | 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 |
| <b>25 (J)</b> | 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 |

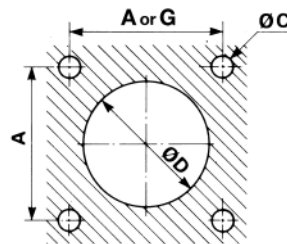
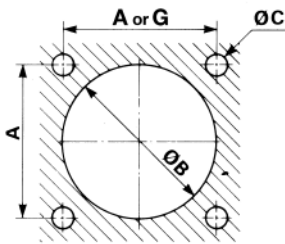


# Common section

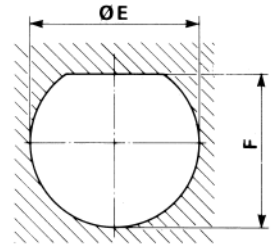


## Panel cut-out

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) |
|-----------------|-------|--------|--------|--------|--------|--------|--------|--------|--------|
| <b>A</b>        | 18.26 | 20.62  | 23.01  | 24.61  | 26.97  | 29.36  | 31.75  | 34.93  | 38.10  |
| <b>G</b>        | 15.09 | 18.26  | 20.62  | 23.01  | 24.61  | 26.97  | 29.36  | 31.75  | 34.94  |
| <b>B min.</b>   | 16.66 | 20.22  | 23.42  | 26.59  | 30.96  | 32.94  | 36.12  | 39.29  | 42.47  |
| <b>C ± 0.13</b> | 3.25  | 3.25   | 3.25   | 3.25   | 3.25   | 3.25   | 3.25   | 3.91   | 3.91   |
| <b>D min.</b>   | 13.11 | 15.88  | 19.05  | 23.01  | 25.81  | 28.98  | 32.16  | 34.93  | 37.69  |
| <b>E + 0.25</b> | 17.78 | 20.96  | 25.65  | 28.83  | 32.01  | 35.18  | 38.35  | 41.53  | 44.70  |
| <b>F 0</b>      | 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*<br>(ordered separately) | O ring for receptacle type 7 |
| <b>09 (A)</b> | 8599-5541                                              | AS3582-019                   |
| <b>11 (B)</b> | 8599-5542                                              | AS3582-022                   |
| <b>13 (C)</b> | 8599-5543                                              | AS3582-024                   |
| <b>15 (D)</b> | 8599-5544                                              | AS3582-026                   |
| <b>17 (E)</b> | 8599-5545                                              | AS3582-028                   |
| <b>19 (F)</b> | 8599-5546                                              | AS3582-128                   |
| <b>21 (G)</b> | 8599-5547                                              | AS3582-130                   |
| <b>23 (H)</b> | 8599-5548                                              | AS3582-132                   |
| <b>25 (J)</b> | 8599-5549                                              | AS3582-134                   |

\* For rear mounting

# Common section



## Crimp contact

| Contact size                         | Contact type | Souriau P/N<br>(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<br>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<br>Coaxial                       | Pin          | -                                    | M39029/102 558         |                                |
|                                      | Socket       | -                                    | M39029/103 559         |                                |
|                                      | Pin          | -                                    | M39029/28 211          |                                |
|                                      | Socket       | -                                    | M39029/75 416          |                                |
| #10<br>Power                         | Pin          | -                                    | M39029/58 528          |                                |
|                                      | Socket       | -                                    | M39029/56 527          |                                |
| #8<br>Power                          | Pin          | 8599-7544                            | -                      |                                |
|                                      | Socket       | 8599-7541                            | -                      |                                |
|                                      | Boot         | 8599-4542                            | -                      | For wire #8                    |
|                                      |              | 8599-4547                            | -                      | For wire #10                   |
| Reductor                             | 8599-7645    | -                                    |                        |                                |
| #8<br>Coaxial                        | Pin          | -                                    | M39029/60 367          |                                |
|                                      | Socket       | -                                    | M39029/59 366          |                                |
|                                      | Boot         | 8590-4571                            | -                      |                                |
| #8<br>Triaxial                       | Pin          | -                                    | M39029/90 529          |                                |
|                                      | Socket       | -                                    | M39029/91 530          |                                |
|                                      | Boot         | 8590-4571                            | -                      |                                |
| #4<br>Power                          | Pin          | 8599-7598 900*                       | -                      | For wire 25 mm <sup>2</sup>    |
|                                      | Socket       | 8599-7599 900*                       | -                      |                                |
|                                      | Pin          | 8599-7534                            | -                      | For wire 21.15 mm <sup>2</sup> |
|                                      | Socket       | 8599-7535                            | -                      |                                |
|                                      | Boot         | for Cable 16 mm <sup>2</sup>         | 8599-4594              | -                              |
|                                      |              | for Cable 10 mm <sup>2</sup>         | 8599-4593              | -                              |
| Reductor<br>Cable 10 mm <sup>2</sup> | 8400-2352A   | -                                    |                        |                                |
| #4<br>Power with<br>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 <sup>2</sup> |       | 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<br>Coaxial                     | Pin                                                     | 1.60      | RG 174<br>RG 179<br>RG 316                                                                    |     |                 |       | 1.65                      | 2.60 |
|                                    | Socket                                                  |           |                                                                                               |     |                 |       |                           |      |
| #12                                | Pin                                                     | 2.40      | 14                                                                                            | 12  | 1.91            | 3.18  | 2.46                      | 3.61 |
|                                    | Socket                                                  |           |                                                                                               |     |                 |       |                           |      |
| #12<br>Coaxial                     | Pin                                                     | 2.40      | RG 174<br>RG 179<br>RG 316                                                                    |     |                 |       | 2.40                      | 2.60 |
|                                    | Socket                                                  |           |                                                                                               |     |                 |       |                           |      |
|                                    | Pin                                                     |           |                                                                                               |     |                 |       |                           |      |
|                                    | Socket                                                  |           |                                                                                               |     |                 |       |                           |      |
| #10<br>Power                       | Pin                                                     | 3.20      | Please consult us                                                                             |     |                 |       | -                         | 2.95 |
|                                    | Socket                                                  |           |                                                                                               |     |                 |       |                           |      |
| #8<br>Power                        | Pin                                                     | 3.64      | -                                                                                             | 8   | -               | 8.98  | -                         | -    |
|                                    | Socket                                                  |           | -                                                                                             | -   | -               | -     | 4.50                      | 6.5  |
|                                    | Boot                                                    |           | -                                                                                             | -   | -               | -     | 2.50                      | 4    |
|                                    | Reductor                                                |           | -                                                                                             | -   | -               | -     | -                         | -    |
| #8<br>Coaxial                      | Pin                                                     | 5.50      | RG 188 A/U                                                                                    |     |                 |       | -                         | 2.80 |
|                                    | Socket                                                  |           |                                                                                               |     |                 |       |                           |      |
|                                    | Boot                                                    |           |                                                                                               |     |                 |       |                           |      |
| #8<br>Triaxial                     | Pin                                                     | 5.50      | 0,76MIL-C17/176 00002<br>FILECA F.2703/14<br>RAYCHEM CHEMINAX 10612<br>FILOTEX M 17/176 00002 |     |                 |       | 3.15                      | 3.40 |
|                                    | Socket                                                  |           |                                                                                               |     |                 |       |                           |      |
|                                    | Boot                                                    |           |                                                                                               |     |                 |       |                           |      |
| #4<br>Power                        | Pin                                                     | 5.74      | -                                                                                             | (3) | -               | 25    | -                         | -    |
|                                    | Socket                                                  |           | 5                                                                                             | 4   | 16              | 21.15 | -                         | -    |
|                                    | Pin                                                     |           | -                                                                                             | -   | -               | -     | 6.35                      | 7.50 |
|                                    | Socket                                                  |           | -                                                                                             | -   | -               | -     | 4                         | 5.8  |
|                                    | Available for<br>Boot 8599-7534<br>and 7535<br>contacts |           | -                                                                                             | -   | -               | -     | -                         | -    |
|                                    | Reductor<br>Cable 10 mm                                 |           | -                                                                                             | -   | -               | -     | -                         | -    |
| #4<br>Power with<br>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<br>violet - blue              |
|                | Socket       | 8599-0753 900                             | 8599-0953 900          | jaune - yellow<br>gris - grey<br>gris - grey |
| # 20 Alumel    | Pin          | 8599-0761 900                             | 8599-0961 900          | jaune - yellow<br>violet - vert - green      |
|                | Socket       | 8599-0765 900                             | 8599-0965 900          | jaune - yellow<br>gris - grey<br>violet      |

| Contact size          | Ø Contact (mm) | Wire section |     |     |       |                 | Ø Over insulation mm |      |      |
|-----------------------|----------------|--------------|-----|-----|-------|-----------------|----------------------|------|------|
|                       |                | min          | Awg | max | min   | mm <sup>2</sup> | 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<br>(Souriau 8365)<br>Turret part number |         | M22520/2-01<br>(Souriau 8476-01)<br>Locator part number |         | M300 BT<br>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<br>Power | Pin          | -                                                   | -       | -                                                       | -       | SP 593                         | M22520/23-02       | 8599-9601           |
|              | Socket       | -                                                   | -       | -                                                       | -       |                                |                    |                     |
| # 4<br>Power | Pin          | -                                                   | -       | -                                                       | -       | -                              | M22520/23-04       | M22520/23-11        |
|              | Socket       | -                                                   | -       | -                                                       | -       | -                              |                    |                     |

| Contact size    | Contact type | Pliers                                                  |                                    |                                    |
|-----------------|--------------|---------------------------------------------------------|------------------------------------|------------------------------------|
|                 |              | M22520/2-01<br>(Souriau 8476-01)<br>Locator part number | M22520/4-01<br>Locator part number | M22520/5-01<br>Locator part number |
| # 12<br>Coaxial | Inner        | -                                                       | -                                  | M22520/5-03                        |
|                 | Outer        | -                                                       | -                                  |                                    |
| # 16<br>Coaxial | Inner        | M22520/2-35                                             | -                                  | -                                  |
|                 | Outer        | -                                                       | M22520/4-02                        | -                                  |
| # 8<br>Coaxial  | Inner        | M22520/2-31                                             | -                                  | -                                  |
|                 | Outer        | -                                                       | -                                  | M22520/5-05                        |
| # 8<br>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<br>.14 | 3,99<br>.16 |  |
| # 20         | 5,31<br>.21 | 5,82<br>.23 |  |
| # 16         | 5,31<br>.21 | 5,82<br>.23 |  |
| # 12         | 5,31<br>.21 | 5,82<br>.23 |  |
| # 8          | 12,5<br>.49 | 13<br>.51   |  |
| # 4          | 12,5<br>.49 | 13<br>.51   |  |

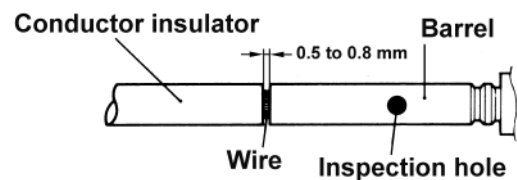
L = Length of wire stripping

### Insertion of wire in contact barrel

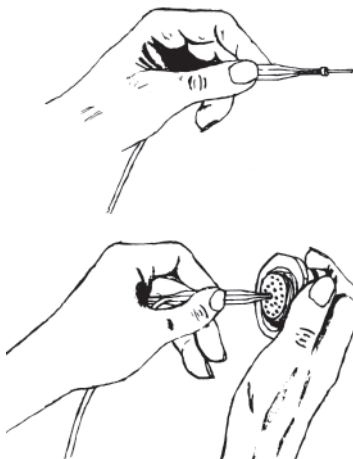
When inserting the stripped wire into the contact barrel check that no strands are left outside and that the wire is visible through the wire inspection hole in the barrel.

**Important:**

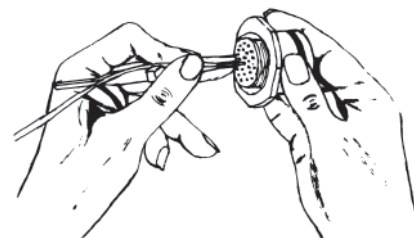
- Slide any accessories over wire strands before carrying out the following operations.
- Contacts are inserted and extracted from the rear of the connector.



### 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.

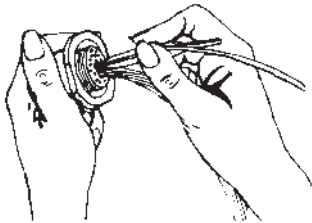
- 3 Withdraw the tool (from rear). Check that the contact is firmly locked by pulling wire gently. When connector is fully loaded, check the position of contact tips. They should all be in the same plane.

