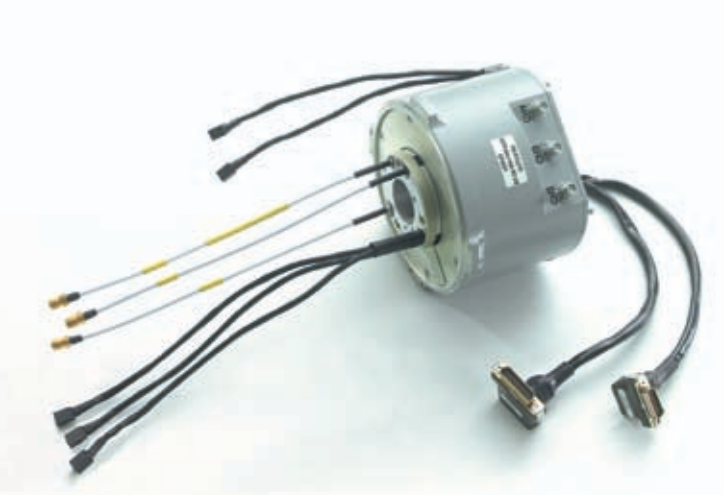
CUSTOM MICRO-D SOLUTIONS

CUSTOM DESIGN CONNECTORS

FROM CUSTOM DESIGN ASSEMBLIES TO MINI-SYSTEMS



Custom designed **solutions**

CUSTOM DESIGN CONNECTORS

In addition to the standard range of Micro-D connectors and assemblies, AXON' can develop custom designed solutions, all based on Micro-D twist-pin contact technology. AXON' is the sole manufacturer in Europe to have fully integrated in-house the design and the manufacture of the Micro-D system, including :
- Twist pins, shells, inserts and interfacial seals.
- Custom designed conductors, wires and cables.
- Complex assembly processes including optimised EMC shielding, branch braiding and overmoulding.

This high level of vertical integration enables AXON' to offer complete solutions which meet the demanding requirements of the aeronautics, space, military, industrial and off-shore markets.

Common applications

MIL-AERO

- Missiles and counter measures.
- Electro-optics.
- Navigation systems.
- Avionics equipment.
- Radar systems.
- Twist capsules.
- Shoulder launched weapon systems.
- Advanced soldier technology systems.
- Military GPS systems.

NON MILITARY

- Down-hole drilling tools.
- Automotive test equipment.
- Medical devices.
- Ruggedised computers.
- Research centres.

SPACE

- Satellite electronics.
- Space station and planetary explorer applications.

MATERIALS & FINISHES

AXON' can offer micro-D solutions with standard and special shell materials and finishes. The table below illustrates some of the more common options, however other materials and finishes may be possible on request :

▲ SALT SPRAY TEST EQUIPMENT

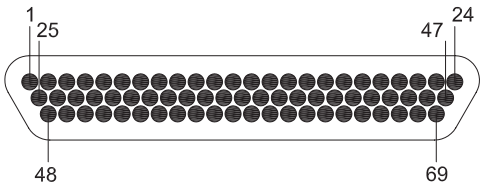
MATERIAL	IN ACCORDANCE WITH	DENSITY (g/cm3)	FINISH	SALT SPRAY RESISTANCE (IN ACCORDANCE WITH EIA-364-26)	TEMPERATURE RANGE	MISCELLANEOUS
ALUMINIUM 6061	SAE AMS-QQ-A-250/11	2.7	STANDARD MIL-DTL-83513 FINISHES			
			- CADMIUM WITH YELLOW CHROMATE OVER ELECTROLESS NICKEL	96 HOURS	150°C	MILITARY APPLICATIONS
			- ELECTROLESS NICKEL	48 HOURS	200°C	MOST COMMON PLATING
			SPECIAL FINISHES			
			- CADMIUM WITH YELLOW CHROMATE OVER ELECTROLESS NICKEL	500 HOURS	150°C	MILITARY APPLICATIONS
			- HEAVY ELECTROLESS NICKEL	500 HOURS	200°C	MILITARY & SPACE APPLICATIONS
			- BLACK ANODISATION (IN ACCORDANCE WITH MIL-A-8625 TYPE II CLASS 2)	48 HOURS	150°C	NON-REFLECTIVE / POOR CONDUCTIVITY
			- CHEMICAL FILM IN ACCORDANCE WITH MIL-C-5541 CLASS 3	48 HOURS	150°C	NON MAGNETIC APPLICATIONS
			- GOLD PLATING IN ACCORDANCE WITH ASTM-B-488 OVER ELECTROLESS NICKEL	48 HOURS	150°C	SPACE GRADE APPLICATIONS
STAINLESS STEEL SERIES 300	-	7.8	PASSIVATION IN ACCORDANCE WITH SAE AMS-27000	1000 HOURS	200°C	EXCELLENT CORROSION RESISTANCE
TITANIUM	-	4.5	NONE	500 HOURS	200°C	ALL ROUND PERFORMANCE WEIGHT, CORROSION, EMC
KOVAR (Fe/Ni/Co ALLOY)	-	8.4	ELECTROLYTIC NICKEL	48 HOURS	200°C	HERMETIC APPLICATIONS

Custom designed **solutions**

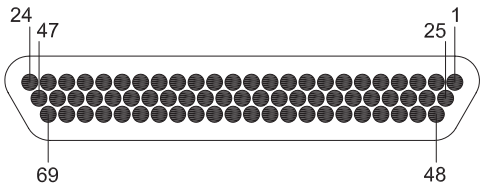
69 AND 74 WAY MICRO-D CONNECTORS

AXON' offers specific contact arrangements for custom applications. Specific designs are not covered by the MIL-DTL-83513 specification but AXON's connectors remain fully compatible with the MIL-DTL-83513 standard as far as performance and construction are concerned.

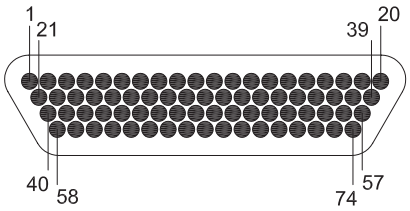
Contact arrangements



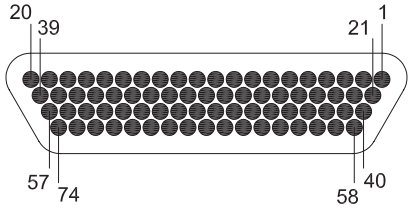
MATING FACE OF 69 WAY MALE CONNECTOR



MATING FACE OF 69 WAY FEMALE CONNECTOR



MATING FACE OF 74 WAY MALE CONNECTOR



MATING FACE OF 74 WAY FEMALE CONNECTOR

1.27 mm (.050'') contact spacing.
1.09 mm (.043'') spacing between rows.

Electrical & mechanical characteristics

As per MIL-DTL-83513

SEE PAGE 15 FOR MORE INFORMATION

Materials

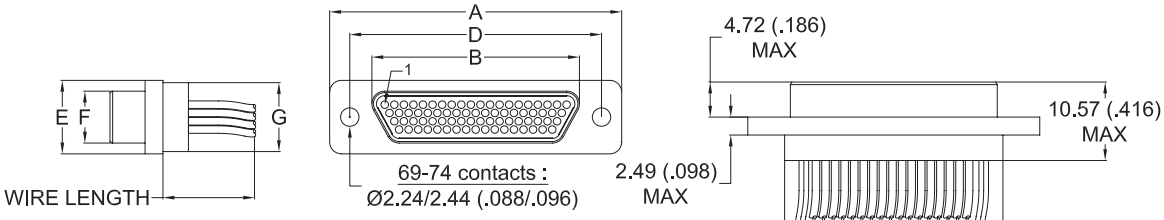
As per MIL-DTL-83513

SEE PAGE 15 FOR MORE INFORMATION

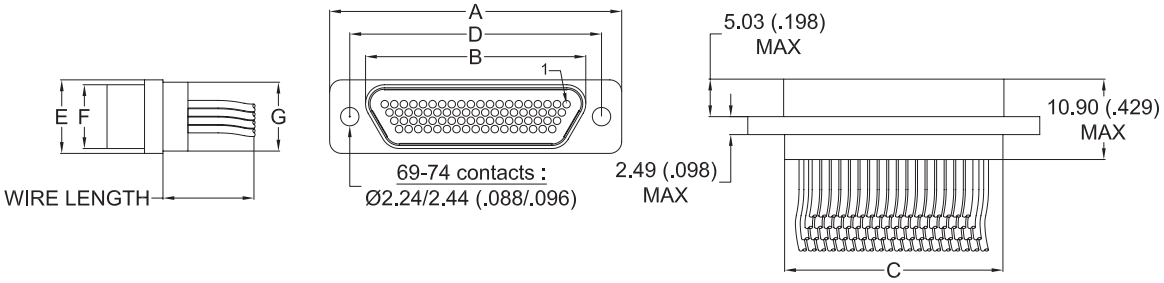
Dimensions

Dimensions are in millimetres (inches).

MALE connector



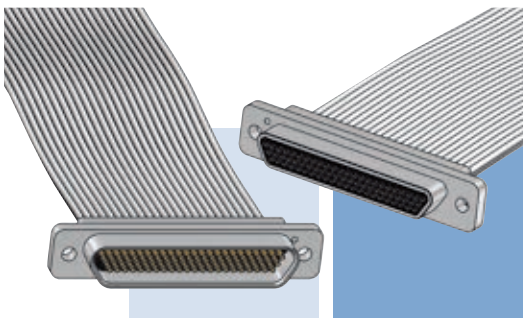
FEMALE connector



	A ± 0.25 (±.010)	B max		C -0.46/+0.25 (-.018/+.010)	D ± 0.13 (±.005)	E ± 0.25 (±.010)	F max		G max
		Male	female				Male	female	
69P/69S	43.82 1.725	32.61 1.284	34.29 1.350	34.04 1.340	38.48 1.515	8.66 .431	5.79 .228	7.44 .293	7.87 .310
74P/74S	38.74 1.525	27.53 1.084	29.22 1.150	28.96 1.140	33.40 1.315	9.75 .384	6.88 .271	8.46 .333	9.14 .360

Available versions metal shell only

- Male pigtail
- Female pigtail
- Saver
- PCB connectors (available on request)



▲ 69 WAY MICRO-D PIGTAIL CONNECTORS

▲ 74 WAY MICRO-D PIGTAIL CONNECTORS

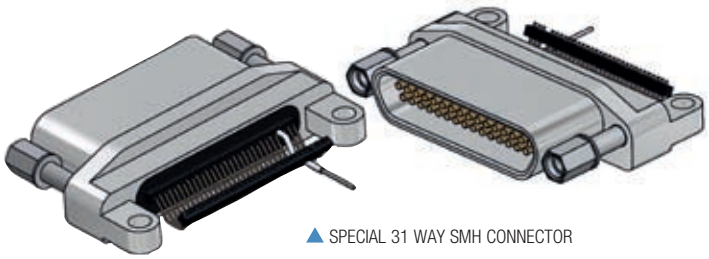
SURFACE MOUNT CONNECTORS

Surface mount connectors are becoming a new industry standard for saving space between electronic Printed Circuit Boards. In comparison with a classic right angled PCB connector (BR), a surface mount connector mounted on the edge of a PCB can greatly reduce the overall space envelope required, both in surface area and in height. Thus, electronic cards can be higher in component density, and stacked more closely than before.

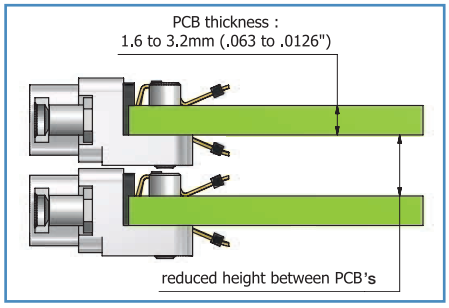
Surface mount connectors are available in 3 versions : SMV (Surface Mount Vertical), SMT (Surface Mount Transversal - on the edge of the card) and SMH (Surface Mount Horizontal). All three styles usually have gold plated tails with a spacing of 0.635 mm (.025").

AXON' offers various hardware options, either the classic jackposts and jackscrews, or more specialised options such as keying hardware.

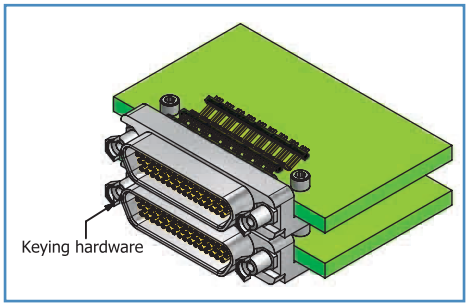
AXON' Surface Mount Connectors are typically compatible with PCB's having a thickness of between 1.6 and 3.2 mm (.063 to .126").
However, AXON' can study custom surface mount connectors to meet your specific application and space requirements.



▲ SPECIAL 31 WAY SMH CONNECTOR

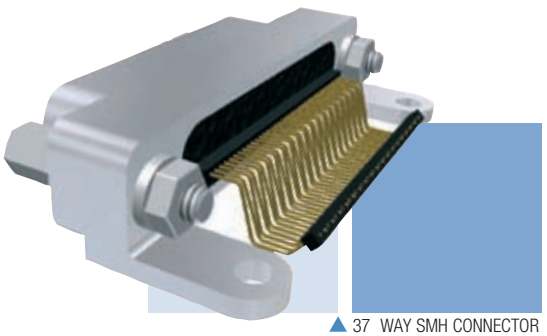


▲ 51 WAY SMT CONNECTOR PCB MOUNT



▲ 51 WAY SMT CONNECTOR

▲ 37 WAY SMH CONNECTOR



▲ 37 WAY SMH CONNECTOR

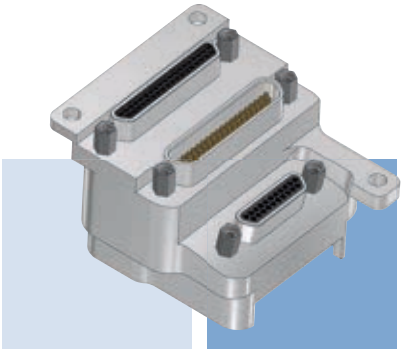
Custom designed **solutions**

CUSTOM DESIGNED SHELLS & HARDWARE

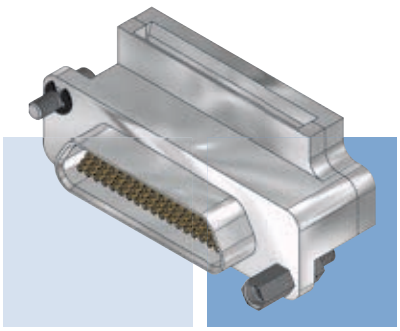
Your system or application may be highly specialised in size, shape, performance or construction, and for this reason the standard Micro-D shell sizes may not be suitable.

Meeting the challenge, AXON' can adapt existing shells or produce custom design Micro-D shells to meet your specific mechanical and environmental requirements. Design and manufacturing expertise on the same site makes it possible for AXON' to offer you a quick turnaround.
As we design and manufacture all the different component parts in-house, we can offer quick design solutions for small series and large volumes.

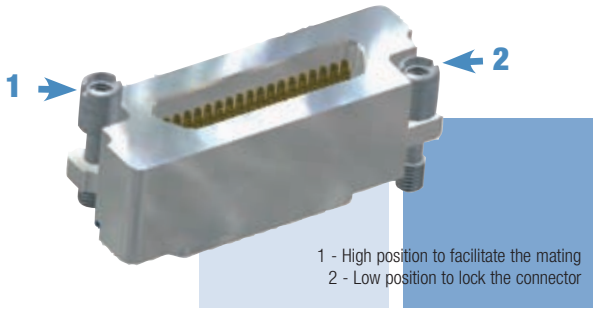
AXON' is also able to develop and manufacture special hardware, such as retractable or captive screws, threaded inserts, and other configurations as required.



