

# 3401-029 Microminiature MDM Connectors

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## Features/Benefits

- **High performance Micropin™ contact system**  
(“twist pin” spring male contact and tubular socket contact)
- **Non removable crimp type contacts**
- **The Connectors are supplied with the Terminations or Cables installed in factory**
- **MDM Connector layout: 9, 15, 21, 25, 31, 37, 51 cavities**
- **MDM contact centers: 1,27 (.050)**
- **Distance between:**
  - 2 adjacent contacts: 1,27 (.050)
  - 2 contact rows: 1,09 (.043)
- **Non-magnetic**
- **Non-outgassing**
- **Moisture and humidity seal between contacts and between contacts and shell, provided by compression interfacial seal**



## Typical Applications

- **Low Size Connectors**
- **Low Weight**
- **Satellites harnesses and payloads**

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High performance Microminiature connectors, ESA qualified, for space applications.

Suitable for Board-to Board, Board-to Cable or Cable-to Cable applications.

Space/High reliability MDM connectors meet stringent tests for outgassing and residual magnetism and are suitable for use in space, medical, and high performance military/aerospace applications.

MDM connectors meet the performance of the ESCC 3401 and MIL-PRF-83513 Specifications and the dimensional requirements of the ESCC 3401/031 Detail Specification.

# 3401-029 Microminiature MDM Connectors

## How to order – ESA quality level

Description (example): 340102901B 25PFR112F

3401029	01	B	25	P	FR112	F
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**ESCC Detail Specification number**

**Variant:** Shell finish

01: Electroless Nickel (Finish A174)  
02: Gold over electroless Nickel (Finish FR172)

**Testing Level**

Level B (Standard: B3 = LAT3)

**Shell Size:** Number of contacts

9  
15  
21  
25  
31  
37  
51

**Contact Type**

P: Pin (Male contact)

S: Socket (Female contact)

**Mounting**

No code: No hardware

E: Captive Nut option

(Not available with FR136, FR136A, FR139 terminations)

F: Float Mount option

(Not available with FR136, FR136A, FR139 terminations)

**Termination Type**

FR112: Harness type, AWG26, length 508,00 (20.000), cable 3901/013/02B

FR112A: Harness type, AWG26, length 508,00 (20.000), cable 3901/002/56B

FR113: Harness type, AWG26, length 914,00 (36.000), cable 3901/013/02B

FR113A: Harness type, AWG26, length 914,00 (36.000), cable 3901/002/56B

FR123: Harness type, AWG26, length 4000,00 (157.480), cable 3901/013/02B

FR123A: Harness type, AWG26, length 4000,00 (157.480), cable 3901/002/56B

FR114: Harness type, AWG28, length 508,00 (20.000), cable 3901/013/01B

FR114A: Harness type, AWG28, length 508,00 (20.000), cable 3901/002/61B

FR115: Harness type, AWG28, length 914,00 (36.000), cable 3901/013/01B

FR115A: Harness type, AWG28, length 914,00 (36.000), cable 3901/002/61B

FR116: Straight Pigtail Terminations, length 25,40 (1.000)

FR136: 90° bent PCB Terminations, length 4,50 (.177)

FR136A: 90° bent PCB Terminations, Narrow profile, length 3,50 (.138) – Size 9 only

FR139: Straight PCB Terminations, length 4,50 (.177) – Size 51 not available

## FR164: SOLDER CUP TYPE CONTACT – QUALITY LEVEL: ACCORDING TO ESA.

Connectors supplied with dust caps (not available separately)

Other configurations available on request, consult factory.

CDRI with description MDM-115366-xxxx

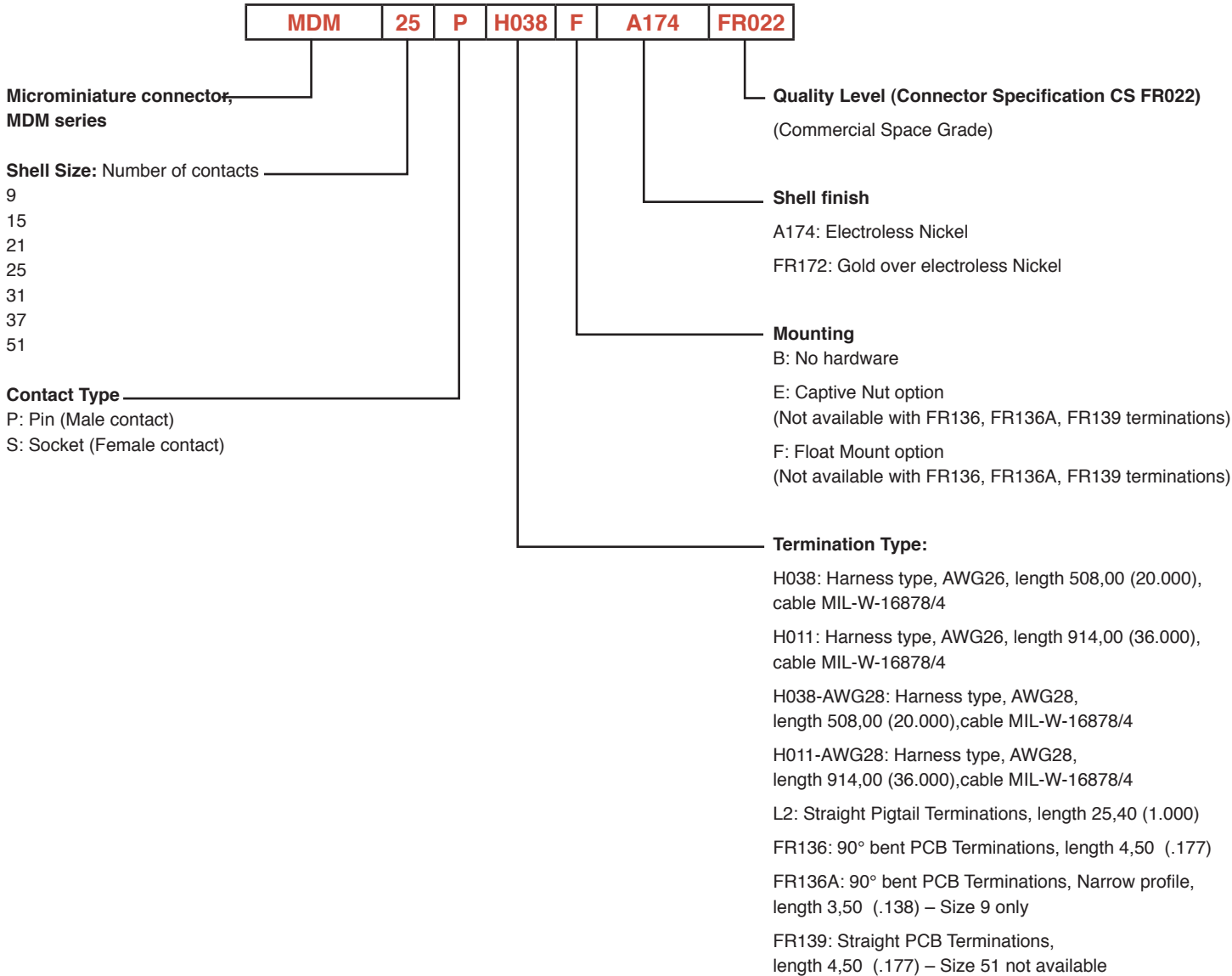


Dimensions are shown in mm (inch)  
Dimensions subject to change

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## How to order – FR022 quality level

