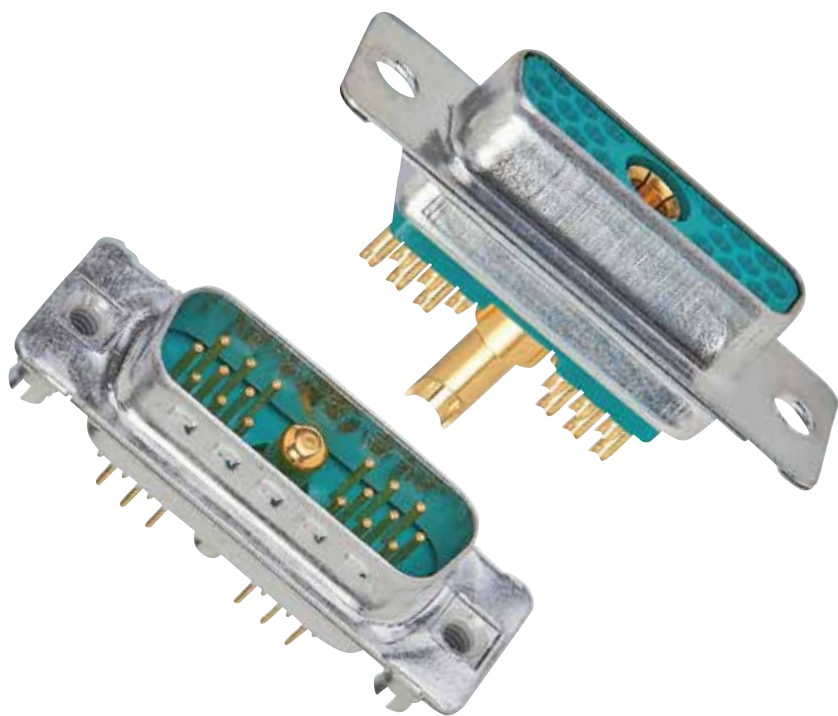


## SECTION 2

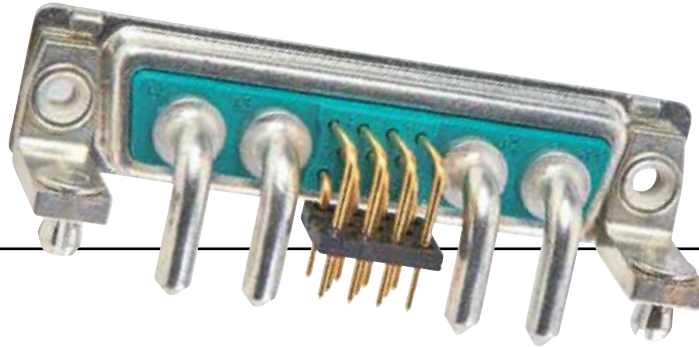
# COMBINATION D-SUB CONNECTORS

Combination D-SUB Connectors provide the ideal solution for applications to require power, signal and coaxial connections within one connector. This series of connectors achieves space saving on PCB's and I/O designs.

Within this product family are various pin out configurations possible. Almost endless selections can be created mixing power, signal and coaxial contacts.



Examples are coaxial contacts handling frequencies up to 2 GHz. Power contacts from 10 amp to 40 amp current handling. Signal contacts in various styles complete the product offering.



Industry standard terminations types, solder cup, PCB contacts in straight and angled pin configurations. Crimp types and wire wrap contacts.

**Here are just a few Product characteristics:**

- Space savings on the PCB
- Different wire terminations are possible in a single connector
- Cost savings - mixed layout
- Insertable and removable coaxial, power, high voltage and signal contacts
- Precision machined contacts
- Various quality classes are available
- Wide product range

A wide range of standard pin configurations fully loaded with signal contacts are available. Specially configured contacts with power, coaxial and signal contacts can be constructed. Please use the Part Number Creator on page 2 | 2 and 2 | 3 or contact technical support at your closest CONEC office.



