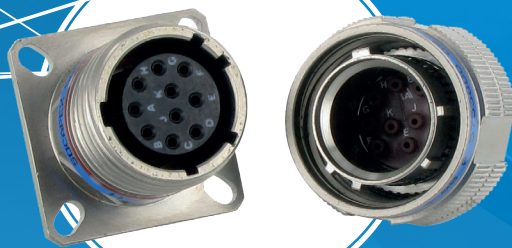


# MIL-DTL-38999 Series III EN3645 TV-CTV



NOTES

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## ABOUT US



## ABOUT AMPHENOL SOCAPEX

**Amphenol**  
**Socapex**

For over 65 years, **Amphenol Socapex** has been providing rugged and reliable connectors and interconnect solutions to a large base of customers worldwide in the military, aerospace and industrial markets.

Our products and solutions, designed for rugged and unique situations involving extreme conditions, provide the innovativeness and flexibility essential to meet the needs and requirements of these demanding sectors.

Headquartered in the Technic Valley between Geneva and Mont-Blanc, **Amphenol Socapex** has 30,000 m<sup>2</sup> of manufacturing capacity. Our in-house molding, machining, screw machining & assembly capabilities within our 2 facilities in France & India give us the ability to manage all types of volume with consistent quality.

More info on [www.amphenol-socapex.com](http://www.amphenol-socapex.com)

**Amphenol Socapex is part of Amphenol Group.**



Thyez (74), France



Manufacturing site in Pune, India

## ABOUT AMPHENOL

**Amphenol**

Founded in 1932, **Amphenol** is one of the largest manufacturers of interconnect products in the world. The company designs, manufactures, and markets electrical, electronic, and fiber optic connectors, interconnect systems, and coaxial and specialty cables.

**Amphenol** products are engineered and manufactured in the Americas, Europe, Asia and Africa and sold by a worldwide sales and marketing organization.

**Amphenol** has a diversified presence as a leader in high growth areas of the interconnect industry and provides solutions for customers in the automotive, broadband, industrial, information technology and data communications, military and aerospace, mobile devices, and mobile networks markets.

More info on [www.amphenol.com](http://www.amphenol.com)

## AMPHENOL SOCAPEX QUALITY &amp; ENVIRONMENTAL CERTIFICATION



Certified Management System



Certified Management System



Certified Management System



Certified Management System

## CONNECTOR RANGE &amp; ACCESSORIES

## STANDARD

TV METALLIC SHELLS



CTV COMPOSITE SHELLS



## RANGE DERIVATED

REDUCED FLANGE



STAND OFF RECEPTACLE



TVS-Y/TVS-YN HERMETIC



BREAKAWAY CONNECTORS



THRU-BULKHEAD RECEPTACLES



RECEPTACLES WITH ENHANCED SEALING



INTEGRATED BACKSHELLS

MIL-DTL-38999  
OPTICAL  
CONNECTORS

TVOP



STARTOP



## ACCESSORIES

BACKSHELLS



PROTECTIVE CAPS



## TECHNICAL CHARACTERISTICS

## GENERAL CHARACTERISTICS

## TV-CTV CONNECTORS (MIL-DTL-38999 SERIES III/EN3645)

- MIL-DTL-38999 series III connectors
- EN3645 connectors
- Dedicated to harsh environment applications
- 9 shell sizes (from 09 to 25)
- Thread coupling
- 100% scoop-proof
- More than 80 contact arrangements
- Intermountable with MIL-DTL-38999 series I



## AMPHENOL ADDED VALUE

Amphenol goes further the European and American standards by offering an extended range with:

- Inserts compatible with quadrax
- Grounded connectors with conductive insert for specific use
- Receptacles with reinforced sealing
- Hermetic version in Y & N classes
- High density inserts (with size 23 contacts)
- Filtered versions using tubular or planar technology

## MAIN FEATURES

## SHELL MATERIAL AND PLATING:

- |                   |                                                                                                       |
|-------------------|-------------------------------------------------------------------------------------------------------|
| • Aluminium       | Standard material                                                                                     |
| • Composite       | Lightweight solution up to 70%weight saving<br>Corrosion resistant up to 2000H of salt spray exposure |
| • Stainless steel | Firewall capability                                                                                   |
| • Marine bronze   | High corrosion resistance<br>Robustness for marine applications                                       |

## PLATING:

- Olive drab cadmium
- Nickel
- Passivation
- Black zinc nickel

## CONTACTS

- Standard contacts plated with a minimum of 1.27µm gold
- Size 00, 4, 8, 10, 12, 16, 20, 22D, 23
- Signal, power, twinax, coax, quadrax and optical termini

**Contact protection:** interfacial seal ensures sealing around each contact and prevents electrolytic erosion



## OTHERS

## Quick coupling

- Mate and self-lock in a 360° turn of the coupling nut
- Anti-decoupling device for high vibration performance

## EMI/RFI protection:

- Shell to shell bottoming
- Grounding fingers on the plug shell

## APPLICATIONS

## Military and aeronautic applications:

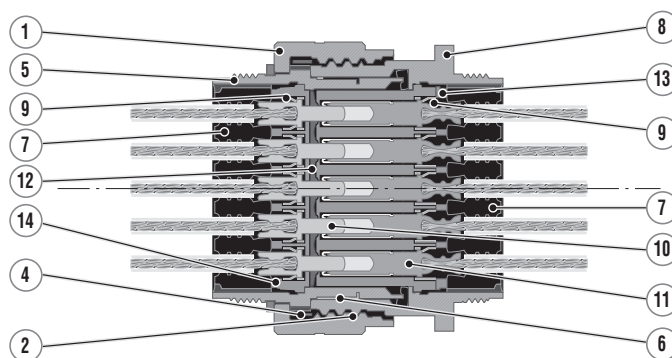
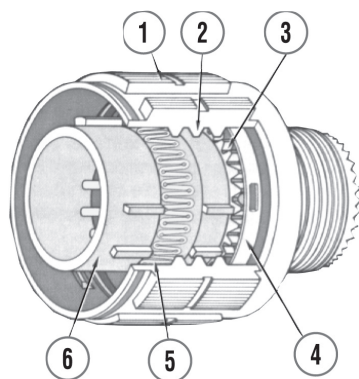
battlefield, ground vehicles, aircrafts, communication systems...

## Advanced industrial applications:

high vibration requirements, high density

## TECHNICAL CHARACTERISTICS

## MECHANICAL CHARACTERISTICS



- 1 Coupling nut
- 2 Quick coupling thread
- 3 Ratchet
- 4 Anti decoupling device
- 5 Plug shell
- 6 Spring fingers (EMI)
- 7 Grommet

- 8 Receptacle shell
- 9 Contact retention clips
- 10 Crimping pin contact
- 11 Crimping socket contact
- 12 Interfacial seal
- 13 Socket insert
- 14 Pin insert

- Thermoplastic insert
- Silicone rubber back insert and interfacial seal
- **Durability:** - 500 cycles  
- 1500 cycles with composite connector " CTV " fitted with " H " and " J " contact types
- **Shocks:** half sine wave of 300 G magnitude during 3ms per EIA364.27
- **Sine vibrations:** - 60 g from - 55°C to + 175°C (olive drab cadmium finish)  
- 60 g from - 55°C to +200°C (nickel finish and firewall version)
- **Random vibrations per EIA364.28:** - 1 G<sup>2</sup> / Hz at 175°C olive drab cadmium finish  
- 1G<sup>2</sup> / Hz at 200°C nickel finish and firewall version  
- 5G<sup>2</sup> / Hz at ambient
- **Bending moment**

| Shell size               |          | Bending moment<br>Nm |
|--------------------------|----------|----------------------|
| MIL-DTL-38999 Series III | Amphenol |                      |
| A                        | 09       | 11.3                 |
| B                        | 11       | 33.9                 |
| C                        | 13       | 45.2                 |
| D                        | 15       | 56.5                 |
| E                        | 17       | 67.8                 |
| F                        | 19       | 79.1                 |
| G                        | 21       | 90.4                 |
| H                        | 23       | 101.7                |
| J                        | 25       | 113.0                |

## • Contact retention force

| Contact Size     | 23 | 22D | 20 | 16  | 12  | 8   | 4   |
|------------------|----|-----|----|-----|-----|-----|-----|
| Maximum load (N) | 44 | 44  | 67 | 111 | 111 | 111 | 150 |

## TECHNICAL CHARACTERISTICS

## ENVIRONMENTAL CHARACTERISTICS

## • Salt spray exposure and working temperature:

## • Waterproof shells

| Shell material  | Shell finish                                                                                     | Salt spray exposure per EIA364.26    | Class norm            | Amphenol                                         | Operating temperature |         | Shell to shell Conductivity |
|-----------------|--------------------------------------------------------------------------------------------------|--------------------------------------|-----------------------|--------------------------------------------------|-----------------------|---------|-----------------------------|
|                 |                                                                                                  |                                      |                       |                                                  | mini                  | maxi    |                             |
| Composite       | Electroless Nickel<br>O.D cadmium                                                                | 2000 H<br>2000 H                     | M<br>J                | CTV-RF<br>CTV-RW                                 | -65°C                 | +200°C* | 3mΩ                         |
|                 |                                                                                                  |                                      |                       |                                                  | -65°C                 | +175°C  | 3mΩ                         |
| Aluminium       | Electroless Nickel<br>O.D cadmium<br>Duralon (Ni-PTFE)<br>Green Zinc Cobalt<br>Black Zinc Nickel | 48 H<br>500 H<br>500H<br>96H<br>500H | F<br>W<br>T<br>-<br>Z | TVS-RF<br>TV-RW<br>TV-DT<br>TV-RZ<br>TV-ZN TV-DZ | -65°C                 | +200°C* | 1mΩ                         |
|                 |                                                                                                  |                                      |                       |                                                  | -65°C                 | +175°C  | 2.5mΩ                       |
|                 |                                                                                                  |                                      |                       |                                                  | -65°C                 | +175°C  | 2.5mΩ                       |
|                 |                                                                                                  |                                      |                       |                                                  | -65°C                 | +175°C  | 3mΩ                         |
|                 |                                                                                                  |                                      |                       |                                                  | -65°C                 | +175°C  | 2.5mΩ                       |
| Stainless steel | Nickel<br>—                                                                                      | 500 H<br>500 H                       | S<br>K                | TVS-RS<br>TVS-RK                                 | -65°C                 | +200°C* | 1mΩ                         |
|                 |                                                                                                  |                                      |                       |                                                  | -65°C                 | +200°C* | 10mΩ                        |
| Bronze          | —                                                                                                | 500 H                                |                       | TVS-RB                                           | -65°C                 | +200°C* | 5mΩ                         |

## • Hermetic shells

| Shell materiel  | Shell finish | Salt spray exposure per EIA364.26 | Class norm | Amphenol        | Operating temperature |         |
|-----------------|--------------|-----------------------------------|------------|-----------------|-----------------------|---------|
|                 |              |                                   |            |                 | min                   | max     |
| Stainless steel | Nickel<br>-  | 48 H<br>500 H                     | N<br>Y     | TVS-YN<br>TVS-Y | -65°C                 | +200°C* |
|                 |              |                                   |            |                 | -65°C                 | +200°C* |

\* 175°C maxi only for high-density contact arrangements

• **Humidity:** per MIL-DTL-38999: § 3.29

• **Altitude immersion:** according to MIL-DTL-38999 III standard (except hermetics)

• **Air leakage** < 1.10<sup>-7</sup> cm<sup>3</sup>/s under 1 bar of differential pressure (hermetics only)

## • Fluid immersion per EIA364.10:

- Hydraulic fluid, per MIL-H-5606
- Turbine fluid, grade JP-8, per MIL-DTL-83133 (NATO TYPE 34)
- Lubricating oil, per MIL-L-7808
- Lubricating oil, per MIL-PRF-23699
- Defrosting fluid, per MIL-A-8243
- Cleaning compound, diluted for cleaning, per MIL-PRF-87937 type I alkaline base

- Gasoline, per ASTM-D-4814
- Gasohol, per A-A-52530
- One part isopropyl alcohol, per TT-I-735, grade A or B ; and 3 parts mineral spirits, per A-A-2904, type II, grade A or P-D-680, type I, by volume
- Coolant, dielectric fluid, synthetic silicate ester base MIL-PRF-47220 (Coolanol 25) or equivalent
- Hydraulic fluid M2-V Chevron oil ST0145LB0001 or equivalent

# TECHNICAL CHARACTERISTICS ELECTRICAL CHARACTERISTICS

## • Contact rating - nominal current per contact

| Contact size | 23 *1 | 22 D | 20  | 16 | 12  | 8   | 4    | 00  |
|--------------|-------|------|-----|----|-----|-----|------|-----|
| Crimp (A)    | 5     | 5    | 7.5 | 13 | 23  | 60  | 100  | 230 |
| Hermetic (A) | 3     | 3    | 5   | 10 | 17  | -   | -    | -   |
| PC Tail (A)  | 3     | 3    | 4.5 | 10 | 17  | 40  | -    | -   |
| Resistance   | 15    | 8    | 4.7 | 2  | 1.1 | 0.6 | 0.26 | -   |

## • Contact resistance

| Contact Size    | 23 *1 | 22D | 20  | 16 | 12  | 8   | 4    |
|-----------------|-------|-----|-----|----|-----|-----|------|
| Resistance (mΩ) | 15    | 8   | 4.7 | 2  | 1.1 | 0.6 | 0.26 |

- Insulation resistance
  - at ambient > 5.10<sup>3</sup> Mohms
  - at maximum temperature > 10<sup>3</sup> Mohms

## • Service rating

| Service | Dielectric withstanding voltage (Vrms) |         |              |         |              |         |              |         | Working voltage |      |
|---------|----------------------------------------|---------|--------------|---------|--------------|---------|--------------|---------|-----------------|------|
|         | At sea level                           |         | 15000 meters |         | 21000 meters |         | 34000 meters |         |                 |      |
|         | mated                                  | unmated | mated        | unmated | mated        | unmated | mated        | unmated | Vrms            | Vdc  |
| M       | 1300                                   | 1300    | 800          | 550     | 800          | 350     | 800          | 200     | 400             | 550  |
| I       | 1800                                   | 1800    | 1000         | 600     | 1000         | 400     | 1000         | 200     | 600             | 850  |
| II      | 2300                                   | 2300    | 1000         | 800     | 1000         | 500     | 1000         | 200     | 900             | 1250 |

## • Dimensions of acceptable contacts and cables

| Contact Size | Contact Diameter mm | Crimp barrel |          | Acceptable cables          |      |      |       |                       |         |      |
|--------------|---------------------|--------------|----------|----------------------------|------|------|-------|-----------------------|---------|------|
|              |                     | Diameter mm  | Depth mm | Gauge AWG<br>Section mm²   |      |      |       | Outside diameter (mm) |         |      |
|              |                     |              |          |                            |      |      |       | Min                   | Average | Max  |
| 23 *1        | 0,68                | 0,88 ± 0,03  | 3,81     | 22                         | 24   | 26   | 28    | -                     | -       | 1.2  |
|              |                     |              |          | 0.38                       | 0.22 | 0.15 | 0.095 |                       |         |      |
| 22D          | 0.76                | 0.88 ± 0.03  | 3.58     | 22                         | 24   | 26   | 28    | 0.76                  | 1.20    | 1.37 |
|              |                     |              |          | 0.38                       | 0.22 | 0.15 | 0.095 |                       |         |      |
| 20           | 1                   | 1.19 ± 0.03  | 5.30     | 20                         | 22   | 24   | -     | 1.02                  | 1.83    | 2.11 |
|              |                     |              |          | 0.60                       | 0.38 | 0.22 | -     |                       |         |      |
| 16           | 1.57                | 1.70 ± 0.03  | 5.30     | 16                         | 18   | 20   | -     | 1.68                  | 2.41    | 2.77 |
|              |                     |              |          | 1.34                       | 0.93 | 0.60 | -     |                       |         |      |
| 12           | 2.36                | 2.54 ± 0.06  | 10       | 12                         | 14   | -    | -     | 2.46                  | 3.20    | 3.61 |
|              |                     |              |          | 3.30                       | 1.94 | -    | -     |                       |         |      |
| 8            | 3.60                | 4.6 ± 0.05   | 10       | 8                          |      |      |       | 4.50                  | -       | 5.2  |
|              |                     |              |          | 8.98 Max acceptable: 10mm² |      |      |       |                       |         |      |
| 4            | 5.70                | 7.4 ± 0.05   | 12       | 4                          |      |      |       | 7.73                  | -       | 8.4  |
|              |                     |              |          | 21.10                      |      |      |       |                       |         |      |

\*1 High-Density arrangements

## TECHNICAL CHARACTERISTICS

## INSERT ARRANGEMENTS

| Contact Size        | 23<br>(high density) | 22D | 20 | 16 | 12 | 8 | 4 |
|---------------------|----------------------|-----|----|----|----|---|---|
| Caption             |                      |     |    |    |    |   |   |
| Available:          |                      |     |    |    |    |   |   |
| Coax                | -                    | -   | -  | ✓  | ✓  | ✓ | - |
| Differential Twinax | -                    | -   | -  | -  | -  | ✓ | - |
| Quadax              | -                    | -   | -  | -  | -  | ✓ | - |
| Power contacts      | -                    | -   | -  | ✓  | ✓  | ✓ | ✓ |
| Grounded cavity     | -                    | -   | -  | ✓  | ✓  | ✓ | - |

Front face of male insert. (Only the major keyway is illustrated)

- 1 MIL-DTL-38999 Series III / EN3645 insert arrangement reference
- 2 TV-CTV insert arrangement
- 3 Service class
- 4 Number of contacts
- 5 Contact sizes

09

|   |           |       |              |       |              |
|---|-----------|-------|--------------|-------|--------------|
|   |           |       |              |       |              |
| 1 | - / 09G01 |       | A 35 / 09N35 |       | A 98 / 09N98 |
| 2 | 09-05     | 09-09 | 09-35        | 09-94 | 09-98        |
| 3 | N/A       |       | M            | M     | I            |
| 4 | 1         | 9     | 6            | 2     | 3            |
| 5 | 8 Twinax° | 23    | 22D          | 20    | 20           |

11

|   |           |             |           |             |           |
|---|-----------|-------------|-----------|-------------|-----------|
|   |           |             |           |             |           |
| 1 | - / 11N01 | B 2 / 11N02 | - / 11N04 | B 5 / 11N05 | - / 11N12 |
| 2 | 11-01     | 11-02       | 11-04     | 11-05       | 11-12     |
| 3 |           | I           | I         | I           | II        |
| 4 | 1         | 2           | 4         | 5           | 1         |
| 5 | 8 Twinax° | 16          | 20        | 20          | 12        |

11

|   |       |              |              |             |
|---|-------|--------------|--------------|-------------|
|   |       |              |              |             |
| 1 |       | B 35 / 11N35 | B 98 / 11N98 | B99 / 11N99 |
| 2 | 11-19 | 11-35        | 11-98        | 11-99       |
| 3 |       | M            | I            | I           |
| 4 | 19    | 13           | 6            | 7           |
| 5 | 23    | 22D          | 20           | 20          |

13

|   |             |             |           |       |              |              |
|---|-------------|-------------|-----------|-------|--------------|--------------|
|   |             |             |           |       |              |              |
| 1 | C 4 / 13N04 | C 8 / 13N08 | - / 13N26 |       | C 35 / 13N35 | C 98 / 13N98 |
| 2 | 13-04       | 13-08       | 13-26     | 13-32 | 13-35        | 13-98        |
| 3 | I           | I           | M         |       | M            | I            |
| 4 | 4           | 8           | 6         | 2     | 22           | 10           |
| 5 | 16          | 20          | 22D       | 12    | 22D          | 20           |

15

|   |       |              |              |              |              |
|---|-------|--------------|--------------|--------------|--------------|
|   |       |              |              |              |              |
| 1 |       | D 05 / 15N05 | D 15 / 15N15 | D 18 / 15N18 | D 19 / 15N19 |
| 2 | 15-04 | 15-05        | 15-15        | 15-18        | 15-19        |
| 3 | I     | M            | I            | I            | I            |
| 4 | 4     | 5            | 14           | 18           | 19           |
| 5 | 12    | 16           | 20           | 20           | 20           |

## TECHNICAL CHARACTERISTICS

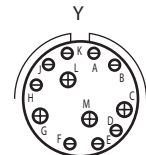
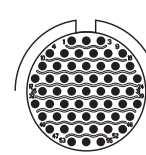
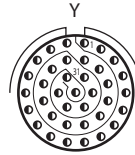
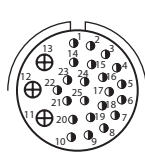
| Contact Size        | 23<br>(high density) | 22D | 20 | 16 | 12 | 8 | 4 |
|---------------------|----------------------|-----|----|----|----|---|---|
| Caption             |                      |     |    |    |    |   |   |
| Available:          |                      |     |    |    |    |   |   |
| Coax                | -                    | -   | -  | ✓  | ✓  | ✓ | - |
| Differential Twinax | -                    | -   | -  | -  | -  | ✓ | - |
| Quadrax             | -                    | -   | -  | -  | -  | ✓ | - |
| Power contacts      | -                    | -   | -  | ✓  | ✓  | ✓ | ✓ |
| Grounded cavity     | -                    | -   | -  | ✓  | ✓  | ✓ | - |

## INSERT ARRANGEMENTS

Front face of male insert. (Only the major keyway is illustrated)

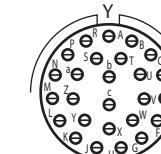
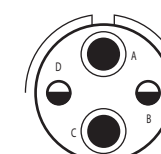
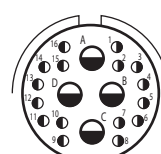
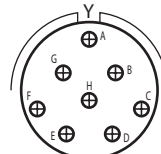
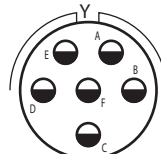
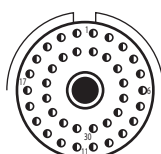
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- 2 TV-CTV insert arrangement
- 3 Service class
- 4 Number of contacts
- 5 Contact sizes

15



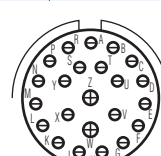
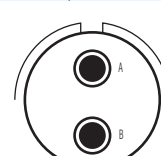
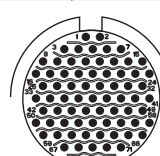
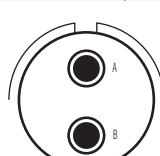
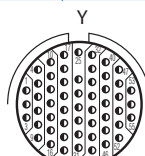
| 1 | 15-25** |    | D 35 / 15N35 |  | 15-55 |    | D 97 / 15N97 |  |
|---|---------|----|--------------|--|-------|----|--------------|--|
| 2 |         |    | 15-35        |  |       |    | 15-97        |  |
| 3 | M       |    | M            |  |       |    | I            |  |
| 4 | 22      | 3  | 37           |  | 55    | 8  | 4            |  |
| 5 | 22D     | 16 | 22D          |  | 23    | 20 | 16           |  |

17



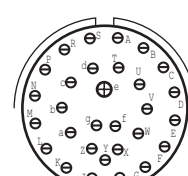
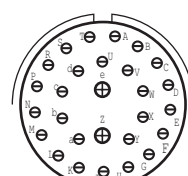
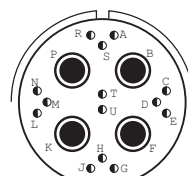
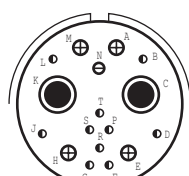
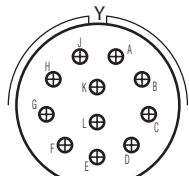
| 1 | E 2 / 17N02 |                       | E 6 / 17N06 |  | E 8 / 17N08 |  | - / 17N20 |    | - / 17N22 |                       | E 26 / 17N26 |  |
|---|-------------|-----------------------|-------------|--|-------------|--|-----------|----|-----------|-----------------------|--------------|--|
| 2 | 17-02       |                       | 17-06       |  | 17-08       |  | 17-20**   |    | 17-22     |                       | 17-26        |  |
| 3 | M           |                       | I           |  | II          |  | M         |    | M         |                       | I            |  |
| 4 | 38          | 1                     | 6           |  | 8           |  | 16        | 4  | 2         | 2                     | 26           |  |
| 5 | 22D         | 8 Twinax <sup>o</sup> | 12          |  | 16          |  | 22D       | 12 | 12 Coax   | 8 Twinax <sup>o</sup> | 20           |  |

17



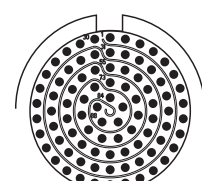
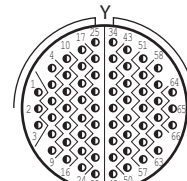
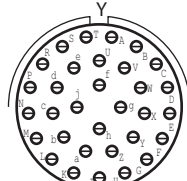
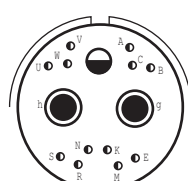
| 1 | E 35 / 17N35 |  | 17-52                                  |  | 17-73 |  | - / 17N75             |  | E 99 / 17N99 |    |
|---|--------------|--|----------------------------------------|--|-------|--|-----------------------|--|--------------|----|
| 2 | 17-35        |  |                                        |  |       |  | 17-75                 |  | 17-99        |    |
| 3 | M            |  |                                        |  |       |  | M                     |  | I            |    |
| 4 | 55           |  | 2                                      |  | 73    |  | 2                     |  | 21           | 2  |
| 5 | 22D          |  | 8 Quadrax<br>(meets 17-82 Boeing spec) |  | 23    |  | 8 Twinax <sup>o</sup> |  | 20           | 16 |

19



| 1 | F 11 / 19N11 |     | - / 19N17 |    |                       |     | F 18                  |    |       |    |       |  |
|---|--------------|-----|-----------|----|-----------------------|-----|-----------------------|----|-------|----|-------|--|
| 2 | 19-11        |     | 19-17     |    |                       |     | 19-18                 |    | 19-28 |    | 19-30 |  |
| 3 | II           |     | M         |    |                       |     | M                     |    | I     |    | I     |  |
| 4 | 11           | 10  | 1         | 4  | 2                     | 14  | 4                     | 26 | 2     | 29 | 1     |  |
| 5 | 16           | 22D | 20        | 16 | 8 Twinax <sup>a</sup> | 22D | 8 Twinax <sup>o</sup> | 20 | 16    | 20 | 16    |  |

19



| 1 | - / 19N31 |    | F 32 / 19N32 |  | F 35 / 19N35 |  | 19-88 |    |
|---|-----------|----|--------------|--|--------------|--|-------|----|
| 2 | 19-31     |    | 19-32        |  | 19-35        |  |       |    |
| 3 | M         |    | I            |  | M            |  | I     |    |
| 4 | 2         | 1  | 12           |  | 32           |  | 66    | 88 |
| 5 | 8 Coax    | 12 | 22D          |  | 20           |  | 22D   | 23 |

## TECHNICAL CHARACTERISTICS

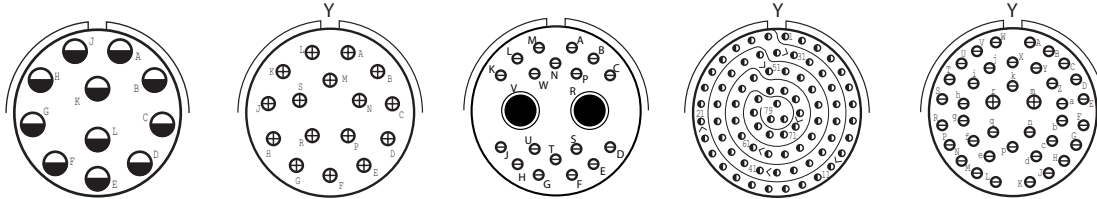
## INSERT ARRANGEMENTS

| Contact Size        | 23<br>(high density) | 22D | 20 | 16 | 12 | 8 | 4 |
|---------------------|----------------------|-----|----|----|----|---|---|
| Caption             |                      |     |    |    |    |   |   |
| Available:          |                      |     |    |    |    |   |   |
| Coax                | -                    | -   | -  | ✓  | ✓  | ✓ | - |
| Differential Twinax | -                    | -   | -  | -  | -  | ✓ | - |
| Quadrax             | -                    | -   | -  | -  | -  | ✓ | - |
| Power contacts      | -                    | -   | -  | ✓  | ✓  | ✓ | ✓ |
| Grounded cavity     | -                    | -   | -  | ✓  | ✓  | ✓ | - |

Front face of male insert. (Only the major keyway is illustrated)

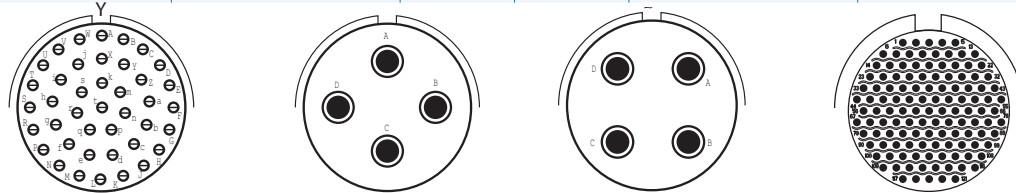
- 1 MIL-DTL-38999 Series III / EN3645 insert arrangement reference
- 2 TV-CTV insert arrangement
- 3 Service class
- 4 Number of contacts
- 5 Contact sizes

21



| 1 | G 11 / 21N11 | G 16 / 21N16 | - / 21N20 | G 35 / 21N35 | G 39 / 21N39 |
|---|--------------|--------------|-----------|--------------|--------------|
| 2 | 21-11        | 21-16        | 21-AJ     | 21-35        | 21-39        |
| 3 | I            | II           | M         | M            | I            |
| 4 | 11           | 16           | 18        | 79           | 37           |
| 5 | 12           | 16           | 20        | 8 twinax°    | 20           |

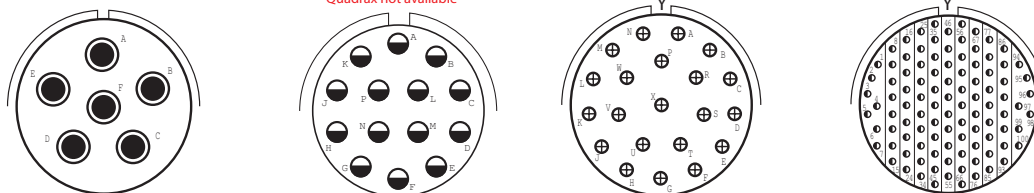
21



| 1 | G 41 / 21N41 |         | G 75 / 21N75         |        |
|---|--------------|---------|----------------------|--------|
| 2 | 21-41        | 21-48   | 21-75                | 21-121 |
| 3 | I            | M       | M                    |        |
| 4 | 41           | 4       | 4                    | 121    |
| 5 | 20           | 8 power | 8 coax or 8 twinax*° | 23     |

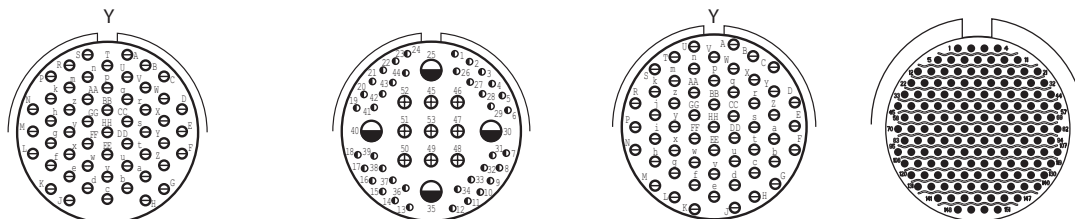
Quadrax not available

23



| 1 | - / 23N06 |       | H 21 / 23N21 | H 35 / 23N35 |
|---|-----------|-------|--------------|--------------|
| 2 | 23-06     | 23-14 | 23-21        | 23-35        |
| 3 | M         | I     | II           | M            |
| 4 | 6         | 14    | 21           | 100          |
| 5 | 8 twinax° | 12    | 16           | 22D          |

23



| 1 | H 53 / 23N53 | - / 23N54 | H 55 / 23N55 |        |
|---|--------------|-----------|--------------|--------|
| 2 | 23-53        | 23-54     | 23-55        | 23-151 |
| 3 | I            | M         | I            |        |
| 4 | 53           | 40        | 55           | 151    |
| 5 | 20           | 22D       | 20           | 23     |

## TECHNICAL CHARACTERISTICS

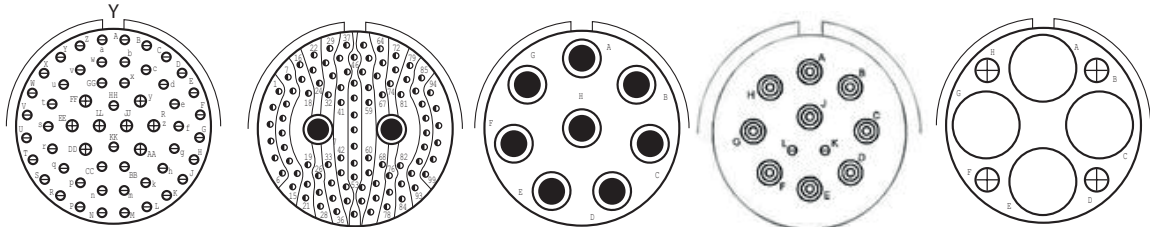
| Contact Size        | 23<br>(high density) | 22D | 20 | 16 | 12 | 8 | 4 |
|---------------------|----------------------|-----|----|----|----|---|---|
| Caption             |                      |     |    |    |    |   |   |
| Available:          |                      |     |    |    |    |   |   |
| Coax                | -                    | -   | -  | ✓  | ✓  | ✓ | - |
| Differential Twinax | -                    | -   | -  | ✓  | -  | ✓ | - |
| Quadax              | -                    | -   | -  | -  | -  | ✓ | - |
| Power contacts      | -                    | -   | -  | ✓  | ✓  | ✓ | ✓ |
| Grounded cavity     | -                    | -   | -  | ✓  | ✓  | ✓ | - |

## INSERT ARRANGEMENTS

Front face of male insert. (Only the major keyway is illustrated)

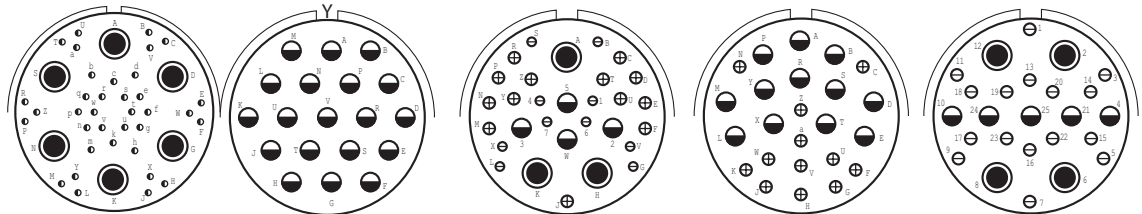
- 1 MIL-DTL-38999 Series III / EN3645 insert arrangement reference
- 2 TV-CTV insert arrangement
- 3 Service class
- 4 Number of contacts
- 5 Contact sizes

25



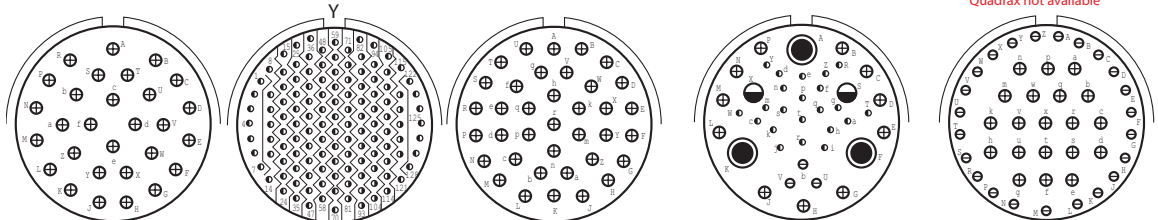
|   |             |             |             |              |       |
|---|-------------|-------------|-------------|--------------|-------|
| 1 | J 4 / 25N04 | J 7 / 25N07 | J 8 / 25N08 | J 11 / 25N11 | 25-1A |
| 2 | 25-04       | 25-07       | 25-08       | 25-11        | 25-1A |
| 3 | I           | M           | M           | N            | I     |
| 4 | 48          | 8           | 8           | 2            | 4     |
| 5 | 20          | 16          | 22D         | 10 power     | 16    |

25



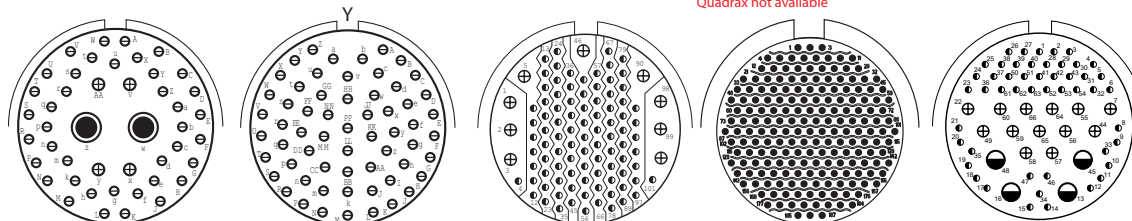
|   |           |              |              |              |           |
|---|-----------|--------------|--------------|--------------|-----------|
| 1 | - / 25L17 | J 19 / 25N19 | J 20 / 25N20 | J 24 / 25N24 | - / 25N26 |
| 2 | 25-17     | 25-19        | 25-20        | 25-24        | 25-26     |
| 3 | M         | I            | N            | I            | I         |
| 4 | 36        | 6            | 10           | 12           | 16        |
| 5 | 22D       | 8 twinax°    | 13           | 12           | 5         |

25



|   |              |              |              |       |              |
|---|--------------|--------------|--------------|-------|--------------|
| 1 | J 29 / 25N29 | J 35 / 25N35 | J 37 / 25N37 | 25-41 | J 43 / 25N43 |
| 2 | 25-29        | 25-35        | 25-37        | 25-41 | 25-43        |
| 3 | I            | M            | I            | I     | I            |
| 4 | 29           | 128          | 37           | 11    | 23           |
| 5 | 16           | 22D          | 16           | 16    | 20           |

25



|   |              |              |         |        |                        |
|---|--------------|--------------|---------|--------|------------------------|
| 1 | J 46 / 25N46 | J 61 / 25N61 | 25-92** | 25-187 | 25-F4                  |
| 2 | 25-46        | 25-61        | 25-92** | 25-187 | 25-F4                  |
| 3 | I            | I            | M       |        | Size 22D=M, Balance =I |
| 4 | 40           | 61           | 92      | 187    | 49                     |
| 5 | 20           | 20           | 22D     | 23     | 22D                    |

\* Military P/N delivered with 8 twinax and proprietary P/N delivered with size 8 coaxial contacts for RG 180 and RG 195 wire.

