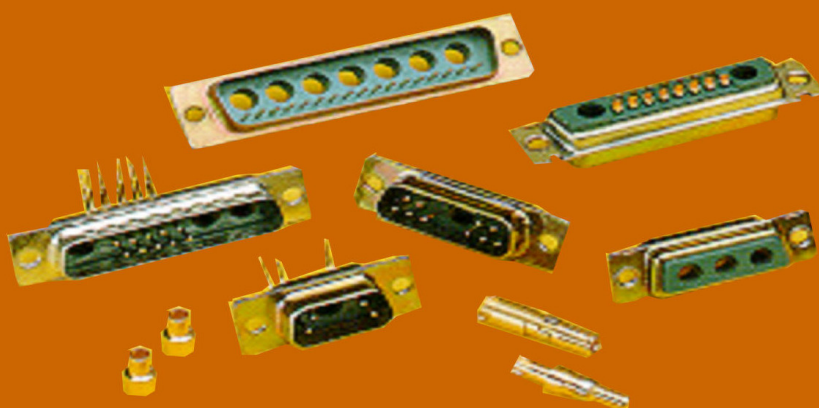


Mixed Layout Connectors



Denny Industrial Centre, Waterbeach, Cambridge CB25 9QR England
Tel: +44 (0)1223 860041 Fax: +44 (0)1223 863625
email: sales@cambridgeconnectors.com
net: www.cambridgeconnectors.com

Contents

Standard Connectors

Co-axial Connectors

High Current Contacts

High Voltage Contacts

Press Fit Contacts

Pneumatic Contacts

Contact Plating Codes

Tooling

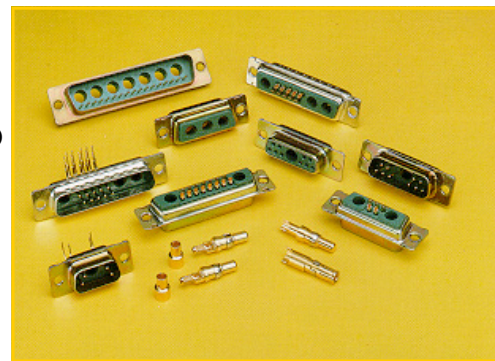
Ordering Code

Filter Connectors with Power Contacts

Mixed Layout Connectors

Description:

The mixed layout series is available in the same shell sizes as the D Subminiature series and enables signal, high voltage, high power and co-axial contacts to be combined in the same connector. Contacts are available in solder bucket, straight, right angle, PCB mount and press-fit styles. Crimp contact versions are also available.



Mechanical Data

Mating Force per signal contact:	$\leq 3,4$ N
Extraction Force:	$\geq 0,2$ N
Temperature Range:	-55°C to 155°C
Mating Cycles:	Standard: ≥ 500

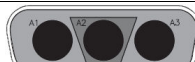
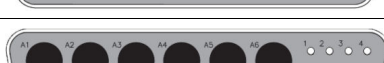
Materials and Platings

Insulator:	Thermoplastic; glass filled (UL94V-O)
Shell:	Steel
Shell Plating:	Yellow chromate over zinc plating or tin plated over nickel
Contact Material:	Cu alloy
Contact Plating:	Standard: 0.8 microns gold over nickel other platings available on request

Electrical Data

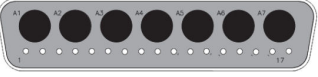
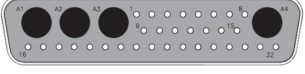
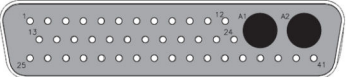
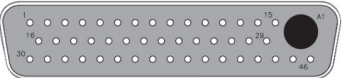
Current Rating: (Signal Contacts)	5A
Test Voltage (effective value) between 2 contacts/shell and contact:	1000V, 50 Hz, 1 min.
Resistance between mated contacts:	$\leq 2,7$ M ohm (MIL-C-24308)
Insulation Resistance (pair of contacts):	> 5000 M ohm
Volume Resistivity:	10^{16} ohm cm
Dielectric Strength:	50 kV / mm

Contact Arrangements

SHELL SIZE	CONTACT FORMAT	LAYOUT	AVAILABILITY	
			*STANDARD	CRIMP
1	1W1		NO	YES
				
1	2W2C		YES	NO
2	3W3		YES	NO
2	3W3C		YES	NO
2	7W2		YES	YES
2	11W1		YES	YES
3	5W5		YES	NO
3	9W4		YES	YES
3	13W3		YES	YES
3	17W2		YES	YES
3	21W1		YES	YES
4	8W8		YES	NO
4	13W6		YES	YES
4	17W5		YES	YES
4	21WA4		YES	YES
4	25W3		YES	YES
4	27W2		YES	YES

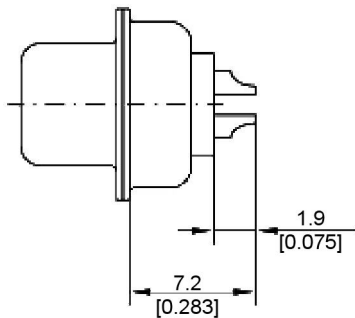
* Standard contacts non-removable

Contact Arrangements

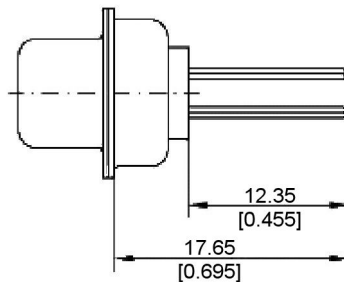
SHELL SIZE	CONTACT FORMAT	LAYOUT	AVAILABILITY	
			*STANDARD	CRIMP
5	24W7		YES	YES
5	36W4		YES	YES
5	43W2		YES	YES
5	47W1		YES	YES