## PART NUMBER CREATOR

for standard version

3 003W3 S X X 6 1 A 1 O X

## Product Line

- 3 = Shell steel tin plated  
 1 = Brass tin plated\*  
 5 = Shell yellow chromated\* (not RoHS compliant)  
 A = Stainless steel\*

\*on request

## Shell size and design

- 1 = 5W1, 2W2C  
 2 = 3W3, 7W2, 11W1, 3W3C  
 3 = 5W5, 9W4, 13W3, 17W2, 21W1  
 4 = 8W8, 13W6, 17W5, 21W4, 25W3, 27W2  
 5 = 24W7, 36W4, 43W2, 47W1

Empty positions ADD „0“ = 003W3

## Contact type

- P = Plug connector  
 S = Socket connector

## Surface/Quality class for SIGNAL contacts

- A = Quality class 3 = 50 mating cycles  
 B = Quality class 2 = 200 mating cycles\*  
 C = Quality class 1 = 500 mating cycles  
 J = Special application = > 500 mating cycles (on request)\*  
 X = Crimp and 3W3, 5W5, 8W8, 2W2C, 3W3C (no contacts are supplied with the connector)

\*on request

## Termination only for SIGNAL contacts

- K = Crimp without contacts  
 M = Solder cup  
 N = Wire wrap, .500" / 12.7 mm  
 P = Press fit  
 R = Solder pin, straight, .220" / 5.6 mm  
 T = Solder pin, angled, .280" / 7.19 mm
- U = Solder pin, angled, .370" / 9.40 mm  
 W\* = Solder pin, angled, .450" / 11.43 mm  
 X = 3W3, 5W5, 8W8, 2W2C, 3W3C  
 Z\* = Solder pin, angled, .540" / 13.84 mm  
 \* = please contact us

## Termination for HIGH POWER- or COAXIAL contacts

## Quality class 3/Quality class 1

- C1 = Solder/Crimp angled 10 A  
 C2 = Solder/Crimp angled 20 A  
 C3 = Solder/Crimp angled 30 A  
 C4 = Solder/Crimp angled 40 A  
 F2,61/F1,41 = Solder cup 10 A  
 F4,62/F3,42 = Solder cup 20 A  
 F6,63/F5,43 = Solder cup 30 A  
 F8,64/F7,44 = Solder cup 40 A  
 68/48 = Solder pin, straight 20 A, D= .077" / 1.95 mm  
 69/49 = Solder pin, straight 20 A, D= .102" / 2.60 mm  
 70/50 = Solder pin, straight 20 A, D= .110" / 2.85 mm  
 71/51 = Solder pin, straight 30 A, D= .130" / 3.18 mm  
 72/52 = Solder pin, straight 40 A, D= .150" / 3.75 mm

## Quality class 3/Quality class 1

- 59/55 = Solder pin, angled 15 A  
 73/56 = Solder pin, angled 20 A  
 74/57 = Solder pin, angled 30 A  
 75/58 = Solder pin, angled 40 A  
 77/60 = Solder pin, angled 40 A  
 81/66 = Solder pin, angled 20 A  
 82/67 = Solder pin, angled 30 A  
 85/65 = Solder pin, angled 30 A  
 G7/76 = 3 Solder pins Straight 50 Ω  
 G9/78 = 3 Solder pins angled 50 Ω  
 H1/79 = 3 Solder pins angled 50 Ω  
 H4/80 = 5 Solder pins angled 50 Ω  
 G8/86 = 3 Solder pins Straight 75 Ω

## Quality class 3/Quality class 1

- H2/88 = 3 Solder pins angled 75 Ω  
 H3/89 = 3 Solder pins angled 75 Ω  
 H5/90 = 5 Solder pins angled 75 Ω  
 91 = Screw termination 20 A  
 /P1 = press fit 30A  
 /P2 = press fit 30A  
 /P4 = press fit 30A  
 99 = no high power, coax or crimp contacts loaded  
 Coaxial contacts with cable termination must be ordered separately.