\*\* Not available in composite version.

Y Available in hermetic version.

○ Delivered with twinax contacts for simple braid cable (M17/1760002, AECMA Pr EN 3375 - 003, Raychem 10612, EPD44690, EPD44691).

Δ Delivered with twinax contacts for double braid cable (PAN 6421, AECMA Pr EN 3375 - 004, Raychem 10613, EPD44692, EPD44693).

## TECHNICAL CHARACTERISTICS

## INSERT ARRANGEMENTS

| Arrangements | Service Class | Total number of contacts | Number and size of contacts |     |    |    |    |         |          |         |        |                   |         | Grounded insert availability** |   | Quadrax available |
|--------------|---------------|--------------------------|-----------------------------|-----|----|----|----|---------|----------|---------|--------|-------------------|---------|--------------------------------|---|-------------------|
|              |               |                          | 23                          | 22D | 20 | 16 | 12 | 12 coax | 10 power | 8 power | 8 coax | 8 triax or twinax | 4 power | P                              | S |                   |
| 09-05*       | N/A           | 1                        |                             |     |    |    |    |         |          |         |        | 1                 |         | X                              | X | X                 |
| 09-09        |               | 9                        | 9                           |     |    |    |    |         |          |         |        |                   |         |                                |   |                   |
| 09-35        | M             | 6                        |                             | 6   |    |    |    |         |          |         |        |                   |         |                                |   |                   |
| 09-94        | M             | 2                        |                             |     | 2  |    |    |         |          |         |        |                   |         |                                |   |                   |
| 09-98        | I             | 3                        |                             |     | 3  |    |    |         |          |         |        |                   |         |                                |   |                   |
| 11-01        |               | 1                        |                             |     |    |    |    |         |          |         |        | 1                 |         |                                |   | X                 |
| 11-02        | I             | 2                        |                             |     |    | 2  |    |         |          |         |        |                   |         | X                              | X |                   |
| 11-04        | I             | 4                        |                             |     | 4  |    |    |         |          |         |        |                   |         |                                |   |                   |
| 11-05        | I             | 5                        |                             |     | 5  |    |    |         |          |         |        |                   |         |                                |   |                   |
| 11-12        | II            | 1                        |                             |     |    |    | 1  |         |          |         |        |                   |         |                                |   |                   |
| 11-19        |               | 19                       | 19                          |     |    |    |    |         |          |         |        |                   |         |                                |   |                   |
| 11-35        | M             | 13                       |                             | 13  |    |    |    |         |          |         |        |                   |         |                                |   |                   |
| 11-98        | I             | 6                        |                             |     | 6  |    |    |         |          |         |        |                   |         |                                |   |                   |
| 11-99        | I             | 7                        |                             |     | 7  |    |    |         |          |         |        |                   |         |                                |   |                   |
| 13-04        | I             | 4                        |                             |     |    | 4  |    |         |          |         |        |                   |         | X                              |   |                   |
| 13-08        | I             | 8                        |                             |     | 8  |    |    |         |          |         |        |                   |         |                                |   |                   |
| 13-26        | M             | 8                        |                             | 6   |    |    | 2  |         |          |         |        |                   |         |                                |   |                   |
| 13-32        |               | 32                       | 32                          |     |    |    |    |         |          |         |        |                   |         |                                |   |                   |
| 13-35        | M             | 22                       |                             | 22  |    |    |    |         |          |         |        |                   |         |                                |   |                   |
| 13-98        | I             | 10                       |                             |     | 10 |    |    |         |          |         |        |                   |         |                                |   |                   |
| 15-04        | I             | 4                        |                             |     |    |    | 4  |         |          |         |        |                   |         |                                |   |                   |
| 15-05        | II            | 5                        |                             |     |    | 5  |    |         |          |         |        |                   |         | X                              |   |                   |
| 15-15        | I             | 15                       |                             |     | 14 | 1  |    |         |          |         |        |                   |         |                                |   |                   |
| 15-18        | I             | 18                       |                             |     | 18 |    |    |         |          |         |        |                   |         |                                |   |                   |
| 15-19        | I             | 19                       |                             |     | 19 |    |    |         |          |         |        |                   |         |                                |   |                   |
| 15-25        | M             | 25                       |                             | 22  |    | 3  |    |         |          |         |        |                   |         |                                |   |                   |
| 15-35        | M             | 37                       |                             | 37  |    |    |    |         |          |         |        |                   |         |                                |   |                   |
| 15-55        |               | 55                       | 55                          |     |    |    |    |         |          |         |        |                   |         |                                |   |                   |
| 15-97        | I             | 12                       |                             |     | 8  | 4  |    |         |          |         |        |                   |         |                                |   |                   |
| 17-02        | M             | 39                       |                             | 38  |    |    |    |         |          |         |        | 1                 |         |                                |   | X                 |
| 17-06        | I             | 6                        |                             |     |    |    | 6  |         |          |         |        |                   |         | X                              |   |                   |
| 17-08        | II            | 8                        |                             |     |    | 8  |    |         |          |         |        |                   |         | X                              | X |                   |
| 17-20        | M             | 20                       |                             | 16  |    |    | 4  |         |          |         |        |                   |         |                                |   |                   |
| 17-22        |               | 4                        |                             |     |    |    |    | 2       |          |         |        | 2                 |         | X                              | X | X                 |
| 17-26        | I             | 26                       |                             |     | 26 |    |    |         |          |         |        |                   |         |                                |   |                   |
| 17-35        | M             | 55                       |                             | 55  |    |    |    |         |          |         |        |                   |         |                                |   |                   |
| 17-52        | I             | 2                        |                             |     |    |    |    |         |          |         |        |                   |         | X                              | X | X                 |
| 17-73        |               | 73                       | 73                          |     |    |    |    |         |          |         |        |                   |         |                                |   |                   |
| 17-75        | M             | 2                        |                             |     |    |    |    |         |          |         |        | 2                 |         |                                |   | X                 |
| 17-99        | I             | 23                       |                             |     | 21 | 2  |    |         |          |         |        |                   |         |                                |   |                   |
| 19-11        | II            | 11                       |                             |     |    | 11 |    |         |          |         |        |                   |         | X                              | X |                   |
| 19-17        | M             | 17                       |                             | 10  | 1  | 4  |    |         |          |         |        | 2                 |         |                                |   | X                 |
| 19-18        | M             | 18                       |                             | 14  |    |    |    |         |          |         |        | 4                 |         |                                |   | X                 |
| 19-28        | I             | 28                       |                             |     | 26 | 2  |    |         |          |         |        |                   |         |                                |   |                   |
| 19-30        | I             | 30                       |                             |     | 29 | 1  |    |         |          |         |        |                   |         |                                |   |                   |
| 19-31        | M             | 15                       |                             | 12  |    |    | 1  |         |          |         | 2      |                   |         |                                |   | X                 |
| 19-32        | I             | 32                       |                             |     | 32 |    |    |         |          |         |        |                   |         |                                |   |                   |
| 19-35        | M             | 66                       |                             | 66  |    |    |    |         |          |         |        |                   |         |                                |   |                   |
| 19-88        |               | 88                       | 88                          |     |    |    |    |         |          |         |        |                   |         |                                |   |                   |
| 21-11        | I             | 11                       |                             |     |    |    | 11 |         |          |         |        |                   |         |                                |   |                   |
| 21-16        | II            | 16                       |                             |     |    | 16 |    |         |          |         |        |                   |         | X                              |   |                   |
| 21-AJ        | M             | 20                       |                             |     | 18 |    |    |         |          |         |        | 2                 |         |                                |   | X                 |
| 21-35        | M             | 79                       |                             | 79  |    |    |    |         |          |         |        |                   |         |                                |   |                   |
| 21-39        | I             | 39                       |                             |     | 37 | 2  |    |         |          |         |        |                   |         |                                |   |                   |
| 21-41        | I             | 41                       |                             |     | 41 |    |    |         |          |         |        |                   |         |                                |   |                   |
| 21-48        |               | 4                        |                             |     |    |    |    |         |          | 4       |        |                   |         |                                |   |                   |
| 21-75°       | M             | 4                        |                             |     |    |    |    |         |          |         | 4      | or 4              |         | X                              | X | X                 |
| 21-121       |               | 121                      | 121                         |     |    |    |    |         |          |         |        |                   |         |                                |   |                   |

Legend:

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**High-Density arrangements**

Only grounded insert version available

Grounded version (metallic insert for use with coaxial, twinax or quadrax contacts, for receptacle only).

21-75 delivered with TWINAX contacts when ordered under the Mil P/N

For CTV: 15-25&amp; 17-20 arrangements not available

# TECHNICAL CHARACTERISTICS INSERT ARRANGEMENTS

| Arrangements | Service Class | Total number of contacts | Number and size of contacts |     |    |    |    |         |          |         |        |                   |         | Grounded insert availability** |   | QuadraX available |
|--------------|---------------|--------------------------|-----------------------------|-----|----|----|----|---------|----------|---------|--------|-------------------|---------|--------------------------------|---|-------------------|
|              |               |                          | 23                          | 22D | 20 | 16 | 12 | 12 coax | 10 power | 8 power | 8 coax | 8 triax or twinax | 4 power | P                              | S |                   |
| 23-06        | M             | 6                        |                             |     |    |    |    |         |          |         |        | 6                 |         | X                              | X | X                 |
| 23-14        | I             | 14                       |                             |     |    |    | 14 |         |          |         |        |                   |         |                                |   |                   |
| 23-21        | II            | 21                       |                             |     |    | 21 |    |         |          |         |        |                   |         | X                              | X |                   |
| 23-35        | M             | 100                      |                             | 100 |    |    |    |         |          |         |        |                   |         |                                |   |                   |
| 23-53        | I             | 53                       |                             |     | 53 |    |    |         |          |         |        |                   |         |                                |   |                   |
| 23-54        | M             | 53                       |                             | 40  |    | 9  | 4  |         |          |         |        |                   |         |                                |   |                   |
| 23-55        | I             | 55                       |                             |     | 55 |    |    |         |          |         |        |                   |         |                                |   |                   |
| 23-151       |               | 151                      | 151                         |     |    |    |    |         |          |         |        |                   |         |                                |   |                   |
| 25-04        | I             | 56                       |                             |     | 48 | 8  |    |         |          |         |        |                   |         |                                |   |                   |
| 25-07        | M             | 99                       |                             | 97  |    |    |    |         |          |         |        | 2                 |         |                                |   | X                 |
| 25-08        | M             | 8                        |                             |     |    |    |    |         |          |         |        | 8                 |         | X                              | X | X                 |
| 25-11        | N             | 11                       |                             |     | 2  |    |    |         | 9        |         |        |                   |         |                                |   |                   |
| 25-1A        |               | 8                        |                             |     |    | 4  |    |         |          |         |        |                   | 4       |                                |   |                   |
| 25-17        | M             | 42                       |                             | 36  |    |    |    |         |          |         |        | 6                 |         |                                |   | X                 |
| 25-19        | I             | 19                       |                             |     |    |    | 19 |         |          |         |        |                   |         | X                              |   |                   |
| 25-20        | N             | 30                       |                             |     | 10 | 13 |    | 4*      |          |         |        | 3                 |         |                                |   | X                 |
| 25-24        | I             | 24                       |                             |     |    | 12 | 12 |         |          |         |        |                   |         |                                |   |                   |
| 25-26        | I             | 25                       |                             |     | 16 |    | 5  |         |          |         | 4      |                   |         |                                |   |                   |
| 25-29        | I             | 29                       |                             |     |    | 29 |    |         |          |         |        |                   |         | X                              |   |                   |
| 25-35        | M             | 128                      |                             | 128 |    |    |    |         |          |         |        |                   |         |                                |   |                   |
| 25-37        | I             | 37                       |                             |     |    | 37 |    |         |          |         |        |                   |         |                                |   |                   |
| 25-41        | I             | 41                       |                             | 22  | 3  | 11 |    | 2*      |          |         |        | 3                 |         |                                |   |                   |
| 25-43        | I             | 43                       |                             |     | 23 | 20 |    |         |          |         |        |                   |         |                                |   |                   |
| 25-46        | I             | 46                       |                             |     | 40 | 4  |    |         |          |         | 2      |                   |         |                                |   | X                 |
| 25-61        | I             | 61                       |                             |     | 61 |    |    |         |          |         |        |                   |         |                                |   |                   |
| 25-92        | M             | 101                      |                             | 92  |    | 9  |    |         |          |         |        |                   |         |                                |   |                   |
| 25-187       |               | 187                      | 187                         |     |    |    |    |         |          |         |        |                   |         |                                |   |                   |
| 25-F4        | M             | 66                       |                             | 49  |    | 13 | 4  |         |          |         |        |                   |         |                                |   |                   |

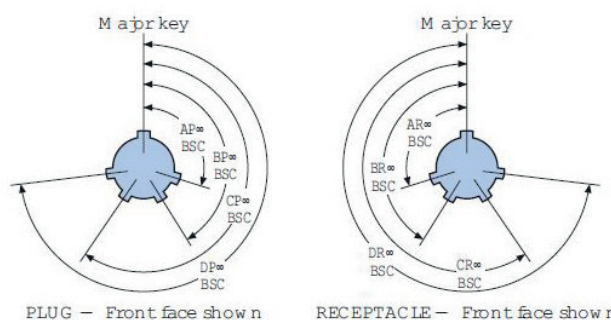
## High-Density arrangements

Legend: \*\* Grounded version (metallic insert for use with coaxial, twinax or quadraX contacts, for receptacle only).

## TECHNICAL CHARACTERISTICS CODING - POLARIZATION

To avoid cross-plugging problems in applications requiring the use of more than one MIL-DTL-38999 III connector of the same size, alternate key-rotations are available as indicated in the accompanying chart. As shown in the diagram below, the secondary keys rotate clockwise from the major one.

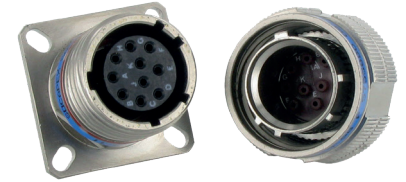
In the reference system, the polarization is shown by the letters N, A, B, C, D or E.



| Shell size | Coding identification letter | AR° or AP° BSC | BR° or BP° BSC | CR° or CP° BSC | DR° or DP° BSC |
|------------|------------------------------|----------------|----------------|----------------|----------------|
| 9          | N                            | 105            | 140            | 215            | 265            |
|            | A                            | 102            | 132            | 248            | 320            |
|            | B                            | 80             | 118            | 230            | 312            |
|            | C                            | 35             | 140            | 205            | 275            |
|            | D                            | 64             | 155            | 234            | 304            |
| 11 and 13  | E                            | 91             | 131            | 197            | 240            |
|            | N                            | 95             | 141            | 208            | 236            |
|            | A                            | 113            | 156            | 182            | 292            |
|            | B                            | 90             | 145            | 195            | 252            |
|            | C                            | 53             | 156            | 220            | 255            |
| 17 and 19  | D                            | 119            | 146            | 176            | 298            |
|            | E                            | 51             | 141            | 184            | 242            |
|            | N                            | 80             | 142            | 196            | 293            |
|            | A                            | 135            | 170            | 200            | 310            |
|            | B                            | 49             | 169            | 200            | 244            |
| 21 and 25  | C                            | 66             | 140            | 200            | 257            |
|            | D                            | 62             | 145            | 180            | 280            |
|            | E                            | 79             | 153            | 197            | 272            |
|            | N                            | 80             | 142            | 196            | 293            |
|            | A                            | 135            | 170            | 200            | 310            |
|            | B                            | 49             | 169            | 200            | 244            |
|            | C                            | 66             | 140            | 200            | 257            |
|            | D                            | 62             | 145            | 180            | 280            |
|            | E                            | 79             | 153            | 197            | 272            |

## STANDARD RANGE

## TV METALLIC SHELLS



## ALUMINIUM SHELLS

**Presentation**

Aluminium TV shell connectors are used in professional and international electronic defense programs in standard environmental conditions.

**Main characteristics**

- Material shell: Aluminium alloy.
- Shell to shell continuity: Max resistance - 1 mΩ for F class  
- 2.5 mΩ for W-Z class
- Shell to contact continuity, for grounded inserts versions: Max resistance 10 mΩ
- EMI shielding effectiveness: - 1GHz: -85 dB (Class F, W-Z)  
- 10 GHz: -65 dB (Class F); -50 dB (Class W-Z)
- Standard MIL wiring tools

## MARINE BRONZE SHELLS

**Presentation**

TVS-B bronze connectors are not defined in MIL-DTL-38999-III standard but they are based on its requirements.

TVS-B connectors conform to the European standard CECC 75.201.002. (deviation F485 to be added for plug)

This series was initially selected by the British Navy for a new generation of ships. By extension a lot of the NATO Navy choose this series as a standard of interconnection.

**Main characteristics**

- Material shell: Nickel aluminum bronze DGS 1043.
- EMI shielding effectiveness: < -65 dB from 100 MHz to 10 GHz.

## STAINLESS STEEL SHELLS

**Presentation**

Stainless steel shell connectors are used in high temperature environments and in harsh vibration conditions. They provide FIREWALL capabilities.

**Main characteristics**

- Thermosetting insert
- Shell to shell continuity: Max resistance - 10 mΩ for Class K  
- 1 mΩ for Class S
- EMI shielding effectiveness: - 1 GHz: -65 dB (Class K); -85 dB (Class S)  
- 10 GHz: -45 dB (Class K); -65 dB (Class S)

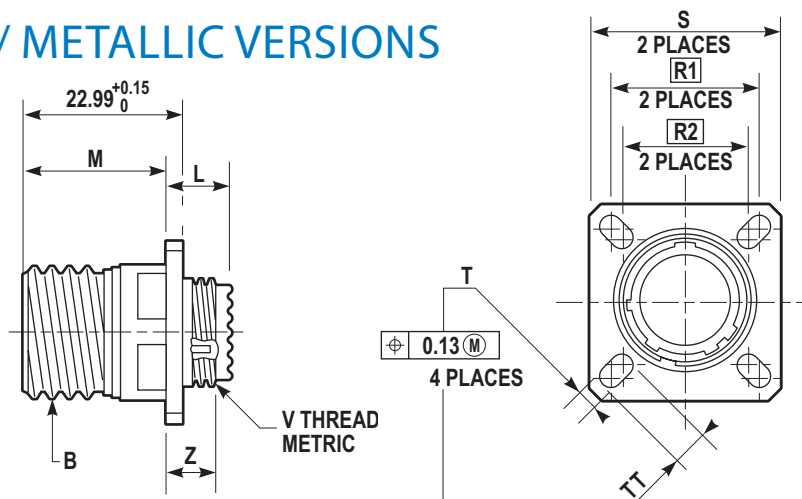
## STANDARD RANGE

## TV METALLIC SHELLS

## OVERALL DIMENSIONS / METALLIC VERSIONS

## SQUARE FLANGE RECEPTACLE

|          |             |
|----------|-------------|
| TVP00RW  | JD38999/20W |
| TVP00ZN  | JD38999/20Z |
| TVPS00RF | JD38999/20F |
| TVPS00RB |             |
| TVPS00RK | JD38999/20K |
| TVPS00RS | JD38999/20S |



| Shell size                  |          | B<br>thread<br>Class 2A<br>0.1P-0.3L-TS<br>(inches) | L<br>Max<br>(mm) | M<br>+0.00<br>-0.13<br>(mm) | R1<br>(mm) | R2<br>(mm) | S<br>±0.25<br>(mm) | T<br>+0.20<br>-0.13<br>(mm) | Z1<br>Max<br>(mm) | TT<br>+0.20<br>-0.13<br>(mm) | V thread<br>metric |
|-----------------------------|----------|-----------------------------------------------------|------------------|-----------------------------|------------|------------|--------------------|-----------------------------|-------------------|------------------------------|--------------------|
| MIL-DTL-38999<br>Series III | Amphenol |                                                     |                  |                             |            |            |                    |                             |                   |                              |                    |
| A                           | 9        | .6250                                               | 11.91            | 20.83                       | 18.26      | 15.09      | 23.83              | 3.25                        | 3.89              | 5.49                         | M12x1-6g           |
| B                           | 11       | .7500                                               | 11.91            | 20.83                       | 20.62      | 18.26      | 26.19              | 3.25                        | 3.89              | 4.93                         | M15x1-6g           |
| C                           | 13       | .8750                                               | 11.91            | 20.83                       | 23.01      | 20.62      | 28.58              | 3.25                        | 3.89              | 4.93                         | M18x1-6g           |
| D                           | 15       | 1.0000                                              | 11.91            | 20.83                       | 24.61      | 23.01      | 30.96              | 3.25                        | 3.89              | 4.93                         | M22x1-6g           |
| E                           | 17       | 1.1875                                              | 11.91            | 20.83                       | 26.97      | 24.61      | 33.32              | 3.25                        | 3.89              | 4.93                         | M25x1-6g           |
| F                           | 19       | 1.2500                                              | 11.91            | 20.83                       | 29.36      | 26.97      | 36.53              | 3.25                        | 3.89              | 4.93                         | M28x1-6g           |
| G                           | 21       | 1.3750                                              | 12.70            | 20.07                       | 31.75      | 29.36      | 39.67              | 3.25                        | 4.65              | 4.93                         | M31x1-6g           |
| H                           | 23       | 1.5000                                              | 12.70            | 20.07                       | 34.93      | 31.75      | 42.88              | 3.91                        | 4.65              | 6.15                         | M34x1-6g           |
| J                           | 25       | 1.6250                                              | 12.70            | 20.07                       | 38.10      | 34.93      | 46.02              | 3.91                        | 4.65              | 6.15                         | M37x1-6g           |

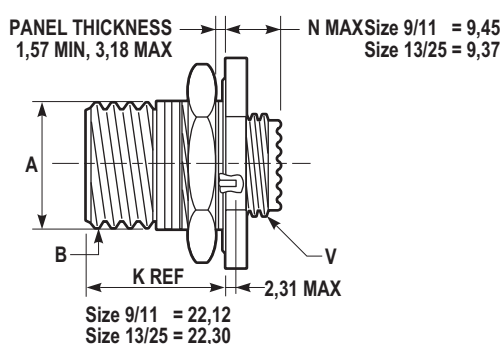
For panel drilling, see section "Printed Circuit Board Connectors"

For PCB contacts stickout, see section "Printed Circuit Board Connectors"

Maximum panel thickness for rear panel mounting:  
5mm from size 21 to 25  
5,8mm from size 9 to 19

## JAM NUT RECEPTACLE

|         |             |
|---------|-------------|
| TV07RW  | JD38999/24W |
| TV07ZN  | JD38999/24Z |
| TVS07RF | JD38999/24F |
| TVS07RB |             |
| TVS07RK | JD38999/24K |
| TVS07RS | JD38999/24S |



| Shell size                  |          | B<br>thread<br>Class 2A<br>0.1P-0.3L-TS<br>(inches) | A<br>+0.10<br>-0.15<br>(mm) | C<br>Max<br>(mm) | H Hex<br>+0.43<br>-0.41<br>(mm) | S<br>+/-0.4<br>(mm) | V thread<br>metric | Hex nut<br>max torque<br>N.m |
|-----------------------------|----------|-----------------------------------------------------|-----------------------------|------------------|---------------------------------|---------------------|--------------------|------------------------------|
| MIL-DTL-38999<br>Series III | Amphenol |                                                     |                             |                  |                                 |                     |                    |                              |
| A                           | 9        | .6250                                               | 16.53                       | 30.45            | 22.23                           | 26.97               | M12x1-6g           | 4.1                          |
| B                           | 11       | .7500                                               | 19.07                       | 35.20            | 25.40                           | 31.75               | M15x1-6g           | 5.3                          |
| C                           | 13       | .8750                                               | 23.82                       | 38.38            | 30.17                           | 34.93               | M18x1-6g           | 6.9                          |
| D                           | 15       | 1.0000                                              | 26.97                       | 41.55            | 33.32                           | 38.10               | M22x1-6g           | 8.6                          |
| E                           | 17       | 1.1875                                              | 30.15                       | 44.73            | 36.52                           | 41.28               | M25x1-6g           | 9.8                          |
| F                           | 19       | 1.2500                                              | 33.32                       | 49.50            | 39.67                           | 46.02               | M28x1-6g           | 10.9                         |
| G                           | 21       | 1.3750                                              | 36.50                       | 52.65            | 42.87                           | 49.23               | M31x1-6g           | 12.7                         |
| H                           | 23       | 1.5000                                              | 39.67                       | 55.85            | 46.02                           | 52.37               | M34x1-6g           | 13.8                         |
| J                           | 25       | 1.6250                                              | 42.85                       | 59.00            | 50.80                           | 55.58               | M37x1-6g           | 15                           |

For panel drilling, see section "Printed Circuit Board Connectors"

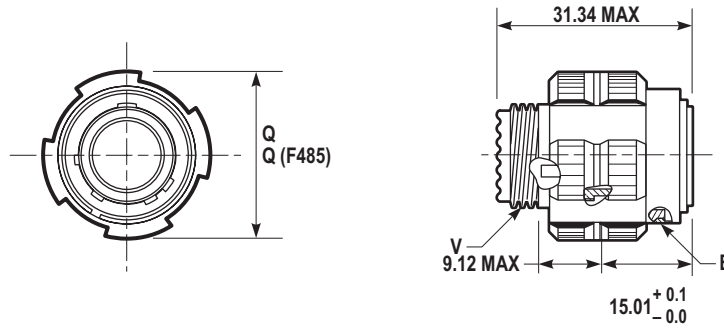
For PCB contacts stickout, see section "Printed Circuit Board Connectors"

## STANDARD RANGE

## TV METALLIC SHELLS

## STRAIGHT PLUG

|         |             |
|---------|-------------|
| TV06RW  | JD38999/26W |
| TV06ZN  | JD38999/26Z |
| TVS06RF | JD38999/26F |
| TVS06RB |             |
| TVS06RK | JD38999/26K |
| TVS06RS | JD38999/26S |



| Shell size                  |          | B<br>thread<br>Class 2A<br>0.1P-0.3L-TS | Q<br>Max<br>(mm) | V thread<br>metric<br>(mm) | Q (F485)*<br>(mm) |
|-----------------------------|----------|-----------------------------------------|------------------|----------------------------|-------------------|
| MIL-DTL-38999<br>Series III | Amphenol |                                         |                  |                            |                   |
| A                           | 9        | .6250                                   | 21.82            | M12x1-6g                   | 21.1              |
| B                           | 11       | .7500                                   | 24.62            | M15x1-6g                   | 23.8              |
| C                           | 13       | .8750                                   | 28.98            | M18x1-6g                   | 28.2              |
| D                           | 15       | 1.0000                                  | 32.16            | M22x1-6g                   | 31.4              |
| E                           | 17       | 1.1875                                  | 35.33            | M25x1-6g                   | 36.5              |
| F                           | 19       | 1.2500                                  | 38.10            | M28x1-6g                   | 39.3              |
| G                           | 21       | 1.3750                                  | 41.28            | M31x1-6g                   | 42.5              |
| H                           | 23       | 1.5000                                  | 44.45            | M34x1-6g                   | 45.3              |
| J                           | 25       | 1.6250                                  | 47.63            | M37x1-6g                   | 48.4              |

\* Conforms to CECC 75.201.002 (coupling nut for arctic gloves)

Handwriting practice lines consisting of 20 horizontal dotted lines.