Description (example): MDM-25PH038F-A174-FR022



Note:  
Connectors supplied with dust caps (not available separately)  
Other configurations available on request, consult factory.  
CDRI with description MDM-115288-xxxx

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## Materials and Finishes

Shells	Aluminium alloy Finish A174: 25,4 $\mu\text{m}$ min. (1000 $\mu\text{in}$ min.) electroless Nickel over Copper underlay Finish FR172: 2,54 $\mu\text{m}$ min. (100 $\mu\text{in}$ min.) Gold over 25,4 $\mu\text{m}$ min. (1000 $\mu\text{in}$ min.) electroless Nickel
Insulators	LCP (Liquid Crystal Polymer) thermoplastic material, UL 94-V0, glass-filled, black color
Female contacts	Copper alloy / Finish: 1,27 $\mu\text{m}$ (50 $\mu\text{in}$ ) min. Gold over Copper underlay
Male contacts	Copper alloy / Finish: 1,27 $\mu\text{m}$ (50 $\mu\text{in}$ ) min. Gold over Copper underlay
MDM PCB Housings	Diallylphthalate thermoset material, UL 94-V0, glass-filled, dark green color
Interfacial Seals	Fluorosilicone elastomere, pink color
Screwlocks	Stainless Steel type 303, passivated
Accessories	Stainless Steel type 303, passivated
Dust Caps	Polyethylene thermoplastic material, transparent pink color
Encapsulant	Epoxy
Uninsulated rigid Wire	Copper / Finish: 1,27 $\mu\text{m}$ (50 $\mu\text{in}$ ) min. Gold over 2,54 (100 $\mu\text{in}$ ) min. Silver underlay
ESCC 3901/013 Cables	Copper alloy / Finish 2,00 $\mu\text{m}$ (79 $\mu\text{in}$ ) min. Silver / Extruded PTFE Insulation
ESCC 3901/002 Cables	Copper alloy / Finish 2,00 $\mu\text{m}$ (79 $\mu\text{in}$ ) min. Silver / Wrapped Polyimide tape Insulation
MIL-W-16878/4 Cables	Copper alloy / Finish Silver coating / Extruded PTFE Insulation

## Quality Levels

### ESA Quality Level.

The Dole plant (France) is qualified by ESA for the supply of Microminiature connectors Type MDM, according to the ESCC Generic Specification N° 3401, and to the applicable ESCC Detail Specifications n° 3401/029 (MDM Connectors), 3401/041 (Connector Savers) and 3401/032 (Accessories).

First qualification obtained in 1986 (renewed every 2 years).  
Qualification certificate: 140 (MDM).

Applications: Flight equipments, satellites, launchers (ESA requirements).

### FR022 Quality Level.

“Commercial Space Grade”.

C&K Connector Specification CS FR022, amendment to the ESCC Generic Specification n° 3401, for low cost products manufactured:

- in the same ESA qualified site
- through the same manufacturing and control processes
- with the same piece parts (except for the cables: MIL-W-16878/4 instead of ESCC 3901)
- with lighter controls, documentation and traceability

Applications: Engineering models, ground equipments, testing, some flight equipments (no need for high requirements).

The connectors and accessories, supplied according to these 2 quality levels, are totally compatible, interchangeable, and intermateable, as they are manufactured with the same piece parts (except for the cables), in the same ESA qualified site.

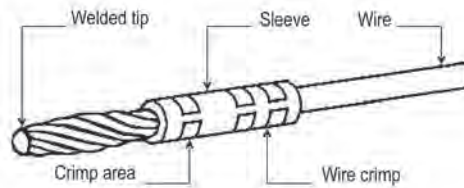
# 3401-029 Microminiature MDM Connectors

## Performance Specifications

Operating Temperature range	-55°C / +125°C (-67°F / +257°F)					
Storage Temperature range	-55°C / +125°C (-67°F / +257°F)					
Working Voltage (between contacts and contact and shell)	Sea level 150 Vrms	33000 m (108240 feet) altitude 100 Vrms				
Rated Current	Solid uninsulated Wire 2,5 A max.	AWG 26 Wire 2,5 A max.	AWG 28 Wire 1,5 A max.			
Insulation Resistance (500 V DC)	5000 MΩ min.					
Voltage Proof	600 Vrms / 2.0 mA max. leakage current					
Contact Retention in insert	22,25 N max. / No contact axial displacement allowed					
Engagement / Separation Forces (Male Contacts)	Gauge Fixture	Inner diameter min. / max.	Separation Force (N min.)	Engagement Force (N max.)		
	Max.	0,559 (.0220) / 0,564 (.0222)		1,667		
	Min.	0,582 (.0229) / 0,587 (.0231)	0,137			
Mating / Unmating Forces	Shell Size	Mating Force (N max.)	Unmating Force (N min.)	Unmating Force (N max.)		
	9	20	1.3	20		
	15	33	2.0	33		
	21	47	2.9	47		
	25	55	3.5	55		
	31	69	4.3	69		
	37	82	5.1	82		
	51	113	7.1	113		
100	222	---	222			
Mechanical Endurance	500 cycles mating/unmating					
Contact Resistance	Low level current (10 mA / 20 mV DC): 6.0 mΩ max. Rated current: 5.0 mΩ max.					
Maximum Rated Current	Nb of Contacts per Connector	Solid uninsulated Wire	AWG 26 Wire	AWG 28 Wire		
	2 to 4	2,0 A max.	2,0 A max.	1,4 A max.		
	5 to 14	1,8 A max.	1,8 A max.	1,2 A max.		
15 and over	1,4 A max.	1,4 A max.	0,9 A max.			
Maximum Weight	Shell Size	FR112 to FR116 & FR123 (1)	FR136 (2)	FR136A (2)	FR139 (2)	Savers (2)
	9	2.2 g	7.4 g	7.4 g	4.6 g	4.0 g
	15	3.0 g	7.8 g	N.A.	5.0 g	5.5 g
	21	3.8 g	8.5 g	N.A.	5.4 g	7.0 g
	25	4.3 g	10.2 g	N.A.	6.5 g	8.0 g
	31	5.1 g	12.2 g	N.A.	7.7 g	9.5 g
	37	5.9 g	14.4 g	N.A.	9.2 g	10.0 g
51	7.2 g	16.5 g	N.A.	N.A.	13.5 g	
	Note (1): Connector with contacts and rear potting, without cables and accessories Add: 0.4 g for float mount (code F) Add: 1.0 g for captive nut (code E)					
	Note (2): Connectors with contacts and rear potting					
	Solid Uninsulated Wire		1.60 g / m			
	Insulated Cable AWG26 (ESCC 390101302B)		2.30 g / m			
	Insulated Cable AWG28 (ESCC 390101301B)		1.80 g / m			
	Insulated Cable AWG26 (ESCC 390100256B)		1.93 g / m			
	Insulated Cable AWG28 (ESCC 390100261B)		1.23 g / m			
	Hardwares: see pages 31 to 38					
Residual Magnetism Level	20000 Gamma max. (NM)					

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## Contact Design



The high-performance and reliable contact characteristics are obtained by the Micropin™ contact system. The flexible “twist-pin” spring contact consists of 7 strands of 0,127 (.005) diameter beryllium copper wire helically wound around a core of 3 strands 0,09 (.0035) diameter soft copper wire. This wire bundle is crimped into a sleeve at one end. The other end is terminated with a hemispherically shaped weld. The wire bundle is compressed to create a bulge with a diameter slightly larger than the socket inside diameter. The pin elongates and twists when it enters the socket. Electrical contact is maintained along 7 spiral lines. The socket is a precision-made tube with a chamfered lead-in.