## Mounting style

- A1 = Riveted  
 A2 = M3 threaded insert  
 A3 = 4-40 UNC threaded insert  
 A4 = M3 threaded rear spacer  
 A5 = 4-40 UNC threaded rear spacer  
 A6 = Float fastening  
 A7 = Threaded rear spacer for M3 press fit  
 A8 = Threaded rear spacer for 4-40 UNC press fit  
 C1 = M3 threaded rear spacer with PCB clip, PCB .063" / 1.60 mm  
 C2 = 4-40 UNC threaded rear spacer with PCB clip, PCB .063" / 1.60 mm  
 C3 = M3 threaded rear spacer with PCB clip, PCB .091" / 2.30 mm  
 C4 = 4-40 UNC threaded rear spacer with PCB clip, PCB .091" / 2.30 mm  
 C5 = M3 threaded rear spacer with PCB clip, PCB .126" / 3.20 mm  
 C6 = 4-40 UNC Threaded rear spacer with PCB clip, PCB .126" / 3.20 mm  
 D1 = M3 clip and threaded rear spacer with PCB clip, PCB .063" / 1.60 mm  
 D2 = 4-40 UNC clip and threaded rear spacer with PCB clip, PCB .063" / 1.60 mm  
 D3 = M3 clip and threaded rear spacer with PCB clip, PCB .091" / 2.30 mm  
 D4 = 4-40 UNC clip and threaded rear spacer with PCB clip, PCB .091" / 2.30 mm  
 D5 = M3 clip and threaded rear spacer with PCB clip, PCB .126" / 3.20 mm  
 D6 = 4-40 UNC clip and threaded rear spacer with PCB clip, PCB .126" / 3.20 mm  
 E1 = M3 threaded rear spacer with PCB clip, PCB .063" / 1.60 mm  
 E2 = 4-40 UNC threaded rear spacer with PCB clip, PCB .063" / 1.60 mm  
 E3 = M3 threaded rear spacer with PCB clip, PCB .091" / 2.30 mm  
 E4 = 4-40 UNC threaded rear spacer with PCB clip, PCB .091" / 2.30 mm  
 E5 = M3 threaded rear spacer with PCB clip, PCB .126" / 3.20 mm
- E6 = 4-40 UNC threaded rear spacer with PCB clip, PCB .126" / 3.20 mm  
 F1 = M3 clip and threaded rear spacer with PCB clip, PCB .063" / 1.60 mm  
 F2 = 4-40 UNC clip and threaded rear spacer with PCB clip, PCB .063" / 1.60 mm  
 F3 = M3 clip and threaded rear spacer with PCB clip, PCB .091" / 2.30 mm  
 F4 = 4-40 UNC clip and threaded rear spacer with PCB clip, PCB .091" / 2.30 mm  
 F5 = M3 clip and threaded rear spacer with PCB clip, PCB .126" / 3.20 mm  
 F6 = 4-40 UNC clip and threaded rear spacer with PCB clip, PCB .126" / 3.20 mm  
 G1 = Metal bracket, M3 threaded insert for .370" / 9.40 mm  
 G2 = Metal bracket, 4-40 UNC threaded insert for .370" / 9.40 mm  
 G3 = Metal bracket, M3 threaded insert and clip for .370" / 9.40 mm  
 G4 = Metal bracket, 4-40 UNC threaded insert and clip for .370" / 9.40 mm  
 H1 = Metal bracket, M3 threaded lock for .370" / 9.40 mm  
 H2 = Metal bracket, 4-40 UNC threaded lock for .370" / 9.40 mm  
 H3 = Metal bracket, M3 threaded lock and clip for .370" / 9.40 mm  
 H4 = Metal bracket, 4-40 UNC threaded lock and clip for .370" / 9.40 mm  
 N1 = Metal bracket, M3 threaded insert for .280" / 7.19 mm  
 N2 = Metal bracket, 4-40 UNC threaded insert for .280" / 7.19 mm  
 N3 = Metal bracket, M3 threaded insert and clip for .280" / 7.19 mm  
 N4 = Metal bracket, 4-40 UNC threaded insert and clip for .280" / 7.19 mm  
 P1 = Metal bracket, M3 threaded lock for .280" / 7.19 mm  
 P2 = Metal bracket, 4-40 UNC threaded lock for .280" / 7.19 mm  
 P3 = Metal bracket, M3 threaded lock and clip for .280" / 7.19 mm  
 P4 = Metal bracket, 4-40 UNC threaded lock and clip for .280" / 7.19 mm  
 W1 = Threaded rear spacer with M3 press in pin  
 W2 = Threaded rear spacer with 4-40 UNC press in pin