## STANDARD RANGE

## CTV COMPOSITE SHELLS



## PRESENTATION

Qualified to MIL- DTL- 38999 standard, the Amphenol composite Tri-Start Connectors offers a lightweight corrosion resistant connector with the same high performance features as its metal counterpart. It also includes the following features:

- Lightweight (20 - 40% weight savings vs. aluminium, 60 - 70% weight savings vs stainless steel)
- High Corrosion resistance
- Durability

Note: Coupling nuts and hexagonal nuts are delivered without plating (black)

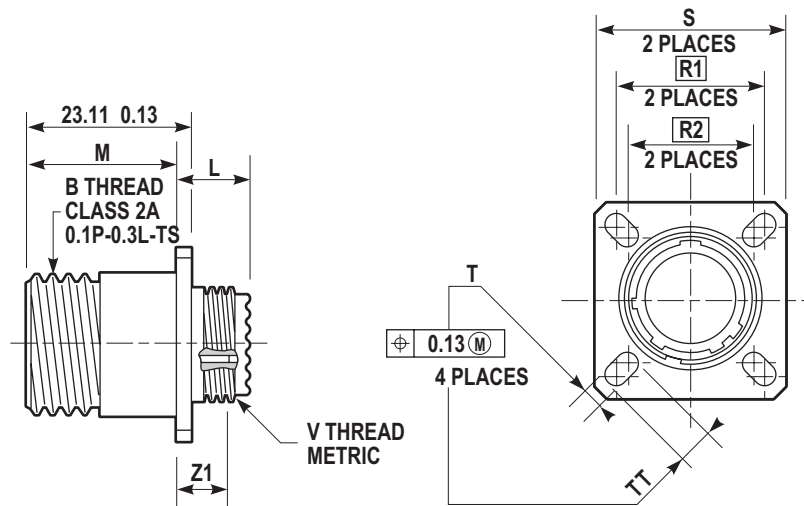
## MAIN CHARACTERISTICS

- Shell to shell continuity: Max resistance
  - Class M: 3 mΩ
  - Class J: 3 mΩ
- Durability: - 500 cycles with standards contacts
  - 1500 cycles with "H" type SAE AS39029 pin contacts and "J" type SAE AS39029 socket contacts
- Ozone exposure: MIL-DTL-38999 § 4.5.28 / EIA 364.14.
- Fungus resistance conforms to: MIL-STD-810, method 508.
- EMI shielding effectiveness:
  - 1 GHz: -85 dB ( Class M, J)
  - 10 GHz: -65 dB (Class M), -50 dB (Class J)

## OVERALL DIMENSIONS - COMPOSITE VERSIONS

SQUARE FLANGE  
RECEPTACLE

CTVP00RW JD38999/20J  
CTVPS00RF JD38999/20M



| Shell size                  |          | B                  | L           | M                      | R1    | R2    | S             | T                      | Z1          | TT                     | V thread |
|-----------------------------|----------|--------------------|-------------|------------------------|-------|-------|---------------|------------------------|-------------|------------------------|----------|
| MIL-DTL-38999<br>Series III | Amphenol | Thread<br>(inches) | Max<br>(mm) | +0.00<br>-0.13<br>(mm) | (mm)  | (mm)  | ±0.25<br>(mm) | +0.20<br>-0.13<br>(mm) | Max<br>(mm) | +0.20<br>-0.13<br>(mm) | metric   |
| A                           | 9        | .6250              | 13.055      | 19.685                 | 18.26 | 15.09 | 23.83         | 3.25                   | 5.03        | 5.49                   | M12x1-6g |
| B                           | 11       | .7500              | 13.055      | 19.685                 | 20.62 | 18.26 | 26.19         | 3.25                   | 5.03        | 4.93                   | M15x1-6g |
| C                           | 13       | .8750              | 13.055      | 19.685                 | 23.01 | 20.62 | 28.58         | 3.25                   | 5.03        | 4.93                   | M18x1-6g |
| D                           | 15       | 1.0000             | 13.055      | 19.685                 | 24.61 | 23.01 | 30.96         | 3.25                   | 5.03        | 4.39                   | M22x1-6g |
| E                           | 17       | 1.1875             | 13.055      | 19.685                 | 26.97 | 24.61 | 33.32         | 3.25                   | 5.03        | 4.93                   | M25x1-6g |
| F                           | 19       | 1.2500             | 13.055      | 19.685                 | 29.36 | 26.97 | 36.53         | 3.25                   | 5.03        | 4.93                   | M28x1-6g |
| G                           | 21       | 1.3750             | 13.843      | 18.923                 | 31.75 | 29.36 | 39.67         | 3.25                   | 5.79        | 4.93                   | M31x1-6g |
| H                           | 23       | 1.5000             | 13.843      | 18.923                 | 34.93 | 31.75 | 42.88         | 3.91                   | 5.79        | 6.15                   | M34x1-6g |
| J                           | 25       | 1.6250             | 13.843      | 18.923                 | 38.10 | 34.93 | 46.02         | 3.91                   | 5.79        | 6.15                   | M37x1-6g |

For panel drilling, see section "Printed Circuit Board Connectors"

For PCB contacts stickout, see section "Printed Circuit Board Connectors"

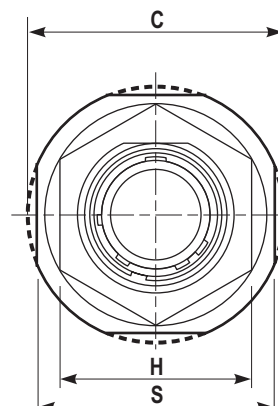
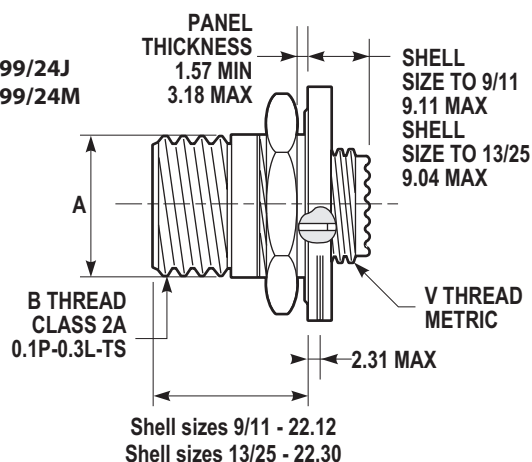
Maximum panel thickness for rear panel mounting: 5,8mm from size 9 to 19  
5mm from size 21 to 25

## STANDARD RANGE

## CTV COMPOSITE SHELLS

JAM NUT  
RECEPTACLE

CTV07 RW JD38999/24J  
CTVS07 RF JD38999/24M



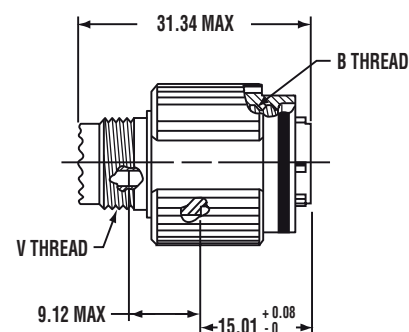
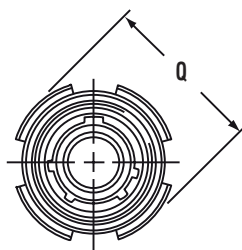
| Shell size                  |          | A<br>+0.00<br>-0.25<br>(mm) | B<br>Thread<br>(inches) | C<br>Max<br>(mm) | H Hex<br>+0.43<br>-0.41<br>(mm) | S<br>+0.28<br>-0.25<br>(mm) | V thread<br>metric | Hex nut<br>max torque<br>N.m |
|-----------------------------|----------|-----------------------------|-------------------------|------------------|---------------------------------|-----------------------------|--------------------|------------------------------|
| MIL-DTL-38999<br>Series III | Amphenol |                             |                         |                  |                                 |                             |                    |                              |
| A                           | 9        | 16.99                       | .6250                   | 30.45            | 22.23                           | 26.97                       | M12x1-6g           | 4.1                          |
| B                           | 11       | 19.53                       | .7500                   | 35.20            | 25.40                           | 31.75                       | M15x1-6g           | 5.3                          |
| C                           | 13       | 24.26                       | .8750                   | 38.38            | 30.17                           | 34.92                       | M18x1-6g           | 6.9                          |
| D                           | 15       | 27.53                       | 1.0000                  | 41.55            | 33.32                           | 38.10                       | M22x1-6g           | 8.6                          |
| E                           | 17       | 30.68                       | 1.1875                  | 44.73            | 36.52                           | 41.28                       | M25x1-6g           | 9.8                          |
| F                           | 19       | 33.86                       | 1.2500                  | 49.50            | 39.67                           | 46.02                       | M28x1-6g           | 10.9                         |
| G                           | 21       | 37.06                       | 1.3750                  | 52.65            | 42.87                           | 49.22                       | M31x1-6g           | 12.7                         |
| H                           | 23       | 40.00                       | 1.5000                  | 55.85            | 46.02                           | 52.37                       | M34x1-6g           | 13.8                         |
| J                           | 25       | 43.41                       | 1.6250                  | 59.00            | 50.80                           | 55.57                       | M37x1-6g           | 15                           |

For panel drilling, see section "Printed Circuit Board Connectors"

For PCB contacts stickout, see section "Printed Circuit Board Connectors"

## STRAIGHT PLUG

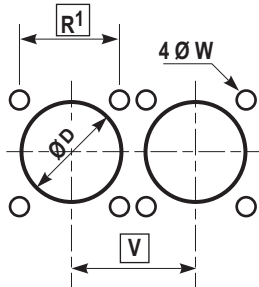
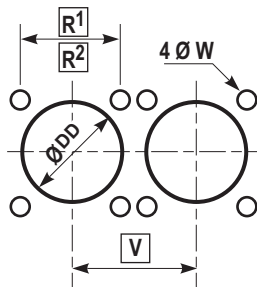
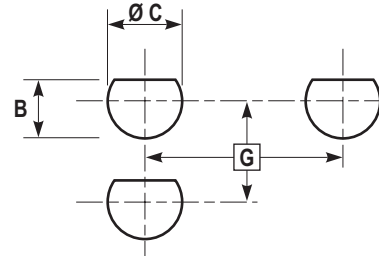
CTV06 RW JD38999/26J  
CTVS06 RF JD38999/26M



| Shell size                  |          | B<br>Thread<br>0.1P-0.3L-TS-2B<br>(inches) | Q<br>Max<br>(mm) | V thread<br>metric<br>(mm) |
|-----------------------------|----------|--------------------------------------------|------------------|----------------------------|
| MIL-DTL-38999<br>Series III | Amphenol |                                            |                  |                            |
| A                           | 9        | .6250                                      | 21.82            | M12x1-6g                   |
| B                           | 11       | .7500                                      | 24.99            | M15x1-6g                   |
| C                           | 13       | .8750                                      | 29.39            | M18x1-6g                   |
| D                           | 15       | 1.0000                                     | 32.49            | M22x1-6g                   |
| E                           | 17       | 1.1875                                     | 35.69            | M25x1-6g                   |
| F                           | 19       | 1.2500                                     | 38.48            | M28x1-6g                   |
| G                           | 21       | 1.3750                                     | 41.68            | M31x1-6g                   |
| H                           | 23       | 1.5000                                     | 44.88            | M34x1-6g                   |
| J                           | 25       | 1.6250                                     | 47.98            | M37x1-6g                   |

## STANDARD RANGE

## PANEL DRILLING FOR COMPOSITE AND METALLIC RECEPTACLES

Square flange receptacle  
rear panel mountingSquare flange receptacle  
front panel mountingJam nut receptacle  
rear panel mounting

| Shell size                  |          | R <sup>1</sup><br>(mm) | R <sup>2</sup><br>(mm) | V<br>Mini<br>(mm) | ØD<br>Min<br>(mm) | ØDD<br>Min<br>(mm) | ØW<br>+0<br>-0.25<br>(mm) | G<br>Mini<br>(mm) | ØC<br>+0.25<br>0<br>(mm) | B<br>+0<br>-0.25<br>(mm) |
|-----------------------------|----------|------------------------|------------------------|-------------------|-------------------|--------------------|---------------------------|-------------------|--------------------------|--------------------------|
| MIL-DTL-38999<br>Series III | Amphenol |                        |                        |                   |                   |                    |                           |                   |                          |                          |
| A                           | 9        | 18.26                  | 15.09                  | 24.60             | 16.66             | 13.11              | 3.25                      | 27.80             | 17.60                    | 16.70                    |
| B                           | 11       | 20.62                  | 18.26                  | 27.00             | 20.22             | 15.88              | 3.25                      | 32.60             | 20.96                    | 19.59                    |
| C                           | 13       | 23.01                  | 20.62                  | 30.20             | 23.42             | 19.05              | 3.25                      | 36.00             | 25.65                    | 24.26                    |
| D                           | 15       | 24.61                  | 23.01                  | 33.30             | 26.59             | 23.01              | 3.25                      | 39.60             | 28.83                    | 27.56                    |
| E                           | 17       | 26.97                  | 24.61                  | 36.50             | 30.96             | 25.81              | 3.25                      | 43.30             | 32.01                    | 30.73                    |
| F                           | 19       | 29.36                  | 26.97                  | 39.30             | 32.94             | 28.98              | 3.25                      | 47.00             | 35.18                    | 33.91                    |
| G                           | 21       | 31.75                  | 29.36                  | 42.50             | 36.12             | 32.16              | 3.25                      | 50.60             | 38.35                    | 37.08                    |
| H                           | 23       | 34.93                  | 31.75                  | 45.70             | 39.29             | 34.93              | 3.81                      | 54.20             | 41.53                    | 40.26                    |
| J                           | 25       | 38.10                  | 34.93                  | 48.80             | 42.47             | 37.69              | 3.81                      | 59.70             | 44.70                    | 43.43                    |

## STANDARD RANGE

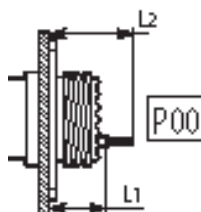
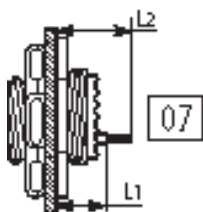
## PRINTED CIRCUIT BOARD CONNECTORS

| Contacts | Ø A (mm) Minimum hole diameter |                     |                   |                     |
|----------|--------------------------------|---------------------|-------------------|---------------------|
|          | CI Version                     |                     | LI Version        |                     |
|          | Gold PCB contacts              | Tinned PCB contacts | Gold PCB contacts | Tinned PCB contacts |
| Size 22D | 0.8                            | 0.9                 | 1.0               | 1.1                 |
| Size 20  | 1.0                            | 1.1                 | 1.0               | 1.1                 |

## STANDARD PCB - TAIL DIMENSIONS AT THE REAR OF RECEPTACLES (IN MM)

|        |    |     | CI Contacts (5 mm tail length) |          |          |          |          |          | LI Contacts (8.5 mm tail length) |          |          |          |          |          |
|--------|----|-----|--------------------------------|----------|----------|----------|----------|----------|----------------------------------|----------|----------|----------|----------|----------|
|        |    |     | TV 07 - CTV 07                 |          | TVP 00   |          | CTVP 00  |          | TV 07 - CTV 07                   |          | TVP 00   |          | CTVP 00  |          |
|        |    |     | 09 & 11                        | 13 to 25 | 09 to 19 | 21 to 25 | 09 to 19 | 21 to 25 | 09 & 11                          | 13 to 25 | 09 to 19 | 21 to 25 | 09 to 19 | 21 to 25 |
| Pin    | L1 | min | 10.13                          | 9.95     | 11.55    | 12.31    | 12.71    | 13.47    | 10.13                            | 9.95     | 11.55    | 12.31    | 12.71    | 13.47    |
|        |    | Max | 11.07                          | 10.89    | 12.39    | 13.15    | 13.52    | 14.28    | 11.07                            | 10.89    | 12.39    | 13.15    | 13.52    | 14.28    |
|        | L2 | min | 15.03                          | 14.85    | 16.45    | 17.21    | 17.61    | 18.37    | 18.53                            | 18.35    | 19.95    | 20.71    | 21.11    | 21.87    |
|        |    | Max | 16.17                          | 15.99    | 17.49    | 18.25    | 18.62    | 19.38    | 19.67                            | 19.49    | 20.99    | 21.75    | 22.12    | 22.88    |
| Socket | L1 | min | 9.93                           | 9.75     | 11.35    | 12.11    | 12.51    | 13.27    | 9.93                             | 9.75     | 11.35    | 12.11    | 12.51    | 13.27    |
|        |    | Max | 10.87                          | 10.69    | 12.19    | 12.95    | 13.32    | 14.08    | 10.87                            | 10.69    | 12.19    | 12.95    | 13.32    | 14.08    |
|        | L2 | min | 14.83                          | 14.65    | 16.25    | 17.01    | 17.41    | 18.17    | 18.33                            | 18.15    | 19.75    | 20.51    | 20.91    | 21.67    |
|        |    | Max | 15.97                          | 15.79    | 17.29    | 18.05    | 18.42    | 19.18    | 19.47                            | 19.29    | 20.79    | 21.55    | 21.92    | 22.68    |

For HD38999 inserts, the CI contacts dimensions are valid for pin contacts only. Consult us for socket contacts and pin contact LI version.



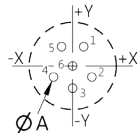
## STANDARD RANGE

## PRINTED CIRCUIT BOARD CONNECTORS

09

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 1              | +1.14  | +1.98  |
| 2              | +1.98  | -1.14  |
| 3              | 0      | -2.29  |
| 4              | -1.98  | -1.14  |
| 5              | -1.14  | +1.98  |
| 6              | 0      | 0      |

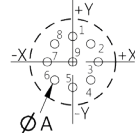
9-35



6 Contacts Size 22D

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 1              | 0      | +2.67  |
| 2              | +1.89  | +1.89  |
| 3              | +2.67  | 0      |
| 4              | +1.89  | -1.89  |
| 5              | 0      | -2.67  |
| 6              | -1.89  | -1.89  |
| 7              | -2.67  | 0      |
| 8              | -1.89  | +1.89  |
| 9              | 0      | 0      |

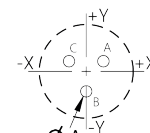
9-9



9 Contacts Size 23

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| A              | +1.65  | +0.97  |
| B              | 0      | -1.91  |
| C              | -1.65  | +0.97  |

9-98

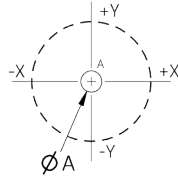


3 Contacts Size 20

11

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| A              | 0      | 0      |

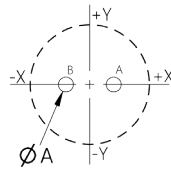
11-12



1 Contacts Size 12

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| A              | +2.41  | 0      |
| B              | -2.41  | 0      |

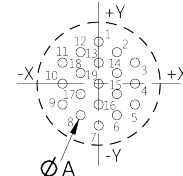
11-2



2 Contacts Size 16

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 1              | 0      | +4.08  |
| 2              | +1.77  | +3.06  |
| 3              | +3.53  | +2.04  |
| 4              | +3.53  | 0      |
| 5              | +3.53  | -2.04  |
| 6              | +1.77  | -3.06  |
| 7              | 0      | -4.08  |
| 8              | -1.77  | -3.06  |
| 9              | -3.53  | -2.04  |
| 10             | -3.53  | 0      |
| 11             | -3.53  | +2.04  |
| 12             | -1.77  | +3.06  |
| 13             | 0      | +2.04  |
| 14             | +1.77  | +1.02  |
| 15             | +1.77  | -1.02  |
| 16             | 0      | -2.04  |
| 17             | -1.77  | -1.02  |
| 18             | -1.77  | +1.02  |
| 19             | 0      | 0      |

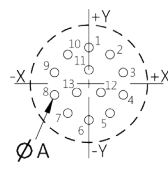
11-19



19 Contacts Size 23

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 1              | 0      | +3.71  |
| 2              | +2.16  | +3.00  |
| 3              | +3.51  | +1.14  |
| 4              | +3.51  | -1.14  |
| 5              | +2.16  | -3.00  |
| 6              | 0      | -3.71  |
| 7              | -2.16  | -3.00  |
| 8              | -3.51  | -1.14  |
| 9              | -3.51  | +1.14  |
| 10             | -2.16  | +3.00  |
| 11             | 0      | +1.42  |
| 12             | +1.24  | -0.89  |
| 13             | -1.24  | -0.89  |

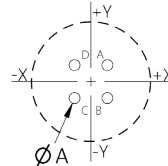
11-35



13 Contacts Size 22D

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| A              | +1.65  | +1.65  |
| B              | +1.65  | -1.65  |
| C              | -1.65  | -1.65  |
| D              | -1.65  | +1.65  |

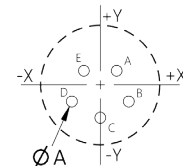
11-4



4 Contacts Size 20

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| A              | +1.65  | +1.42  |
| B              | +2.87  | -1.65  |
| C              | 0      | -3.30  |
| D              | -2.87  | -1.65  |
| E              | -1.65  | +1.42  |

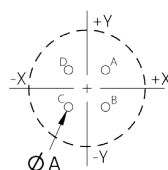
11-5



5 Contacts Size 20

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| A              | +1.91  | +1.91  |
| B              | +1.91  | -1.91  |
| C              | -1.91  | -1.91  |
| D              | -1.91  | +1.91  |

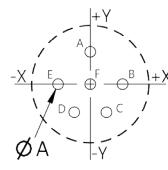
11-54



4 Contacts Size 22D

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| A              | 0      | +3.30  |
| B              | +3.30  | 0      |
| C              | +1.65  | -2.87  |
| D              | -1.65  | -2.87  |
| E              | -3.30  | 0      |
| F              | 0      | 0      |

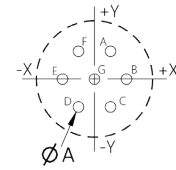
11-98



6 Contacts Size 20

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| A              | +1.65  | +2.87  |
| B              | +3.30  | 0      |
| C              | +1.65  | -2.87  |
| D              | -1.65  | -2.87  |
| E              | -3.30  | 0      |
| F              | -1.65  | +2.87  |
| G              | 0      | 0      |

11-99



7 Contacts Size 20

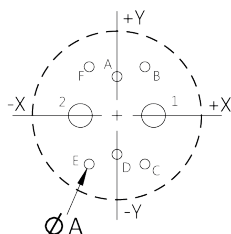
## STANDARD RANGE

## PRINTED CIRCUIT BOARD CONNECTORS

13

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| A              | 0      | +3.47  |
| B              | +2.47  | +4.34  |
| C              | +2.47  | -4.34  |
| D              | 0      | -3.47  |
| E              | -2.47  | -4.34  |
| F              | -2.47  | +4.34  |
| 1              | +3.25  | 0      |
| 2              | -3.25  | 0      |

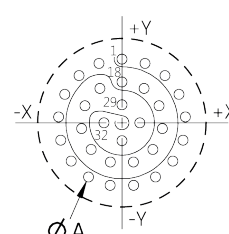
13-26



6 Contacts Size 22D  
2 Contacts Size 12

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 1              | 0      | +5.68  |
| 2              | +2.05  | +5.30  |
| 3              | +3.83  | +4.20  |
| 4              | +5.09  | +2.53  |
| 5              | +5.66  | +0.52  |
| 6              | +5.46  | -1.55  |
| 7              | +4.53  | -3.42  |
| 8              | +2.99  | -4.83  |
| 9              | +1.04  | -5.58  |
| 10             | -1.04  | -5.58  |
| 11             | -2.99  | -4.83  |
| 12             | -4.53  | -3.42  |
| 13             | -5.46  | -1.55  |
| 14             | -5.66  | +0.52  |
| 15             | -5.09  | +2.53  |
| 16             | -3.83  | +4.20  |

13-32

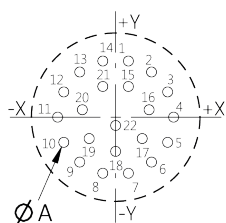


32 Contacts Size 23

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 17             | -2.05  | +5.30  |
| 18             | 0      | +3.64  |
| 19             | +1.97  | +3.06  |
| 20             | +3.31  | +1.51  |
| 21             | +3.60  | -0.52  |
| 22             | +2.75  | -2.38  |
| 23             | +1.03  | -3.49  |
| 24             | -1.03  | -3.49  |
| 25             | -2.75  | -2.38  |
| 26             | -3.60  | -0.52  |
| 27             | -3.31  | +1.51  |
| 28             | -1.97  | +3.06  |
| 29             | 0      | +1.60  |
| 30             | +1.60  | 0      |
| 31             | 0      | -1.60  |
| 32             | -1.60  | 0      |

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 1              | +1.14  | +5.00  |
| 2              | +3.20  | +4.01  |
| 3              | +4.62  | +2.24  |
| 4              | +5.16  | 0      |
| 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             | -5.16  | 0      |
| 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      | -3.05  |
| 19             | -2.36  | -1.91  |
| 20             | -2.97  | +0.66  |
| 21             | -1.14  | +2.72  |
| 22             | 0      | -0.76  |

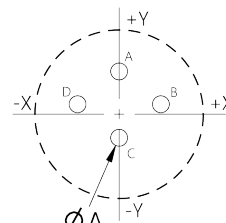
13-35



22 Contacts Size 22D

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| A              | 0      | +3.81  |
| B              | +3.71  | +0.89  |
| C              | 0      | -2.11  |
| D              | -3.71  | +0.89  |

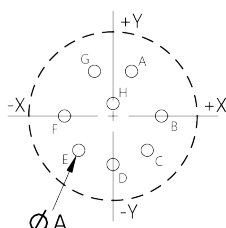
13-4



4 Contacts Size 16

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| A              | +1.65  | +3.99  |
| B              | +4.32  | 0      |
| C              | +3.05  | -3.05  |
| D              | 0      | -4.32  |
| E              | -3.05  | -3.05  |
| F              | -4.32  | 0      |
| G              | -1.65  | +3.99  |
| H              | 0      | +1.12  |

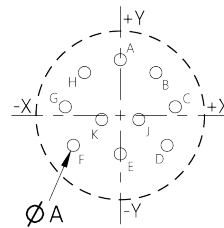
13-8



8 Contacts Size 20

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| A              | 0      | +4.95  |
| B              | +3.18  | +3.81  |
| C              | +4.90  | +0.76  |
| D              | +4.17  | -2.67  |
| E              | 0      | -3.43  |
| F              | -4.17  | -2.67  |
| G              | -4.90  | +0.76  |
| H              | -3.18  | +3.81  |
| J              | +1.65  | -0.38  |
| K              | -1.65  | -0.38  |

13-98



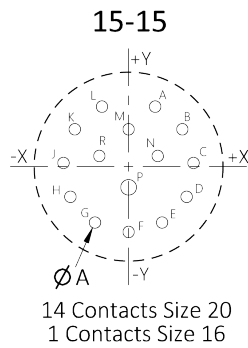
10 Contacts Size 20

## STANDARD RANGE

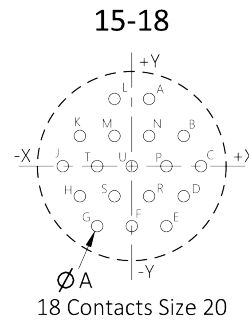
## PRINTED CIRCUIT BOARD CONNECTORS

15

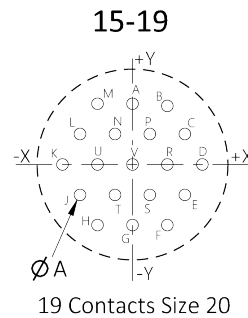
| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| A              | +2.54  | +5.72  |
| B              | +5.13  | +3.56  |
| C              | +6.20  | +0.36  |
| D              | +5.54  | -2.87  |
| E              | +3.20  | -5.31  |
| F              | 0      | -6.22  |
| G              | -3.20  | -5.31  |
| H              | -5.54  | -2.87  |
| J              | -6.20  | +0.36  |
| K              | -5.13  | +3.56  |
| L              | -2.54  | +5.72  |
| M              | 0      | +3.56  |
| N              | +2.79  | +1.02  |
| P              | 0      | -1.96  |
| R              | -2.79  | +1.02  |



| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| A              | +1.65  | +6.40  |
| B              | +4.95  | +2.87  |
| C              | +6.60  | 0      |
| D              | +4.95  | -2.87  |
| E              | +3.30  | -5.72  |
| F              | 0      | -5.72  |
| G              | -3.30  | -5.72  |
| H              | -4.95  | -2.87  |
| J              | -6.60  | 0      |
| K              | -4.95  | +2.87  |
| L              | -1.65  | +6.40  |
| M              | -1.65  | +2.87  |
| N              | +1.65  | +2.87  |
| P              | +3.30  | 0      |
| R              | +1.65  | -2.87  |
| S              | -1.65  | -2.87  |
| T              | -3.30  | 0      |
| U              | 0      | 0      |

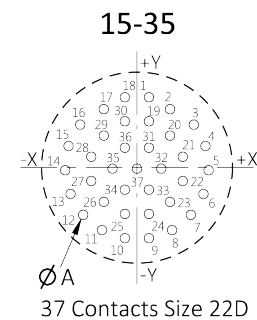


| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| A              | 0      | +5.72  |
| B              | +3.30  | +5.72  |
| C              | +4.95  | +2.87  |
| D              | +6.60  | 0      |
| E              | +4.95  | -2.87  |
| F              | +3.30  | -5.72  |
| G              | 0      | -5.72  |
| H              | -3.30  | -5.72  |
| J              | -4.95  | -2.87  |
| K              | -6.60  | 0      |
| L              | -4.95  | +2.87  |
| M              | -3.30  | +5.72  |
| N              | -1.65  | +2.87  |
| P              | +1.65  | +2.87  |
| R              | +3.30  | 0      |
| S              | +1.65  | -2.87  |
| T              | -1.65  | -2.87  |
| U              | -3.30  | 0      |
| V              | 0      | 0      |

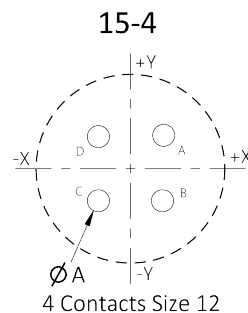


| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 1              | +1.14  | +6.65  |
| 2              | +3.12  | +5.51  |
| 3              | +5.36  | +4.06  |
| 4              | +6.45  | +2.03  |
| 5              | +6.76  | -0.25  |
| 6              | +6.27  | -2.49  |
| 7              | +5.08  | -4.45  |
| 8              | +3.30  | -5.89  |
| 9              | +1.14  | -6.65  |
| 10             | -1.14  | -6.65  |
| 11             | -3.30  | -5.89  |
| 12             | -5.08  | -4.45  |
| 13             | -6.27  | -2.49  |
| 14             | -6.76  | -0.25  |
| 15             | -6.45  | +2.03  |
| 16             | -5.36  | +4.06  |
| 17             | -3.12  | +5.51  |
| 18             | -1.14  | +6.65  |
| 19             | +1.14  | +4.37  |

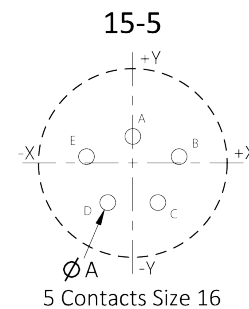
| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 20             | +3.12  | +3.02  |
| 21             | +4.32  | +1.02  |
| 22             | +4.32  | -1.27  |
| 23             | +3.12  | -3.23  |
| 24             | +1.14  | -4.37  |
| 25             | -1.14  | -4.37  |
| 26             | -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      | -0.10  |



| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| A              | +3.18  | +3.18  |
| B              | +3.18  | -3.18  |
| C              | -3.18  | -3.18  |
| D              | -3.18  | +3.18  |



| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| A              | 0      | +2.54  |
| B              | +4.42  | +0.61  |
| C              | +2.39  | -3.76  |
| D              | -2.39  | -3.76  |
| E              | -4.42  | +0.61  |



## STANDARD RANGE

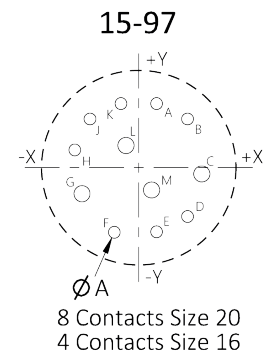
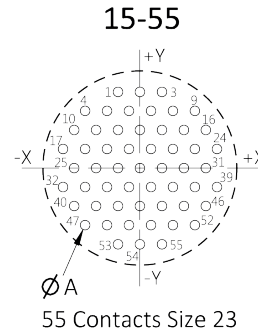
## PRINTED CIRCUIT BOARD CONNECTORS

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| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 1              | -2.04  | +7.07  |
| 2              | 0      | +7.07  |
| 3              | +2.04  | +7.07  |
| 4              | -5.10  | +5.30  |
| 5              | -3.06  | +5.30  |
| 6              | -1.02  | +5.30  |
| 7              | +1.02  | +5.30  |
| 8              | +3.06  | +5.30  |
| 9              | +5.10  | +5.30  |
| 10             | -6.12  | +3.53  |
| 11             | -4.08  | +3.53  |
| 12             | -2.04  | +3.53  |
| 13             | 0      | +3.53  |
| 14             | +2.04  | +3.53  |
| 15             | +4.08  | +3.53  |
| 16             | +6.12  | +3.53  |
| 17             | -7.14  | +1.77  |
| 18             | -5.10  | +1.77  |
| 19             | -3.06  | +1.77  |

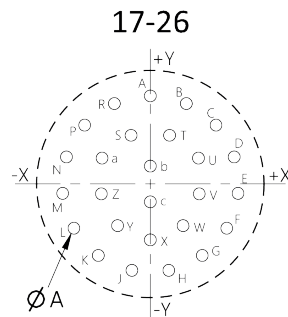
| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 20             | -1.02  | +1.77  |
| 21             | +1.02  | +1.77  |
| 22             | +3.06  | +1.77  |
| 23             | +5.10  | +1.77  |
| 24             | +7.14  | +1.77  |
| 25             | -6.12  | 0      |
| 26             | -4.08  | 0      |
| 27             | -2.04  | 0      |
| 28             | 0      | 0      |
| 29             | +2.04  | 0      |
| 30             | +4.08  | 0      |
| 31             | +6.12  | 0      |
| 32             | -7.14  | -1.77  |
| 33             | -5.10  | -1.77  |
| 34             | -3.06  | -1.77  |
| 35             | -1.02  | -1.77  |
| 36             | +1.02  | -1.77  |
| 37             | +3.06  | -1.77  |
| 38             | +5.10  | -1.77  |

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 39             | +7.14  | -1.77  |
| 40             | -6.12  | -3.53  |
| 41             | -4.08  | -3.53  |
| 42             | -2.04  | -3.53  |
| 43             | 0      | -3.53  |
| 44             | +2.04  | -3.53  |
| 45             | +4.08  | -3.53  |
| 46             | +6.12  | -3.53  |
| 47             | -5.10  | -5.30  |
| 48             | -3.06  | -5.30  |
| 49             | -1.02  | -5.30  |
| 50             | +1.02  | -5.30  |
| 51             | +3.06  | -5.30  |
| 52             | +5.10  | -5.30  |
| 53             | -2.04  | -7.07  |
| 54             | 0      | -7.07  |
| 55             | +2.04  | -7.07  |