Standard Signal Contacts

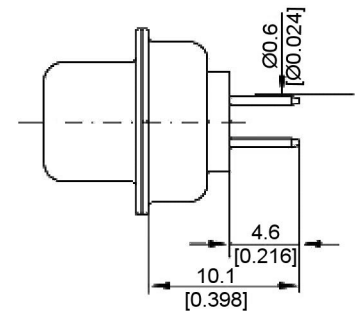
Signal contacts are available in the following styles:-



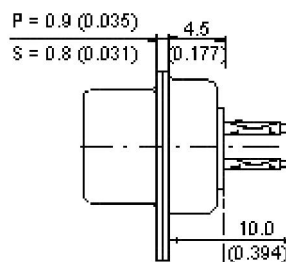
Solder Bucket



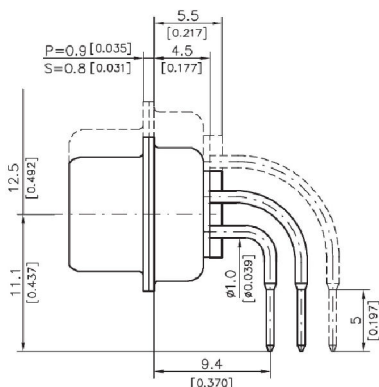
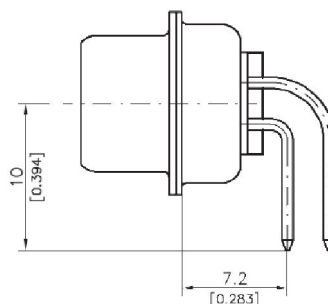
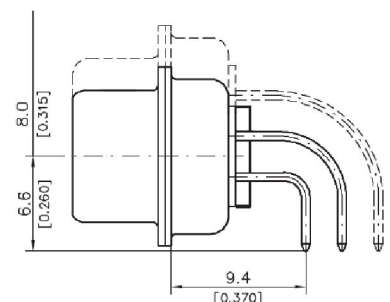
Wire Wrap



Printed Circuit



Non-compliant Press Fit

Rt. Angle PCB Mounting
2.54mm spacingRt. Angle PCB Mounting
2.84mm spacingRt. Angle PCB Mounting
2.54mm spacing (short)

Coaxial Contacts Technical Data

Mechanical Data

Mating & unmating force (pair of contacts)	≤ 7 N
Recommended temperature range:	-55°C to 135°C
Mating Cycles:	Standard: ≥ 500 Low cost ≥ 200

Electrical Data

Characteristic Impedance	50 ohm / 75 ohm
Insulation resistance	10^7 M ohm
Contact resistance inner conductor	$\leq 2,7$ M ohm
Contact resistance outer conductor	$\leq 2,7$ M ohm
Proof voltage	750V / 50Hz
Current rating (DC)	2A

Materials

Outer conductor	Cu alloy
Inner conductor	Cu alloy
Retaining clip	Cu alloy
Insulators	PTFE / PBTP / PI

Co-axial Contacts**50 Ohm Cable Co-axial Contacts**

CABLE TYPE	TYPE	PLUG	SOCKET
RG178BU; RG196AU	Straight Solder	31D-0172-**-	31D-0173-**-
RG404U	Rt. Angle Solder	31D-0255-**-	31D-0256-**-

RG174U; RG188AU	Straight Solder	31D-0170-**-	31D-0171-**-
RG316U	Straight "Snap in" Crimp	31D-0247-**-	31D-0248-**-
	Rt. Angle Solder	31D-0253-**-	31D-0254-**-
	Rt. Angle "Snap in"	31D-0259-**-	31D-0260-**-

RG180BU	Straight Solder	31D-0178-**-	31D-0179-**-
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RG58CU; RG141AU	Straight Solder	31D-0215-**-	31D-0216-**-
	Straight "Snap in" Crimp	31D-0251-**-	31D-0252-**-

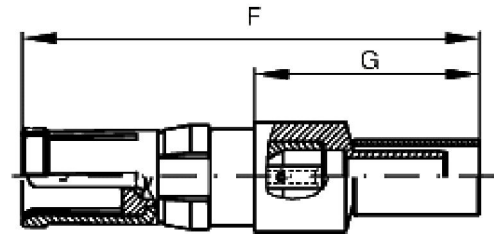
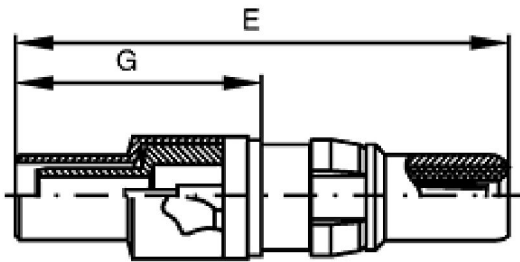
RG316U (Double Braid)	Straight Solder	31D-0217-**-	31D-0218-**-
	Straight "Snap in" Crimp	31D-0249-**-	31D-0250-**-
	Rt. Angle Solder	31D-0257-**-	31D-0258-**-