OX = Standard

# TECHNICAL DATA

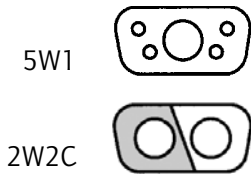
## Standard version

| Materials                                            | Connector with signal contacts                                                                                           | Coaxial contacts     | High power contacts    | High voltage contacts  |
|------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|----------------------|------------------------|------------------------|
| Insulator<br>Green standard / black crimp            | PBTP, GV<br>(UL94 V-0)                                                                                                   |                      |                        |                        |
| Shell                                                | steel tin plated<br>brass tin / stainless steel on request                                                               |                      |                        |                        |
| Contact plating                                      | Gold plated over nickel                                                                                                  |                      |                        |                        |
| Contact material                                     | CU alloy                                                                                                                 |                      |                        |                        |
| Retaining clip                                       |                                                                                                                          | CU alloy             |                        |                        |
| Insulator                                            |                                                                                                                          | PTFE/PBTP/PI         |                        | PTFE                   |
| <b>Mechanical and electrical characteristics</b>     |                                                                                                                          |                      |                        |                        |
| Current rating                                       | 7,5A (UL) / 5A (CSA, VDE)                                                                                                |                      |                        |                        |
| Test voltage between 2 contacts<br>contact and shell | 1000 V, 50Hz<br>1 min.                                                                                                   |                      | 1000 V, 50Hz<br>1 min. |                        |
| Resistance between mated contacts                    | max. 8 mΩ                                                                                                                | max. 2.7 mΩ          | max. 1 mΩ              | max. 2.7 mΩ            |
| Insulation resistance                                | ≥5 GΩ                                                                                                                    | ≥ 10 GΩ              | ≥ 5 GΩ                 | ≥ 2x10 <sup>7</sup> MΩ |
| Volume resistivity                                   | 10 <sup>16</sup> Ωcm                                                                                                     |                      |                        |                        |
| Dielectric impedance                                 | 50KV/mm                                                                                                                  |                      |                        |                        |
| Characteristic impedance                             |                                                                                                                          | 50/75 Ω              |                        |                        |
| VSWR-value at according<br>MIL-C-39012               | 1.2GHz<br>1.5GHz<br>2.0GHz                                                                                               | ≤1,2<br>≤1,3<br>≤1,5 |                        |                        |
| Dielectric voltage                                   |                                                                                                                          | 750V 50Hz            |                        | 3.8kV                  |
| Frequency range                                      |                                                                                                                          | 0-2GHz               |                        |                        |
| Working voltage                                      | 250 V                                                                                                                    | 250 V                | 250 V                  | max. 2.8kV             |
| Temperature range                                    | -55°C to +125°C                                                                                                          |                      |                        |                        |
| Insertion force per contact                          | 3.4N                                                                                                                     | 7N                   | 7N                     | 5N                     |
| Extraction force per contact                         | 0.2N                                                                                                                     | 7N                   | approx. 5N             | approx. 2.5N           |
| Mating cycles                                        | A = Quality class 3 = 50 mating cycles, B = Quality class 2 = 200 mating cycles, C = Quality class 1 = 500 mating cycles |                      |                        |                        |

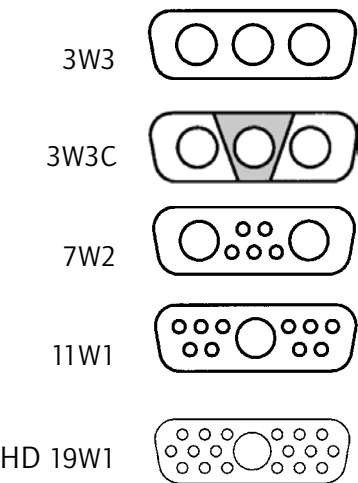
Technical specifications are subject to change without notice.

