



# MACH-D

High-Performance D-Sub Connectors  
for Use in Harsh Environments

- Precision machined shell provides EMI shielding protection
- Grounding strip provides excellent electromagnetic compatibility (EMC)
- Mechanically rugged machined shell protects against shock, vibration, and impact
- IP67 configurations protect against fluid and dust ingress
- High-performance M24308 intermateable



**Positronic®**  
an Amphenol company

THE SCIENCE OF **CERTAINTY®**

M020 22/03



**Positronic®**

an Amphenol company

Positronic builds premium D-Sub connectors for a wide variety of global industries. But every product delivers the same outcome: Certainty. That's our master spec, our driving purpose.

We believe in the people who are advancing our world and making it a better place, those who are realizing new discoveries, developing technologies that help humans connect, and expanding commerce to advance economies. That is why we are serious about developing high-reliability interconnect solutions – because failure is not an option for critical systems, they must perform.

From deep space discovery to medical breakthroughs, Positronic delivers ***The Science of Certainty.***

## WHAT CAN YOU BE CERTAIN ABOUT?

- Failsafe product performance
- Maximum design flexibility
- Leading levels of energy efficiency and temperature control
- Responsive, knowledgeable support

**THE SCIENCE  
OF CERTAINTY®**

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### Removable Contacts

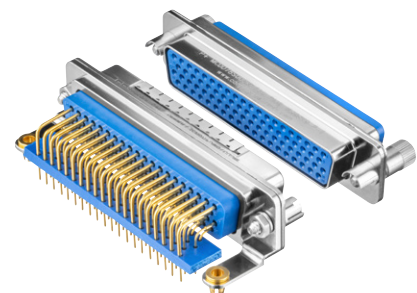
|                                                 |    |
|-------------------------------------------------|----|
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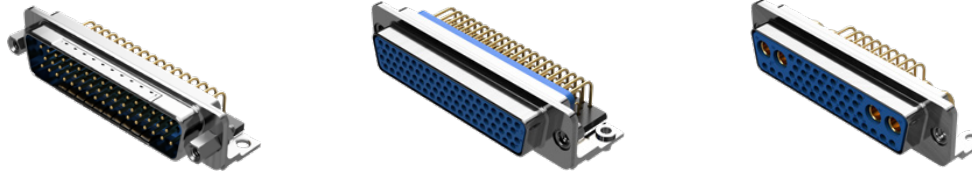
### Test Data

|                              |    |
|------------------------------|----|
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|------------------------------|----|



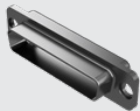
Positronic MACH-D connectors are built with precision machined shells that provide superior EMI shielding. EMI shielding protects against electronic disruptions, guarding against data loss, and defending against system failure. The MACH-D design and manufacturing process removes these

worries and allows the connector to exceed our customers' needs for quality and reliability. The MACH-D offers standard and high density signal contact arrangements as well as hybrid versions, which combine power and signal in a single connector body. A wide variety of accessories are also available.



|                       | MCD                                                                                           | MCDD      | MCBX      |
|-----------------------|-----------------------------------------------------------------------------------------------|-----------|-----------|
| Shell sizes           | 1 to 5                                                                                        | 1 to 6    |           |
| Shell material        | Machined aluminum, stainless steel                                                            |           |           |
| Shell finish          | Electroless nickel, passivated stainless steel, cadmium, chemical conversion coating, or gold |           |           |
| Contact size          | #20                                                                                           | #22       | #8, #20   |
| Current rating        | Up to 17A                                                                                     | Up to 12A | Up to 75A |
| Female contact design | PosiBand® Closed Entry (LSA for size 8)                                                       |           |           |
| Contact termination   | Crimp<br>Solder Cup<br>Solder PCB<br>Press-Fit                                                |           |           |
| Insulator material    | DAP, PBT                                                                                      | PBT       |           |
| Insulator color       | Green (DAP), Blue (PBT)                                                                       | Blue      |           |
| Polarization          | Trapezoidal shape of shell                                                                    |           |           |
| Number of layouts     | 5                                                                                             | 6         | 25        |
| Locking system        | Jackscrews                                                                                    |           |           |

## PLATING OPTIONS

| MACH-D Connectors           |                                                                                     |      |                 |                |                                                                              |
|-----------------------------|-------------------------------------------------------------------------------------|------|-----------------|----------------|------------------------------------------------------------------------------|
| SHELL PLATING               |                                                                                     | CODE | SHELL MATERIAL  | ROHS COMPLIANT | PLATING SPECIFICATIONS                                                       |
| Electroless nickel          |    | K    | Aluminum        | YES            | ASTM B733, Type V, SC2, Class 4                                              |
| Stainless steel, passivated |    | S    | Stainless steel | YES            | SAE AMS2700 Type 6<br>Comparable to MIL-DTL-24308 Code P                     |
| Cadmium                     |    | U    | Aluminum        | NO             | SAE AMS-QQ-P-416 Type II, Class 2<br>Comparable to MIL-DTL-24308 Code F      |
| Gold                        |   | A    | Aluminum        | YES            | ASTM B488, Type I, Code C, Class 1.25<br>Comparable to MIL-DTL-24308 Class M |
| Chemical conversion         |  | T    | Aluminum        | YES            | MIL-DTL-5541, Type II,<br>Class 1A and Class 3                               |

*The above plating images are software-generated and may differ from the actual product appearance.*

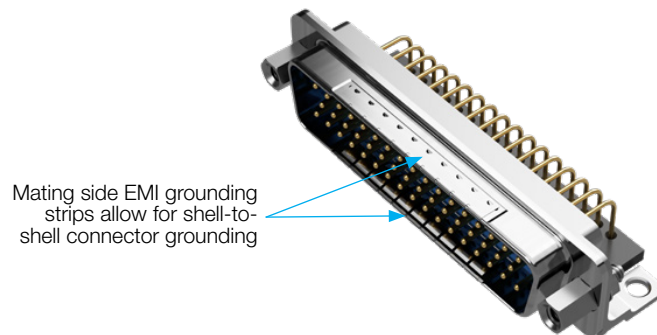
### The Advantages of Stainless Steel Shells

D-Sub connector shells are typically made from steel, aluminum, or brass. Although these are strong materials, they are vulnerable to moisture and subsequent corrosion. Plating the shell with a protective coating helps abate corrosion, but plating materials are vulnerable and can also be hazardous to the environment -- especially cadmium. There is an increasing industry appetite for shell material options that can survive extremely harsh conditions and be environmentally green.

To address this need, Positronic offers stainless steel shells as a standard option on a variety of our D-Sub connector products -- including MACH-D. Stainless steel does not easily corrode and it can outperform nearly any plating material option in a salt spray test. It is also resistant to high temperatures and is very mechanically robust. Our expertise in stainless steel connector shells is evidenced by the fact that Positronic is approved to manufacture over 600 part numbers as part of the MIL-DTL-24308 QPL. That's more than any other connector manufacturer in the industry. Give stainless steel the opportunity to prove why it is quickly becoming one of the most desirable D-Sub shell materials available on the market today!

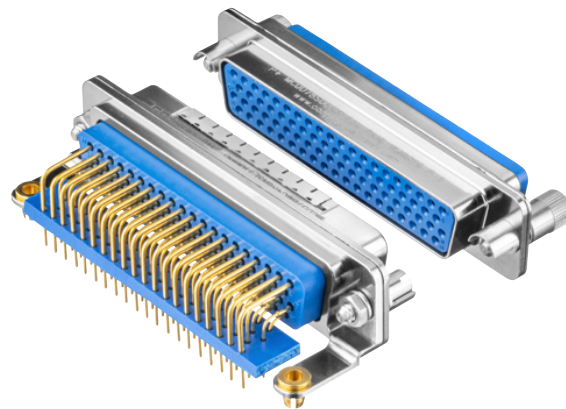
## NEW ACCESSORIES & FEATURES

### EMI Grounding Strips



### Keyed / Polarized Jackscrew System

This keyed jackscrew system functions by way of corresponding keyways on the Code K rotating male jackscrew and Code S fixed female jackpost. When used properly, this system allows for 36 unique key combinations, which are user-configurable. The rotating male jackscrews feature an internal hex head for trouble-free rotation.

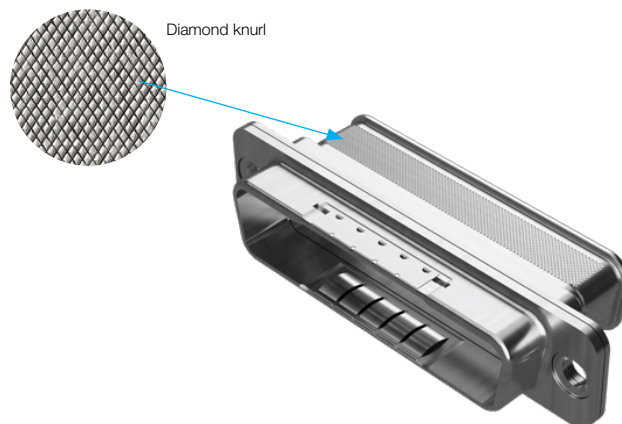


### Banding Feature on Rear Connector Shell

For applications requiring both 360 degree braid shield termination as well as desirable strain relief characteristics, the new diamond knurl banding feature is a perfect solution.

This is an option on the rear shell of all MACH-D connectors by selecting Code C in the Backshells & Boardlocks step.

This feature is designed for use with standard banding-style clamps and tooling. The diamond knurl is ideal in preventing braid rotation and slippage.



## M24308 AT A GLANCE

### Overview

The M24308 D-Subminiature connector is a standardized military connector, defined by United States military specification MIL-DTL-24308. Small enough to fit into tight spaces and with proven reliability, M24308 connectors are an ideal choice for mission-critical tasks where connector performance cannot be a question.



### About M24308

M24308 connectors come in many different styles with a variety of options for class, contact termination, and type. They are designed to operate between -55°C and +125°C. Compact and spatially efficient, M24308 connectors are ideal for applications requiring high density packaging. You can find these connectors in a variety of applications from communication and information technology to aircraft, missiles, and satellites.

Positronic products meet or exceed the requirements set forth within the M24308 specification. Our connectors have gone through rigorous testing to certify quality and performance. They are built for mission-critical applications – where failure is not an option.

Positronic products are part of the U.S. Defense Logistics Agency (DLA) Qualified Products List (QPL), which means they have met the qualification requirements, including appropriate product identification, qualification, and periodic verification testing. This designation means the products are trusted and approved for use in any appropriate application requiring high quality components.

The MIL-DTL-24308 specification can be downloaded at <https://quicksearch.dla.mil>



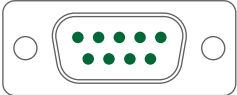
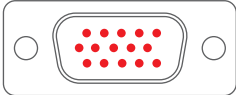
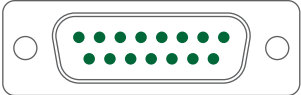
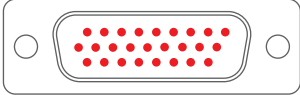
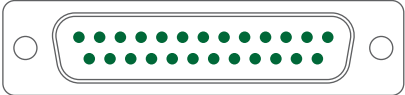
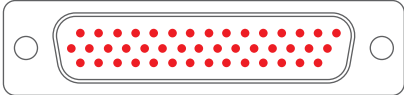
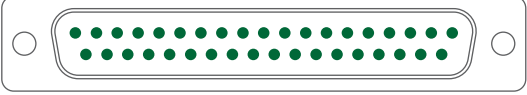
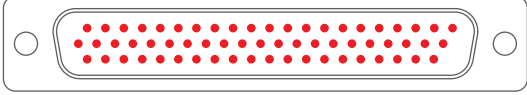
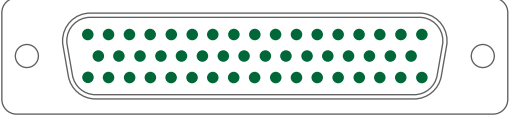
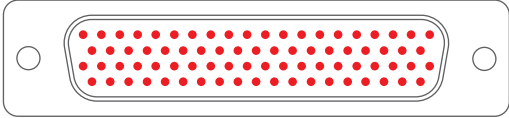
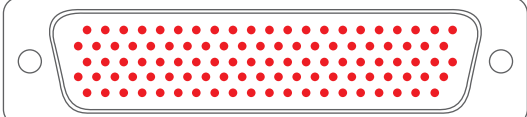
### Positronic MACH-D Connectors

Although machined shell D-Sub connectors are not included as part of MIL-DTL-24308, MACH-D connectors are fully intermateable with standard M24308-type D-Subs and, in many cases, outperform the minimum requirements as outlined in MIL-DTL-24308. For our DD, HDC, and RD Series connectors, Positronic has held its position on the MIL-DTL-24308 QPL for over 40 years and we continue to boast the largest M24308 QPL of any connector manufacturer. Qualified materials, processes, and supply chain are the backbone of our connectors, which we rely on for every D-Sub product from industrial to military and space-grade product offerings.

LAYOUTS

Connectors shown at actual size. Face view of male or rear view of female shown. All Positronic products utilize solid, machined contacts.

Scale 1:1

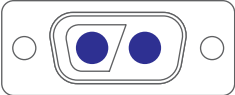
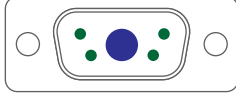
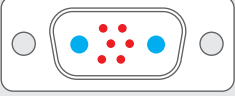
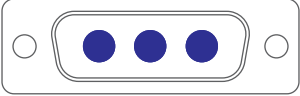
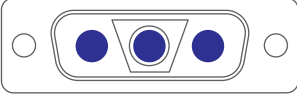
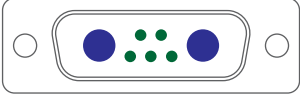
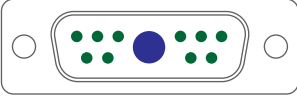
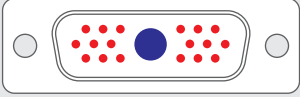
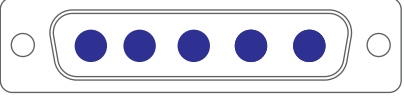
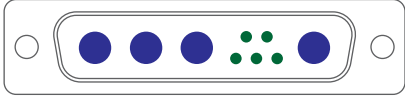
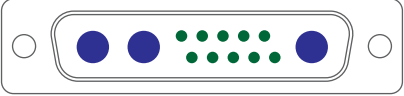
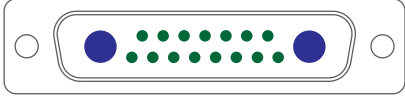
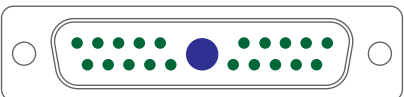
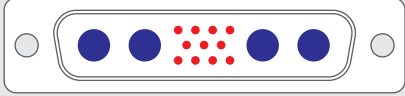
| MCD STANDARD DENSITY                                                                            | SIZE | MCDD HIGH DENSITY                                                                                 |
|-------------------------------------------------------------------------------------------------|------|---------------------------------------------------------------------------------------------------|
| <br>(9) #20    | 1    | <br>(15) #22    |
| <br>(15) #20   | 2    | <br>(26) #22    |
| <br>(25) #20   | 3    | <br>(44) #22    |
| <br>(37) #20   | 4    | <br>(62) #22    |
| <br>(50) #20 | 5    | <br>(78) #22  |
|                                                                                                 | 6    | <br>(104) #22 |

| CONTACT SIZE                                                                          |                                                                                       |
|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| #20                                                                                   | #22                                                                                   |
|  |  |

LAYOUTS

Connectors shown at actual size. Face view of male or rear view of female shown. All Positronic products utilize solid, machined contacts