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

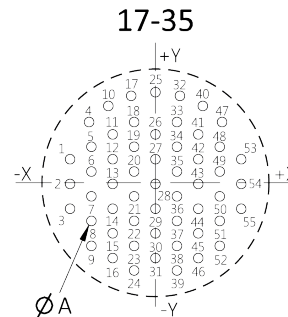
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| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| A              | 0      | +8.15  |
| B              | +3.33  | +7.44  |
| C              | +6.07  | +5.44  |
| D              | +7.75  | +2.51  |
| E              | +8.10  | -0.86  |
| F              | +7.06  | -4.09  |
| G              | +4.80  | -6.60  |
| H              | +1.70  | -7.98  |
| J              | -1.70  | -7.98  |
| K              | -4.80  | -6.60  |
| L              | -7.06  | -4.09  |
| M              | -8.10  | -0.86  |
| N              | -7.75  | +2.51  |

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| P              | -6.07  | +5.44  |
| R              | -3.33  | +7.44  |
| S              | -1.78  | +4.50  |
| T              | +1.78  | +4.50  |
| U              | +4.45  | +2.39  |
| V              | +4.52  | -0.91  |
| W              | +3.02  | -3.84  |
| X              | 0      | -5.16  |
| Y              | -3.02  | -3.84  |
| Z              | -4.52  | -0.91  |
| a              | -4.45  | +2.39  |
| b              | 0      | +1.65  |
| c              | 0      | -1.65  |

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 1              | -7.92  | +2.18  |
| 2              | -7.92  | -0.10  |
| 3              | -7.92  | -2.39  |
| 4              | -6.15  | +5.61  |
| 5              | -5.94  | +3.33  |
| 6              | -5.94  | +1.04  |
| 7              | -5.94  | -1.24  |
| 8              | -5.94  | -3.53  |
| 9              | -5.94  | -5.82  |
| 10             | -4.37  | +7.09  |
| 11             | -3.96  | +4.47  |
| 12             | -3.96  | +2.18  |
| 13             | -3.96  | -0.10  |
| 14             | -3.96  | -2.39  |
| 15             | -3.96  | -4.67  |
| 16             | -3.96  | -6.96  |
| 17             | -2.26  | +8.03  |
| 18             | -1.98  | +5.61  |
| 19             | -1.98  | +3.33  |



| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 20             | -1.98  | +1.04  |
| 21             | -1.98  | -1.24  |
| 22             | -1.98  | -3.53  |
| 23             | -1.98  | -5.82  |
| 24             | -1.98  | -8.10  |
| 25             | 0      | +8.36  |
| 26             | 0      | +4.47  |
| 27             | 0      | +2.18  |
| 28             | 0      | -0.10  |
| 29             | 0      | -2.39  |
| 30             | 0      | -4.67  |
| 31             | 0      | -6.96  |
| 32             | +2.26  | +8.03  |
| 33             | +1.98  | +5.61  |
| 34             | +1.98  | +3.33  |
| 35             | +1.98  | +1.04  |
| 36             | +1.98  | -1.24  |
| 37             | +1.98  | -3.53  |
| 38             | +1.98  | -5.82  |

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 39             | +1.98  | -8.10  |
| 40             | +4.37  | +7.09  |
| 41             | +3.96  | +4.47  |
| 42             | +3.96  | +2.18  |
| 43             | +3.96  | -0.10  |
| 44             | +3.96  | -2.39  |
| 45             | +3.96  | -4.67  |
| 46             | +3.96  | -6.96  |
| 47             | +6.15  | +5.61  |
| 48             | +5.94  | +3.33  |
| 49             | +5.94  | +1.04  |
| 50             | +5.94  | -1.24  |
| 51             | +5.94  | -3.53  |
| 52             | +5.94  | -5.82  |
| 53             | +7.92  | +2.18  |
| 54             | +7.92  | -0.10  |
| 55             | +7.92  | -2.39  |

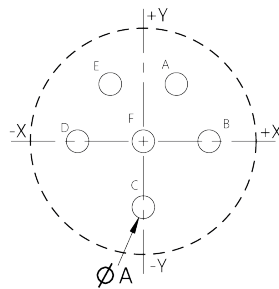
## STANDARD RANGE

## PRINTED CIRCUIT BOARD CONNECTORS

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| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| A              | +3.07  | +5.31  |
| B              | +6.12  | 0      |
| C              | 0      | -6.12  |
| D              | -6.12  | 0      |
| E              | -3.07  | +5.31  |
| F              | 0      | 0      |

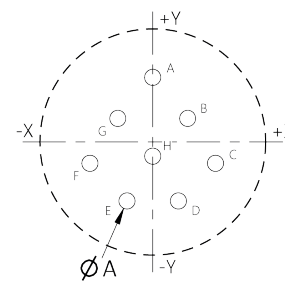
17-6



6 Contacts Size 12

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| A              | 0      | +5.99  |
| B              | +3.25  | +2.18  |
| C              | +5.84  | -1.98  |
| D              | +2.39  | -5.49  |
| E              | -2.39  | -5.49  |
| F              | -5.84  | -1.98  |
| G              | -3.25  | +2.18  |
| H              | 0      | -1.32  |

17-8



8 Contacts Size 16

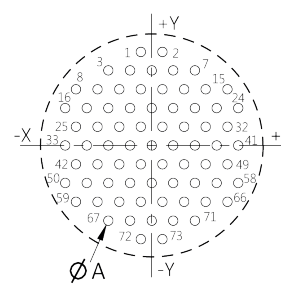
| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 1              | -1.02  | +8.83  |
| 2              | +1.02  | +8.83  |
| 3              | -4.08  | +7.07  |
| 4              | -2.04  | +7.07  |
| 5              | 0      | +7.07  |
| 6              | +2.04  | +7.07  |
| 7              | +4.08  | +7.07  |
| 8              | -7.14  | +5.30  |
| 9              | -5.10  | +5.30  |
| 10             | -3.06  | +5.30  |
| 11             | -1.02  | +5.30  |
| 12             | +1.02  | +5.30  |
| 13             | +3.06  | +5.30  |
| 14             | +5.10  | +5.30  |
| 15             | +7.14  | +5.30  |
| 16             | -8.16  | +3.53  |
| 17             | -6.12  | +3.53  |
| 18             | -4.08  | +3.53  |
| 19             | -2.04  | +3.53  |

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 20             | 0      | +3.53  |
| 21             | +2.04  | +3.53  |
| 22             | +4.08  | +3.53  |
| 23             | +6.12  | +3.53  |
| 24             | +8.16  | +3.53  |
| 25             | -7.14  | +1.77  |
| 26             | -5.10  | +1.77  |
| 27             | -3.06  | +1.77  |
| 28             | -1.02  | +1.77  |
| 29             | +1.02  | +1.77  |
| 30             | +3.06  | +1.77  |
| 31             | +5.10  | +1.77  |
| 32             | +7.14  | +1.77  |
| 33             | -8.16  | 0      |
| 34             | -6.12  | 0      |
| 35             | -4.08  | 0      |
| 36             | -2.04  | 0      |
| 37             | 0      | 0      |
| 38             | +2.04  | 0      |

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 39             | +4.08  | 0      |
| 40             | +6.12  | 0      |
| 41             | +8.16  | 0      |
| 42             | -7.14  | -1.77  |
| 43             | -5.10  | -1.77  |
| 44             | -3.06  | -1.77  |
| 45             | -1.02  | -1.77  |
| 46             | +1.02  | -1.77  |
| 47             | +3.06  | -1.77  |
| 48             | +5.10  | -1.77  |
| 49             | +7.14  | -1.77  |
| 50             | -8.16  | -3.53  |
| 51             | -6.12  | -3.53  |
| 52             | -4.08  | -3.53  |
| 53             | -2.04  | -3.53  |
| 54             | 0      | -3.53  |
| 55             | +2.04  | -3.53  |
| 56             | +4.08  | -3.53  |
| 57             | +6.12  | -3.53  |

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 58             | +8.16  | -3.53  |
| 59             | -7.14  | -5.30  |
| 60             | -5.10  | -5.30  |
| 61             | -3.06  | -5.30  |
| 62             | -1.02  | -5.30  |
| 63             | +1.02  | -5.30  |
| 64             | +3.06  | -5.30  |
| 65             | +5.10  | -5.30  |
| 66             | +7.14  | -5.30  |
| 67             | -4.08  | -7.07  |
| 68             | -2.04  | -7.07  |
| 69             | 0      | -7.07  |
| 70             | +2.04  | -7.07  |
| 71             | +4.08  | -7.07  |
| 72             | -1.02  | -8.83  |
| 73             | +1.02  | -8.83  |

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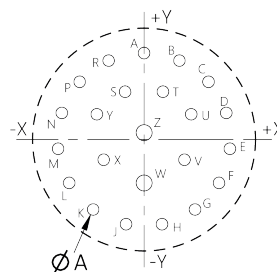


73 Contacts Size 23

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| A              | 0      | +8.15  |
| B              | +3.33  | +7.44  |
| C              | +6.07  | +5.44  |
| D              | +7.75  | +2.51  |
| E              | +8.10  | -0.86  |
| F              | +7.06  | -4.09  |
| G              | +4.80  | -6.60  |
| H              | +1.70  | -7.98  |
| J              | -1.70  | -7.98  |
| K              | -4.80  | -6.60  |
| L              | -7.06  | -4.09  |
| M              | -8.10  | -0.86  |

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| N              | -7.75  | +2.51  |
| P              | -6.07  | +5.44  |
| R              | -3.33  | +7.44  |
| S              | -1.78  | +4.50  |
| T              | +1.78  | +4.50  |
| U              | +4.45  | +2.39  |
| V              | +3.81  | -1.91  |
| W              | 0      | -4.09  |
| X              | -3.81  | -1.91  |
| Y              | -4.45  | +2.39  |
| Z              | 0      | +0.64  |

17-99

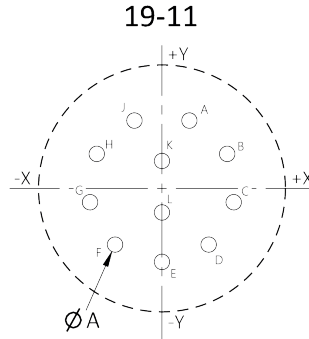
21 Contacts Size 20  
2 Contacts Size 16

## STANDARD RANGE

## PRINTED CIRCUIT BOARD CONNECTORS

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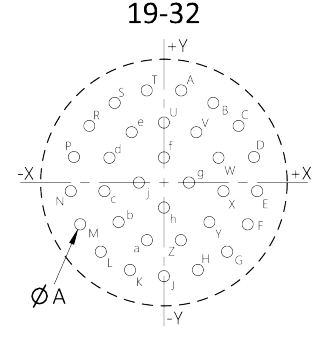
| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| A              | +2.67  | +6.60  |
| B              | +6.35  | +3.35  |
| C              | +6.99  | -1.35  |
| D              | +4.55  | -5.46  |
| E              | 0      | -7.14  |
| F              | -4.55  | -5.46  |
| G              | -6.99  | -1.35  |
| H              | -6.35  | +3.35  |
| J              | -2.67  | +6.60  |
| K              | 0      | +2.67  |
| L              | 0      | -2.34  |



11 Contacts Size 16

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| A              | +1.68  | +8.97  |
| B              | +4.80  | +7.75  |
| C              | +7.26  | +5.51  |
| D              | +8.76  | +2.49  |
| E              | +9.07  | -0.84  |
| F              | +8.15  | -4.06  |
| G              | +6.15  | -6.73  |
| H              | +3.30  | -8.51  |
| J              | 0      | -9.12  |
| K              | -3.30  | -8.51  |
| L              | -6.15  | -6.73  |
| M              | -8.15  | -4.06  |
| N              | -9.07  | -0.84  |
| P              | -8.76  | +2.49  |
| R              | -7.26  | +5.51  |
| S              | -4.80  | +7.75  |

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| T              | -1.68  | +8.97  |
| U              | 0      | +5.84  |
| V              | +3.15  | +4.90  |
| W              | +5.31  | +2.41  |
| X              | +5.79  | -0.84  |
| Y              | +4.42  | -3.84  |
| Z              | +1.65  | -5.61  |
| a              | -1.65  | -5.61  |
| b              | -4.42  | -3.84  |
| c              | -5.79  | -0.84  |
| d              | -5.31  | +2.41  |
| e              | -3.15  | +4.90  |
| f              | 0      | +2.44  |
| g              | +2.44  | 0      |
| h              | 0      | -2.44  |
| j              | -2.44  | 0      |

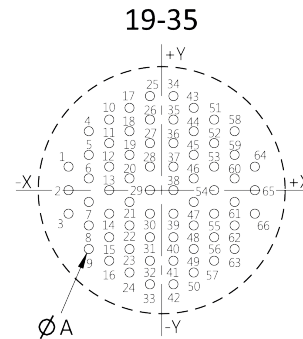


32 Contacts Size 20

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 1              | -9.07  | +2.29  |
| 2              | -9.07  | 0      |
| 3              | -9.07  | -2.29  |
| 4              | -7.09  | +5.72  |
| 5              | -7.09  | +3.43  |
| 6              | -7.09  | +1.14  |
| 7              | -7.09  | -1.14  |
| 8              | -7.09  | -3.43  |
| 9              | -7.09  | -5.72  |
| 10             | -5.11  | +6.86  |
| 11             | -5.11  | +4.57  |
| 12             | -5.11  | +2.29  |
| 13             | -5.11  | 0      |
| 14             | -5.11  | -2.29  |
| 15             | -5.11  | -4.57  |
| 16             | -5.11  | -6.86  |
| 17             | -3.12  | +8.00  |
| 18             | -3.12  | +5.72  |
| 19             | -3.12  | +3.43  |
| 20             | -3.12  | +1.14  |
| 21             | -3.12  | -1.14  |
| 22             | -3.12  | -3.43  |

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 23             | -3.12  | -5.72  |
| 24             | -3.12  | -8.00  |
| 25             | -1.14  | +9.14  |
| 26             | -1.14  | +6.86  |
| 27             | -1.14  | +4.57  |
| 28             | -1.14  | +2.29  |
| 29             | -1.14  | 0      |
| 30             | -1.14  | -2.29  |
| 31             | -1.14  | -4.57  |
| 32             | -1.14  | -6.86  |
| 33             | -1.14  | -9.14  |
| 34             | +1.14  | +9.14  |
| 35             | +1.14  | +6.86  |
| 36             | +1.14  | +4.57  |
| 37             | +1.14  | +2.29  |
| 38             | +1.14  | 0      |
| 39             | +1.14  | -2.29  |
| 40             | +1.14  | -4.57  |
| 41             | +1.14  | -6.86  |
| 42             | +1.14  | -9.14  |
| 43             | +3.12  | +8.00  |
| 44             | +3.12  | +5.72  |

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 45             | +3.12  | +3.43  |
| 46             | +3.12  | +1.14  |
| 47             | +3.12  | -1.14  |
| 48             | +3.12  | -3.43  |
| 49             | +3.12  | -5.72  |
| 50             | +3.12  | -8.00  |
| 51             | +5.11  | +6.86  |
| 52             | +5.11  | +4.57  |
| 53             | +5.11  | +2.29  |
| 54             | +5.11  | 0      |
| 55             | +5.11  | -2.29  |
| 56             | +5.11  | -4.57  |
| 57             | +5.11  | -6.86  |
| 58             | +7.09  | +5.72  |
| 59             | +7.09  | +3.43  |
| 60             | +7.09  | +1.14  |
| 61             | +7.09  | -1.14  |
| 62             | +7.09  | -3.43  |
| 63             | +7.09  | -5.72  |
| 64             | +9.07  | +2.29  |
| 65             | +9.07  | 0      |
| 66             | +9.07  | -2.29  |



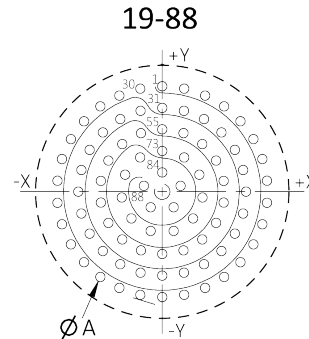
66 Contacts Size 22D

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 1              | 0      | +9.99  |
| 2              | +2.08  | +9.77  |
| 3              | +4.06  | +9.12  |
| 4              | +5.87  | +8.08  |
| 5              | +7.42  | +6.68  |
| 6              | +8.65  | +4.99  |
| 7              | +9.50  | +3.09  |
| 8              | +9.93  | +1.04  |
| 9              | +9.93  | -1.04  |
| 10             | +9.50  | -3.09  |
| 11             | +8.65  | -4.99  |
| 12             | +7.42  | -6.68  |
| 13             | +5.87  | -8.08  |
| 14             | +4.06  | -9.12  |
| 15             | +2.08  | -9.77  |
| 16             | 0      | -9.99  |
| 17             | -2.08  | -9.77  |
| 18             | -4.06  | -9.12  |
| 19             | -5.87  | -8.08  |
| 20             | -7.42  | -6.68  |
| 21             | -8.65  | -4.99  |
| 22             | -9.50  | -3.09  |

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 23             | -9.93  | -1.04  |
| 24             | -9.93  | +1.04  |
| 25             | -9.50  | +3.09  |
| 26             | -8.65  | +4.99  |
| 27             | -7.42  | +6.68  |
| 28             | -5.87  | +8.08  |
| 29             | -4.06  | +9.12  |
| 30             | -2.08  | +9.77  |
| 31             | 0      | +7.95  |
| 32             | +2.06  | +7.67  |
| 33             | +3.97  | +6.88  |
| 34             | +5.62  | +5.62  |
| 35             | +6.88  | +3.97  |
| 36             | +7.67  | +2.06  |
| 37             | +7.95  | 0      |
| 38             | +7.67  | -2.06  |
| 39             | +6.88  | -3.97  |
| 40             | +5.62  | -5.62  |
| 41             | +3.97  | -6.88  |
| 42             | +2.06  | -7.67  |
| 43             | 0      | -7.95  |
| 44             | -2.06  | -7.67  |

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 45             | -3.97  | -6.88  |
| 46             | -5.62  | -5.62  |
| 47             | -6.88  | -3.97  |
| 48             | -7.67  | -2.06  |
| 49             | -7.95  | 0      |
| 50             | -7.67  | +2.06  |
| 51             | -6.88  | +3.97  |
| 52             | -5.62  | +5.62  |
| 53             | -3.97  | +6.88  |
| 54             | -2.06  | +7.67  |
| 55             | 0      | +5.91  |
| 56             | +2.02  | +5.55  |
| 57             | +3.80  | +4.52  |
| 58             | +5.11  | +2.95  |
| 59             | +5.82  | +1.03  |
| 60             | +5.82  | -1.03  |
| 61             | +5.11  | -2.95  |
| 62             | +3.80  | -4.52  |
| 63             | +2.02  | -5.55  |
| 64             | 0      | -5.91  |
| 65             | -2.02  | -5.55  |
| 66             | -3.80  | -4.52  |

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 67             | -5.11  | -2.95  |
| 68             | -5.82  | -1.03  |
| 69             | -5.82  | +1.03  |
| 70             | -5.11  | +2.95  |
| 71             | -3.80  | +4.52  |
| 72             | -2.02  | +5.55  |
| 73             | 0      | +3.87  |
| 74             | +2.09  | +3.25  |
| 75             | +3.52  | +1.61  |
| 76             | +3.83  | -0.55  |
| 77             | +2.92  | -2.53  |
| 78             | +1.09  | -3.71  |
| 79             | -1.09  | -3.71  |
| 80             | -2.92  | -2.53  |
| 81             | -3.83  | -0.55  |
| 82             | -3.52  | +1.61  |
| 83             | -2.09  | +3.25  |
| 84             | 0      | +1.83  |
| 85             | +1.74  | +0.56  |
| 86             | +1.09  | -1.48  |
| 87             | -1.09  | -1.48  |
| 88             | -1.74  | +0.56  |



88 Contacts Size 23

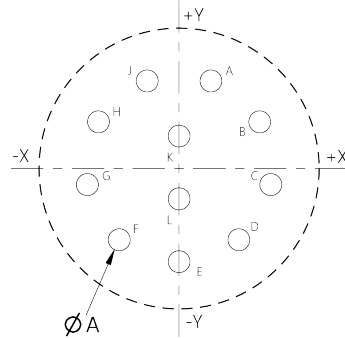
## STANDARD RANGE

## PRINTED CIRCUIT BOARD CONNECTORS

21

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| A              | +3.07  | +8.43  |
| B              | +7.77  | +4.50  |
| C              | +8.84  | -1.55  |
| D              | +5.77  | -6.86  |
| E              | 0      | -8.97  |
| F              | -5.77  | -6.86  |
| G              | -8.84  | -1.55  |
| H              | -7.77  | +4.50  |
| J              | -3.07  | +8.43  |
| K              | 0      | +3.12  |
| L              | 0      | -2.92  |

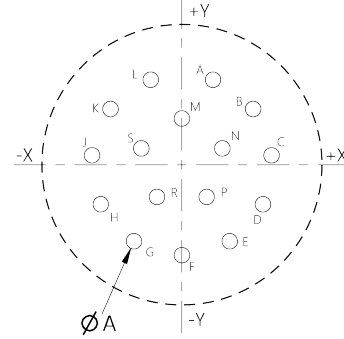
21-11



11 Contacts Size 12

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| A              | +3.00  | +8.18  |
| B              | +6.88  | +5.36  |
| C              | +8.66  | +0.91  |
| D              | +7.82  | -3.81  |
| E              | +4.62  | -7.37  |
| F              | 0      | -8.71  |
| G              | -4.62  | -7.37  |
| H              | -7.82  | -3.81  |
| J              | -8.66  | +0.91  |
| K              | -6.88  | +5.36  |
| L              | -3.00  | +8.18  |
| M              | 0      | +4.45  |
| N              | +3.91  | +1.57  |
| P              | +2.39  | -3.10  |
| R              | -2.39  | -3.10  |
| S              | -3.91  | +1.57  |

21-16

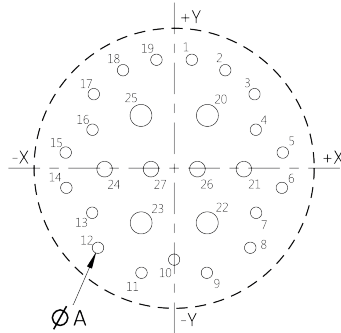


16 Contacts Size 16

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 1              | +1.70  | +10.46 |
| 2              | +4.93  | +9.45  |
| 3              | +7.45  | +7.14  |
| 4              | +7.87  | +3.71  |
| 5              | +10.46 | +1.52  |
| 6              | +10.39 | -1.88  |
| 7              | +7.90  | -4.29  |
| 8              | +7.34  | -7.67  |
| 9              | +3.15  | -10.08 |
| 10             | 0      | -8.81  |
| 11             | -3.15  | -10.08 |
| 12             | -7.34  | -7.67  |
| 13             | -7.90  | -4.29  |
| 14             | -10.39 | -1.88  |

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 15             | -10.46 | +1.52  |
| 16             | -7.87  | +3.71  |
| 17             | -7.45  | +7.14  |
| 18             | -4.93  | +9.45  |
| 19             | -1.70  | +10.46 |
| 20             | +3.20  | +5.08  |
| 21             | +6.71  | -0.08  |
| 22             | +3.18  | -5.26  |
| 23             | -3.18  | -5.26  |
| 24             | -6.71  | -0.08  |
| 25             | -3.20  | +5.08  |
| 26             | +2.24  | -0.08  |
| 27             | -2.24  | -0.08  |

21-29

19 Contacts Size 20  
4 Contacts Size 16  
4 Contacts Size 12

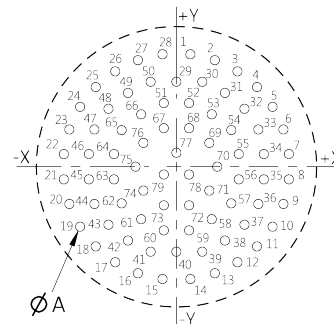
| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 1              | +1.35  | +10.82 |
| 2              | +3.71  | +10.26 |
| 3              | +5.89  | +9.19  |
| 4              | +7.77  | +7.67  |
| 5              | +9.27  | +5.77  |
| 6              | +10.31 | +3.58  |
| 7              | +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  |

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 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      | +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      | -8.81  |

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 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  |

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 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      |
| 71             | +3.18  | -2.29  |
| 72             | +1.22  | -3.71  |
| 73             | -1.22  | -3.71  |
| 74             | -3.18  | -2.29  |
| 75             | -3.94  | 0      |
| 76             | -3.18  | +2.29  |
| 77             | 0      | +1.35  |
| 78             | +1.22  | -0.74  |
| 79             | -1.22  | -0.74  |

21-35



79 Contacts Size 22D

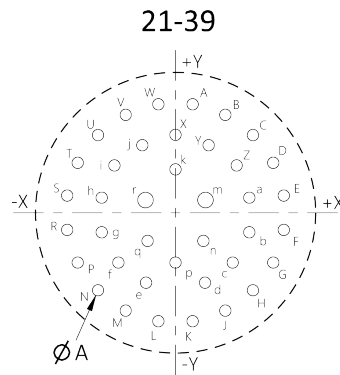
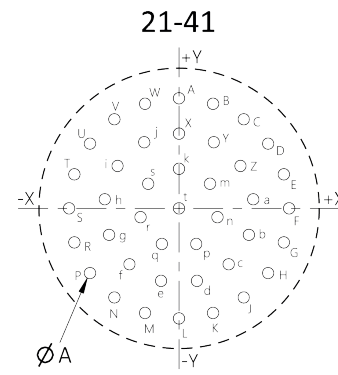
## STANDARD RANGE

## PRINTED CIRCUIT BOARD CONNECTORS

21

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 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 |

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| X              | 0      | +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      | +4.17  |
| m              | +2.90  | +1.22  |
| n              | +2.69  | -2.72  |
| p              | 0      | -4.80  |
| q              | -2.69  | -2.72  |
| r              | -2.90  | +1.09  |

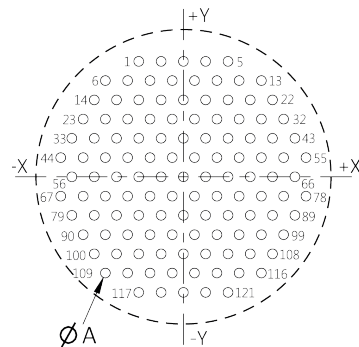
37 Contacts Size 20  
2 Contacts Size 16

41 Contacts Size 20

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| A              | 0      | +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      |
| G              | +10.09 | -3.28  |
| H              | +8.58  | -6.23  |
| J              | +6.23  | -8.58  |
| K              | +3.28  | -10.09 |
| L              | 0      | -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      |
| T              | -10.09 | +3.28  |
| U              | -8.58  | +6.23  |
| V              | -6.23  | +8.58  |
| W              | -3.28  | +10.09 |
| X              | 0      | +7.20  |

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 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      | +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      | 0      |

21-121



121 Contacts Size 23

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 1              | -4.08  | +10.60 |
| 2              | -2.04  | +10.60 |
| 3              | 0      | +10.60 |
| 4              | +2.04  | +10.60 |
| 5              | +4.08  | +10.60 |
| 6              | -7.14  | +8.83  |
| 7              | -5.10  | +8.83  |
| 8              | -3.06  | +8.83  |
| 9              | -1.02  | +8.83  |
| 10             | +1.02  | +8.83  |
| 11             | +3.06  | +8.83  |
| 12             | +5.10  | +8.83  |
| 13             | +7.14  | +8.83  |
| 14             | -8.16  | +7.07  |
| 15             | -6.12  | +7.07  |
| 16             | -4.08  | +7.07  |
| 17             | -2.04  | +7.07  |
| 18             | 0      | +7.07  |
| 19             | +2.04  | +7.07  |
| 20             | +4.08  | +7.07  |
| 21             | +6.12  | +7.07  |

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 22             | +8.16  | +7.07  |
| 23             | -9.18  | +5.30  |
| 24             | -7.14  | +5.30  |
| 25             | -5.10  | +5.30  |
| 26             | -3.06  | +5.30  |
| 27             | -1.02  | +5.30  |
| 28             | +1.02  | +5.30  |
| 29             | +3.06  | +5.30  |
| 30             | +5.10  | +5.30  |
| 31             | +7.14  | +5.30  |
| 32             | +9.18  | +5.30  |
| 33             | -10.20 | +3.53  |
| 34             | -8.16  | +3.53  |
| 35             | -6.12  | +3.53  |
| 36             | -4.08  | +3.53  |
| 37             | -2.04  | +3.53  |
| 38             | 0      | +3.53  |
| 39             | +2.04  | +3.53  |
| 40             | +4.08  | +3.53  |
| 41             | +6.12  | +3.53  |
| 42             | +8.16  | +3.53  |

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 43             | +10.20 | +3.53  |
| 44             | -11.22 | +1.77  |
| 45             | -9.18  | +1.77  |
| 46             | -7.14  | +1.77  |
| 47             | -5.10  | +1.77  |
| 48             | -3.06  | +1.77  |
| 49             | -1.02  | +1.77  |
| 50             | +1.02  | +1.77  |
| 51             | +3.06  | +1.77  |
| 52             | +5.10  | +1.77  |
| 53             | +7.14  | +1.77  |
| 54             | +9.18  | +1.77  |
| 55             | +11.22 | +1.77  |
| 56             | -10.20 | 0      |
| 57             | -8.16  | 0      |
| 58             | -6.12  | 0      |
| 59             | -4.08  | 0      |
| 60             | -2.04  | 0      |
| 61             | 0      | 0      |
| 62             | +2.04  | 0      |
| 63             | +4.08  | 0      |

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 64             | +6.12  | 0      |
| 65             | +8.16  | 0      |
| 66             | +10.20 | 0      |
| 67             | -11.22 | -1.77  |
| 68             | -9.18  | -1.77  |
| 69             | -7.14  | -1.77  |
| 70             | -5.10  | -1.77  |
| 71             | -3.06  | -1.77  |
| 72             | -1.02  | -1.77  |
| 73             | +1.02  | -1.77  |
| 74             | +3.06  | -1.77  |
| 75             | +5.10  | -1.77  |
| 76             | +7.14  | -1.77  |
| 77             | +9.18  | -1.77  |
| 78             | +11.22 | -1.77  |
| 79             | -10.20 | -3.53  |
| 80             | -8.16  | -3.53  |
| 81             | -6.12  | -3.53  |
| 82             | -4.08  | -3.53  |
| 83             | -2.04  | -3.53  |
| 84             | 0      | -3.53  |

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 85             | +2.04  | -3.53  |
| 86             | +4.08  | -3.53  |
| 87             | +6.12  | -3.53  |
| 88             | +8.16  | -3.53  |
| 89             | +10.20 | -3.53  |
| 90             | -9.18  | -5.30  |
| 91             | -7.14  | -5.30  |
| 92             | -5.10  | -5.30  |
| 93             | -3.06  | -5.30  |
| 94             | -1.02  | -5.30  |
| 95             | +1.02  | -5.30  |
| 96             | +3.06  | -5.30  |
| 97             | +5.10  | -5.30  |
| 98             | +7.14  | -5.30  |
| 99             | +9.18  | -5.30  |
| 100            | -8.16  | -7.07  |
| 101            | -6.12  | -7.07  |
| 102            | -4.08  | -7.07  |
| 103            | -2.04  | -7.07  |
| 104            | 0      | -7.07  |
| 105            | +2.04  | -7.07  |

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 106            | +4.08  | -7.07  |
| 107            | +6.12  | -7.07  |
| 108            | +8.16  | -7.07  |
| 109            | -7.14  | -8.83  |
| 110            | -5.10  | -8.83  |
| 111            | -3.06  | -8.83  |
| 112            | -1.02  | -8.83  |
| 113            | +1.02  | -8.83  |
| 114            | +3.06  | -8.83  |
| 115            | +5.10  | -8.83  |
| 116            | +7.14  | -8.83  |
| 117            | -4.08  | -10.60 |
| 118            | -2.04  | -10.60 |
| 119            | 0      | -10.60 |
| 120            | +2.04  | -10.60 |
| 121            | +4.08  | -10.60 |

## STANDARD RANGE

## PRINTED CIRCUIT BOARD CONNECTORS

23

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 1              | -10.87 | +6.12  |
| 2              | -11.86 | +3.91  |
| 3              | -12.40 | +1.55  |
| 4              | -10.54 | 0      |
| 5              | -12.40 | -1.55  |
| 6              | -10.87 | -3.61  |
| 7              | -10.87 | -6.02  |
| 8              | -8.43  | +8.46  |
| 9              | -8.43  | +6.05  |
| 10             | -8.43  | +3.63  |
| 11             | -8.43  | +1.22  |
| 12             | -8.43  | -1.19  |
| 13             | -8.43  | -3.61  |
| 14             | -8.43  | -6.02  |
| 15             | -8.43  | -8.43  |
| 16             | -6.32  | +9.65  |
| 17             | -6.32  | +7.24  |
| 18             | -6.32  | +4.83  |
| 19             | -6.32  | +2.41  |
| 20             | -6.32  | 0      |

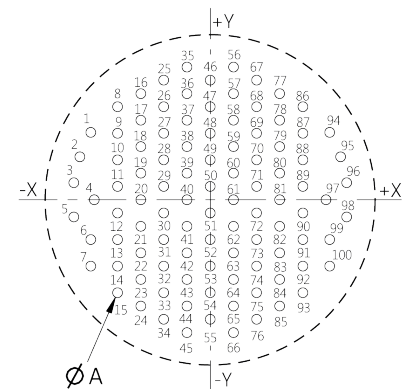
| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 21             | -6.32  | -2.41  |
| 22             | -6.32  | -4.83  |
| 23             | -6.32  | -7.24  |
| 24             | -6.32  | -9.65  |
| 25             | -4.22  | +10.87 |
| 26             | -4.22  | +8.46  |
| 27             | -4.22  | +6.05  |
| 28             | -4.22  | +3.63  |
| 29             | -4.22  | +1.22  |
| 30             | -4.22  | -1.19  |
| 31             | -4.22  | -3.61  |
| 32             | -4.22  | -6.02  |
| 33             | -4.22  | -8.43  |
| 34             | -4.22  | -10.85 |
| 35             | -2.11  | +12.07 |
| 36             | -2.11  | +9.65  |
| 37             | -2.11  | +7.24  |
| 38             | -2.11  | +4.83  |
| 39             | -2.11  | +2.41  |
| 40             | -2.11  | 0      |