PIN CONFIGURATION – MATING SIDE OF SOCKET CONNECTOR

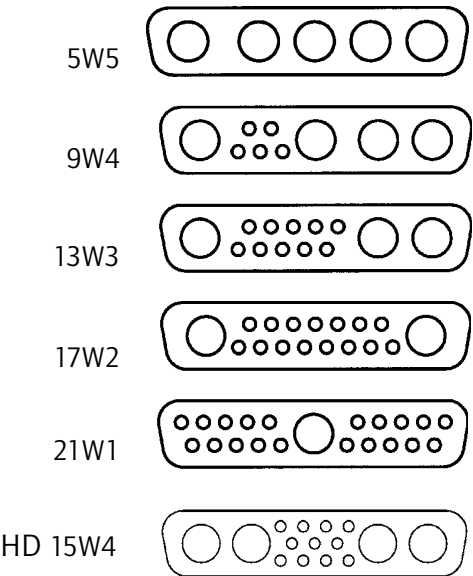
SHELL SIZE 1



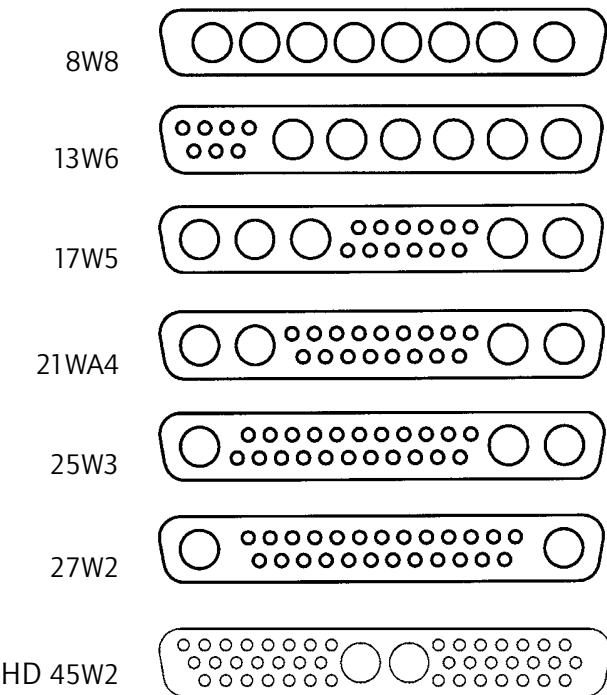
SHELL SIZE 2



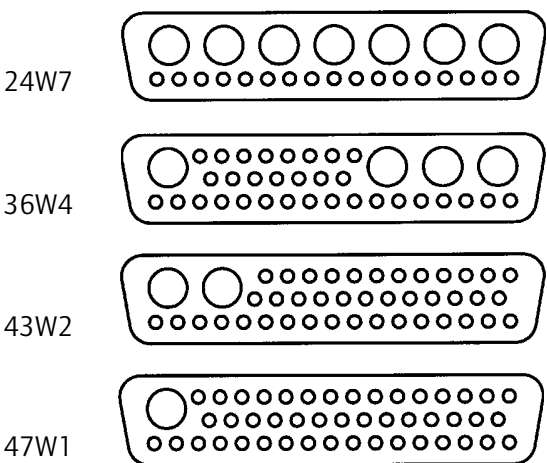
SHELL SIZE 3



SHELL SIZE 4



SHELL SIZE 5



Connectors 3W3, 5W5 and 8W8 with female insulators: Socket contacts are fingerprobe safe according to UL 1950 and CSA 22.2.950.

# TECHNICAL INFORMATION

## SKIN EFFECT

Alternating currents do not uniformly occupy the entire cross section of the conductor, rather inductance effect in the conductor deflects the current towards the surface of the conductor, whereby this deflection increases with the frequency.

The resistive attenuation of a transmission line increases with the frequency as a result of this skin effect.

The skin depth (equivalent thickness of the layer in which current flows) can be determined using

$$\delta = \frac{1}{\sqrt{f \pi \sigma \mu_0 \mu_r}}$$

$f$  = frequency

$\sigma$  = conductivity of the conductor material

$\sigma_{Ag} = 62 \times 10^6 \text{ S/m}$

$\sigma_{Cu} = 58 \times 10^6 \text{ S/m}$

$\mu_0 = 1,256 \cdot 10^{-6} \text{ Vs / Am}$

$\mu_r$  ... relative permeability constant for the employed material

## VSWR-VALUE

The ratio between the value of the largest and the smallest voltages on a loss-free line is known as the ripple or voltage standing wave ratio  $s$  (where  $1 \leq s < \infty$ ). The reciprocal value of the VSWR is known as the inverse voltage standing wave ratio  $m$  (where  $0 < m \leq 1$ ).