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

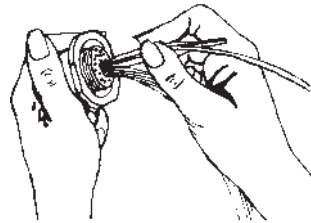
# Common section



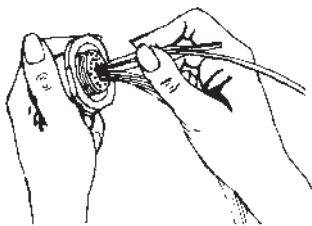
## Extraction of the contacts



- 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

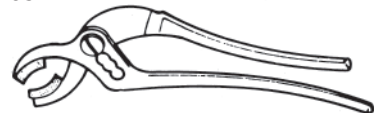
Backshell tightening pliers, part number: 8498-03

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

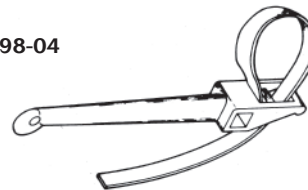
Strap clamp, part number: 8498-04

Spare strap, part number: 8498-103

8498-03



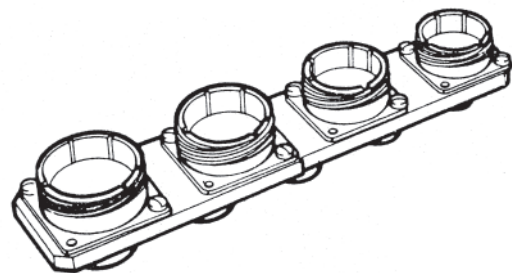
8498-04



## 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           |

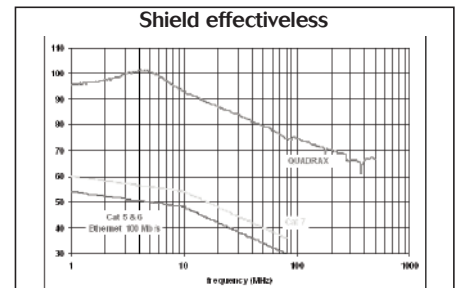
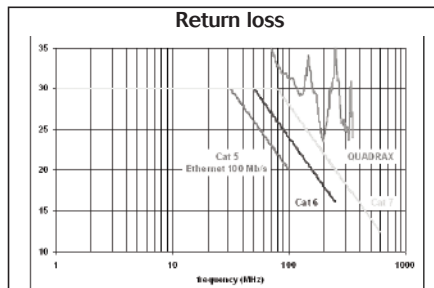
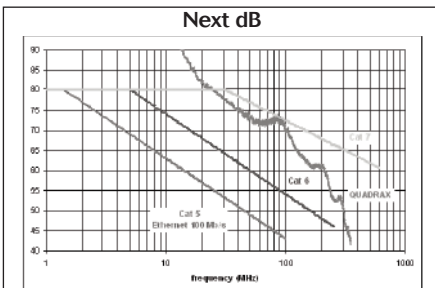
### Electrical

- **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

|                                                        |           |          |          |           |          |           |          |          |            |
|--------------------------------------------------------|-----------|----------|----------|-----------|----------|-----------|----------|----------|------------|
| <b>Basic Series</b>                                    | <b>8D</b> | <b>0</b> | <b>C</b> | <b>11</b> | <b>W</b> | <b>81</b> | <b>P</b> | <b>N</b> | <b>284</b> |
| <b>Shell style:</b>                                    |           |          |          |           |          |           |          |          |            |
| 0: Square flange receptacle                            |           |          |          |           |          |           |          |          |            |
| 7: Jam nut receptacle                                  |           |          |          |           |          |           |          |          |            |
| 5: Plug                                                |           |          |          |           |          |           |          |          |            |
| <b>Type:</b>                                           |           |          |          |           |          |           |          |          |            |
| C: Receptacle with Quadrax PC tail contacts*           |           |          |          |           |          |           |          |          |            |
| Q: Connectors with Quadrax crimp contacts              |           |          |          |           |          |           |          |          |            |
| <b>Shell size:</b> 11 - 17 - 21 - 25                   |           |          |          |           |          |           |          |          |            |
| <b>Plating:</b>                                        |           |          |          |           |          |           |          |          |            |
| 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)                         |           |          |          |           |          |           |          |          |            |
| <b>Contact layout:</b> See page 8 to 11                |           |          |          |           |          |           |          |          |            |
| <b>Contact type:</b>                                   |           |          |          |           |          |           |          |          |            |
| P: Pin      A: Connector supplied less pin contact     |           |          |          |           |          |           |          |          |            |
| S: Socket    B: Connector supplied less socket contact |           |          |          |           |          |           |          |          |            |
| <b>Orientation:</b> N, A, B, C, D & E (See page 58)    |           |          |          |           |          |           |          |          |            |
| <b>Specification:</b>                                  |           |          |          |           |          |           |          |          |            |
| 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

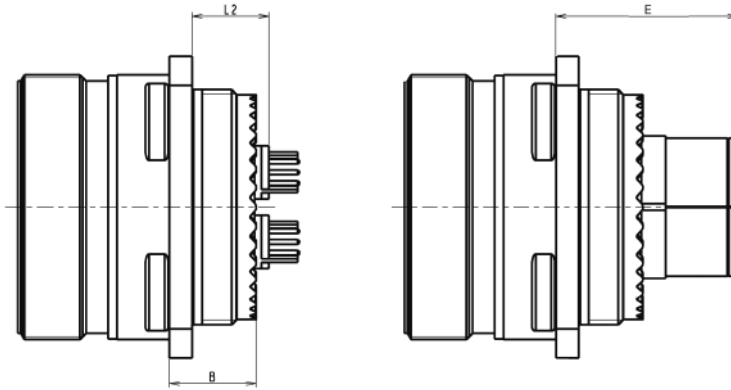
|                                                         |            |          |            |           |           |          |          |            |
|---------------------------------------------------------|------------|----------|------------|-----------|-----------|----------|----------|------------|
| <b>Basic Series</b>                                     | <b>JVS</b> | <b>C</b> | <b>00A</b> | <b>09</b> | <b>35</b> | <b>P</b> | <b>N</b> | <b>284</b> |
| <b>Shell style:</b>                                     |            |          |            |           |           |          |          |            |
| C: Receptacle with Quadrax PC tail contacts*            |            |          |            |           |           |          |          |            |
| Q: Connectors with Quadrax crimp contacts               |            |          |            |           |           |          |          |            |
| <b>Shell style:</b>                                     |            |          |            |           |           |          |          |            |
| 00A: Square flange receptacle                           |            |          |            |           |           |          |          |            |
| 16A: Plug                                               |            |          |            |           |           |          |          |            |
| 07A: Jam nut receptacle                                 |            |          |            |           |           |          |          |            |
| <b>Shell size:</b> 11 - 17 - 21 - 25                    |            |          |            |           |           |          |          |            |
| <b>Contact layout:</b> See page 8 to 11                 |            |          |            |           |           |          |          |            |
| <b>Contact type:</b>                                    |            |          |            |           |           |          |          |            |
| P: Pin      A: Connector supplied less pin contact      |            |          |            |           |           |          |          |            |
| S: Femelle    B: Connector supplied less socket contact |            |          |            |           |           |          |          |            |
| <b>Orientation:</b> N, A, B, C, D & E (See page 58)     |            |          |            |           |           |          |          |            |
| <b>Specification:</b>                                   |            |          |            |           |           |          |          |            |
| 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

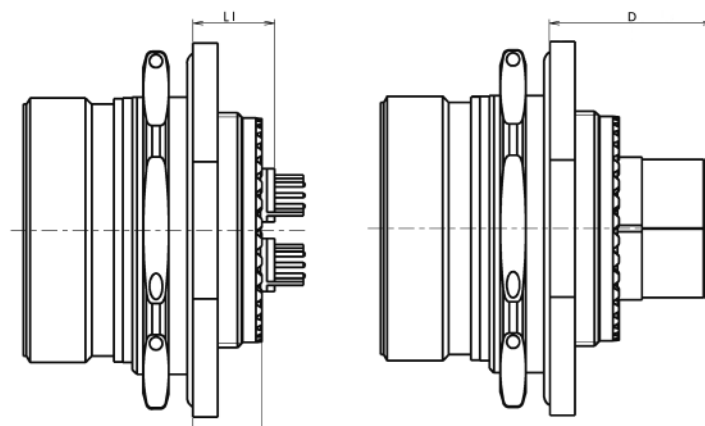


## Square flange receptacle – Type 0



| 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   |

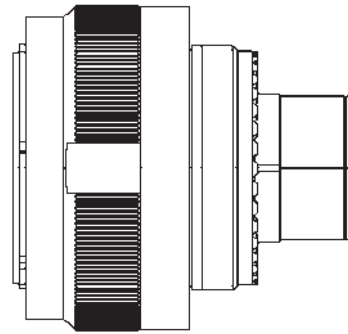
Dimensions in millimeters)

# 8D-JVS Series with quadrax contacts

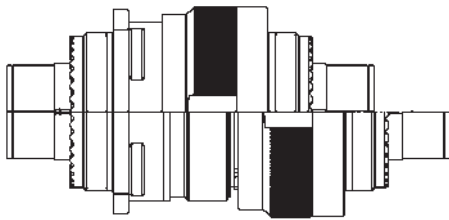


## Plug - Type 5

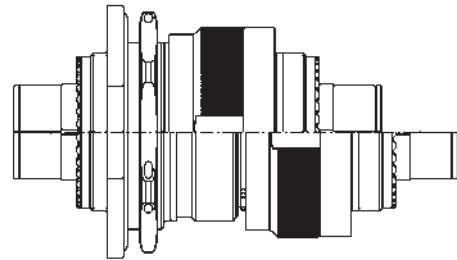
| Shell size | C max. size. |
|------------|--------------|
| 11         | 44.00        |
| 17         | 44.00        |
| 21         | 44.00        |
| 25         | 44.00        |



## Mated connector - Type 0 & type 5

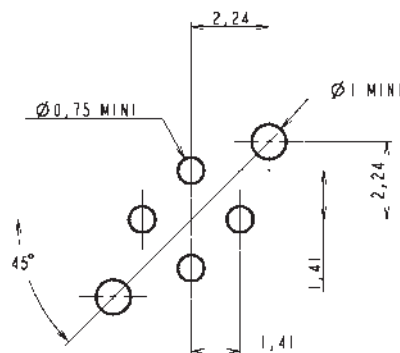


## Mated connector - Type 7 & type 5



| 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

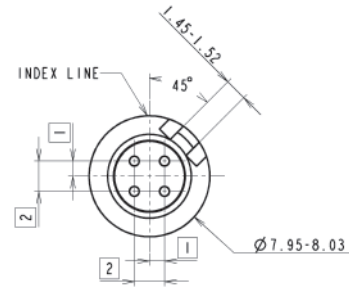
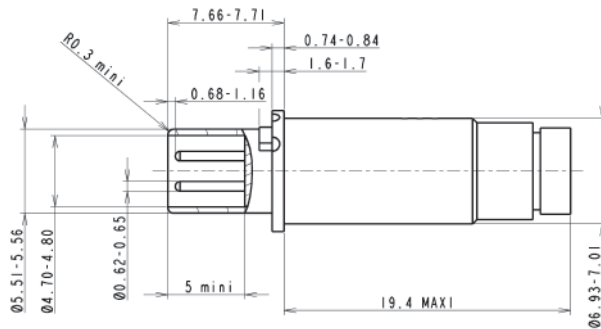


(Dimensions in millimeters)

# 8D-JVS Series with quadrax contacts

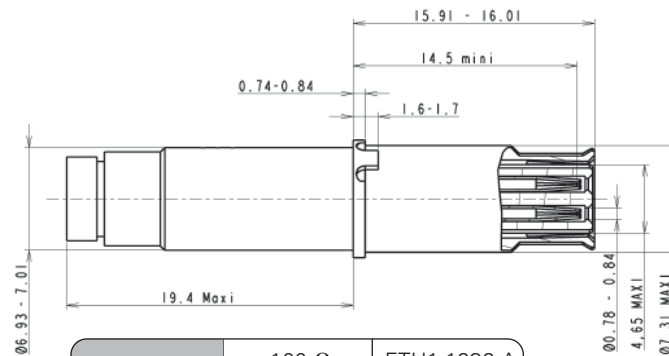
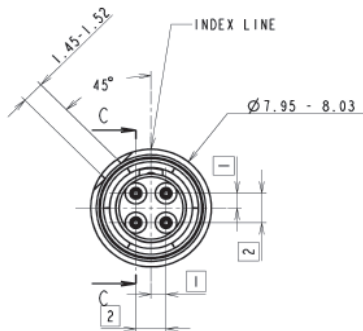


## Crimp pin contact



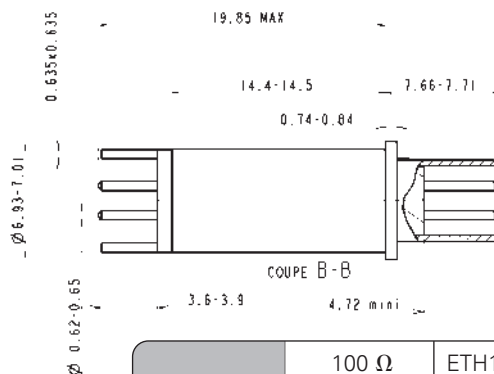
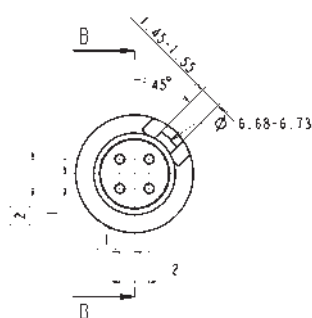
|             |              |             |
|-------------|--------------|-------------|
| Part number | 100 $\Omega$ | ETH1-1235 A |
|             | 150 $\Omega$ | ETH1-1503 A |

## Crimp socket contact



|             |              |             |
|-------------|--------------|-------------|
| Part number | 100 $\Omega$ | ETH1-1236 A |
|             | 150 $\Omega$ | ETH1-1504 A |

## Pin contact for PCB mount



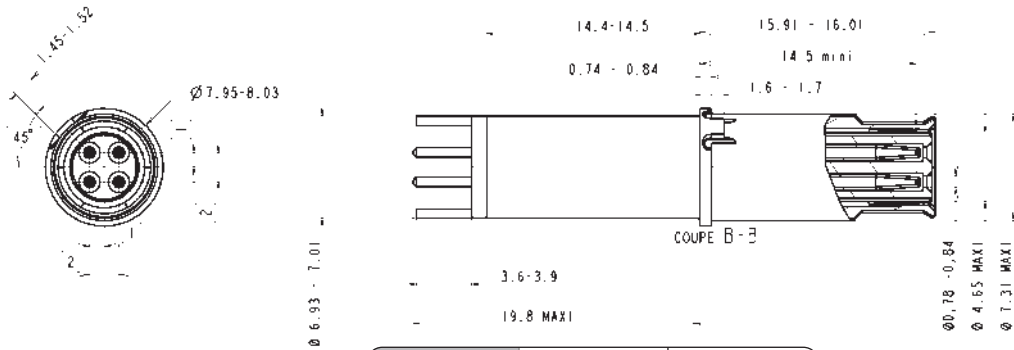
|             |              |             |
|-------------|--------------|-------------|
| Part number | 100 $\Omega$ | ETH1-1237 A |
|             | 150 $\Omega$ | ETH1-1501 A |