Scale 1:1

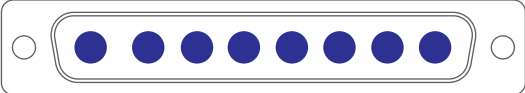
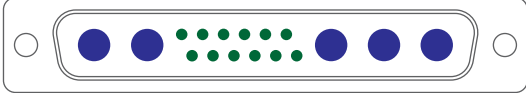
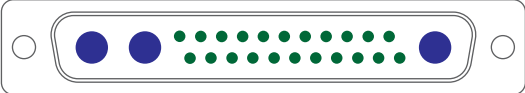
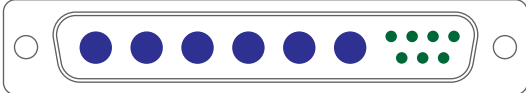
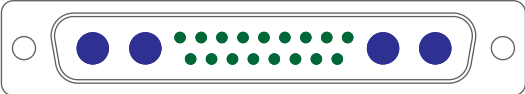
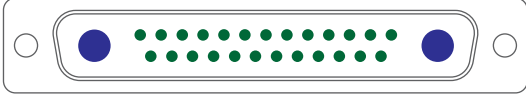
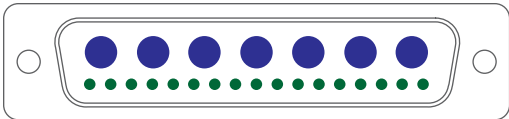
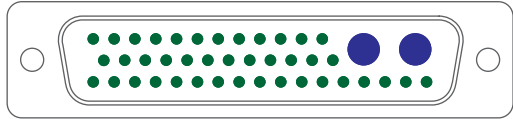
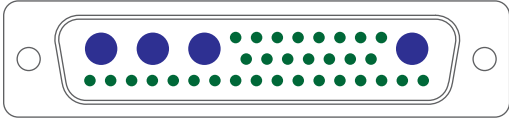
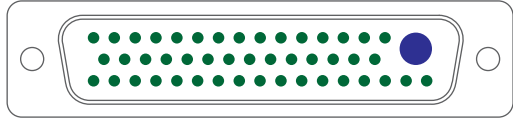
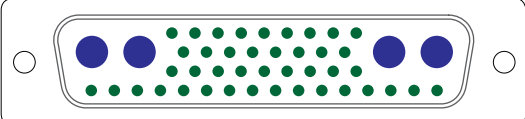
| MCBX                                                                                                                                    | SIZE | MCBX                                                                                                                                     |
|-----------------------------------------------------------------------------------------------------------------------------------------|------|------------------------------------------------------------------------------------------------------------------------------------------|
| <br>2WK2 (2) #8                                        | 1    | <br>5W1 (1) #8, (4) #20                                |
| Contact Technical Sales<br><br>8W2 (2) #16, (6) #22    |      |                                                                                                                                          |
| <br>3W3 (3) #8                                         | 2    | <br>3WK3 (3) #8                                        |
| <br>7W2 (2) #8, (5) #20                                |      | <br>11W1 (1) #8, (10) #20                              |
| Contact Technical Sales<br><br>19W1 (1) #8, (18) #22 |      |                                                                                                                                          |
| <br>5W5 (5) #8                                       | 3    | <br>9W4 (4) #8, (5) #20                              |
| <br>13W3 (3) #8, (10) #20                            |      | <br>17W2 (2) #8, (15) #20                            |
| <br>21W1 (1) #8, (20) #20                            |      | Contact Technical Sales<br><br>15W4 (4) #8, (11) #22 |

| CONTACT SIZE                                                                          |                                                                                       |                                                                                       |                                                                                       |
|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| #8                                                                                    | #16                                                                                   | #20                                                                                   | #22                                                                                   |
|  |  |  |  |

LAYOUTS

Connectors shown at actual size. Face view of male or rear view of female shown. All Positronic products utilize solid, machined contacts

Scale 1:1

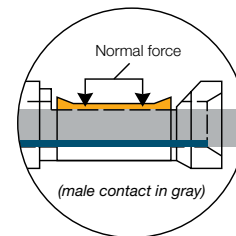
| MCBX                                                                                                         | SIZE | MCBX                                                                                                          |
|--------------------------------------------------------------------------------------------------------------|------|---------------------------------------------------------------------------------------------------------------|
| <br>8W8 (8) #8              | 4    | <br>17W5 (5) #8, (12) #20   |
| <br>25W3 (3) #8, (22) #20   |      | <br>13W6 (6) #8, (7) #20    |
| <br>21WA4 (4) #8, (17) #20  |      | <br>27W2 (2) #8, (25) #20   |
| <br>24W7 (7) #8, (17) #20  | 5    | <br>43W2 (2) #8, (41) #20  |
| <br>36W4 (4) #8, (32) #20 |      | <br>47W1 (1) #8, (46) #20 |
| <br>46W4 (4) #8, (42) #20 | 6    |                                                                                                               |

| CONTACT SIZE                                                                          |                                                                                       |
|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| #8                                                                                    | #20                                                                                   |
|  |  |

## POSIBAND®

PosiBand is a unique contact technology that eliminates the weaknesses of the split-tine design.

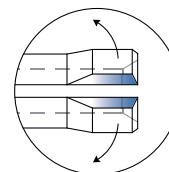
- The PosiBand female contact configuration features a higher cross-sectional area of material compared to split-tine designs and a solid, unbroken ring at the entry point, which increases the mechanical robustness of the contact.
- PosiBand has greater surface engagement at the male and female contact interface, resulting in more consistent electrical performance.
- Resistance of size 22 contacts is 5 milliohms, maximum. Resistance of size 20 contacts is 4 milliohms, maximum. Low contact resistance offers opportunities to use size 22 and size 20 contacts for power.
- PosiBand has lower average insertion forces, resulting in greater ease in mating, especially in larger high density connectors. The average lower insertion force is accomplished while meeting or exceeding performance requirements.
- As the PosiBand external pressure element performs the mechanical action of the connection, the contact body material can be selected from a large spectrum of alloys featuring higher conductivity or superior crimp deformation properties, eliminating the need for further processing such as annealing.
- PosiBand is qualified under SAE AS39029 and MIL-DTL-24308 specifications. PosiBand is also qualified to the higher 40 gram contact separation test requirement of GSFC S-311-P4/08 and GSFC S-311-P4/10.



### PosiBand®

Over-separation is **eliminated**

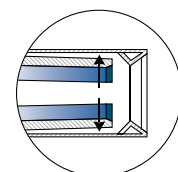
Surface engagement is **consistent** along the barrel



### Open Entry

Over-separation is **limited** by insulator cavity

Surface engagement **concentrated** at the tip



### Legacy Closed Entry

Over-separation is **limited** by sleeve

Surface engagement **concentrated** at the tip

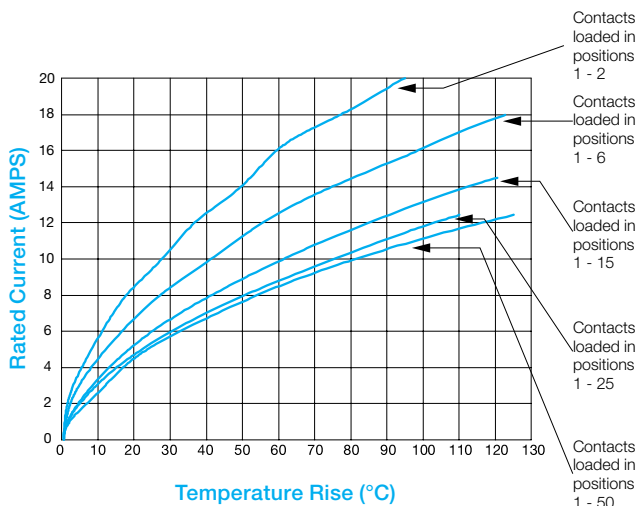
## TEMPERATURE RISE CURVES

Tested per IEC Publication 60512-3, Test 5a

### MCD / MCBX #20 Contacts

Initial Contact Resistance: 4 milliohms, maximum.

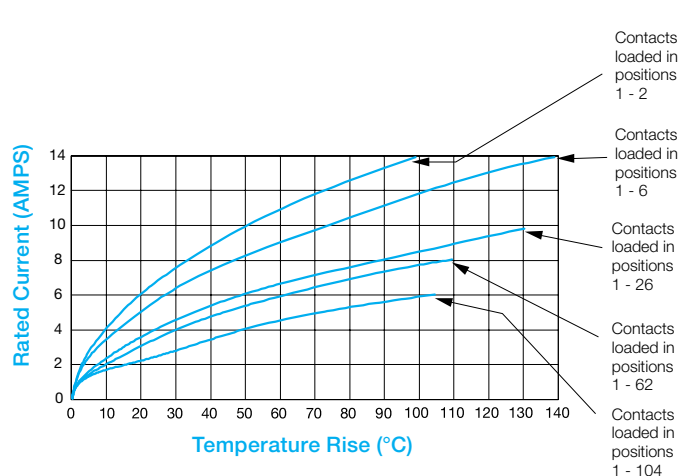
Curve developed using 50-pin Standard Density D-subminiature connectors loaded with size 20 crimp contacts terminated to 20 AWG wire.



### MCDD #22 Contacts

Initial Contact Resistance: 5 milliohms, maximum.

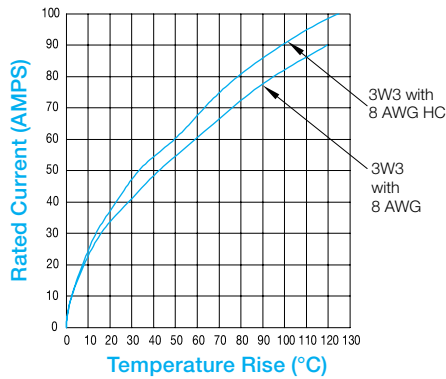
Curve developed using 104-pin High Density D-subminiature connectors loaded with size 22 crimp contacts terminated to 22 AWG wire.



## TEMPERATURE RISE CURVES

Tested per IEC Publication 60512-3, Test 5a

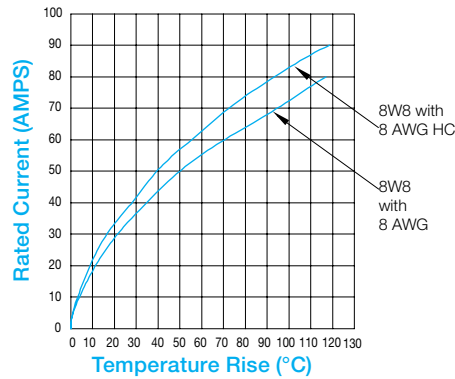
**MCBX3W3 #8  
Contacts**



Curves developed using male crimp connectors mated to female crimp connectors.

Higher performing curve is developed using [high conductivity \(HC\)](#) contacts.

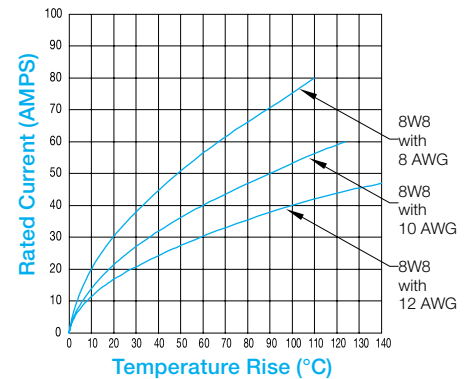
**MCBX8W8 #8  
Contacts**



Curves developed using male crimp connectors mated to female crimp connectors.

Higher performing curve is developed using [high conductivity \(HC\)](#) contacts.

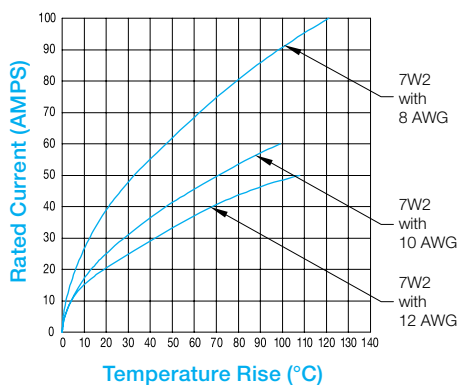
**MCBX8W8 #8  
Contacts**



Curves developed using male crimp connectors mated to female crimp connectors.

Curves are developed using [standard conductivity](#) contacts.

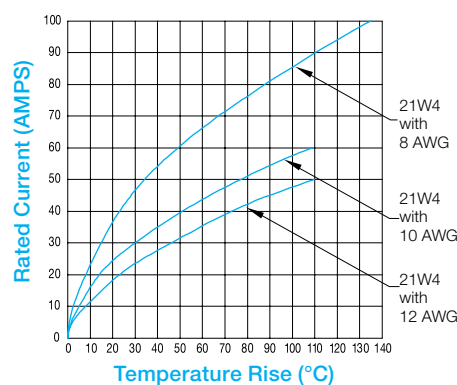
**MCBX7W2 #8  
Contacts**



Curves developed using male crimp connectors mated to female PCB terminations.

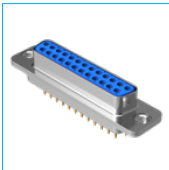
Curves are developed using [standard conductivity](#) contacts.

**MCBX21WA4 #8  
Contacts**



Curves developed using male crimp connectors mated to female PCB terminations.

Curves are developed using [standard conductivity](#) contacts.



MCD Series connectors are standard density D-Sub connectors, built for high-performance applications requiring rugged machined shells. Features include:

- Machined shells for ruggedness, planarity, and precision
- Interfacial seals and rear grommets for waterproofing
- Unique accessories include EMI grounding strips, keyed jackscrews, and banding backshell
- Quality and performance in accordance with MIL-DTL-24308

Trust the **MCD** to deliver **The Science of Certainty** in mission-critical applications.

TECH SPECS

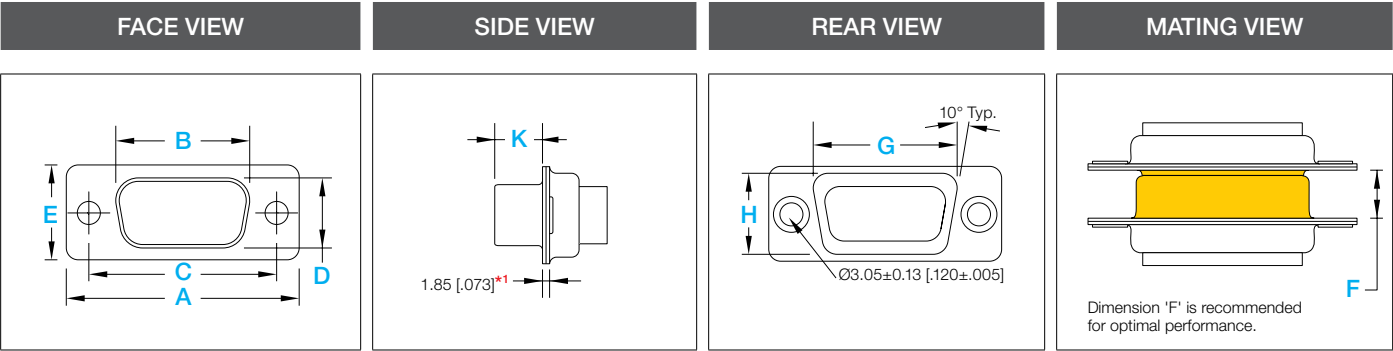
| GENERAL            |                                                                                                                                                                                                                                 |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Part Number Prefix | MCD                                                                                                                                                                                                                             |
| Performance Level  | Mil/Aero<br>Spaceflight                                                                                                                                                                                                         |
| Conformance        | Meets or exceeds performance requirements for MIL-DTL-24308; fully intermateable to MIL-DTL-24308 connectors<br>Meets or exceeds performance requirements for NASA Goddard GSFC-311; fully intermateable to GSFC-311 connectors |
| RoHS Compliance    | Optional                                                                                                                                                                                                                        |

| MATERIAL            |                                                                                                     | IN ACCORDANCE WITH                                               |
|---------------------|-----------------------------------------------------------------------------------------------------|------------------------------------------------------------------|
| Insulator           | PBT (PCB terminations)<br>DAP (wire terminations)                                                   | MIL-DTL-24308 §3.3.5.1                                           |
| Insulator Color     | Blue (PBT), Green (DAP)                                                                             |                                                                  |
| Flammability Rating | UL 94V-0                                                                                            | UL 94                                                            |
| Contact Material    | Copper alloy                                                                                        | MIL-DTL-24308 §3.3.4; AS39029<br>MIL-DTL-24308 §3.3.4.2; AS39029 |
| Contact Plating     | 50 µin gold over nickel or copper underplate                                                        | MIL-DTL-24308 §3.3.4.1; AS39029                                  |
| Shell Material      | Aluminum<br>Stainless steel<br><i>For other shell options, please contact Technical Sales</i>       | ASTM B221<br>ASTM A240                                           |
| Shell Finish        | Gold<br>Electroless nickel<br>Stainless steel, passivated<br>Cadmium<br>Chemical conversion coating | See page 3                                                       |
| Interfacial Seal    | Fluorosilicone                                                                                      | MIL-R-25988 Type II Class I Grade 40                             |
| Rear Grommet        | Fluorosilicone                                                                                      | MIL-R-25988 Type II Class I Grade 40                             |

