



ITT

Interconnect Solutions
Cannon, VEAM, BIW

Assuring **100% reliability**
in over **5,000** missile launches
to our armed forces and global allies



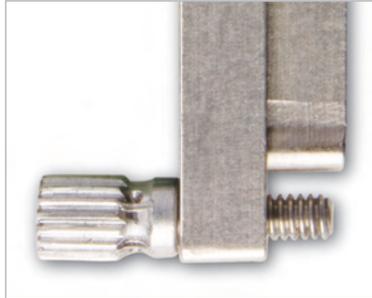
Engineered for life

The Challenge

ICS's top tier Micro connector customers approached ITT, Interconnect Solutions about a high density and robust low profile Nano miniature connector that allowed more signal carrying capacity in a smaller package. In addition, these customers identified the need to have these connectors perform in high shock and vibration environments as well as high temperature +200 degree C environments. These same customers requested the use of ITT's standard twist pin contact system within this new form factor of products.



Standard hardware accessories featuring jackscrew assembly option accommodating increased functionality in user applications



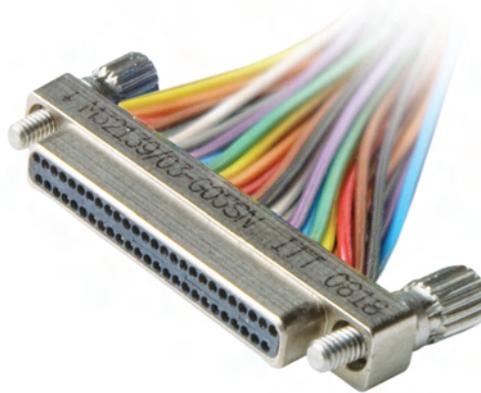
Knurled Jack Screws for ease of mating



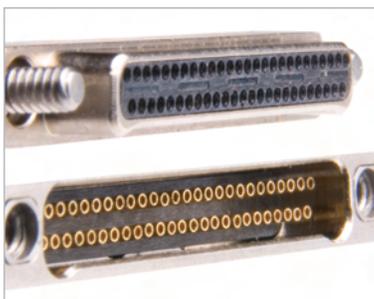
High temperature LCP dielectric material providing wider range of operating capabilities for hostile environments



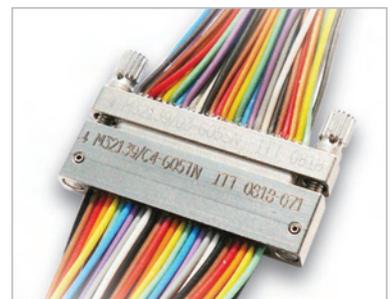
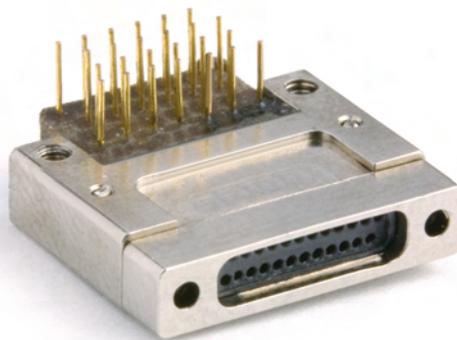
Proven twist pin contact construction with 5 points of electrical contact and high reliability crimp joints yielding robust contact performance



Thru hole PCB Mount with mating plug connector accommodating placement directly on printed circuit boards. SMT version available in the future



Multiple contact layouts from 9 to 51 positions, on 0.025 centers providing greater variability in data transmission requirements



Cable Harnesses available in discrete insulated wires, ribbon cable, and flex circuit terminations

The ITT Solution ...

Interconnect Solutions collated VOC information from multiple OEM's manufacturing sophisticated electronics equipment for Aerospace, Geophysical, and Industrial applications and correlated this input with market trend data for small form factor connectors. Based on the strong VOC results and ITT's engineering expertise in designing and manufacturing micro miniature connectors, ICS developed the dual row Nano Miniature NDD Series connector family. This new family of nano miniature connector products addresses the harsh environments typically seen in our customers' applications and provides higher density signals within a smaller profile connector package.

Dimensions shown in inches (mm)
Specifications and dimensions subject to change

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Nano Miniature NDD Series Connectors