▲ EXAMPLES OF MICRO D SHAPE FULLY INTEGRATED INTO AN ELECTRONIC BOX COVER TO ELIMINATE RF/EMI LEAKAGE IN COMPARISON TO A CLASSIC PANEL MOUNT CONNECTOR



▲ MICRO-D WITH SPECIAL INTEGRATED BACKSHELL FOR FLAT CABLE



1 - High position to facilitate the mating
2 - Low position to lock the connector

▲ CUSTOM MICRO-D DESIGN
51 WAY SAVER WITH CUSTOM RETRACTABLE SCREWS

Custom designed **solutions**

EMI & PANEL MOUNT CONNECTORS

EMI protection is a key issue for all electronics devices. Since the mid eighties AXON' has had a dedicated team of engineers who specialise in this field. The AXON' EMI Team has developed simulation software to predict the transfer impedance (or shield efficiency) of a connector, a cable or a complete cable assembly during the design phase before any manufacturing commences.

Product tests in AXON's stirred mode chamber and transfer impedance test bench validate the simulated results. Simulation is an excellent tool to optimise a design in order to provide the best compromise between performance, weight and cost. Such simulation has proven over the years that a good component is not enough to ensure good EMI performance. In addition, it is essential to ensure the right combination and compatibility between connector, cable and the shield termination to the backshell.
The AXON' Micro-D backshells are specifically designed to perfectly fit the connector and prevent EMI leakage. Many other micro-D backshells are simply maintained against the connector by the hardware, but these solutions do not offer optimised EMI performance.

On request, the flange of a panel mount connector can incorporate a groove which enables an EMI o-ring or gasket to be fitted. In this case the flanges are wider than for normal connectors.

▲ SILVER PLATED FLANGE MICRO-D WITH EMI O-RING AND 360° SCREEN TERMINATION TO EMI BACKSHELL

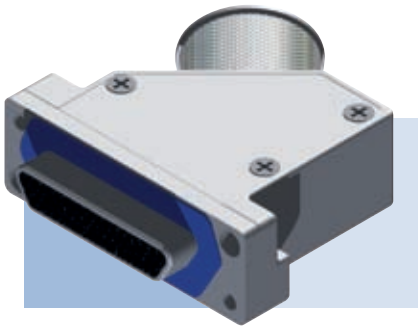
▲ CUSTOM ANGLED EMI BACKSHELL

▲ LARGE FLANGE MICRO-D PIGTAILS WITH EMI GASKET GROOVES (51 WAY ON THE LEFT HAND SIDE, 25 WAY ON THE RIGHT HAND SIDE)

EMI SOLUTIONS

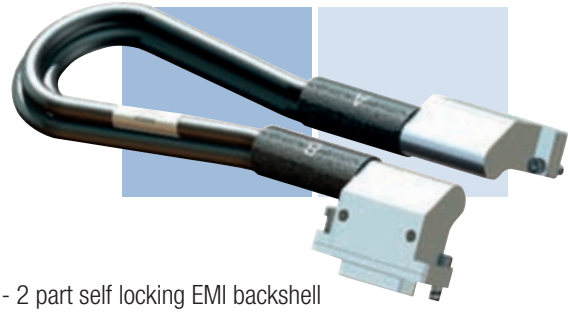
AXON' has drawn on long experience in the fields of RF and EMI protection to design and adapt the Micro-D connector to meet the most challenging of EMI environments. EMI customisation of the standard micro system can include :

- EMI gaskets or o-rings
- Special backshells
- Special connector shell designs
- Special finishes
- Optimised shield termination to the backshell.



▲ 2 PART SELF-LOCKING 45° EMI BACKSHELL WITH LARGE FLANGE MICRO-D CONNECTOR

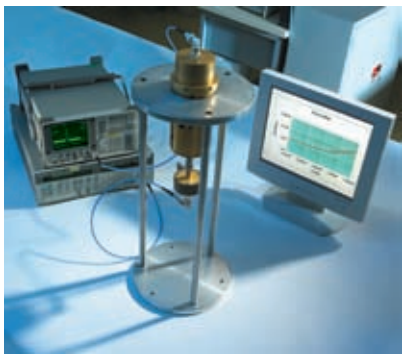
HIGH PERFORMANCE EMI HARNESS



- 2 part self locking EMI backshell
- optimised shielding
- 360° screen termination
- EMI gasket
- special technical solutions for better EMI protection

▲ STIRRED MODE CHAMBER

▲ EMI BACKSHELL ON ITS OWN, AND FITTED TO A MICRO-D WITH SHIELD TERMINATION TO CABLE AND OVERALL PROTECTION



▲ MEASUREMENT OF TRANSFER IMPEDANCE

FILTERED MICRO-D CONNECTORS

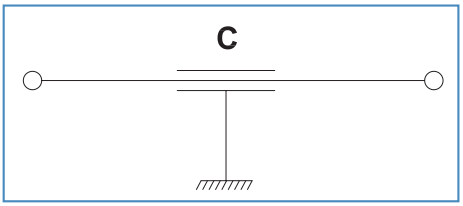
Integrated systems require more power with major current fluctuations, creating a “noisy” electromagnetic field. Filtered Micro-D connectors are designed to protect your equipment from this electromagnetic interference.

General configuration

Axon’ filtered Micro-D connectors are available with two different types of filters: C filter and PI filter, both low-pass. High frequency signals are attenuated, whilst low frequency and DC signals pass through.

C FILTER

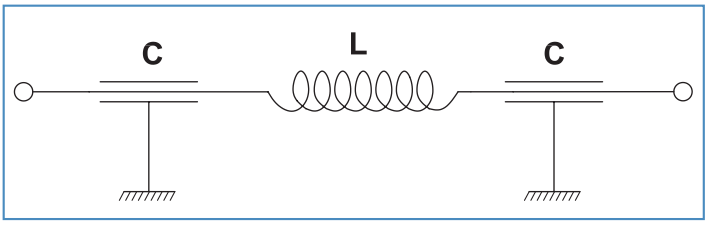
- One capacitor per filtered pin.
- Best suited for high input and output impedance and when a fast attenuation is not necessary.
- When small size is needed.

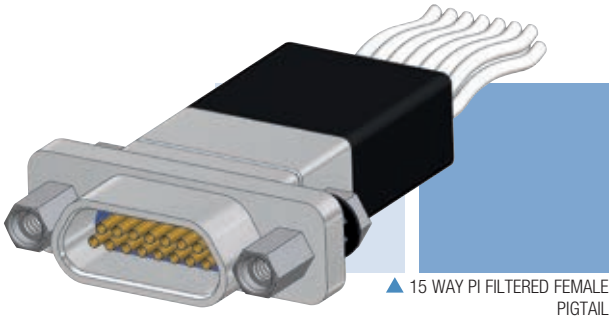


▲ 9 WAY PI FILTERED BS FEMALE CONNECTOR

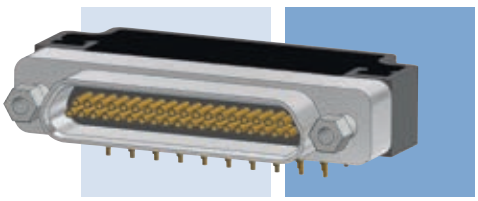
PI FILTER

- Two capacitors on either side of an inductor per filtered pin.
- Used for high impedance and a sharp attenuation.
- Performances at high frequency are excellent.





▲ 15 WAY PI FILTERED FEMALE PIGTAIL



▲ 37 WAY C FILTERED CBR FEMALE CONNECTOR

Electrical & mechanical characteristics

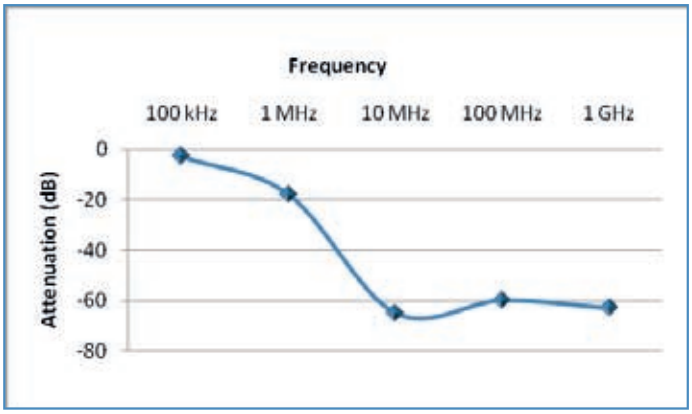
CHARACTERISTIC	SPECIFICATION	TEST METHOD
CURRENT RATING	3 A max.	EIA-364-70
SIGNAL CONTACT RESISTANCE	8 mΩ max.	EIA-364-06
INSULATION RESISTANCE	5000 MΩ min. @ 500 V DC	EIA-364-21
DIELECTRIC WITHSTANDING VOLTAGE - SEA LEVEL 0 m	125V DC	EIA-364-20
CONTACT ENGAGING AND SEPARATION FORCE	170 g max. (6 oz) 14 g min. (0.5 oz)	EIA-364-37
CONNECTOR MATING AND DE-MATING FORCE	283 g (10 oz) x number of contacts max.	EIA-364-13
CONTACT RETENTION	2.26 kg (5 lbs) for 5 seconds min.	EIA-364-29
DURABILITY	500 mating cycles min.	EIA-364-09
TEMPERATURE RANGES - STANDARD	-55°C / +125°C	
VIBRATION	20 g's -No discontinuity >1µs	EIA-364-28 -TEST CONDITION IV
SHOCK	50 g's -No discontinuity >1µs	EIA-364-27 -TEST CONDITION E
SALT SPRAY	48 hours	EIA-364-26 -TEST CONDITION B
HUMIDITY	Insulation resistance > 1MΩ	EIA-364-31 - METHOD IV

Material & Finish

COMPONENT	MATERIAL	FINISH
MALE CONTACT (TWIST PIN)	COPPER AND BERYLLIUM COPPER.	GOLD PLATING IN ACCORDANCE WITH ASTM-B488, TYPE II, CLASS 1 (1.27µm (0.050") MIN.), CODE C OVER NICKEL UNDERPLATE IN ACCORDANCE WITH SAE-AMS-QQ-N-290 CLASS 2 (1.27µm (0.050") TO 3.81µm (0.150"))
FEMALE CONTACT	COPPER ALLOY	
CAPACITORS	PLANAR CERAMIC ARRAY	
INDUCTORS	FERRITE	
METAL SHELL	ALUMINIUM ALLOY, TYPE 6061 IN ACCORDANCE WITH SAE-AMS-QQ-A-250/11	YELLOW CHROMATE OVER CADMIUM : IN ACCORDANCE WITH SAE-AMS-QQ-P-416, TYPE II, CLASS 3 ELECTROLESS NICKEL PLATING IN ACCORDANCE WITH SAE-AMS2404, CLASS 3 OR 4, .0005 INCH MIN.
	STAINLESS STEEL, 300 SERIES	PASSIVATION IN ACCORDANCE WITH SAE-AMS2700
PLASTIC SHELL/ INSERT / PCB TRAY	LIQUID CRYSTAL POLYMER, 30% LOADED GLASS FIBRE POLYESTER, 94V0, IN ACCORDANCE WITH MIL-M-24519 (200°C)	
INTERFACIAL SEAL	FLUOROSILICONE RUBBER IN ACCORDANCE WITH A-A-59588	
HARDWARE	STAINLESS STEEL, 300 SERIES	PASSIVATION IN ACCORDANCE WITH SAE-AMS2700
ENCAPSULANT	EPOXY RESIN	
INSULATED WIRE	PTFE INSULATED SILVER PLATED COPPER IN ACCORDANCE WITH NEMA-HP3 PTFE INSULATED SILVER PLATED COPPER IN ACCORDANCE WITH SAE-AS22759/11 ETFE INSULATED SILVER PLATED COPPER IN ACCORDANCE WITH SAE-AS22759/33	
UNINSULATED WIRE	GOLD PLATED SOLID COPPER WIRE IN ACCORDANCE WITH A-A-59551 TIN PLATED SOLID COPPER WIRE IN ACCORDANCE WITH A-A-59551	

Electrical characteristics of the filters

▲ 9 WAY PI FILTERED BS FEMALE CONNECTOR



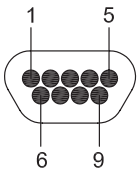
▲ ATTENUATION OF THE AXON' 9 WAY PI FILTER WITH A CAPACITANCE OF 66000 PF

Contact arrangements

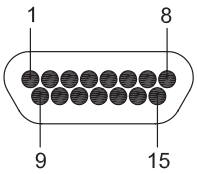
Axon' filtered Micro-D connectors are available in 7 sizes, from 9 to 51 contacts on 2 rows.
They are fully intermateable with standard Micro-D connectors.

MATING FACE OF MALE RECTANGULAR CONNECTOR

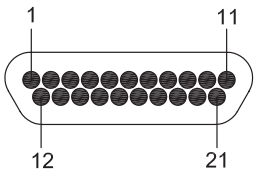
- 1.27 mm (.050") contact spacing.
- 1.09 mm (.043") spacing between rows.



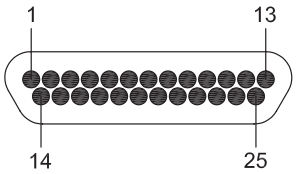
9 CONTACTS



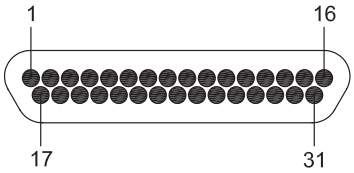
15 CONTACTS



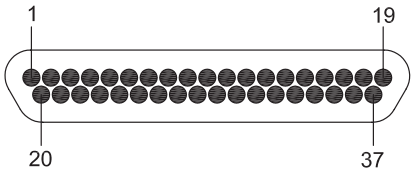
21 CONTACTS



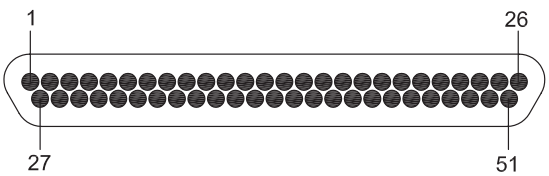
25 CONTACTS



31 CONTACTS



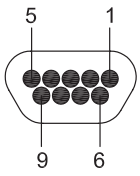
37 CONTACTS



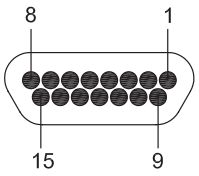
51 CONTACTS DUAL ROW

MATING FACE OF FEMALE RECTANGULAR CONNECTOR

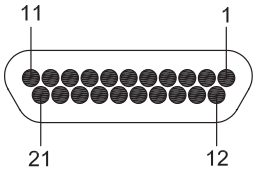
- 1.27 mm (.050") contact spacing.
- 1.09 mm (.043") spacing between rows.