Normal mating conditions

Severe misalignment

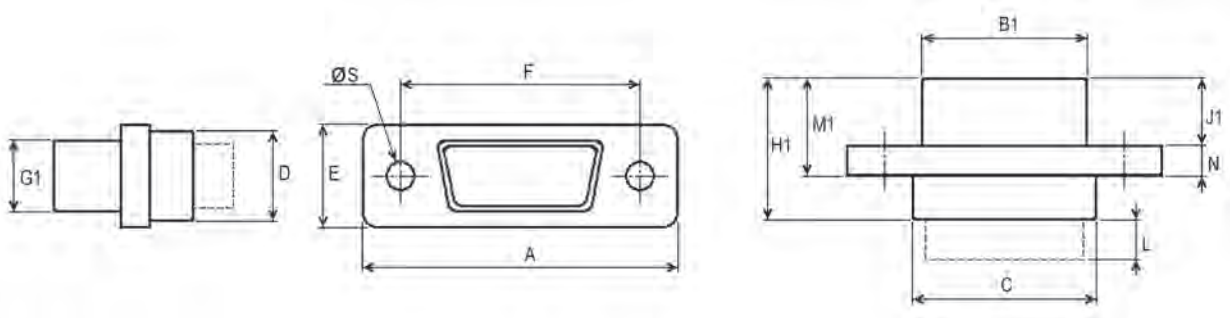
Twist-pin contacts will mate even under severe misalignment.

The flexible twist-pin is recessed into the insulator and the rigid socket is exposed, reversing the traditional positions of pin and socket. During mating, the socket is guided into the pin insulator by the lead-in chamfer. The pin is kept from flexing beyond the socket capture radius by the walls of the cavity. The hemispherical weld of controlled radius at the tip of the pin combines with the lead-in chamfers of the socket contact and the pin insulator to cam the pin into alignment. By controlling the welding process and the dimensions of the socket contact and the insulators, it is impossible for the recessed pin to escape the socket capture radius.

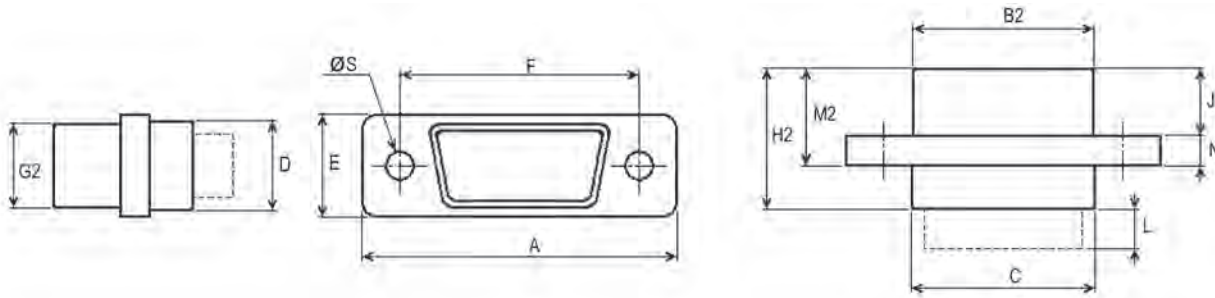
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## Dimensions

### Shell Size (Plua)



### Shell Size (Receptacle)



Shell Size		9	15	21	25	31	37	51
<b>A</b>	max.	19,94 (.785)	23,75 (.935)	27,56 (1.085)	30,10 (1.185)	33,91 (1.335)	37,72 (1.485)	36,45 (1.435)
<b>B1</b>	max.	8,46 (.333)	12,27 (.483)	16,08 (.633)	18,62 (.733)	22,43 (.883)	26,24 (1.033)	24,97 (.983)
<b>B2</b>	max.	10,16 (.400)	13,97 (.550)	17,78 (.700)	20,32 (.800)	24,13 (.950)	27,94 (1.100)	26,67 (1.050)
<b>C</b>	max.	10,16 (.400)	13,97 (.550)	17,78 (.700)	20,32 (.800)	24,13 (.950)	27,94 (1.100)	26,67 (1.050)
<b>D</b>	max.	6,86 (.270)	6,86 (.270)	6,86 (.270)	6,86 (.270)	6,86 (.270)	6,86 (.270)	7,87 (.310)
<b>E</b>	max.	7,82 (.308)	7,82 (.308)	7,82 (.308)	7,82 (.308)	7,82 (.308)	7,82 (.308)	8,92 (.351)
<b>F</b>	± 0,13 (.005)	14,35 (.565)	18,16 (.715)	21,97 (.865)	24,51 (.965)	28,32 (1.115)	32,13 (1.265)	30,86 (1.215)
<b>G1</b>	max.	4,65 (.184)	4,65 (.184)	4,65 (.184)	4,65 (.184)	4,65 (.184)	4,65 (.184)	5,74 (.227)
<b>G2</b>	max.	6,38 (.252)	6,38 (.252)	6,38 (.252)	6,38 (.252)	6,38 (.252)	6,38 (.252)	7,47 (.295)
<b>H1</b>	max.	10,57 (.416)	10,57 (.416)	10,57 (.416)	10,57 (.416)	10,57 (.416)	10,57 (.416)	10,57 (.416)
<b>H2</b>	max.	10,90 (.429)	10,90 (.429)	10,90 (.429)	10,90 (.429)	10,90 (.429)	10,90 (.429)	10,90 (.429)
<b>J1</b>	max.	4,72 (.186)	4,72 (.186)	4,72 (.186)	4,72 (.186)	4,72 (.186)	4,72 (.186)	4,72 (.186)
<b>J2</b>	max.	5,05 (.199)	5,05 (.199)	5,05 (.199)	5,05 (.199)	5,05 (.199)	5,05 (.199)	5,05 (.199)
<b>L</b>	max.	Termination Length: see page 8						
<b>M1</b>	max.	7,26 (.286)	7,26 (.286)	7,26 (.286)	7,26 (.286)	7,26 (.286)	7,26 (.286)	7,26 (.286)
<b>M2</b>	max.	7,59 (.299)	7,59 (.299)	7,59 (.299)	7,59 (.299)	7,59 (.299)	7,59 (.299)	7,59 (.299)
<b>N</b>	± 0,13 (.005)	2,29 (.090)	2,29 (.090)	2,29 (.090)	2,29 (.090)	2,29 (.090)	2,29 (.090)	2,29 (.090)
<b>Øs</b>	± 0,08 (.003)	2,31 (.091)	2,31 (.091)	2,31 (.091)	2,31 (.091)	2,31 (.091)	2,31 (.091)	2,31 (.091)