75 Ohm Cable Co-axial Contacts

CABLE TYPE	TYPE	PLUG	SOCKET
RG179BU; RG187AU	Straight Solder (short)	31D-0230-**-	31D-0231-**-
	Straight Solder	31D-0226-**-	31D-0227-**-
	Straight "Snap in" crimp	31D-0263-**-	31D-0264-**-
	Rt. Angle "Snap in" crimp	31D-0267-**-	31D-0268-**-

RG180BU	Straight "Snap in" crimp	31D-0265-**-	31D-0266-**-
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Cable Co-axial Contacts



Straight Cable Plugs - 50 ohm

Part No.	E	G
31D-0172-**-	22.5 (0.886)	11.2 (0.441)
31D-0170-**-	22.5 (0.886)	11.2 (0.441)
31D-0178-**-	22.5 (0.886)	11.2 (0.441)
31D-0247-**-	22.5 (0.886)	11.2 (0.441)
31D-0249-**-	22.5 (0.886)	11.2 (0.441)
31D-0215-**-	26.3 (1.035)	14.8 (0.583)
31D-0217-**-	23.5 (0.925)	12.2 (0.480)
31D-0251-**-	22.2 (0.874)	10.9 (0.429)

Straight Cable Sockets - 50 ohm

Part No.	F	G
31D-0173-**-	23.0 (0.906)	11.2 (0.441)
31D-0171-**-	23.0 (0.906)	11.2 (0.441)
31D-0179-**-	23.0 (0.906)	11.2 (0.441)
31D-0248-**-	23.0 (0.906)	11.2 (0.441)
31D-0250-**-	23.0 (0.906)	11.2 (0.441)
31D-0216-**-	26.8 (1.055)	14.8 (0.583)
31D-0218-**-	24.0 (0.945)	12.2 (0.480)
31D-0252-**-	22.7 (0.894)	10.9 (0.429)

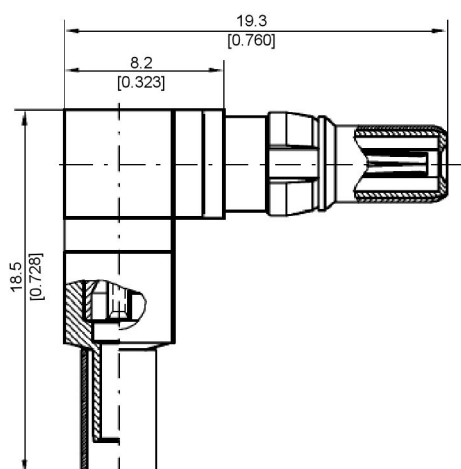
Straight Cable Plugs - 75 Ohm

Part No.	E	G
31D-0230-**-	18.55 (0.730)	7.3 (0.287)
31D-0226-**-	22.5 (0.886)	11.2 (0.441)
31D-0263-**-	22.45 (0.884)	11.2 (0.441)
31D-0265-**-	21.65 (0.852)	10.4 (0.409)

Straight Cable Sockets - 75 Ohm

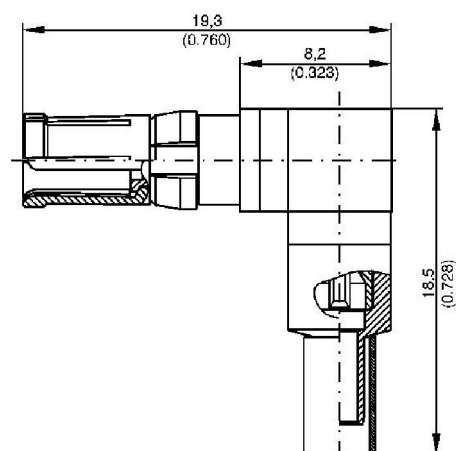
Part No.	F	G
31D-0231-**-	19.05 (0.75)	7.3 (0.287)
31D-0227-**-	23.00 (0.906)	11.2 (0.441)
31D-0264-**-	22.95 (0.904)	11.2 (0.441)
31D-0266-**-	22.15 (0.872)	10.4 (0.409)

Cable Co-axial Contacts



Rt. Angle Cable Plugs - 50 Ohm

Part No.	H
31D-0255-**-	18.5 (0.728)
31D-0253-**-	18.5 (0.728)
31D-0259-**-	18.5 (0.728)
31D-0257-**-	19.5 (0.768)



Rt. Angle Cable Sockets - 50 Ohm

Part No.	K
31D-0256-**-	19.8 (0.780)
31D-0254-**-	19.8 (0.780)
31D-0260-**-	19.8 (0.780)
31D-0260-**-	19.3 (0.760)

Rt. Angle Cable Plugs - 75 Ohm

Part No.	H
31D-0267-**-	18.5 (0.728)

Rt. Angle Cable Sockets - 75 Ohm

Part No.	H
31D-0268-**-	19.8 (0.780)