## TECH SPECS

| MATERIAL                                                             |                                                                                                                                                      | IN ACCORDANCE WITH                                           |
|----------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
| EMI Spring                                                           | Copper alloy, plated electroless nickel                                                                                                              | ASTM B194; AMS-C-26074                                       |
| Adhesive/Sealant                                                     | MasterBond Supreme 10AOHT<br>3M DP190<br><i>For low outgassing requirements, please contact Technical Sales</i>                                      |                                                              |
| Conductive Gasket                                                    | CHOFORM 5513<br><i>For non-conductive options or configurations compatible with Spira-Shield metal EMI shielding, please contact Technical Sales</i> |                                                              |
| ELECTRICAL                                                           |                                                                                                                                                      | IN ACCORDANCE WITH                                           |
| Working Voltage (rms)                                                | 300V                                                                                                                                                 | EIA-364-20                                                   |
| Initial Contact Resistance                                           | 4 mΩ maximum                                                                                                                                         | MIL-DTL-24308 §3.5.9; EIA-364-06;<br>IEC 60512-2, Test 2b    |
| Contact Current Rating at 70°C Temperature Rise                      | 18A 2 contacts energized<br>14A 6 contacts energized<br>11A 15 contacts energized<br>10A 25 contacts energized<br>9A 50 contacts energized           | UL 1977                                                      |
| Insulation Resistance                                                | 5 GΩ                                                                                                                                                 | MIL-DTL-24308 §3.5.8; EIA-364-21                             |
| Proof Voltage (rms)                                                  | 1000V                                                                                                                                                | EIA-364-20                                                   |
| MECHANICAL                                                           |                                                                                                                                                      | IN ACCORDANCE WITH                                           |
| Female Contact Design                                                | PosiBand closed entry                                                                                                                                |                                                              |
| Contact Retention in Insulator                                       | 40N [9 lbs] (removable contacts only)                                                                                                                | MIL-DTL-24308 §3.5.5; EIA-364-29                             |
| Resistance to Soldering Heat<br>- Hand Soldering<br>- Wave Soldering | 360°C [680°F] for 4 seconds<br>260°C [500°F] for 20 seconds                                                                                          | MIL-STD-202-210, condition A<br>MIL-STD-202-210, condition C |
| Polarization                                                         | Trapezoidal shape of shell                                                                                                                           |                                                              |
| Mechanical Durability                                                | 500 cycles                                                                                                                                           | MIL-DTL-24308 §3.5.16; EIA-364-09                            |
| ENVIRONMENTAL                                                        |                                                                                                                                                      | IN ACCORDANCE WITH                                           |
| Operating Temperature                                                | -55 to 125°C                                                                                                                                         | MIL-DTL-24308 §3.5.11; EIA-364-32                            |
| Outgassing                                                           | Low outgassing options (TML <1.0%, CVCM <0.1%, RML <1.0%) are available, <i>please contact Technical Sales.</i>                                      | ASTM E 595; ECSS-Q-ST-70-02C                                 |
| Waterproof                                                           | IP67 ( <i>when ordered with the IP-rated panel mount accessories</i> )                                                                               | IEC 60529                                                    |

SHELL DIMENSIONS

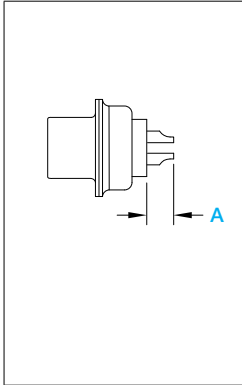


\*1 The 1.85 [0.073] shell thickness in the SIDE VIEW is only valid for configurations without angle brackets.

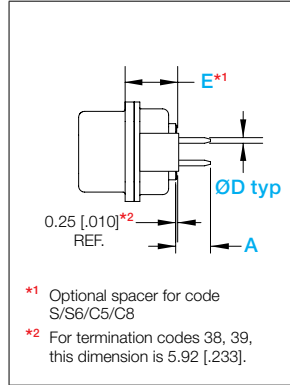
| SHELL SIZE | GENDER | A<br>±0.38<br>[.015] | B<br>±0.13<br>[.005] | C<br>±0.13<br>[.005] | D<br>±0.13<br>[.005] | E<br>±0.38<br>[.015] | G<br>±0.25<br>[.010] | H<br>±0.25<br>[.010] | K<br>±0.13<br>[.005] | F<br>±0.38<br>[.015] |
|------------|--------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| 1          | Male   | 30.81<br>[1.213]     | 18.75<br>[.738]      | 24.99<br>[.984]      | 10.19<br>[.401]      | 12.55<br>[.494]      | 19.82<br>[.780]      | 10.82<br>[.426]      | 5.92<br>[.233]       | 6.73<br>[.265]       |
|            | Female |                      | 16.33<br>[.643]      |                      | 7.90<br>[.311]       |                      |                      |                      | 6.17<br>[.243]       |                      |
| 2          | Male   | 39.14<br>[1.541]     | 27.08<br>[1.066]     | 33.32<br>[1.312]     | 10.19<br>[.401]      | 12.55<br>[.494]      | 28.15<br>[1.108]     | 10.82<br>[.426]      | 5.92<br>[.233]       | 6.73<br>[.265]       |
|            | Female |                      | 24.66<br>[.971]      |                      | 7.90<br>[.311]       |                      |                      |                      | 6.17<br>[.243]       |                      |
| 3          | Male   | 53.04<br>[2.088]     | 40.79<br>[1.606]     | 47.04<br>[1.852]     | 10.19<br>[.401]      | 12.55<br>[.494]      | 41.87<br>[1.648]     | 10.82<br>[.426]      | 5.84<br>[.230]       | 6.50<br>[.256]       |
|            | Female |                      | 38.38<br>[1.511]     |                      | 7.90<br>[.311]       |                      |                      |                      | 6.17<br>[.243]       |                      |
| 4          | Male   | 69.32<br>[2.729]     | 57.25<br>[2.254]     | 63.50<br>[2.500]     | 10.19<br>[.401]      | 12.55<br>[.494]      | 58.28<br>[2.294]     | 10.82<br>[.426]      | 5.84<br>[.230]       | 6.50<br>[.256]       |
|            | Female |                      | 54.84<br>[2.159]     |                      | 7.90<br>[.311]       |                      |                      |                      | 6.17<br>[.243]       |                      |
| 5          | Male   | 66.93<br>[2.635]     | 54.64<br>[2.151]     | 61.11<br>[2.406]     | 13.03<br>[.513]      | 15.37<br>[.605]      | 55.88<br>[2.200]     | 13.67<br>[.538]      | 5.84<br>[.230]       | 6.50<br>[.256]       |
|            | Female |                      | 52.43<br>[2.064]     |                      | 10.74<br>[.423]      |                      |                      |                      | 6.17<br>[.243]       |                      |

## CONTACT TERMINATIONS

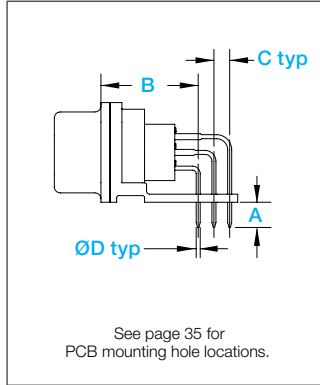
Solder Cup



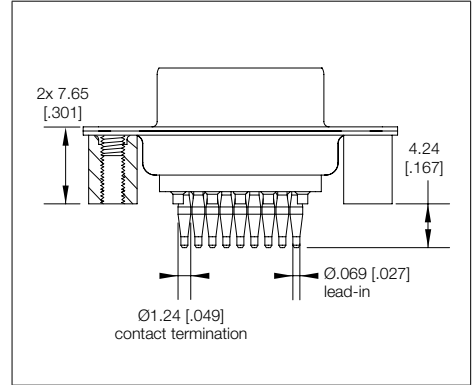
Straight Solder



Right Angle Solder



Straight Press-fit, Code 98



| Code | Termination type   | A            | B            | C           | ØD          | E            |
|------|--------------------|--------------|--------------|-------------|-------------|--------------|
| 0/1  | Crimp              | --           | --           | --          | --          | 6.60 [.260]  |
| 2    | Solder cup         | 3.18 [.125]  | --           | --          | --          | 11.37 [.448] |
| 3    | Straight solder    | 4.31 [.170]  | --           | --          | 0.76 [.030] | 6.60 [.260]  |
| 31   | Straight solder    | 4.31 [.170]  | --           | --          | 1.01 [.040] | 6.60 [.260]  |
| 32   | Straight solder    | 9.52 [.375]  | --           | --          | 0.76 [.030] | 6.60 [.260]  |
| 33   | Straight solder    | 12.70 [.500] | --           | --          | 0.76 [.030] | 6.60 [.260]  |
| 36   | Straight solder    | 6.00 [.236]  | --           | --          | 0.60 [.024] | 6.60 [.260]  |
| 38   | Straight solder    | 8.45 [.333]  | --           | --          | 0.76 [.030] | 12.29 [.484] |
| 39   | Straight solder    | 11.63 [.458] | --           | --          | 0.76 [.030] | 12.29 [.484] |
| 4    | Right angle solder | 4.31 [.170]  | 12.34 [.486] | 2.84 [.112] | 0.76 [.030] | --           |
| 42   | Right angle solder | 5.00 [.197]  | 10.3 [.406]  | 2.54 [.100] | 0.60 [.024] | --           |
| 5    | Right angle solder | 4.31 [.170]  | 8.07 [.318]  | 2.84 [.112] | 0.76 [.030] | --           |
| 51   | Right angle solder | 3.18 [.125]  | 8.07 [.318]  | 2.84 [.112] | 0.76 [.030] | --           |
| 52   | Right angle solder | 6.35 [.250]  | 8.07 [.318]  | 2.84 [.112] | 0.76 [.030] | --           |
| 53   | Right angle solder | 4.31 [.170]  | 8.07 [.318]  | 2.84 [.112] | 1.01 [.040] | --           |
| 54   | Right angle solder | 3.18 [.125]  | 8.07 [.318]  | 2.84 [.112] | 1.01 [.040] | --           |

## CREATE A PART

For additional options and accessories, please see following page.

|  |            |           |          |          |           |          |          |          |            |            |  |
|--|------------|-----------|----------|----------|-----------|----------|----------|----------|------------|------------|--|
|  | <b>MCD</b> | <b>37</b> | <b>S</b> | <b>5</b> | <b>R2</b> | <b>N</b> | <b>0</b> | <b>S</b> | <b>/AA</b> | <b>-15</b> |  |
|--|------------|-----------|----------|----------|-----------|----------|----------|----------|------------|------------|--|

|                                                                                                                                                  |  |  |  |  |  |  |  |  |  |  |                                                                                                                  |
|--------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|--|--|--|--|--|--|------------------------------------------------------------------------------------------------------------------|
| Series                                                                                                                                           |  |  |  |  |  |  |  |  |  |  | Modifications                                                                                                    |
| <b>MCD</b> Standard Density                                                                                                                      |  |  |  |  |  |  |  |  |  |  | <b>-XXXX</b> See bottom of following page for typical modification options                                       |
| Layout                                                                                                                                           |  |  |  |  |  |  |  |  |  |  | Contact Plating                                                                                                  |
| <b>9</b> (9) #20 <b>37</b> (37) #20                                                                                                              |  |  |  |  |  |  |  |  |  |  | <b>-15</b> 50µin Au (min) over Ni over Cu                                                                        |
| <b>15</b> (15) #20 <b>50</b> (50) #20                                                                                                            |  |  |  |  |  |  |  |  |  |  | <b>-50</b> 50µin Au (min) over Cu                                                                                |
| <b>25</b> (25) #20                                                                                                                               |  |  |  |  |  |  |  |  |  |  | Environmental Compliance                                                                                         |
| Contact Gender                                                                                                                                   |  |  |  |  |  |  |  |  |  |  | <b>/AA</b> RoHS                                                                                                  |
| <b>M</b> Male pin                                                                                                                                |  |  |  |  |  |  |  |  |  |  | Shells                                                                                                           |
| <b>NEW MG</b> Male pin with grounding strips                                                                                                     |  |  |  |  |  |  |  |  |  |  | <b>A</b> Aluminum, gold finish                                                                                   |
| <b>P</b> Male pin with interfacial seal                                                                                                          |  |  |  |  |  |  |  |  |  |  | <b>K</b> Aluminum, electroless nickel finish                                                                     |
| <b>NEW PG</b> Male pin with interfacial seal & grounding strips                                                                                  |  |  |  |  |  |  |  |  |  |  | <b>S</b> Stainless steel, passivated                                                                             |
| <b>S</b> Female socket                                                                                                                           |  |  |  |  |  |  |  |  |  |  | Locking Systems                                                                                                  |
| Termination                                                                                                                                      |  |  |  |  |  |  |  |  |  |  | <b>0</b> None                                                                                                    |
| <b>0</b> Wire, order contacts separately                                                                                                         |  |  |  |  |  |  |  |  |  |  | <b>E5</b> Rotating male jackscrews, internal hex                                                                 |
| <b>1</b> Wire, crimp contacts included, 20 - 24 AWG [0.50mm <sup>2</sup> - 0.25mm <sup>2</sup> ]                                                 |  |  |  |  |  |  |  |  |  |  | <b>NEW K</b> Rotating male jackscrews, low-profile, internal hex, 36-position polarization (mates to S jackpost) |
| <b>19</b> Wire, M39029 crimp contacts included, 20 - 24 AWG [0.50mm <sup>2</sup> - 0.25mm <sup>2</sup> ]                                         |  |  |  |  |  |  |  |  |  |  | <b>NEW S</b> Fixed female jackposts, 36-position polarization (mates to K jackscrew)                             |
| <b>2</b> Wire, fixed solder cup, 0.5mm <sup>2</sup> [20 AWG] max.                                                                                |  |  |  |  |  |  |  |  |  |  | <b>T2</b> Fixed female jackposts, washer set                                                                     |
| <b>3</b> Straight solder, 0.71 [.030] tail diameter, 4.32 [.170] tail length                                                                     |  |  |  |  |  |  |  |  |  |  | <i>All locking system options are compatible with EN and EJ backshells</i>                                       |
| <b>32</b> Straight solder, 0.71 [.030] tail diameter, 9.52 [.375] tail length                                                                    |  |  |  |  |  |  |  |  |  |  | Backshells and Boardlocks                                                                                        |
| <b>4</b> Right angle solder, 0.71 [.030] tail diameter, 12.34 [.486] contact extension, 4.32 [.170] tail length                                  |  |  |  |  |  |  |  |  |  |  | <b>0</b> None                                                                                                    |
| <b>5</b> Right angle solder, 0.71 [.030] tail diameter, 8.07 [.318] contact extension, 4.32 [.170] tail length                                   |  |  |  |  |  |  |  |  |  |  | <b>NEW C</b> Banding feature on rear shell, diamond knurl (eliminates the need for backshell)                    |
| <b>98</b> Straight press-fit                                                                                                                     |  |  |  |  |  |  |  |  |  |  | <b>EN</b> Backshell, aluminum, top opening, machined, electroless nickel finish, grounding clips                 |
| Mounting Options                                                                                                                                 |  |  |  |  |  |  |  |  |  |  | <b>P*2</b> IP67-rated inside wall mount flange, O-ring, for use with C options in Mounting Options step          |
| <b>0</b> Clearance hole, 3.05 [.120] Ø                                                                                                           |  |  |  |  |  |  |  |  |  |  | <b>N</b> Boardlocks, for use with R angle brackets in Mounting Options step                                      |
| <b>C7</b> IP67-rated inside wall mount, integrated angle brackets with boardlocks, alignment bar, for use with right angle PCB termination types |  |  |  |  |  |  |  |  |  |  |                                                                                                                  |
| <b>C8</b> IP67-rated inside wall mount, standoffs with boardlocks, for use with straight PCB termination types                                   |  |  |  |  |  |  |  |  |  |  |                                                                                                                  |
| <b>G</b> Rear grommet, for use with crimp connectors only                                                                                        |  |  |  |  |  |  |  |  |  |  |                                                                                                                  |
| <b>R2</b> Angle brackets integrated with shell, alignment bar with non-removable female jackposts                                                |  |  |  |  |  |  |  |  |  |  |                                                                                                                  |
| <b>R6</b> Angle brackets integrated with shell, clearance hole, 3.05 [.120] Ø, alignment bar                                                     |  |  |  |  |  |  |  |  |  |  |                                                                                                                  |
| <b>R7</b> Angle brackets integrated with shell, 4-40 threaded hole, alignment bar                                                                |  |  |  |  |  |  |  |  |  |  |                                                                                                                  |
| <b>R8</b> Angle brackets integrated with shell, 4-40 locknut, alignment bar                                                                      |  |  |  |  |  |  |  |  |  |  |                                                                                                                  |
| <b>S*1</b> Standoffs, swaged, 4-40                                                                                                               |  |  |  |  |  |  |  |  |  |  |                                                                                                                  |
| <b>S5</b> Locknut, swaged, 4-40                                                                                                                  |  |  |  |  |  |  |  |  |  |  |                                                                                                                  |
| <b>S6</b> Standoffs, swaged, 4-40, boardlocks                                                                                                    |  |  |  |  |  |  |  |  |  |  |                                                                                                                  |

For additional options and accessories, please see following page.