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## Terminations

Code	Quality Level	Dimensions and composition of the Terminations or Cables							
		AWG	Length	Strands	Sheath	Conductor dia.	Conductor sect.	Sheath dia.	Cable Ref.
FR112 FR112A H038	ESA ESA FR022	26	508,00 min. (20.000 min.)	7 19 7	PTFE Polyimide PTFE	0,50 mm max. 0,53 mm max. 0,48 mm max.	0,14 mm <sup>2</sup> nom. 0,15 mm <sup>2</sup> nom. 0,14 mm <sup>2</sup> nom.	0,89 mm max. 0,78 mm max. 1,10 mm max.	ESCC 390101302 ESCC 390100256 MIL-W-16878/4
FR113 FR113A H011	ESA ESA FR022	26	914,00 min. (36.000 min.)	7 19 7	PTFE Polyimide PTFE	0,50 mm max. 0,53 mm max. 0,48 mm max.	0,14 mm <sup>2</sup> nom. 0,15 mm <sup>2</sup> nom. 0,14 mm <sup>2</sup> nom.	0,89 mm max. 0,78 mm max. 1,10 mm max.	ESCC 390101302 ESCC 390100256 MIL-W-16878/4
FR123 FR123A CDRI (*)	ESA ESA FR022	26	4000,00 min. (157.480 min.)	7 19 7	PTFE Polyimide PTFE	0,50 mm max. 0,53 mm max. 0,48 mm max.	0,14 mm <sup>2</sup> nom. 0,15 mm <sup>2</sup> nom. 0,14 mm <sup>2</sup> nom.	0,89 mm max. 0,78 mm max. 1,10 mm max.	ESCC 390101302 ESCC 390100256 MIL-W-16878/4
FR114 FR114A H038-AWG28	ESA ESA FR022	28	508,00 min. (20.000 min.)	7 19 7	PTFE Polyimide PTFE	0,42 mm max. 0,43 mm max. 0,39 mm max.	0,09 mm <sup>2</sup> nom. 0,10 mm <sup>2</sup> nom. 0,09 mm <sup>2</sup> nom.	0,82 mm max. 0,68 mm max. 1,00 mm max.	ESCC 390101301 ESCC 390100261 MIL-W-16878/4
FR115 FR115A H011-AWG28	ESA ESA FR022	28	914,00 min. (36.000 min.)	7 19 7	PTFE Polyimide PTFE	0,42 mm max. 0,43 mm max. 0,39 mm max.	0,09 mm <sup>2</sup> nom. 0,10 mm <sup>2</sup> nom. 0,09 mm <sup>2</sup> nom.	0,82 mm max. 0,68 mm max. 1,00 mm max.	ESCC 390101301 ESCC 390100261 MIL-W-16878/4
FR116 L2	ESA FR022	25	25,40 min. (1.000 min.)	Solid uninsulated wire (Gold finish)		0,455mm max.	0,162 mm <sup>2</sup> nom.	Straight Pigtail Terminations	
FR136 FR136	ESA FR022	25	4,50 ± 0,35 (.177 ± .014)	Solid uninsulated wire (Gold finish)		0,455mm max.	0,162 mm <sup>2</sup> nom.	90° bent PCB Terminations (Sizes 9 to 51)	
FR136A FR136A	ESA FR022	25	3,50 ± 0,20 (.138 ± .008)	Solid uninsulated wire (Gold finish)		0,455mm max.	0,162 mm <sup>2</sup> nom.	90° bent PCB Terminations (Size 9 / Narrow profile)	
FR139 FR139	ESA FR022	25	4,50 ± 0,35 (.177 ± .014)	Solid uninsulated wire (Gold finish)		0,455mm max.	0,162 mm <sup>2</sup> nom.	Straight PCB Terminations (Size 9 to 37)	

Other termination types available on request: CDRI (\*)

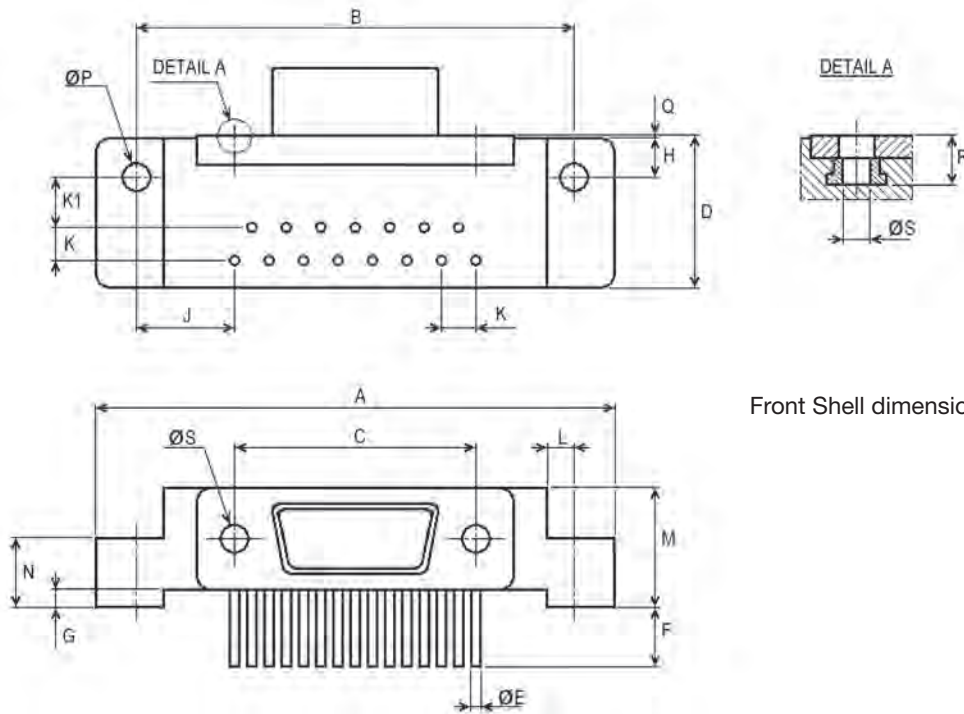
## Availability per Shell Size

Shell Size	9	15	21	25	31	37	51
FR112 + ...	Yes	Yes	Yes	Yes	Yes	Yes	Yes
FR113 + ...	Yes	Yes	Yes	Yes	Yes	Yes	Yes
FR123 + ...	Yes	Yes	Yes	Yes	Yes	Yes	Yes
FR114 + ...	Yes	Yes	Yes	Yes	Yes	Yes	Yes
FR115 + ...	Yes	Yes	Yes	Yes	Yes	Yes	Yes
FR116 + ...	Yes	Yes	Yes	Yes	Yes	Yes	Yes
FR136	Yes	Yes	Yes	Yes	Yes	Yes	Yes
FR136A	Yes	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
FR139	Yes	Yes	Yes	Yes	Yes	Yes	N.A.