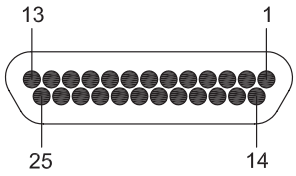
9 CONTACTS



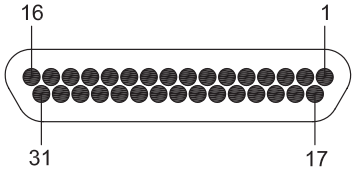
15 CONTACTS



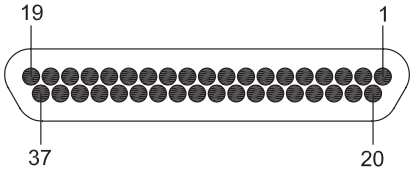
21 CONTACTS



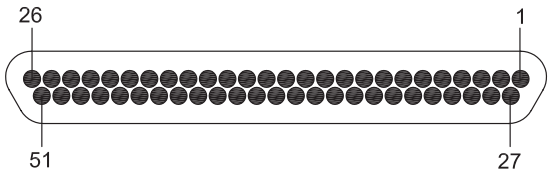
25 CONTACTS



31 CONTACTS

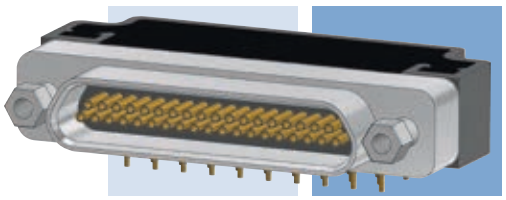


37 CONTACTS

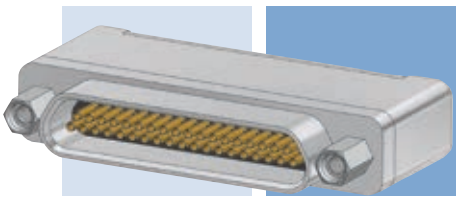


51 CONTACTS DUAL ROW

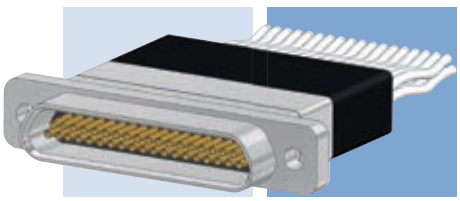
Axon' standard range of filtered Micro-D



▲ CBR 0.100'' - CONDENSED RIGHT ANGLE MOUNT CONNECTORS



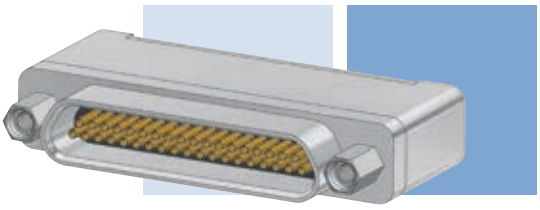
▲ BS 0.050'' - VERTICAL MOUNT CONNECTORS

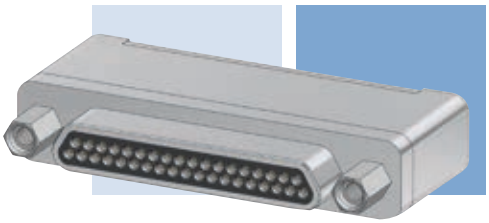


▲ PIGTAIL CONNECTORS

PCB filtered connectors

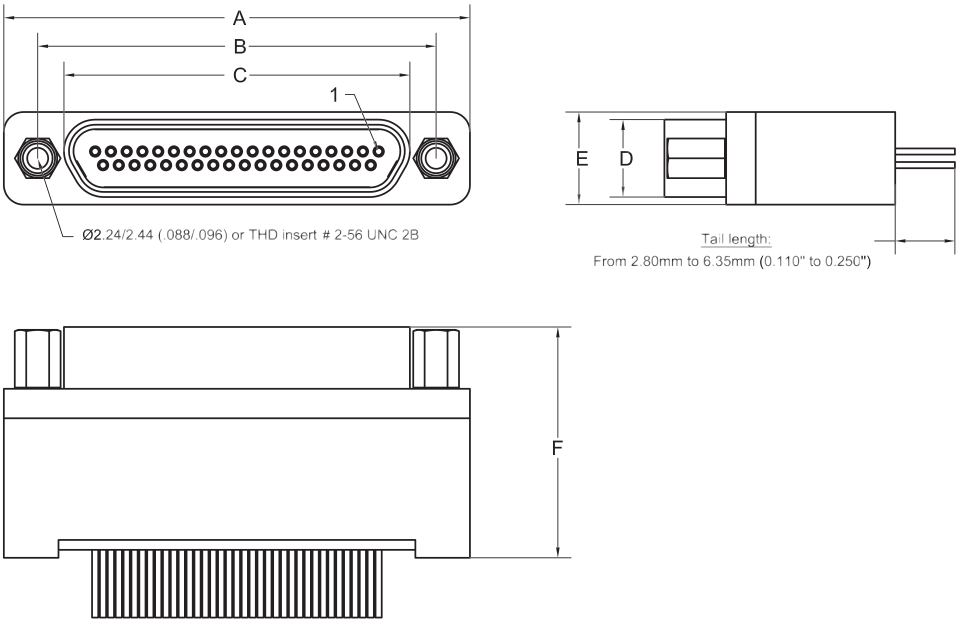
BS CONNECTORS TYPE 0.050'' PITCH METAL SHELL





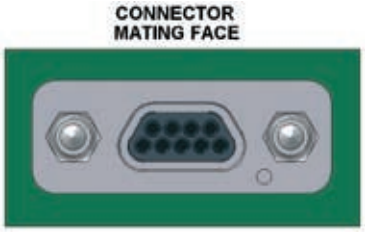
DIMENSIONS

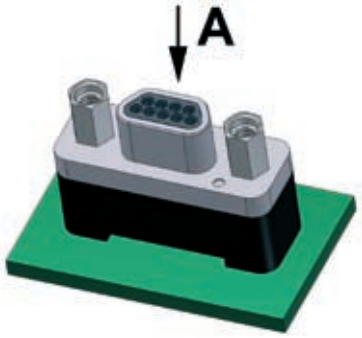
Dimensions are in millimetres (inches).



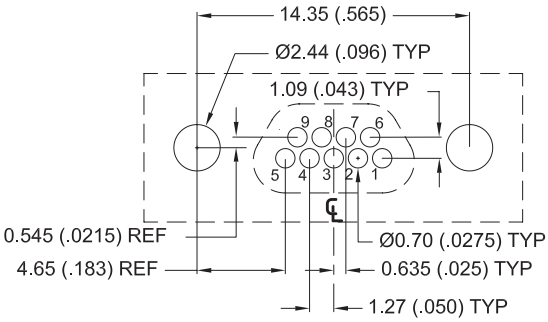
	A ± 0.25 (±.010)	B ± 0.13 (±.005)	C max		D max		E max	F max	
			Male	Female	Male	Female		C filter	PI filter
9P / 9S	19.94 .785	14.35 .565	8.48 .334	10.16 .400	4.69 .185	6.35 .250	7.87 .310	13.00 .512	20.00 .788
15P / 15S	23.75 .935	18.16 .715	12.29 .484	14.00 .551	4.69 .185	6.35 .250	7.87 .310	13.00 .512	20.00 .788
21P / 21S	27.56 1.085	21.97 0.865	16.10 .634	17.81 .701	4.69 .185	6.35 .250	7.87 .310	13.00 .512	20.00 .788
25P / 25S	30.10 1.185	24.51 0.965	18.64 .734	20.35 .801	4.69 .185	6.35 .250	7.87 .310	13.00 .512	20.00 .788
31P / 31S	33.91 1.335	28.32 1.115	22.45 .884	24.16 .951	4.69 .185	6.35 .250	7.87 .310	13.00 .512	20.00 .788
37P / 37S	37.72 1.485	32.13 1.265	26.26 1.034	27.96 1.101	4.69 .185	6.35 .250	7.87 .310	13.00 .512	20.00 .788

PCB LAYOUT FOR FILTERED BS TYPE 0.050'' PITCH MALE CONNECTORS

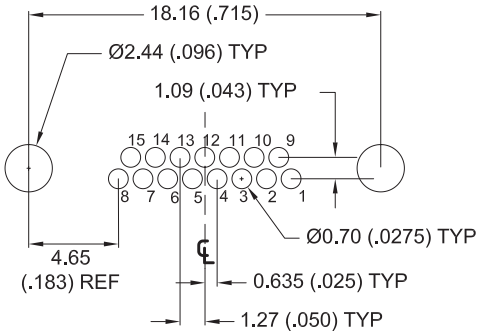




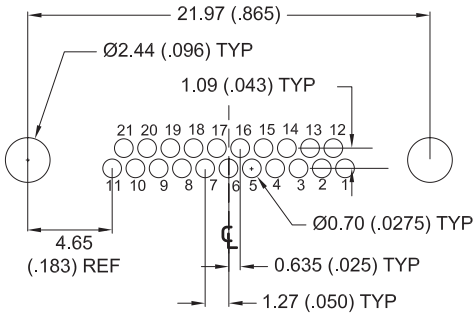
9 CONTACTS - view A



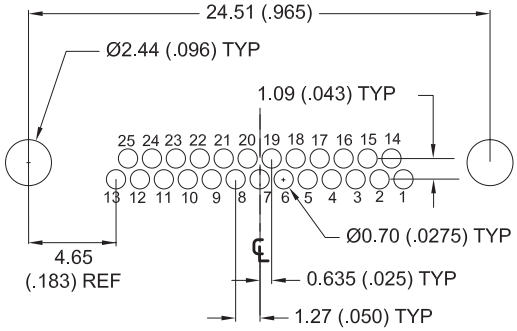
15 CONTACTS - view A



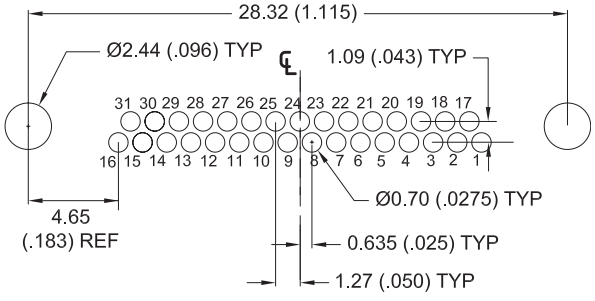
21 CONTACTS - view A



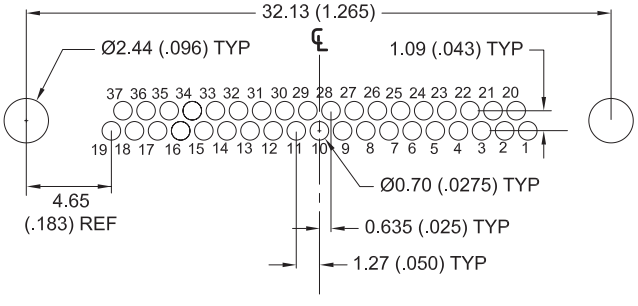
25 CONTACTS - view A



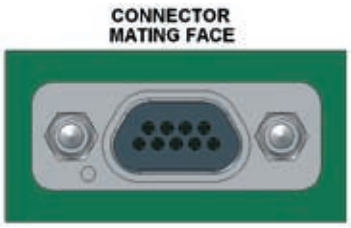
31 CONTACTS - view A

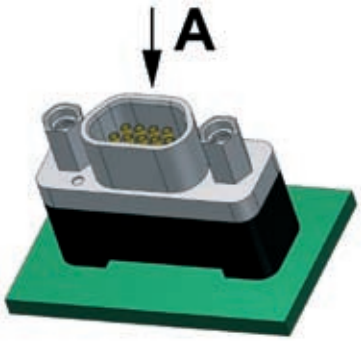


37 CONTACTS - view A

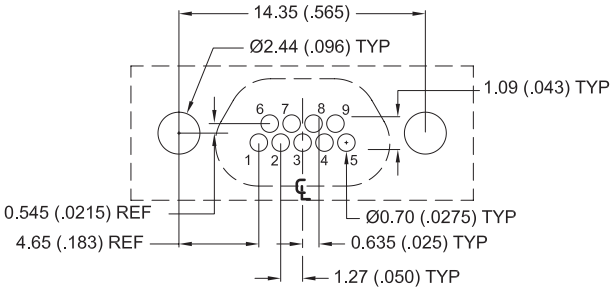


PCB LAYOUT FOR FILTERED BS TYPE 0.050'' PITCH FEMALE CONNECTORS

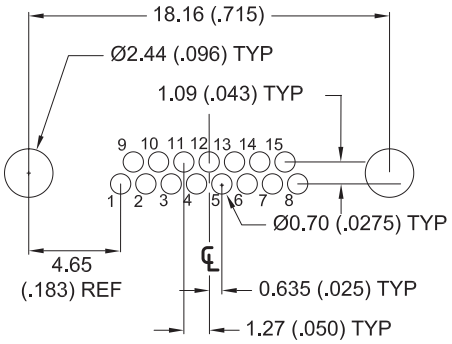




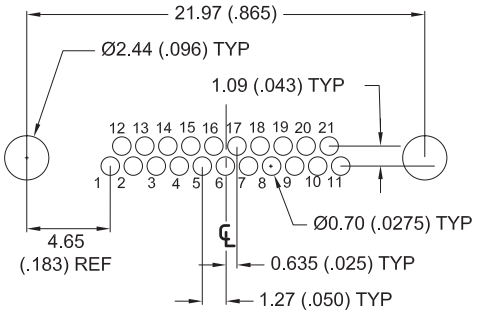
9 CONTACTS - VIEW A



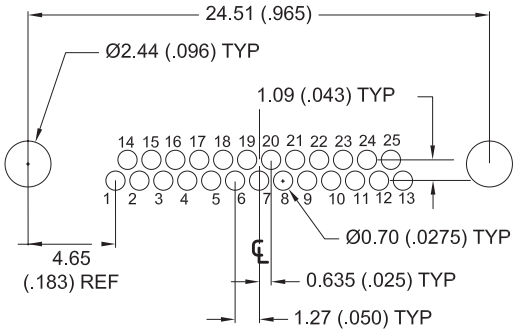
15 CONTACTS - VIEW A



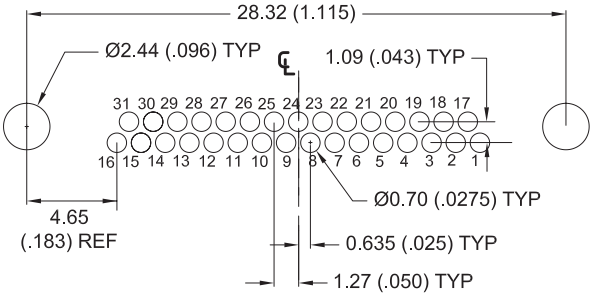
21 CONTACTS - VIEW A



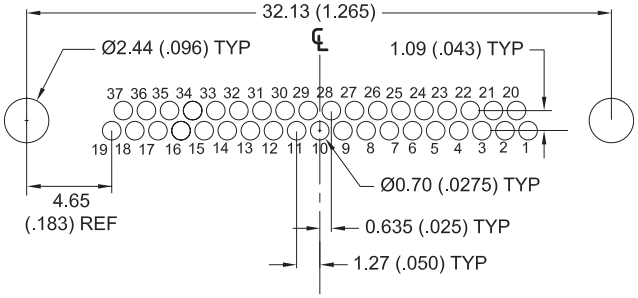
25 CONTACTS - VIEW A



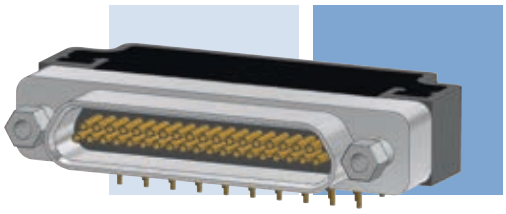
31 CONTACTS - VIEW A

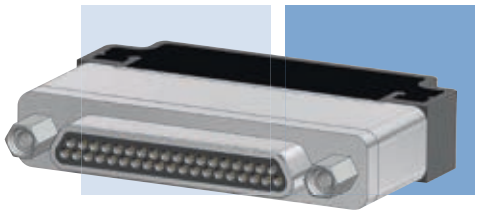


37 CONTACTS - VIEW A



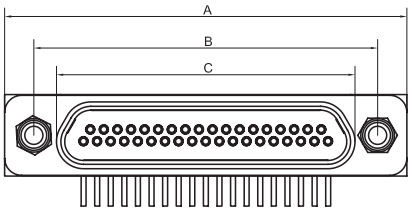
CBR CONNECTORS 0.100'' METAL SHELL

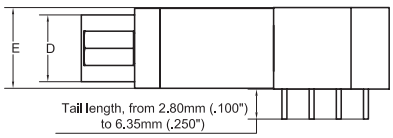




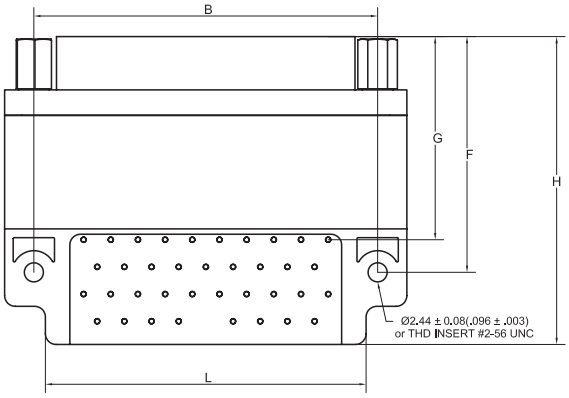
DIMENSIONS

Dimensions are in millimetres (inches).