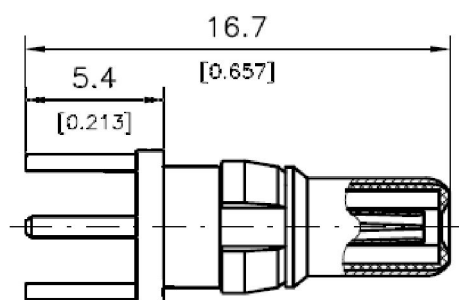
Cable Co-axial Contacts

50 Ohm PCB Co-axial Contacts

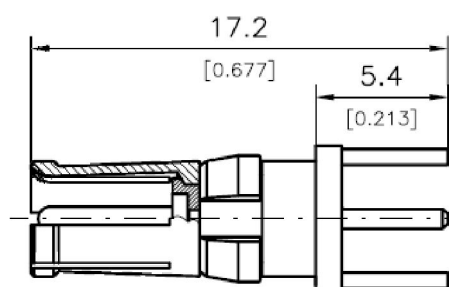
PCB STYLE	TYPE	PLUG	SOCKET
3 pin mounting	Straight PCB	31D-0169-**	31D-0225-**
3 pin mounting	Rt. Angle PCB	31D-0206-**	31D-0207-**
5 pin mounting	Rt. Angle PCB (short)	31D-0176-**	31D-0177-**

75 Ohm PCB Coaxial Contacts

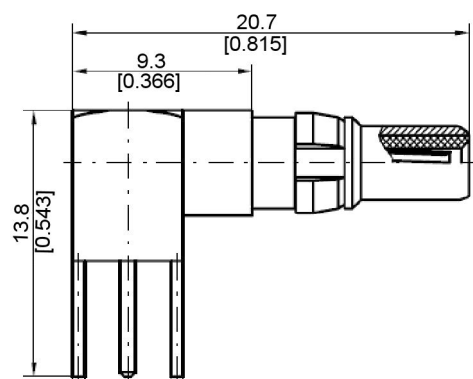
PCB STYLE	TYPE	PLUG	SOCKET
3 pin mounting	Straight PCB	31D-0269-**	31D-0270-**
3 pin mounting	Rt. Angle PCB	31D-0232-**	31D-0214-**
5 pin mounting	Rt. Angle PCB (short)	31D-0233-**	31D-0234-**



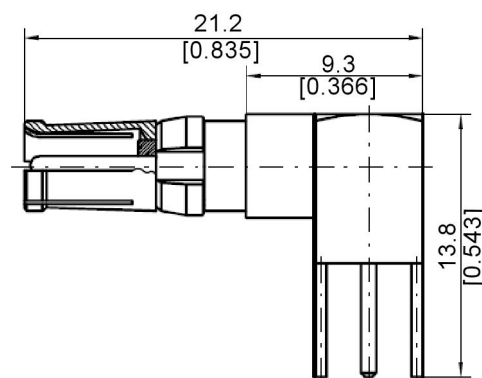
Straight PCB Plug 50/75 Ohm



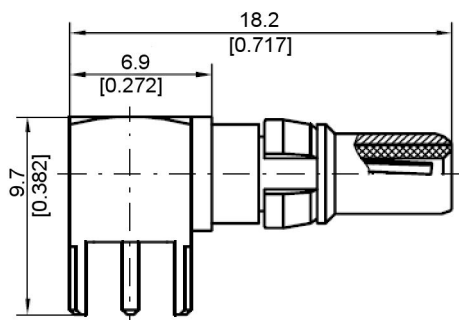
Straight PCB Socket 50/75 Ohm



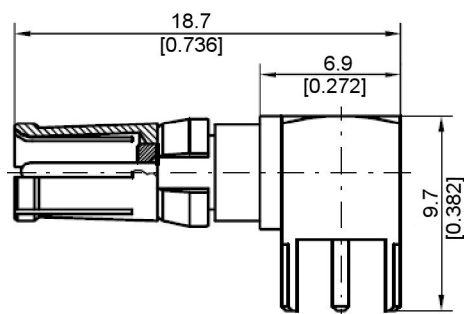
Rt. Angle PCB Plug (3 pin)



Rt. Angle PCB Socket (3 pin)



Rt. Angle PCB Plug short (5 pin)



Rt. Angle PCB Socket short (5 pin)

Press Fit Power Contacts (30A)

Newly developed high power flexible press-fit contacts, with a power rating of up to 30 amps, are now available from Cambridge Connectors. They can be used as single contacts as well as with DIN41612 and D-Subminiature connectors with mixed layouts.

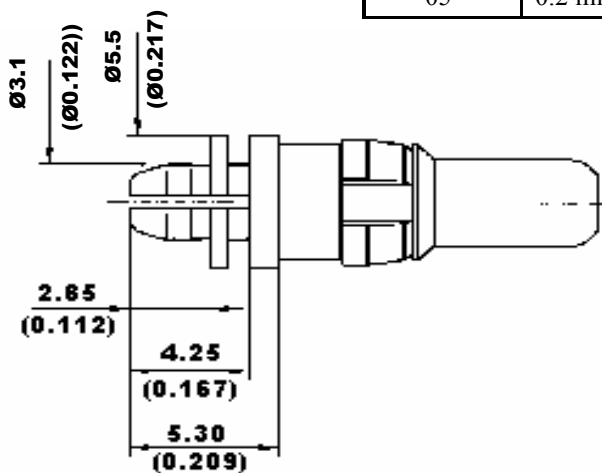
In addition to the exceptional 30 amp power capability the other unique feature of these contacts is the flexible nature of the press-fit. This offers the benefit of a relatively low insertion force of between 80-100N thereby protecting the PCB which may be populated with expensive components. Additional benefits are general PCB drilling tolerances of between 2.8 - 3.0mm and the ability to fit a wide range of PCB thicknesses including multilayer PCB's.