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## Connector Type FR136 / 90° bent PCB Terminations (Shell Sizes 9 to 37)



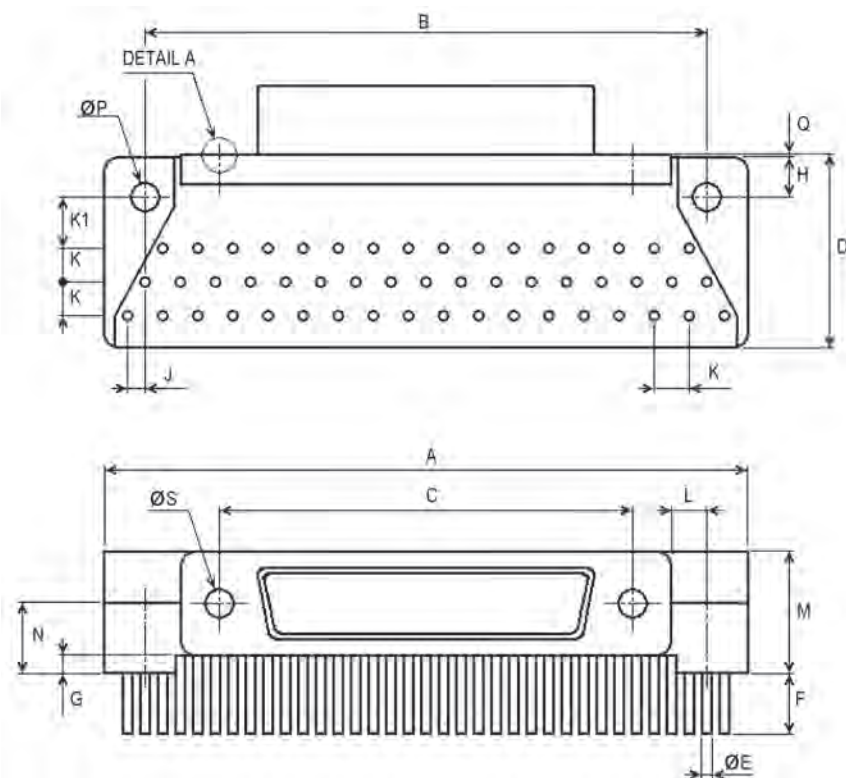
Front Shell dimensions: see page 93

Shell Size		9	15	21	25	31	37
<b>A</b>	max.	35,31 (1.390)	39,12 (1.540)	42,93 (1.690)	45,47 (1.790)	51,82 (2.040)	59,44 (2.340)
<b>B</b>	± 0,18 (.007)	29,21 (1.150)	33,02 (1.300)	36,83 (1.450)	39,37 (1.550)	45,72 (1.800)	53,34 (2.100)
<b>C</b>	± 0,13 (.005)	14,35 (.565)	18,16 (.715)	21,97 (.865)	24,51 (.965)	28,32 (1.115)	32,13 (1.265)
<b>D</b>	max.	11,56 (.455)	11,56 (.455)	11,56 (.455)	11,56 (.455)	11,56 (.455)	11,56 (.455)
<b>øE</b>	max.	0,46 (.018)	0,46 (.018)	0,46 (.018)	0,46 (.018)	0,46 (.018)	0,46 (.018)
<b>F</b>	± 0,35 (.014)	4,50 (.177)	4,50 (.177)	4,50 (.177)	4,50 (.177)	4,50 (.177)	4,50 (.177)
<b>G</b>	± 0,20 (.008)	1,50 (.059)	1,50 (.059)	1,50 (.059)	1,50 (.059)	1,50 (.059)	1,50 (.059)
<b>H</b>	± 0,38 (.015)	3,17 (.125)	3,17 (.125)	3,17 (.125)	3,17 (.125)	3,17 (.125)	3,17 (.125)
<b>J</b>	Typ.	9,53 (.375)	7,62 (.300)	5,72 (.225)	4,45 (.175)	3,81 (.150)	3,81 (.150)
<b>K</b>	Typ.	2,54 (.100)	2,54 (.100)	2,54 (.100)	2,54 (.100)	2,54 (.100)	2,54 (.100)
<b>K1</b>	± 0,25 (.010)	3,81 (.150)	3,81 (.150)	3,81 (.150)	3,81 (.150)	3,81 (.150)	3,81 (.150)
<b>L</b>	± 0,05 (.002)	2,05 (.081)	2,05 (.081)	2,05 (.081)	2,05 (.081)	2,05 (.081)	2,05 (.081)
<b>M</b>	± 0,10 (.004)	9,10 (.358)	9,10 (.358)	9,10 (.358)	9,10 (.358)	9,10 (.358)	9,10 (.358)
<b>N</b>	± 0,15 (.006)	5,30 (.209)	5,30 (.209)	5,30 (.209)	5,30 (.209)	5,30 (.209)	5,30 (.209)
<b>øP (*)</b>	± 0,15 (.006)	2,45 (.096)	2,45 (.096)	2,45 (.096)	2,45 (.096)	2,45 (.096)	2,45 (.096)
<b>Q</b>	± 0,10 (.004)	0,30 (.012)	0,30 (.012)	0,30 (.012)	0,30 (.012)	0,30 (.012)	0,30 (.012)
<b>R</b>	min.	4,60 (.181)	4,60 (.181)	4,60 (.181)	4,60 (.181)	4,60 (.181)	4,60 (.181)
<b>øS</b>	Typ.	2-56-UNC-2B	2-56-UNC-2B	2-56-UNC-2B	2-56-UNC-2B	2-56-UNC-2B	2-56-UNC-2B

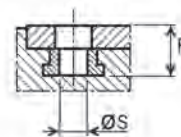
Note (\*): Maximum torque 0.44 Nm.

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Connector Type FR136 / 90° bent PCB Terminations (Shell Size 51)



DETAIL A



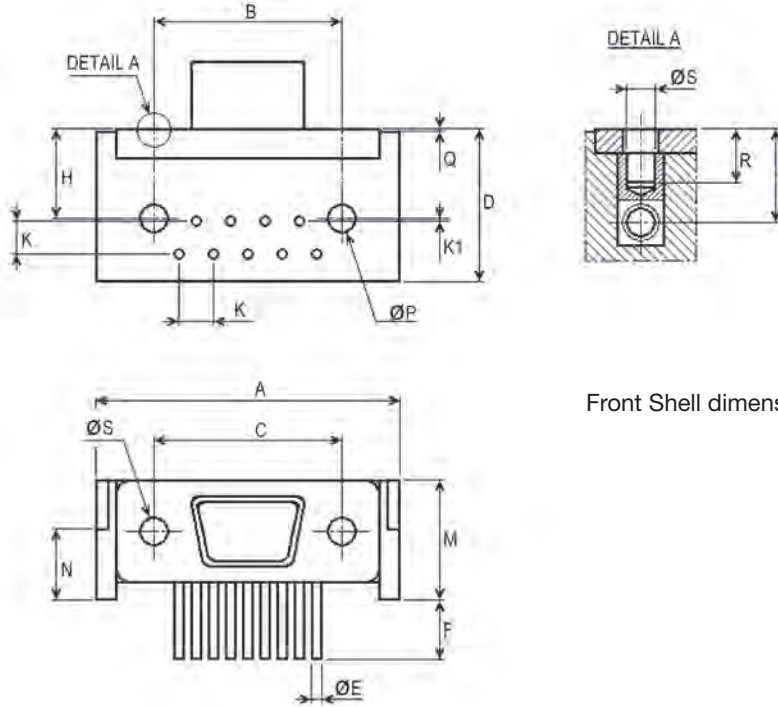
Front Shell dimensions: see page 93

Shell Size	51
A	max. 47,63 (1.875)
B	± 0,18 (.007) 40,64 (1.600)
C	± 0,13 (.005) 30,86 (1.215)
D	max. 14,35 (.565)
øE	max. 0,46 (.018)
F	± 0,35 (.014) 4,50 (.177)
G	± 0,20 (.008) 1,50 (.059)
H	± 0,38 (.015) 3,17 (.125)
J	Typ. 1,27 (.050)
K	Typ. 2,54 (.100)
K1	± 0,25 (.010) 3,81 (.150)
L	± 0,05 (.002) 2,05 (.081)
M	± 0,10 (.004) 10,25 (.404)
N	± 0,15 (.006) 5,96 (.235)
øP (*)	± 0,15 (.006) 2,45 (.096)
Q	± 0,10 (.004) 0,30 (.012)
R	min. 4,60 (.181)
øS	Typ. 2-56-UNC-2B

Note (\*): Maximum torque 0.44 Nm.