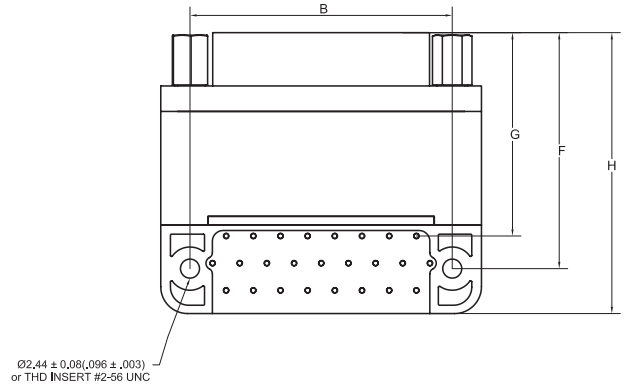




31-37 way connectors



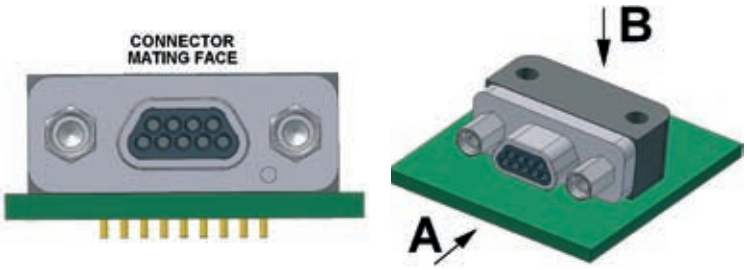
9-25 way connectors



	A ± 0.25 (±.010)	B ± 0.13 (±.005)	C max		D max		E max	F max		G max		H max	
			Male	Female	Male	Female		C filter	PI filter	C filter	PI filter	C filter	PI filter
9P / 9S	19.94 .785	14.35 .565	8.48 .334	10.16 .400	4.69 .185	6.35 .250	7.82 .308	16.00 .630	22.50 .886	13.00 .512	20.00 .788	21.00 .827	29.00 1.142
15P / 15S	23.75 .935	18.16 .715	12.29 .484	14.00 .551	4.69 .185	6.35 .250	7.82 .308	16.00 .630	22.50 .886	13.00 .512	20.00 .788	21.00 .827	29.00 1.142
21P / 21S	27.56 1.085	21.97 0.865	16.10 .634	17.81 .701	4.69 .185	6.35 .250	7.82 .308	16.00 .630	22.50 .886	13.00 .512	20.00 .788	21.00 .827	29.00 1.142
25P / 25S	30.10 1.185	24.51 0.965	18.64 .734	20.35 .801	4.69 .185	6.35 .250	7.82 .308	16.00 .630	22.50 .886	13.00 .512	20.00 .788	21.00 .827	29.00 1.142
31P / 31S	33.91 1.335	28.32 1.115	22.45 .884	24.16 .951	4.69 .185	6.35 .250	7.82 .308	16.00 .630	22.50 .886	13.00 .512	20.00 .788	22.00 .866	29.00 1.142
37P / 37S	37.72 1.485	32.13 1.265	26.26 1.034	27.96 1.101	4.69 .185	6.35 .250	7.82 .308	16.00 .630	22.50 .886	13.00 .512	20.00 .788	22.00 .866	29.00 1.142

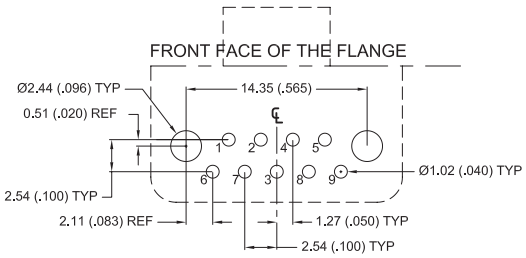
PCB LAYOUT FOR FILTERED CBR TYPE 0.100” PITCH - MALE CONNECTORS

VIEW A

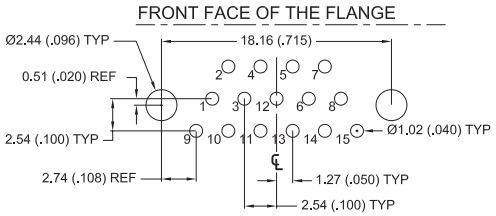


9 CONTACTS - VIEW B

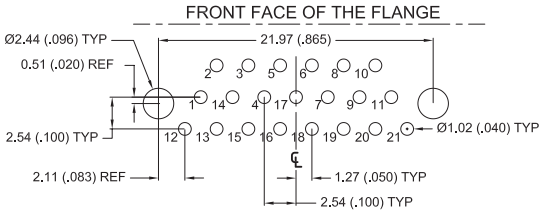
PCB
BOARD LAYOUT



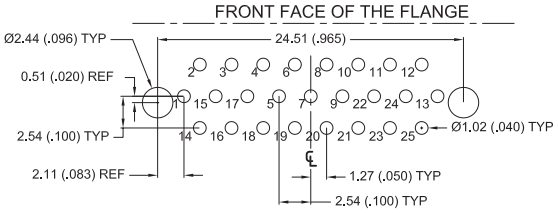
15 CONTACTS - VIEW B



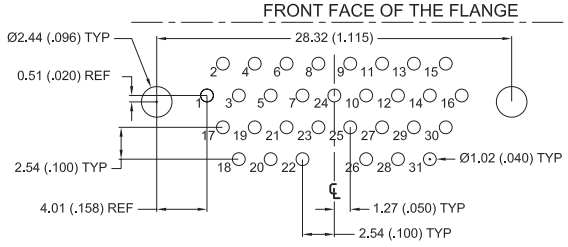
21 CONTACTS - VIEW B



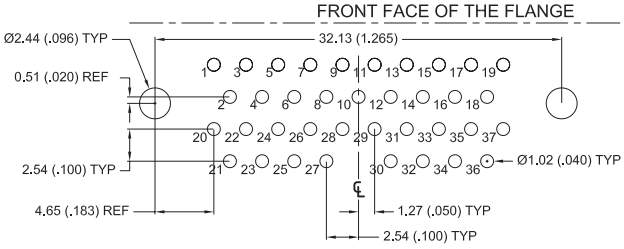
25 CONTACTS - VIEW B



31 CONTACTS - VIEW B

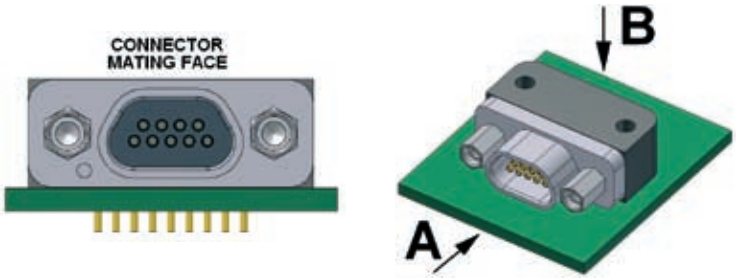


37 CONTACTS - VIEW B

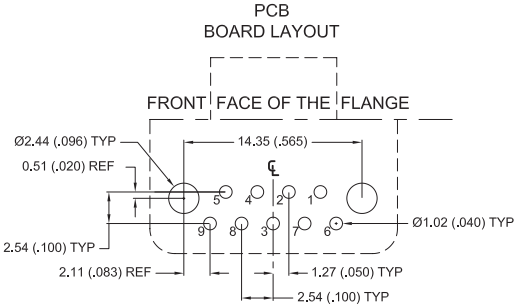


PCB LAYOUT FOR FILTERED CBR TYPE 0.100" PITCH - FEMALE CONNECTORS

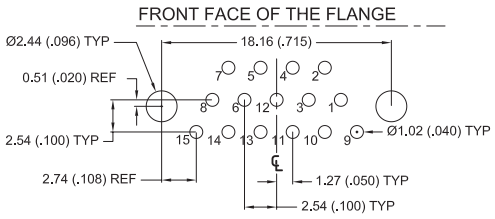
VIEW A



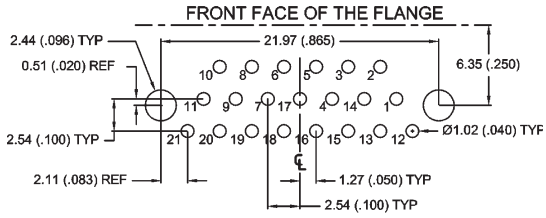
9 CONTACTS - VIEW B



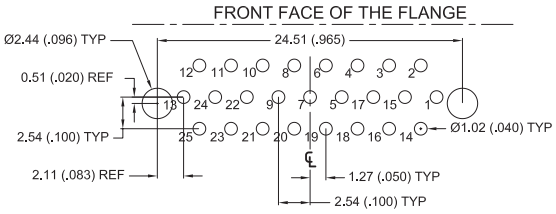
15 CONTACTS - VIEW B



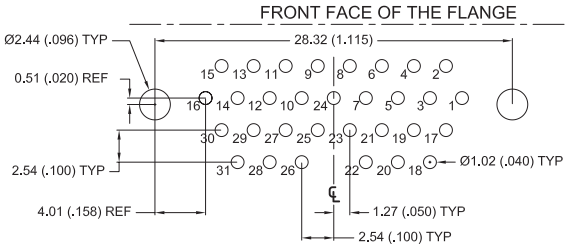
21 CONTACTS - VIEW B



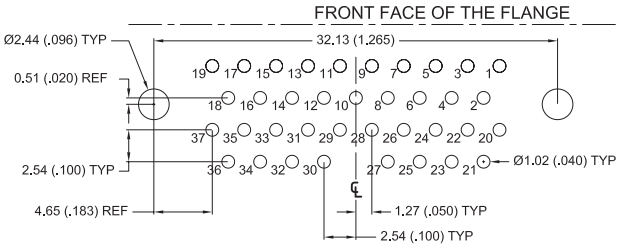
25 CONTACTS - VIEW B



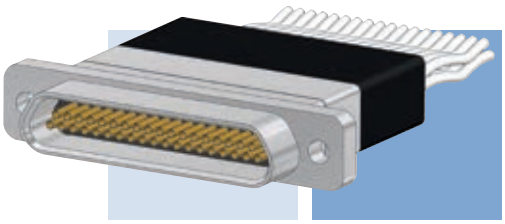
31 CONTACTS - VIEW B

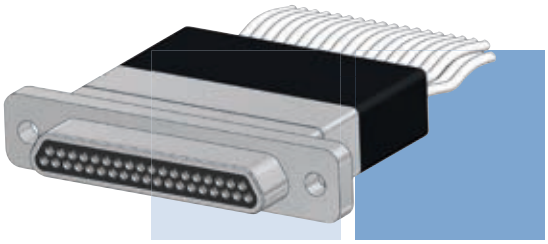


37 CONTACTS - VIEW B



Pigtail connectors

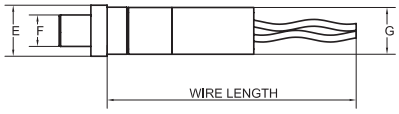


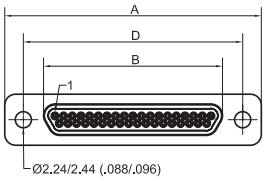


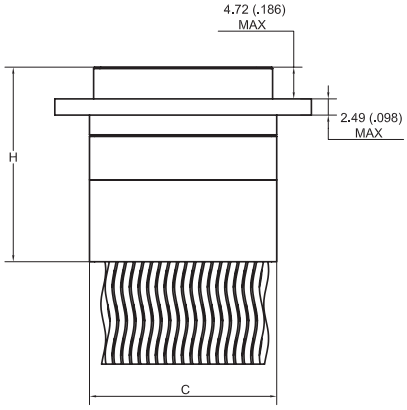
DIMENSIONS

Dimensions are in millimetres (inches).

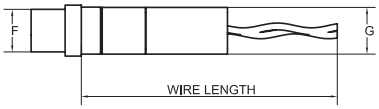
MALE Connector

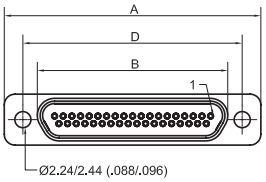


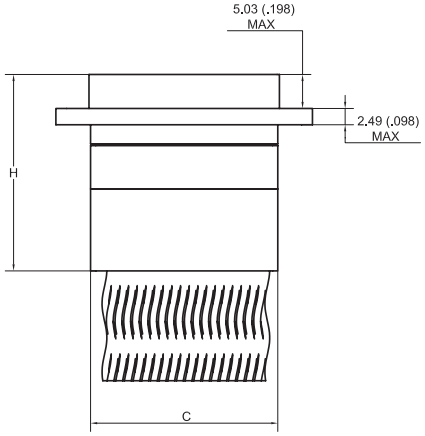




FEMALE Connector







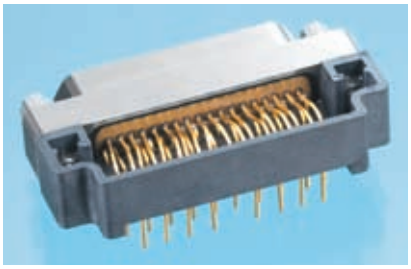
	A ± 0.25 (±.010)	B max		C -0.46/+0.25 (-.018/+.010)	D ± 0.13 (±.005)	E ± 0.25 (±.010)	F max		G max	H max	
		Male	female				Male	female		C filter	PI filter
9P / 9S	19.69 .775	8.48 .334	10.16 .400	9.91 .390	14.35 .565	7.57 .298	4.69 .185	6.35 .250	6.86 .270	21.00 .827	25.00 .985
15P / 15S	23.50 .925	12.29 .484	14.00 .551	13.72 .540	18.16 .715	7.57 .298	4.69 .185	6.35 .250	6.86 .270	21.00 .827	25.00 .985
21P / 21S	27.31 1.075	16.10 .634	17.81 .701	17.53 .690	21.97 .865	7.57 .298	4.69 .185	6.35 .250	6.86 .270	21.00 .827	25.00 .985
25P / 25S	29.85 1.175	18.64 .734	20.35 .801	20.07 .790	24.51 .965	7.57 .298	4.69 .185	6.35 .250	6.86 .270	21.00 .827	25.00 .985
31P / 31S	33.66 1.325	22.45 .884	24.16 .951	23.88 .940	28.32 1.115	7.57 .298	4.69 .185	6.35 .250	6.86 .270	21.00 .827	25.00 .985
37P / 37S	37.47 1.475	26.26 1.034	27.96 1.101	27.69 1.090	32.13 1.265	7.57 .298	4.69 .185	6.35 .250	6.86 .270	21.00 .827	25.00 .985
51DR P / 51DR S	46.36 1.825	35.15 1.384	36.83 1.450	36.58 1.440	41.02 1.615	7.57 .298	4.69 .185	6.35 .250	6.86 .270	21.00 .827	25.00 .985

Custom designs

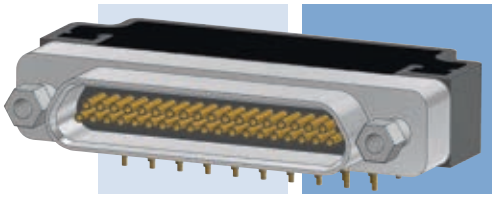
Please contact Axon' to request special designs of filtered Micro-D connectors.