\*1 Required if Termination Code 98 selected

\*2 For use with C options in Mounting Options step

## ADDITIONAL OPTIONS

Options shown on this page are less common than others. Customers may experience a price and/or lead time impact when selecting these options.

### Additional Termination Options

|           |                                                                                                                          |
|-----------|--------------------------------------------------------------------------------------------------------------------------|
| <b>12</b> | Wire, crimp contacts included, 26 - 30 AWG [0.12mm <sup>2</sup> - 0.05mm <sup>2</sup> ]                                  |
| <b>31</b> | Straight solder, 1.02 [.040] tail diameter, 4.32 [.170] tail length                                                      |
| <b>33</b> | Straight solder, 0.71 [.030] tail diameter, 12.70 [.500] tail length                                                     |
| <b>36</b> | Straight solder, metric footprint, 0.61 [.024] tail diameter, 5.99 [.236] tail length                                    |
| <b>38</b> | Straight solder, 0.71 [.030] tail diameter, 8.45 [.333] tail length                                                      |
| <b>39</b> | Straight solder, 0.71 [.030] tail diameter, 11.63 [.458] tail length                                                     |
| <b>42</b> | Right angle solder, metric footprint, 0.61 [.024] tail diameter, 10.31 [.406] contact extension, 5.00 [.197] tail length |
| <b>51</b> | Right angle solder, 0.71 [.030] tail diameter, 8.07 [.318] contact extension, 3.18 [.125] tail length                    |
| <b>52</b> | Right angle solder, 0.71 [.030] tail diameter, 8.07 [.318] contact extension, 6.35 [.250] tail length                    |
| <b>53</b> | Right angle solder, 1.02 [.040] tail diameter, 8.07 [.318] contact extension, 4.32 [.170] tail length                    |
| <b>54</b> | Right angle solder, 1.02 [.040] tail diameter, 8.07 [.318] contact extension, 3.18 [.125] tail length                    |

### Additional Mounting Options

|           |                                                                                                                        |
|-----------|------------------------------------------------------------------------------------------------------------------------|
| <b>C5</b> | IP67-rated inside wall mount, standoffs, for use with termination codes 2, 3, and 98                                   |
| <b>C6</b> | IP67-rated inside wall mount, integrated angle brackets, alignment bar, for use with right angle PCB termination types |

### Additional Backshell Options

|           |                                                                                          |
|-----------|------------------------------------------------------------------------------------------|
| <b>EJ</b> | Backshell, aluminum, top opening, machined, chemical conversion coating, grounding clips |
|-----------|------------------------------------------------------------------------------------------|

### Additional Locking Systems Options

|          |                                                              |
|----------|--------------------------------------------------------------|
| <b>T</b> | Fixed female jackposts, compatible with EN and EJ backshells |
|----------|--------------------------------------------------------------|

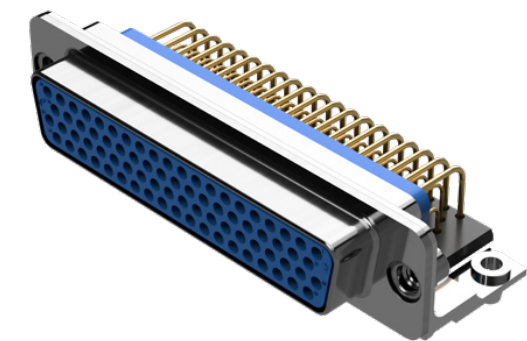
### Additional Shells Options

|          |                                       |
|----------|---------------------------------------|
| <b>T</b> | Aluminum, chemical conversion coating |
| <b>U</b> | Aluminum, cadmium finish              |

### Typical Modification Options

- Low outgassing per ASTM E595 and ECSS-Q-ST-70-02C
- Solder coated contact tails
- Thermocouple contacts
- Blind mate hardware
- Protective dust caps
- EMI dust caps
- ESD packaging
- 100% inspection or other increased inspection levels

Please contact Technical Sales for additional modification options not listed here and for part numbering details.



MCDD Series connectors are high density D-sub connectors, built for high performance applications requiring rugged machined shells. Features include:

- Machined shells for ruggedness, planarity, and precision
- Interfacial seals and rear grommets for waterproofing
- Unique accessories include EMI grounding strips, keyed jackscrews, and banding backshell
- Quality and performance in accordance with MIL-DTL-24308

Trust the **MCDD** to deliver ***The Science of Certainty*** in mission-critical applications.

## TECH SPECS

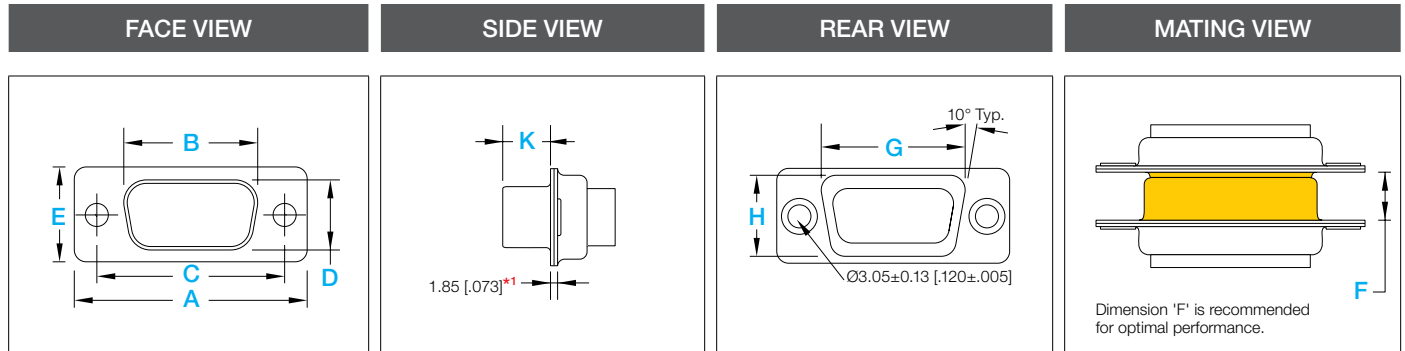
| GENERAL            |                                                                                                                                                                                                                                 |  |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Part Number Prefix | MCDD                                                                                                                                                                                                                            |  |
| Performance Level  | Mil/Aero<br>Spaceflight                                                                                                                                                                                                         |  |
| Qualifications     | Meets or exceeds performance requirements for MIL-DTL-24308; fully intermateable to MIL-DTL-24308 connectors<br>Meets or exceeds performance requirements for NASA Goddard GSFC-311; fully intermateable to GSFC-311 connectors |  |
| RoHS Compliance    | Optional                                                                                                                                                                                                                        |  |

| MATERIAL            |                                                                                                     | IN ACCORDANCE WITH                                               |
|---------------------|-----------------------------------------------------------------------------------------------------|------------------------------------------------------------------|
| Insulator           | PBT                                                                                                 | MIL-DTL-24308 §3.3.5.1                                           |
| Insulator Color     | Blue (PBT)                                                                                          |                                                                  |
| Flammability Rating | UL 94V-0                                                                                            | UL 94                                                            |
| Contact Material    | Copper alloy                                                                                        | MIL-DTL-24308 §3.3.4; AS39029<br>MIL-DTL-24308 §3.3.4.2; AS39029 |
| Contact Plating     | 50 µin gold over nickel or copper underplate                                                        | MIL-DTL-24308 §3.3.4.1; AS39029                                  |
| Shell Material      | Aluminum<br>Stainless steel<br><i>For other shell options, please contact Technical Sales</i>       | ASTM B221<br>ASTM A240                                           |
| Shell Finish        | Gold<br>Electroless nickel<br>Stainless steel, passivated<br>Cadmium<br>Chemical conversion coating | See page 3                                                       |
| Interfacial Seal    | Fluorosilicone                                                                                      | MIL-R-25988 Type II Class I Grade 40                             |
| Rear Grommet        | Fluorosilicone                                                                                      | MIL-R-25988 Type II Class I Grade 40                             |

## TECH SPECS

| MATERIAL                                                                  |                                                                                                                                                      | IN ACCORDANCE WITH                                           |
|---------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
| EMI Spring                                                                | Copper alloy, plated with electroless nickel                                                                                                         | ASTM B194; AMS-C-26074                                       |
| Adhesive/Sealant                                                          | MasterBond Supreme 10AOHT<br>3M DP190<br><i>For low outgassing requirements, please contact Technical Sales</i>                                      |                                                              |
| Conductive Gasket                                                         | CHOFORM 5513<br><i>For non-conductive options or configurations compatible with Spira-Shield metal EMI shielding, please contact Technical Sales</i> |                                                              |
| ELECTRICAL                                                                |                                                                                                                                                      | IN ACCORDANCE WITH                                           |
| Working Voltage (rms)                                                     | 300V                                                                                                                                                 | EIA-364-20                                                   |
| Initial Contact Resistance                                                | 5 mΩ maximum                                                                                                                                         | MIL-DTL-24308 §3.5.9; EIA-364-06;<br>IEC 60512-2, Test 2b    |
| Contact Current Rating at 70°C Temperature Rise                           | 12A 2 contacts energized<br>10A 6 contacts energized<br>7.5A 26 contacts energized<br>6.5A 62 contacts energized<br>5.0A 104 contacts energized      | UL 1977                                                      |
| Insulation Resistance                                                     | 5 GΩ                                                                                                                                                 | MIL-DTL-24308 §3.5.8; EIA-364-21                             |
| Proof Voltage                                                             | 1000V                                                                                                                                                | EIA-364-20                                                   |
| MECHANICAL                                                                |                                                                                                                                                      | IN ACCORDANCE WITH                                           |
| Female Contact Design                                                     | PosiBand closed entry                                                                                                                                |                                                              |
| Contact Retention In Insulator                                            | 40N [9 lbs] (removable contacts only)                                                                                                                | MIL-DTL-24308 §3.5.5; EIA-364-29                             |
| Resistance To Soldering Heat<br>- Selective Soldering<br>- Wave Soldering | 360°C [680°F] for 4 seconds<br>260°C [500°F] for 20 seconds                                                                                          | MIL-STD-202-210, condition A<br>MIL-STD-202-210, condition C |
| Polarization                                                              | Trapezoidal shape of shell                                                                                                                           |                                                              |
| Mechanical Durability                                                     | 500 cycles                                                                                                                                           | MIL-DTL-24308 §3.5.16; EIA-364-09                            |
| ENVIRONMENTAL                                                             |                                                                                                                                                      | IN ACCORDANCE WITH                                           |
| Operating Temperature                                                     | -55 to 125°C                                                                                                                                         | MIL-DTL-24308 §3.5.11; EIA-364-32                            |
| Outgassing                                                                | Low outgassing options (TML <1.0%, CVCM <0.1%, RML <1.0%) are available, please contact Technical Sales.                                             | ASTM E 595;<br>ECSS-Q-ST-70-02C                              |
| Waterproof                                                                | IP67 (when ordered with the IP-rated panel mount accessories)                                                                                        | IEC 60529                                                    |

## SHELL DIMENSIONS

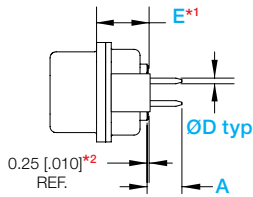


\*1 The 1.85 [0.073] shell thickness in the SIDE VIEW is only valid for configurations without angle brackets.

| SHELL SIZE | GENDER | A<br>±0.38<br>[.015] | B<br>±0.13<br>[.005] | C<br>±0.13<br>[.005] | D<br>±0.13<br>[.005] | E<br>±0.38<br>[.015] | G<br>±0.25<br>[.010] | H<br>±0.25<br>[.010] | K<br>±0.13<br>[.005] | F<br>±0.38<br>[.015] |
|------------|--------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| 1          | Male   | 30.81<br>[1.213]     | 18.75<br>[.738]      | 24.99<br>[.984]      | 10.19<br>[.401]      | 12.55<br>[.494]      | 19.82<br>[.780]      | 10.82<br>[.426]      | 5.92<br>[.233]       | 6.73<br>[.265]       |
|            | Female |                      | 16.33<br>[.643]      |                      | 7.90<br>[.311]       |                      |                      |                      | 6.17<br>[.243]       |                      |
| 2          | Male   | 39.14<br>[1.541]     | 27.08<br>[1.066]     | 33.32<br>[1.312]     | 10.19<br>[.401]      | 12.55<br>[.494]      | 28.15<br>[1.108]     | 10.82<br>[.426]      | 5.92<br>[.233]       | 6.73<br>[.265]       |
|            | Female |                      | 24.66<br>[.971]      |                      | 7.90<br>[.311]       |                      |                      |                      | 6.17<br>[.243]       |                      |
| 3          | Male   | 53.04<br>[2.088]     | 40.79<br>[1.606]     | 47.04<br>[1.852]     | 10.19<br>[.401]      | 12.55<br>[.494]      | 41.87<br>[1.648]     | 10.82<br>[.426]      | 5.84<br>[.230]       | 6.50<br>[.256]       |
|            | Female |                      | 38.38<br>[1.511]     |                      | 7.90<br>[.311]       |                      |                      |                      | 6.17<br>[.243]       |                      |
| 4          | Male   | 69.32<br>[2.729]     | 57.25<br>[2.254]     | 63.50<br>[2.500]     | 10.19<br>[.401]      | 12.55<br>[.494]      | 58.28<br>[2.294]     | 10.82<br>[.426]      | 5.84<br>[.230]       | 6.50<br>[.256]       |
|            | Female |                      | 54.84<br>[2.159]     |                      | 7.90<br>[.311]       |                      |                      |                      | 6.17<br>[.243]       |                      |
| 5          | Male   | 66.93<br>[2.635]     | 54.64<br>[2.151]     | 61.11<br>[2.406]     | 13.03<br>[.513]      | 15.37<br>[.605]      | 55.88<br>[2.200]     | 13.67<br>[.538]      | 5.84<br>[.230]       | 6.50<br>[.256]       |
|            | Female |                      | 52.43<br>[2.064]     |                      | 10.74<br>[.423]      |                      |                      |                      | 6.17<br>[.243]       |                      |
| 6          | Male   | 69.32<br>[2.729]     | 58.01<br>[2.284]     | 63.50<br>[2.500]     | 14.61<br>[.575]      | 16.97<br>[.668]      | 59.03<br>[2.324]     | 15.24<br>[.600]      | 5.84<br>[.230]       | 6.50<br>[.256]       |
|            | Female |                      | 55.60<br>[2.189]     |                      | 12.32<br>[.485]      |                      |                      |                      | 6.17<br>[.243]       |                      |

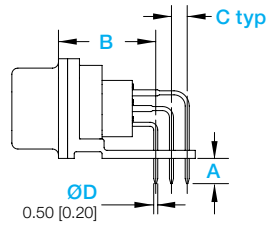
## CONTACT TERMINATIONS

Straight Solder



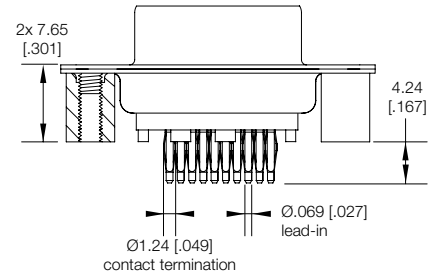
- \*1 Optional spacer for code S/S6/C5/C8  
\*2 For termination codes 38, 39, this dimension is 3.00 [.118].