# 3401-029 Microminiature MDM Connectors

Connector Type FR136A / 90° bent PCB Terminations, Narrow Profile (Shell Size 9)

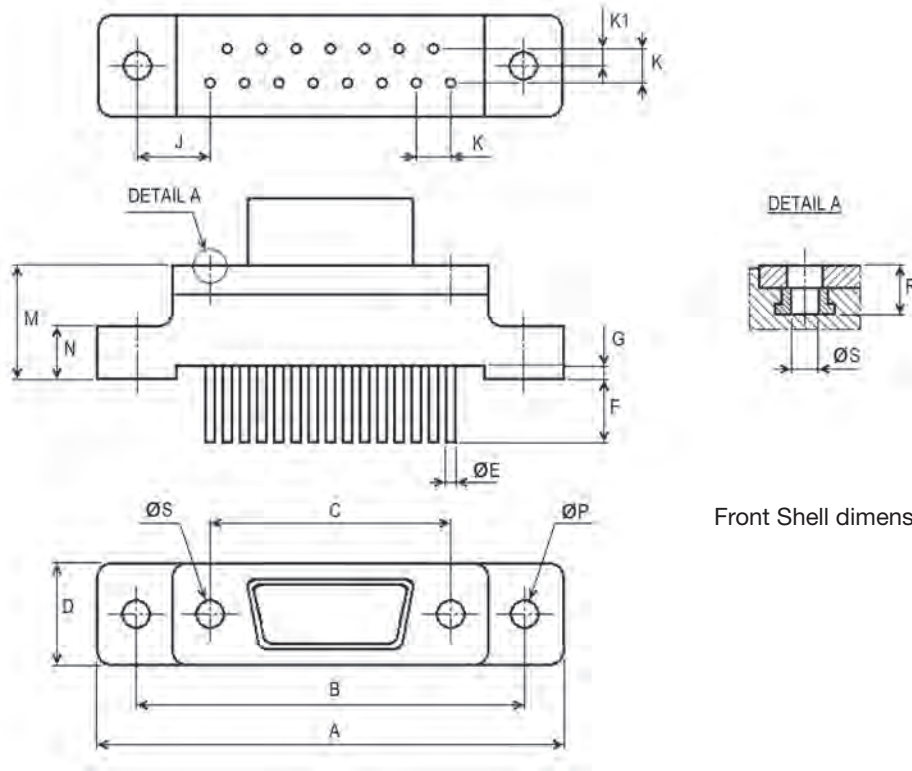


Front Shell dimensions: see page 93

Shell Size		9
A	max.	23,12 (.910)
B	± 0,13 (.005)	14,35 (.565)
C	± 0,13 (.005)	14,35 (.565)
D	max.	11,50 (.453)
ØE	max.	0,46 (.018)
F	± 0,20 (.008)	3,50 (.138)
H	± 0,38 (.015)	6,86 (.270)
K	Typ.	2,54 (.100)
K1	Typ.	0,20 (.008)
M	± 0,10 (.004)	9,10 (.358)
N	± 0,15 (.006)	5,30 (.209)
ØP	Typ.	M2 x 0,4
Q	± 0,10 (.004)	0,30 (.012)
R	min.	4,60 (.181)
ØS	Typ.	2-56-UNC-2B
T	± 0,38 (.015)	6,86 (.270)

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Connector Type FR139 / Straight PCB Terminations (Shell Sizes 9 to 37)



Front Shell dimensions: see page 93

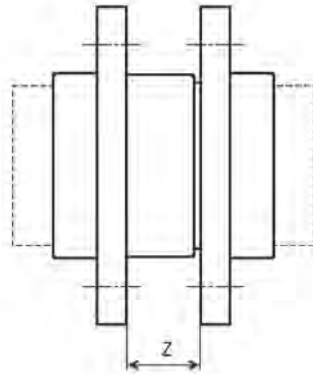
Shell Size		9	15	21	25	31	37
<b>A</b>	max.	35,31 (1.390)	35,31 (1.390)	42,93 (1.690)	44,20 (1.740)	51,82 (2.040)	59,44 (2.340)
<b>B</b>	± 0,18 (.007)	29,21 (1.150)	29,21 (1.150)	36,83 (1.450)	38,10 (1.500)	45,72 (1.800)	53,34 (2.100)
<b>C</b>	± 0,13 (.005)	14,35 (.565)	18,16 (.715)	21,97 (.865)	24,51 (.965)	28,32 (1.115)	32,13 (1.265)
<b>D</b>	max.	7,82 (.308)	7,82 (.308)	7,82 (.308)	7,82 (.308)	7,82 (.308)	7,82 (.308)
<b>ØE</b>	max.	0,46 (.018)	0,46 (.018)	0,46 (.018)	0,46 (.018)	0,46 (.018)	0,46 (.018)
<b>F</b>	± 0,35 (.014)	4,50 (.177)	4,50 (.177)	4,50 (.177)	4,50 (.177)	4,50 (.177)	4,50 (.177)
<b>G</b>	± 0,10 (.004)	1,00 (.039)	1,00 (.039)	1,00 (.039)	1,00 (.039)	1,00 (.039)	1,00 (.039)
<b>J</b>	Typ.	9,53 (.375)	5,72 (.225)	5,72 (.225)	3,81 (.150)	3,81 (.150)	3,81 (.150)
<b>K</b>	Typ.	2,54 (.100)	2,54 (.100)	2,54 (.100)	2,54 (.100)	2,54 (.100)	2,54 (.100)
<b>K1</b>	± 0,25 (.010)	1,27 (.050)	1,27 (.050)	1,27 (.050)	1,27 (.050)	1,27 (.050)	1,27 (.050)
<b>M</b>	± 0,20 (.008)	8,82 (.347)	8,82 (.347)	8,82 (.347)	8,82 (.347)	8,82 (.347)	8,82 (.347)
<b>N</b>	± 0,10 (.004)	4,10 (.161)	4,10 (.161)	4,10 (.161)	4,10 (.161)	4,10 (.161)	4,10 (.161)
<b>ØP (*)</b>	± 0,15 (.006)	2,45 (.096)	2,45 (.096)	2,45 (.096)	2,45 (.096)	2,45 (.096)	2,45 (.096)
<b>R</b>	min.	4,60 (.181)	4,60 (.181)	4,60 (.181)	4,60 (.181)	4,60 (.181)	4,60 (.181)
<b>ØS</b>	Typ.	2-56-UNC-2B	2-56-UNC-2B	2-56-UNC-2B	2-56-UNC-2B	2-56-UNC-2B	2-56-UNC-2B

Note (\*): Maximum torque 0.44 Nm.