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 41             | -2.11  | -2.41  |
| 42             | -2.11  | -4.83  |
| 43             | -2.11  | -7.24  |
| 44             | -2.11  | -9.65  |
| 45             | -2.11  | -12.07 |
| 46             | 0      | +10.87 |
| 47             | 0      | +8.46  |
| 48             | 0      | +6.05  |
| 49             | 0      | +3.63  |
| 50             | 0      | +1.22  |
| 51             | 0      | -1.19  |
| 52             | 0      | -3.61  |
| 53             | 0      | -6.02  |
| 54             | 0      | -8.43  |
| 55             | 0      | -10.85 |
| 56             | +2.11  | +12.07 |
| 57             | +2.11  | +9.65  |
| 58             | +2.11  | +7.24  |
| 59             | +2.11  | +4.83  |
| 60             | +2.11  | +2.41  |

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 61             | +2.11  | 0      |
| 62             | +2.11  | -2.41  |
| 63             | +2.11  | -4.83  |
| 64             | +2.11  | -7.24  |
| 65             | +2.11  | -9.65  |
| 66             | +2.11  | -12.07 |
| 67             | +4.22  | +10.87 |
| 68             | +4.22  | +8.46  |
| 69             | +4.22  | +6.05  |
| 70             | +4.22  | +3.63  |
| 71             | +4.22  | +1.22  |
| 72             | +4.22  | -1.19  |
| 73             | +4.22  | -3.61  |
| 74             | +4.22  | -6.02  |
| 75             | +4.22  | -8.43  |
| 76             | +4.22  | -10.85 |
| 77             | +6.32  | +9.65  |
| 78             | +6.32  | +7.24  |
| 79             | +6.32  | +4.83  |
| 80             | +6.32  | +2.41  |

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 81             | +6.32  | 0      |
| 82             | +6.32  | -2.41  |
| 83             | +6.32  | -4.83  |
| 84             | +6.32  | -7.24  |
| 85             | +6.32  | -9.65  |
| 86             | +8.43  | +8.46  |
| 87             | +8.43  | +6.05  |
| 88             | +8.43  | +3.63  |
| 89             | +8.43  | +1.22  |
| 90             | +8.43  | -1.19  |
| 91             | +8.43  | -3.61  |
| 92             | +8.43  | -6.02  |
| 93             | +8.43  | -8.43  |
| 94             | +10.87 | +6.12  |
| 95             | +11.86 | +3.91  |
| 96             | +12.40 | +1.55  |
| 97             | +10.54 | 0      |
| 98             | +12.40 | -1.55  |
| 99             | +10.87 | -3.61  |
| 100            | +10.87 | -6.02  |

23-35



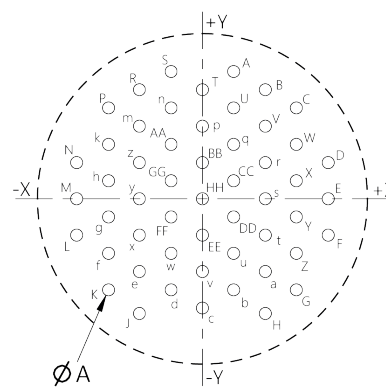
100 Contacts Size 22D

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| A              | +2.84  | +11.56 |
| B              | +5.72  | +9.91  |
| C              | +8.53  | +8.26  |
| D              | +11.43 | +3.30  |
| E              | +11.43 | 0      |
| F              | +11.43 | -3.30  |
| G              | +8.53  | -8.26  |
| H              | +5.72  | -10.41 |
| J              | -5.72  | -10.41 |
| K              | -8.53  | -8.26  |
| L              | -11.43 | -3.30  |
| M              | -11.43 | 0      |
| N              | -11.43 | +3.30  |
| P              | -8.53  | +8.26  |
| R              | -5.72  | +9.91  |
| S              | -2.84  | +11.56 |
| T              | 0      | +9.91  |
| U              | +2.84  | +8.26  |

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| V              | +5.72  | +6.60  |
| W              | +8.53  | +4.95  |
| X              | +8.53  | +1.65  |
| Y              | +8.53  | -1.65  |
| Z              | +8.53  | -4.95  |
| a              | +5.72  | -6.60  |
| b              | +2.84  | -8.26  |
| c              | 0      | -9.91  |
| d              | -2.84  | -8.26  |
| e              | -5.72  | -6.60  |
| f              | -8.53  | -4.95  |
| g              | -8.53  | -1.65  |
| h              | -8.53  | +1.65  |
| k              | -8.53  | +4.95  |
| m              | -5.72  | +6.60  |
| n              | -2.84  | +8.26  |
| p              | 0      | +6.60  |
| q              | +2.84  | +4.95  |

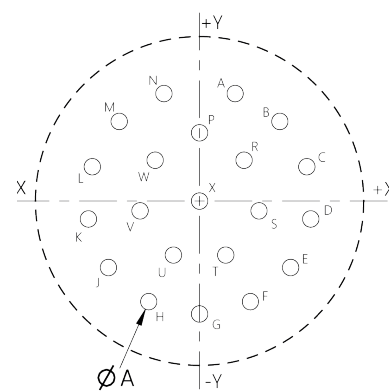
| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| r              | +5.72  | +3.30  |
| s              | +5.72  | 0      |
| t              | +5.72  | -3.30  |
| u              | +2.84  | -4.95  |
| v              | 0      | -6.60  |
| w              | -2.84  | -4.95  |
| x              | -5.72  | -3.30  |
| y              | -5.72  | 0      |
| z              | -5.72  | +3.30  |
| AA             | -2.84  | +4.95  |
| BB             | 0      | +3.30  |
| CC             | +2.84  | +1.65  |
| DD             | +2.84  | -1.65  |
| EE             | 0      | -3.30  |
| FF             | -2.84  | -1.65  |
| GG             | -2.84  | +1.65  |
| HH             | 0      | 0      |

23-53



53 Contacts Size 20

23-21



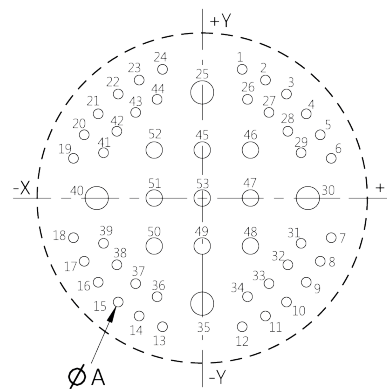
21 Contacts Size 16

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 1              | +3.61  | +11.71 |
| 2              | +5.74  | +10.72 |
| 3              | +7.65  | +9.45  |
| 4              | +9.45  | +7.65  |
| 5              | +10.72 | +5.74  |
| 6              | +11.71 | +3.61  |
| 7              | +11.71 | -3.61  |
| 8              | +10.72 | -5.74  |
| 9              | +9.45  | -7.65  |
| 10             | +7.65  | -9.45  |
| 11             | +5.74  | -10.72 |
| 12             | +3.61  | -11.71 |
| 13             | -3.61  | -11.71 |
| 14             | -5.74  | -10.72 |
| 15             | -7.65  | -9.45  |
| 16             | -9.45  | -7.65  |
| 17             | -10.72 | -5.74  |
| 18             | -11.71 | -3.61  |

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 19             | -11.71 | +3.61  |
| 20             | -10.72 | +5.74  |
| 21             | -9.45  | +7.65  |
| 22             | -7.65  | +9.45  |
| 23             | -5.74  | +10.72 |
| 24             | -3.61  | +11.71 |
| 25             | 0      | +9.60  |
| 26             | +4.11  | +8.97  |
| 27             | +6.07  | +7.77  |
| 28             | +7.77  | +6.07  |
| 29             | +8.97  | +4.11  |
| 30             | +9.60  | 0      |
| 31             | +8.97  | -4.11  |
| 32             | +7.77  | -6.07  |
| 33             | +6.07  | -7.77  |
| 34             | +4.11  | -8.97  |
| 35             | 0      | -9.60  |
| 36             | -4.11  | -8.97  |

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 37             | -6.07  | -7.77  |
| 38             | -7.77  | -6.07  |
| 39             | -8.97  | -4.11  |
| 40             | -9.60  | 0      |
| 41             | -8.97  | +4.11  |
| 42             | -7.77  | +6.07  |
| 43             | -6.07  | +7.77  |
| 44             | -4.11  | +8.97  |
| 45             | 0      | +4.37  |
| 46             | +4.37  | +4.37  |
| 47             | +4.37  | 0      |
| 48             | +4.37  | -4.37  |
| 49             | 0      | -4.37  |
| 50             | -4.37  | -4.37  |
| 51             | -4.37  | 0      |
| 52             | -4.37  | +4.37  |
| 53             | 0      | 0      |

23-54

40 Contacts Size 22D  
9 Contacts Size 16  
4 Contacts Size 12

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 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      | -10.31 |
| H              | -4.65  | -9.19  |
| J              | -8.33  | -6.07  |
| K              | -10.16 | -1.65  |
| L              | -9.80  | +3.12  |
| M              | -7.34  | +7.24  |
| N              | -3.25  | +9.78  |
| P              | 0      | +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      | 0      |

## STANDARD RANGE

## PRINTED CIRCUIT BOARD CONNECTORS

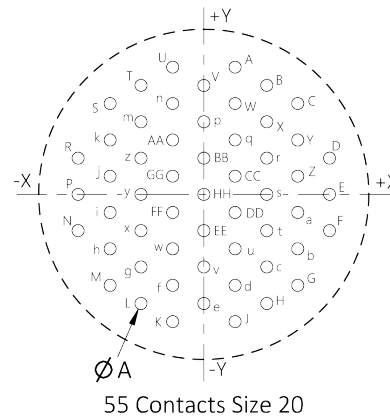
23

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| A              | +2.84  | +11.56 |
| B              | +5.72  | +9.91  |
| C              | +8.53  | +8.26  |
| D              | +11.43 | +3.30  |
| E              | +11.43 | 0      |
| F              | +11.43 | -3.30  |
| G              | +8.53  | -8.26  |
| H              | +5.72  | -9.91  |
| J              | +2.84  | -11.56 |
| K              | -2.84  | -11.56 |
| L              | -5.72  | -9.91  |
| M              | -8.53  | -8.26  |
| N              | -11.43 | -3.30  |
| P              | -11.43 | 0      |
| R              | -11.43 | +3.30  |
| S              | -8.53  | +8.26  |
| T              | -5.72  | +9.91  |
| U              | -2.84  | +11.56 |
| V              | 0      | +9.91  |

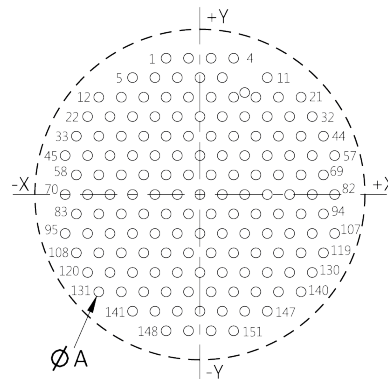
| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| W              | +2.84  | +8.26  |
| X              | +5.72  | +6.60  |
| Y              | +8.53  | +4.95  |
| Z              | +8.53  | +1.65  |
| a              | +8.53  | -1.65  |
| b              | +8.53  | -4.95  |
| c              | +5.72  | -6.60  |
| d              | +2.84  | -8.26  |
| e              | 0      | -9.91  |
| f              | -2.84  | -8.26  |
| g              | -5.72  | -6.60  |
| h              | -8.53  | -4.95  |
| i              | -8.53  | -1.65  |
| j              | -8.53  | +1.65  |
| k              | -8.53  | +4.95  |
| m              | -5.72  | +6.60  |
| n              | -2.84  | +8.26  |
| p              | 0      | +6.60  |
| q              | +2.84  | +4.95  |

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| r              | +5.72  | +3.30  |
| s              | +5.72  | 0      |
| t              | +5.72  | -3.30  |
| u              | +2.84  | -4.95  |
| v              | 0      | -6.60  |
| w              | -2.84  | -4.95  |
| x              | -5.72  | -3.30  |
| y              | -5.72  | 0      |
| z              | -5.72  | +3.30  |
| AA             | -2.84  | +4.95  |
| BB             | 0      | +3.30  |
| CC             | +2.84  | +1.65  |
| DD             | +2.84  | -1.65  |
| EE             | 0      | -3.30  |
| FF             | -2.84  | -1.65  |
| GG             | -2.84  | +1.65  |
| HH             | 0      | 0      |

23-55



23-151



| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 1              | -3.06  | +12.37 |
| 2              | -1.02  | +12.37 |
| 3              | +1.02  | +12.37 |
| 4              | +3.06  | +12.37 |
| 5              | -6.12  | +10.60 |
| 6              | -4.08  | +10.60 |
| 7              | -2.04  | +10.60 |
| 8              | 0      | +10.60 |
| 9              | +2.04  | +10.60 |
| 10             | +4.08  | +10.60 |
| 11             | +6.12  | +10.60 |
| 12             | -9.18  | +8.83  |
| 13             | -7.14  | +8.83  |
| 14             | -5.10  | +8.83  |
| 15             | -3.06  | +8.83  |
| 16             | -1.02  | +8.83  |
| 17             | +1.02  | +8.83  |
| 18             | +3.06  | +8.83  |
| 19             | +5.10  | +8.83  |
| 20             | +7.14  | +8.83  |
| 21             | +9.18  | +8.83  |
| 22             | -10.20 | +7.07  |

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 23             | -8.16  | +7.07  |
| 24             | -6.12  | +7.07  |
| 25             | -4.08  | +7.07  |
| 26             | -2.04  | +7.07  |
| 27             | 0      | +7.07  |
| 28             | +2.04  | +7.07  |
| 29             | +4.08  | +7.07  |
| 30             | +6.12  | +7.07  |
| 31             | +8.16  | +7.07  |
| 32             | +10.20 | +7.07  |
| 33             | -11.22 | +5.30  |
| 34             | -9.18  | +5.30  |
| 35             | -7.14  | +5.30  |
| 36             | -5.10  | +5.30  |
| 37             | -3.06  | +5.30  |
| 38             | -1.02  | +5.30  |
| 39             | +1.02  | +5.30  |
| 40             | +3.06  | +5.30  |
| 41             | +5.10  | +5.30  |
| 42             | +7.14  | +5.30  |
| 43             | +9.18  | +5.30  |
| 44             | +11.22 | +5.30  |

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 45             | -12.24 | +3.53  |
| 46             | -10.20 | +3.53  |
| 47             | -8.16  | +3.53  |
| 48             | -6.12  | +3.53  |
| 49             | -4.08  | +3.53  |
| 50             | -2.04  | +3.53  |
| 51             | 0      | +3.53  |
| 52             | +2.04  | +3.53  |
| 53             | +4.08  | +3.53  |
| 54             | +6.12  | +3.53  |
| 55             | +8.16  | +3.53  |
| 56             | +10.20 | +3.53  |
| 57             | +12.24 | +3.53  |
| 58             | -11.22 | +1.77  |
| 59             | -9.18  | +1.77  |
| 60             | -7.14  | +1.77  |
| 61             | -5.10  | +1.77  |
| 62             | -3.06  | +1.77  |
| 63             | -1.02  | +1.77  |
| 64             | +1.02  | +1.77  |
| 65             | +3.06  | +1.77  |
| 66             | +5.10  | +1.77  |

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 67             | +7.14  | +1.77  |
| 68             | +9.18  | +1.77  |
| 69             | +11.22 | +1.77  |
| 70             | -12.24 | 0      |
| 71             | -10.20 | 0      |
| 72             | -8.16  | 0      |
| 73             | -6.12  | 0      |
| 74             | -4.08  | 0      |
| 75             | -2.04  | 0      |
| 76             | 0      | 0      |
| 77             | +2.04  | 0      |
| 78             | +4.08  | 0      |
| 79             | +6.12  | 0      |
| 80             | +8.16  | 0      |
| 81             | +10.20 | 0      |
| 82             | +12.24 | 0      |
| 83             | -11.22 | -1.77  |
| 84             | -9.18  | -1.77  |
| 85             | -7.14  | -1.77  |
| 86             | -5.10  | -1.77  |
| 87             | -3.06  | -1.77  |
| 88             | -1.02  | -1.77  |

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 89             | +1.02  | -1.77  |
| 90             | +3.06  | -1.77  |
| 91             | +5.10  | -1.77  |
| 92             | +7.14  | -1.77  |
| 93             | +9.18  | -1.77  |
| 94             | +11.22 | -1.77  |
| 95             | -12.24 | -3.53  |
| 96             | -10.20 | -3.53  |
| 97             | -8.16  | -3.53  |
| 98             | -6.12  | -3.53  |
| 99             | -4.08  | -3.53  |
| 100            | -2.04  | -3.53  |
| 101            | 0      | -3.53  |
| 102            | +2.04  | -3.53  |
| 103            | +4.08  | -3.53  |
| 104            | +6.12  | -3.53  |
| 105            | +8.16  | -3.53  |
| 106            | +10.20 | -3.53  |
| 107            | +12.24 | -3.53  |
| 108            | -11.22 | -5.30  |
| 109            | -9.18  | -5.30  |
| 110            | -7.14  | -5.30  |

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 111            | -5.10  | -5.30  |
| 112            | -3.06  | -5.30  |
| 113            | -1.02  | -5.30  |
| 114            | +1.02  | -5.30  |
| 115            | +3.06  | -5.30  |
| 116            | +5.10  | -5.30  |
| 117            | +7.14  | -5.30  |
| 118            | +9.18  | -5.30  |
| 119            | +11.22 | -5.30  |
| 120            | -10.20 | -7.07  |
| 121            | -8.16  | -7.07  |
| 122            | -6.12  | -7.07  |
| 123            | -4.08  | -7.07  |
| 124            | -2.04  | -7.07  |
| 125            | 0      | -7.07  |
| 126            | +2.04  | -7.07  |
| 127            | +4.08  | -7.07  |
| 128            | +6.12  | -7.07  |
| 129            | +8.16  | -7.07  |
| 130            | +10.20 | -7.07  |
| 131            | -9.18  | -8.83  |
| 132            | -7.14  | -8.83  |

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 133            | -5.10  | -8.83  |
| 134            | -3.06  | -8.83  |
| 135            | -1.02  | -8.83  |
| 136            | +1.02  | -8.83  |
| 137            | +3.06  | -8.83  |
| 138            | +5.10  | -8.83  |
| 139            | +7.14  | -8.83  |
| 140            | +9.18  | -8.83  |
| 141            | -6.12  | -10.60 |
| 142            | -4.08  | -10.60 |
| 143            | -2.04  | -10.60 |
| 144            | 0      | -10.60 |
| 145            | +2.04  | -10.60 |
| 146            | +4.08  | -10.60 |
| 147            | +6.12  | -10.60 |
| 148            | -3.06  | -12.37 |
| 149            | -1.02  | -12.37 |
| 150            | +1.02  | -12.37 |
| 151            | +3.06  | -12.37 |

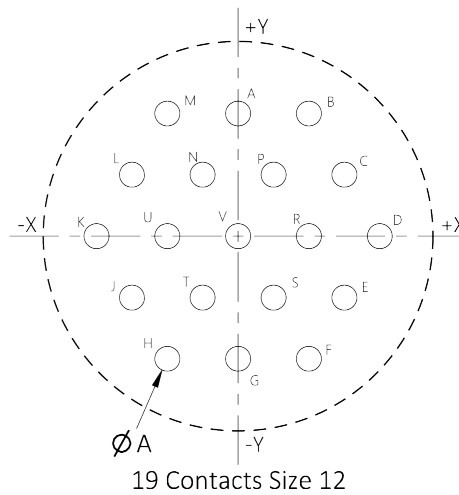
## STANDARD RANGE

## PRINTED CIRCUIT BOARD CONNECTORS

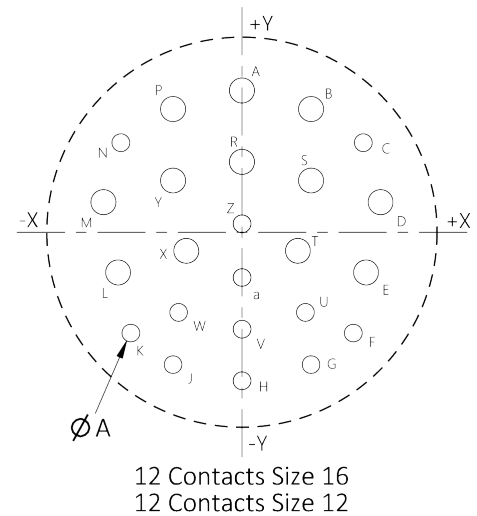
25

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| A              | 0      | +10.39 |
| B              | +5.99  | +10.39 |
| C              | +8.99  | +5.21  |
| D              | +11.99 | 0      |
| E              | +8.99  | -5.21  |
| F              | +5.99  | -10.39 |
| G              | 0      | -10.39 |
| H              | -5.99  | -10.39 |
| J              | -8.99  | -5.21  |
| K              | -11.99 | 0      |
| L              | -8.99  | +5.21  |
| M              | -5.99  | +10.39 |
| N              | -3.00  | +5.21  |
| P              | +3.00  | +5.21  |
| R              | +5.99  | 0      |
| S              | +3.00  | -5.21  |
| T              | -3.00  | -5.21  |
| U              | -5.99  | 0      |
| V              | 0      | 0      |

25-19



25-24



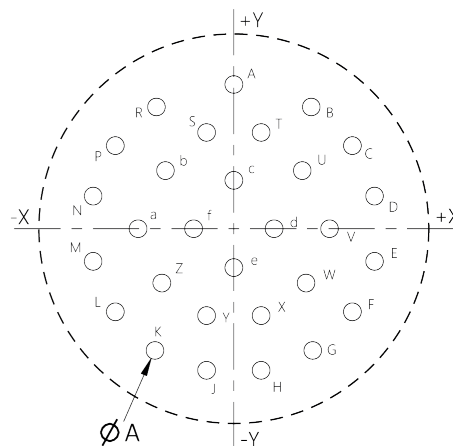
| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| A              | 0      | +11.99 |
| B              | +5.84  | +10.41 |
| C              | +10.24 | +7.57  |
| D              | +11.71 | +2.54  |
| E              | +10.49 | -3.40  |
| F              | +9.40  | -8.53  |
| G              | +5.84  | -11.20 |
| H              | 0      | -12.57 |
| J              | -5.84  | -11.20 |
| K              | -9.40  | -8.53  |
| L              | -10.49 | -3.40  |
| M              | -11.71 | +2.54  |

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| N              | -10.24 | +7.57  |
| P              | -5.84  | +10.41 |
| R              | 0      | +5.94  |
| S              | +5.84  | +4.37  |
| T              | +4.72  | -1.57  |
| U              | +5.36  | -6.78  |
| V              | 0      | -8.20  |
| W              | -5.36  | -6.78  |
| X              | -4.72  | -1.57  |
| Y              | -5.84  | +4.37  |
| Z              | 0      | +0.71  |
| a              | 0      | -3.84  |

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| A              | 0      | +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  |
| R              | -6.55  | +10.31 |

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| S              | -2.31  | +8.15  |
| T              | +2.31  | +8.15  |
| U              | +5.79  | +4.93  |
| V              | +8.10  | 0      |
| W              | +6.10  | -4.60  |
| X              | +2.31  | -7.37  |
| Y              | -2.31  | -7.37  |
| Z              | -6.10  | -4.60  |
| a              | -8.10  | 0      |
| b              | -5.79  | +4.93  |
| c              | 0      | +4.09  |
| d              | +3.40  | 0      |
| e              | 0      | -3.30  |
| f              | -3.40  | 0      |

25-29

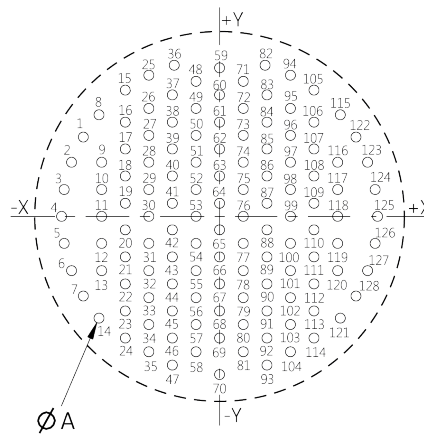


## STANDARD RANGE

## PRINTED CIRCUIT BOARD CONNECTORS

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25-35



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| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 1              | -12.17 | +7.09  |
| 2              | -13.21 | +4.83  |
| 3              | -13.87 | +2.41  |
| 4              | -14.10 | 0      |
| 5              | -13.87 | -2.41  |
| 6              | -13.21 | -4.83  |
| 7              | -12.17 | -7.09  |
| 8              | -10.77 | +9.07  |
| 9              | -10.54 | +4.83  |
| 10             | -10.54 | +2.41  |
| 11             | -10.54 | 0      |
| 12             | -10.54 | -2.41  |
| 13             | -10.54 | -4.83  |
| 14             | -10.77 | -9.07  |
| 15             | -8.43  | +11.28 |
| 16             | -8.43  | +8.43  |
| 17             | -8.43  | +6.02  |
| 18             | -8.43  | +3.61  |
| 19             | -8.43  | +1.19  |
| 20             | -8.43  | -1.19  |
| 21             | -8.43  | -3.61  |
| 22             | -8.43  | -6.02  |

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 23             | -8.43  | -8.43  |
| 24             | -8.43  | -10.85 |
| 25             | -6.32  | +12.60 |
| 26             | -6.32  | +9.65  |
| 27             | -6.32  | +7.24  |
| 28             | -6.32  | +4.83  |
| 29             | -6.32  | +2.41  |
| 30             | -6.32  | 0      |
| 31             | -6.32  | -2.41  |
| 32             | -6.32  | -4.83  |
| 33             | -6.32  | -7.24  |
| 34             | -6.32  | -9.65  |
| 35             | -6.32  | -12.07 |
| 36             | -4.06  | +13.49 |
| 37             | -4.22  | +10.85 |
| 38             | -4.22  | +8.43  |
| 39             | -4.22  | +6.02  |
| 40             | -4.22  | +3.61  |
| 41             | -4.22  | +1.19  |
| 42             | -4.22  | -1.19  |
| 43             | -4.22  | -3.61  |
| 44             | -4.22  | -6.02  |

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 45             | -4.22  | -8.43  |
| 46             | -4.22  | -10.85 |
| 47             | -4.22  | -13.26 |
| 48             | -2.11  | +12.07 |
| 49             | -2.11  | +9.65  |
| 50             | -2.11  | +7.24  |
| 51             | -2.11  | +4.83  |
| 52             | -2.11  | +2.41  |
| 53             | -2.11  | 0      |
| 54             | -2.11  | -2.41  |
| 55             | -2.11  | -4.83  |
| 56             | -2.11  | -7.24  |
| 57             | -2.11  | -9.65  |
| 58             | -2.11  | -12.07 |
| 59             | 0      | +13.26 |
| 60             | 0      | +10.85 |
| 61             | 0      | +8.43  |
| 62             | 0      | +6.02  |
| 63             | 0      | +3.61  |
| 64             | 0      | +1.19  |
| 65             | 0      | -1.19  |
| 66             | 0      | -3.61  |

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 67             | 0      | -6.02  |
| 68             | 0      | -8.43  |
| 69             | 0      | -10.85 |
| 70             | 0      | -14.10 |
| 71             | +2.11  | +12.07 |
| 72             | +2.11  | +9.65  |
| 73             | +2.11  | +7.24  |
| 74             | +2.11  | +4.83  |
| 75             | +2.11  | +2.41  |
| 76             | +2.11  | 0      |
| 77             | +2.11  | -2.41  |
| 78             | +2.11  | -4.83  |
| 79             | +2.11  | -7.24  |
| 80             | +2.11  | -9.65  |
| 81             | +2.11  | -12.07 |
| 82             | +4.06  | +13.49 |
| 83             | +4.22  | +10.85 |
| 84             | +4.22  | +8.43  |
| 85             | +4.22  | +6.02  |
| 86             | +4.22  | +3.61  |
| 87             | +4.22  | +1.19  |
| 88             | +4.22  | -1.19  |

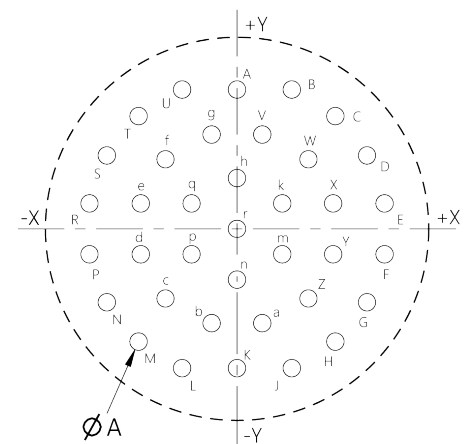
| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 89             | +4.22  | -3.61  |
| 90             | +4.22  | -6.02  |
| 91             | +4.22  | -8.43  |
| 92             | +4.22  | -10.85 |
| 93             | +4.22  | -13.26 |
| 94             | +6.32  | +12.60 |
| 95             | +6.32  | +9.65  |
| 96             | +6.32  | +7.24  |
| 97             | +6.32  | +4.83  |
| 98             | +6.32  | +2.41  |
| 99             | +6.32  | 0      |
| 100            | +6.32  | -2.41  |
| 101            | +6.32  | -4.83  |
| 102            | +6.32  | -7.24  |
| 103            | +6.32  | -9.65  |
| 104            | +6.32  | -12.07 |
| 105            | +8.43  | +11.28 |
| 106            | +8.43  | +8.43  |
| 107            | +8.43  | +6.02  |
| 108            | +8.43  | +3.61  |
| 109            | +8.43  | +1.19  |
| 110            | +8.43  | -1.19  |

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 111            | +8.43  | -3.61  |
| 112            | +8.43  | -6.02  |
| 113            | +8.43  | -8.43  |
| 114            | +8.43  | -10.85 |
| 115            | +10.77 | +9.07  |
| 116            | +10.54 | +4.83  |
| 117            | +10.54 | +2.41  |
| 118            | +10.54 | 0      |
| 119            | +10.54 | -2.41  |
| 120            | +10.54 | -4.83  |
| 121            | +10.77 | -9.07  |
| 122            | +12.17 | +7.09  |
| 123            | +13.21 | +4.83  |
| 124            | +13.87 | +2.41  |
| 125            | +14.10 | 0      |
| 126            | +13.87 | -2.41  |
| 127            | +13.21 | -4.83  |
| 128            | +12.17 | -7.09  |

25-37

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| A              | 0      | +11.99 |
| B              | +4.70  | +11.99 |
| C              | +8.46  | +9.70  |
| D              | +11.20 | +6.32  |
| E              | +12.70 | +2.18  |
| F              | +12.70 | -2.18  |
| G              | +11.20 | -6.32  |
| H              | +8.46  | +9.70  |
| J              | +4.72  | -11.99 |
| K              | 0      | -11.99 |
| L              | -4.72  | -11.99 |
| M              | -8.46  | -9.70  |
| N              | -11.20 | -6.32  |
| P              | -12.70 | -2.18  |
| R              | -12.70 | +2.18  |
| S              | -11.20 | +6.32  |
| T              | -8.46  | +9.70  |
| U              | -4.72  | +11.99 |
| V              | +2.18  | +8.13  |

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| W              | +6.15  | +5.99  |
| X              | +8.28  | +2.18  |
| Y              | +8.28  | -2.18  |
| Z              | +6.15  | -5.99  |
| a              | +2.18  | -8.13  |
| b              | -2.18  | -8.13  |
| c              | -6.15  | -5.99  |
| d              | -8.28  | -2.18  |
| e              | -8.28  | +2.18  |
| f              | -6.15  | +5.99  |
| g              | -2.18  | +8.13  |
| h              | 0      | +4.37  |
| k              | +3.91  | +2.18  |
| m              | +3.91  | -2.18  |
| n              | 0      | -4.37  |
| p              | -3.91  | -2.18  |
| q              | -3.91  | +2.18  |
| r              | 0      | 0      |



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## STANDARD RANGE

## PRINTED CIRCUIT BOARD CONNECTORS

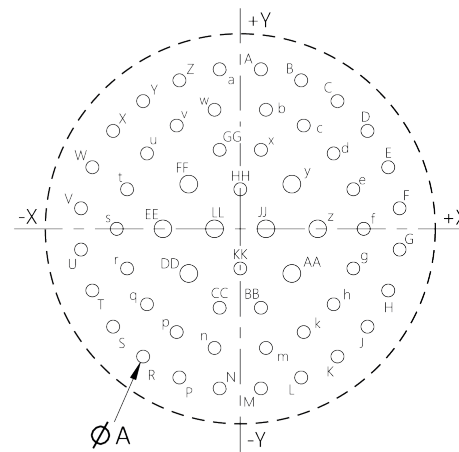
25

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 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              | +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  |

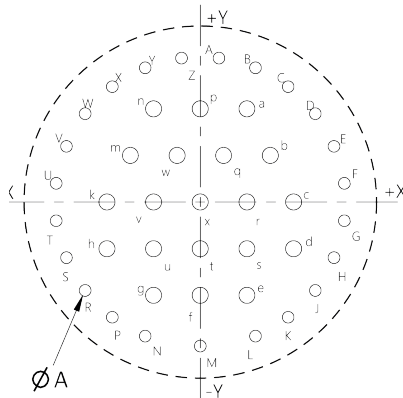
| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| W              | -12.52 | +5.21  |
| X              | -10.77 | +8.28  |
| Y              | -8.23  | +10.80 |
| Z              | -5.16  | +12.57 |
| a              | -1.75  | +13.49 |
| b              | +2.18  | +10.08 |
| c              | +5.38  | +8.74  |
| d              | +7.90  | +6.38  |
| e              | +9.58  | +3.35  |
| f              | +10.46 | 0      |
| g              | +9.58  | -3.35  |
| h              | +7.90  | -6.38  |
| k              | +5.38  | -8.74  |
| m              | +2.18  | -10.08 |
| n              | -2.18  | -10.08 |
| p              | -5.38  | -8.74  |
| q              | -7.90  | -6.38  |
| r              | -9.58  | -3.35  |
| s              | -10.46 | 0      |