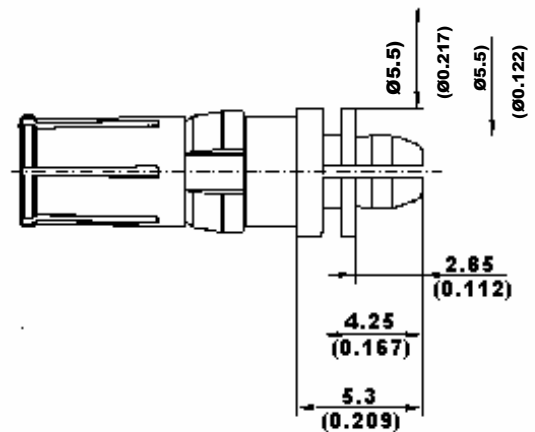
High Power Contacts - PCB Termination

Current Rating	Type	Plug	Socket
30A	Straight Press Fit	31D-0277-**	31D-0278-**
30A	R/A Press Fit	31D-0299-**	31D-0300-**

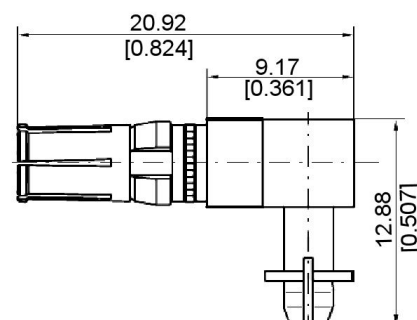
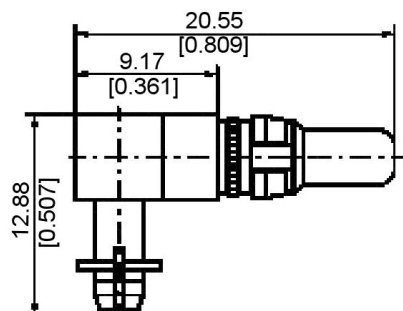
Code Suffix	Mating Area	Termination Area
** = 09	0.8 micron Au	1 micron Sn
** = 05	0.2 micron Au	1 micron Sn



Press Fit Plug



Press Fit Socket



High Power Contacts Technical Data

Mechanical Data

Mating Force (pair of contacts)	≤ 7 N
Temperature Range:	-55°C to 155°C
Mating Cycles:	Standard: ≥ 500 Low cost ≥ 200

Electrical Data

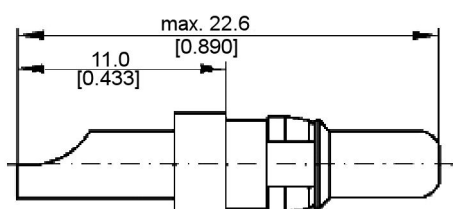
Contact resistance	≤ 1 M ohm
Current rating (DC) with an ambient temperature of 20°C	10-40A

Materials

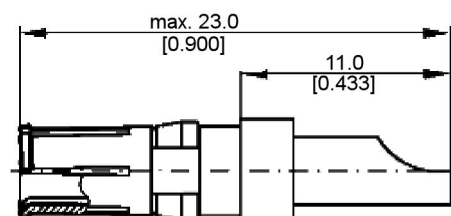
Pin contact	Cu alloy
Socket contact	Cu alloy
Retaining clip	Cu alloy

High Power Contacts (10-40 Amps)**Cable Termination**

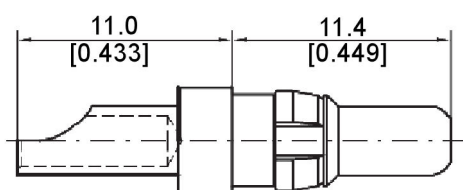
WIRE SIZE	CURRENT RATING	TYPE	PLUG	SOCKET
AWG 16-20	10A	Straight Solder	31D-0180-**-	31D-0183-**-
AWG 16-20	10A	Straight Crimp	31D-0155-**-	31D-0158-**-
AWG 12-14	20A	Straight solder	31D-0181-**-	31D-0184-**-
AWG 12-14	20A	Straight Crimp	31D-0156-**-	31D-0159-**-
AWG 10-12	30A	Straight Solder	31D-0296-**-	31D-0297-**-
AWG 10-12	30A	Straight Crimp	31D-0298-**-	31D-0280-**-
AWG 8-12	40A	Straight Solder	31D-0182-**-	31D-0185-**-
AWG 8-12	40A	Straight Crimp	31D-0157-**-	31D-0160-**-