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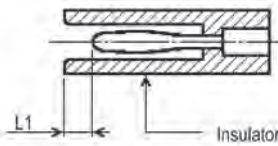
## Mounting Condition

Z: 5,49 (.216) max.

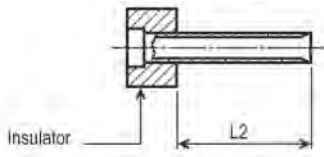


## Contacts

Plug (Male Contact)

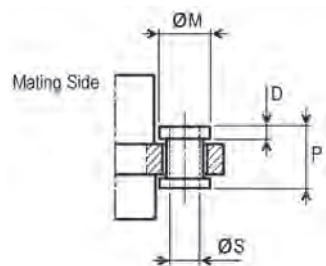


Receptacle (Female Contact)



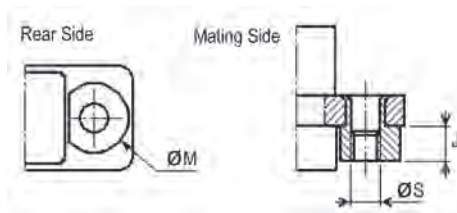
	Min.	Max.
L1	0,25 (.010)	0,91 (.036)
L2	3,30 (.130)	3,66 (.144)

## Float Mount (option F)



ØM	3,81 ± 0,08 (.150 ± .003)
ØS	2,29 ± 0,04 (.090 ± .002)
D	1,04 ± 0,08 (.041 ± .003)
P	4,70 max. (.185 max.)
Allowable diametral float	0,36 ± 0,10 (.014 ± .004)
Max. allowable axial float	0,51 (.020)

## Captive Nut (option E)

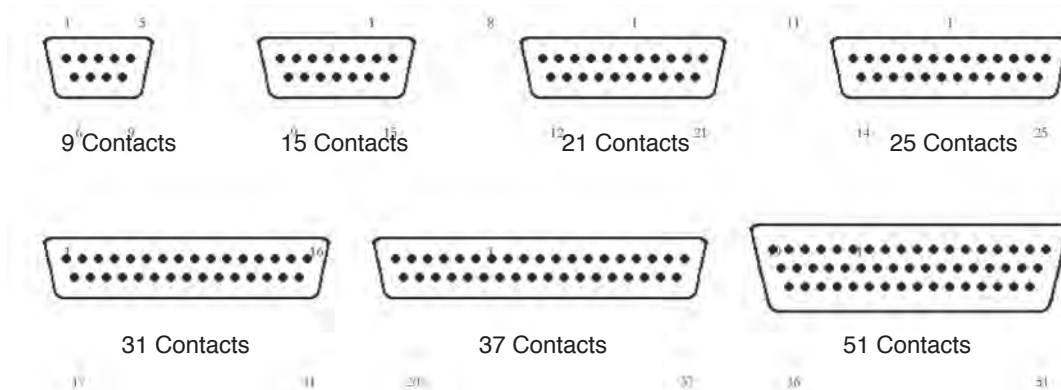


ØM	5,10 max. (.200 max.)
ØS	2-56-UNC-2B
J	2,60 max. (.102 max.)

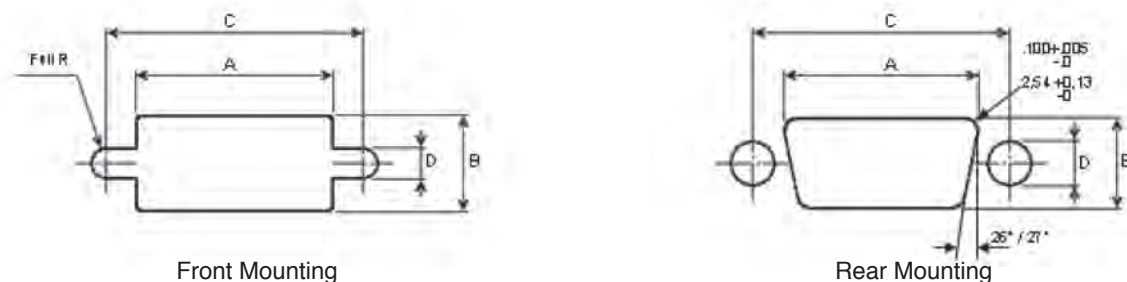
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## Arrangements

Front view of Plugs (use mirror view for Receptacle)



## Panel Cutouts



Front Mounting	Shell Size	A	B	C	D
		+ 0,10 (.004) / - 0,00 (.000)	+ 0,10 (.004) / - 0,00 (.000)	+ 0,13 (.005) / - 0,00 (.000)	+ 0,13 (.005) / - 0,00 (.000)
	9	10,36 (.408)	6,88 (.271)	14,48 (.570)	2,26 (.089)
	15	14,17 (.558)	6,88 (.271)	18,29 (.720)	2,26 (.089)
	21	17,98 (.708)	6,88 (.271)	22,10 (.870)	2,26 (.089)
	25	20,52 (.808)	6,88 (.271)	24,64 (.970)	2,26 (.089)
	31	24,33 (.958)	6,88 (.271)	28,45 (1.120)	2,26 (.089)
	37	28,14 (1.108)	6,88 (.271)	32,26 (1.270)	2,26 (.089)
	51	26,87 (1.058)	8,00 (.315)	30,99 (1.220)	2,26 (.089)

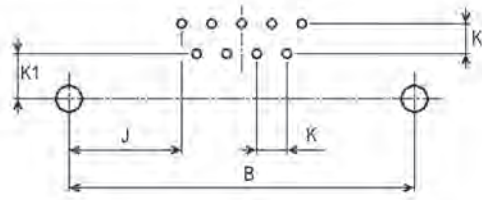
Rear Mounting	Shell Size	A	B	C	D
		+ 0,10 (.004) / - 0,00 (.000)	+ 0,10 (.004) / - 0,00 (.000)	+ 0,13 (.005) / - 0,00 (.000)	+ 0,02 (.001) / - 0,00 (.000)
	9	10,19 (.401)	6,40 (.252)	14,48 (.570)	3,18 (.125)
	15	14,00 (.551)	6,40 (.252)	18,29 (.720)	3,18 (.125)
	21	17,81 (.701)	6,40 (.252)	22,10 (.870)	3,18 (.125)
	25	20,34 (.801)	6,40 (.252)	24,64 (.970)	3,18 (.125)
	31	24,16 (.951)	6,40 (.252)	28,45 (1.120)	3,18 (.125)
	37	27,97 (1.101)	6,40 (.252)	32,26 (1.270)	3,18 (.125)
	51	26,70 (1. 51)	7,49 (.295)	30,99 (1.220)	3,18 (.125)

Note: Front and Rear Mounting accommodate 2-56 UNC-2A screws.