A few examples of custom-made connectors are illustrated below.

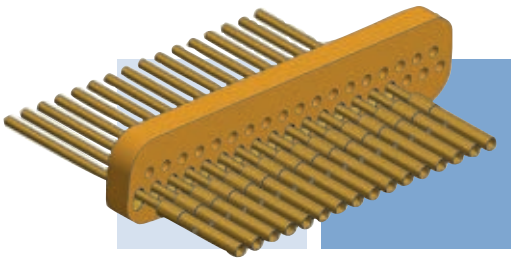
37 WAY PARTIALLY C-FILTERED CONNECTOR



▲ FILTERED CONNECTOR



▲ 37 WAY FILTERED CONNECTOR



▲ "PLANAR FILTER" WITH SELECTIVE FILTERING

37 WAY C-FILTERED PANEL MOUNT CONNECTOR WITH EMI PROTECTION

▲ CUSTOM FILTERED BS CONNECTORS

Custom designed **solutions**

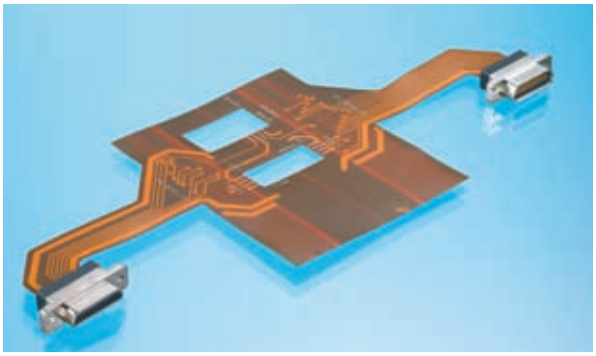
TERMINATION WITH FLEX CIRCUITS

AXON' offers Micro-D connectors with flexible printed circuit (FPC) termination as an alternative to standard wire pigtails.

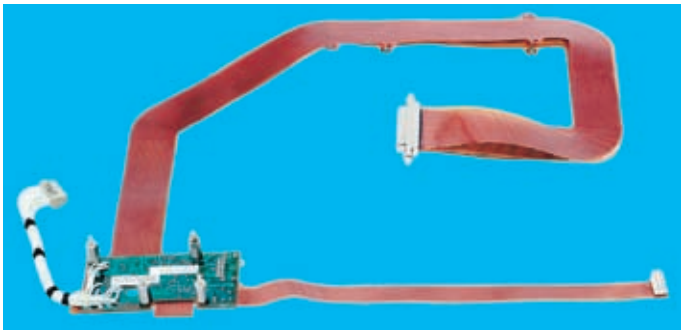
Likewise, AXON' can design and produce complex, multi-branched harnesses with flex circuits for applications where wire or cable solutions are not suitable in terms of space envelope, process or application usage.

Flex (or flexi-rigid) circuits are custom designed to meet the customer's specific requirements, and can be tailor made to a multitude of shapes and constructions.

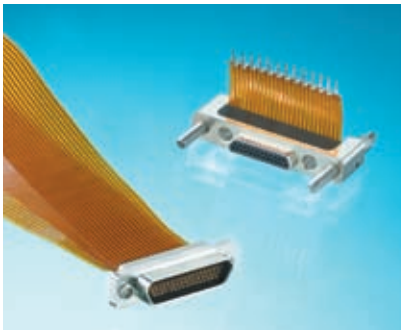
Please contact us for all your specific flex circuit assembly requirements.



▲ MULTIBRANCHED FLEXIBLE PRINTED CIRCUIT WITH MICRO-D TERMINATION



▲ ASSEMBLY WITH FLEXIBLE PRINTED CIRCUIT



▲ CONNECTOR TERMINATION WITH FLEXIBLE PRINTED CIRCUIT

Custom designed solutions

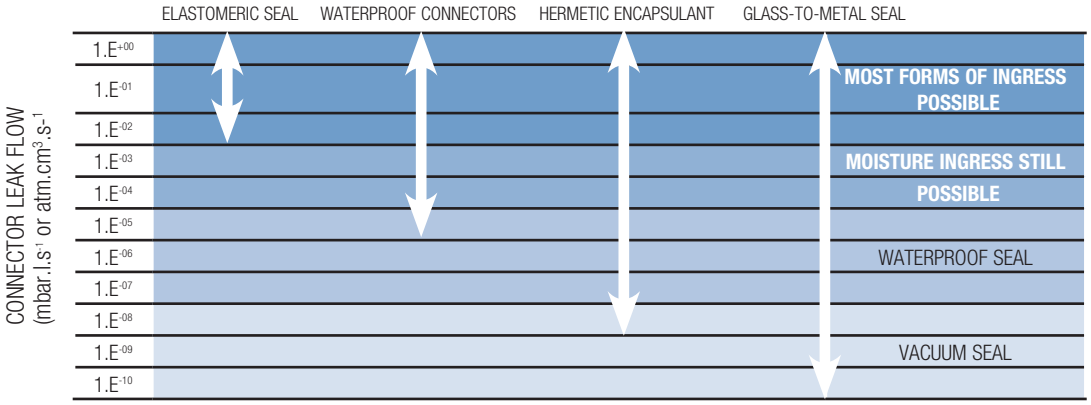
WATERPROOF & HERMETIC CONNECTORS

Waterproof and hermetic connectors are used in applications where an enclosure needs to be isolated from the outside world, generally to avoid moisture permeation. Different sealing technologies are available to achieve this and AXON' proposes the most effective solutions for each customer's specific needs. Helium leak rate is the most common method to quantify an exchange occurring between two environments. As helium is one of the smallest atoms available in the universe, helium leak testing is more rigorous than other leak tests.

AXON' offers four ranges of male and female products for these applications, achieving varying degrees of hermeticity (see graph below):

- Elastomeric seal with over-sized flange for basic protection;
- Waterproof seal to avoid fluid exchange into the system;
- Hermetic seal to protect the system against any infiltration under normal conditions of use, the best solution for most military applications;
- Glass-to-metal seal to overcome the harshest hermetic environments.

In the vast majority of applications, the use of a hermetic encapsulant offers sufficient levels of hermeticity at a reasonable price. Only extreme environments require glass-to-metal sealing. Based on its expertise AXON' can also design tailor-made connectors to fit your application needs. Furthermore, AXON' fully tests its hermetic Micro-D solutions to provide reliability and satisfaction to its customers.



Each solution presents specific characteristics when compared with non-hermetic standard Micro-D connectors:

- Connectors with an elastomeric seal have a larger flange than standard Micro-D connectors to accommodate the seal groove.
- In addition, waterproof and hermetic Micro-D connectors present a larger backpotting to ensure a high quality sealing.
- Glass-to-metal-sealed Micro-D connectors are made of specific materials such as Kovar® and/or titanium. The different alloys used in these connectors alter contact resistance and corrosion characteristics. Aluminium based glass-to-metal sealed connectors are also available for better corrosion characteristics or reduced weight.

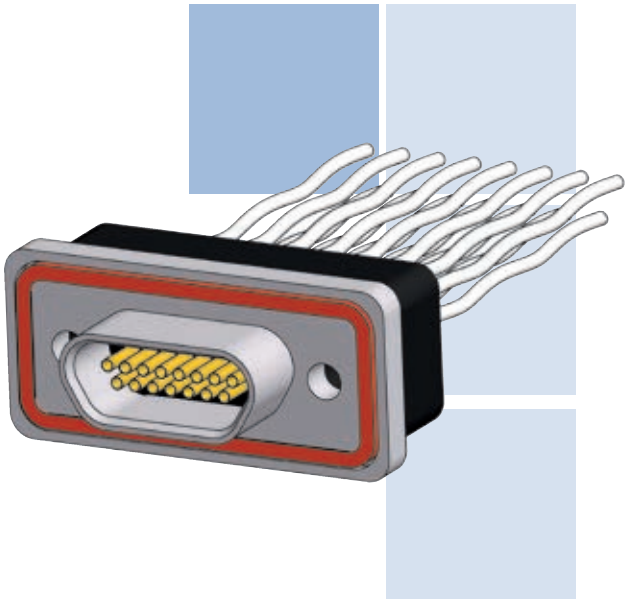
All AXON' hermetic Micro-D connectors can be used to maintain low or high pressure vacuum seals by the method of mounting the flange to the panel. Laser welding, soldering or o-rings are all possible solutions depending on the environment. They are fully intermateable with standard Micro-D connectors. A wide range of products is already available but custom interconnect solutions can be designed for specific panel cut-outs and thicknesses. Please contact us for any specific applications.

ELECTRICAL & MECHANICAL PERFORMANCES

	ELASTOMERIC SEAL	WATERPROOF ENCAPSULANT	HERMETIC ENCAPSULANT	GLASS-TO-METAL SEAL
MAXIMUM LEAK RATE	1.10^{-2} mbar.l.s^{-1}	1.10^{-5} mbar.l.s^{-1}	1.10^{-8} mbar.l.s^{-1}	$< 1.10^{-9}$ mbar.l.s^{-1}
SERVICE TEMPERATURE RANGE	-25 °C / +175 °C	-40 °C / +125 °C	-40 °C / +125 °C	-55 °C / +200 °C
CURRENT RATING	3 A MAX	3 A MAX	3 A MAX	1 A MAX

For other operating performances please refer to MIL-DTL-83513

HERMETIC CONNECTOR



METAL SHELL

- High performance hermetic metal connector and PTFE wire.
- Male Twist Pin or female connector.
- 9 to 100 contacts.
- According to MIL-DTL-83513.

IDENTIFICATION CODE

MDH	1A	51	S	4	L	050	B

SERIES
MDH : Micro-D Hermetic series.

HERMETIC TECHNOLOGY
1A : Hermetic potting.
2A : Glass-to-metal seal.

NUMBER OF CONTACTS
09,15,21,25,31,37,51, 51DR, 100.
See pages 16&17 for contact arrangements.

CONNECTOR GENDER
P : Male (pin contacts).
S : Female (socket contacts).

TERMINATION TYPE
Solid uninsulated wires
G : AWG 25 gold plated.
FS : Solder cup.

For colour codes F, L, W
1: E 2607 , AWG 26, 7 strands, 600V.
4: E 2619 , AWG 26, 19 strands, 600V
6: E 2807 , AWG 28, 7 strands, 600V.
8: E 3007 , AWG 30, 7 strands, 600V.
A: E 2407 , AWG 24, 7 strands, 600V.
C: E 2419 , AWG 24, 19 strands, 600V.
E: M22759/33, AWG 26,19 strands, 600V.

See page 19 for wire types.

COLOUR CODE
BLANK : If wire type is G or FS.
W : 10 colour repeat.
F : All yellow.
L : All white.
See page 20 for colour code.

WIRE LENGTH (cm)
Attention ! Wire length in centimetres - (1cm = 10mm = 0.394").
BLANK : If wire type is G or FS.

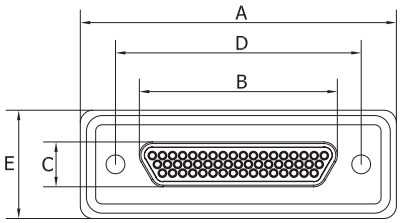
HARDWARE
B : No hardware.
XB : Laser welding design.
XP : Jackposts (custom design)*.
XX : Custom male hardware.

*Please consult us

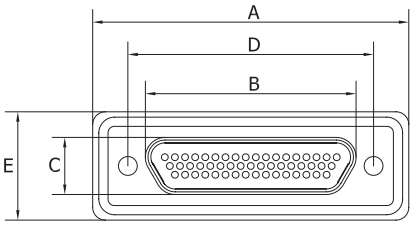
DIMENSIONS

Dimensions are in millimetres (inches).

MALE connector



FEMALE connector



	A ± 0.25 (±.010)	B max.		C max.		D ± 0.13 (±.005)	E ± 0.25 (±.010)
		Male	Female	Male	Female		
9 P / 9 S	23.20 .913	8.48 .334	10.16 .400	4.69 .185	6.35 .250	14.35 .565	12.50 .492
15 P / 15 S	27.00 1.063	12.29 .484	14.00 .551	4.69 .185	6.35 .250	18.16 .715	12.50 .492
21 P / 21 S	30.81 1.213	16.10 .634	17.81 .701	4.69 .185	6.35 .250	21.97 .865	12.50 .492
25 P / 25 S	33.40 1.315	18.64 .734	20.35 .801	4.69 .185	6.35 .250	24.51 .965	12.50 .492
31 P / 31 S	37.16 1.463	22.45 .884	24.16 .951	4.69 .185	6.35 .250	28.32 1.115	12.50 .492
37 P / 37 S	41.00 1.614	26.26 1.034	27.96 1.101	4.69 .185	6.35 .250	32.13 1.265	12.50 .492
51 P / 51 S	39.70 1.563	24.99 .984	26.70 1.051	5.79 .228	7.44 .293	30.86 1.215	13.60 .535

HIGH DENSITY CONNECTORS

NANO-D PITCH

As the need for increased miniaturisation is becoming ever greater, AXON' has developed an ultra-high density solution within the existing micro connector size. By putting nano contacts and nano pitch spacing into an existing micro shell, extremely compact connectors with very high pin counts can be produced in circular, rectangular, plastic and metal forms.

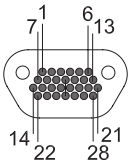
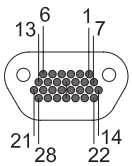
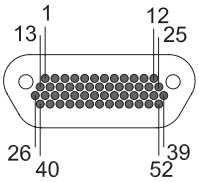
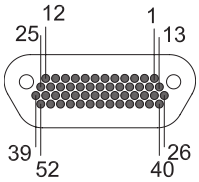
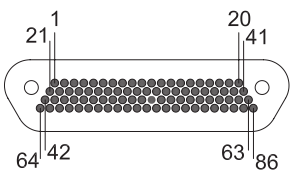
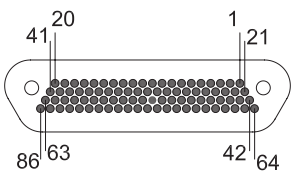
Optimal cabling density is achieved in a rectangular ultra high density connector made with Nano-D contacts and spacing inside a standard Micro-D shell size. Such a connector can accommodate a very large amount of pins while retaining excellent Micro-D reliability.

Most electrical and environmental performances are comparable to those of standard Nano-D connectors (250VAC, 200°C), combined with the robustness and shielding efficiency of the Micro-D metal shell.

This same process can be applied to most of the standard and special Micro-D range, making it possible to have ultra high density versions of PCB connectors, wide flange versions, circular, rectangular and combo style versions- with a mix of Micro-D and Nano-D contacts.