Right Angle Solder



See page 35 for PCB mounting hole locations.

Straight Press-fit, Code 98



| Code                    | Termination type   | A            | B            | C           | E            |
|-------------------------|--------------------|--------------|--------------|-------------|--------------|
| 0/1                     | Crimp              | --           | --           | --          | 10.41 [.410] |
| 3                       | Straight solder    | 3.81 [.150]  | --           | --          | 10.41 [.410] |
| 32                      | Straight solder    | 9.52 [.375]  | --           | --          | 10.41 [.410] |
| 33                      | Straight solder    | 12.70 [.500] | --           | --          | 10.41 [.410] |
| 38                      | Straight solder    | 5.53 [.218]  | --           | --          | 12.29 [.484] |
| 39                      | Straight solder    | 8.71 [.343]  | --           | --          | 12.29 [.484] |
| 4<br>(Shell sizes 1-4)  | Right angle solder | 3.18 [.125]  | 12.34 [.486] | 1.98 [.078] | --           |
| 4<br>(Shell sizes 5-6)  | Right angle solder | 3.18 [.125]  | 12.34 [.486] | 2.08 [.082] | --           |
| 51<br>(Shell sizes 1-4) | Right angle solder | 3.18 [.125]  | 8.07 [.318]  | 1.98 [.078] | --           |
| 51<br>(Shell sizes 5-6) | Right angle solder | 3.18 [.125]  | 8.07 [.318]  | 2.08 [.082] | --           |
| 52<br>(Shell sizes 1-4) | Right angle solder | 6.35 [.250]  | 8.07 [.318]  | 1.98 [.078] | --           |
| 52<br>(Shell sizes 5-6) | Right angle solder | 6.35 [.250]  | 8.07 [.318]  | 2.08 [.082] | --           |

## CREATE A PART

For additional options and accessories, please see following page.

|                                                                                                                                           |  |                          |           |          |          |          |          |          |          |            |            |                                                                                                                  |
|-------------------------------------------------------------------------------------------------------------------------------------------|--|--------------------------|-----------|----------|----------|----------|----------|----------|----------|------------|------------|------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                           |  | <b>MCDD</b>              | <b>62</b> | <b>S</b> | <b>3</b> | <b>S</b> | <b>0</b> | <b>K</b> | <b>S</b> | <b>/AA</b> | <b>-15</b> |                                                                                                                  |
| Series                                                                                                                                    |  | <b>MCDD</b> High Density |           |          |          |          |          |          |          |            |            | Modifications                                                                                                    |
|                                                                                                                                           |  |                          |           |          |          |          |          |          |          |            |            | -XXXX See bottom of following page for typical modification options                                              |
| Layout                                                                                                                                    |  |                          |           |          |          |          |          |          |          |            |            | Contact Plating                                                                                                  |
|                                                                                                                                           |  |                          |           |          |          |          |          |          |          |            |            | -15 50µin Au (min) over Ni over Cu                                                                               |
|                                                                                                                                           |  |                          |           |          |          |          |          |          |          |            |            | -50 50µin Au (min) over Cu                                                                                       |
| Contact Gender                                                                                                                            |  |                          |           |          |          |          |          |          |          |            |            | Environmental Compliance                                                                                         |
|                                                                                                                                           |  |                          |           |          |          |          |          |          |          |            |            | /AA RoHS                                                                                                         |
| <b>NEW</b> M Male pin                                                                                                                     |  |                          |           |          |          |          |          |          |          |            |            | Shells                                                                                                           |
| <b>NEW</b> MG Male pin with grounding strips                                                                                              |  |                          |           |          |          |          |          |          |          |            |            | A Aluminum, gold finish                                                                                          |
| P Male pin with interfacial seal                                                                                                          |  |                          |           |          |          |          |          |          |          |            |            | K Aluminum, electroless nickel finish                                                                            |
| <b>NEW</b> PG Male pin with interfacial seal & grounding strips                                                                           |  |                          |           |          |          |          |          |          |          |            |            | S Stainless steel, passivated                                                                                    |
| S Female socket                                                                                                                           |  |                          |           |          |          |          |          |          |          |            |            | Locking Systems                                                                                                  |
| Termination                                                                                                                               |  |                          |           |          |          |          |          |          |          |            |            | 0 None                                                                                                           |
| 0 Wire, order contacts separately                                                                                                         |  |                          |           |          |          |          |          |          |          |            |            | <b>NEW</b> E5 Rotating male jackscrews internal hex                                                              |
| 1 Wire, crimp contacts included, 22 - 30 AWG [0.3 mm <sup>2</sup> - 0.05 mm <sup>2</sup> ]                                                |  |                          |           |          |          |          |          |          |          |            |            | <b>NEW</b> K Rotating male jackscrews, low-profile, internal hex, 36-position polarization (mates to S jackpost) |
| 19 Wire, M39029 crimp contacts included, 22 - 28 AWG [0.3 mm <sup>2</sup> - 0.08 mm <sup>2</sup> ]                                        |  |                          |           |          |          |          |          |          |          |            |            | <b>NEW</b> S Fixed female jackposts, 36-position polarization (mates to K jackscrew)                             |
| 3 Straight solder, 0.51 [.020] tail diameter, 3.81 [.150] tail length                                                                     |  |                          |           |          |          |          |          |          |          |            |            | T2 Fixed female jackposts, washer set                                                                            |
| 32 Straight solder, 0.51 [.020] tail diameter, 7.62 [.300] tail length                                                                    |  |                          |           |          |          |          |          |          |          |            |            | All locking system options are compatible with EN and EJ backshells                                              |
| 4 Right angle solder, 0.51 [.020] tail diameter, 12.34 [.486] contact extension, 3.17 [.125] tail length                                  |  |                          |           |          |          |          |          |          |          |            |            | Backshells & Boardlocks                                                                                          |
| 98 Straight press-fit                                                                                                                     |  |                          |           |          |          |          |          |          |          |            |            | 0 None                                                                                                           |
| Mounting Options                                                                                                                          |  |                          |           |          |          |          |          |          |          |            |            | <b>NEW</b> C Banding feature on rear shell, diamond knurl (eliminates the need for backshell)                    |
| 0 Clearance hole, 3.05 [.120] Ø                                                                                                           |  |                          |           |          |          |          |          |          |          |            |            | EN Backshell, aluminum, top opening, machined, electroless nickel finish, grounding clips                        |
| C7 IP67-rated inside wall mount, integrated angle brackets with boardlocks, alignment bar, for use with right angle PCB termination types |  |                          |           |          |          |          |          |          |          |            |            | P*2 IP67-rated inside wall mount flange, O-ring, for use with C options in Mounting Options step                 |
| C8 IP67-rated inside wall mount, standoffs with boardlocks, for use with straight PCB termination types                                   |  |                          |           |          |          |          |          |          |          |            |            | N Boardlocks, for use with R angle brackets in Mounting Options step                                             |
| G Rear grommet, for use with crimp connectors only                                                                                        |  |                          |           |          |          |          |          |          |          |            |            |                                                                                                                  |
| R2 Angle brackets integrated with shell, alignment bar with non-removable female jackposts                                                |  |                          |           |          |          |          |          |          |          |            |            |                                                                                                                  |
| R6 Angle brackets integrated with shell, clearance hole, 3.05 [.120] Ø, alignment bar                                                     |  |                          |           |          |          |          |          |          |          |            |            |                                                                                                                  |
| R7 Angle brackets integrated with shell, 4-40 threaded hole, alignment bar                                                                |  |                          |           |          |          |          |          |          |          |            |            |                                                                                                                  |
| R8 Angle brackets integrated with shell, 4-40 locknut, alignment bar                                                                      |  |                          |           |          |          |          |          |          |          |            |            |                                                                                                                  |
| S*1 Standoffs, swaged, 4-40                                                                                                               |  |                          |           |          |          |          |          |          |          |            |            |                                                                                                                  |
| S5 Locknut, swaged, 4-40                                                                                                                  |  |                          |           |          |          |          |          |          |          |            |            |                                                                                                                  |
| S6 Standoffs, swaged, 4-40, boardlocks                                                                                                    |  |                          |           |          |          |          |          |          |          |            |            |                                                                                                                  |

For additional options and accessories, please see following page.

\*1 Required if Termination Code 98 selected

\*2 For use with C options in Mounting Options step

## ADDITIONAL OPTIONS

Options shown on this page are less common than others. Customers may experience a price and/or lead time impact when selecting these options.

### Additional Termination Options

|           |                                                                                                       |
|-----------|-------------------------------------------------------------------------------------------------------|
| <b>2</b>  | Wire, removable solder cup, 22 - 30 AWG (0.3mm <sup>2</sup> -0.05mm <sup>2</sup> )                    |
| <b>33</b> | Straight solder, 0.51 [.020] tail diameter, 12.70 [.500] tail length                                  |
| <b>38</b> | Straight solder, 0.51 [.020] tail diameter, 5.53 [.218] tail length                                   |
| <b>39</b> | Straight solder, 0.51 [.020] tail diameter, 8.71 [.343] tail length                                   |
| <b>51</b> | Right angle solder, 0.51 [.020] tail diameter, 8.07 [.318] contact extension, 3.18 [.125] tail length |
| <b>52</b> | Right angle solder, 0.51 [.020] tail diameter, 8.07 [.318] contact extension, 6.35 [.250] tail length |

### Additional Mounting Options

|           |                                                                                                                        |
|-----------|------------------------------------------------------------------------------------------------------------------------|
| <b>C5</b> | IP67-rated inside wall mount, standoffs, for use with termination codes 2, 3, and 98                                   |
| <b>C6</b> | IP67-rated inside wall mount, integrated angle brackets, alignment bar, for use with right angle PCB termination types |

### Additional Backshell Options

|           |                                                                                          |
|-----------|------------------------------------------------------------------------------------------|
| <b>EJ</b> | Backshell, aluminum, top opening, machined, chemical conversion coating, grounding clips |
|-----------|------------------------------------------------------------------------------------------|

### Additional Locking Systems Options

|          |                                                              |
|----------|--------------------------------------------------------------|
| <b>T</b> | Fixed female jackposts, compatible with EN and EJ backshells |
|----------|--------------------------------------------------------------|

### Additional Shells Options

|          |                                       |
|----------|---------------------------------------|
| <b>T</b> | Aluminum, chemical conversion coating |
| <b>U</b> | Aluminum, cadmium finish              |

### Typical Modification Options

- Low outgassing per ASTM E595 and ECSS-Q-ST-70-02C
- Solder coated contact tails
- Thermocouple contacts
- Blind mate hardware
- Protective dust caps
- EMI dust caps
- ESD packaging
- 100% inspection or other increased inspection levels

Please contact Technical Sales for additional modification options not listed here and for part numbering details.



MCBX Series connectors are mixed density, combination D-Sub connectors built for high-performance applications requiring rugged machined shells. Features include:

- Ability to mix power and signal together in one D-Sub package
- Twenty-five (25) layout options available
- Machined shells for ruggedness, planarity, and precision
- Interfacial seals and rear grommets for waterproofing
- Unique accessories include EMI grounding strips, keyed jackscrews, and banding backshell
- Quality and performance in accordance with MIL-DTL-24308

Trust the **MCBX** to deliver ***The Science of Certainty*** in mission-critical applications.

## TECH SPECS

### GENERAL

|                    |                                                                                                                                    |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------|
| Part Number Prefix | MCBX                                                                                                                               |
| Performance Level  | Mil/Aero<br>Spaceflight                                                                                                            |
| Qualifications     | Meets or exceeds performance requirements for MIL-DTL-24308<br>Meets or exceeds performance requirements for NASA Goddard GSFC-311 |
| RoHS Compliance    | Optional                                                                                                                           |

### MATERIAL

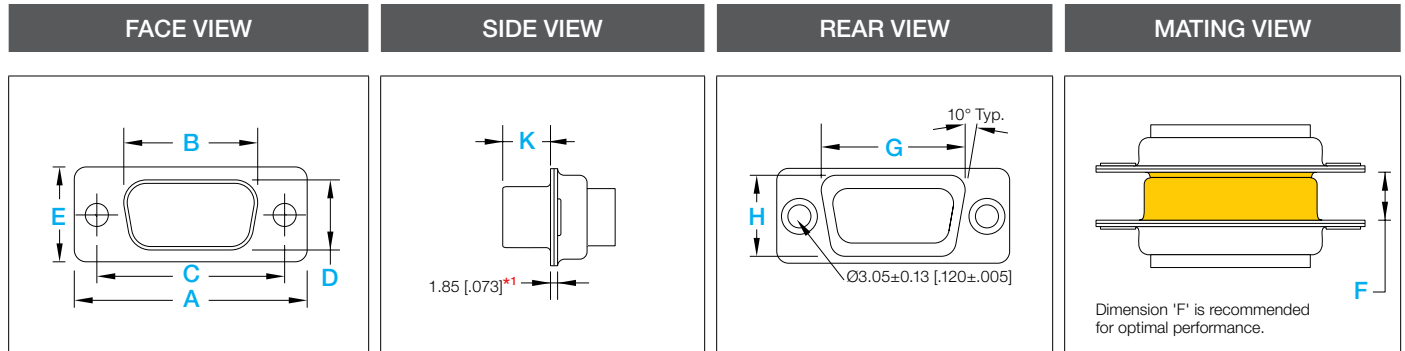
### IN ACCORDANCE WITH

|                        |                                                                                                     |                                                                    |
|------------------------|-----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|
| Insulator              | PBT                                                                                                 | MIL-DTL-24308 §3.3.5.1                                             |
| Insulator Color        | Blue (PBT)                                                                                          |                                                                    |
| Flammability Rating    | UL 94V-0                                                                                            | UL 94                                                              |
| Contact Material       | Copper alloy                                                                                        | MIL-DTL-24308 §3.3.4; AS39029<br>MIL-DTL-24308 §3.3.4.2; AS39029   |
| Signal Contact Plating | 50 µin gold over nickel or copper underplate                                                        | MIL-DTL-24308 §3.3.4.1; AS39029<br>MIL-DTL-24308 §3.3.4.2; AS39029 |
| Power Contact Plating  | 50 µin gold over nickel or copper underplate                                                        | MIL-DTL-24308 §3.3.4.1                                             |
| Shell Material         | Aluminum<br>Stainless steel<br><i>For other shell options, please contact Technical Sales</i>       | ASTM B221<br>ASTM A240                                             |
| Shell Finish           | Gold<br>Electroless nickel<br>Stainless steel, passivated<br>Cadmium<br>Chemical conversion coating | See page 3                                                         |
| Interfacial Seal       | <i>Contact Technical Sales</i>                                                                      |                                                                    |
| Rear Grommet           | <i>Contact Technical Sales</i>                                                                      |                                                                    |

## TECH SPECS

| MATERIAL                                                                  |                                                                                                                                                      | IN ACCORDANCE WITH                                           |
|---------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
| EMI Spring                                                                | Copper alloy, plated with electroless nickel                                                                                                         | ASTM B194; AMS-C-26074                                       |
| Adhesive/Sealant                                                          | RTV 133<br>MasterBond Supreme 10AOHT<br>3M DP190<br><i>For low outgassing requirements, please contact Technical Sales</i>                           |                                                              |
| Conductive Gasket                                                         | CHOFORM 5513<br><i>For non-conductive options or configurations compatible with Spira-Shield metal EMI shielding, please contact Technical Sales</i> |                                                              |
| ELECTRICAL                                                                |                                                                                                                                                      | IN ACCORDANCE WITH                                           |
| Working Voltage (rms)                                                     | 300V                                                                                                                                                 | EIA-364-20                                                   |
| Initial Contact Resistance                                                | Size 8      0.5 mΩ maximum<br>Size 16      1 mΩ maximum<br>Size 20      4 mΩ maximum<br>Size 22      5 mΩ maximum                                    | MIL-DTL-24308 §3.5.9;<br>EIA-364-06;<br>IEC 60512-2, Test 2b |
| Contact Current Rating at 70°C Temperature Rise                           | Up to 75A, see page 10                                                                                                                               | UL 1977                                                      |
| Insulation Resistance                                                     | 5 GΩ                                                                                                                                                 | MIL-DTL-24308 §3.5.8; EIA-364-21                             |
| Proof Voltage                                                             | 1000V                                                                                                                                                | EIA-364-20                                                   |
| MECHANICAL                                                                |                                                                                                                                                      | IN ACCORDANCE WITH                                           |
| Female Contact Design                                                     | PosiBand Closed Entry (LSA for size 8)                                                                                                               |                                                              |
| Contact Retention In Insulator                                            | 40N [9 lbs] (Applies to removable signal contacts)<br>98N [22 lbs] (Applies to size 8 contacts)                                                      | MIL-DTL-24308 §3.5.5;<br>EIA-364-29                          |
| Resistance To Soldering Heat<br>- Selective Soldering<br>- Wave Soldering | 360°C [680°F] for 4 seconds<br>260°C [500°F] for 20 seconds                                                                                          | MIL-STD-202-210, condition A<br>MIL-STD-202-210, condition C |
| Polarization                                                              | Trapezoidal shape of shell                                                                                                                           |                                                              |
| Mechanical Durability                                                     | 500 cycles                                                                                                                                           | MIL-DTL-24308 §3.5.16; EIA-364-09                            |
| ENVIRONMENTAL                                                             |                                                                                                                                                      | IN ACCORDANCE WITH                                           |
| Operating Temperature                                                     | -55 to 125°C                                                                                                                                         | MIL-DTL-24308 §3.5.11; EIA-364-32                            |
| Outgassing                                                                | Low outgassing options (TML <1.0%, CVCN <0.1%, RML <1.0%) are available, please contact Technical Sales.                                             | ASTM E 595;<br>ECSS-Q-ST-70-02C                              |
| Waterproof                                                                | <i>Contact Technical Sales</i>                                                                                                                       |                                                              |

## SHELL DIMENSIONS

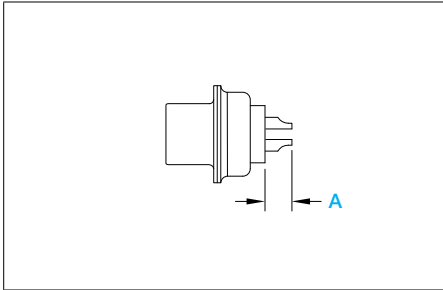


\*1 The 1.85 [0.073] shell thickness in the SIDE VIEW is only valid for configurations without angle brackets.