(Dimensions in millimeters)

# 8D-JVS Series with quadrax contacts



## Socket contact for PCB mount

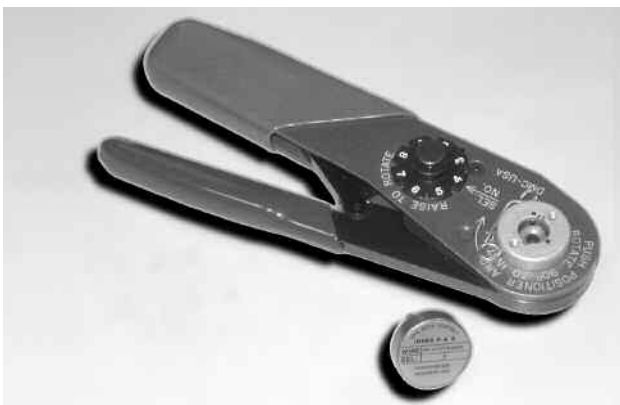


|             |              |             |
|-------------|--------------|-------------|
| Part number | 100 $\Omega$ | ETH1-1238 A |
|             | 150 $\Omega$ | ETH1-1502 A |

(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 |
|---------------------------------------------------------------------------|----|---|---|----|---|----|---|---|
| <b>Shell style:</b>                                                       |    |   |   |    |   |    |   |   |
| 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)                           |    |   |   |    |   |    |   |   |
| <b>Designation:</b>                                                       |    |   |   |    |   |    |   |   |
| E: ELIO™ optical connector                                                |    |   |   |    |   |    |   |   |
| <b>Shell size:</b> 09 - 11 - 13 - 19 - 25                                 |    |   |   |    |   |    |   |   |
| <b>Plating:</b>                                                           |    |   |   |    |   |    |   |   |
| 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)                                                   |    |   |   |    |   |    |   |   |
| <b>Contact layout:</b>                                                    |    |   |   |    |   |    |   |   |
| See page 8 to 11)                                                         |    |   |   |    |   |    |   |   |
| <b>Insert type:</b>                                                       |    |   |   |    |   |    |   |   |
| A: Male insert (plug)                                                     |    |   |   |    |   |    |   |   |
| B: Female insert with ceramic alignment sleeves (receptacle)              |    |   |   |    |   |    |   |   |
| <b>Orientation:</b> N, A, B, C, D & E (See page 58)                       |    |   |   |    |   |    |   |   |

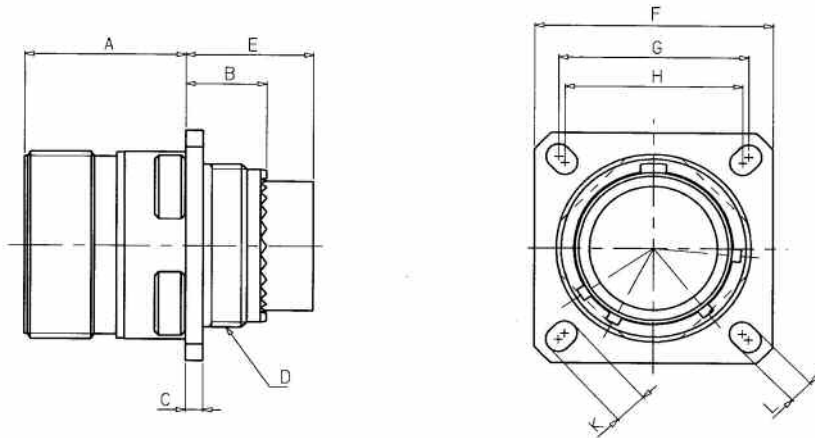
## Connector part numbers Bronze

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

# 8D - JVS Series with optical Elio contacts

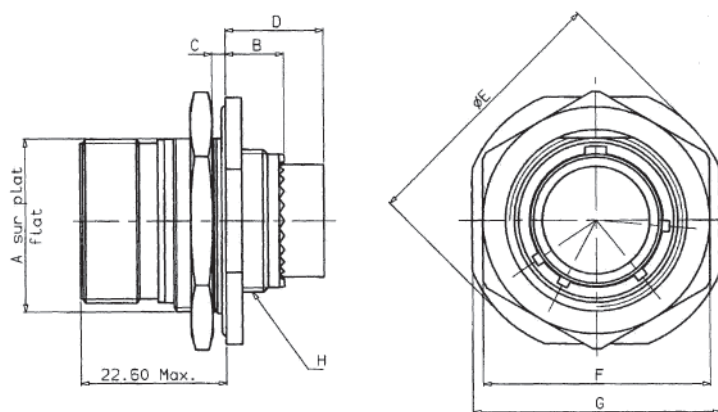


## Receptacle type 0



| 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



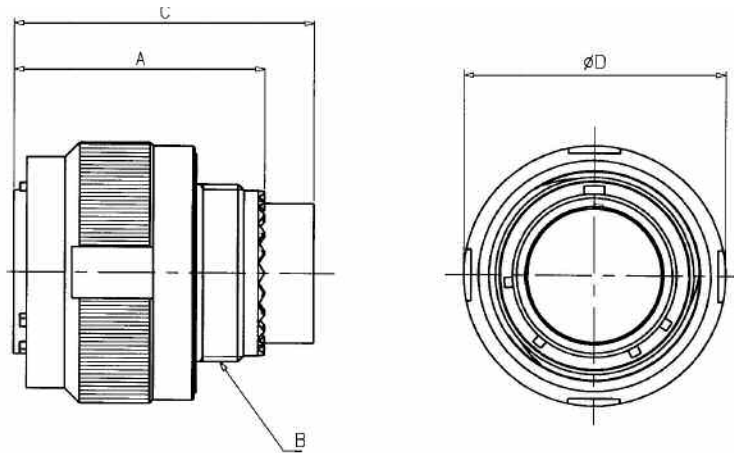
| Shell size | A Max. | B Max. | C Max. | D Max. | E Max. | F Max. | G ± 0.40 | H Thread   |
|------------|--------|--------|--------|--------|--------|--------|----------|------------|
| 09         | 16.55  | 9.90   | 3.20   | 16.40  | 32.50  | 23.00  | 27.00    | M12 x 1-6g |
| 11         | 19.07  | 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

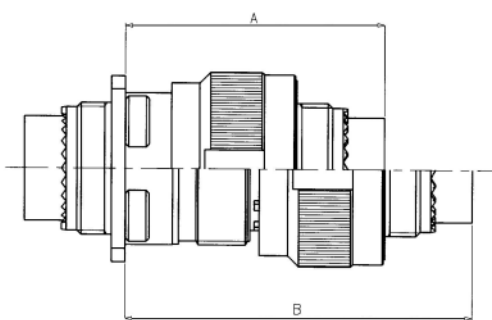


## Plug type 5

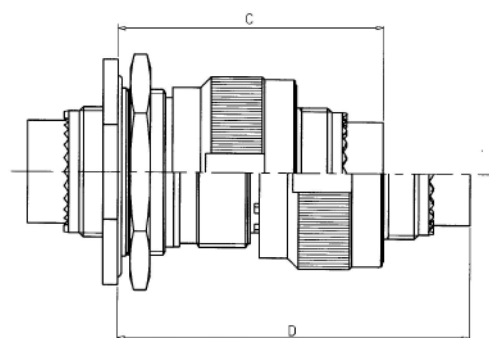


| Shell size | A Max. | B Thread   | C Max. | D Max. |
|------------|--------|------------|--------|--------|
| 09         | 31.00  | M12 x 1-6g | 37.50  | 21.80  |
| 11         | 31.00  | M15 x 1-6g | 37.50  | 25.00  |
| 13         | 31.00  | M18 x 1-6g | 37.50  | 29.40  |
| 19         | 31.00  | M18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

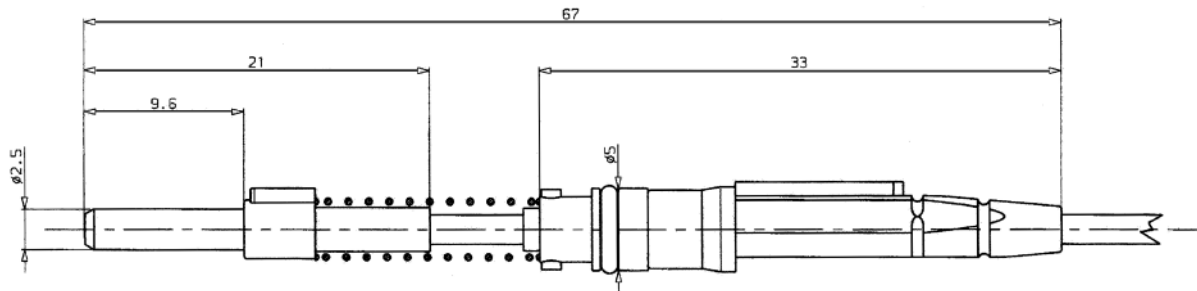
| Shell size | A Max. | B Max. | C Max. | D Max. |
|------------|--------|--------|--------|--------|
| 09         | 43.50  | 58.80  | 44.80  | 60.10  |
| 11         | 43.50  | 58.80  | 44.80  | 60.10  |
| 13         | 43.50  | 58.80  | 45.00  | 60.30  |
| 19         | 43.50  | 58.80  | 45.00  | 60.30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

Dimensions in millimeters

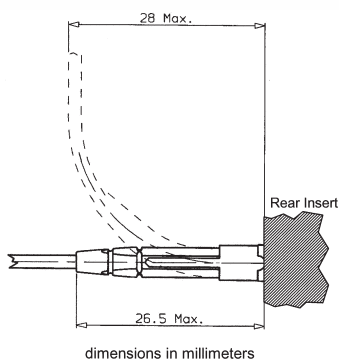
# 8D - JVS Series with optical Elio contacts



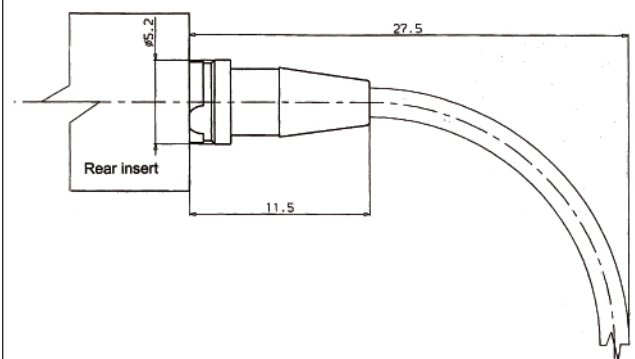
## Dimensions of ELIO™ Termini - Straight long boot version (L)



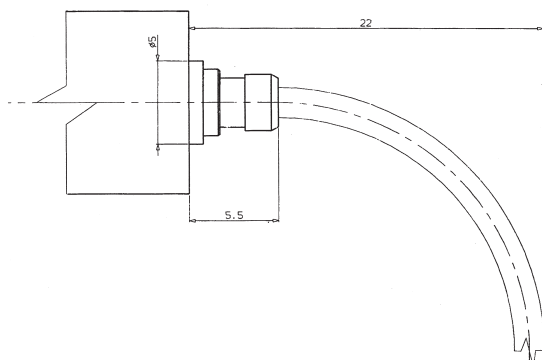
## Rear dimensions of the straight long boot version of the ELIO™ Termini



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



## Rear dimensions of the ELIO™ Termini without boot



## Ordering information

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

Dimensions in millimeters

# 8D - JVS Series with optical Elio contacts



## Adaptor for standard backshells

### Elio - ABA

Shell size:

09 - 11 - 13 - 25

XX

XX

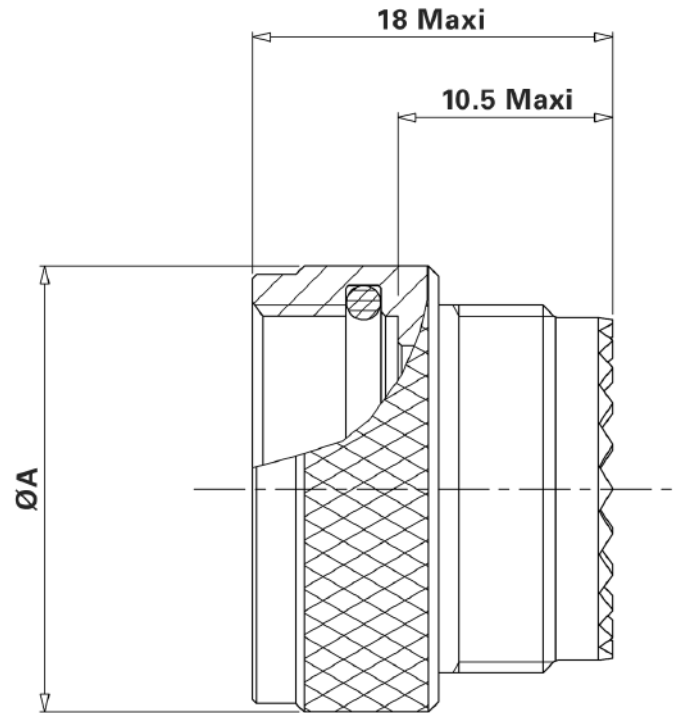
Plating:

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

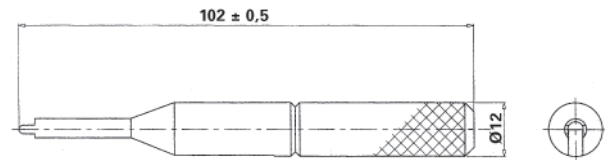
### Insertion and extraction tool

For the terminus with boot



P/N : ELI1-0231A

For the terminus without boot

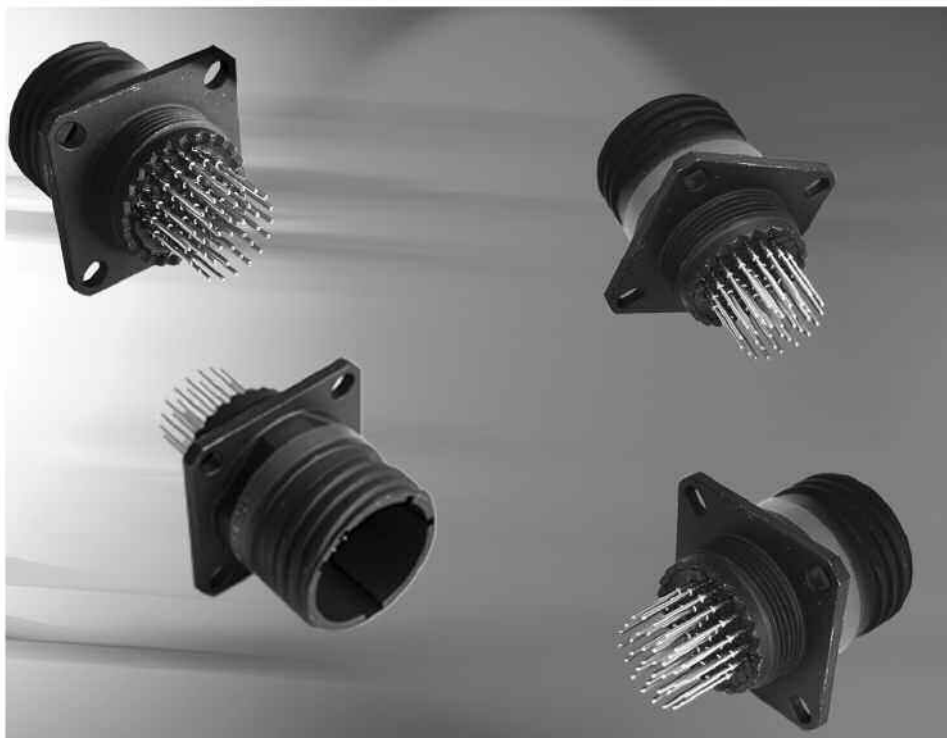


P/N : 80WV0049A





## 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.cm<sup>3</sup>/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...).