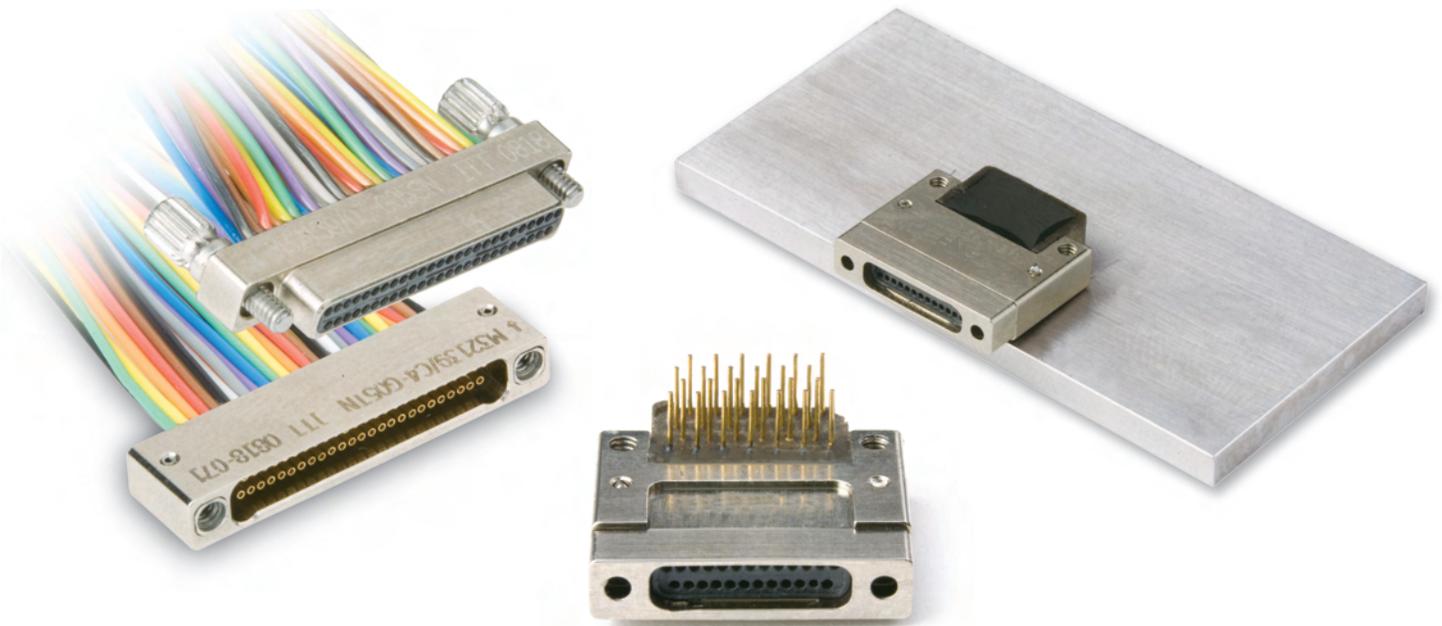
Technical Overview

ITT has been manufacturing harsh environment single row nano miniature connectors since 1971. The new NDD series from ITT takes advantage of ITT's over 35 years experience in nano miniature connector design to introduce a new level of innovative higher density family of connector products. This new Nano Miniature NDD Series connector will be qualified to the new military specification MIL-DTL-32139.

ITT's NDD miniature connectors are small form factor high density interconnects designed and manufactured for high reliability and harsh environment applications. These interconnects are ideal where size and weight limitations require an ultra low profile and robust interconnect package. Utilizing our innovative twist pin contact system on 0.025 contact spacing and having 5 points of electrical contact, the NDD series offers an extremely rugged small form factor interconnect solution. Typical applications for the NDD series are Avionics, Aerospace, Defense Electronics, Geophysical, Industrial Control Systems, and Medical Diagnostics.

Twist Pin technology

At the heart of ITT's new dual row NDD series we've incorporated our proven twist pin contact system. The twist pin contact system has been utilized exclusively for ITT's larger MDM series of products for over 45 years.



NDD Series- Nano Miniature Connector Performance Summary

Dielectric Withstanding Voltage:	250 VAC RMS at Sea Level, 100 VAC RMS at 70,000 feet
Contact Rating:	1 amp maximum
Wire Accommodation:	#30-#32 AWG
Insulation Resistance:	5000 Meg ohms min @ 100 VDC
Contact Resistance:	71 mv max @ 1 amp
Engagement/Separation Force:	Forces not to exceed 5 oz/contact
Operating Temperature:	-55 ° C to +125 ° C*
Humidity (Mated):	Per EIA-364, procedure 31-A
Vibration:	20 g's, in accordance with EIA-364-28, condition IV
Mechanical Shock:	100 g's, in accordance with EIA-364-27m condition G
Durability:	500 cycles of mating durability (500 CPH Max)
Mating/Unmating after Durability:	Forces not to exceed 7 oz/contact
Salt Spray/Corrosion Resistance:	48 hour salt spray, in accordance with EIA-364-26, condition B
Thermal Vacuum Out gassing:	Total Mass Loss (TML) 1.0% maximum, Volatile Condensable Material, (VCM) 0.1% Max

* Temperature Rating of -55 ° C to +200 ° C available with special termination processes



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Microminiature

D

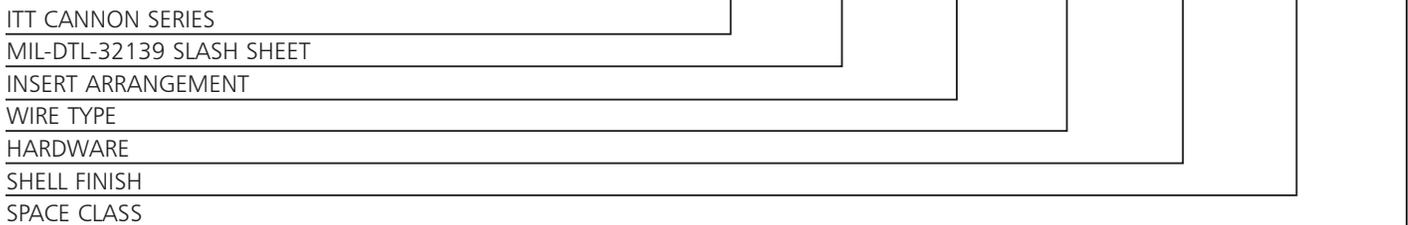
Electrical Specifications for the Connector

ITT's dual row NDD series of connectors have a contact rating of 1 Amp maximum with a contact resistance rating of 71 millivolt drop maximum. This new connector series has a voltage rating of 250 VAC RMS at sea level and a 100 VAC RMS at 70,000 feet altitude. Insulation resistance for the connector series is rated at 5000 megaohms minimum.