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| t              | -9.58  | +3.35  |
| u              | -7.90  | +6.38  |
| v              | -5.38  | +8.74  |
| w              | -2.18  | +10.08 |
| x              | +1.75  | +6.68  |
| y              | +4.37  | +3.78  |
| z              | +6.55  | 0      |
| AA             | +4.37  | -3.78  |
| BB             | +1.75  | -6.68  |
| CC             | -1.75  | -6.68  |
| DD             | -4.37  | -3.78  |
| EE             | -6.55  | 0      |
| FF             | -4.37  | +3.78  |
| GG             | -1.75  | +6.68  |
| HH             | 0      | +3.35  |
| JJ             | +2.18  | 0      |
| KK             | 0      | -3.35  |
| LL             | -2.18  | 0      |

25-4

48 Contacts Size 20  
8 Contacts Size 16

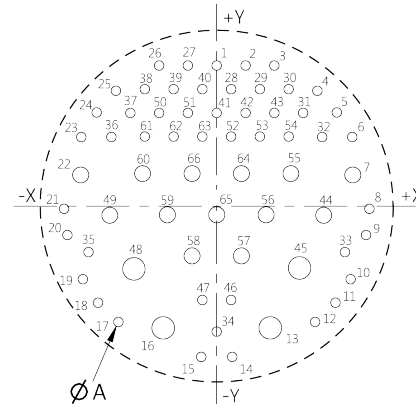
25-43

23 Contacts Size 20  
20 Contacts Size 16

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 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      | -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 |

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| Z              | -1.75  | +13.49 |
| a              | +4.37  | +8.74  |
| b              | +6.55  | +4.37  |
| c              | +8.74  | 0      |
| d              | +8.74  | -4.37  |
| e              | +4.37  | -8.74  |
| f              | 0      | -8.74  |
| g              | -4.37  | -8.74  |
| h              | -8.74  | -4.37  |
| k              | -8.74  | 0      |
| m              | -6.55  | +4.37  |
| n              | -4.37  | +8.74  |
| p              | 0      | +8.74  |
| q              | +2.18  | +4.37  |
| r              | +4.37  | 0      |
| s              | +4.37  | -4.37  |
| t              | 0      | -4.37  |
| u              | -4.37  | -4.37  |
| v              | -4.37  | 0      |
| w              | -2.18  | +4.37  |
| x              | 0      | 0      |

25-F4

49 Contacts Size 22D  
13 Contacts Size 16  
4 Contacts Size 12

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 1              | 0      | +13.18 |
| 2              | +2.69  | +13.18 |
| 3              | +5.38  | +13.18 |
| 4              | +9.42  | +10.82 |
| 5              | +11.23 | +8.79  |
| 6              | +12.67 | +6.48  |
| 7              | +12.73 | +2.92  |
| 8              | +14.27 | -0.25  |
| 9              | +13.97 | -2.72  |
| 10             | +12.52 | -6.86  |
| 11             | +11.10 | -9.07  |
| 12             | +9.19  | -10.87 |
| 13             | +5.00  | -11.43 |
| 14             | +1.45  | -14.15 |
| 15             | -1.45  | -14.15 |
| 16             | -5.00  | -11.43 |
| 17             | -9.19  | -10.87 |
| 18             | -11.10 | -9.07  |
| 19             | -12.52 | -6.86  |
| 20             | -13.97 | -2.72  |
| 21             | -14.27 | -0.25  |
| 22             | -12.73 | +2.92  |

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 23             | -12.67 | +6.48  |
| 24             | -11.23 | +8.79  |
| 25             | -9.42  | +10.82 |
| 26             | -5.38  | +13.18 |
| 27             | -2.69  | +13.18 |
| 28             | +1.35  | +10.97 |
| 29             | +4.04  | +10.97 |
| 30             | +6.73  | +10.97 |
| 31             | +8.08  | +8.74  |
| 32             | +9.86  | +6.48  |
| 33             | +11.99 | -4.32  |
| 34             | 0      | -11.79 |
| 35             | -11.99 | -4.32  |
| 36             | -9.86  | +6.48  |
| 37             | -8.08  | +8.74  |
| 38             | -6.73  | +10.97 |
| 39             | -4.04  | +10.97 |
| 40             | -1.35  | +10.97 |
| 41             | 0      | +8.74  |
| 42             | +2.69  | +8.74  |
| 43             | +5.38  | +8.74  |
| 44             | +10.01 | -0.86  |

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 45             | +7.75  | -5.89  |
| 46             | +1.35  | -8.81  |
| 47             | -1.35  | -8.81  |
| 48             | -7.75  | -5.89  |
| 49             | -10.01 | -0.86  |
| 50             | -5.38  | +8.74  |
| 51             | -2.69  | +8.74  |
| 52             | +1.35  | +6.53  |
| 53             | +4.04  | +6.53  |
| 54             | +6.73  | +6.53  |
| 55             | +6.93  | +3.05  |
| 56             | +4.62  | -0.81  |
| 57             | +2.31  | -4.67  |
| 58             | -2.31  | -4.67  |
| 59             | -4.62  | -0.81  |
| 60             | -6.93  | +3.05  |
| 61             | -6.73  | +6.53  |
| 62             | -4.04  | +6.53  |
| 63             | -1.35  | +6.53  |
| 64             | +2.31  | +3.05  |
| 65             | 0      | -0.81  |
| 66             | -2.31  | +3.05  |

## STANDARD RANGE

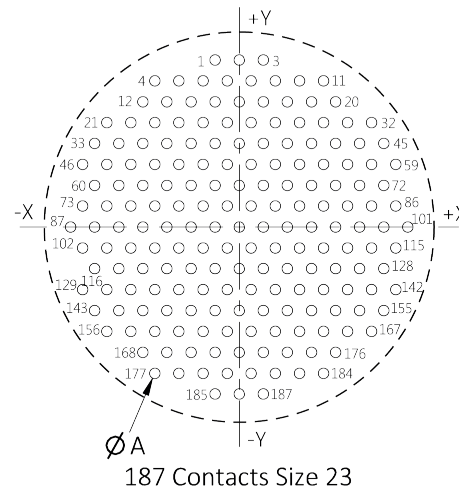
## PRINTED CIRCUIT BOARD CONNECTORS

25

| Cavity marking | X (mm) | Y (mm) | Cavity marking | X (mm) | Y (mm) | Cavity marking | X (mm) | Y (mm) | Cavity marking | X (mm) | Y (mm) | Cavity marking | X (mm) | Y (mm) | Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|----------------|--------|--------|----------------|--------|--------|----------------|--------|--------|----------------|--------|--------|----------------|--------|--------|
| 1              | -2.04  | +14.13 | 22             | -9.18  | +8.83  | 43             | +8.16  | +7.07  | 64             | -4.08  | +3.53  | 85             | +11.22 | +1.77  | 106            | -5.10  | -1.77  |
| 2              | 0      | +14.13 | 23             | -7.14  | +8.83  | 44             | +10.20 | +7.07  | 65             | -2.04  | +3.53  | 86             | +13.26 | +1.77  | 107            | -3.06  | -1.77  |
| 3              | +2.04  | +14.13 | 24             | -5.10  | +8.83  | 45             | +12.24 | +7.07  | 66             | 0      | +3.53  | 87             | -14.28 | 0      | 108            | -1.02  | -1.77  |
| 4              | -7.14  | +12.37 | 25             | -3.06  | +8.83  | 46             | -13.26 | +5.30  | 67             | +2.04  | +3.53  | 88             | -12.24 | 0      | 109            | +1.02  | -1.77  |
| 5              | -5.10  | +12.37 | 26             | -1.02  | +8.83  | 47             | -11.22 | +5.30  | 68             | +4.08  | +3.53  | 89             | -10.20 | 0      | 110            | +3.06  | -1.77  |
| 6              | -3.06  | +12.37 | 27             | +1.02  | +8.83  | 48             | -9.18  | +5.30  | 69             | +6.12  | +3.53  | 90             | -8.16  | 0      | 111            | +5.10  | -1.77  |
| 7              | -1.02  | +12.37 | 28             | +3.06  | +8.83  | 49             | -7.14  | +5.30  | 70             | +8.16  | +3.53  | 91             | -6.12  | 0      | 112            | +7.14  | -1.77  |
| 8              | +1.02  | +12.37 | 29             | +5.10  | +8.83  | 50             | -5.10  | +5.30  | 71             | +10.20 | +3.53  | 92             | -4.08  | 0      | 113            | +9.18  | -1.77  |
| 9              | +3.06  | +12.37 | 30             | +7.14  | +8.83  | 51             | -3.06  | +5.30  | 72             | +12.24 | +3.53  | 93             | -2.04  | 0      | 114            | +11.22 | -1.77  |
| 10             | +5.10  | +12.37 | 31             | +9.18  | +8.83  | 52             | -1.02  | +5.30  | 73             | -13.26 | +1.77  | 94             | 0      | 0      | 115            | +13.26 | -1.77  |
| 11             | +7.14  | +12.37 | 32             | +11.22 | +8.83  | 53             | +1.02  | +5.30  | 74             | -11.22 | +1.77  | 95             | +2.04  | 0      | 116            | -12.24 | -3.53  |
| 12             | -8.16  | +10.60 | 33             | -12.24 | +7.07  | 54             | +3.06  | +5.30  | 75             | -9.18  | +1.77  | 96             | +4.08  | 0      | 117            | -10.20 | -3.53  |
| 13             | -6.12  | +10.60 | 34             | -10.20 | +7.07  | 55             | +5.10  | +5.30  | 76             | -7.14  | +1.77  | 97             | +6.12  | 0      | 118            | -8.16  | -3.53  |
| 14             | -4.08  | +10.60 | 35             | -8.16  | +7.07  | 56             | +7.14  | +5.30  | 77             | -5.10  | +1.77  | 98             | +8.16  | 0      | 119            | -6.12  | -3.53  |
| 15             | -2.04  | +10.60 | 36             | -6.12  | +7.07  | 57             | +9.18  | +5.30  | 78             | -3.06  | +1.77  | 99             | +10.20 | 0      | 120            | -4.08  | -3.53  |
| 16             | 0      | +10.60 | 37             | -4.08  | +7.07  | 58             | +11.22 | +5.30  | 79             | -1.02  | +1.77  | 100            | +12.24 | 0      | 121            | -2.04  | -3.53  |
| 17             | +2.04  | +10.60 | 38             | -2.04  | +7.07  | 59             | +13.26 | +5.30  | 80             | +1.02  | +1.77  | 101            | +14.28 | 0      | 122            | 0      | -3.53  |
| 18             | +4.08  | +10.60 | 39             | 0      | +7.07  | 60             | -12.24 | +3.53  | 81             | +3.06  | +1.77  | 102            | -13.26 | -1.77  | 123            | +2.04  | -3.53  |
| 19             | +6.12  | +10.60 | 40             | +2.04  | +7.07  | 61             | -10.20 | +3.53  | 82             | +5.10  | +1.77  | 103            | -11.22 | -1.77  | 124            | +4.08  | -3.53  |
| 20             | +8.16  | +10.60 | 41             | +4.08  | +7.07  | 62             | -8.16  | +3.53  | 83             | +7.14  | +1.77  | 104            | -9.18  | -1.77  | 125            | +6.12  | -3.53  |
| 21             | -11.22 | +8.83  | 42             | +6.12  | +7.07  | 63             | -6.12  | +3.53  | 84             | +9.18  | +1.77  | 105            | -7.14  | -1.77  | 126            | +8.16  | -3.53  |

| Cavity marking | X (mm) | Y (mm) | Cavity marking | X (mm) | Y (mm) | Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|----------------|--------|--------|----------------|--------|--------|
| 127            | +10.20 | -3.53  | 148            | -2.04  | -7.07  | 169            | -6.12  | -10.60 |
| 128            | +12.24 | -3.53  | 149            | 0      | -7.07  | 170            | -4.08  | -10.60 |
| 129            | -13.26 | -5.30  | 150            | +2.04  | -7.07  | 171            | -2.04  | -10.60 |
| 130            | -11.22 | -5.30  | 151            | +4.08  | -7.07  | 172            | 0      | -10.60 |
| 131            | -9.18  | -5.30  | 152            | +6.12  | -7.07  | 173            | +2.04  | -10.60 |
| 132            | -7.14  | -5.30  | 153            | +8.16  | -7.07  | 174            | +4.08  | -10.60 |
| 133            | -5.10  | -5.30  | 154            | +10.20 | -7.07  | 175            | +6.12  | -10.60 |
| 134            | -3.06  | -5.30  | 155            | +12.24 | -7.07  | 176            | +8.16  | -10.60 |
| 135            | -1.02  | -5.30  | 156            | -11.22 | -8.83  | 177            | -7.14  | -12.37 |
| 136            | +1.02  | -5.30  | 157            | -9.18  | -8.83  | 178            | -5.10  | -12.37 |
| 137            | +3.06  | -5.30  | 158            | -7.14  | -8.83  | 179            | -3.06  | -12.37 |
| 138            | +5.10  | -5.30  | 159            | -5.10  | -8.83  | 180            | -1.02  | -12.37 |
| 139            | +7.14  | -5.30  | 160            | -3.06  | -8.83  | 181            | +1.02  | -12.37 |
| 140            | +9.18  | -5.30  | 161            | -1.02  | -8.83  | 182            | +3.06  | -12.37 |
| 141            | +11.22 | -5.30  | 162            | +1.02  | -8.83  | 183            | +5.10  | -12.37 |
| 142            | +13.26 | -5.30  | 163            | +3.06  | -8.83  | 184            | +7.14  | -12.37 |
| 143            | -12.24 | -7.07  | 164            | +5.10  | -8.83  | 185            | -2.04  | -14.13 |
| 144            | -10.20 | -7.07  | 165            | +7.14  | -8.83  | 186            | 0      | -14.13 |
| 145            | -8.16  | -7.07  | 166            | +9.18  | -8.83  | 187            | +2.04  | -14.13 |
| 146            | -6.12  | -7.07  | 167            | +11.22 | -8.83  |                |        |        |
| 147            | -4.08  | -7.07  | 168            | -8.16  | -10.60 |                |        |        |

25-187



STANDARD RANGE

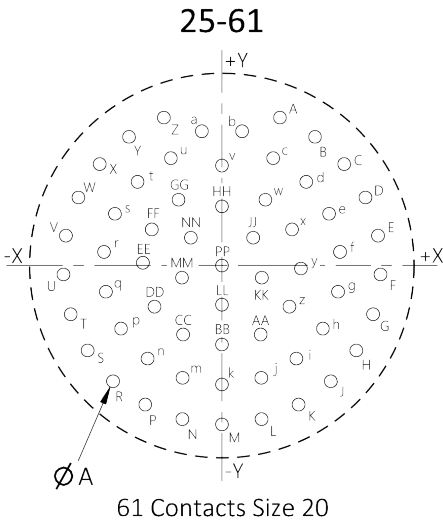
PRINTED CIRCUIT BOARD CONNECTORS

25

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| 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      | -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  |

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| Y              | -7.98  | +11.05 |
| Z              | -4.98  | +12.70 |
| 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      | -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  |

| Cavity marking | X (mm) | Y (mm) |
|----------------|--------|--------|
| v              | 0      | +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      | -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      | +5.08  |
| JJ             | +2.67  | +2.39  |
| KK             | +3.43  | -1.04  |
| LL             | 0      | -3.35  |
| MM             | -3.43  | -1.04  |
| NN             | -2.67  | +2.39  |
| PP             | 0      | 0      |



Handwriting practice lines consisting of 20 horizontal dotted lines.

## EXTENDED RANGE

## REDUCED FLANGE

NEW

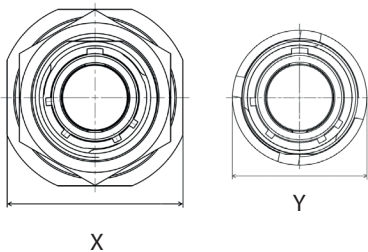


## MAIN CHARACTERISTICS

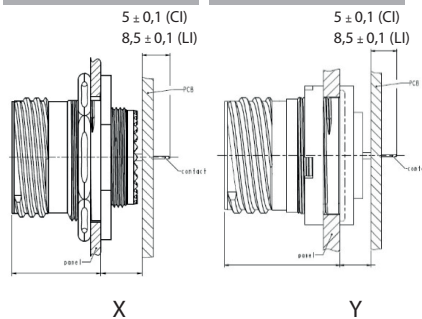
- More density on panel 37% average footprint surface reduction
- More space inside the box: 36% average reduction of panel/PCB distance
- Lighter: 30% average lighter than standard 38999 stand off receptacle
- Derivated from MIL-DTL-38999 series III version
- Mates with standard MIL-DTL-38999 series III plugs and caps
- Reduced flange receptacles are available in crimp version, with PC Tail contacts, as well as in stand off version
- For jam nut (TV07) configurations

## SMALLER DIMENSIONS

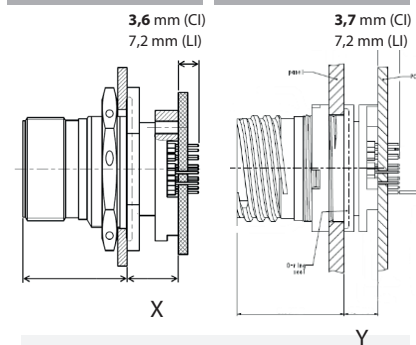
## Crimp Contacts

38999 Series III  
Standard38999 Series III  
Reduced Flange

## PC Tail Contacts

38999 Series III  
PC Tail38999 Series III  
Reduced Flange  
PC Tail

## PC Tail Contacts &amp; Stand Off

38999 Series III  
Stand Off38999 Series III  
Reduced Flange  
Stand Off► Deviation: **F312/F311\*** with safety castel nut► Deviation: **F059/F058\*** with safety castel nut\* with safety  
castel nut

## FOOTPRINT AND WEIGHT SAVING

| Sizes | Footprint Reduction (mm²) |
|-------|---------------------------|
| 9     | 43%                       |
| 11    | 46%                       |
| 13    | 43%                       |
| 15    | 36%                       |
| 17    | 26%                       |
| 19    | 37%                       |
| 21    | 36%                       |
| 23    | 34%                       |
| 25    | 30%                       |

Example of **Weight Reduction** :

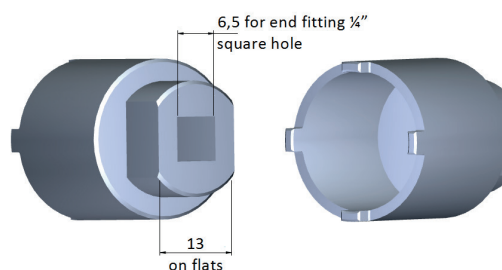
38999 Series III stand off version: TV07WCI13-35P F459 = 31.46 g

38999 Series III Reduced flange stand off version : TV07WCI13-35P F259 = 19.49 g

> The #13 Reduced flange stand off version is **38 % lighter** than 38999 Series III standard stand off version.

## TOOLS

| Sizes | Tools PN |
|-------|----------|
| 9     | 809681   |
| 11    | 809682   |
| 13    | 809683   |
| 15    | 809684   |
| 17    | 809685   |
| 19    | 809686   |
| 21    | 809687   |
| 23    | 809688   |
| 25    | 809689   |



## EXTENDED RANGE

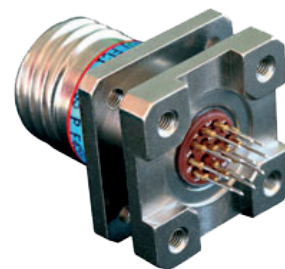
## STAND OFF RECEPTACLES

## MAIN CHARACTERISTICS

- Receptacles with stand-off flange shells, for attachment to printed circuit boards.
- Tin plated contacts. Lead free versions available.
- Available in wall mount (TVP00) and jam nut (TV07) configurations.
- Prevent any mechanical stress on the contact tails.
- Provide grounding continuity between PCB and box.
- Increase reliability and resistance to shocks and vibrations
- For composite versions, please consult us.

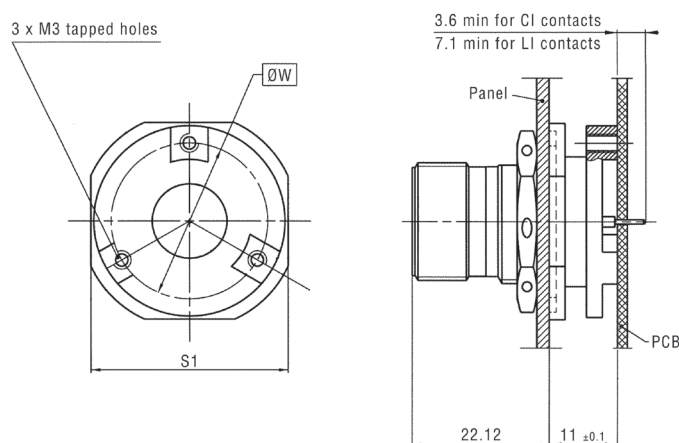
## Deviations :

- Lead Tinned Stand Off : F459
  - Silver Tinned Stand Off : F459LF
  - Silver Copper Tinned Stand Off : F459LFC
- For other versions, please consult us*

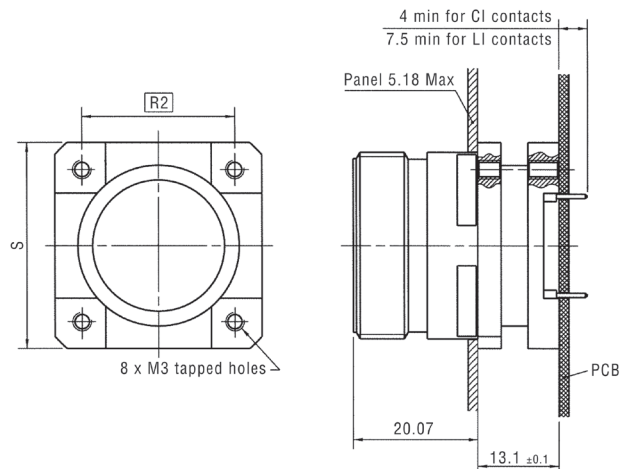


## OVERALL DIMENSIONS

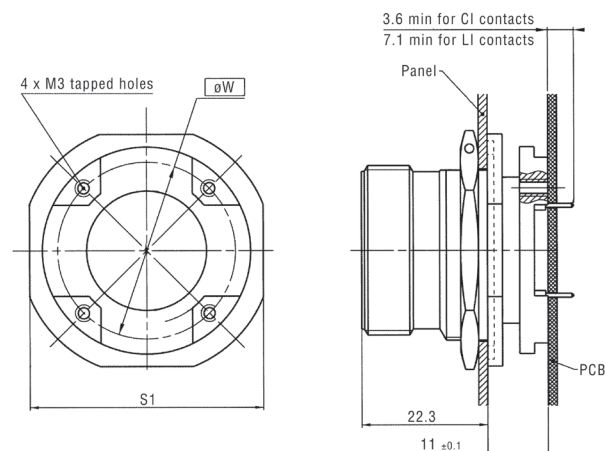
## Jam nut receptacle (size 9 and 11)



## Square flange receptacle (size 9 to 25)



## Jam nut receptacle (size 13 to 25)



| Shell Size | S ± 0.25 (mm) | R2 (mm) | S1 ± 0.4 (mm) | ØW (mm) |
|------------|---------------|---------|---------------|---------|
| 9          | 23.83         | 16.00   | 27.0          | 20.50   |
| 11         | 26.19         | 18.26   | 31.8          | 25.20   |
| 13         | 28.58         | 20.62   | 34.9          | 25.25   |
| 15         | 30.96         | 23.01   | 38.1          | 28.42   |
| 17         | 33.32         | 26.10   | 41.3          | 31.42   |
| 19         | 36.53         | 27.24   | 46.0          | 35.03   |
| 21         | 39.67         | 29.36   | 49.2          | 37.82   |
| 23         | 42.88         | 31.75   | 52.4          | 41.12   |
| 25         | 46.02         | 34.93   | 55.6          | 44.30   |

Contact us for more detailed information.

For ordering informations, see section "Printed Circuit Board Connectors"

## EXTENDED RANGE

## TVS-Y / TVS-YN HERMETIC RECEPTACLES

## PRESENTATION

TVS-Y and TVS-YN hermetic receptacles are dedicated to applications requiring low air leakage or high protection facing to contamination.



## MAIN CHARACTERISTICS

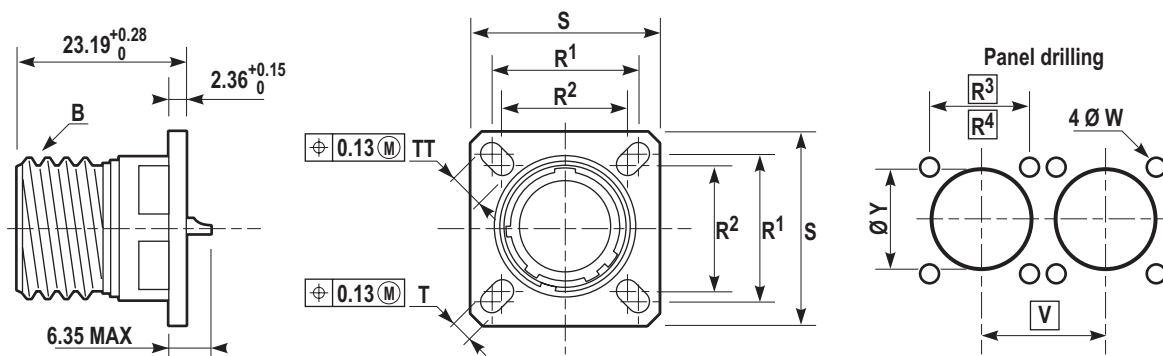
- 9 shell sizes (stainless steel)
- Solder pin contacts in nickel alloy
- Contact plating in active zone: Gold
- Glass insert
- Air leakage  $< 1.10^{-7} \text{ cm}^3/\text{s}$  under 1 bar of differential pressure
- Passivation or nickel plating

## OVERALL DIMENSIONS - HERMETIC VERSIONS

## Square flange receptacle

TVPS02Y JD38999/21Y

TVPS02YN JD38999/21N



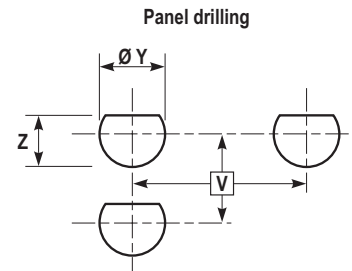
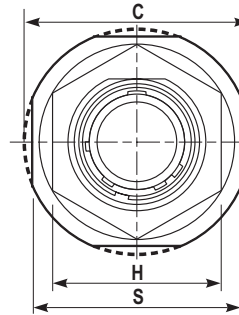
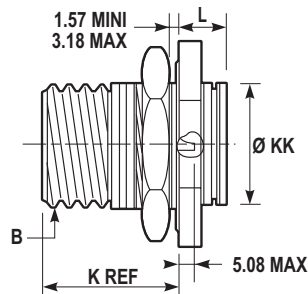
| Shell size                  |          | B<br>thread<br>Class 2A<br>0.1P-0.3L-TS<br>(inches) | R <sup>1</sup><br>(mm) | R <sup>2</sup><br>(mm) | S<br>±0.25<br>(mm) | T<br>+0.20<br>-0.13<br>(mm) | TT<br>+0.20<br>-0.13<br>(mm) | ØW<br>+0<br>-0.25<br>(mm) | R <sup>3</sup><br>(mm) | R <sup>4</sup><br>(mm) | V<br>Mini<br>(mm) | ØY<br>Mini<br>(mm) |
|-----------------------------|----------|-----------------------------------------------------|------------------------|------------------------|--------------------|-----------------------------|------------------------------|---------------------------|------------------------|------------------------|-------------------|--------------------|
| MIL-DTL-38999<br>Series III | Amphenol |                                                     |                        |                        |                    |                             |                              |                           |                        |                        |                   |                    |
| A                           | 9        | .6250                                               | 18.26                  | 15.09                  | 23.83              | 3.25                        | 5.49                         | 3.25                      | 18.26                  | 15.09                  | 24.60             | 16.66              |
| B                           | 11       | .7500                                               | 20.62                  | 18.26                  | 26.19              | 3.25                        | 4.93                         | 3.25                      | 20.62                  | 18.26                  | 27.00             | 20.22              |
| C                           | 13       | .8750                                               | 23.01                  | 20.62                  | 28.58              | 3.25                        | 4.93                         | 3.25                      | 23.01                  | 20.62                  | 31.50             | 23.42              |
| D                           | 15       | 1.0000                                              | 24.61                  | 23.01                  | 30.96              | 3.25                        | 4.39                         | 3.25                      | 24.61                  | 23.01                  | 34.50             | 26.59              |
| E                           | 17       | 1.1875                                              | 26.97                  | 24.61                  | 33.32              | 3.25                        | 4.93                         | 3.25                      | 26.97                  | 24.61                  | 28.00             | 30.96              |
| F                           | 19       | 1.2500                                              | 29.36                  | 26.97                  | 36.53              | 3.25                        | 4.93                         | 3.25                      | 29.36                  | 26.97                  | 40.50             | 32.94              |
| G                           | 21       | 1.3750                                              | 31.75                  | 29.36                  | 39.67              | 3.25                        | 4.93                         | 3.25                      | 31.75                  | 29.36                  | 44.00             | 36.12              |
| H                           | 23       | 1.5000                                              | 34.93                  | 31.75                  | 42.88              | 3.91                        | 6.15                         | 3.81                      | 34.93                  | 31.75                  | 47.00             | 39.29              |
| J                           | 25       | 1.6250                                              | 38.10                  | 34.93                  | 46.02              | 3.91                        | 6.15                         | 3.81                      | 38.10                  | 34.93                  | 50.00             | 42.47              |

## EXTENDED RANGE

## TVS-Y / TVS-YN HERMETIC RECEPTACLES

## Jam nut receptacle

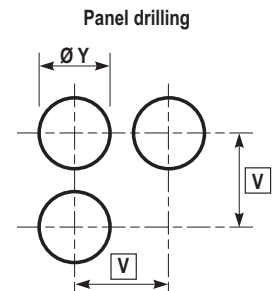
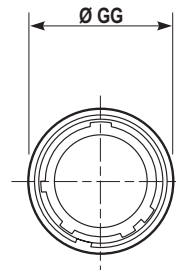
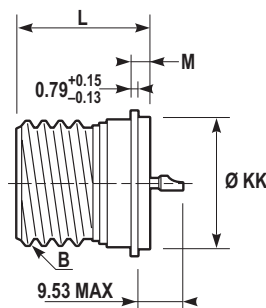
TVS07Y JD38999/23Y  
TVS07YN JD38999/23N



| Shell size                  |                     | B<br>thread<br>Class 2A<br>0.1P-0.3L-TS<br>(inches) | C<br>Maxi<br>(mm) | H/plats<br>+0.043<br>-0.41<br>(mm) | L<br>Maxi<br>(mm) | ØKK<br>+0.28<br>0<br>(mm) | B<br>±0.25<br>(mm) | V<br>Mini<br>(mm) | ØY<br>Mini<br>(mm) | Z<br>+0<br>-0.25<br>(mm) | Hex nut<br>max torque<br>value N.m |
|-----------------------------|---------------------|-----------------------------------------------------|-------------------|------------------------------------|-------------------|---------------------------|--------------------|-------------------|--------------------|--------------------------|------------------------------------|
| MIL-DTL-38999<br>Series III | Amphenol<br>Socapex |                                                     |                   |                                    |                   |                           |                    |                   |                    |                          |                                    |
| A                           | 9                   | .6250                                               | 30.45             | 22.23                              | 9.07              | 16.31                     | 26.97              | 27.80             | 17.78              | 16.99                    | 4.1                                |
| B                           | 11                  | .7500                                               | 35.20             | 25.40                              | 9.07              | 19.46                     | 31.75              | 32.60             | 20.96              | 19.53                    | 5.3                                |
| C                           | 13                  | .8750                                               | 38.38             | 30.18                              | 9.07              | 22.66                     | 34.93              | 36.00             | 25.65              | 24.26                    | 6.9                                |
| D                           | 15                  | 1.0000                                              | 41.55             | 33.32                              | 9.07              | 25.86                     | 38.10              | 39.60             | 28.83              | 27.53                    | 8.6                                |
| E                           | 17                  | 1.1875                                              | 44.73             | 36.53                              | 9.07              | 29.01                     | 41.28              | 43.30             | 32.01              | 30.68                    | 9.8                                |
| F                           | 19                  | 1.2500                                              | 49.50             | 39.67                              | 9.68              | 32.21                     | 46.02              | 47.00             | 35.18              | 33.86                    | 10.9                               |
| G                           | 21                  | 1.3750                                              | 52.65             | 42.80                              | 9.68              | 35.36                     | 49.23              | 50.60             | 38.35              | 37.06                    | 12.7                               |
| H                           | 23                  | 1.5000                                              | 65.85             | 46.02                              | 9.68              | 38.56                     | 52.37              | 54.20             | 41.53              | 40.01                    | 13.8                               |
| J                           | 25                  | 1.6250                                              | 59.00             | 50.80                              | 9.68              | 41.71                     | 55.58              | 59.70             | 44.70              | 43.41                    | 15                                 |

## Solder mounting receptacle

TVSIY JD38999/25Y  
TVSIYN JD38999/25N



| Shell size                  |          | B<br>thread<br>Class 2A<br>0.1P-0.3L-TS<br>(inches) | ØGG<br>+0.28<br>-0.25<br>(mm) | ØKK<br>+0.03<br>-0.13<br>(mm) | L<br>+0.28<br>-0<br>(mm) | M<br>+0.15<br>-0.13<br>(mm) | V<br>Mini<br>(mm) | ØY<br>Mini<br>(mm) |
|-----------------------------|----------|-----------------------------------------------------|-------------------------------|-------------------------------|--------------------------|-----------------------------|-------------------|--------------------|
| MIL-DTL-38999<br>Series III | Amphenol |                                                     |                               |                               |                          |                             |                   |                    |
| A                           | 9        | .6250                                               | 19.05                         | 17.07                         | 20.47                    | 3.18                        | 24.60             | 17.60              |
| B                           | 11       | .7500                                               | 21.44                         | 19.84                         | 20.47                    | 3.18                        | 27.00             | 20.40              |
| C                           | 13       | .8750                                               | 24.61                         | 23.01                         | 20.47                    | 3.18                        | 31.50             | 23.50              |
| D                           | 15       | 1.0000                                              | 27.79                         | 26.19                         | 20.47                    | 3.18                        | 34.50             | 26.70              |
| E                           | 17       | 1.1875                                              | 30.94                         | 29.36                         | 20.47                    | 3.18                        | 38.00             | 29.90              |
| F                           | 19       | 1.2500                                              | 33.32                         | 31.75                         | 20.47                    | 3.18                        | 40.50             | 32.30              |
| G                           | 21       | 1.3750                                              | 36.53                         | 34.93                         | 20.47                    | 3.18                        | 44.00             | 35.50              |
| H                           | 23       | 1.5000                                              | 39.70                         | 38.10                         | 21.29                    | 3.96                        | 47.00             | 38.60              |
| J                           | 25       | 1.6250                                              | 42.88                         | 41.28                         | 21.29                    | 3.96                        | 50.00             | 41.80              |

## POLARIZATION

| MS<br>Code | Socket contact<br>Amphenol code | MS<br>Code | Pin contact<br>Amphenol code |
|------------|---------------------------------|------------|------------------------------|
| SN         | S (normal)                      | PN         | P (normal)                   |
| SA         | H                               | PA         | G                            |
| SB         | J                               | PB         | I                            |
| SC         | L                               | PC         | K                            |
| SD         | N                               | PD         | M                            |
| SE         | T                               | PE         | R                            |

## EXTENDED RANGE

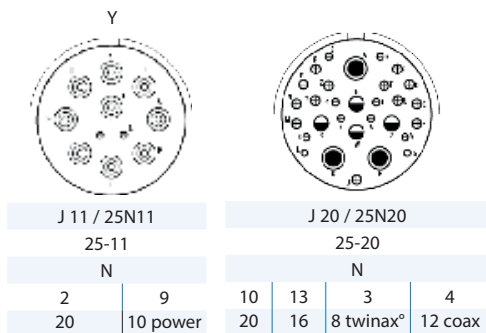
## LANYARD RELEASE PLUGS (BREAKAWAY CONNECTORS)

## PRESENTATION

Amphenol Breakaway Connectors provide unequalled performance in environments requiring instant disengagement.