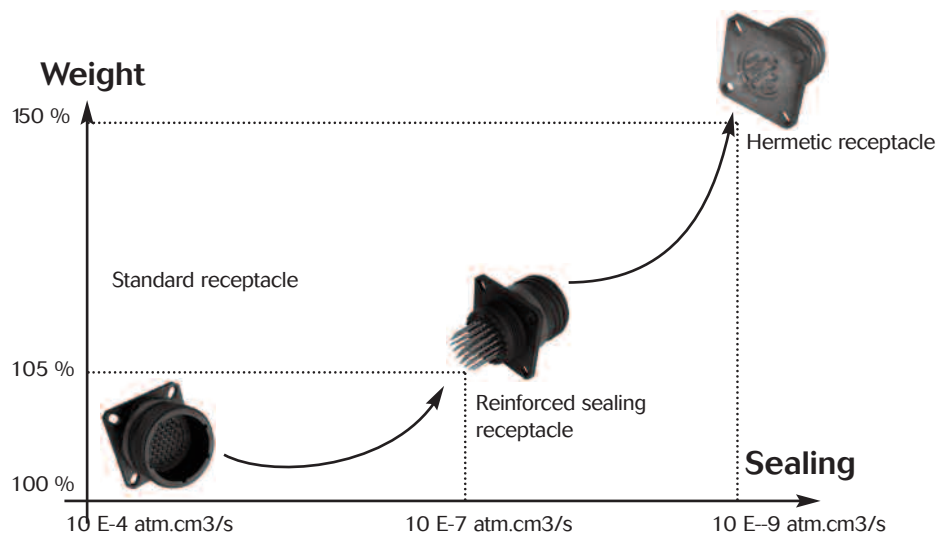
Don't forget the digit related to the spill length (C, M, L, S).

### Examples:

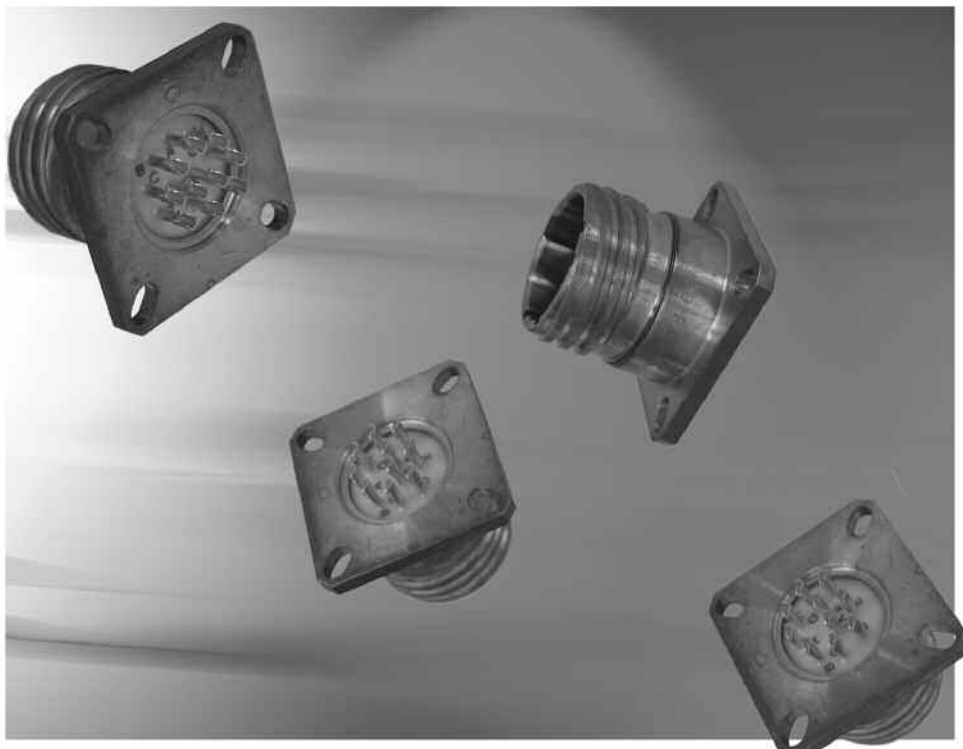
8D (Alu) = 8DR 0 C 13 W 35 PN

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

## Comparison between standard, reinforced sealing and hermetic version

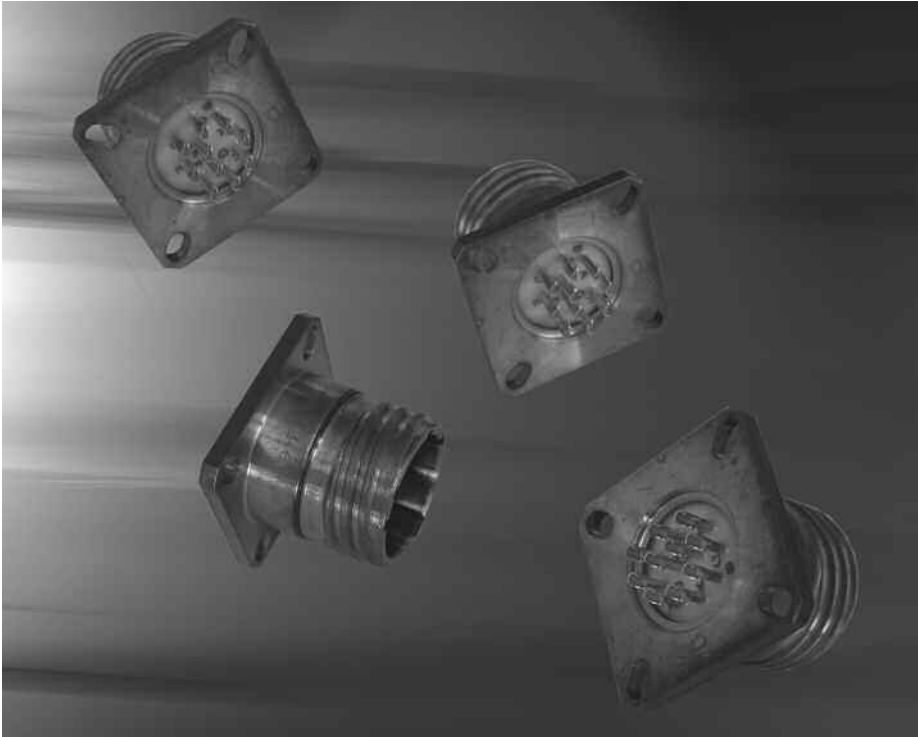


# F 38999 Hermetic



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  $10^{-7}$  cm<sup>3</sup>/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 $\Omega$  (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

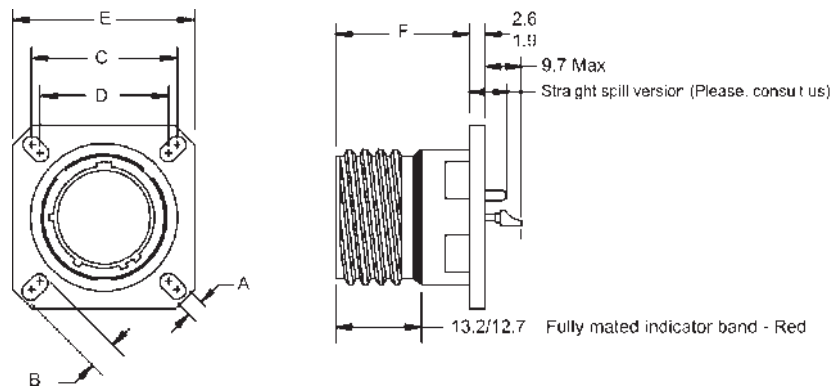
# F 38999 Hermetic



## Ordering information

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

### Box mounting flange receptacle (type 21)



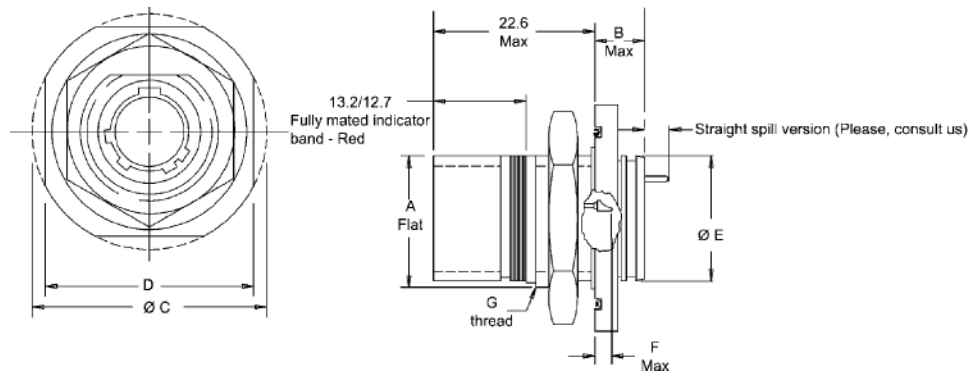
| Shell size | A<br>± 0.20 | B<br>± 0.20 | C     | D     | E<br>± 0.30 | F<br>Max. |
|------------|-------------|-------------|-------|-------|-------------|-----------|
| A (9)      | 3.25        | 5.49        | 18.26 | 15.09 | 23.80       | 21.40     |
| B (11)     | 3.25        | 4.93        | 20.62 | 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

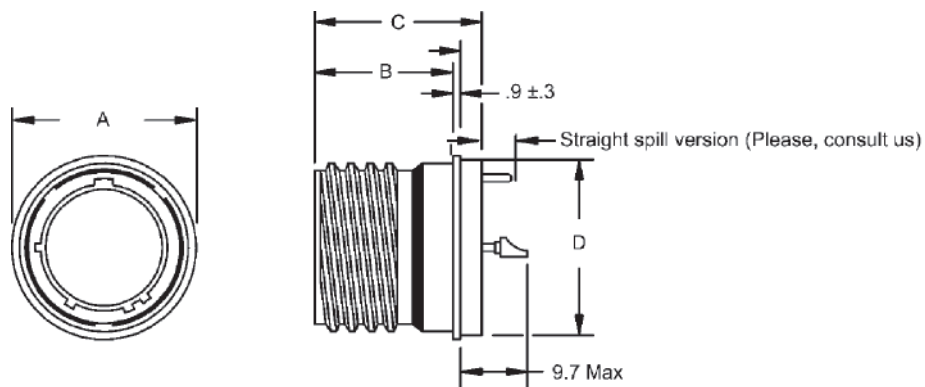


## Jam nut receptacle type 23



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

## Solder mounting receptacle (type 25)



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

Dimensions in millimeters

# 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<sup>e</sup> 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

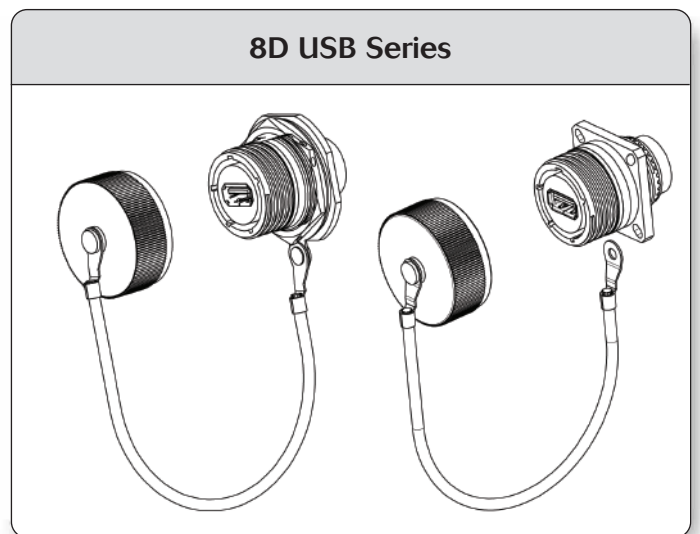
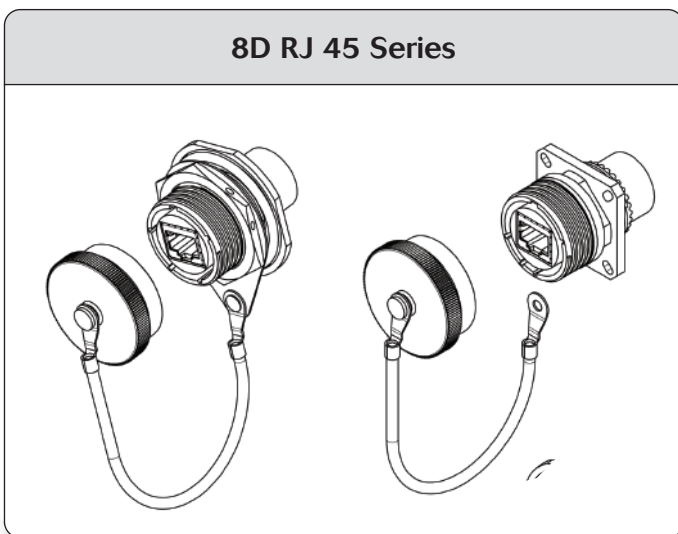