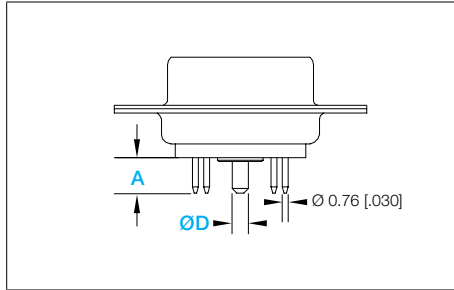
| SHELL SIZE | GENDER | A<br>±0.38<br>[.015] | B<br>±0.13<br>[.005] | C<br>±0.13<br>[.005] | D<br>±0.13<br>[.005] | E<br>±0.38<br>[.015] | G<br>±0.25<br>[.010] | H<br>±0.25<br>[.010] | K<br>±0.13<br>[.005] | F<br>±0.38<br>[.015] |
|------------|--------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| 1          | Male   | 30.81<br>[1.213]     | 18.75<br>[.738]      | 24.99<br>[.984]      | 10.19<br>[.401]      | 12.55<br>[.494]      | 19.82<br>[.780]      | 10.82<br>[.426]      | 5.92<br>[.233]       | 6.73<br>[.265]       |
|            | Female |                      | 16.33<br>[.643]      |                      | 7.90<br>[.311]       |                      |                      |                      | 6.17<br>[.243]       |                      |
| 2          | Male   | 39.14<br>[1.541]     | 27.08<br>[1.066]     | 33.32<br>[1.312]     | 10.19<br>[.401]      | 12.55<br>[.494]      | 28.15<br>[1.108]     | 10.82<br>[.426]      | 5.92<br>[.233]       | 6.73<br>[.265]       |
|            | Female |                      | 24.66<br>[.971]      |                      | 7.90<br>[.311]       |                      |                      |                      | 6.17<br>[.243]       |                      |
| 3          | Male   | 53.04<br>[2.088]     | 40.79<br>[1.606]     | 47.04<br>[1.852]     | 10.19<br>[.401]      | 12.55<br>[.494]      | 41.87<br>[1.648]     | 10.82<br>[.426]      | 5.84<br>[.230]       | 6.50<br>[.256]       |
|            | Female |                      | 38.38<br>[1.511]     |                      | 7.90<br>[.311]       |                      |                      |                      | 6.17<br>[.243]       |                      |
| 4          | Male   | 69.32<br>[2.729]     | 57.25<br>[2.254]     | 63.50<br>[2.500]     | 10.19<br>[.401]      | 12.55<br>[.494]      | 58.28<br>[2.294]     | 10.82<br>[.426]      | 5.84<br>[.230]       | 6.50<br>[.256]       |
|            | Female |                      | 54.84<br>[2.159]     |                      | 7.90<br>[.311]       |                      |                      |                      | 6.17<br>[.243]       |                      |
| 5          | Male   | 66.93<br>[2.635]     | 54.64<br>[2.151]     | 61.11<br>[2.406]     | 13.03<br>[.513]      | 15.37<br>[.605]      | 55.88<br>[2.200]     | 13.67<br>[.538]      | 5.84<br>[.230]       | 6.50<br>[.256]       |
|            | Female |                      | 52.43<br>[2.064]     |                      | 10.74<br>[.423]      |                      |                      |                      | 6.17<br>[.243]       |                      |
| 6          | Male   | 69.32<br>[2.729]     | 58.01<br>[2.284]     | 63.50<br>[2.500]     | 14.61<br>[.575]      | 16.97<br>[.668]      | 59.03<br>[2.324]     | 15.24<br>[.600]      | 5.84<br>[.230]       | 6.50<br>[.256]       |
|            | Female |                      | 55.60<br>[2.189]     |                      | 12.32<br>[.485]      |                      |                      |                      | 6.17<br>[.243]       |                      |

## CONTACT TERMINATIONS

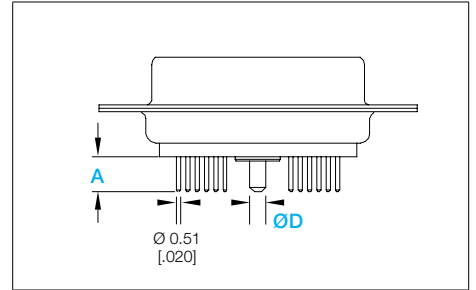
Solder Cup



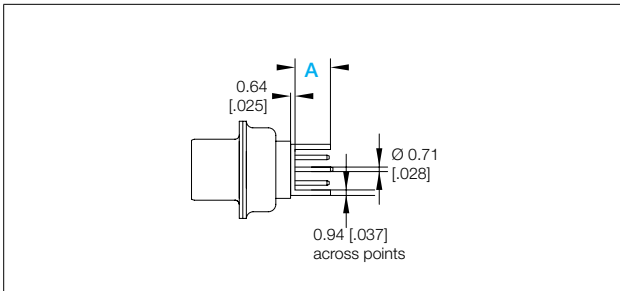
Straight Solder (Standard Density)



Straight Solder (High Density)



Straight Solder, code 65

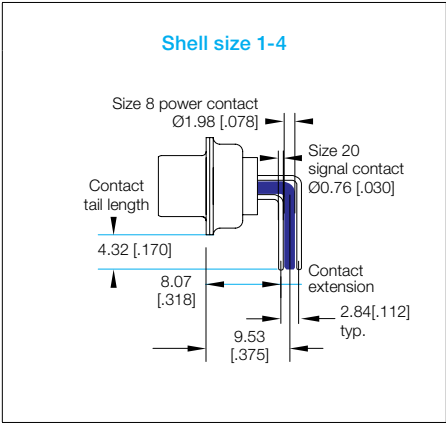


| Code | Termination type | A           | ØD<br>Size 8 |
|------|------------------|-------------|--------------|
| 2    | Solder cup       | 3.18 [.125] | --           |
| 3    | Straight solder  | 4.32 [.170] | --           |
| 35   | Straight solder  | 4.32 [.170] | 1.98 [.078]  |
| 37   | Straight solder  | 4.32 [.170] | 3.18 [.125]  |
| 65   | Straight solder  | 4.32 [.170] | --           |

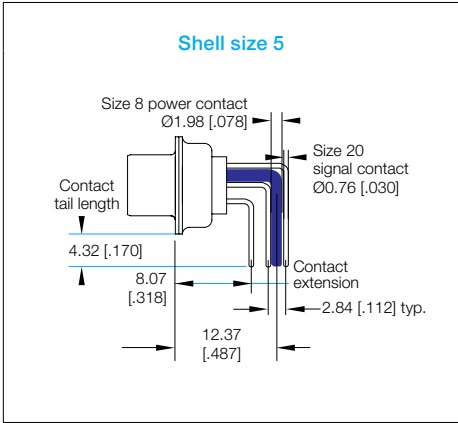
CONTACT TERMINATIONS

See page 35 for PCB mounting hole locations.

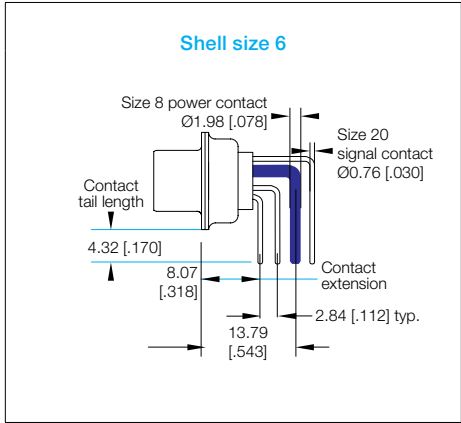
Right Angle Solder, code 5, 55



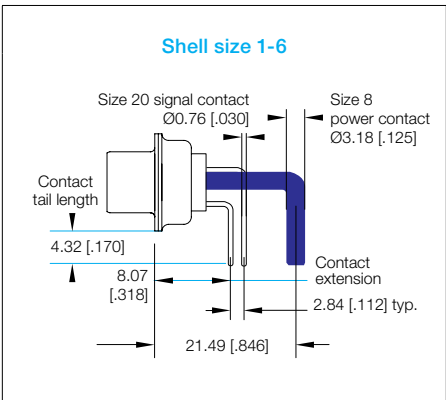
Right Angle Solder, code 5, 55



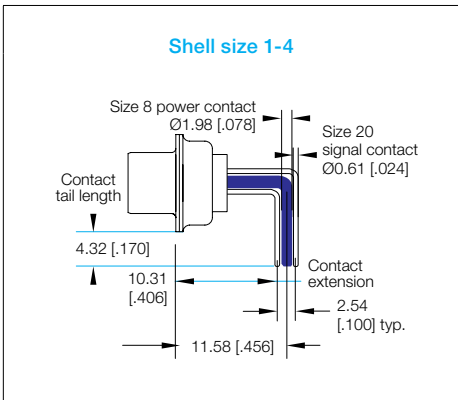
Right Angle Solder, code 5, 55



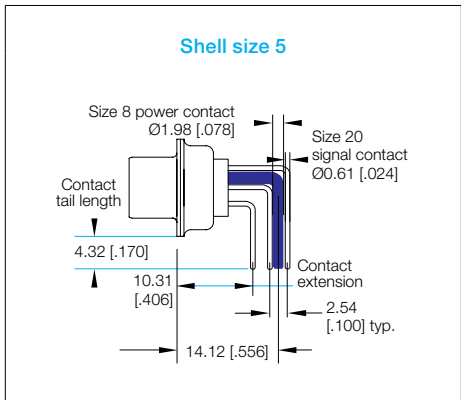
Right Angle Solder, code 5, 57



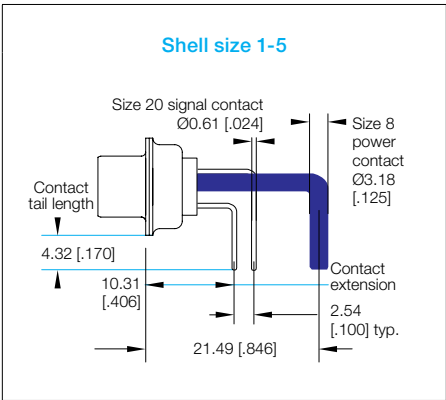
Right Angle Solder, code 7 and 75



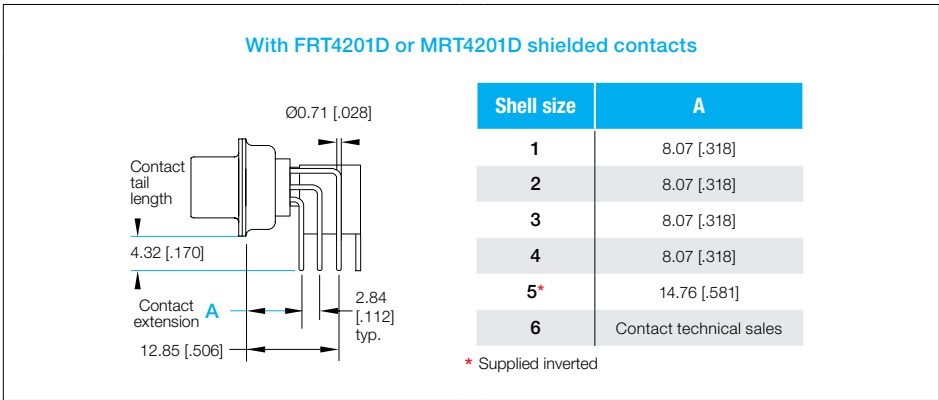
Right Angle Solder, code 7 and 75



Right Angle Solder, code 7 and 77



Right Angle Solder, code 85, shell size 1-5



## CREATE A PART

For additional options and accessories, please see following page.

| MCBX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  | 17W2 |  | S | 55 | R7 | 0 | 0 | S | /AA | -15 |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|------|--|---|----|----|---|---|---|-----|-----|--|
| <p>Series</p> <p>MCBX Combo-D</p> <p>Layout</p> <p>SHELL SIZE 1<br/>2WK2 (2) #8<br/>5W1 (1) #8, (4) #20</p> <p>SHELL SIZE 2<br/>3W3 (3) #8<br/>3WK3 (3) #8<br/>7W2 (2) #8, (5) #20<br/>11W1 (1) #8, (10) #20</p> <p>SHELL SIZE 3<br/>5W5 (5) #8<br/>9W4 (4) #8, (5) #20<br/>13W3 (3) #8, (10) #20<br/>17W2 (2) #8, (15) #20<br/>21W1 (1) #8, (20) #20</p> <p>SHELL SIZE 4<br/>8W8 (8) #8<br/>13W6 (6) #8, (7) #20<br/>17W5 (5) #8, (12) #20<br/>21WA4 (4) #8, (17) #20<br/>25W3 (3) #8, (22) #20<br/>27W2 (2) #8, (20) #20</p> <p>SHELL SIZE 5<br/>24W7 (7) #8, (17) #20<br/>36W4 (4) #8, (32) #20<br/>43W2 (2) #8, (41) #20<br/>47W1 (1) #8, (46) #20</p> <p>SHELL SIZE 6<br/>46W4 (4) #8, (42) #20</p> <p>Contact Gender</p> <p>M Male pin<br/>MG Male pin with grounding strips<br/>S Female socket</p> <p>Termination</p> <p>Other size 8 contact styles can be ordered separately - see Contacts section</p> <p>0 Connector ordered without contacts<br/>1 Wire, signal crimp contacts included<br/>11 Crimp signal &amp; MC/FC 4012D power contacts included<br/>15 Crimp signal &amp; MC/FC 4008D power contacts included<br/>19 Wire, M39029 crimp contacts included, 20 - 24 AWG [0.50mm<sup>2</sup> - 0.25mm<sup>2</sup>]<br/>2 Fixed solder cup, signal contacts only<br/>3 Straight solder, signal contacts only, 4.32 [.170] tail length<br/>35 Straight solder, signal and 1.98 [.078] Ø power contacts, 4.32 [.170] tail length<br/>37 Straight solder, signal and 3.18 [.125] Ø power contacts, 4.32 [.170] tail length<br/>5 Right angle solder, signal contacts only, 8.07 [3.18] signal contact extension<br/>55 Right angle solder, signal and 1.98 [.078] Ø power contacts, 8.07 [3.18] signal contact extension<br/>57 Right angle solder, signal and 3.18 [.125] Ø power contacts, 8.07 [3.18] signal contact extension<br/>65 Straight solder, signal and size 8 shielded contacts, 4.32 [.170] tail length<br/>85 Right angle solder, signal and size 8 shielded contacts, 8.07 [3.18] signal contact extension</p> <p>Mounting Options</p> <p>0 Clearance hole, 3.05 [.120] Ø<br/>R2*1 Angle brackets integrated with shell, alignment bar with non-removable female jackposts<br/>R6*1 Angle brackets integrated with shell, clearance hole, 3.05 [.120] Ø, alignment bar<br/>R7*1 Angle brackets integrated with shell, 4-40 threaded hole, alignment bar<br/>R8*1 Angle brackets integrated with shell, 4-40 locknut, alignment bar<br/>S Standoffs, swaged, 4-40<br/>S5 Locknut, swaged, 4-40<br/>S6 Standoffs, swaged, 4-40, boardlocks</p> |  |      |  |   |    |    |   |   |   |     |     |  |
| <p>Modifications</p> <p>-XXXX See bottom of following page for typical modification options</p> <p>Contact Plating</p> <p>-15 50µin Au (min) over Ni over Cu<br/>-50 50µin Au (min) over Cu</p> <p>Environmental Compliance</p> <p>/AA RoHS</p> <p>Shells</p> <p>A Aluminum, gold finish<br/>K Aluminum, electroless nickel finish<br/>S Stainless steel, passivated</p> <p>Locking Systems</p> <p>0 None<br/>E5 Rotating male jackscrews internal hex<br/>NEW K Rotating male jackscrews, low-profile, internal hex, 36-position polarization (mates to S jackpost)<br/>NEW S Fixed female jackposts, 36-position polarization (mates to K jackscrew)<br/>T2 Fixed female jackposts, washer set<br/>All locking system options are compatible with EN and EJ backshells</p> <p>Backshells &amp; Boardlocks</p> <p>0 None<br/>C Banding feature on rear shell, diamond knurl (eliminates the need for backshell)<br/>NEW EN Backshell, aluminum, top opening, machined, electroless nickel finish, grounding clips<br/>N Boardlocks, for use with R angle brackets in Mounting Options step</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |      |  |   |    |    |   |   |   |     |     |  |

For additional options and accessories, please see following page.