▲ RECTANGULAR HIGH DENSITY MICRO-D CONNECTORS

Contact arrangements

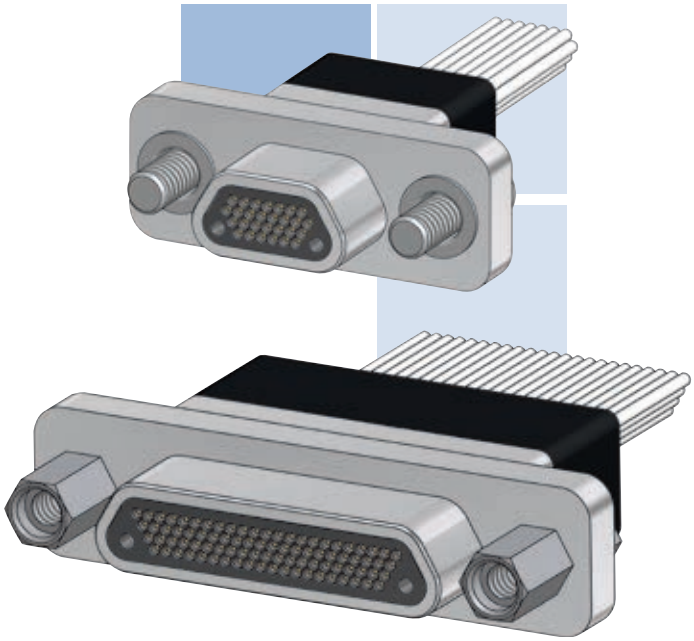
MATING FACE OF MALE CONNECTOR	MATING FACE OF FEMALE CONNECTOR
	
28 NANO WAYS IN A 9 WAY MICRO INSERT	
	
52 NANO WAYS IN A 15 WAY MICRO INSERT	
	
86 NANO WAYS IN A 25 WAY MICRO INSERT	

Electrical & mechanical characteristics

CHARACTERISTIC	SPECIFICATION	TEST METHOD
CURRENT RATING	1 A max.	EIA-364-70
SIGNAL CONTACT RESISTANCE	71 mΩ max.	EIA-364-06
INSULATION RESISTANCE	5000 MΩ min. @ 100 V DC	EIA-364-21
DIELECTRIC WITHSTANDING VOLTAGE - SEA LEVEL 0 m - ALTITUDE 21 km (70,000 ft)	 250 V AC 100 V AC	EIA-364-20
CONTACT ENGAGING AND SEPARATION FORCE	141 g max. (5 oz) 11 g min. (0.4 oz)	EIA-364-37
CONNECTOR MATING AND DE-MATING FORCE	198 g (7 oz) x number of contacts max.	EIA-364-13
CONTACT RETENTION	0.9 kg (2 lbs) for 5 seconds min.	EIA-364-29
DURABILITY	200 mating cycles min.	EIA-364-09
TEMPERATURE RANGES - STANDARD - HIGH TEMP	 -55°C / +150°C -55°C / +200°C	
VIBRATION	20 g's - No discontinuity >1µs	EIA-364-28 - TEST CONDITION IV
SHOCK	50 g's - No discontinuity >1µs	EIA-364-27 - TEST CONDITION E
SALT SPRAY	48 hours	EIA-364-26 - TEST CONDITION B
HUMIDITY	Insulation resistance > 1MΩ	EIA-364-31 - METHOD IV

Material & Finish

COMPONENT	MATERIAL	FINISH
MALE CONTACT (TWIST PIN)	PRECIOUS METAL ALLOY IN ACCORDANCE WITH ASTM-B-477 OR 541 OR 562	NONE
	BERYLLIUM COPPER IN ACCORDANCE WITH ASTM-B-194	GOLD PLATING IN ACCORDANCE WITH ASTM-B488, TYPE II, CLASS 1 (1.27µM (0.050") MIN.), CODE C OVER NICKEL UNDERPLATE IN ACCORDANCE WITH SAE-AMS-QQ-N-290 CLASS 2 (1.27µM (0.050") TO 3.81µM (0.150"))
FEMALE CONTACT	BERYLLIUM COPPER IN ACCORDANCE WITH ASTM-B-194	
METAL SHELL	ALUMINIUM ALLOY, TYPE 6061 IN ACCORDANCE WITH SAE-AMS-QQ-A-250/11	ELECTROLESS NICKEL PLATING IN ACCORDANCE WITH SAE-AMS2404, CLASS 3 OR 4, GRADE B
	STAINLESS STEEL, 300 SERIES	PASSIVATION IN ACCORDANCE WITH SAE-AMS2700
PLASTIC / INSERT / PCB TRAY	LIQUID CRYSTAL POLYMER, 30% LOADED GLASS FIBRE POLYESTER, 94VO, IN ACCORDANCE WITH MIL-M-24519 (200°C)	
	PEEK	
HARDWARE	STAINLESS STEEL, 300 SERIES	PASSIVATION IN ACCORDANCE WITH SAE-AMS2700
ENCAPSULANT	EPOXY RESIN	
INSULATED WIRE	PTFE INSULATED SILVER PLATED COPPER IN ACCORDANCE WITH NEMA-HP3	
UNINSULATED WIRE	GOLD PLATED SOLID COPPER WIRE IN ACCORDANCE WITH A-A-59551	



PIGTAIL CONNECTOR

METAL SHELL

- High performance metal connector and PTFE wires
- Operating temperature: 150°C or 200°C
- 28 to 86 contacts

IDENTIFICATION CODE

MDHDA	2	52	P	1	L	050	L

SERIES

MDHDA : Micro-D High Density AXON.

CONNECTOR TYPE

1 : Cadmium aluminum shell + potting 150°C.
2 : Nickel aluminum shell + potting 150°C.
3 : Nickel aluminum shell + potting 200°C.

NUMBER OF CONTACTS

28, 52, 86.

See page 230 for contact arrangements.

CONNECTOR GENDER

P : Male (pin contacts).
S : Female (socket contacts).

WIRE TYPE

1 : UT3007, AWG 30, 7 strands, 160V.
2 : ET3207, AWG 32, 7 strands, 250V.
3 : ET3407, AWG 34, 7 strands, 250V.
4 : ET3607, AWG 36, 7 strands, 250V.

COLOUR CODE

L : All white.
F : All yellow.
W : 10 colour repeat.

See page 20 for colour code.

WIRE LENGTH (cm)

Attention ! Wire length in centimetres - (1cm = 10mm = 0.394").

L	L ≤ 10	10 < L ≤ 100	L >100
in cm (inches)	L ≤ 3.940	3.940 < L ≤ 39.40	L > 39.40
TOLERANCE	-0 / +0.5	-0 / +3	-0 / +5
in cm (inches)	-0 / +0.200	-0 / +1.180	-0 / +1.970

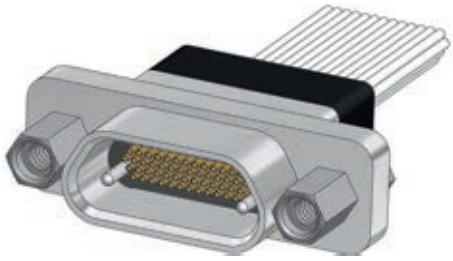
HARDWARE

B : No hardware.
C : U-clips with low profile hex skt head jackscrews (removable).
D : U-clips with low profile slot head jackscrews (removable).
M : Low profile socket hex head jackscrews (removable).
N : High profile socket hex head jackscrews (removable).
S : Low profile slot head jackscrews (removable).
T : High profile slot head jackscrews (removable).
P : Jackposts (removable).
K : High profile slot head jackscrews (non removable).
L : Low profile socket hex head jackscrews (non removable).
F : Float mount (non removable).

DIMENSIONS

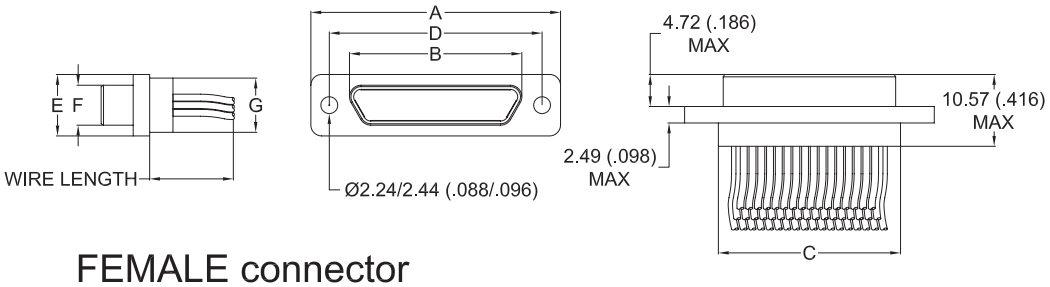
Dimensions are in millimetres (inches).

▲ PIGTAIL 28 WAY PLUG

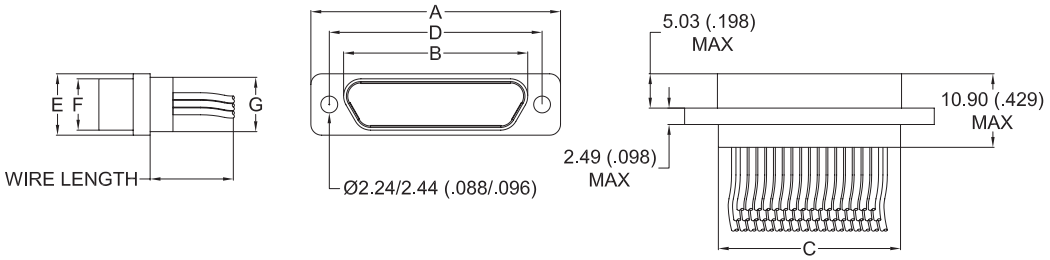


▲ PIGTAIL 86 WAY RECEPTACLE

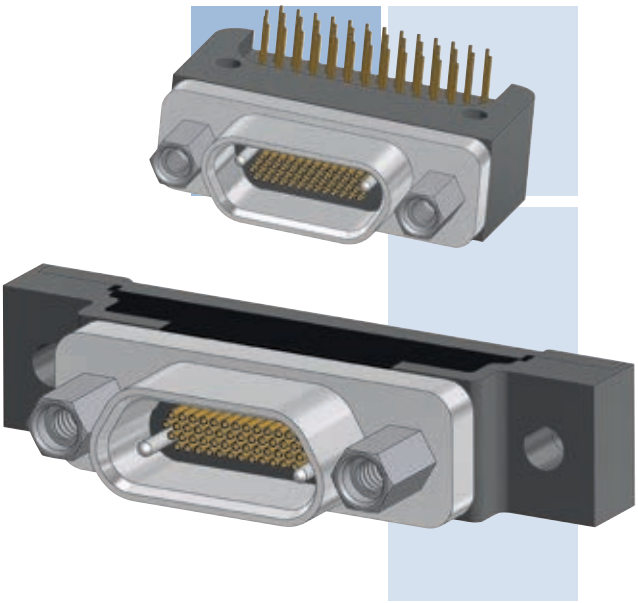
MALE connector



FEMALE connector



	A ± 0.25 (±.010)	B max.		C - 0.46/+0.25 (-.018/+0.10)	D ± 0.13 (±.005)	E ± 0.25 (±.010)	F max.		G max.
		Male	Female				Male	Female	
28 P / 28 S	19.69 .775	8.48 .334	10.16 .400	9.91 .390	14.35 .565	7.57 .298	4.69 .185	6.35 .250	6.86 .270
52 P / 52 S	23.50 .925	12.29 .484	14.00 .551	13.72 .540	18.16 .715	7.57 .298	4.69 .185	6.35 .250	6.86 .270
86 P / 86 S	29.85 1.175	18.64 .734	20.35 .801	20.07 .790	24.51 .965	7.57 .298	4.69 .185	6.35 .250	6.86 .270



PCB CONNECTOR

0.025" PITCH

METAL SHELL

-Board Straight connector and Board Right angle connector for flexible and rigid printed circuit board
- Operating temperature: 150°C or 200°C
- Several tail lengths available

IDENTIFICATION CODE

MDHDA	2	52	S	BS	W	G	1

SERIES
MDHDA : Micro-D High Density AXON.

CONNECTOR TYPE
1 : Cadmium aluminum shell + potting 150°C.
2 : Nickel aluminum shell + potting 150°C.
3 : Nickel aluminum shell + potting 200°C.

NUMBER OF CONTACTS
28, 52, 86 (number of nano-D contact).
See page 230 for contact arrangements.

CONNECTOR GENDER
P : Male (pin contacts).
S : Female (socket contacts).

PCB VERSION
BS : Board Straight connector 0.025" pitch.
CBR : Condensed Board Right Angle connector 0.025" pitch.

HARDWARE
B: No hardware.
P : Jackposts (non removable).
T : Threaded inserts installed.
W : Jackpost and threaded inserts installed.

CONDUCTOR TYPE
G: Gold plated solid conductor AWG30.

TAIL LENGTH
1 : 2.80mm (0.110").
2 : 3.80mm (0.150").
3 : 4.80mm (0.190").

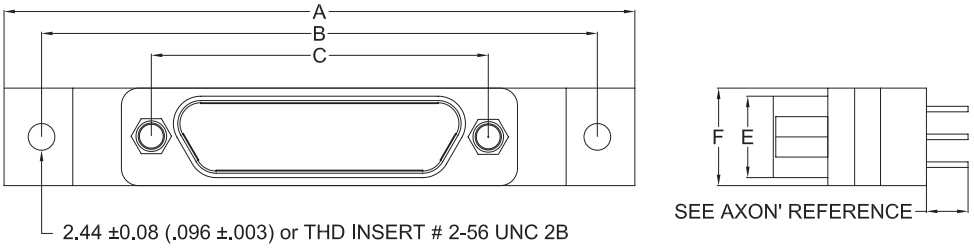
BOARD STRAIGHT TYPE (BS) 0.025” PITCH

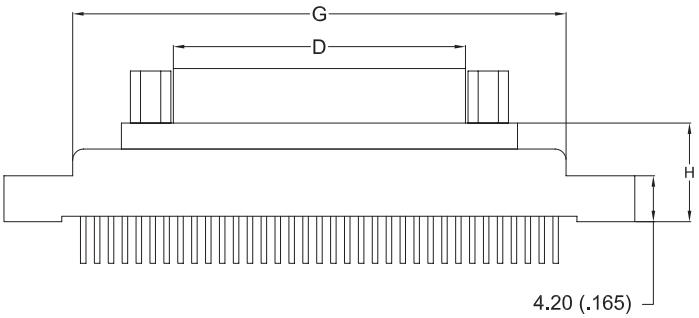
▲ BS 0.025” 28 WAY RECEPTACLE

▲ BS 0.025” 86 WAY RECEPTACLE

DIMENSIONS

Dimensions are in millimetres (inches).