Current Rating	Voltage Rating (DWV)	Insulation Resistance
1 AMP maximum	250 VAC RMS sea level, 100 VAC RMS at 70,000 feet	5000 Meg ohms minimum



ITT PART NUMBER NOMENCLATURE TO MIL-DTL-32139



ITT CANNON SERIES:

NDS - Metal Shell, Single Row, Liquid Crystalline Polymer (LCP) Insulator (Not Currently Tooled)
 NDD - Metal Shell, Dual Row, LCP Insulator

MIL-DTL-32139 SLASH SHEET

01 - Connector, Plug, Single Row, Nano Miniature, Dual Lobe Polarization
 02 - Connector, Receptacle, Single Row, Nano Miniature, Dual Lobe Polarization
 03 - Connector, Plug, Dual Row, Nano Miniature, Dual Lobe Polarization
 04 - Connector, Receptacle, Dual Row, Nano Miniature, Dual Lobe Polarization

INSERT ARRANGEMENT

*A9 - 9 Contacts
 B15 - 15 Contacts
 *C21 - 21 Contacts
 D25 - 25 Contacts
 *E31 - 31 Contacts
 F37 - 37 Contacts
 G51 - 51 Contacts
 * Not currently tooled by ITT

WIRE TYPE

01 - 6 inches long #30 AWG wire per Nema HP3-ETXBBB9, White
 02 - 18 inches long #30 AWG wire per Nema HP3-ETXBBB9, White
 03 -36 inches long #30 AWG wire per Nema HP3-ETXBBB9, White
 04 - 6 inches long #30 AWG wire per Nema HP3-ETXBBB(*), Color Coded per MIL-STD-681, Sys 1, Ten Solid Colors Repeating
 05 - 18 inches long #30 AWG wire per Nema HP3-ETXBBB(*), Color Coded per MIL-STD-681, Sys 1, Ten Solid Colors Repeating
 06 -36 inches long #30 AWG wire per Nema HP3-ETXBBB(*), Color Coded per MIL-STD-681, Sys 1, Ten Solid Colors Repeating
 07 - 6 inches long #30 AWG wire per MIL-W-22759/33-30-9, White
 08 - 18 inches long #30 AWG wire per MIL-W-22759/33-30-9, White
 09 -36 inches long #30 AWG wire per MIL-W-22759/33-30-9, White
 10 - 6 inches long #30 AWG wire per MIL-W-22759/33-30-(*), Color Coded per MIL-STD-681, Sys 1, Ten Solid Colors Repeating

Consult Factory for additional wire terminations

HARDWARE

For slash sheets /1 and /3 only:
 S = Jackscrew Installed
 For slash sheets /2 and /4 only:
 T = Threaded hole

SHELL FINISH

C = Aluminum, Cadmium Finish
 N = Aluminum, Electroless Nickel Finish
 S = Stainless Steel, Passivated – Not currently tooled by ITT Cannon
 T = Titanium – Not currently tooled by ITT Cannon

SPACE CLASS

Blank = For Non-Space Applications
 S = Space Class Testing Performed

Dimensions shown in inches (mm)
 Specifications and dimensions subject to change

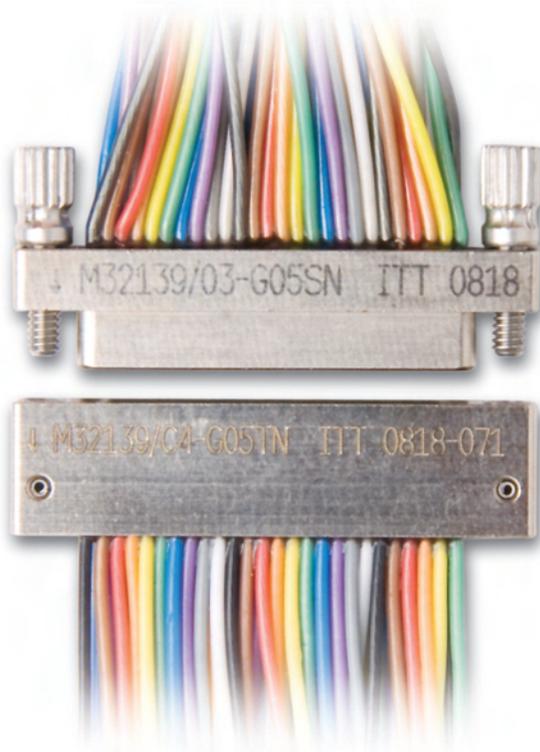
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Nano Miniature NDD Series Connectors

Even with a wide range of choices in interconnect configurations, ITT recognized that customers were demanding higher density connectors operating at higher temperature ranges. Based on ITT's nearly 50 years of experience in developing Micro interconnect technologies, we proudly present our next generation dual row NDD Nano (0.025) connector system, soon to be qualified to the Mil DTL 32139 specification. This high density interconnect package provides a robust shock and vibration capable solution, offering multiple configurations from 9 to 51 contact positions and including PCB versions. The unique knurled jackscrew assemblies allow for easier mating and demating, which is important for such small form factor connectors. Also, the entire connector family can be rated for 200 degree C environments based on ITT's material selection and process technologies.