\*1 Alignment bar is not included for 2WK2, 3WK3, 3W3, 5W5, and 8W8 Layouts with right angle termination styles.

# ADDITIONAL OPTIONS

Options shown on this page are less common than others. Customers may experience a price and/or lead time impact when selecting these options.

## Additional Termination Options

|    |                                                                                                                        |
|----|------------------------------------------------------------------------------------------------------------------------|
| 12 | Crimp signal & MC/FC 4016D power contacts included                                                                     |
| 36 | Straight solder, signal and 2.39 [.094] Ø power contacts included, 4.32 [.170] tail length                             |
| 7  | Right angle solder, metric footprint, signal contacts included, 10.31 [.406] contact extension                         |
| 75 | Right angle solder, metric footprint, signal and 1.98 [.078] Ø power contacts included, 10.31 [.406] contact extension |
| 77 | Right angle solder, metric footprint, signal and 3.18 [.125] Ø power contacts included, 10.31 [.406] contact extension |

## Additional Backshell Options

|    |                                                                                          |
|----|------------------------------------------------------------------------------------------|
| EJ | Backshell, aluminum, top opening, machined, chemical conversion coating, grounding clips |
|----|------------------------------------------------------------------------------------------|

## Additional Locking Systems Options

|   |                                                              |
|---|--------------------------------------------------------------|
| T | Fixed female jackposts, compatible with EN and EJ backshells |
|---|--------------------------------------------------------------|

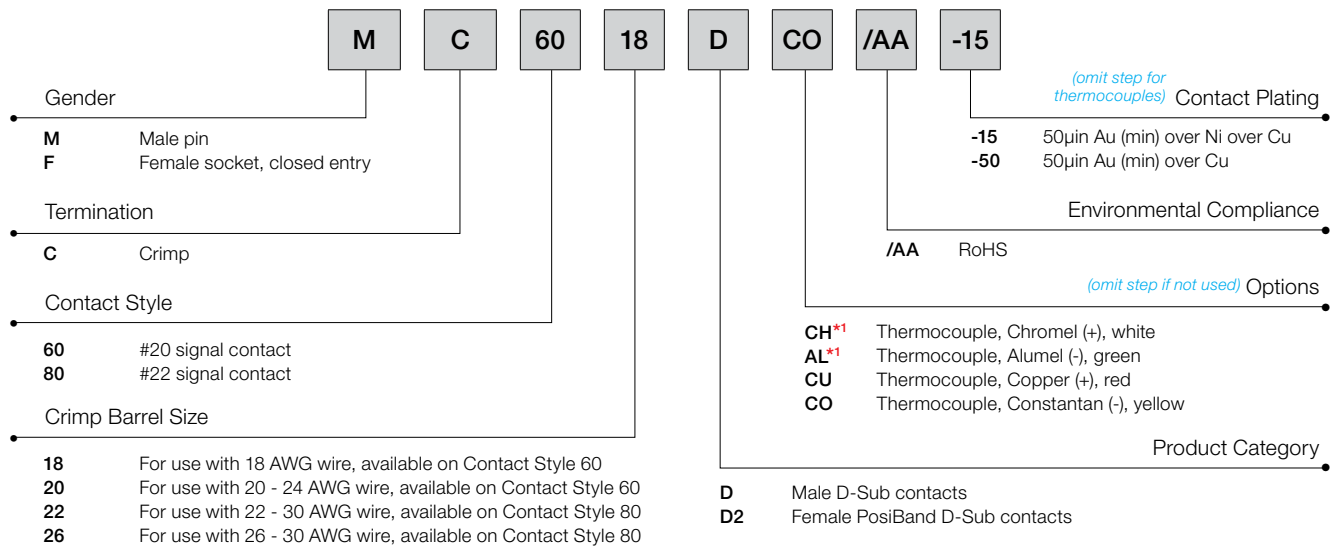
## Additional Shells Options

|   |                                       |
|---|---------------------------------------|
| T | Aluminum, chemical conversion coating |
| U | Aluminum, cadmium finish              |

## Typical Modification Options

|                                                                                                                                                                                                                                                                                                                                                                                                                              |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"><li>• Low outgassing per ASTM E595 and ECSS-Q-ST-70-02C</li><li>• Solder coated contact tails</li><li>• Thermocouple contacts</li><li>• IP-rated waterproofing</li><li>• Blind mate hardware</li><li>• Protective dust caps</li><li>• EMI dust caps</li><li>• Panel mount with EMI O-ring</li><li>• ESD packaging</li><li>• 100% inspection or other increased inspection levels</li></ul> |
| <p>Please contact Technical Sales for additional modification options not listed here and for part numbering details.</p>                                                                                                                                                                                                                                                                                                    |

## #20 & #22 SIGNAL CONTACTS



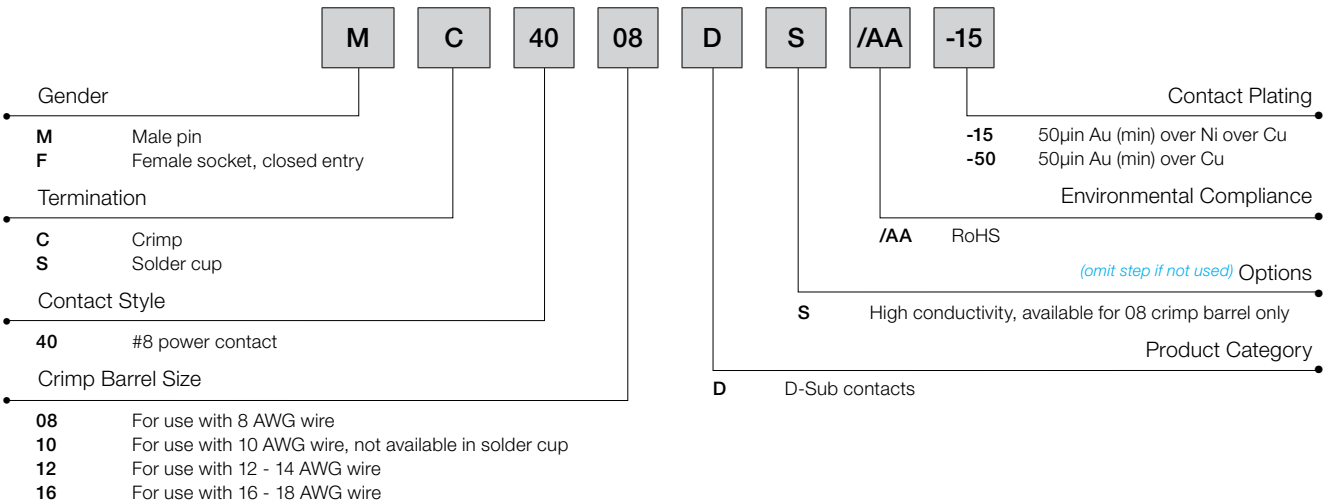
\*1 Chromel® and Alumel® are registered trademarks of the Hoskins Manufacturing Company

## M39029 MILITARY CONTACT PART NUMBERS

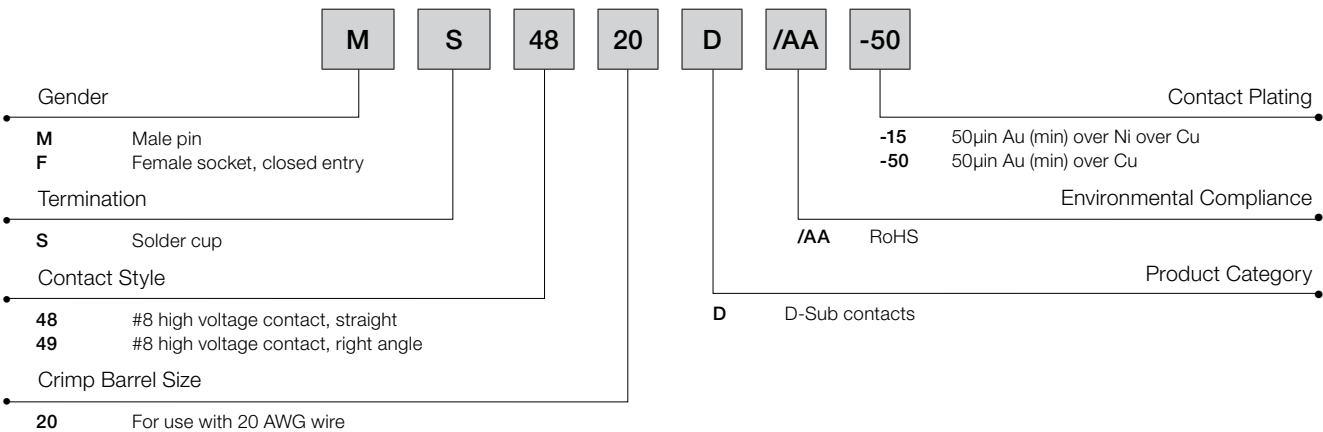
| PART NUMBER   | Series     | Size | Gender | Female Contact Style | Stranded AWG [mm2] | Color Code              | Plating                | Type  |
|---------------|------------|------|--------|----------------------|--------------------|-------------------------|------------------------|-------|
| M39029/57-354 | MCDD, MCBX | #22  | Female | Closed entry         | #22-28 [.3 - .08]  | Orange / Green / Yellow | 50µin Au (min) over Ni | Crimp |
| M39029/58-360 | MCDD, MCBX | #22  | Male   | n/a                  | #22-28 [.3 - .08]  | Orange / Blue / Black   | 50µin Au (min) over Ni | Crimp |
| M39029/57-982 | MCDD, MCBX | #22  | Female | Closed entry         | #22-28 [.3 - .08]  | White / Gray / Red      | 50µin Au (min) over Cu | Crimp |
| M39029/58-986 | MCDD, MCBX | #22  | Male   | n/a                  | #22-28 [.3 - .08]  | White / Gray / Blue     | 50µin Au (min) over Cu | Crimp |
| M39029/63-368 | MCD, MCBX  | #20  | Female | Closed entry         | #20-24 [.5 - .25]  | Orange / Blue / Gray    | 50µin Au (min) over Ni | Crimp |
| M39029/64-369 | MCD, MCBX  | #20  | Male   | n/a                  | #20-24 [.5 - .25]  | Orange / Blue / White   | 50µin Au (min) over Ni | Crimp |
| M39029/63-928 | MCD, MCBX  | #20  | Female | Closed entry         | #20-24 [.5 - .25]  | White / Red / Gray      | 50µin Au (min) over Cu | Crimp |
| M39029/64-968 | MCD, MCBX  | #20  | Male   | n/a                  | #20-24 [.5 - .25]  | White / Blue/ Gray      | 50µin Au (min) over Cu | Crimp |

Positronic is qualified to supply the legacy design, as well as the PosiBand design. If the requirement is for PosiBand-style female contacts, add "POSIBAND" to the end of the M39029 part number (e.g. M39029/57-354 POSIBAND).

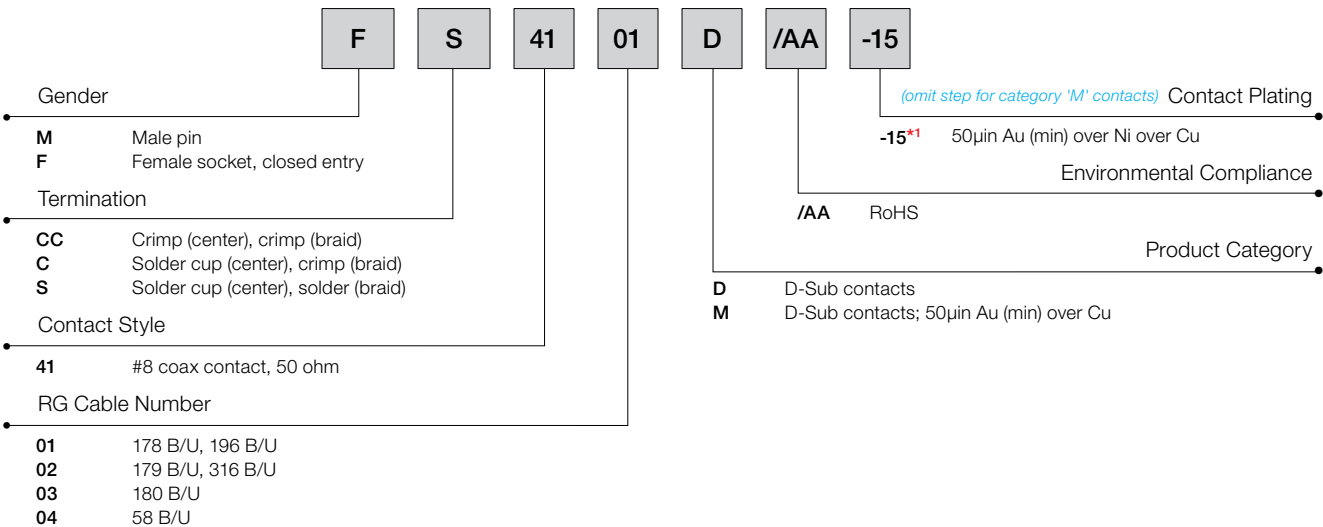
#8 POWER CONTACTS



#8 HIGH VOLTAGE CONTACTS



#8 COAX CONTACTS

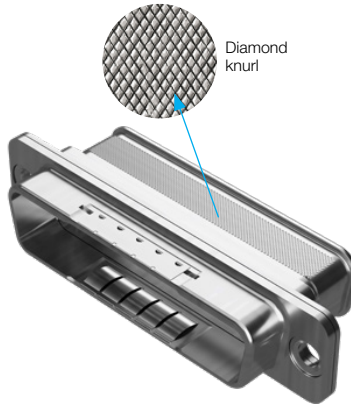


\*1 Contact plating applies to center conductor only.  
Braid conductor is plated 30µin Au (min) over Ni over Cu.