Designed to provide quick disconnect of a connector plug and receptacle with an axial pull on the lanyard, the "Breakaway" Fail Safe connector family offers a wide range of electrical and mechanical features:

- Compatible/intermateable with MIL-DTL-38999 series III receptacles
- Quick disconnect between plug and receptacle and damage free separation
- Up to 15° misalignment for instant desengagement
- Tread coupling (tri start connector)
- Other shell size and arrangements available in MIL-DTL-38999 standard lanyard versions
- 2 arrangements available for MIL-STD-1760 applications :



## POLARIZATION

| MS Code | Socket contact Amphenol code | MS Code | Pin contact Amphenol code |
|---------|------------------------------|---------|---------------------------|
| SN      | S (normal)                   | PN      | P (normal)                |
| SA      | H                            | PA      | G                         |
| SB      | J                            | PB      | I                         |
| SC      | L                            | PC      | K                         |
| SD      | N                            | PD      | M                         |
| SE      | T                            | PE      | R                         |

## OVERALL DIMENSIONS

## Lanyard release plugs - MIL-STD-1760

TVFBRW

JD38999/31W

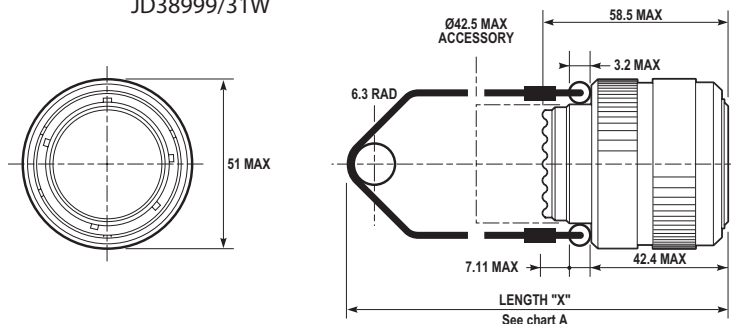


TABLE A

| Length "X" MIL.STD 1760 coding | mm  |
|--------------------------------|-----|
| A*                             | 102 |
| B*                             | 115 |
| C*                             | 127 |
| D                              | 140 |
| E                              | 153 |
| F                              | 166 |
| G                              | 178 |
| H                              | 191 |
| J                              | 407 |
| K                              | 229 |
| M                              | 254 |
| X                              | 432 |

Other lengths are also available under TVFBRW proprietary designation. Consult us.

\* for TV FBRW only

## EXTENDED RANGE

## LANYARD RELEASE PLUGS (BREAKAWAY CONNECTORS)

## Lanyard release plugs

## Standard version

(ordering information, see section "How to Order")

|            |             |
|------------|-------------|
| 885565...P | JD38999/29W |
| 915565...P | JD38999/29F |
| 885565...S | JD38999/30W |
| 915565...S | JD38999/30F |

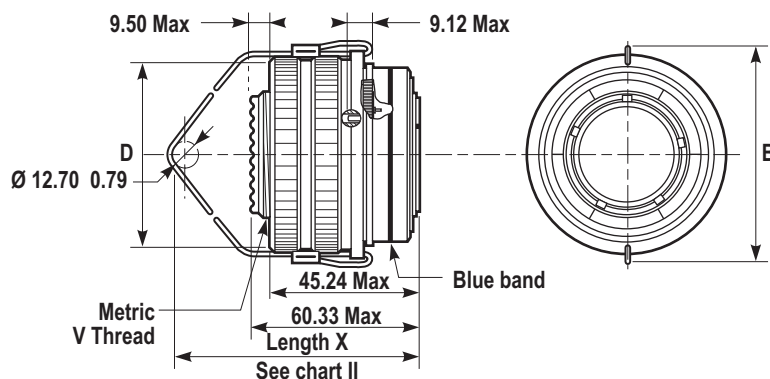


TABLE I

| Arrangement code | Insert arrangement |
|------------------|--------------------|
| 04               | 11-04              |
| 06               | 11-35              |
| 07               | 11-98              |
| 08               | 11-02              |
| 10               | 13-4               |
| 11               | 13-08              |
| 13               | 13-98              |
| 14               | 13-35              |
| 18               | 15-5               |
| 19               | 15-19              |
| 20               | 15-35              |
| 21               | 15-97              |
| 22               | 15-18              |
| 23               | 15-15              |
| 27               | 17-06              |
| 28               | 17-08              |
| 29               | 17-26              |
| 30               | 17-35              |
| 31               | 17-99              |
| 37               | 19-11              |
| 38               | 19-28              |
| 39               | 19-32              |
| 40               | 19-35              |
| 47               | 21-11              |
| 48               | 21-16              |
| 49               | 21-35              |
| 50               | 21-41              |
| 51               | 21-39              |
| 57               | 23-21              |
| 58               | 23-35              |
| 59               | 23-53              |
| 60               | 23-55              |
| 61               | 23-54              |
| 66               | 25-19              |
| 67               | 25-29              |
| 68               | 25-35              |
| 69               | 25-43              |
| 70               | 25-61              |
| 71               | 25-04              |
| 72               | 25-24              |
| 73               | 25-46              |

TABLE II

| Shell size               |          | Metric Max | B Max (mm) | D Max (mm) |
|--------------------------|----------|------------|------------|------------|
| MIL-DTL-38999 Series III | Amphenol |            |            |            |
| B                        | 11       | M15X1.0-6G | 46.89      | 28.17      |
| C                        | 13       | M18x1.0-6g | 50.09      | 31.75      |
| D                        | 15       | M22X1.0-6G | 52.81      | 34.93      |
| E                        | 17       | M25X1.0-6G | 56.01      | 38.10      |
| F                        | 19       | M28X1.0-6G | 58.45      | 41.28      |
| G                        | 21       | M31X1.0-6G | 62.79      | 44.45      |
| H                        | 23       | M34X1.0-6G | 65.89      | 47.63      |
| J                        | 25       | M37X1.0-6G | 68.71      | 50.08      |

TABLE III

| Length "X" (mm) | Code MS/Amphenol |
|-----------------|------------------|
| 102             | A                |
| 115             | B                |
| 127             | C                |
| 140             | D                |
| 153             | E                |
| 166             | F                |
| 178             | G                |
| 191             | H                |
| 203             | I                |
| 216             | J                |
| 229             | K                |
| 242             | L                |
| 254             | M                |
| 267             | N                |
| 280             | P                |
| 293             | R                |
| 305             | S                |
| 318             | T                |
| 331             | U                |
| 356             | V                |
| 381             | W                |
| 407             | X                |
| 432             | Y                |
| 458             | Z                |

## EXTENDED RANGE THRU-BULKHEAD RECEPTACLES

TVB thru-bulkhead receptacles are used for the feed through of circuits on bulkheads or panels.



- Intermateable with MIL-DTL-38999 Series III connectors
- 9 shell sizes
- Interfacial seal on male side
- Olive drab cadmium or nickel plating
- Coding possibility

### HOW TO ORDER

| Thru-bulkhead Receptacles                                                                                                                                         | TVB | W | 15 35 | PS | N | F467 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|---|-------|----|---|------|
| <b>Shell Material and finish</b><br>W: Olive drab cadmium plated aluminium<br>F: Electroless nickel plated aluminium<br>B: Marine bronze<br>ZN: Black Zinc Nickel |     |   |       |    |   |      |
| Shell size and insert arrangements: see section "Insert Arrangements"                                                                                             |     |   |       |    |   |      |
| <b>Contact type</b><br>PS: Pin & Socket                                                                                                                           |     |   |       |    |   |      |
| <b>Coding</b><br>N, A, B, C, D, E                                                                                                                                 |     |   |       |    |   |      |
| <b>Deviation</b><br>F467: Drilled and tapped mounting holes (recommended)                                                                                         |     |   |       |    |   |      |

For further information, please consult us.

## RANGE DERIVATED RECEPTACLES WITH ENHANCED SEALING

TV07 ETC receptacles with enhanced sealing are derived from the standard MIL-DTL-38999 Series III receptacles. The inserts have been modified to ensure an air leakage of  $< 1.10^{-6} \text{cm}^3/\text{s}$  under 1 bar of differential pressure.



- Intermateable with MIL-DTL-38999 Series III connectors
- 9 shell sizes
- Solder or PCB pin contacts. Socket contacts available upon request

### HOW TO ORDER

| Series                                                                                                                                                                                                                                    | TV | 07 | W | ET | C | 15 35 | P | A |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|---|----|---|-------|---|---|
| <b>Shell Type</b><br>Jam nut receptacle: 175°C (O.D. cadmium): 07 200°C (nickel, bronze): S07                                                                                                                                             |    |    |   |    |   |       |   |   |
| <b>Shell material, finish and contact type</b><br>W: Olive drab cadmium plated aluminium<br>F: Electroless nickel plated aluminium<br>B: Marine bronze<br>Z: Green zinc cobalt plated aluminium<br>ZN: Black zinc nickel plated aluminium |    |    |   |    |   |       |   |   |
| Enhanced sealing                                                                                                                                                                                                                          |    |    |   |    |   |       |   |   |
| <b>Contact termination</b><br>C: Solder contacts<br>CI: Standard PCB contacts<br>LI: Long tail PCB contacts                                                                                                                               |    |    |   |    |   |       |   |   |
| Shell size and insert arrangements: see section "Insert Arrangements"                                                                                                                                                                     |    |    |   |    |   |       |   |   |
| <b>Contact type</b><br>P: Pin                                                                                                                                                                                                             |    |    |   |    |   |       |   |   |
| <b>Coding</b><br>Blank for normal, A, B, C, D, E                                                                                                                                                                                          |    |    |   |    |   |       |   |   |

For further information, please consult us.

## EXTENDED RANGE

## INTEGRATED BACKSHELLS

## MAIN CHARACTERISTICS

- All in one product
- Time saving during order and installation
- Space and weight saving
- Deviation : F472



Available on plugs and receptacles, these 2 in 1 connectors/band backshells provide a high EMI protection with a quick, easy and cost effective cabling process. They are low profile, with enhance sealing level and allow the use of macro and micro bands, as well as straight or right angle heat shrink moulded pieces. The design of the shells makes them compatible with over moulding process.

For further information, please consult us.

## EXTENDED RANGE

## MIL-DTL-38999 SERIES III OPTICAL CONNECTORS

## TVOP

The TVOP connector is an optical version of the MIL-DTL-38999 series III connector, which uses standard 2.5 mm telecom optical termini in dedicated high precision inserts. It is designed to provide high level of performance and reliability, and cost effective solution for outdoor and indoor applications.



- 1 to 8 channels
- Available in multimode, singlemode PC and singlemode APC
- 0.5 dB typical Insertion Loss in multimode and singlemode

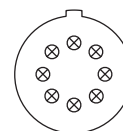
## Insert arrangements



11-2



13-4



17-8

## STARTOP

The STARTOP connector is made of standard MIL-DTL-38999 electrical connectors, using size 16 MIL-PRF-29504 optical termini. Hybrid versions (electrical and optical) are available, for further details please consult us.



- 1 to 8 channels
- Available in multimode
- 0.8 dB typical Insertion Loss

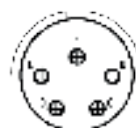
## Insert arrangements



11-02



13-04



15-05



17-08

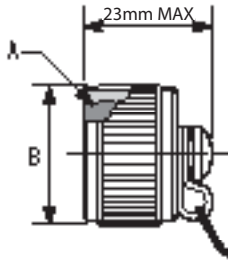
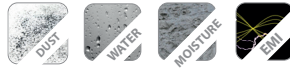
For further details, please consult the EWOC catalog (DOC-000503-ANG).

## ACCESSORIES

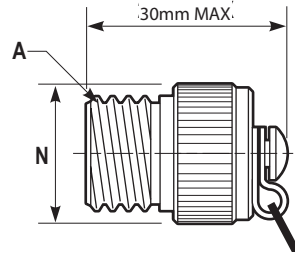
## PROTECTIVE CAPS

## STANDARD METALLIC CAPS

- For receptacles & plugs
- IP 68 (permanent sealing)



Protection cap for receptacles equipped with metallic chain, nylon cord or stainless steel rope



Protection cap for plugs equipped with metallic chain, nylon cord or stainless steel rope

| Cap type               | Metallic chain length (mm) | Nylon cord length (mm) | Stainless steel rope length (mm) |
|------------------------|----------------------------|------------------------|----------------------------------|
| BEC/BER for receptacle | 152                        | ±105                   | 127                              |
| BF for plug            | 127                        | 160                    | 127                              |

| Shell size                  |          | A thread<br>0.1P-0.3L-TS<br>Class 2B<br>(inches) | B<br>Dia<br>Max<br>(mm) | C<br>Dia<br>Min<br>(mm) | N<br>Dia<br>Max<br>(mm) |
|-----------------------------|----------|--------------------------------------------------|-------------------------|-------------------------|-------------------------|
| MIL-DTL-38999<br>Series III | Amphenol |                                                  |                         |                         |                         |
| A                           | 9        | .6250                                            | 22.23                   | 17.86                   | 22.73                   |
| B                           | 11       | .7500                                            | 25.40                   | 21.44                   | 25.40                   |
| C                           | 13       | .8750                                            | 28.58                   | 25.81                   | 29.74                   |
| D                           | 15       | 1.0000                                           | 31.75                   | 28.98                   | 32.99                   |
| E                           | 17       | 1.1875                                           | 36.53                   | 32.16                   | 36.47                   |
| F                           | 19       | 1.2500                                           | 38.10                   | 36.27                   | 39.19                   |
| G                           | 21       | 1.3750                                           | 41.28                   | 38.51                   | 42.42                   |
| H                           | 23       | 1.5000                                           | 44.45                   | 41.68                   | 45.39                   |
| J                           | 25       | 1.6250                                           | 47.63                   | 44.86                   | 48.62                   |

## ORDERING INFORMATION

| Standard Metallic Caps                                                                                                                                                                                                                   | B | EC | N | TV | W | 15 |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|----|---|----|---|----|
| <b>Protection cap type</b><br>EC: For square flange receptacle<br>ER: For jam nut receptacle<br>F: For plug                                                                                                                              |   |    |   |    |   |    |
| <b>Wire type</b><br>N: Nylon cord<br>Blank for metallic chain<br>R: Jacketed stainless steel rope<br>RO: Jacketed stainless steel rope with washer end (only for plug)                                                                   |   |    |   |    |   |    |
| <b>Connector type</b>                                                                                                                                                                                                                    |   |    |   |    |   |    |
| <b>Finish</b><br>B: Bronze ✓<br>F: Electroless nickel plated, aluminium version ✓<br>W: Olive drab cadmium plated aluminium version<br>Z: Green zinc cobalt plated aluminium ✓<br>ZN: Black zinc Nickel aluminium from Amphenol Europe ✓ |   |    |   |    |   |    |
| <b>Corresponding connector shell size:</b><br>09/11/13/15/17/19/21/23/25                                                                                                                                                                 |   |    |   |    |   |    |

For stainless steel caps, please consult us

✓: RoHS compliant

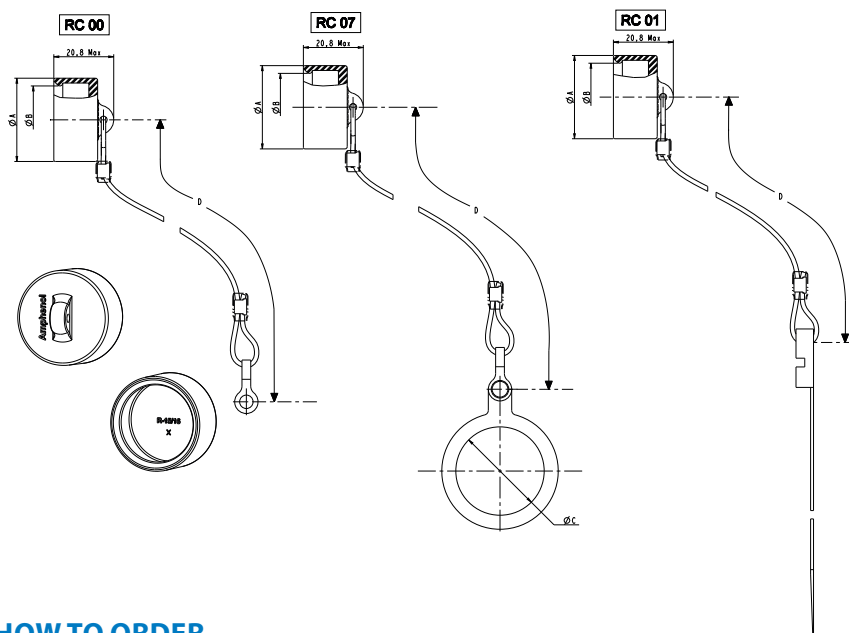
## ACCESSORIES

## PROTECTIVE CAPS

## RUBBER CAPS

NEW

- For receptacles
- IP67 (1m, 1 hour sealing)



| Sizes | ØA Max | ØB Max | ØC Max <sup>+0,25</sup> <sub>0</sub> | D Max |
|-------|--------|--------|--------------------------------------|-------|
| 9     | 19,25  | 13,85  | 17,86                                | 140   |
| 11    | 22,55  | 17,2   | 22,63                                | 140   |
| 13    | 25,95  | 20,6   | 25,81                                | 140   |
| 15    | 28,75  | 23,4   | 30,24                                | 140   |

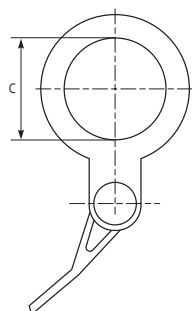
## HOW TO ORDER

| Cap Series                       | RC | 00 | N | TV | 9 |
|----------------------------------|----|----|---|----|---|
| <b>Protection cap type</b>       |    |    |   |    |   |
| 00: For square flange receptacle |    |    |   |    |   |
| 07: For jam nut receptacle       |    |    |   |    |   |
| 01: For line receptacle          |    |    |   |    |   |
| <b>Wire type</b>                 |    |    |   |    |   |
| N: Nylon cord                    |    |    |   |    |   |
| <b>Connector type</b>            |    |    |   |    |   |
| <b>Shell size:</b>               |    |    |   |    |   |
| 09/11/13/15/17/19                |    |    |   |    |   |

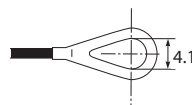
## ACCESSORIES

## PROTECTIVE CAPS - TERMINATION TYPE

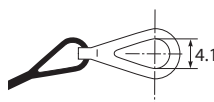
## For both standard Metallic Caps &amp; Rubber Caps



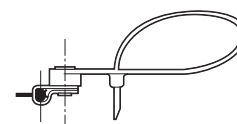
Termination of the chain, rope (RO type) or cord for jam nut receptacle protection caps



Termination of the cord or rope (R type) for square flange receptacle protection caps



Termination of the chain for square flange receptacle and plug protection caps



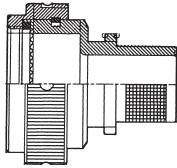
Termination of the cord for plugs protection caps

## ACCESSORIES

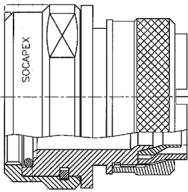
## BACKSHELLS



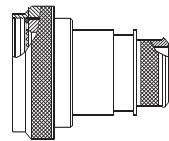
## SHIELDING

**TV-35: BAND BACKSHELL FOR SHIELDING**

- Full 360° shield termination
- Available with different cabling chambers
- Easy maintenance or repairability
- Sealing ensured by straight or right angled heat-shrink molded piece
- Right angle version: TV SBC

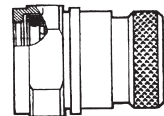
**TV NSA: HIGH LEVEL OF EMI/RFI PROTECTION**

- Electrical continuity between cable and connector by clamping the braid with a screwing system
- Free inner ring to avoid twisting of the braid when screwing
- Sealing ensured by straight or right angle heat-shrink molded piece

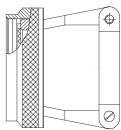
**M85049/88: BAND LOCK ADAPTOR**

- MIL standardized band backshell
- Full 360° termination
- Sealing ensured by straight or right angle heat-shrink molded piece
- Right angle and 45° versions available

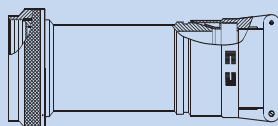
## SEALING

**TV NSD: ADAPTER FOR HEAT-SHRINK MOLDED PIECE**

## MECHANICAL RETENTION

**M85049/38 - M85049/38S: STRAIN RELIEF CLAMP**

- MIL standardized strain relief clamp
- Mechanical retention of the cable
- Easy maintenance or repairability
- Self locking option available

**M85049/19: NON-ENVIRONMENTAL EMI/RFI BACKSHELL**

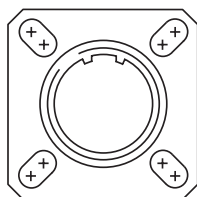
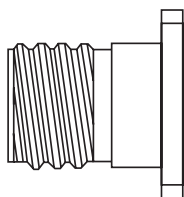
- 360° screen termination
- Strain relief cable holding mechanism

For more detailed information, consult our Backshell catalog (E118)

## ACCESSORIES

## OTHER ACCESSORIES

## DUMMY RECEPTACLES



- Dummy receptacles match all plug types with any shell coding (N, A, B, C, D, E)
- Dimensions are identical to the front part of TVP00 receptacles
- A rubber washer ensures correct sealing of mated connectors
- Specific polarized versions are available on request

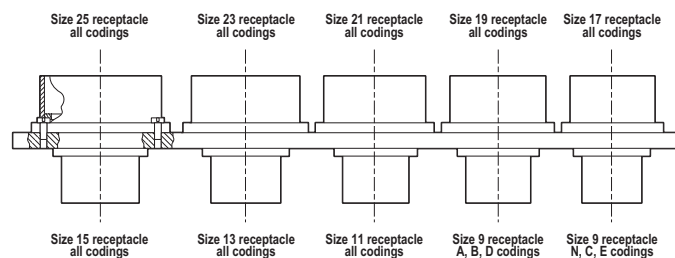
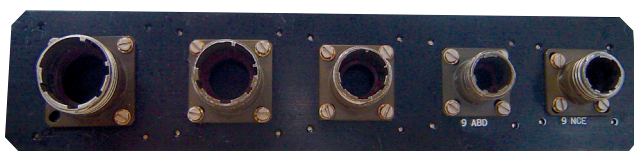
## How to order - Amphenol designation

| Dummy receptacle                                 | SE | 00 | TV | W | 11 |
|--------------------------------------------------|----|----|----|---|----|
| <b>Shell type</b>                                |    |    |    |   |    |
| 00: derived from the TV square flange receptacle |    |    |    |   |    |
| <b>Series</b>                                    |    |    |    |   |    |
| <b>Finish</b>                                    |    |    |    |   |    |
| W: Olive-drab cadmium plated                     |    |    |    |   |    |
| F: Electroless nickel plated ✓                   |    |    |    |   |    |
| B: Marine Bronze ✓                               |    |    |    |   |    |
| ZN: Black Zinc Nickel plated ✓                   |    |    |    |   |    |
| <b>Shell size</b>                                |    |    |    |   |    |
| 09/11/13/15/17/19/21/23/25                       |    |    |    |   |    |

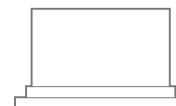
✓: RoHS compliant

## HOLDING SUPPORT EQUIPPED WITH OLIVE DRAB CADMIUM DUMMY RECEPTACLES

REFERENCE: 809 931



## PLASTIC DUST CAPS



| Shell size | Plastic dust caps for plug | Plastic dust caps for receptacles |
|------------|----------------------------|-----------------------------------|
| 9          | 606062                     | 606061                            |
| 11         | 805414                     | 606062                            |
| 13         | 606073                     | 606063                            |
| 15         | 606066                     | 606064                            |
| 17         | 606067                     | 606065                            |
| 19         | 606068                     | 606066                            |
| 21         | 606070                     | 606067                            |
| 23         | 606079                     | 606068                            |
| 25         | 606079                     | 606069                            |

## ACCESSORIES

## OTHER ACCESSORIES

## CRIMP CONTACTS

|                  | Contact size | Pin contacts                               |               | Socket contacts                            |               |
|------------------|--------------|--------------------------------------------|---------------|--------------------------------------------|---------------|
|                  |              | Proprietary No                             | Military No   | Proprietary No                             | Military No   |
| Signal and Power | 00           | Refer to catalog contacts (DOC-000081-ANG) |               | Refer to catalog contacts (DOC-000081-ANG) |               |
|                  | 4            | 900007                                     | -             | 900047                                     | -             |
|                  | 8*           | 900197<br>900198**                         | -             | 900217                                     | -             |
|                  | 12           | 900005                                     | M39029/58-365 | 900045                                     | M39029/56-353 |
|                  | 16           | 900000                                     | M39029/58-364 | 900040                                     | M39029/56-352 |
|                  | 20           | 900001                                     | M39029/58-363 | 900041                                     | M39029/56-351 |
|                  | 22D          | 900004                                     | M39029/58-360 | 900044                                     | M39029/56-348 |
|                  | 23           | 900049                                     | M39029/18-177 | 900048                                     | M39029/17-172 |

\* Use with piggy back grommets is mandatory

\*\* For arrangement 21-48 only

|                 | Contact size | Pin contacts   |               | Socket contacts |               | Cable Type                                              |
|-----------------|--------------|----------------|---------------|-----------------|---------------|---------------------------------------------------------|
|                 |              | Proprietary No | Military No   | Proprietary No  | Military No   |                                                         |
| Coax            | 8*           | 900130         | M39029/60-367 | 900140          | M39029/59-366 | M17/95-RG180                                            |
|                 |              | 900135         | -             | 900145          | -             | M17/94-RG179<br>M17/113-RG316<br>M17/119-RG174          |
|                 | 12           | 900340         | M39029/28-211 | 900350          | M39029/75-416 | M17/94-RG179<br>M17/113-RG316<br>M17/119-RG174          |
|                 |              | 900341         | M39029/28-409 | 900351          | M39029/75-417 | M17/95-RG180<br>Raychem 9528 A1318                      |
|                 |              | 900384***      | -             | 900394**        | -             | M17/113-RG316                                           |
|                 | 16           | 071094         | M39029/76-424 | 070248          | M39029/77-428 | M17/94-RG179<br>M17/113-RG316<br>M17/119-RG174<br>KX22A |
|                 |              | 070575         | M39029/76-425 | 071965          | M39029/77-429 | M17/93-RG178<br>M17/169-00001                           |
| Twinax          | 8*           | 074834         | M39029/90-529 | 072453          | M39029/91-530 | M17/176-00002                                           |
| Twinax          | 8*           | 600611         | -             | 600614          | -             | M17/176-00002                                           |
| Quadrax 100Ω    | 8            | 900330         | -             | 900338          | -             | Tensolite NF24 Q100                                     |
| Optical contact | 16           | -              | M29504/4-4040 | -               | M29504/5-4046 | 50/125 & 62.5/125 fiber                                 |

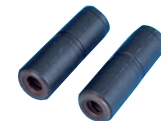
\* Use with piggy back grommets is mandatory

\*\*\* High performance size 12 coaxial contacts 50 ohms matched

For other cable types, please consult us

## PIGGY BACK GROMMETS

The piggy back grommets insure back contact sealing when using size 8 power, coax, twinax or quadrax contacts. Quadrax contact part numbers always include piggy back grommets.



| Type of contact        | Cable OD (mm) | Proprietary No |
|------------------------|---------------|----------------|
| Size 8 power           | 4.4 to 5.2    | 900471         |
| Size 8 twinax and coax | 3 to 4.4      | 900472         |
| Size 8 twinax and coax | 3 to 4.4      | 900476 ****    |

\*\*\*\* to use for arrangements 25-20, 19-17

## ACCESSORIES

## OTHER ACCESSORIES

## SEALING PLUGS

To be mounted behind the crimp contacts

| Contact size | Proprietary No | Military No  |
|--------------|----------------|--------------|
| 8 power      | 900024         | -            |
| 12           | 900023         | MS27488-12-2 |
| 16           | 900020         | MS27488-16-2 |
| 20           | 900021         | MS27488-20-2 |
| 22D          | 900022         | MS27488-22-2 |
| 23           | 900022         | MS27488-22-2 |

## DUMMY CONTACTS

To be mounted instead of the contacts

| Contact size | Dummy contact material      | Proprietary No |
|--------------|-----------------------------|----------------|
| 4            | White plastic               | 900329         |
| 8            | Green plastic               | 900488         |
| 8            | Brass + gold finish         | 900183         |
| 8            | White plastic (recommended) | 900029         |
| 12           | Brass + gold finish         | 900025         |
| 12           | White plastic               | 900486         |
| 16           | Brass + gold finish         | 900028         |
| 16           | Blue plastic                | 900026         |
| 20           | Brass + gold finish         | 900332         |

Metal dummy contacts are recommended for applications requesting EMI protection.

## STANDARD PC TAIL CONTACTS

|        | Contact size | Type | Pin contacts        |                | Socket contacts     |                |
|--------|--------------|------|---------------------|----------------|---------------------|----------------|
|        |              |      | Tail dimension (mm) | Proprietary No | Tail dimension (mm) | Proprietary No |
| Signal | 12           | CI   | 5                   | 900238         | 5                   | 900403         |
|        | 16           | CI   | 5                   | 900240         | 5                   | 900263         |
|        |              | LI   | 8.5                 | 900246         | 8.5                 | 600526         |
|        | 20           | CI   | 5                   | 900241         | 5                   | 900251         |
|        |              | LI   | 8.5                 | 900243         | 8.5                 | 900252         |
|        | 22D          | CI   | 5                   | 900245         | 5                   | 900256         |
|        |              | LI   | 8.5                 | 922389         | 8.5                 | 922390         |
| Coax   | 23           | CI   | 5                   | 900458         | 5                   | 900459         |
|        | 12           | -    | consult us          | 900489         | -                   | -              |
|        |              | -    | consult us          | 900409         | -                   | -              |
|        | 16           | -    | consult us          | 900184**       | consult us          | 900405         |
| Twinax | 8            | -    | consult us          | 072265         | -                   | -              |

\*\* 900179 = 900184 + tin plating

Other PC tail lengths are available, please consult us.