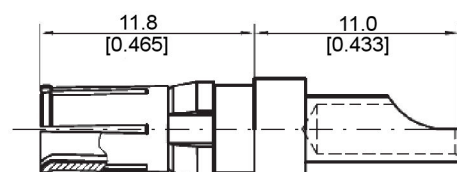
Straight Solder Plug



Straight Solder Socket



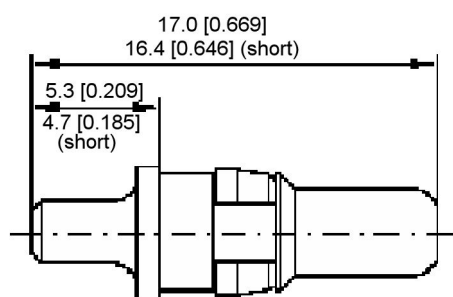
Straight Crimp Plug



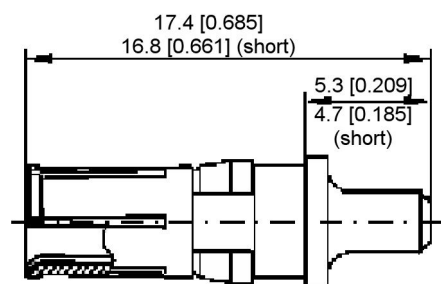
Straight Crimp Socket

HIGH POWER CONTACTS (20-40 AMPS)**PCB Termination**

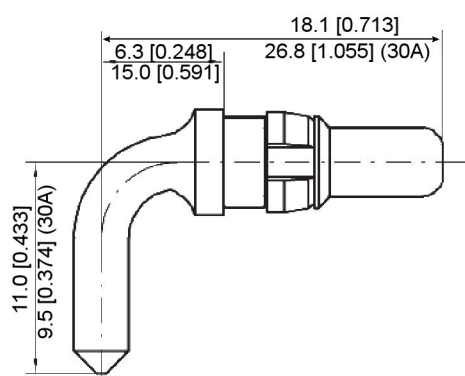
CURRENT RATING	TYPE	PLUG	SOCKET
20A	Straight	31D-0273-**	31D-0274-**
20A	Straight (short)	31D-0162-**	31D-0164-**
20A	Rt. Angle	31D-0186-**	31D-0187-**
30A	Rt. Angle	31D-0275-**	31D-0276-**
40A	Straight	31D-0301-**	31D-0161-**
40A	Rt. Angle	31D-0165-**	31D-0166-**



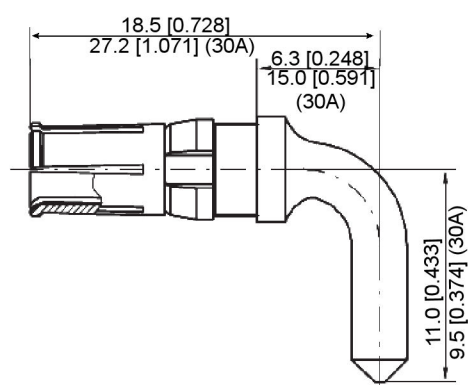
Straight Plug



Straight Soket



Rt. Angle Plug



Rt. Angle Socket

High Voltage Contacts Technical Data

Mechanical Data

Mating force (pair of contacts)	$\leq 5 \text{ N}$
Unmating force	Ca 2,5N
Temperature Range:	-55°C to 125°C
Mating Cycles:	Standard: ≥ 500

Electrical Data

Insulation resistance	$\geq 2 * 10^7 \text{ M ohm}$
Contact resistance outer conductor	$\leq 3 \text{ M ohm}$
Proof voltage	4 kV / 50 Hz
Current rating (DC)	2A
Operating voltage	$\leq 3 \text{ kV}$

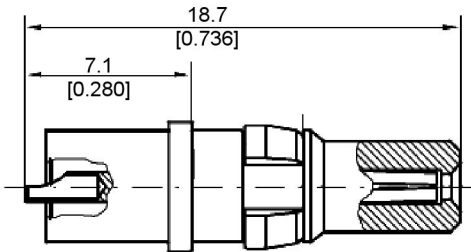
Materials

Plug	Cu alloy
Receptacle	Cu alloy
Retaining clip	PI
Insulators	PTFE

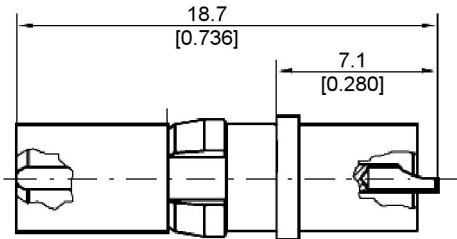
High Voltage Contacts

Cable Termination

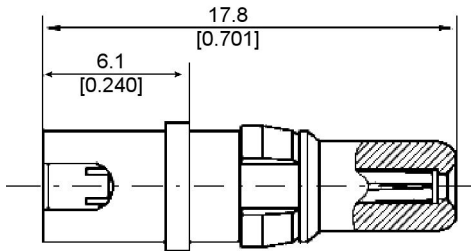
Wire Size	Current Rating	Type	Plug	Socket
AWG 20	1.5A	Straight Solder	31D-0188-**-	31D-0189-**-
AWG 20	1.5A	Rt. Angle Solder	31D-0190-**-	31D-0191-**-