## BACKSHELLS & BOARDLOCKS

**C**

Banding feature on rear shell, diamond knurl (eliminates the need for backshell)



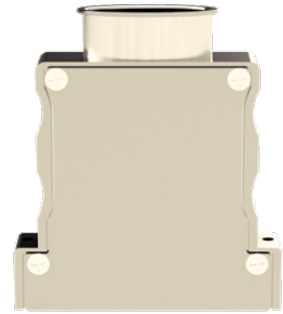
**EN**

Backshell, aluminum, top opening, machined, electroless nickel finish, grounding clips



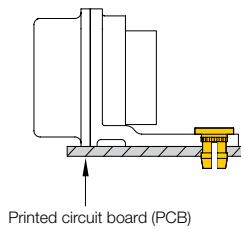
**EJ**

Backshell, aluminum, top opening, machined, chemical conversion coating, grounding clips



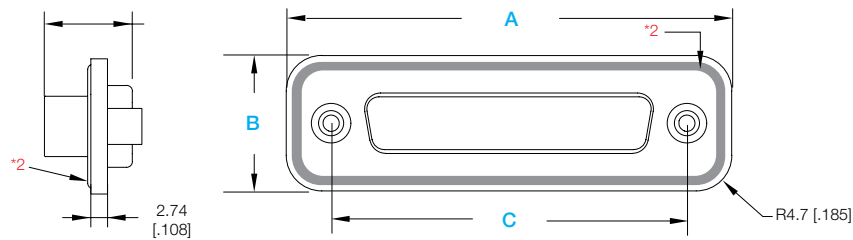
**N**

Boardlocks, for use with angle brackets



EN Backshell shown here

PANEL MOUNT SEALING FLANGE

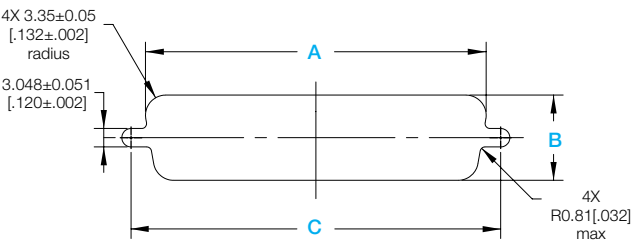


| SHELL<br>SIZE | A<br>±0.25 [D±.010] | B<br>±0.25 [D±.010] | C<br>±0.13 [.005] |
|---------------|---------------------|---------------------|-------------------|
| 1             | 36.68 [1.444]       | 17.88 [704]         | 24.99 [984]       |
| 2             | 45.01 [1.772]       | 17.88 [704]         | 33.32 [1.312]     |
| 3             | 58.90 [2.319]       | 17.88 [704]         | 47.04 [1.852]     |
| 4             | 75.18 [2.960]       | 17.88 [704]         | 63.50 [2.500]     |
| 5             | 72.80 [2.866]       | 20.70 [815]         | 61.11 [2.406]     |
| 6             | 75.18 [2.960]       | 22.30 [878]         | 63.50 [2.500]     |

<sup>\*1</sup> Standard O-ring material: CHOFORM 5513 Ag/Cu filled silicone (form-in-place, non-removable)  
<sup>\*2</sup> O-ring groove dimensions compatible with Spira-Shield SS-02 metal EMI gasketing

Panel Cutout Dimensions

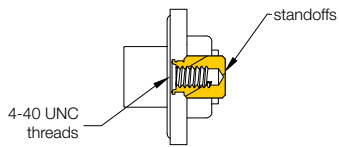
| INSIDE PANEL MOUNT | SHELL<br>SIZE | A             | B            | C             |
|--------------------|---------------|---------------|--------------|---------------|
|                    | 1             | 20.47 [.806]  | 11.40 [.449] | 24.99 [.984]  |
|                    | 2             | 28.80 [1.134] | 11.40 [.449] | 33.32 [1.312] |
|                    | 3             | 42.52 [1.674] | 11.40 [.449] | 47.04 [1.852] |
|                    | 4             | 59.08 [2.326] | 11.40 [.449] | 63.50 [2.500] |
|                    | 5             | 56.34 [2.218] | 14.10 [.555] | 61.11 [2.406] |
|                    | 6             | 59.51 [2.343] | 15.67 [.617] | 63.50 [2.500] |



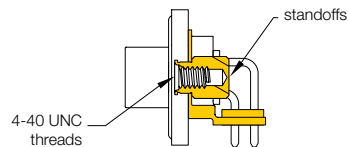
For panel cutout details for use with code S keyed jackposts, contact Technical Sales.

## MOUNTING OPTIONS

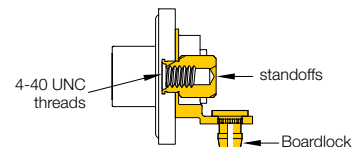
**C5** IP67-rated inside wall mount, standoffs, for use with termination codes 2 and 3



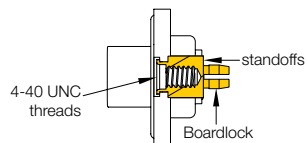
**C6** IP67-rated inside wall mount, integrated angle brackets, alignment bar, for use with right-angle PCB termination types



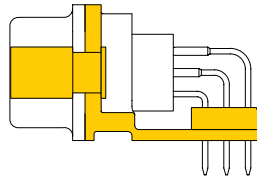
**C7** IP67-rated inside wall mount, integrated angle brackets with boardlocks, alignment bar, for use with right-angle PCB termination types



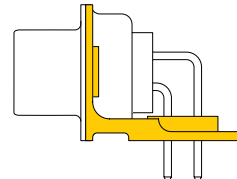
**C8** IP67-rated inside wall mount, standoffs with boardlocks, for use with straight PCB termination types



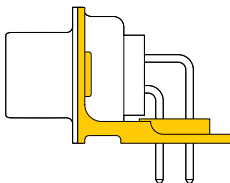
**R2** Angle brackets integrated with shell, alignment bar with non-removable female jackposts



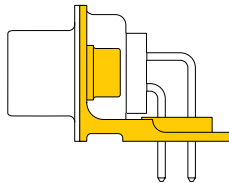
**R6** Angle brackets, integrated with shell, clearance hole, 3.05 [120] Ø, alignment bar



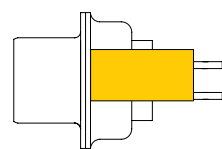
**R7** Angle brackets, integrated with shell, 4-40 threaded hole, alignment bar



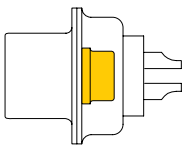
**R8** Angle brackets, integrated with shell, 4-40 locknut, alignment bar



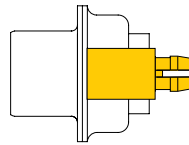
**S** Standoffs, swaged, 4-40



**S5** Locknut, swaged, 4-40

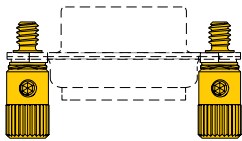


**S6** Standoffs, swaged, 4-40, boardlocks

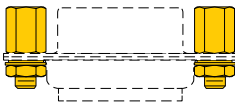


LOCKING SYSTEMS

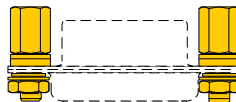
**E5** Rotating male jackscrews internal hex



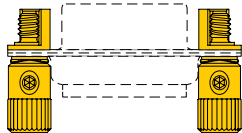
**T** Fixed female jackposts



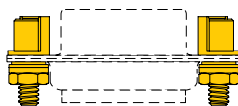
**T2** Fixed female jackposts, washer set



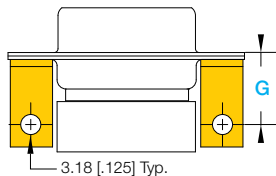
**K** Rotating male jackscrews, low-profile, internal hex, 36-position polarization (mates to S jackpost)



**S** Fixed female jackposts, 36-position polarization (mates to K and E5 jackscrews)



MOUNTING HOLE FOR ANGLE BRACKET

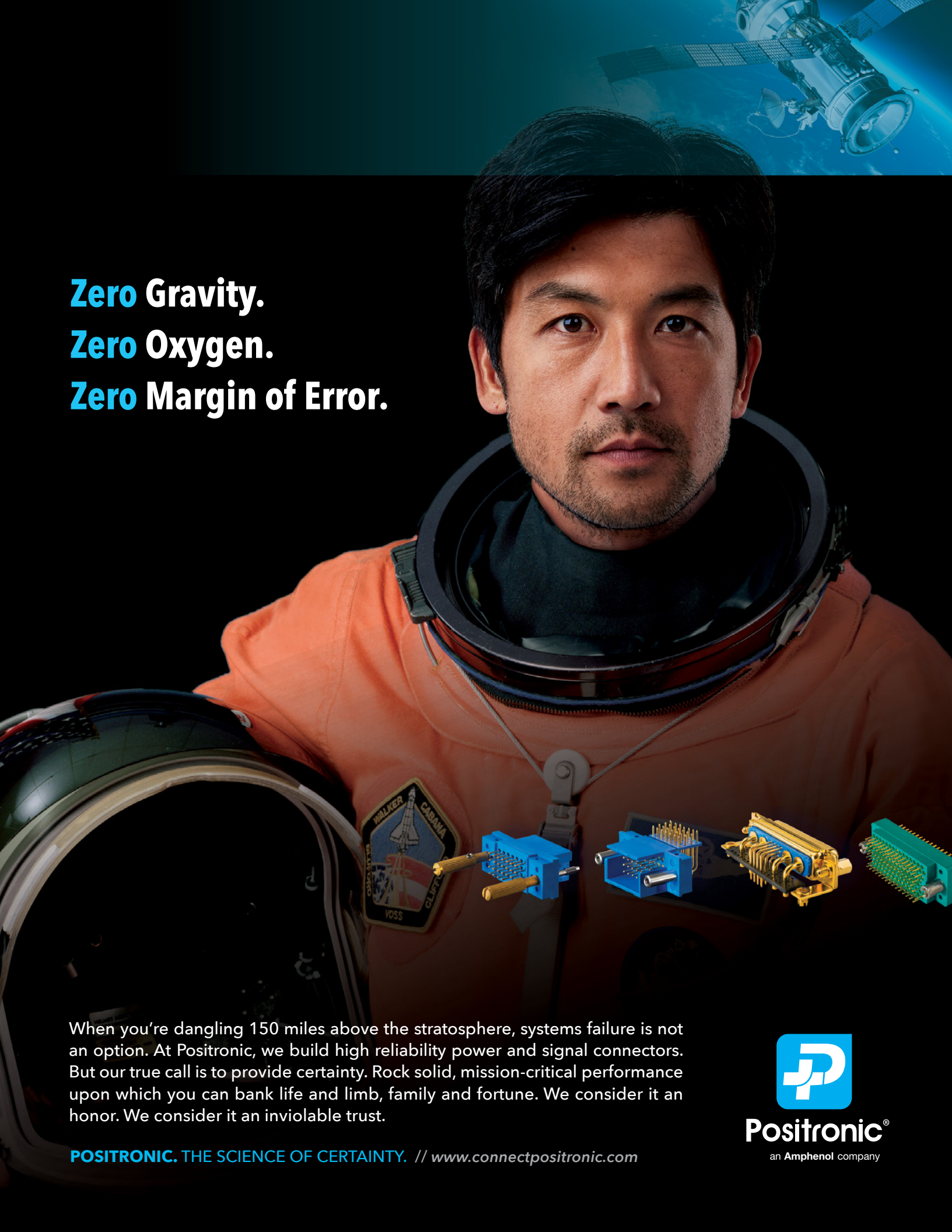


| SERIES | Termination Code | Shell size      |   |   |   |              |              |
|--------|------------------|-----------------|---|---|---|--------------|--------------|
|        |                  | 1               | 2 | 3 | 4 | 5            | 6            |
|        |                  | G ± 0.25 [.010] |   |   |   |              |              |
| MCD    | 4                | 13.76 [.542]    |   |   |   | 15.18 [.598] |              |
|        | 42               | 11.58 [.456]    |   |   |   | 12.85 [.506] |              |
|        | 5/51/52/53/54    | 9.44 [.372]     |   |   |   | 10.87 [.428] |              |
| MCDD   | 4                | 14.24 [.561]    |   |   |   | 15.39 [.606] | 16.43 [.647] |
|        | 51/52            | 10.06 [.396]    |   |   |   | 11.20 [.441] | 12.11 [.477] |
| MCBX   | 5/55/57/85       | 9.44 [.372]     |   |   |   | 10.87 [.428] | 12.36 [.487] |
|        | 7/75/77          | 11.43 [.450]    |   |   |   | 12.77 [.503] | 13.89 [.547] |

## TEST DATA

The following tests have been conducted using applicable configurations of MCD, MCDD, and MCBX Series connectors:

| Test                            | Test Condition                                                                                                        | Criteria                                                            | Results |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|---------|
| Contact Retention               | MIL-DTL-24308J                                                                                                        | Signal contacts: 9 pound axial force, each direction                | Pass    |
|                                 | EIA-364-29                                                                                                            | Power contacts: 22 pounds axial force, each direction               |         |
| Dielectric Withstanding Voltage | MIL-DTL-24308J @ sea level                                                                                            | 1000V                                                               | Pass    |
|                                 | MIL-DTL-24308J @ 70000 ft-equivalent                                                                                  | 325V                                                                |         |
| Insulation Resistance           | MIL-DTL-24308J<br>EIA-364-21                                                                                          | 5 GΩ                                                                | Pass    |
| Contact Resistance              | MIL-DTL-24308J<br>EIA-364-06                                                                                          | Per MIL-DTL-24308J Table VI                                         | Pass    |
| Temperature Cycling             | MIL-DTL-24308J<br>EIA-364-32, condition I (5 cycles) @ -55°C to 155°C                                                 | Connector verified with DWV, insulation resistance, mating/unmating | Pass    |
| Humidity                        | MIL-DTL-24308J<br>EIA-364-31, method IV                                                                               | Connector verified with DWV, insulation resistance                  | Pass    |
| Vibration                       | MIL-DTL-24308J<br>EIA-364-28, test condition IV (sinusoidal)<br>10-2000 Hz, 20 g peak                                 | No signal discontinuity longer than 1 μs, no damage                 | Pass    |
|                                 | MIL-DTL-24308J<br>EIA-364-28, test condition VI, letter J (random)<br>50-2000 Hz, 1.0 g <sup>2</sup> /Hz, 43.92 g RMS | No signal discontinuity longer than 1 μs, no damage                 |         |
| Shock                           | MIL-DTL-24308J<br>EIA-364-27, test condition E                                                                        | No signal discontinuity longer than 1 μs, no damage                 | Pass    |
| Durability                      | MIL-DTL-24308J<br>EIA-364-09                                                                                          | 500 mating cycles                                                   | Pass    |
|                                 | EIA-364-09 (extreme lifespan)                                                                                         | 10000 mating cycles                                                 |         |
| Salt Spray                      | MIL-DTL-24308J<br>EIA-364-26, test condition A                                                                        | 96 hours (Code T shell plating)                                     | Pass    |
|                                 | MIL-DTL-24308J<br>EIA-364-26, test condition C                                                                        | 500 hours (Code K, S, U shell platings)                             |         |
| Magnetic Permeability           | ASTM A342/A342M                                                                                                       | ≤ 2μ                                                                | Pass    |
| Residual Magnetism              | Goddard S-311 Level C (GSFC NMC)                                                                                      | ≤ 20 gamma                                                          | Pass    |
| Outgassing                      | ASTM E595, ECSS-Q-ST-70-02C                                                                                           | TML <1.0%, CVCM <0.1%, RML <1.0%                                    | Pass    |



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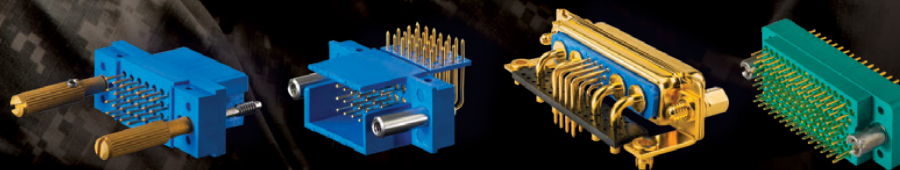
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- ✓ **2D/3D drawings** 

All dimensional tolerances are  $\pm 0.38$  [0.015], unless otherwise specified. Dimensions are in millimeters [inches]. All dimensions are subject to change. Product pictures may not be identical in appearance to actual production parts.

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#4,900,261\* #5,255,580 #5,329,697 #6,260,268  
#6,835,079 #7,115,002 #8,944,697 #9,304,263

\*Patented in Canada, 1992 Other patents pending

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Positronic Industries SAS: FA7Y0  
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