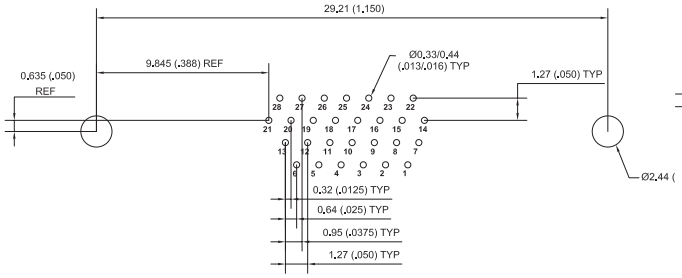


	A max.	B ± 0.18 (±.007)	C ± 0.13 (±.005)	D max.		E max.		F max.	G max.	H max.
				Male	Female	Male	Female			
28 P / 28 S	35.31 1.390	29.21 1.150	14.35 .565	8.48 .334	10.16 .400	4.69 .185	6.35 .250	7.82 .308	19.94 .785	9.02 .355
52 P / 52 S	35.31 1.390	29.21 1.150	18.16 .715	12.29 .484	14.00 .551	4.69 .185	6.35 .250	7.82 .308	24.00 .945	9.02 .355
86 P / 86 S	44.20 1.740	38.10 1.500	24.51 .965	18.64 .734	20.35 .801	4.69 .185	6.35 .250	7.82 .308	32.39 1.275	9.02 .355

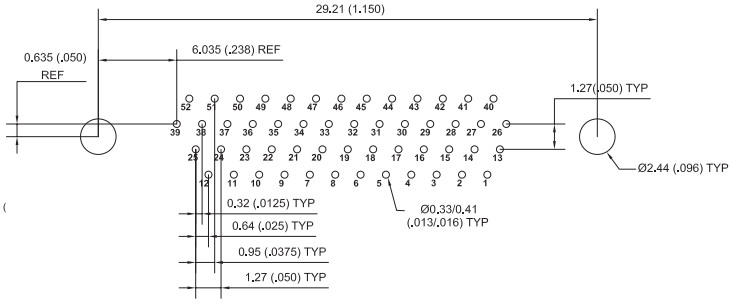
PCB LAYOUT FOR HIGH DENSITY BS TYPE 0.025" CONNECTORS

MALE CONNECTORS

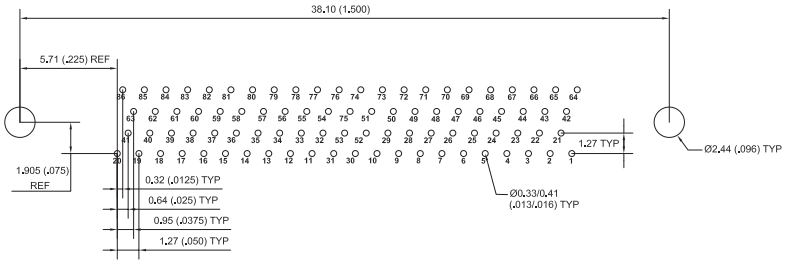
28 CONTACTS - VIEW B



52 CONTACTS - VIEW B

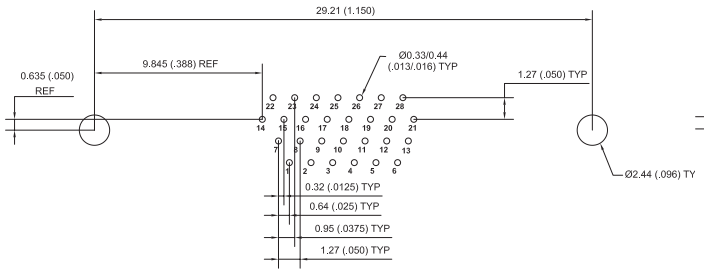


86 CONTACTS - VIEW B

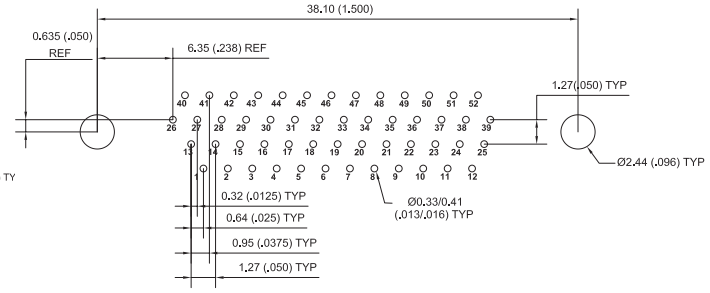


FEMALE CONNECTORS

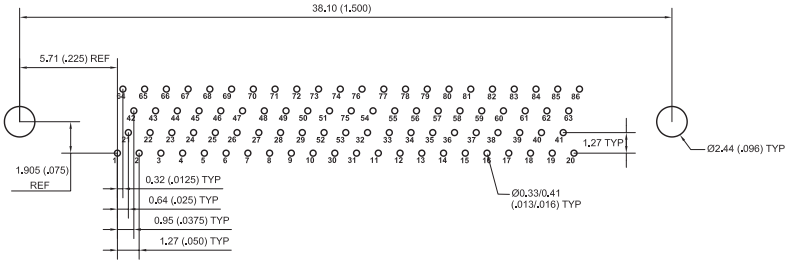
28 CONTACTS - VIEW B



52 CONTACTS - VIEW B



86 CONTACTS - VIEW B



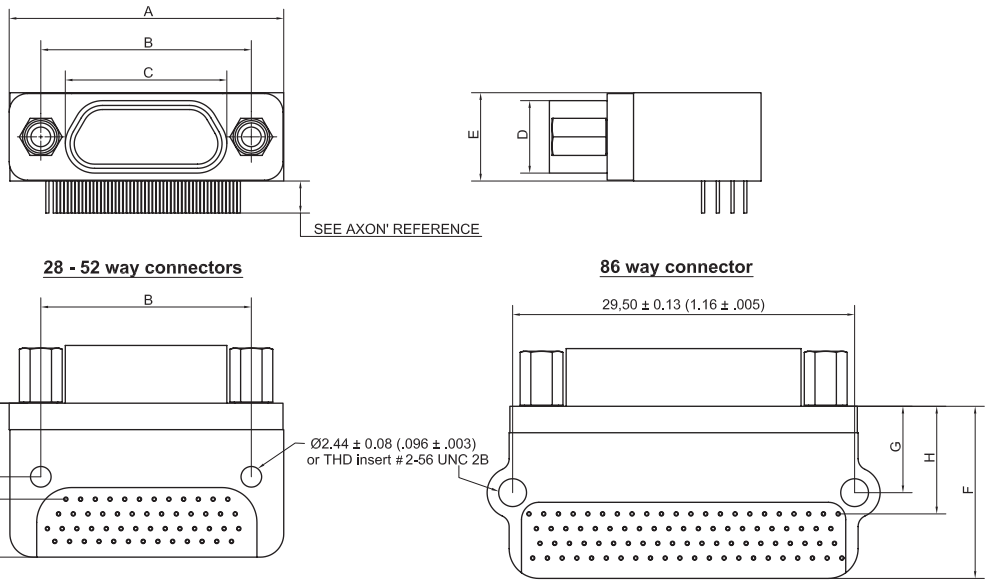
CONDENSED BOARD RIGHT (CBR) 0.025” PITCH

▲ CBR 0.025” 52 WAY RECEPTACLE

▲ CBR 0.025” 86 WAY RECEPTACLE

DIMENSIONS

Dimensions are in millimetres (inches).

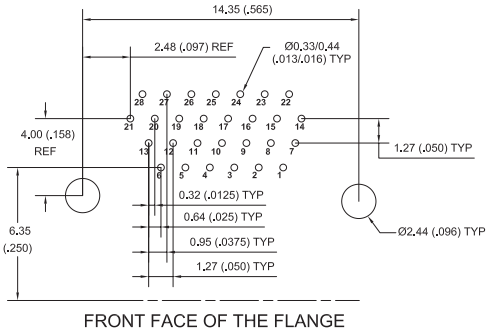


	A max.	B ± 0.13 (±.005)	C max.		D max.		E max.	F max.	G ± 0.25 (±.010)	H ± 0.25 (±.010)
			Male	Female	Male	Female				
28 P / 28 S	19.94 .785	14.35 .565	8.48 .334	10.16 .400	4.69 .185	6.35 .250	7.82 .308	13.50 .532	6.35 .250	7.81 .308
52 P / 52 S	23.75 .935	18.16 .715	12.29 .484	14.00 .551	4.69 .185	6.35 .250	7.82 .308	13.50 .532	6.35 .250	8.28 .326
86 P / 86 S	30.10 1.185	24.51 .965	18.64 .734	20.35 .801	4.69 .185	6.35 .250	7.82 .308	15.00 .590	7.45 .293	9.28 .365

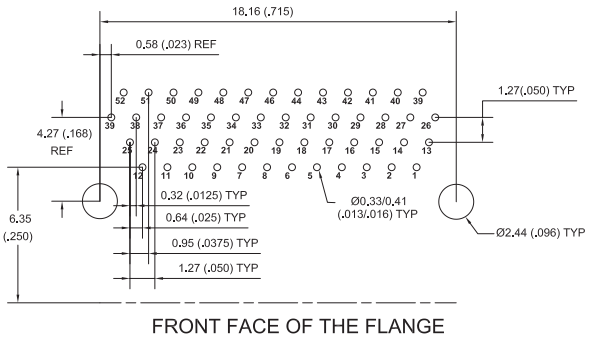
PCB LAYOUT FOR HIGH DENSITY CBR TYPE 0.025" CONNECTORS

MALE CONNECTORS

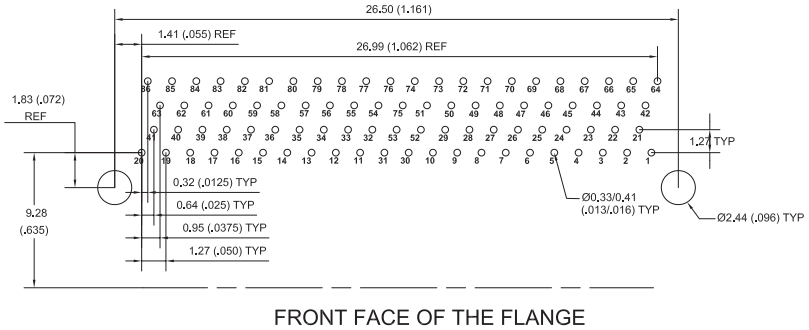
28 CONTACTS - VIEW B



52 CONTACTS - VIEW B

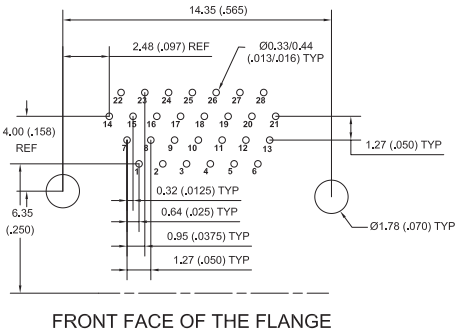


86 CONTACTS - VIEW B

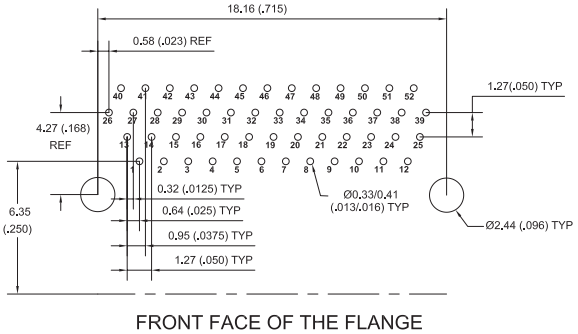


FEMALE CONNECTORS

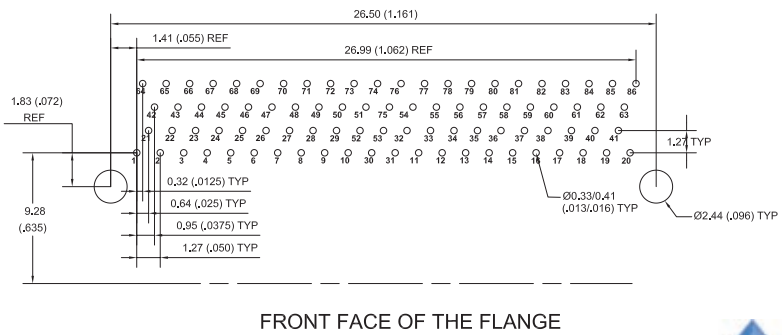
28 CONTACTS - VIEW B



52 CONTACTS - VIEW B



86 CONTACTS - VIEW B

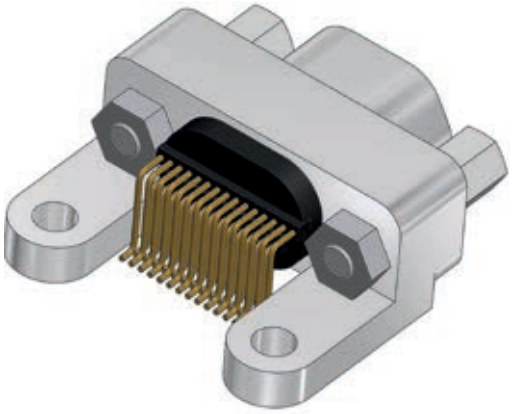


Special products

AXON' can develop on request special high density micro-D connectors based on all the standard shell sizes from 9 to 100 positions, or based on special shells such as the 120-position version or other custom configurations.

SMT CONNECTORS

High density connectors can also be available in SMT versions from 28 to 86 ways.
(please contact us for more details)



Custom designed solutions

NON MAGNETIC MICRO-D INTERCONNECT SOLUTIONS

Powerful magnetic fields have gained interest in high-tech industries over the past decades. Various applications (MRI, Magnetic field detection systems, etc.) now use these complex phenomena but magnetic measurements still present some issues. The difficulty comes mainly from the numerous possible sources of ferromagnetic materials surrounding the probes.
At the same time, systems using such magnetic fields are spreading and components tend to be closer to each other, increasing magnetic disturbances. Committed to its customers, AXON' has developed a new version of Micro-D products: fully non-magnetic connectors are now available. These connectors have limited or no influence on magnetic field lines, improving the reliability of magnetic measurements.

AXON's non-magnetic Micro-D connectors have been designed using new materials and surface treatments to avoid the use of ferromagnetic materials. The magnetisation of these connectors has been reduced by a factor of 10^4 compared to standard connectors.

DESCRIPTION OF MAGNETIC PHENOMENA OCCURRING IN MICRO-D CONNECTORS

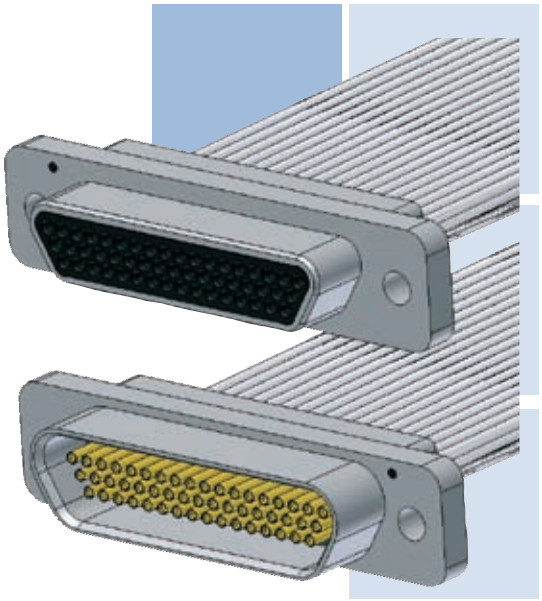
In response to growing market need, AXON' has developed proprietary equipment to characterise and quantify the magnetic influence of connectors on their environment. This equipment reproduces magnetic conditions and measures the connector's interference in both magnetised and demagnetised states. All connectors are tested and most magnetic environments can be reproduced. Drawing on experience in magnetic fields, AXON' can provide specific non-magnetic properties for custom-designed connectors. Custom interconnect solutions can be designed for specific values of magnetic permeability.

PERFORMANCES OF NON-MAGNETIC CONNECTORS

AXON' has extended the D-line® product family to cope with most applications sensitive to magnetic fields. For very high magnetic fields AXON' can offer special, almost totally non-magnetic interconnect solutions, presenting extremely low levels of magnetic permeability.
For very high magnetic fields, AXON' propose special connecting solutions totally non magnetic. It presents extremely low magnetic permeability.

GENERAL PERFORMANCES	
	Non magnetic Micro-D connectors
Residual Magnetic Level	NMB * : 200 gamma residual magnetism level NMC on demand* : 20 gamma residual magnetism level
Operating temperature range	-55°C/+200°C
Current rating	3 A max

For other operating performances please refer to MIL-DTL-83513
* NMB and NMC levels are defined by NASA GSFC/S-311-P-4 for non magnetic subminiature connectors and adapted to the dimensions of microminiature connectors.



NON MAGNETIC CONNECTOR

PLASTIC OR METAL SHELL

- For strong magnetic field environments.
- Minimal magnetic disturbance.
- High performance metal connector and PTFE wire.
- Environmentally sealed.
- Operating temperature : 200°C.
- 9 to 100 contacts.