Product Features

- Micro twist Pin contact system
- 0.025 contact spacing
- Meets the performance requirements of Mil DTL-32139 (Qualification in process)
- 1 amp contact rating
- LCP Dielectric with operating temperature from -55 degrees c to 200 degrees C
- Multiple contact arrangements from 9 to 51 positions
- Knurled jack screw assembly hardware



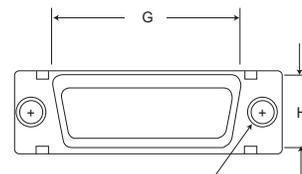
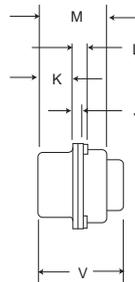
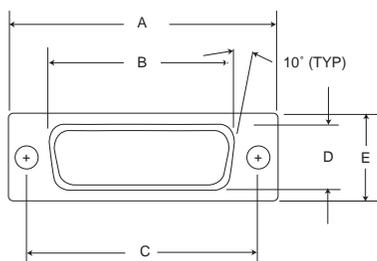
Applications

- Defense Electronics
- High Temperature Geophysical Exploration
- Aerospace Structures
- Satellite Systems
- Medical Electronics

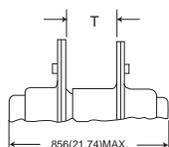


Dimensions shown in inches (mm)
Specifications and dimensions subject to change

Standard Shell

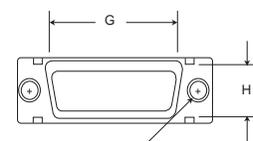
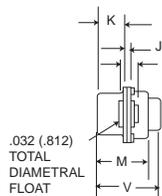
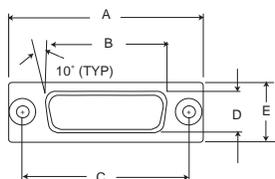


TWO MTG. HOLES
.123 ± .005
(3.12 ± 0.13)



Part Number by Shell Size	T + .020 (0.51) - .000 (0.00)	Part Number by Shell Size	T + .020 (0.51) - .000 (0.00)
2DE19P	.250 (6.35)	2DB52S	.236 (5.99)
2DE19S	.250 (6.35)	2DC79P	.236 (5.99)
2DA31P	.250 (6.35)	2DC79S	.236 (5.99)
2DA31S	.250 (6.35)	2DD100P	.236 (5.99)
2DB52P	.236 (5.99)	2DD100S	.236 (5.99)

Float Mount

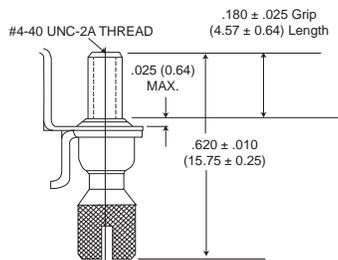


TWO MTG. HOLES
.0885 ± .0025
(2.248 ± 0.064)

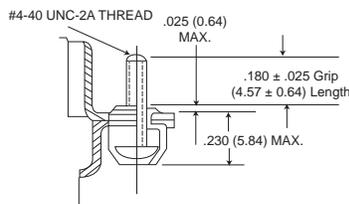
Part Number by Shell Size	A	B	C	D	E	G	H	J	K	L	M	N	V
	± .015 (0.38)	± .010 (0.25)	± .010 (0.25)	± .010 (0.25)	± .015 (0.38)	± .010 (0.25)	± .010 (0.25)	± .010 (0.25)	± .010 (0.25)	± .010 (0.25)	± .010 (0.25)	± .010 (0.25)	Max.
2DE19S	1.213 (30.81)	.697 (17.70)	.984 (24.99)	.360 (9.14)	.494 (12.55)	.759 (19.28)	.422 (10.72)	.036 (.914)	.236 (5.99)	.055 (1.40)	.422 (10.72)	.120 (3.05)	.555 (14.10)
2DA31P	1.541 (39.14)	1.025 (26.03)	1.312 (33.32)	.360 (9.14)	.494 (12.55)	1.083 (27.51)	.422 (10.72)	.036 (.914)	.236 (5.99)	.055 (1.40)	.422 (10.72)	.120 (3.05)	.555 (14.10)
2DA31S	1.541 (39.14)	.968 (24.58)	1.312 (33.32)	.308 (7.82)	.494 (12.55)	1.083 (27.51)	.422 (10.72)	.032 (.812)	.243 (6.17)	.047 (1.19)	.429 (10.90)	.120 (3.05)	.555 (14.10)
2DB52P	2.088 (53.03)	1.583 (40.21)	1.852 (47.04)	.378 (9.60)	.494 (12.55)	1.625 (41.27)	.422 (10.72)	.036 (.914)	.231 (5.87)	.055 (1.40)	.426 (10.82)	.129 (3.28)	.555 (14.10)
2DB52S	2.088 (53.03)	1.508 (38.30)	1.852 (47.04)	.308 (7.82)	.494 (12.55)	1.625 (41.27)	.422 (10.72)	.032 (.812)	.243 (6.17)	.047 (1.19)	.429 (10.90)	.120 (3.05)	.555 (14.10)
2DC79P	2.729 (69.31)	2.231 (56.67)	2.500 (63.50)	.378 (9.60)	.494 (12.55)	2.272 (57.71)	.422 (10.72)	.036 (.914)	.231 (5.87)	.055 (1.40)	.426 (10.82)	.129 (3.28)	.555 (14.10)
2DC79S	2.729 (69.31)	2.156 (54.76)	2.500 (63.50)	.308 (7.82)	.494 (12.55)	2.272 (57.71)	.422 (10.72)	.032 (.812)	.243 (6.17)	.047 (1.19)	.429 (10.90)	.120 (3.05)	.555 (14.10)
2DD100P	2.635 (66.92)	2.127 (54.02)	2.406 (61.11)	.484 (12.29)	.605 (15.37)	2.178 (55.32)	.534 (13.56)	.036 (.914)	.231 (5.87)	.055 (1.40)	.426 (10.82)	.129 (3.28)	.555 (14.10)
2DD100S	2.635 (66.92)	2.062 (52.37)	2.406 (61.11)	.420 (10.67)	.605 (15.37)	2.178 (55.32)	.534 (13.56)	.032 (.812)	.243 (6.17)	.047 (1.19)	.429 (10.90)	.120 (3.05)	.555 (14.10)

For shell with float mounts, add letter F after shell size, e.g., 2DEF19P.