## ACCESSORIES

## OTHER ACCESSORIES

## REDUCING FERRULES

Reducing ferrules allow using cables with smaller diameters than specified in the table part electrical characteristics

| Reducing ferrule No | Contact size | Wire Gauge | Pin contacts    | Socket contacts |
|---------------------|--------------|------------|-----------------|-----------------|
| No reducing ferrule | 8            | 8          | 900197 / 900198 | 900217          |
| 900154              |              | 10         |                 |                 |
| No reducing ferrule | 12           | 12         | 900005          | 900045          |
|                     |              | 14         |                 |                 |
|                     |              | 16         |                 |                 |
| 900092              |              | 16         |                 |                 |
|                     |              | 18         |                 |                 |
|                     |              | 20         |                 |                 |
| 900093              |              | 20         |                 |                 |
|                     |              | 22         |                 |                 |
|                     |              | 24         |                 |                 |
| No reducing ferrule | 16           | 16         | 900000          | 900040          |
|                     |              | 18         |                 |                 |
|                     |              | 20         |                 |                 |
|                     |              | 22         |                 |                 |
| 900091              |              | 24         |                 |                 |
|                     |              | 26         |                 |                 |
|                     |              | 28         |                 |                 |
| No reducing ferrule | 20           | 20         | 900001          | 900041          |
|                     |              | 22         |                 |                 |
|                     |              | 24         |                 |                 |
|                     |              | 26         |                 |                 |
| 900090              |              | 28         |                 |                 |
| 900094              | 22D          | 34         | 900004          | 900044          |
| 900099              |              | 30         |                 |                 |
| No reducing ferrule |              | 22         |                 |                 |
|                     |              | 24         |                 |                 |
|                     |              | 26         |                 |                 |
|                     |              | 28         |                 |                 |

The sealing of mated connectors is only guaranteed for the minimum wire outside diameter given in the table part electrical characteristics.

## 1500 CYCLES CRIMP CONTACTS (FOR CTV ONLY)

|        | Contact size | Pin contacts   |                | Socket contacts |                |
|--------|--------------|----------------|----------------|-----------------|----------------|
|        |              | Proprietary No | Military No    | Proprietary No  | Military No    |
| Signal | 20           | 900318         | M39029/107-621 | 900323          | M39029/106-615 |
|        | 22D          | 900317         | M39029/107-620 | 900322          | M39029/106-614 |
|        | 16           | 900319         | M39029/107-622 | 900324          | M39029/106-616 |

## ACCESSORIES

## APPLICATION TOOLS

## CRIMPING TOOLS



| Contact size | Contact type | Contact part number                        |               | Crimping tool  |              | Positioner     |              |
|--------------|--------------|--------------------------------------------|---------------|----------------|--------------|----------------|--------------|
|              |              | Proprietary No                             | Military No   | Proprietary No | Military No  | Proprietary No | Military No  |
| 00           |              | Refer to catalog contacts (DOC-000081-ANG) |               |                |              |                |              |
| 4            | P            | 900007                                     | -             | 809947         | -            | 809948         | -            |
|              | S            | 900047                                     | -             | 809947         | -            | 809948         | -            |
| 8 Coax       |              | Inner pin & socket                         |               | 809 801        | M22520/2-01  | -              | M22520/2-31  |
|              |              | Outer pin & socket                         |               | 809 914        | M22520/5-01  | 809 915        | M22520/5-41  |
| 8 Power      | P            | 900 197                                    | -             | 809 872        | -            | 809 873        | -            |
|              | P            | 900 198                                    | -             | 809 872        | -            | 809 873        | -            |
|              | S            | 900 217                                    | -             | 809 872        | -            | 809 873        | -            |
| 12 Coax      |              | Inner pin & socket                         |               | 809 801        | M22520/2-01  | 809 932        | M22520/2-34  |
|              |              | Outer pin & socket                         |               | 809 926        | M22520/31-01 | 809 927        | M22520/31-02 |
| 12           | P            | 900 005                                    | M39029/58-365 | 809 857        | M22520/1-01  | 809 858        | M22520/1-04  |
|              | S            | 900 045                                    | M39029/56-353 | 809 857        | M22520/1-01  | 809 858        | M22520/1-04  |
| 16 Coax      |              | Inner pin & socket                         |               | 809 801        | M22520/2-01  | 809 862        | M22520/2-35  |
|              |              | Outer pin & socket                         |               | 809 863        | M22520/4-01  | 809 864        | M22520/4-02  |
| 16           | P            | 900 000                                    | M39029/58-364 | 809 857        | M22520/1-01  | 809 858        | M22520/1-04  |
|              | S            | 900 040                                    | M39029/56-352 | 809 857        | M22520/1-01  | 809 858        | M22520/1-04  |
| 20           | P            | 900 001                                    | M39029/58-363 | 809 857        | M22520/1-01  | 809 858        | M22520/1-04  |
|              |              |                                            |               | 809 801        | M22520/2-01  | 809 826        | M22520/2-10  |
|              | S            | 900 041                                    | M39029/56-351 | 809 857        | M22520/1-01  | 809 858        | M22520/1-04  |
|              |              |                                            |               | 809 801        | M22520/2-01  | 809 826        | M22520/2-10  |
| 22D          | P            | 900 004                                    | M39029/58-360 | 809 801        | M22520/2-01  | 809 810        | M22520/2-09  |
|              | S            | 900 044                                    | M39029/56-348 | 809 801        | M22520/2-01  | 809 835        | M22520/2-07  |
| 23           | P            | 900 049                                    | M39029/18-177 | 809801         | M22520/2-01  | 809 691        | M22520/2-13  |
|              | S            | 900 048                                    | M39029/17-172 | 809801         | M22520/2-01  | 809 692        | M22520/2-16  |

## INSERTION AND REMOVAL TOOLS

## Plastic tools



| Contact size | Insertion tool |              | Removal tool   |              | Colour    |            |
|--------------|----------------|--------------|----------------|--------------|-----------|------------|
|              | Proprietary No | Military No  | Proprietary No | Military No  | Insertion | Extraction |
| 8 Power/coax | *              | *            | -              | M81969/14-12 | -         | green      |
| 12           | 809 859        | M81969/14-04 | 809 859        | M81969/14-04 | yellow    | white      |
| 16           | 809 855        | M81969/14-03 | 809 855        | M81969/14-03 | blue      | white      |
| 20           | 809 854        | M81969/14-10 | 809 854        | M81969/14-10 | red       | orange     |
| 22D          | 809 856        | M81969/14-01 | 809 856        | M81969/14-01 | green     | white      |

\* Manual insertion

## Metallic tools



| Contact size | Straight type                     |                                 | Angle type      |             |                |             |
|--------------|-----------------------------------|---------------------------------|-----------------|-------------|----------------|-------------|
|              | Insertion tools<br>Proprietary No | Removal tools<br>Proprietary No | Insertion tools |             | Removal tools  |             |
|              |                                   |                                 | Proprietary No  | Military No | Proprietary No | Military No |
| 4            | *                                 | 809943                          | -               | -           | -              | -           |
| 8 Power/coax | -                                 | 809961                          | *               | *           | 809 845        | M81969/8-14 |
| 12           | -                                 | -                               | 809 838         | M81969/8-09 | 809 839        | M81969/8-10 |
| 16           | 809 816                           | 809 846                         | 809 812         | M81969/8-07 | 809 820        | M81969/8-08 |
| 20           | 809 817                           | 809 847                         | 809 813         | M81969/8-05 | 809 821        | M81969/8-06 |
| 22D          | 809 819                           | 809 849                         | 809 815         | M81969/8-01 | 809 823        | M81969/8-02 |
| 23           | 810 010                           | 810 010                         | -               | -           | -              | -           |

\* Manual insertion

## HOW TO ORDER

## STANDARD VERSIONS

## AMPHENOL DESIGNATION

| Series                                                                                                                         | TV | P00 | R | Q | W | 17-75 | P | A | - | - |
|--------------------------------------------------------------------------------------------------------------------------------|----|-----|---|---|---|-------|---|---|---|---|
| <b>TV:</b> Metallic shell                                                                                                      |    |     |   |   |   |       |   |   |   |   |
| <b>CTV:</b> Composite shell                                                                                                    |    |     |   |   |   |       |   |   |   |   |
| <b>Shell type</b>                                                                                                              |    |     |   |   |   |       |   |   |   |   |
| <b>P00:</b> Square flange receptacle: 175°C (O.D. cadmium, g.zinc cobalt, ni-PTFE, b.zinc nickel)                              |    |     |   |   |   |       |   |   |   |   |
| <b>PS00:</b> Square flange receptacle: 200°C *** (nickel, s.steel, bronze)                                                     |    |     |   |   |   |       |   |   |   |   |
| <b>07:</b> Jam nut receptacle: 175°C (O.D. cadmium, g.zinc cobalt, ni-PTFE, b.zinc nickel)                                     |    |     |   |   |   |       |   |   |   |   |
| <b>S07:</b> Jam nut receptacle: 200°C *** (nickel, s.steel, bronze)                                                            |    |     |   |   |   |       |   |   |   |   |
| <b>06:</b> Straight plug: 175°C (O.D. cadmium, g.zinc cobalt, ni-PTFE, b.zinc nickel)                                          |    |     |   |   |   |       |   |   |   |   |
| <b>S06:</b> Straight plug: 200°C *** (nickel, s.steel, bronze)                                                                 |    |     |   |   |   |       |   |   |   |   |
| <b>01:</b> In line receptacle 175°C (O.D. cadmium, g.zinc cobalt, ni-PTFE, b.zinc nickel)                                      |    |     |   |   |   |       |   |   |   |   |
| <b>S01:</b> In line receptacles 200°C *** (nickel, s.steel, bronze)                                                            |    |     |   |   |   |       |   |   |   |   |
| <b>P02:</b> P00 without rear thread (no poss. for backshell) 175°C (O.D. cadmium, g.zinc cobalt, ni-PTFE, b.zinc nickel)       |    |     |   |   |   |       |   |   |   |   |
| <b>PS02:</b> PS00 without rear thread (no poss. for backshell) 200°C *** (nickel, s.steel, bronze)                             |    |     |   |   |   |       |   |   |   |   |
| <b>Contact type</b>                                                                                                            |    |     |   |   |   |       |   |   |   |   |
| <b>R:</b> Crimp contacts (or connector delivered without contact)                                                              |    |     |   |   |   |       |   |   |   |   |
| Omit for PC tail contacts, Durmalon plating and black zinc nickel plating                                                      |    |     |   |   |   |       |   |   |   |   |
| <b>Ground Plane receptacle and Quadrax contact options</b>                                                                     |    |     |   |   |   |       |   |   |   |   |
| <b>G:</b> conductive insert                                                                                                    |    |     |   |   |   |       |   |   |   |   |
| <b>Q:</b> insert compatible with quadrax or differential twinax contacts **                                                    |    |     |   |   |   |       |   |   |   |   |
| <b>GQ:</b> conductive insert compatible with quadrax or differential twinax contacts                                           |    |     |   |   |   |       |   |   |   |   |
| Omit for standard receptacle (without conductive insert) and insert without quadrax contact                                    |    |     |   |   |   |       |   |   |   |   |
| <b>Class</b>                                                                                                                   |    |     |   |   |   |       |   |   |   |   |
| <b>W:</b> Olive Drab Cadmium plating (on aluminium or composite)                                                               |    |     |   |   |   |       |   |   |   |   |
| <b>F:</b> Nickel Plating (on aluminium or composite) ✓                                                                         |    |     |   |   |   |       |   |   |   |   |
| <b>K:</b> Passivated Stainless Steel ✓                                                                                         |    |     |   |   |   |       |   |   |   |   |
| <b>S:</b> Nickel plated Stainless Steel ✓                                                                                      |    |     |   |   |   |       |   |   |   |   |
| <b>B:</b> Marine Bronze (copper aluminium alloy) ✓                                                                             |    |     |   |   |   |       |   |   |   |   |
| <b>DT:</b> Durmalon plating (Nickel - PTFE) ✓                                                                                  |    |     |   |   |   |       |   |   |   |   |
| <b>Z:</b> Green zinc Cobalt plated aluminium ✓                                                                                 |    |     |   |   |   |       |   |   |   |   |
| <b>ZN:</b> Black Zinc Nickel plated aluminium ✓                                                                                |    |     |   |   |   |       |   |   |   |   |
| <b>PC Tail Contacts</b>                                                                                                        |    |     |   |   |   |       |   |   |   |   |
| Omit for crimp contacts                                                                                                        |    |     |   |   |   |       |   |   |   |   |
| <b>CI:</b> standard PCB contacts                                                                                               |    |     |   |   |   |       |   |   |   |   |
| <b>LI:</b> long tail PCB contacts                                                                                              |    |     |   |   |   |       |   |   |   |   |
| <b>Shell size and Contact arrangement ***</b>                                                                                  |    |     |   |   |   |       |   |   |   |   |
| See section "Insert Arrangements"                                                                                              |    |     |   |   |   |       |   |   |   |   |
| <b>Contact type</b>                                                                                                            |    |     |   |   |   |       |   |   |   |   |
| <b>P:</b> Pin (500 cycles)                                                                                                     |    |     |   |   |   |       |   |   |   |   |
| <b>S:</b> Socket (500 cycles)                                                                                                  |    |     |   |   |   |       |   |   |   |   |
| <b>H:</b> Pin (1500 cycles - CTV only)                                                                                         |    |     |   |   |   |       |   |   |   |   |
| <b>J:</b> Socket (1500 cycles - CTV only)                                                                                      |    |     |   |   |   |       |   |   |   |   |
| <b>Polarization</b>                                                                                                            |    |     |   |   |   |       |   |   |   |   |
| Blank for normal or <b>A, B, C, D, E</b> . See coding system, section "Insert Arrangements", sub-section "coding polarization" |    |     |   |   |   |       |   |   |   |   |
| <b>Contacts</b>                                                                                                                |    |     |   |   |   |       |   |   |   |   |
| Omit for connectors delivered with contacts                                                                                    |    |     |   |   |   |       |   |   |   |   |
| <b>LC:</b> Connector delivered without contacts                                                                                |    |     |   |   |   |       |   |   |   |   |
| <b>Deviation</b>                                                                                                               |    |     |   |   |   |       |   |   |   |   |
| <b>F404 / F404LF / F404LFC:</b> Tinned PCB contacts (lead tinned / silver tinned / silver-copper tinned)                       |    |     |   |   |   |       |   |   |   |   |
| <b>F485</b> (for TVS06 RB only): Coupling nut conforms to CECC75 - 201 - 002A (for arctic gloves)                              |    |     |   |   |   |       |   |   |   |   |
| <b>F459 / F459LF / F459LFC:</b> stand-off receptacle (lead tinned / silver tinned / silver-copper tinned)                      |    |     |   |   |   |       |   |   |   |   |
| <b>F472</b> Integrated backshells                                                                                              |    |     |   |   |   |       |   |   |   |   |
| For other deviations (FXXX), please <i>consult us</i> .                                                                        |    |     |   |   |   |       |   |   |   |   |

\*\* For Quadrax or dif. Twinax compatible inserts, please omit the "S" corresponding to 200°C compatibility when applicable, in the P/N. Ex: CTV07RGQF17 52PLC  
For other arrangements, shell, coding or deviation, please consult us.

\*\*\*For high-density contact arrangement, please omit the « S » corresponding to 200°C compatibility in the P/N. High-density inserts are +175°C maxi compatible. Ex: TVP 00 RF 09 09 S

✓: RoHS compliant

## HOW TO ORDER

## STANDARD VERSIONS

## MILITARY DESIGNATION (CRIMP CONTACTS ONLY)

| Series                                                                                                                                                                                                                                                                       | JD38999/ | 20 | F | H | 53 | P | A |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|----|---|---|----|---|---|
| <b>Shell type</b><br>20: Square flange receptacle<br>24: Jam nut receptacle<br>26: Straight plug                                                                                                                                                                             |          |    |   |   |    |   |   |
| <b>Shell material and finish</b><br><u>Composite</u><br>J: Olive drab cadmium plated 175°C<br>M: Electroless nickel plated 200°C ✓                                                                                                                                           |          |    |   |   |    |   |   |
| <u>Aluminium</u><br>W: Olive drab cadmium plated 175°C<br>F: Electroless nickel plated 200°C ✓<br>T: Nickel PTFE plated 175°C ✓<br>Z: Black Zinc Nickel plated aluminium 175°C ✓                                                                                             |          |    |   |   |    |   |   |
| <u>Stainless steel</u><br>K: Passivated 200°C, firewall capability ✓<br>S: Nickel plated 200°C, firewall capability ✓                                                                                                                                                        |          |    |   |   |    |   |   |
| <b>Shell size</b><br>A B C D E F G H J MIL<br>09 11 13 15 17 19 21 23 25 Amphenol                                                                                                                                                                                            |          |    |   |   |    |   |   |
| <b>Contact arrangement</b><br>See section "Insert Arrangements"                                                                                                                                                                                                              |          |    |   |   |    |   |   |
| <b>Contact and connector type</b><br>A: Without pin contact<br>B: Without socket contact<br>P: With pin contacts<br>S: With socket contacts<br>H: With 1500 cycles pin contacts (only valid for composite)<br>J: With 1500 cycles socket contacts (only valid for composite) |          |    |   |   |    |   |   |
| <b>Polarization</b><br>N for normal or A, B, C, D, E. See coding system, section "Insert Arrangements"                                                                                                                                                                       |          |    |   |   |    |   |   |

✓: RoHS compliant

## EN3645 (EUROPEAN NORM ORDERING INFORMATION, ASD-STAN) - (CRIMP CONTACTS ONLY)

| Standard number                                                                                                                                                                                                                                                                                                                    | EN3645 | F | 0 | G | N | 16 | A | N |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|---|---|---|---|----|---|---|
| <b>Class:</b><br>W: Crimp version, Aluminum Olive drab cadmium plated, 175°C<br>F: Crimp version, Aluminum Nickel plated, 200°C ✓<br>J: Crimp version, Composite material Olive Drab cadmium plated, 175°C<br>M: Crimp version, Composite material Nickel plated, 200°C ✓<br>K: Crimp version, Passivated Stainless Steel, 200°C ✓ |        |   |   |   |   |    |   |   |
| <b>Shell style:</b><br>0: Square flange receptacle<br>7: Jam Nut Receptacle<br>6: Plug                                                                                                                                                                                                                                             |        |   |   |   |   |    |   |   |
| <b>Shell size code:</b><br>A for 09, B for 11, C for 13, D for 15, E for 17, F for 19, G for 21, H for 23, J for 25                                                                                                                                                                                                                |        |   |   |   |   |    |   |   |
| <b>Insert type:</b><br>N: Standard<br>G: Grounded cavities<br>Q: Quadrx insert, grounded<br>L: Quadrx insert, non grounded<br>R: Power insert                                                                                                                                                                                      |        |   |   |   |   |    |   |   |
| <b>Contact arrangement according to EN3645-002:</b><br>See section "Insert Arrangements"                                                                                                                                                                                                                                           |        |   |   |   |   |    |   |   |
| <b>Contact code:</b><br>M: with Pin contacts      F: with Socket contacts      Coax, twinax, quadrx contacts are not supplied with the connector<br>A: without Pin contacts      B: without Socket contacts                                                                                                                        |        |   |   |   |   |    |   |   |
| <b>Polarization (Key Ways rotation):</b><br>N, A, B, C, D, E. See coding system, section "Insert Arrangements"                                                                                                                                                                                                                     |        |   |   |   |   |    |   |   |

## HOW TO ORDER

## HERMETIC VERSIONS

## AMPHENOL DESIGNATION

| Series                                                                              | TV | SI | YN | 11 | 35 | P | - |
|-------------------------------------------------------------------------------------|----|----|----|----|----|---|---|
| <b>Shell type</b>                                                                   |    |    |    |    |    |   |   |
| PS02: Square flange receptacle                                                      |    |    |    |    |    |   |   |
| S07: Jam nut receptacle                                                             |    |    |    |    |    |   |   |
| SI: Solder mounting receptacle                                                      |    |    |    |    |    |   |   |
| <b>Shell material and finish</b>                                                    |    |    |    |    |    |   |   |
| Y: Stainless steel passivated ✓                                                     |    |    |    |    |    |   |   |
| YN: Stainless steel nickel plated ✓                                                 |    |    |    |    |    |   |   |
| <b>Shell size:</b>                                                                  |    |    |    |    |    |   |   |
| 09/11/13/15/17/19/21/23/25                                                          |    |    |    |    |    |   |   |
| <b>Contact arrangement</b>                                                          |    |    |    |    |    |   |   |
| See section "Insert Arrangements", marked with "Y"                                  |    |    |    |    |    |   |   |
| <b>Contact type</b>                                                                 |    |    |    |    |    |   |   |
| P: Pin                                                                              |    |    |    |    |    |   |   |
| <b>Polarization</b>                                                                 |    |    |    |    |    |   |   |
| Blank for normal or A, B, C, D, E. See coding system, section "Insert Arrangements" |    |    |    |    |    |   |   |

## MILITARY DESIGNATION

| Connector type                                                                                                | JD38999/ | 25 | N | B | 35 | P | N |
|---------------------------------------------------------------------------------------------------------------|----------|----|---|---|----|---|---|
| <b>Shell type</b><br>21: Square flange receptacle<br>23: Jam nut receptacle<br>25: Solder mounting receptacle |          |    |   |   |    |   |   |
| <b>Shell material and finish</b><br>Y: Stainless steel passivated ✓<br>N: Stainless steel nickel plated ✓     |          |    |   |   |    |   |   |
| <b>Shell size</b><br>A B C D E F G H J MIL<br>09 11 13 15 17 19 21 23 25 Amphenol                             |          |    |   |   |    |   |   |
| <b>Contact arrangement</b><br>See section "Insert Arrangements", marked with "Y"                              |          |    |   |   |    |   |   |
| <b>Contact type</b><br>P: Pin                                                                                 |          |    |   |   |    |   |   |
| <b>Polarization</b><br>N for normal or A, B, C, D, E. See coding system, section "Insert Arrangements"        |          |    |   |   |    |   |   |

✓: RoHS compliant

## HOW TO ORDER

## LANYARD RELEASE PLUGS - STANDARD VERSIONS

## AMPHENOL DESIGNATION

|                                                                                                                                                    |    |      |    |   |   |
|----------------------------------------------------------------------------------------------------------------------------------------------------|----|------|----|---|---|
| <b>Shell finish</b><br>88: Olive-drab cadmium plated<br>91: Nickel plated ✓                                                                        | 88 | 5565 | 20 | K | P |
| <b>Connector type</b>                                                                                                                              |    |      |    |   |   |
| <b>Shell size and arrangement code</b><br>See table I, section "Range Derivated", Sub-section "Lanyard Release Plugs"<br>Others, please consult us |    |      |    |   |   |
| <b>Lanyard length</b><br>A to Z code (see table III, section "Range Derivated", Sub-section "Lanyard Release Plugs")                               |    |      |    |   |   |
| <b>Contact type and polarization</b><br>See chart below and coding, section "Insert Arrangement"                                                   |    |      |    |   |   |

## MILITARY DESIGNATION

|                                                                                                                      |          |    |   |   |    |   |   |
|----------------------------------------------------------------------------------------------------------------------|----------|----|---|---|----|---|---|
| <b>Connector type</b><br>JD38999/<br>29: Plug with pin contacts<br>30: Plug with socket contacts                     | JD38999/ | 29 | W | D | 35 | E | N |
| <b>Shell finish</b><br>W: Olive drab cadmium plated<br>F: Nickel plated ✓                                            |          |    |   |   |    |   |   |
| <b>Shell size</b><br>A* B C D E F G H J MIL<br>09* 11 13 15 17 19 21 23 25 Amphenol<br>* Please consult us           |          |    |   |   |    |   |   |
| <b>Contact arrangement</b><br>See table I, section "Range Derivated", Sub-section "Lanyard Release Plugs"            |          |    |   |   |    |   |   |
| <b>Lanyard length</b><br>A to Z code (see table III, section "Range Derivated", Sub-section "Lanyard Release Plugs") |          |    |   |   |    |   |   |
| <b>Polarization</b><br>N for normal or A, B, C, D, E. See coding, section "Insert arrangement"                       |          |    |   |   |    |   |   |

✓: RoHS compliant

## HOW TO ORDER

LANYARD RELEASE PLUGS - COMPATIBLE WITH  
MIL-STD-1760 APPLICATIONS

## AMPHENOL DESIGNATION

| Series                                                                                                                                         | TV | FB | RW | 25-11 | P | E |
|------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|-------|---|---|
| FB: MIL-STD-1760 lanyard release plug                                                                                                          |    |    |    |       |   |   |
| RW: Olive drab cadmium plated                                                                                                                  |    |    |    |       |   |   |
| <b>Arrangement</b><br>25-11, 25-20: see section "Insert Arrangements"                                                                          |    |    |    |       |   |   |
| <b>Contact type and polarization</b><br>G: 25-11 arrangement, pin contacts only<br>P: 25-20 arrangement, pin contacts only                     |    |    |    |       |   |   |
| <b>Lanyard length</b><br>Other lengths are available upon request. See table A, section "Range Derivated", sub-section "Lanyard Release Plugs" |    |    |    |       |   |   |

## MILITARY DESIGNATION

| Series                                                                                                       | JD38999/ | 31 | W | E | 11 | N | 1 |
|--------------------------------------------------------------------------------------------------------------|----------|----|---|---|----|---|---|
| <b>Shell and contact type</b><br>31: Plug with pin contacts, per MIL-STD-1760                                |          |    |   |   |    |   |   |
| <b>Shell finish</b><br>W: Olive drab cadmium plated 175°C                                                    |          |    |   |   |    |   |   |
| <b>Lanyard length.</b> See table A, section "Range Derivated", sub-section "Lanyard Release Plugs"           |          |    |   |   |    |   |   |
| <b>Contact arrangement</b><br>11: 25-11 arrangement<br>20: 25-20 arrangement                                 |          |    |   |   |    |   |   |
| <b>Polarization</b><br>N for 25-20 arrangement. See section "Insert Arrangement"<br>A for 25-11 arrangement. |          |    |   |   |    |   |   |
| <b>Plug locking ring type</b><br>1: Ø 51mm (low profile)<br>2: Ø 68mm (please consult us)                    |          |    |   |   |    |   |   |

For MIL-STD-1760 Type II connectors, please consult us.

Notes section with horizontal lines for writing.

## HOW TO ORDER

## CROSS REFERENCES

| Shell material        | MIL-DTL-38999 Series III | EN 3645              | AMPHENOL                 |
|-----------------------|--------------------------|----------------------|--------------------------|
| Composite shell       | JD38999/20J X XX A °     | EN3645 J0 X N XX A ° | CTVP00RW ■■■ ## P ^ LC   |
|                       |                          |                      | CTVP00WCI ■■■ ## P ^ LC  |
|                       |                          | EN3645 J0 X L XX A ° | CTVP00RQW ■■■ ## P ^ LC  |
|                       |                          | EN3645 J0 X Q XX A ° | CTVP00RGQW ■■■ ## P ^ LC |
|                       | JD38999/20M X XX A °     | EN3645 M0 X N XX A ° | CTVPS00RF ■■■ ## P ^ LC  |
|                       |                          |                      | CTVPS00FCI ■■■ ## P ^ LC |
|                       |                          | EN3645 M0 X L XX A ° | CTVP00RQF ■■■ ## P ^ LC  |
|                       |                          | EN3645 M0 X Q XX A ° | CTVP00RGQF ■■■ ## P ^ LC |
|                       | JD38999/24J X XX A °     | EN3645 J7 X N XX A ° | CTV07RW ■■■ ## P ^ LC    |
|                       |                          |                      | CTV07WCI ■■■ ## P ^ LC   |
|                       |                          | EN3645 J7 X L XX A ° | CTV07RQW ■■■ ## P ^ LC   |
|                       |                          | EN3645 J7 X Q XX A ° | CTV07RGQW ■■■ ## P ^ LC  |
|                       | JD38999/24M X XX A °     | EN3645 M7 X N XX A ° | CTVS07RF ■■■ ## P ^ LC   |
|                       |                          |                      | CTVS07FCI ■■■ ## P ^ LC  |
|                       |                          | EN3645 M7 X L XX A ° | CTV07RQF ■■■ ## P ^ LC   |
|                       |                          | EN3645 M7 X Q XX A ° | CTV07RGQF ■■■ ## P ^ LC  |
| Aluminium shell       | JD38999/26J X XX A °     | EN3645 J6 X N XX A ° | CTV06RW ■■■ ## P ^ LC    |
|                       |                          | EN3645 J6 X L XX A ° | CTV06RQW ■■■ ## P ^ LC   |
|                       | JD38999/26M X XX A °     | EN3645 M6 X N XX A ° | CTVS06RF ■■■ ## P ^ LC   |
|                       |                          | EN3645 M6 X L XX A ° | CTV06RQF ■■■ ## P ^ LC   |
|                       | JD38999/20W X XX A °     | EN3645 W0 X N XX A ° | TVP00RW ■■■ ## P ^ LC    |
|                       |                          |                      | TVP00WCI ■■■ ## P ^ LC   |
|                       |                          | EN3645 W0 X L XX A ° | TVP00RQW ■■■ ## P ^ LC   |
|                       | JD38999/20Z X XX A °     |                      | TVP00ZN ■■■ ## P ^ LC    |
|                       |                          |                      | TVP00ZNCI ■■■ ## P ^ LC  |
|                       |                          |                      | TVP00RQZN ■■■ ## P ^ LC  |
|                       |                          |                      | TVP00RGQZN ■■■ ## P ^ LC |
|                       |                          | EN3645 W0 X Q XX A ° | TVP00RGQW ■■■ ## P ^ LC  |
|                       | JD38999/20F X XX A °     | EN3645 F0 X N XX A ° | TVPS00RF ■■■ ## P ^ LC   |
|                       |                          |                      | TVPS00FCI ■■■ ## P ^ LC  |
|                       |                          | EN3645 F0 X L XX A ° | TVP00RQF ■■■ ## P ^ LC   |
|                       |                          | EN3645 F0 X Q XX A ° | TVP00RGQF ■■■ ## P ^ LC  |
|                       | JD38999/24W X XX A °     | EN3645 W7 X N XX A ° | TV07RW ■■■ ## P ^ LC     |
|                       |                          |                      | TV07WCI ■■■ ## P ^ LC    |
|                       |                          | EN3645 W7 X L XX A ° | TV07RQW ■■■ ## P ^ LC    |
|                       |                          | EN3645 W7 X Q XX A ° | TV07RGQW ■■■ ## P ^ LC   |
|                       | JD38999/24Z X XX A °     |                      | TV07ZN ■■■ ## P ^ LC     |
|                       |                          |                      | TV07ZNCI ■■■ ## P ^ LC   |
|                       |                          |                      | TV07RQZN ■■■ ## P ^ LC   |
|                       |                          |                      | TV07RGQZN ■■■ ## P ^ LC  |
|                       | JD38999/24F X XX A °     | EN3645 F7 X N XX A ° | TVS07RF ■■■ ## P ^ LC    |
|                       |                          |                      | TVS07FCI ■■■ ## P ^ LC   |
|                       |                          | EN3645 F7 X L XX A ° | TV07RQF ■■■ ## P ^ LC    |
|                       |                          | EN3645 F7 X Q XX A ° | TV07RGQF ■■■ ## P ^ LC   |
|                       | JD38999/26W X XX A °     | EN3645 W6 X N XX A ° | TV06RW ■■■ ## P ^ LC     |
|                       |                          | EN3645 W6 X L XX A ° | TV06RQW ■■■ ## P ^ LC    |
|                       | JD38999/26Z X XX A °     |                      | TV06ZN ■■■ ## P ^ LC     |
|                       |                          |                      | TV06RQZN ■■■ ## P ^ LC   |
|                       | JD38999/26F X XX A °     | EN3645 F6 X N XX A ° | TVS06RF ■■■ ## P ^ LC    |
|                       |                          | EN3645 F6 X L XX A ° | TV06RQF ■■■ ## P ^ LC    |
| Stainless Steel shell | JD38999/20K X XX A °     | EN3645 K0 X N XX A ° | TVPS00RK ■■■ ## P ^ LC   |
|                       |                          |                      | TVPS00KCI ■■■ ## P ^ LC  |
|                       | JD38999/20S X XX A °     |                      | TVPS00RS ■■■ ## P ^ LC   |
|                       |                          |                      | TVPS00SCI ■■■ ## P ^ LC  |
|                       | JD38999/24K X XX A °     | EN3645 K7 X N XX A ° | TVS07RK ■■■ ## P ^ LC    |
|                       |                          |                      | TVS07KCI ■■■ ## P ^ LC   |
|                       | JD38999/24S X XX A °     |                      | TVS07RS ■■■ ## P ^ LC    |
|                       |                          |                      | TVS07SCI ■■■ ## P ^ LC   |
| Hermetic receptacle   | JD38999/26K X XX A °     | EN3645 K6 X N XX A ° | TVS06RK ■■■ ## P ^ LC    |
|                       | JD38999/26S X XX A °     |                      | TVS06RS ■■■ ## P ^ LC    |
|                       | JD38999/21Y X XX P °     |                      | TVPS02Y ■■■ ## P ^       |
|                       | JD38999/21N X XX P °     |                      | TVPS02YN ■■■ ## P ^      |
|                       | JD38999/23Y X XX P °     |                      | TVS07Y ■■■ ## P ^        |
|                       | JD38999/23N X XX P °     |                      | TVS07YN ■■■ ## P ^       |
| Dust caps             | JD38999/25Y X XX P °     |                      | TVSIY ■■■ ## P ^         |
|                       | JD38999/25N X XX P °     |                      | TVSIYN ■■■ ## P ^        |
|                       | JD38999/32W X R          |                      | BF R TV W ■■■            |
|                       | JD38999/32W X N          |                      | BF RO TV W ■■■           |
| Dummy receptacle      | JD38999/33W X R          |                      | BEC R TV W ■■■           |
|                       | JD38999/33W X N          |                      | BER R TV W ■■■           |
|                       |                          |                      | SE00 TV W ■■■            |

As example, male version without contact (except for bronze and hermetic male versions with contacts).

| Caption                                     | MIL-DTL-38999 Series III P/N | EN3645 | AMPHENOL P/N |
|---------------------------------------------|------------------------------|--------|--------------|
| Shell size                                  | X                            | X      | ■■■          |
| Insert arrangement                          | XX                           | XX     | ##           |
| Polarization, rotation of secondary keyways | °                            | °      | ^            |

Handwriting practice area with 20 horizontal dotted lines.

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# Amphenol

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This catalog uses paper from managed forests, PEFC & FSC labels, and is printed by a printer certified "Imprim'Vert®".

September 2022

Gestion & Edition by AMPHENOL SOCAPEX

E113H / DOC-000035-ANG

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