IDENTIFICATION CODE

MDN	1A	51	S	4	L	050	B

SERIES
MDN : Micro-D Non magnetic series.

CONNECTOR TYPE
1A : < 200 nT - Nickel aluminium shell + potting 200°C.
2A : < 20 nT - Nickel aluminium shell + potting 200°C.

NUMBER OF CONTACTS
09,15,21,25,31,37,51, 51DR, 100.
See pages 16&17 for contact arrangements.

CONNECTOR GENDER
P : Male (pin contacts).
S : Female (socket contacts).

TERMINATION TYPE
For colour codes F, L, W
1: E 2607 , AWG 26, 7 strands, 600V.
4: E 2619 , AWG 26, 19 strands, 600V
6: E 2807 , AWG 28, 7 strands, 600V.
8: E 3007 , AWG 30, 7 strands, 600V.
A: E 2407 , AWG 24, 7 strands, 600V.
C: E 2419 , AWG 24, 19 strands, 600V.
E: M22759/33, AWG 26,19 strands, 600V.

For colour code V only
3 : M22759/11, AWG26. 19 strands, 600V.
F : E2607, AWG26, 7 strands, 600V.
Solid uninsulated wires
G : AWG 25 gold plated.
FS : Solder cup.

COLOUR CODE
F : All yellow.
L : All white.
BLANK : If wire type is G or FS.
W : 10 colour repeat.
V : MIL-STD-681 striped (only for wire types 3 and F).
See page 20 for colour code.

WIRE LENGTH (cm)
Attention ! Wire length in centimetres - (1cm = 10mm = 0.394").
BLANK : If wire type is G or FS.

L in cm (inches)	L ≤ 10 L ≤ 3.940	10 < L ≤ 100 3.940 < L ≤ 39.40	L > 100 L > 39.40
TOLERANCE in cm (inches)	-0 / +0.5 -0 / +0.200	-0 / +3 -0 / +1.180	-0 / +5 -0 / +1.970

HARDWARE
Titanium or CuBe parts .
B : No hardware.
M : Non magnetic low profile hex skt head jackscrews (removable).
N : Non magnetic high profile hex skt head jackscrews (removable).
S : Non magnetic low profile slot head jackscrews (removable).
T : Non magnetic high profile slot head jackscrews (removable).
X : Special non magnetic hardware

For plastic shells, please contact us (non magnetic contacts and hardware).
Other designs available: low-profile, PCB connectors,etc. Please contact us.

Custom designed **solutions**

FROM ASSEMBLIES TO MINI SYSTEMS

EXPERTISE IN ASSEMBLIES FOR ADVANCED TECHNOLOGIES

With a wealth of experience in cable, interconnect systems and mechanical components, and employing state-of-the-art CAD models and simulation software, the engineering teams at AXON' can design and develop complete mini-systems starting from the customer's overall requirements specification.

Research and Development engineers support the Design Team with their expertise in various disciplines including metallurgy, plastics technology, RF and microwave, EMI and electro-mechanical engineering.

When the customer requirements are complex or unique, multi-skilled project teams including Research & Development, Design, Purchasing, Sales, Production and Quality are created to comprehensively control the different phases of the project from initial prototype phase to mass production.

Assemblies and mini-systems can be produced in custom manufacturing cells dedicated either to product families or to specific customer projects. These manufacturing cells can be replicated in a number of sites around the world for optimum effect in terms of proximity to the customer, production capacity or cost of manpower.

▲ COLLABORATIVE ENGINEERING

Custom designed solutions

OUR HARNESSING CAPABILITIES

From around 1985 onwards, Axon' has been assembling micro-D connectors in all their forms: PCB, pigtails, savers, strips, solder cup and complex multi-branched harnesses, designed for the most challenging of environments.
As a result, Axon' has gained a wealth of experience in the termination of single wires and composite cables into a wide range of circular, rectangular and micro-D connectors.

- From 22 AWG to 40 AWG wires, twisted pairs, shielded wires and cables with standard conductors (7 or 19 strands) or ultra flexible conductors (37 to 140 strands).

- From 12 AWG to 20 AWG wires using power contacts

- With different standard coaxial (RG) and microwave coaxial cables.

- Use of
- Mechanical, thermal and laser strippers, along with manual and semi-automatic crimpers
- 2D or 3D cabling boards to guarantee the repeatability of harness dimensions and characteristics
- Comprehensive potting and overmoulding facilities:
  - Large range of moulds
  - Computer controlled ovens to guarantee curing.
  - High pressure injection presses for moulded strain reliefs.
- Overbraiding machines to provide mechanical or EMI protection of the harnesses
- Various different marking capabilities:
  - Wet ink marking on connectors
  - Laser marking on connectors
  - Label marking (for connectors, wires and cables)
  - Heatshrink tubing identification on cables and wires.
- A range of soldering capabilities including specific machines
  - Hot bar soldering machine
  - Phase vapour machine
  - Joule effect soldering
- Automated test equipment (ATE) for efficient electrical testing with specific test jigs developed by our process engineers.
  - Continuity, net resistance (4 wires), insulation resistance, dielectric strength, capacitance, linear resistance.
  - Filter attenuation according to frequency (up to 1 GHz)
  - Network analyzer to verify insertion loss, return loss, phase matching.
  - Different transfer impedance test benches (EMI characteristics)
- Class 100,000 (Federal standard 6.5 or ISO14644-8) clean rooms and laminar flow to manufacture in a controlled environment with validated operators.

- Manufacturing sites in different countries for effective local support:
USA, Mexico, France, UK, Latvia, Hungary, China, India

▲ LASER STRIPPING MACHINE

▲ THE INTERCONNECT DEPARTMENT

▲ 2D CABLING BOARD

Custom designed **solutions**

TECHNICAL SOLUTIONS FOR ASSEMBLIES

When designing ruggedised systems for harsh or demanding environments, commonly with severe or extreme operating conditions, the available space is often very limited. This in turn makes for challenging routing for the system interconnect, making very small bend radii a pre-requesite for the wires or cables. Where this is the case, highly flexible wires and cables can greatly ease mechanical installation and resulting interconnect life.
To meet these requirements AXON' can build complete interconnect systems using a proprietary range of highly flexible multi-conductor wires and cables called Flexible Wires (FW).

AXON's in-house conductor design and manufacture makes it possible to produce, as standard, FW conductors with up to 120 strands of either 25 µm (1 thou) or 50 µm (2 thou) diameter, in comparison to typical 7 or 19 strand conductors. Silver plated copper or high strength copper alloy conductors ensure that the AXON' FW cables are able to consistently meet high performance standards in applications where flexibility and flexlife are critical.

FW cables are available in various configurations including singles, twisted pairs and shielded composite versions, all of them made with high quality conductors and insulating materials in compliance with RoHS requirements.

The AXON' FW cables can also be integrated inside larger bundles of different wires and cables including signal, power, RF and optical fibres.

▲ MICRO-D MULTIBRANCH HARNESSES

▲ PLASTIC STRIP CONNECTOR MULTIBRANCH HARNESS

▲ FLEXIBLE WIRES INTEGRATED INTO A COMPLEX ASSEMBLY

OVERMOULDING EXPERTISE

DESIGN

AXON's long experience in mould design enables us to offer custom designed moulding and overmoulding, individually tailored to each assembly.

The AXON' Engineering teams use powerful 3D modelling software to rapidly create custom mould designs to fit perfectly within the customer's available space constraints. AXON' can equally work with and process customer's own CAD files in order to optimise the assembly and mould designs through concurrent engineering.

WHY OVERMOULD ?

Overmoulding provides robust and tailor-made mechanical protection for the cable/connector interface which is generally the weakest part of any harness or assembly.

In addition to mechanical protection and strain relief, an overmould can serve many other purposes : shaping, direction change, airtightness, absorption of repeated flexes, provision of fixing points, chemical resistance, protection of shielding termination and improvement of the overall look of the harness.

▲ SILICONE OVERMOULDING

▲ MOULD DESIGN

▲ CUSTOM MOULDED CURVED SHAPE OVER 2 MICRO-D CONNECTORS

OVERMOULDING TECHNIQUES

AXON' can offer several overmoulding techniques to suit customer requirements.

LOW PRESSURE

Low pressure moulding is the technique which consists of injecting a connector cavity with a specific material (e.g. PUR, Epoxy, Silicone) enabling simple potting and the formation of complex shapes. The process involves hot or cold curing to transform a mono or bi-compound material from a viscous to a solid state.
This technique does not entail high pressure in mould cavities and is suitable for small volumes.

HOT MELT

Certain resins become highly viscous when heated and coagulate very quickly as soon as the injected material comes into contact with any components inside the mould, such as wires, cables, metal or plastic parts or connectors.
Manufacturing cycles are therefore very short which make this method suitable for medium and large volumes.
Hot Melt resins can be used alone as a protective part but are often used as pre-protection in conjunction with external high pressure overmoulding.

HIGH PRESSURE

This is the most common overmoulding technique :
Melted material is used to fill a shaped mould which is then cooled, thereby quickly covering and protecting with "required elements". Material temperature, injection speed and pressure in the mould are all high. This method is therefore not appropriate for fragile parts.
This type of moulding method requires specialist machines. AXON' has a large number of vertical injection press machines which allow for easy placement of the different component parts into the mould cavities.
As manufacturing cycles are short, the high pressure technique is suitable for medium and large volumes.

AXON' has expertise in all these overmoulding techniques and can offer a large range of technical solutions to meet customer requirements.

▲ HIGH PRESSURE OVERMOULDING

▲ HOTMELT OVERMOULDING

▲ HIGH PRESSURE OVERMOULDING STRAIN RELIEF ON CIRCULAR 5 WAY MICRO-D CONNECTOR

Custom designed **solutions**

SILFORM®
CABLES & ASSEMBLIES

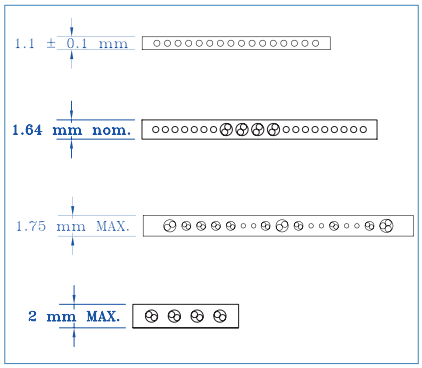
Silicone covered flat cables (SILFORM®) in either straight or shaped form are the result of a combination of a range of AXON' technologies : highly flexible conductors, fine wires and AXON's expertise in the processing of silicone and elastomeric compounds.

SILFORM® cables represent an ideal solution for technically demanding applications requiring high cabling densities along with severe mechanical and environmental restrictions, all within a flat construction.

SILFORM® cables and assemblies can be custom designed to incorporate a wide range of elements including RF cables, mouldings and EMI shielding.

EXTREMELY FLEXIBLE WIRES

- Very high stranded conductors in silver plated copper and copper alloys.
- High flexibility for easy installation (FW product range) and long flexlife (LFW product range).
- Fine braided shields with silver plated copper alloy strands as small as 52 AWG.
- Ultra-thin, high performance fluoropolymer extrusions.
- 26 AWG to 36 AWG.



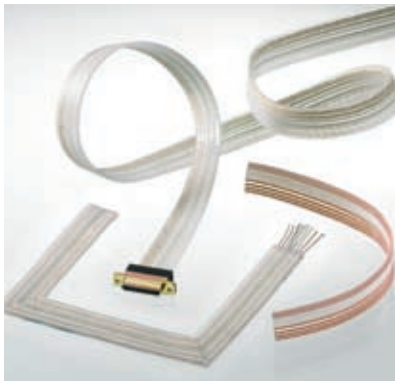
▲ EXAMPLES OF CONSTRUCTION

CONSTRUCTION

- Low shore (20 to 60 shA) silicone in straight or shaped forms.
- Controlled impedance (100 ohms for example).
- Application-specific constructions.
- Integrated wires, shielded bundles, databus, RF, fibre optics, high speed.
- Silicon thickness 0.7 mm.

MINIATURISED ASSEMBLIES

- High quality crimped terminations of wires as small as 36 AWG.
- Automated stripping (rotary blades, laser or mechanical).
- Micro-D and Nano-D connector termination, also other styles of circular and rectangular connectors are possible.
- Low and high pressure moulding/overmoulding at rear of connector.
- EMI termination (backshells, conductive potting, direct shield termination).
- Straight lengths up to 1.5 m max



▲ STRAIGHT OR SHAPED FLAT SILICONE CABLES

▲ OVERMOULDED SILFORM® MICRO-D ASSEMBLY

Custom designed **solutions**

MINI SYSTEMS : COMPLETE SOLUTIONS

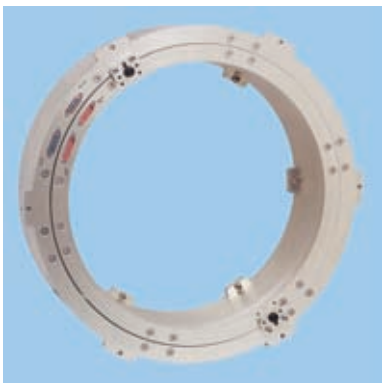
TWIST CAPSULE

AXON' is able to offer custom designed twist capsules (AXOTWIST™) which can rotate freely to defined limits, using our SILFORM® composite cables. Silicone covered flat cables in a "fold-back" configuration are placed between two metal rings which can rotate with respect to one another.
With a huge variety of cable compositions, the AXOTWIST™ system maintains exceptionally low torque and high flexlife within a restricted space.
AXON' has long experience in manufacturing clockspring rotary connectors with flat flexible cables for automotive airbag systems. The company draws on this experience to offer dedicated solutions for the defence and aerospace industries.

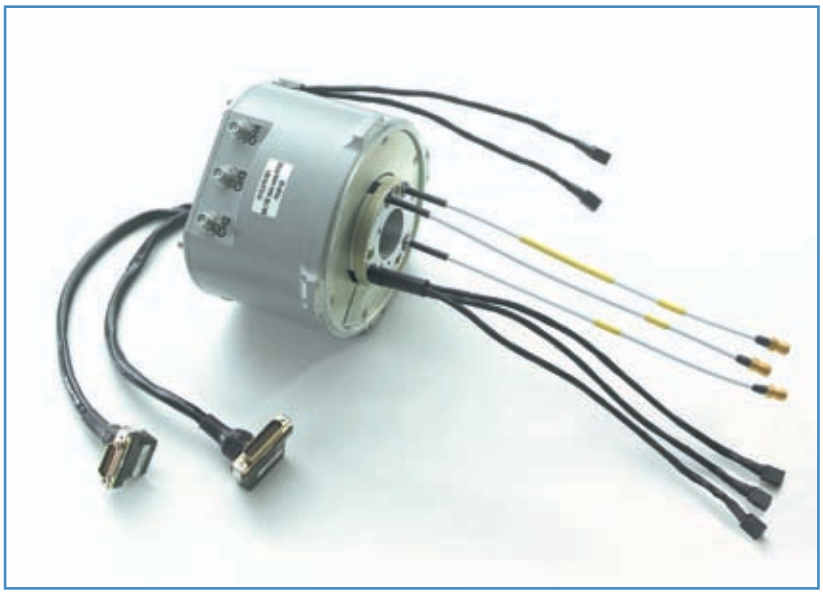
CONNECTORS WITH EXTRA FUNCTIONALITY

Within the micro-D, or indeed any other connector, AXON' can integrate electronic components in order to perform specific functions.
Examples include :
- line-by-line signal filtering to exclude all "noise" outside a given frequency range,
- the inclusion of RFID tags to provide valuable identification data to the manufacturer, the customer or end user,
- or other specific components as required.

Any such components are fully encapsulated in either potting or overmoulding in order to withstand severe operational conditions such as high levels of vibration or shock.



▲ AXOTWIST ™



▲ TWIST CAPSULE