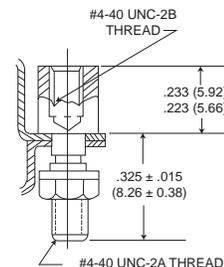
Jackscrew/Jackpost Assembly



Standard (F172) Jackscrew
(factory installed)



Low Profile (F173) Jackscrew
(factory installed)



Jackpost (F171)
Front Panel Connector Mounting Only

Dimensions shown in inches (mm)
Specifications and dimensions subject to change



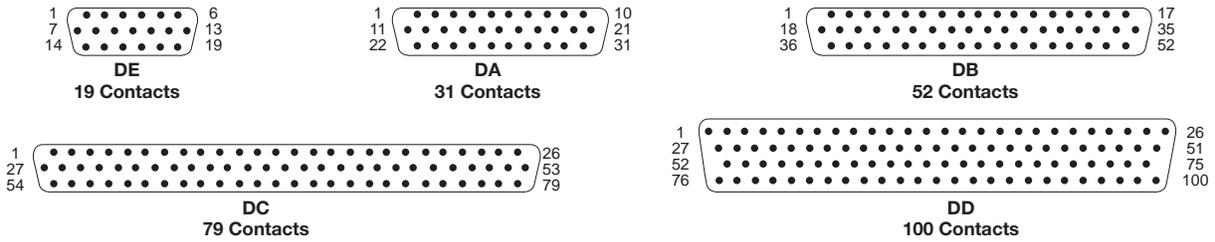
D

Microminiature

Double Density D - .075" Contact Spacing 2D

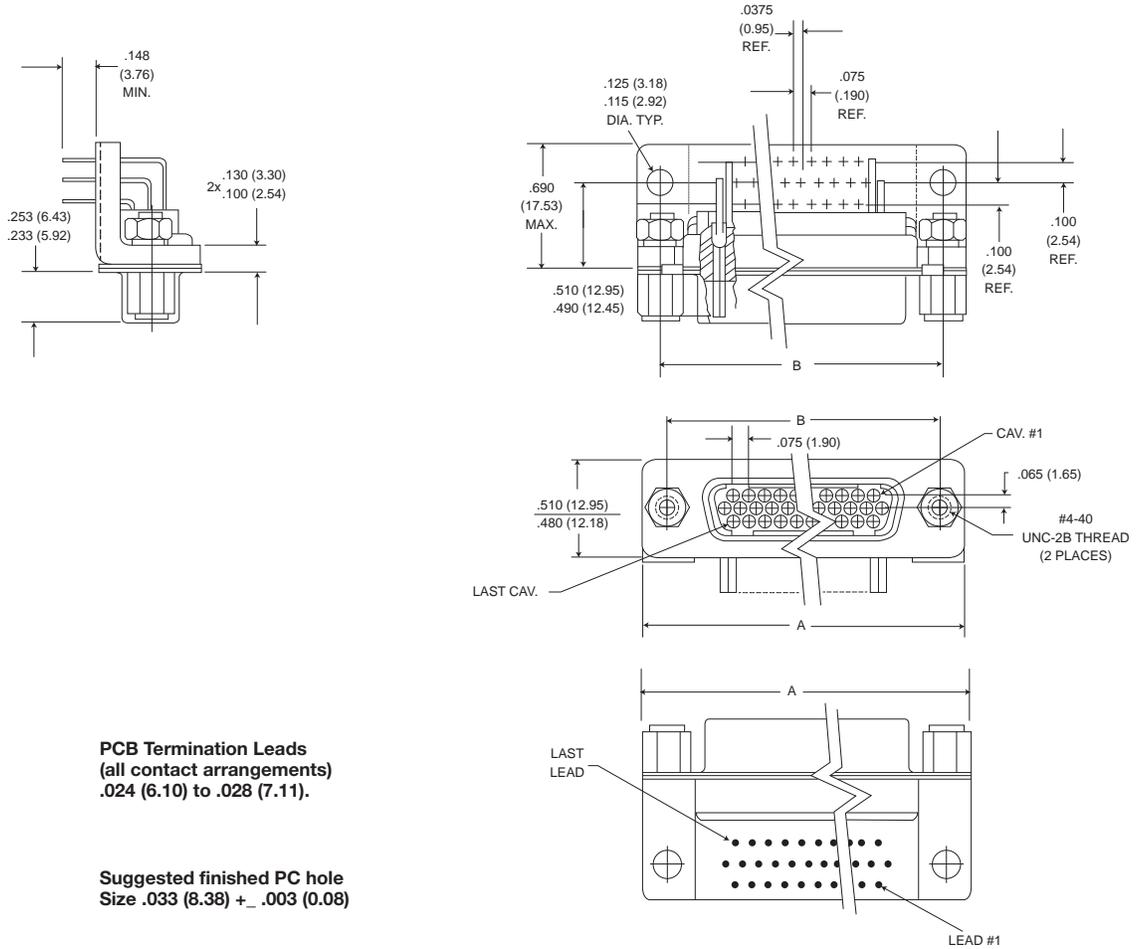
Contact Arrangements

All views are pin front face. Use reverse order for socket side.