# 8D Series with RJ45 USB



## Ordering information

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

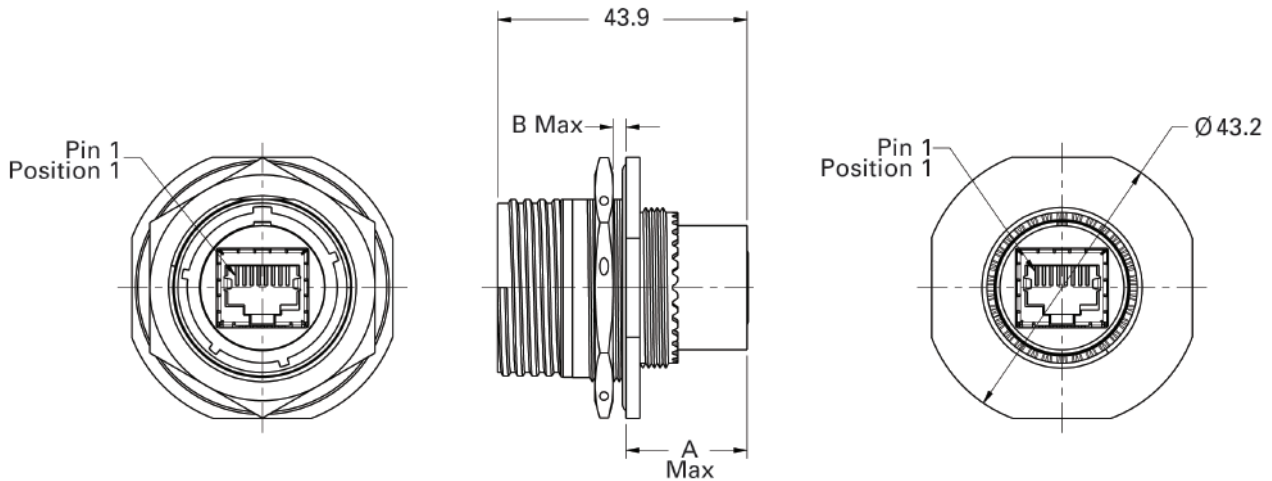


# 8D Series with RJ45 USB



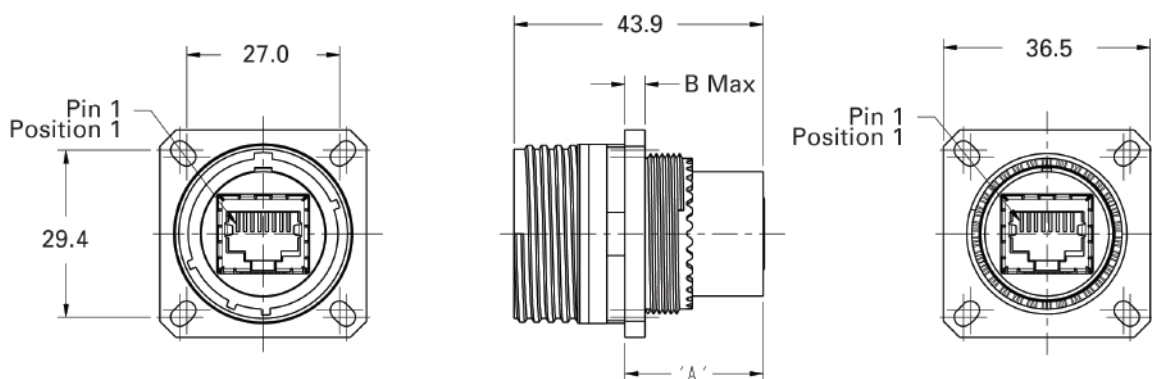
## RJ 45 Feedthrough serie

### 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   |

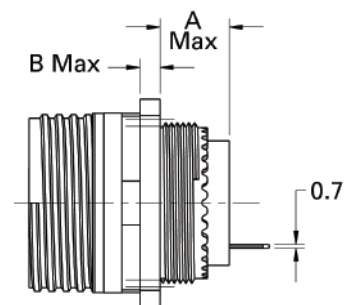
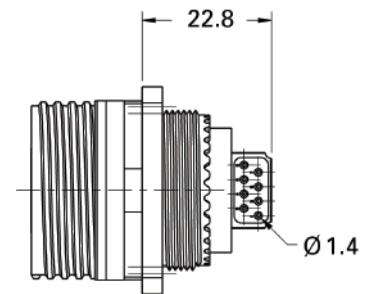
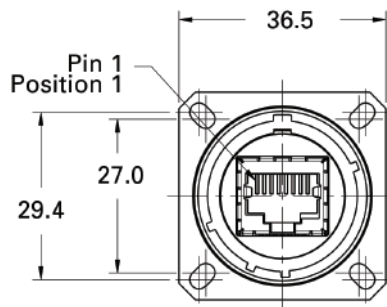
# 8D Series with RJ45 USB



## RJ45 Solder out serie

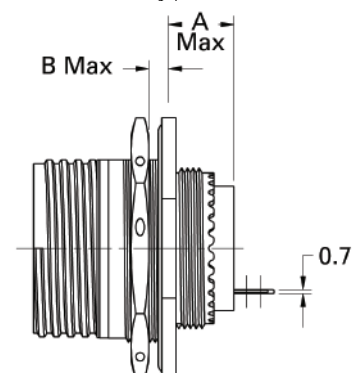
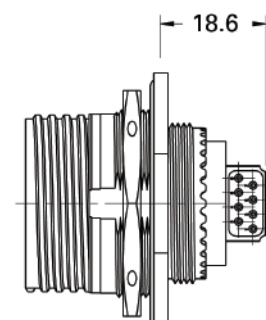
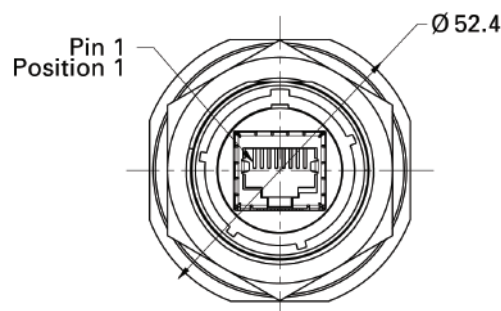
### Suare flange receptacle

| 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   |

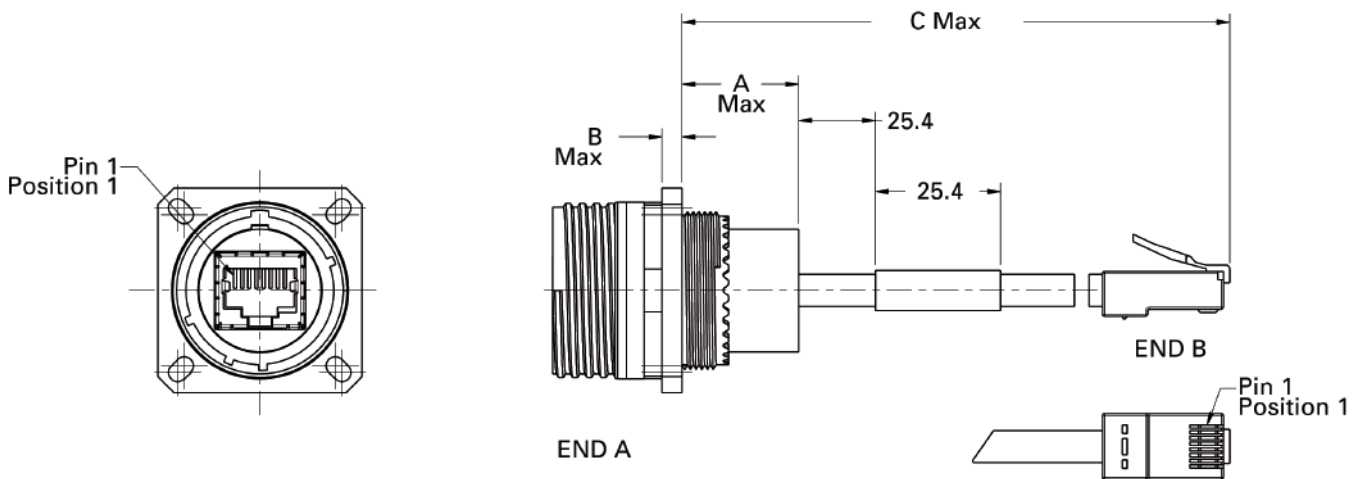


# 8D Series with RJ45 USB



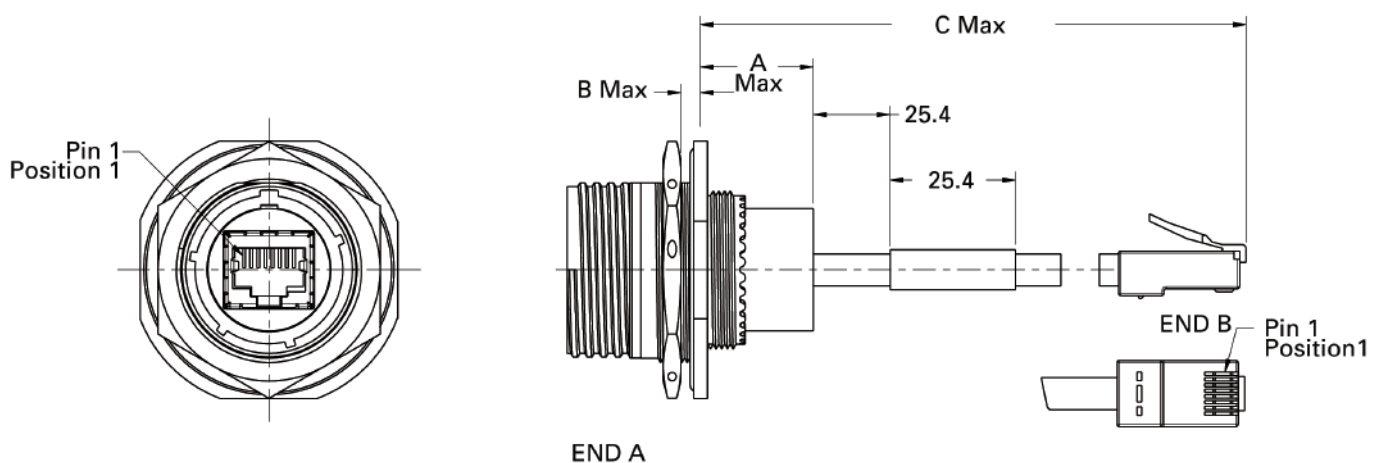
## RJ45 Pigtail serie

### 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



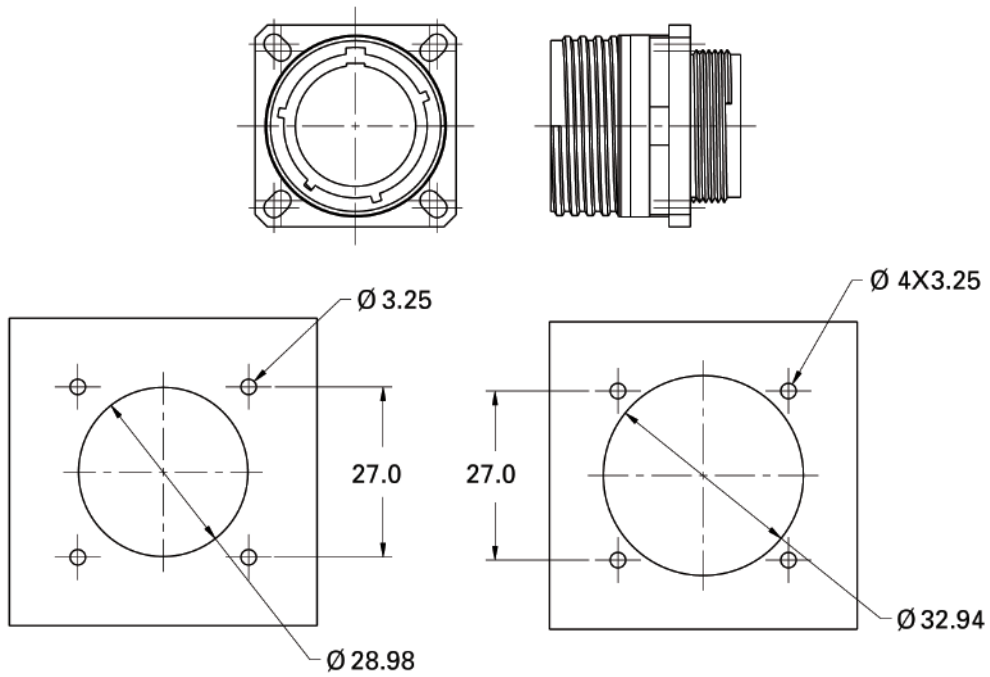
| Shell type | A Max. | B Max. | C Max.       |
|------------|--------|--------|--------------|
| Aluminium  | 21.34  | 3.20   | 304.80 ±25.4 |