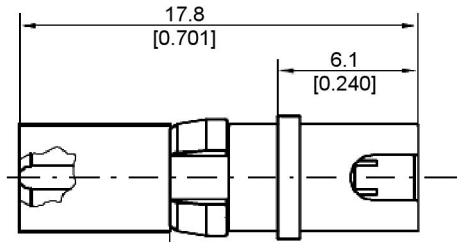
Straight Solder Plug



Straight Solder Socket



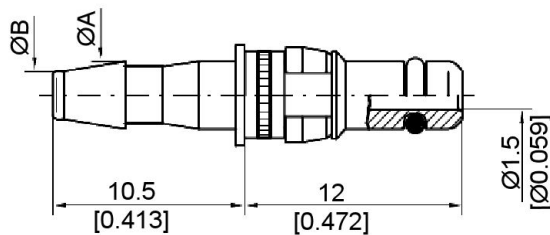
Rt. Angle Solder Plug



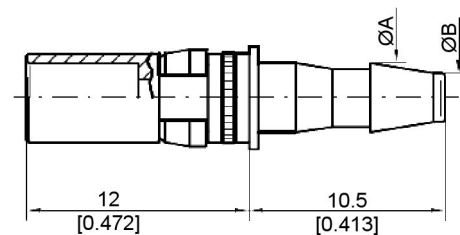
Rt. Angle Solder Socket

Pneumatic Contacts

Technical Data	
Material, Contact	Silver
Material, O Ring	Viton
Maximum Pressure 20°C	7 bar
Temperature Range	-10°C to 60°C

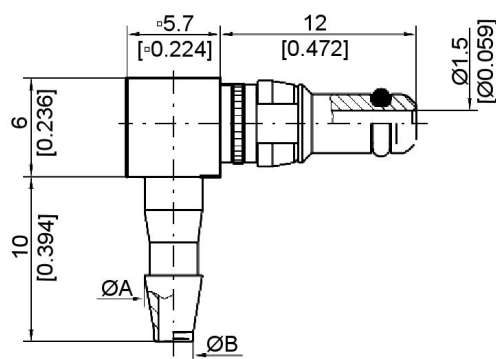


Straight Plug

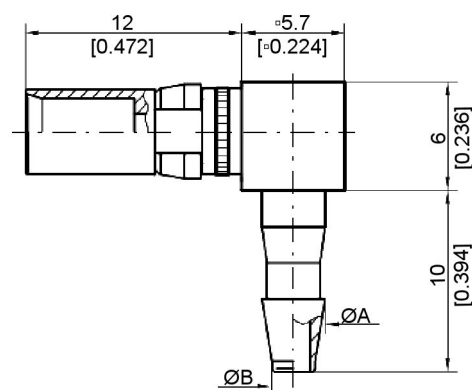


Straight Socket

Air Tube	Tube ID Ømm	ØA mm	ØB mm	Plug Part No.	Socket Part No.
PU2	2	2.6	1.5	31D-0284-00	31D-0285-00
PUN-4 2.5	2.6	3.1	2.0	31D-0286-00	31D-0287-00
PU3	3	3.4	2.3	31D-0288-00	31D-0289-00
PU4	4	4.8	3.7	31D-0290-00	31D-0291-00



Right Angle Plug



Right Angle Socket

Air Tube	Tube ID Ømm	ØA mm	ØB mm	Plug Part No.	Socket Part No.
PU2	2	2.6	1.5	31D-0292-00	31D-0293-00
PU3	3	3.4	2.3	31D-0294-00	31D-0295-00
PU4	4	4.8	3.7	31D-0290-00	31D-0291-00

Contact Plating Codes

All mixed layout contacts are available in a variety of plating thicknesses. For standard contacts these are described in the connectors Ordering Code; crimp contacts are available in platings of 0.8 microns and 0.2 microns. Other contacts are available as follows:-

Coaxial Contacts - Cable & PCB Termination

Code Suffix	Mating Area		Termination Area	
	Inner Conductor	Outer Conductor	Inner Conductor	Outer Conductor
** = 16	1.3 micron Au	0.8 micron Au	1.3 micron Au	0.2 micron Au
** = 17	0.2 micron Au	0.2 micron Au	0.2 micron Au	5 micron Sn
‡	1.3 micron Au	0.8 micron Au	1.3 micron Au	5 micron Sn

‡ Available in PCB styles only

High Power Contacts - Cable Termination

Code Suffix	Mating Area	Termination Area
** = 18	0.8 micron Au	0.2 micron Au
** = 19	0.2 micron Au	5 micron Sn
** = 20 ‡	0.2 micron Au	0.2 micron Au
‡ Crimp Termination only		

High Power Contacts - PCB Termination

Code Suffix	Mating Area	Termination Area
** = 23	0.8 micron Au	5 micron Sn
** = 19	0.2 micron Au	5 micron Sn

High Voltage Contacts - Cable & PCB Termination

Code Suffix	Mating Area	Termination Area
** = 22	1.3 micron Au	1.3 micron Au

Crimp Contacts and Tools

Crimp Signal contacts available in wire sizes 20-24 AWG and 26-28 AWG



31D-0084-08



31D-0085-08

Plastic Insertion/Extraction Tool with Metal Tips for Signal Contacts



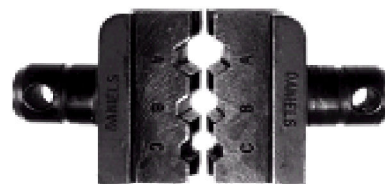
TLG 54

Hand Crimp Tool for Co-axial Contacts (outer conductor)



TLG 55

Die set for above



TLG 56

Hand Crimp Tool for Co-axial Contacts (inner conductor)



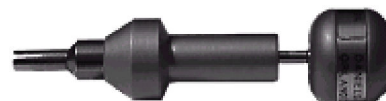
TLG 68

Hand Crimp Tool for High Power Contacts



TLG 79

Extraction Tool for High Voltage/High Power Contacts



TLG 23

Ordering Code

Series:

D = D Subminiature

Product Gender:

P = Plus

S = Socket

Product Version:

M = Mixed Layout - standard

R = Mixed Layout - crimp

Contact Arrangements:**Termination Style:**

S = Solder Bucket

P - Printed Circuit

W - Wire Wrap

A - Right Angled (2.54mm row to row)

B - Right Angled (2.85mm row to row)

C - Right Angled (2.54mm row to row) short

Z - Where contacts are not applicable, i.e. crimp

Plating Code:

C = 0.8 micron (.000030") Gold over Nickel (standard)

A - 0.2 micron (.000008") Gold over Nickel

Z - Where contacts are not applicable

Mounting Style - Vertical Face:

1 = Standard flanged mounting

(other mounting versions available)

Modification Code:

011 = Socket with tin plated shell

012 = Plug with tin plated indented shell

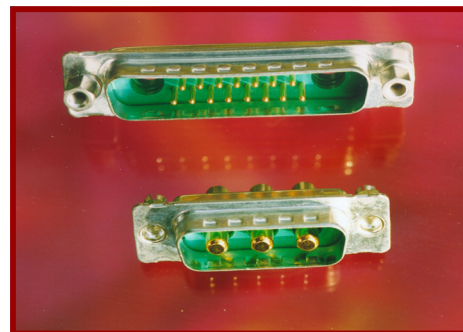
D P M - 17W2 - S C 1 (01:

Note: Coaxial, High Current and High Voltage contacts should be ordered separately.
Crimp signal contacts should be ordered separately.

Mixed Layout Filter D Subminiature Connectors with Power Contacts

To complement their range of standard D Subminiature Filtered Connectors, Cambridge Connectors can now supply mixed layout connectors in filtered versions.

High Power contacts and signal pins can now be filtered in standard subminiature D shell configurations. The use of capacitive feedthrough technology allows filtering of between 100pF and 56nF; custom design selective filtering can also be applied to individual contacts where required.

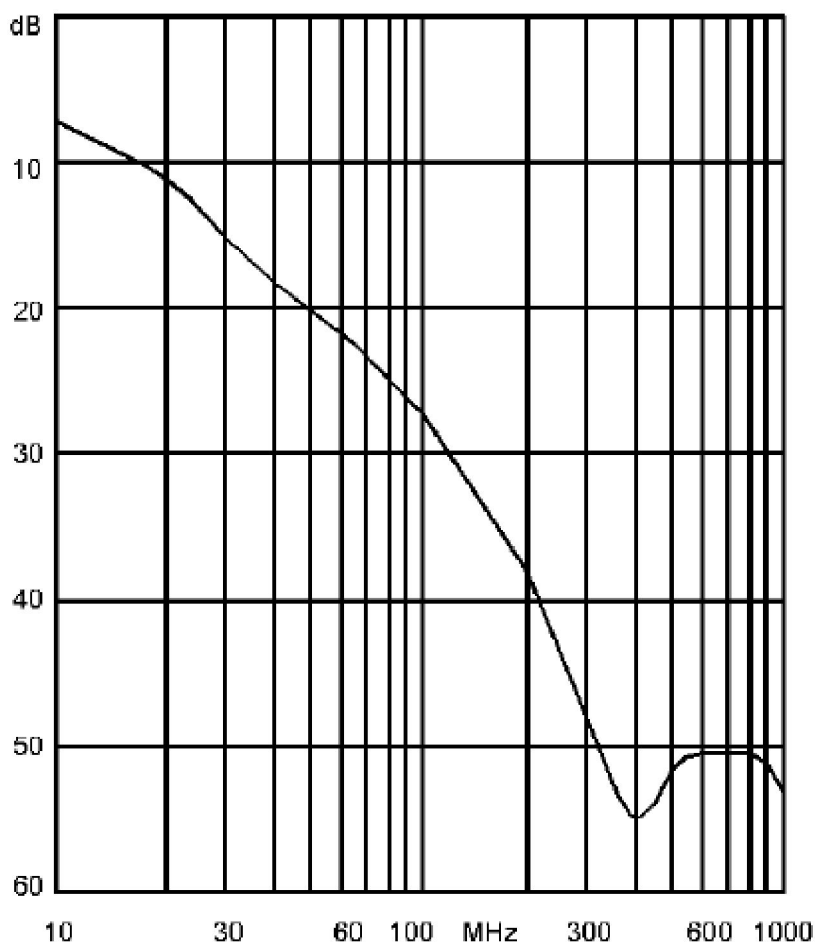


A wide selection of shielded hoods and accessories are available which, when combined with the mixed layout connectors, provide a high level of EMI/EMC filtering in one space saving package.

In addition, where greater filtering is required Pi filtering (CLC) can be used for both signal & power pins. Typically the high frequency insertion losses are in the region of 80dB. LC filtering offers performance halfway between single capacitance filtering and Pi filtering at extremely attractive pricing.

Contact sales desk for more information.

Typical Loss vs. Frequency (50 ohm line)



Materials and Operating Characteristics:

- ◆ Insulator: thermoplastic rated UL94V-O
- ◆ Shell: steel with tin plating:
- ◆ Contacts: screw-machined copper alloy
- ◆ Contact plating: gold over nickel
- ◆ Current rating: 7.5 amps max.
- ◆ Temperature range: -55°C to +105°C
- ◆ Operating Voltage: 200 V
- ◆ Capacitance: 1.0nF (standard)
- ◆ Tolerance of capacitance: -20/+20%