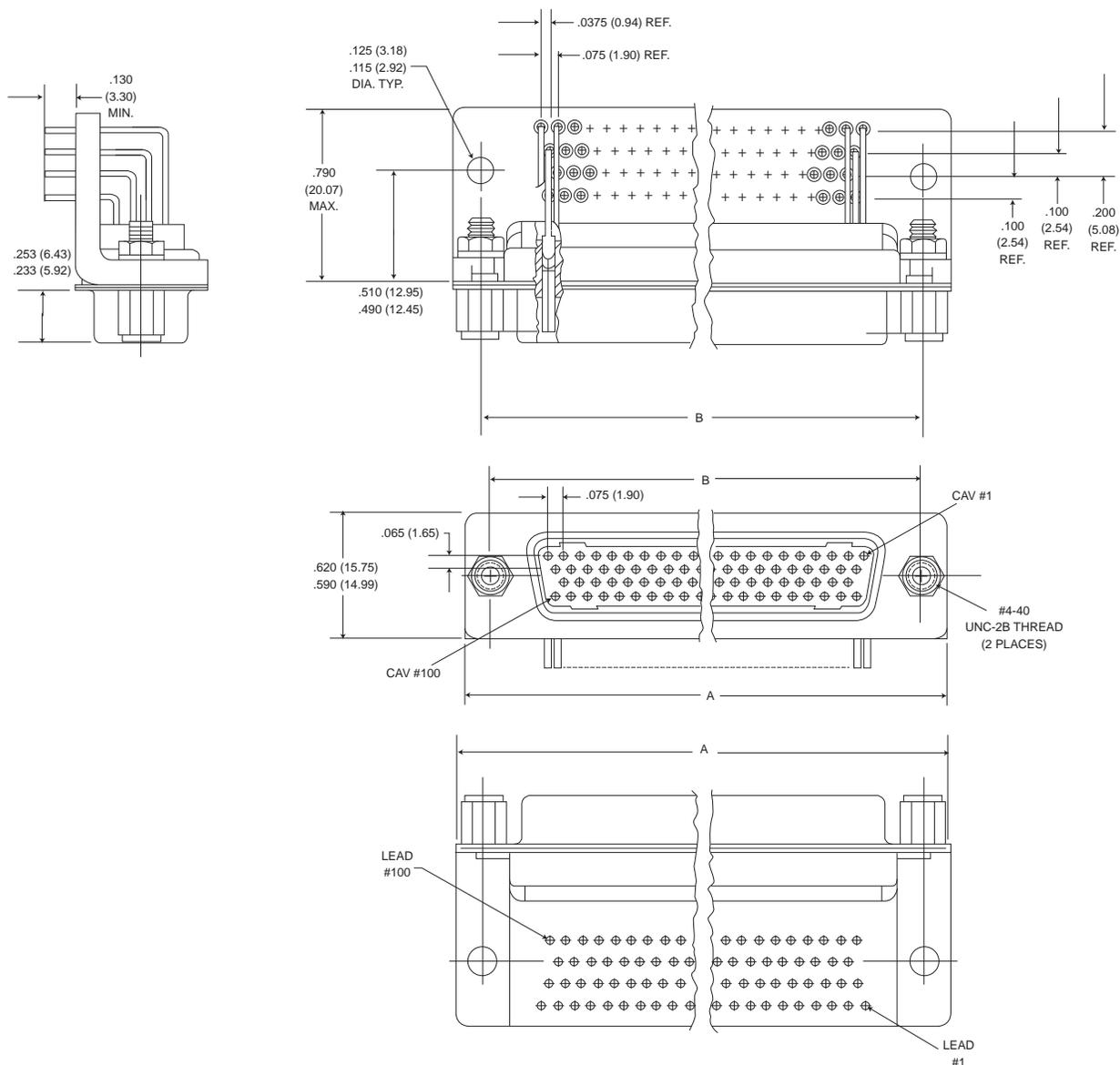
Cavity identification numbers are shown for reference only and do not appear on insulator front face. However they do appear on rear of insulator.

90° PCB Mounting - 3 Row



Part Number by Shell Size	A ± .015 (0.38)	B ± .010 (0.25)	C Max.
2DE19SBRP	1.215 (30.86)	.984 (24.99)	.690 (17.53)
2DA31SBRP	1.540 (39.12)	1.312 (33.32)	.690 (17.53)
2DB52SBRP	2.090 (53.09)	1.852 (47.04)	.690 (17.53)
2DC79SBRP	2.730 (69.34)	2.500 (63.50)	.690 (17.53)

90° PCB Mounting - 4 Row



Part Number by Shell Size	A ± .015 (0.38)	B ± .010 (0.25)	C Max.
2DD100SBRP	2.635 (66.93)	2.406 (61.11)	.790 (20.07)

Contact Arrangements - Page B-56

Dimensions shown in inches (mm)
Specifications and dimensions subject to change

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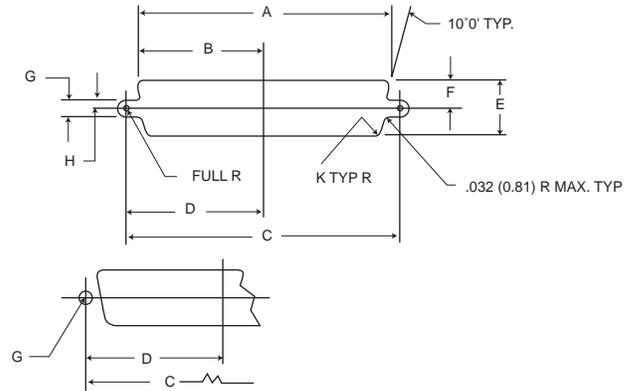