# 8D Series with RJ45 USB

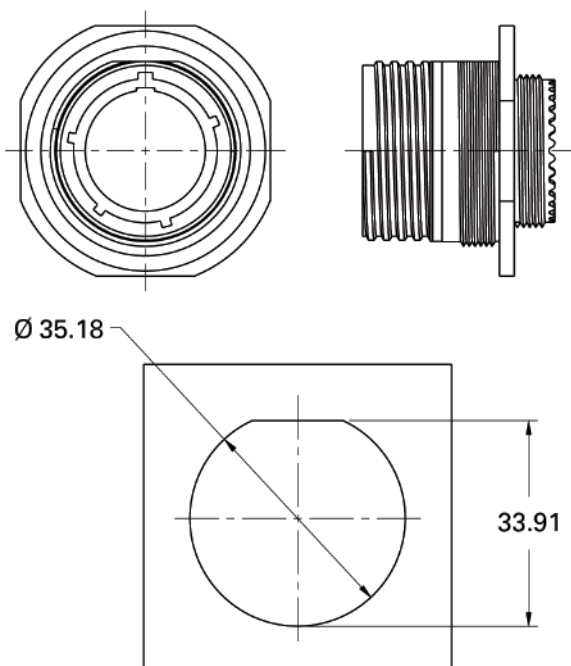


## Panel cut out for RJ45 serie

### Suare flange receptacle



### Jam nut receptacle

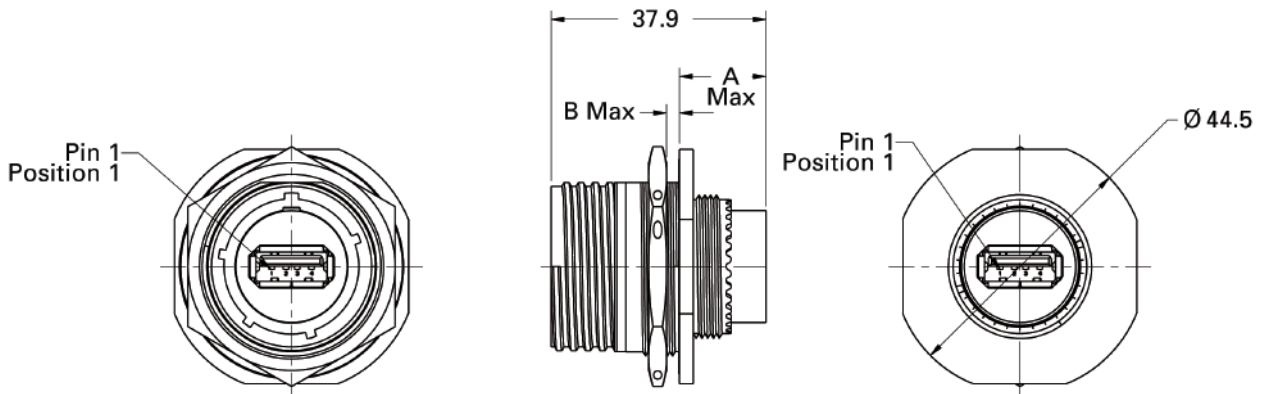


# 8D Series with RJ45 USB



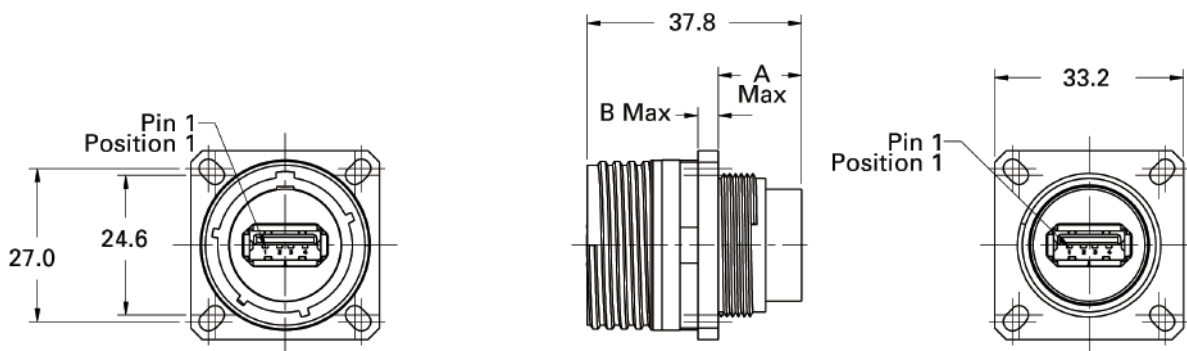
## USB Feedthrough serie

### 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   |

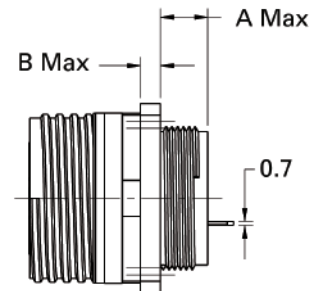
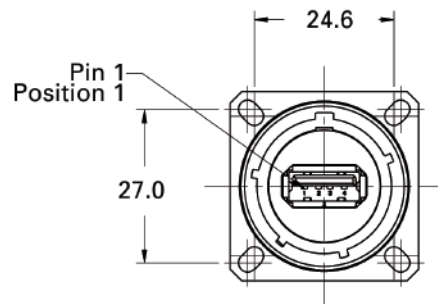
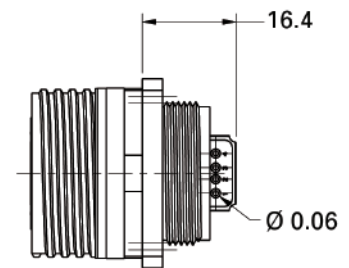
# 8D Series with RJ45 USB



## USB Solder out serie

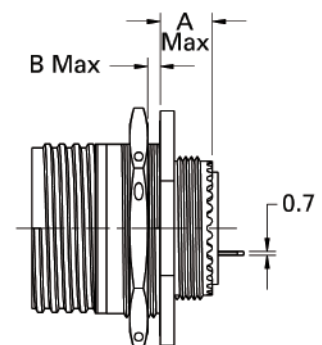
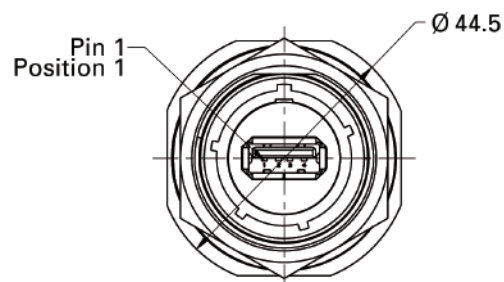
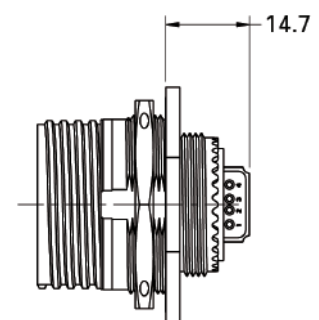
### Suare flange receptacle

| 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   |

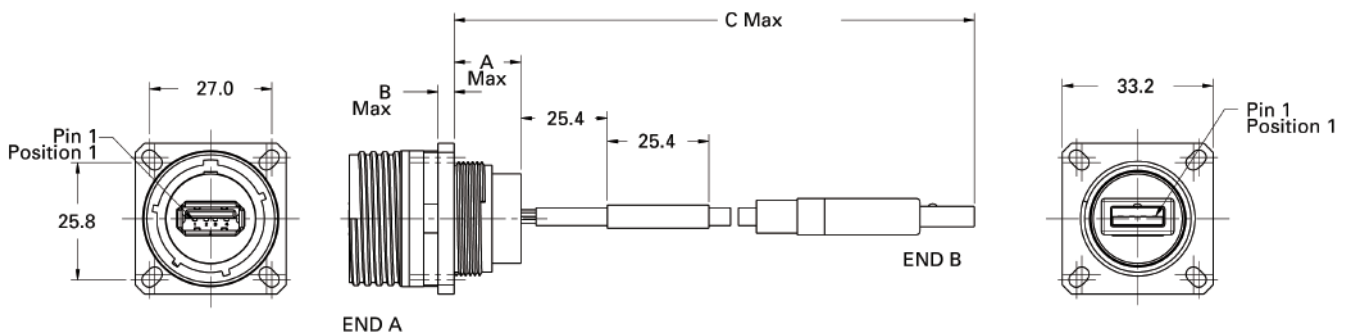


# 8D Series with RJ45 USB



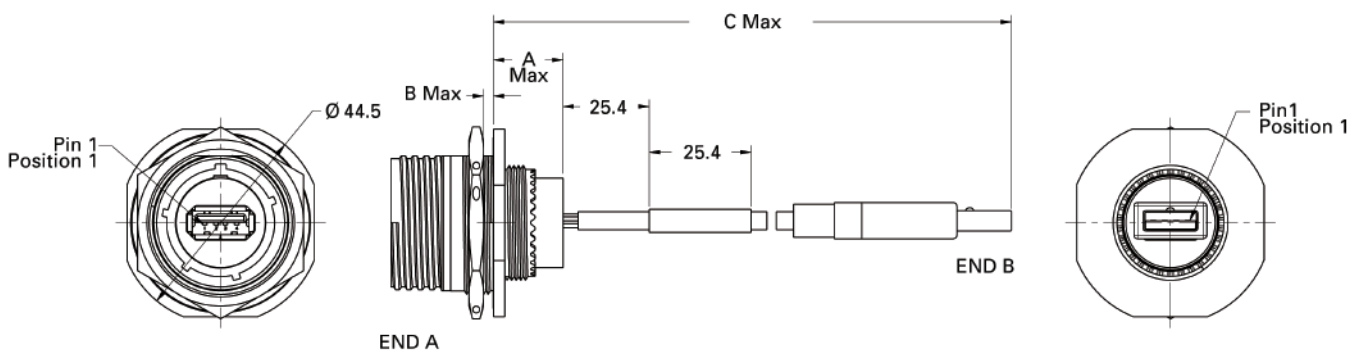
## USB Pigtail serie

### 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 |

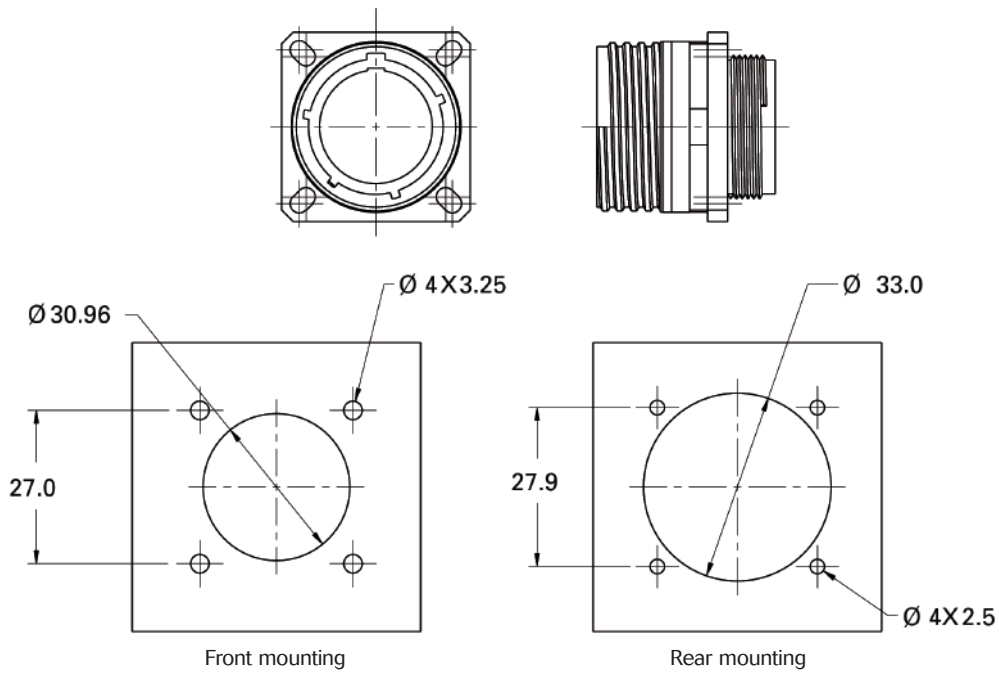


# 8D Series with RJ45 USB

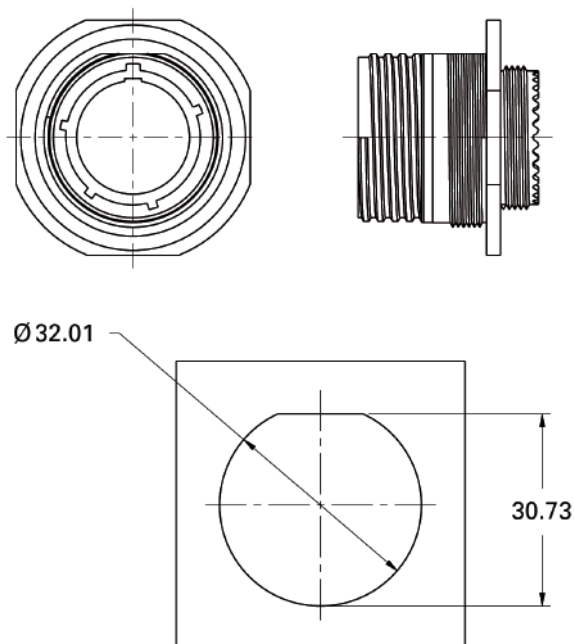


## Panel cut out for USB serie

### 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**

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

**35**

| 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 |

**98**

| 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  |

**99**

| 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**

| 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 |

**04**

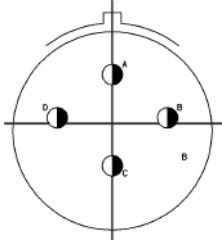
| Contact | Coordinates |       |
|---------|-------------|-------|
|         | X           | Y     |
| A       | +1.65       | +1.65 |
| B       | +1.65       | -1.65 |
| C       | -1.65       | -1.65 |
| D       | -1.65       | +1.65 |