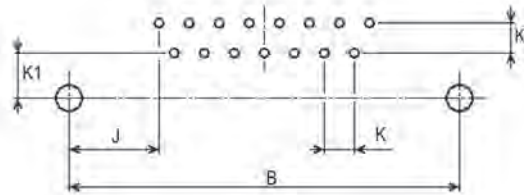
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## PCB Layout / 90° bent PCB Terminations (Size 9 to 37)

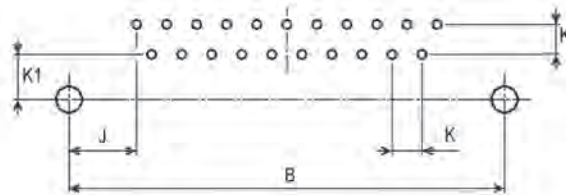
9 Contacts



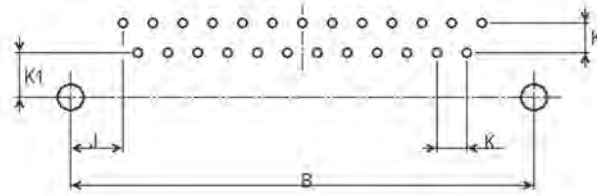
15 Contacts



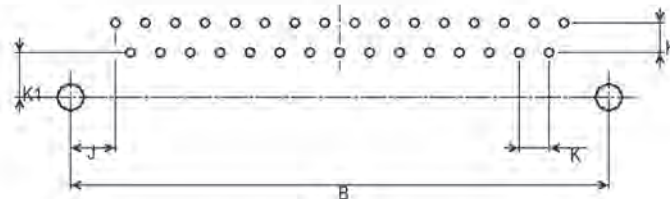
21 Contacts



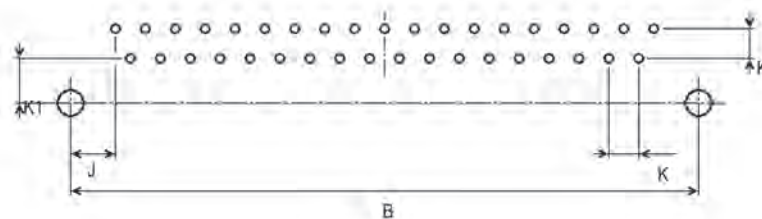
25 Contacts



31 Contacts



37 Contacts

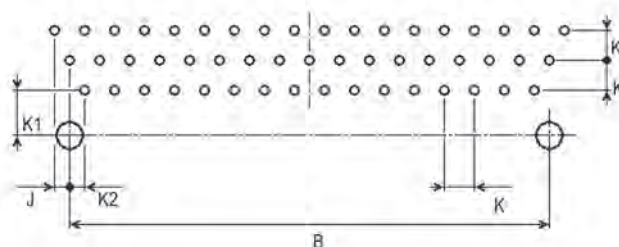


Dimensions: See page 95

# 3401-029 Microminiature MDM Connectors

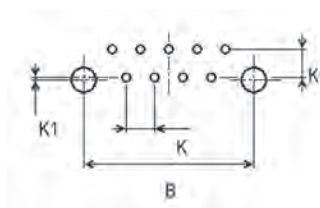
## PCB Layout / 90° bent PCB Terminations (Size 51)

51 Contacts



## PCB Layout / 90° bent PCB Terminations, Narrow Profile (Size 9)

9 Contacts / Narrow



## Dimensions Layout / 90° bent PCB

Shell Size	9	15	21	25	31	37	51	9 Narrow
<b>B</b>	29,21 (1.150)	33,02 (1.300)	36,83 (1.450)	39,37 (1.550)	45,72 (1.800)	53,34 (2.100)	40,64 (1.600)	14,35 (.565)
<b>J</b>	9,53 (.375)	7,62 (.300)	5,72 (.225)	4,45 (.175)	3,81 (.150)	3,81 (.150)	1,27 (.050)	N.A.
<b>K</b>	2,54 (.100)	2,54 (.100)	2,54 (.100)	2,54 (.100)	2,54 (.100)	2,54 (.100)	2,54 (.100)	2,54 (.100)
<b>K1</b>	3,81 (.150)	3,81 (.150)	3,81 (.150)	3,81 (.150)	3,81 (.150)	3,81 (.150)	3,81 (.150)	0,20 (.008)
<b>K2</b>	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	1,27 (.050)	N.A.

## Dimensions Layout / Straight PCB

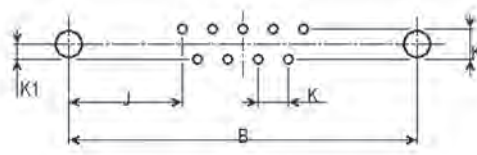
Shell Size	9	15	21	25	31	37
<b>B</b>	29,21 (1.150)	29,21 (1.150)	36,83 (1.450)	38,10 (1.500)	45,72 (1.800)	53,34 (2.100)
<b>J</b>	9,53 (.375)	5,72 (.225)	5,72 (.225)	3,81 (.150)	3,81 (.150)	3,81 (.150)
<b>K</b>	2,54 (.100)	2,54 (.100)	2,54 (.100)	2,54 (.100)	2,54 (.100)	2,54 (.100)
<b>K1</b>	1,27 (.050)	1,27 (.050)	1,27 (.050)	1,27 (.050)	1,27 (.050)	1,27 (.050)



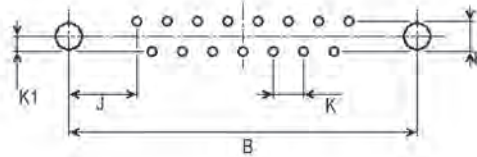
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## PCB Layout / Straight PCB Terminations (Size 9 to 37)

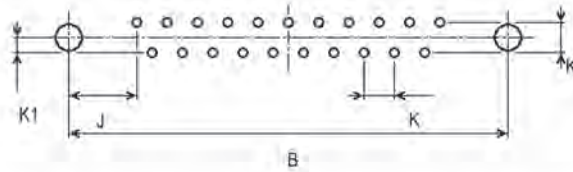
9 Contacts



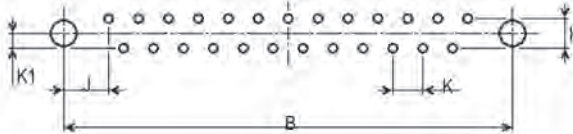
15 Contacts



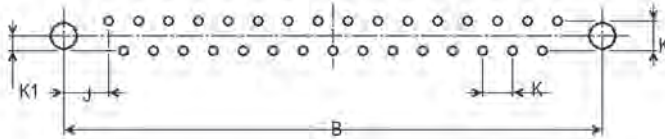
21 Contacts



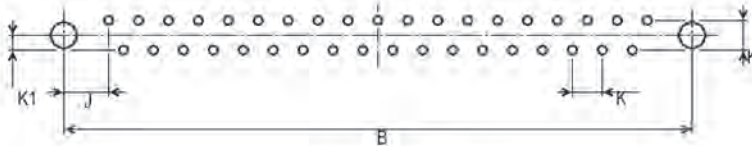
25 Contacts



31 Contacts



37 Contacts



Dimensions: See page 95

PCB Layout for termination FR116 / L2 identically with insulator layout

2 adjacent contacts: 1,27 mm (.050)

2 contact rows: 1,09 (.043)



*Dimensions are shown in mm (inch)  
Dimensions subject to change*



*Dimensions are shown in mm (inch)  
Dimensions subject to change*



*Dimensions are shown in mm (inch)  
Dimensions subject to change*