Microminiature



Double Density D - .075" Contact Spacing 2D

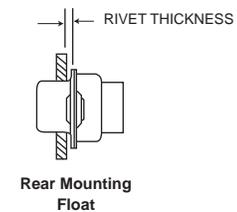
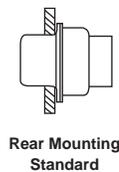
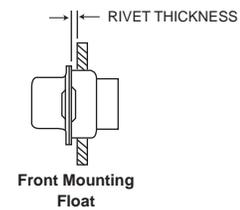
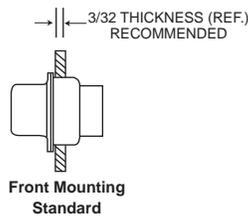
Panel Cutouts



Conn.	Mtg. Method	A ± .005 (0.13)	B ± .005 (0.13)	C ± .005 (0.13)	D ± .005 (0.13)	E ± .005 (0.13)	F ± .005 (0.13)	G ± .002 (0.05)	H ± .002 (0.05)	K ± .002 (0.05)
2DE	Front	.874 (22.20)	.437 (11.10)	.984 (24.99)	.492 (12.50)	.513 (13.03)	.257 (6.53)	.120 (3.05)	.060 (1.52)	.083 (2.11)
	Rear	.806 (20.47)	.403 (10.24)	.984 (24.99)	.492 (12.50)	.449 (11.40)	.225 (5.71)	.120 (3.05)	.060 (1.52)	.132 (3.35)
2DA	Front	1.202 (30.53)	.601 (15.26)	1.312 (33.32)	.656 (16.66)	.513 (13.03)	.257 (6.53)	.120 (3.05)	.060 (1.52)	.083 (2.11)
	Rear	1.134 (28.80)	.567 (14.40)	1.312 (33.32)	.656 (16.66)	.449 (11.40)	.225 (5.71)	.120 (3.05)	.060 (1.52)	.132 (3.35)
2DB	Front	1.743 (44.27)	.872 (22.15)	1.852 (47.04)	.926 (23.52)	.513 (13.03)	.257 (6.53)	.120 (3.05)	.060 (1.52)	.083 (2.11)
	Rear	1.674 (42.52)	.837 (21.26)	1.852 (47.04)	.926 (23.52)	.449 (11.40)	.225 (5.71)	.120 (3.05)	.060 (1.52)	.132 (3.35)
2DC	Front	2.391 (60.73)	1.196 (30.38)	2.500 (63.50)	1.250 (31.75)	.513 (13.03)	.257 (6.53)	.120 (3.05)	.060 (1.52)	.083 (2.11)
	Rear	2.326 (59.08)	1.163 (29.54)	2.500 (63.50)	1.250 (31.75)	.449 (11.40)	.225 (5.71)	.120 (3.05)	.060 (1.52)	.132 (3.35)
2DD	Front	2.297 (58.34)	1.149 (29.18)	2.406 (61.11)	1.203 (30.56)	.623 (15.82)	.312 (7.92)	.120 (3.05)	.060 (1.52)	.083 (2.11)
	Rear	2.218 (56.34)	1.109 (28.17)	2.406 (61.11)	1.203 (30.56)	.555 (14.10)	.278 (7.06)	.120 (3.05)	.060 (1.52)	.132 (3.35)

For contact part numbers, termination tooling and assembly see pages D-86 to D-88.

Panel Mounting



Environmentally sealed Double Density D connector offers superior vibration and moisture resistant characteristics.

The connector features superior environmental sealing which makes it suitable for any application where severe environmental protection is critical.

The connector's contact density design was achieved by using field proven, highly reliable Centipin/Centisocket contacts on .075" centers.

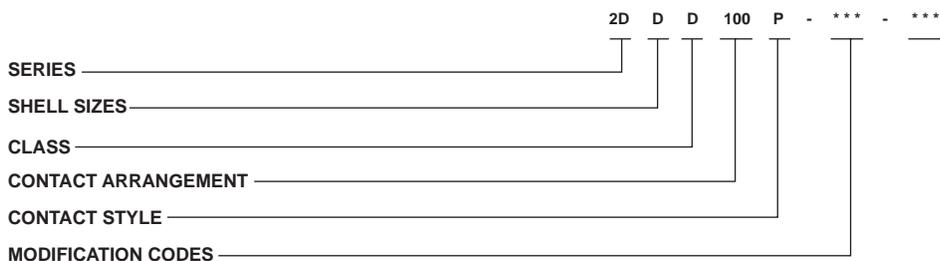
Designed to maximize positive contact mating, the contact positions are reversed, leaving the flexible Centipin contacts recessed in the insulator while the more ruggedized centisocket contacts are exposed.

This reversal of positions and the chamfered-entry of the sockets assures positive mating even under severe conditions where misalignment or mismatching of the connector might occur.

High reliability and protection of the contacts is assured through superior environmental sealing. The socket contacts as well as the Centipin contacts, which feature ITT Cannon's reliable Twist Pin contact design, are retained in the connector body.

A rubber grommet seal the signal wires and connector from external contaminants and moisture. The 90° PCB mounting 2D*D is potted behind the grommet for additional sealing.

How to Order



SERIES:

2D-Double Density "D"

SHELL SIZES:

D*

Consult factory for size E, A, B, C

CLASS:

D - Environmental

CONTACT ARRANGEMENT

100*

Consult factory for sizes 19, 31, 52, 79

CONTACT STYLE

P - Centi-Loc pin (receptacle shell config.)