# Coordinates for straight spill terminations



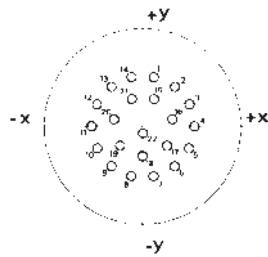
13

04



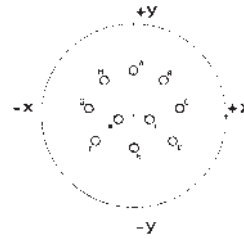
| Contact | Coordinates |       |
|---------|-------------|-------|
|         | X           | Y     |
| A       | 0.00        | +3.81 |
| B       | +3.71       | +0.89 |
| C       | 0.00        | -2.11 |
| D       | -3.71       | -0.89 |

35



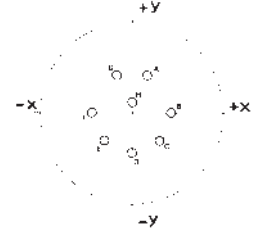
| Contact | Coordinates |       |
|---------|-------------|-------|
|         | X           | Y     |
| 1       | +1.14       | +5.00 |
| 2       | +3.20       | +4.01 |
| 3       | +4.62       | +2.24 |
| 4       | +5.15       | 0.00  |
| 5       | +4.62       | -2.24 |
| 6       | +3.20       | -4.01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

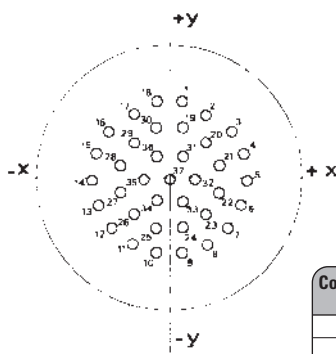
08



| 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

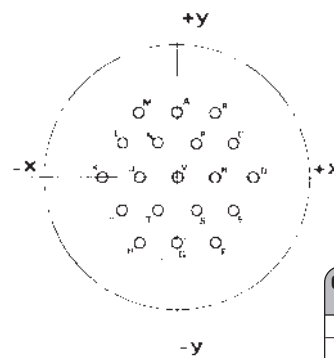
35



| 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



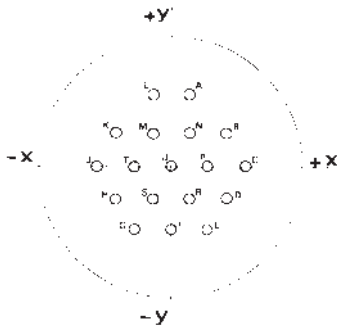
| Contact | Coordinates |       |
|---------|-------------|-------|
|         | X           | Y     |
| A       | 0.00        | +5.72 |
| B       | +3.30       | +5.72 |
| C       | +4.95       | +2.72 |
| D       | +6.60       | 0.00  |
| E       | +4.95       | -2.87 |
| F       | +3.30       | -5.72 |
| 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



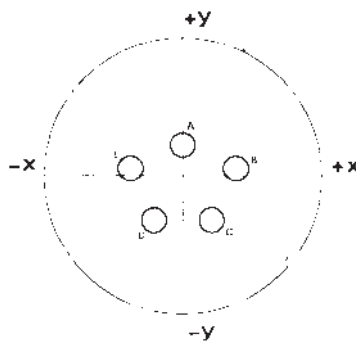
15

18



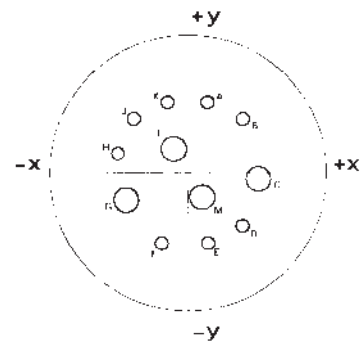
| Contact | Coordinates |       | Contact | Coordinates |       |
|---------|-------------|-------|---------|-------------|-------|
|         | X           | Y     |         | X           | Y     |
| A       | +1.65       | +6.40 | K       | -4.95       | +2.87 |
| B       | +4.95       | +2.87 | L       | -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 |

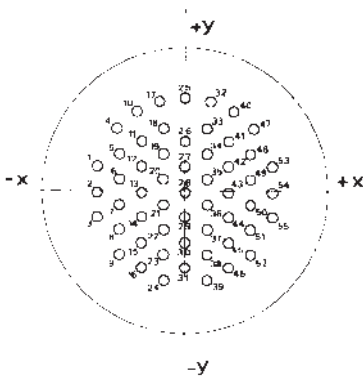
97



| 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 |

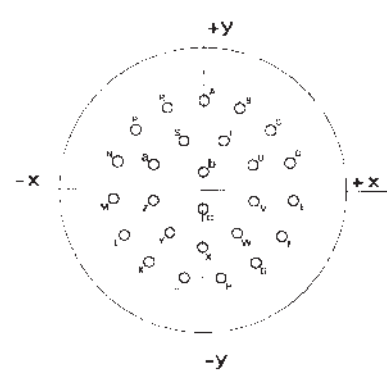
17

35



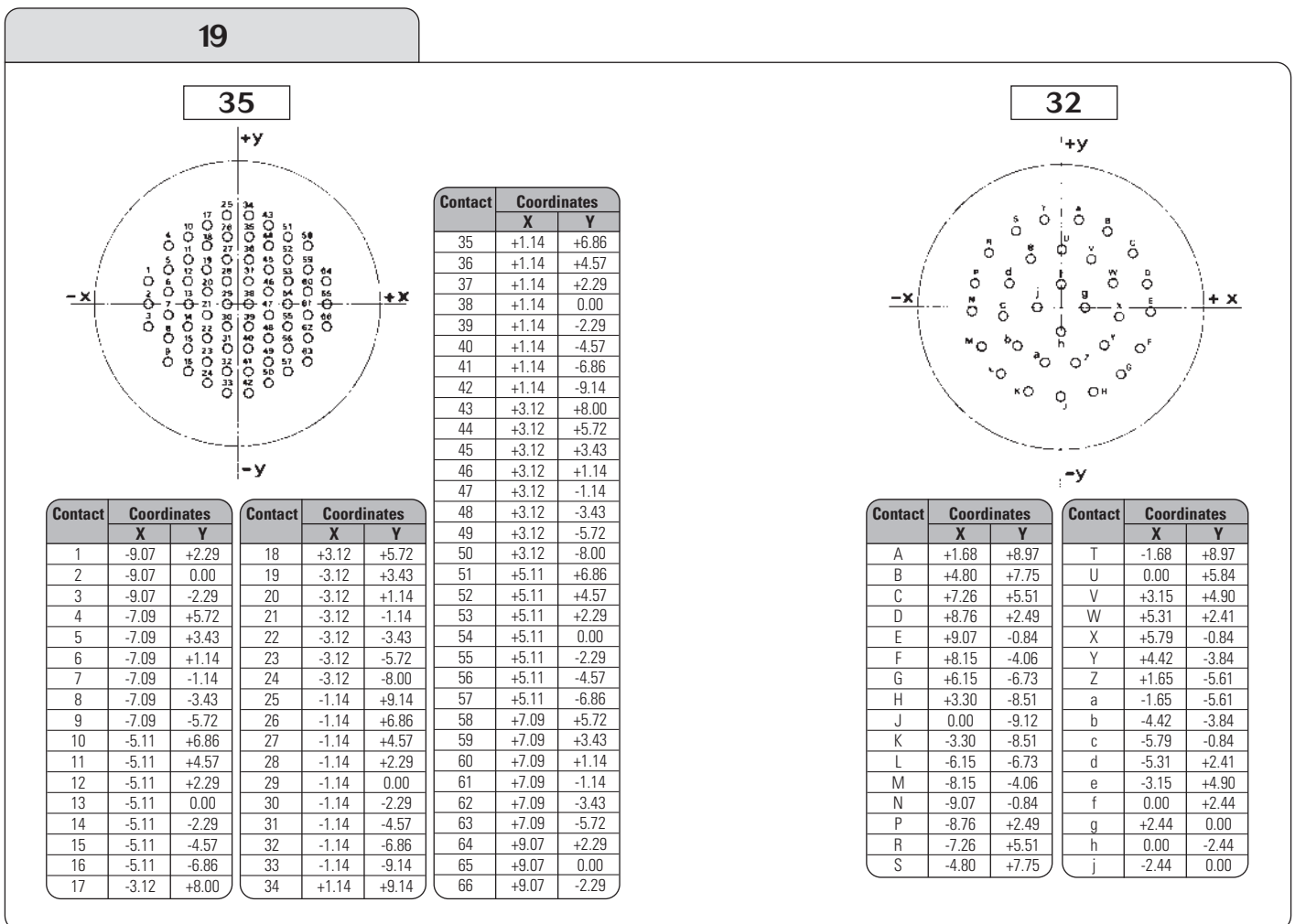
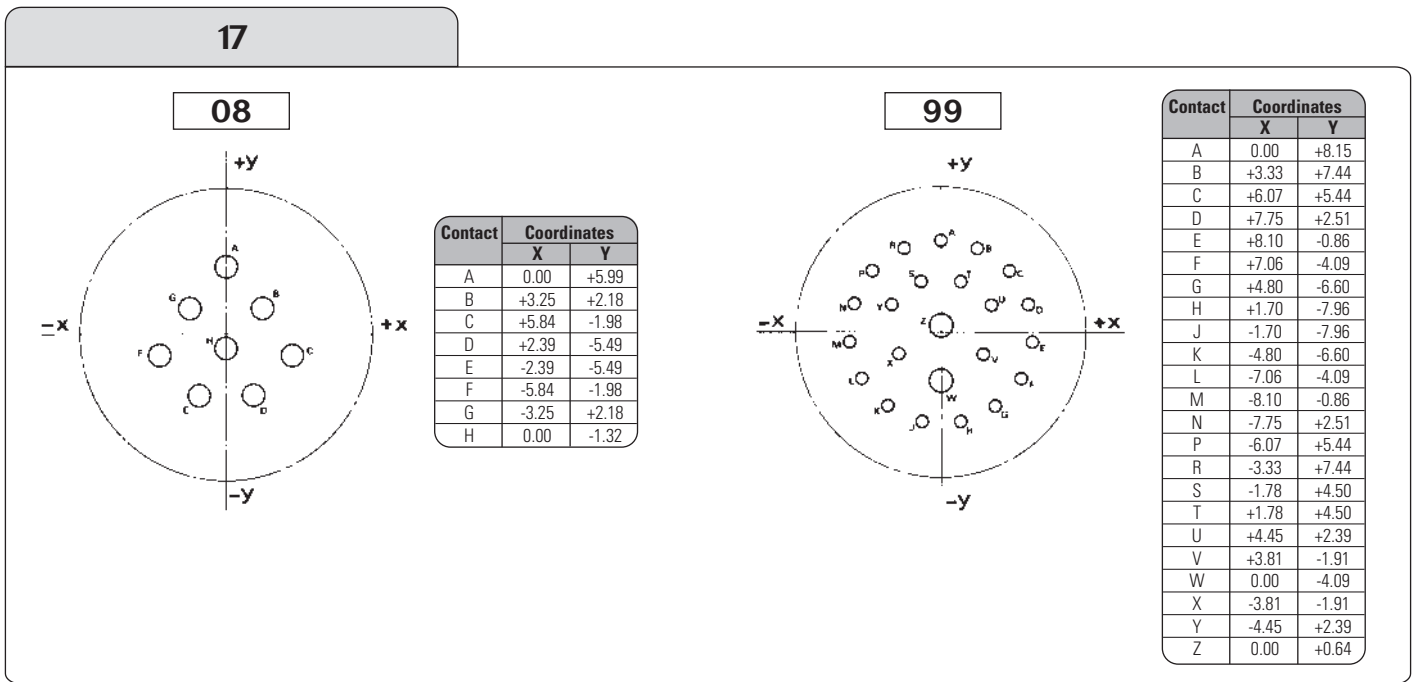
| Contact | Coordinates |       | Contact | Coordinates |       |
|---------|-------------|-------|---------|-------------|-------|
|         | X           | Y     |         | X           | Y     |
| 1       | -7.92       | +2.18 | 14      | -3.96       | -2.39 |
| 2       | -7.92       | -0.10 | 15      | -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 |
| 27      | 0.00        | +2.18 | 40      | +4.37       | +7.09 |
| 28      | 0.00        | -0.10 | 41      | +3.96       | +4.47 |
| 29      | 0.00        | -2.39 | 42      | +3.96       | +2.18 |
| 30      | 0.00        | -4.67 | 43      | +3.96       | -0.10 |
| 31      | 0.00        | -6.96 | 44      | +3.96       | -2.39 |
| 32      | +2.26       | +8.03 | 45      | +3.96       | -4.67 |
| 33      | +1.98       | +5.61 | 46      | +3.96       | -6.96 |
| 34      | +1.98       | +3.33 | 47      | -6.15       | +5.61 |
| 35      | +1.98       | +1.04 | 48      | +5.94       | +3.33 |
| 36      | +1.98       | -1.24 | 49      | +5.94       | +1.04 |
| 37      | +1.98       | -3.53 | 50      | +5.94       | -1.24 |
| 38      | +1.98       | -5.82 | 51      | +5.94       | -3.53 |
| 39      | +1.98       | -8.10 | 52      | +5.94       | -5.82 |
| 40      | +4.37       | +7.09 | 53      | +7.92       | +2.18 |
| 41      | +3.96       | +4.47 | 54      | +7.92       | -0.10 |
| 42      | +3.96       | +2.18 | 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