(VSWR = Voltage standing wave ratio)

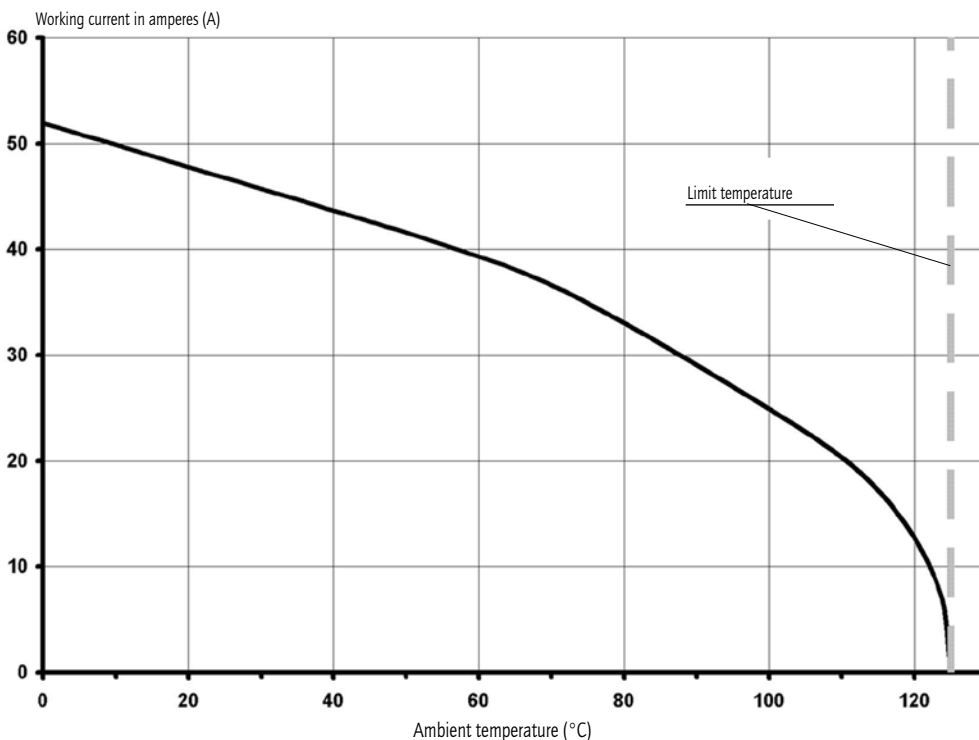
The value of  $s$  is linked with the  $\rightarrow$  reflection coefficient  $r$  on  $s$  transmission line according to the equation

$$s = \frac{(1 + |r|)}{(1 - |r|)}$$

## DERATING CURVE

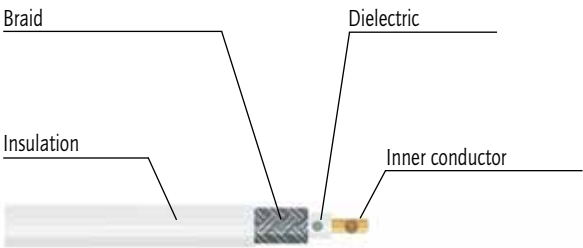
Measurement is according to DIN 41640 part 3 whereas all power contacts are connected in series.

For test procedure – product-no. 3008W8SXX99A has been equipped with 132C11049X and 3008W8PXX99AA10X with 131C11049X.





# CRIMPING INSTRUCTIONS FOR COAX CONTACTS



Strip the wire  
Using dimensions shown on the  
individual product drawings



Slide sleeve over coax cable



Crimp the inner contact on the  
inner conductor



Snap the inner contact into  
the outer contact



Slide braid over outer contact



Crimp the sleeve on to outer  
contact