S - Centi-Lock socket (plug shell config.)

MODIFICATION CODES

*** (Two 3-digit codes permissible)

F0 - Connector without contacts

(F0 will not be printed on the connector)

6 - Environmental D 90° PCB mounting

(socket configuration only)

* ITT Cannon is currently tooled in size D 100 contact version only.

Standard Data

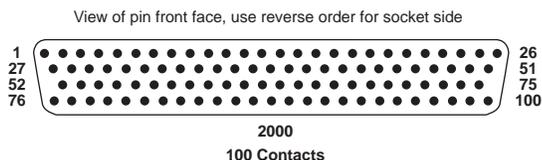
Contacts:

Insertable/removalbe gold-plated size 22 centi-loc crimp contacts (wire sizes #22 thru #26 AWG, stranded or solid).

MATERIALS AND FINISHES

Housings	Aluminum alloy, yellow chromate over cadmium plate
Peripheral Seal	Silicone
Insulators	Diallyl Phthalate
Contacts Retainer	Nylon
Grommet	Polychloroprene (bonded to housing)

Contact Arrangement



Dimensions shown in inches (mm)
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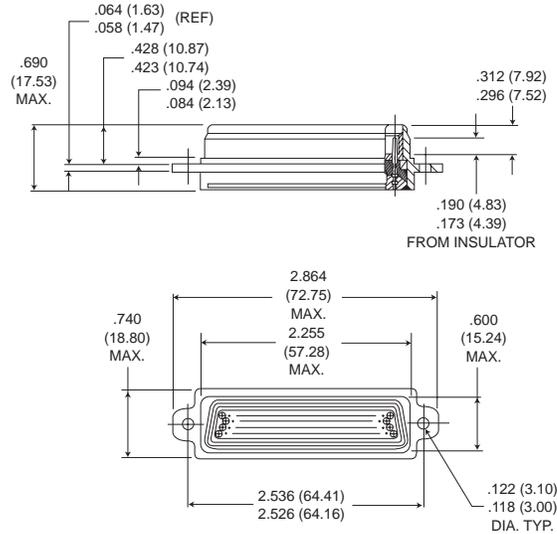
D

Microminiature

Standard Mount (continued)

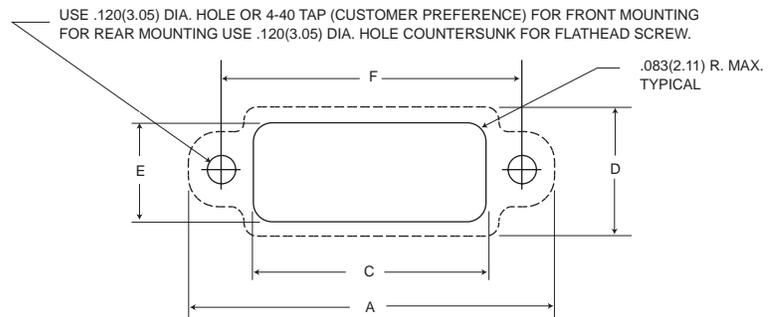
Plug/Socket Connector

2DDD100S



All tolerances are $\pm .010$ (0.25) unless noted otherwise.

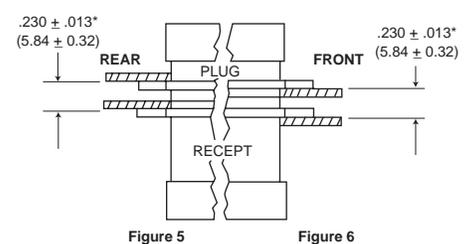
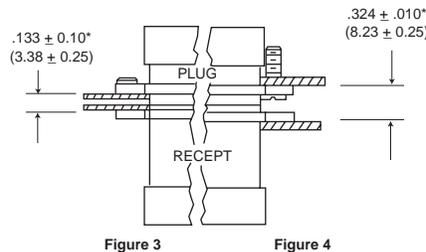
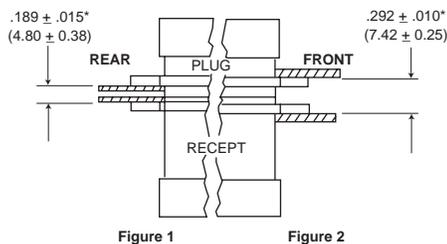
Panel Cutout



Shell Size	A $\pm .010$ (0.25)	C Min.	D $\pm .010$ (0.25)	E Min.	F $\pm .006$ (0.15)
2DDD-100	2.859 (72.62)	2.265 (57.53)	.735 (18.67)	.610 (15.49)	2.531 (64.29)

Note: Panel cutout does not allow for potting cup clearance.

Mounting Dimensions



1. With both connectors rear mounted, use #4-40 flat head screws flush with the panel.
2. With both connectors front mounted, use #4-40 binder or pan head screws.

3. With both connectors rear mounted (float mounting on either plug or receptacle side), use #4-40 flat head screws, flush with the panels.

4. With both connectors front mounted (float mounting on either plug or receptacle side), use #4-40 binder or pan head screws.

- 5/6. With plug assembly front mounted and receptacle assembly rear mounted, use hardware from Figures 5 and 6. If float mounting is desired, use Figure 3 or 4 for the float mounted connector.

*Dimensions between panels represent the recommended limit to be used in the design of the connector mounting method.

NOTE: Max. panel thickness is .125 (3.17) for non-floating rear panel mounting.
Dimensions shown in inches (mm)

Specifications and dimensions subject to change



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Microminiature