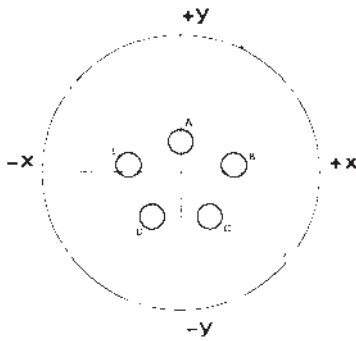


# Coordinates for straight spill terminations



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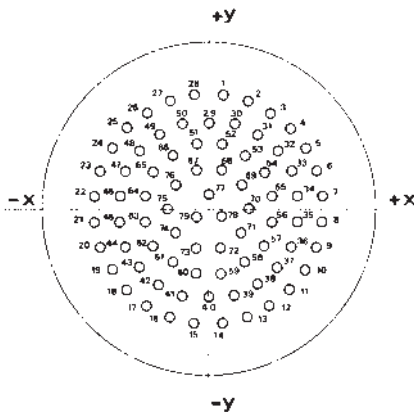
11



| 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 |

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35

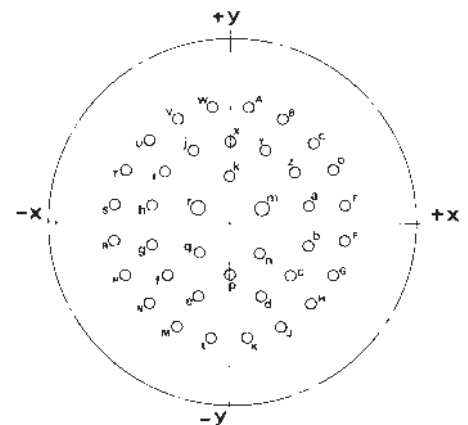


| Contact | Coordinates |       |
|---------|-------------|-------|
|         | X           | Y     |
| 41      | -2.49       | -8.18 |
| 42      | -4.67       | -7.11 |
| 43      | -6.55       | -5.59 |
| 44      | -7.90       | -3.58 |
| 45      | -8.43       | -1.22 |
| 46      | -8.43       | +1.22 |
| 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  |

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| 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 |

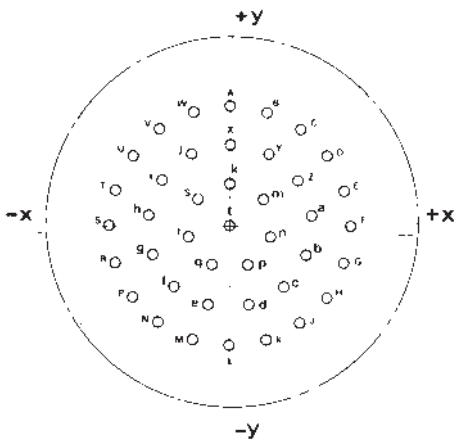
| Contact | Coordinates |       |
|---------|-------------|-------|
|         | X           | Y     |
| X       | 0.00        | +7.49 |
| Y       | +3.20       | +6.50 |
| Z       | +5.89       | +4.55 |
| a       | +7.11       | +1.45 |
| b       | +7.11       | -1.88 |
| c       | +5.51       | -4.80 |
| 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



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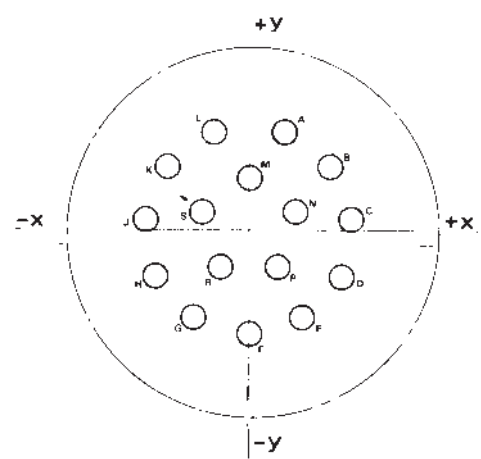


| Contact | Coordinates |        |
|---------|-------------|--------|
|         | X           | Y      |
| T       | -10.09      | +3.28  |
| U       | -8.58       | +6.23  |
| V       | -6.23       | +8.58  |
| W       | -3.28       | +10.09 |
| X       | 0.00        | +7.20  |
| Y       | +3.35       | +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   |

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| 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  |

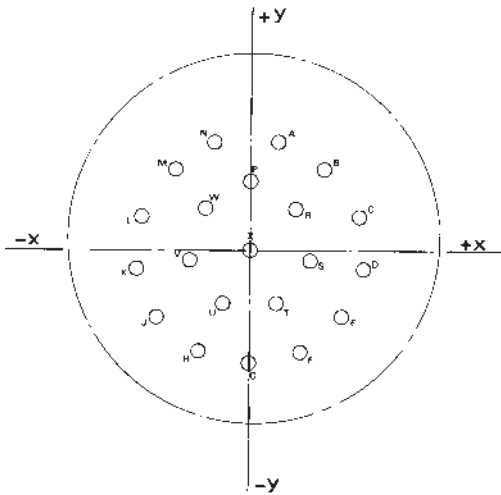
| Contact | Coordinates |       |
|---------|-------------|-------|
|         | X           | Y     |
| J       | -8.66       | +0.91 |
| K       | -6.88       | +5.36 |
| L       | -3.00       | +8.18 |
| M       | 0.00        | +4.45 |
| N       | +3.91       | +1.57 |
| P       | +2.39       | -3.10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

# Coordinates for straight spill terminations



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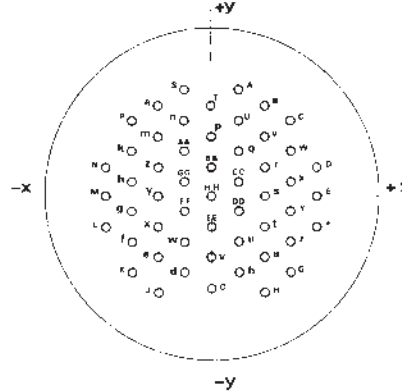
21



| 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  |

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| 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   |

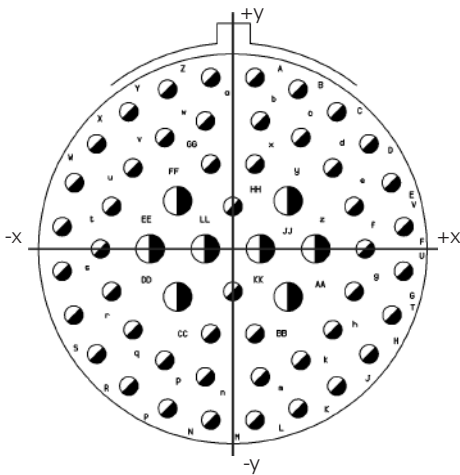


# Coordinates for straight spill terminations



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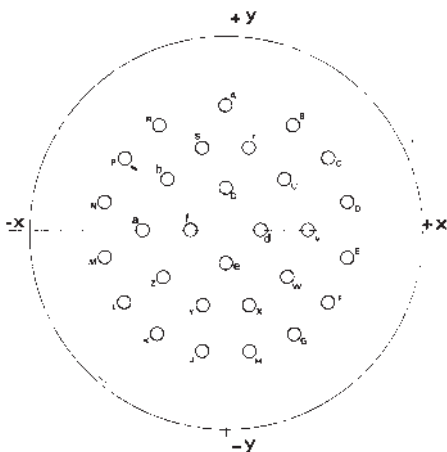


| Contact | Coordinates |        |
|---------|-------------|--------|
|         | X           | Y      |
| A       | +1.75       | +13.49 |
| B       | +5.49       | +12.57 |
| C       | +8.23       | +10.80 |
| D       | +10.77      | +8.28  |
| E       | +12.52      | +5.21  |
| F       | +13.49      | +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  |

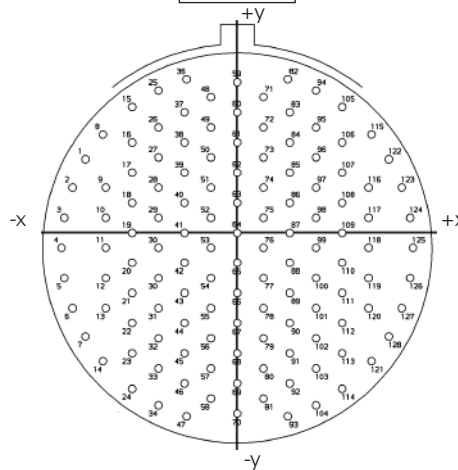
29



| 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 |

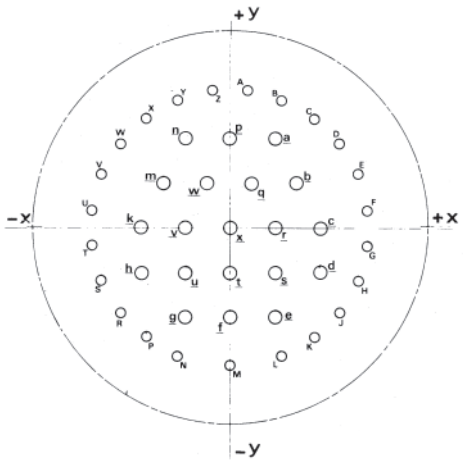
| Contact | Coordinates |        |
|---------|-------------|--------|
|         | X           | Y      |
| a       | -1.73       | +11.53 |
| b       | +1.73       | +11.53 |
| c       | +4.39       | +9.22  |
| d       | +7.24       | +7.19  |
| e       | +9.19       | +4.45  |
| f       | +10.13      | +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



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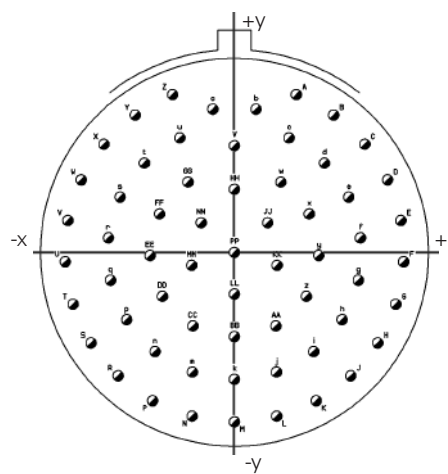
43



| 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  |

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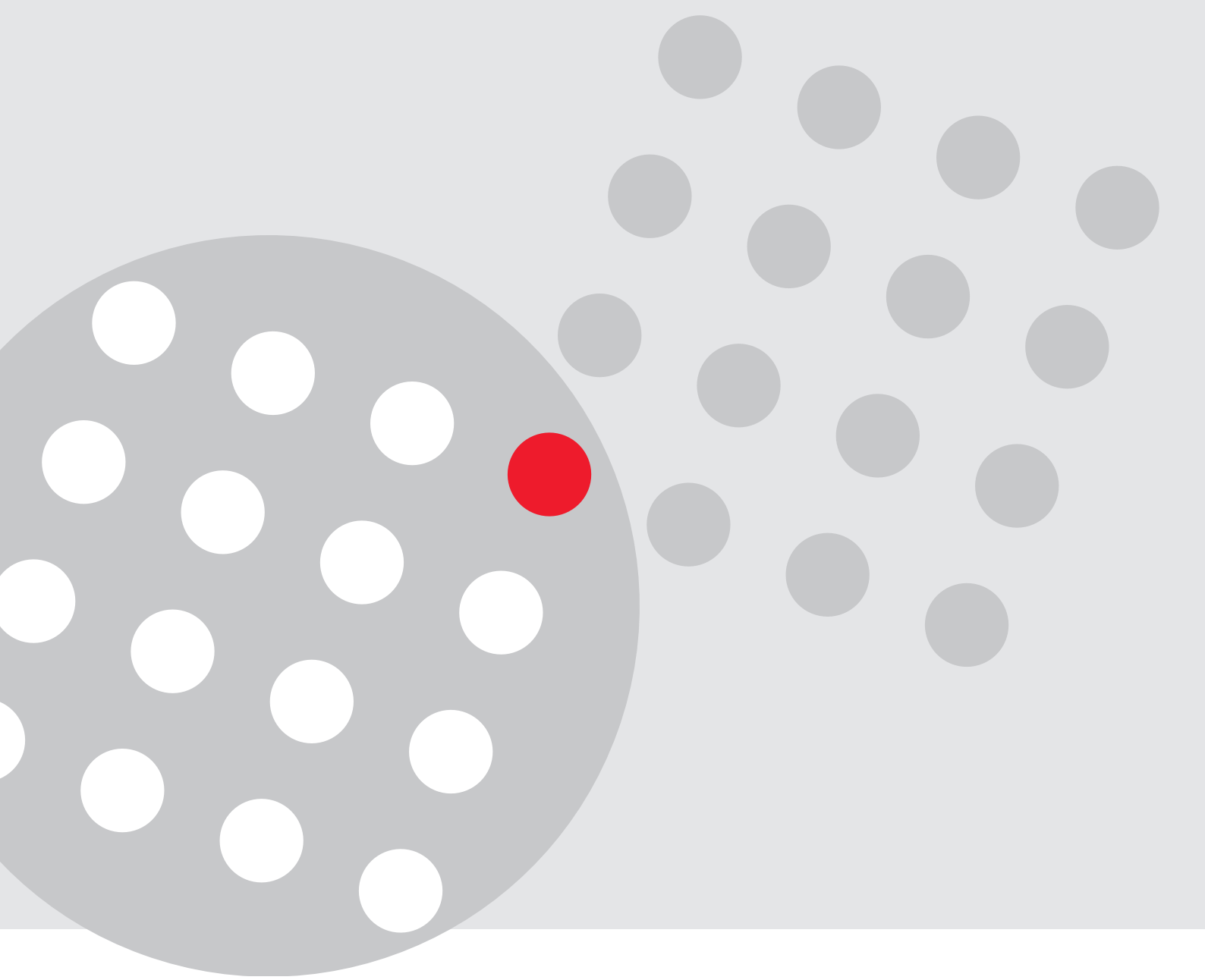
| Contact | Coordinates |        |
|---------|-------------|--------|
|         | X           | Y      |
| A       | +4.98       | +12.70 |
| B       | +7.98       | +11.05 |
| C       | +10.49      | +8.71  |
| D       | +12.32      | +5.84  |
| E       | +13.39      | +2.57  |
| F       | +13.61      | -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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