



4.1/9.5 Mini DIN

Low PIM Connectors
PDF Version Volume 1

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AS9100/ISO 9001:2008 **ROHS**
CERTIFIED COMPLIANT
(978) 927-1060 www.deltarf.com



Applications

4.1/9.5 Mini DIN Application Notes

Delta's 4.1/9.5 Mini DIN series of coaxial connectors were developed to meet the growing demands of today's high performance mobile communications systems. The 4.1/9.5 has an operational frequency range of DC-14 GHz, offers excellent VSWR performance and Low Passive Intermodulation (Low PIM) < -165 dBc. This makes it ideally suited for use in cellular base stations, distributed antenna systems (DAS) and small cell applications.

Typical applications on 3G (UMTS / CDMA 2000) and 4G (LTE / WiMax) base stations include:

- Antennas
- Antenna Feeder Cables
- Combiners
- Diplexers
- Filters
- Jumpers
- Remote Radio Head (RRH)
- Tower Mounted Amplifiers (TMA)
- Triplexers

This small, rugged, high power, Low PIM connector can also be used in TETRA networks, defense, broadcast and other microwave applications.



**General Description****4.1/9.5 Mini DIN Connectors DC - 14 GHz**

Delta's 4.1/9.5 Mini DIN series connectors are a threaded coupling connector designed for high wattage transmissions requiring low VSWR and minimal passive intermodulation (PIM). Mechanically similar yet 30% smaller than the 7/16 series, the 4.1/9.5 Mini DIN is a robust connector capable of performing in harsh tower top environments. Its smaller size and reduced weight allows increased package density and flexibility in system design. This IEC Standard interface offers the right combination of power handling, operational frequency, low VSWR and Low PIM performance for your application now, and in the future.

Albaloy Plating

In applications sensitive to passive intermodulation (PIM), Delta utilizes Albaloy plating, a tin/zinc/copper composite with a bright white finish. It offers the corrosion resistance of nickel and the Low PIM characteristics of silver plating. Albaloy plating has the same composition as, and is fully compatible with, other commercial platings designated Sucoplate®, IP-23, White Bronze, and Tri-Alloy.

Customer Driven Design

This catalog offers a wide range of standard 4.1/9.5 Mini DIN configurations, which includes male and female cable mounts, receptacles, in-series adapters and between series adapters. If you can't find a configuration that meets your requirements, please contact the factory for assistance.

IEC standardization (DIN 47231 or IEC 60169-11)

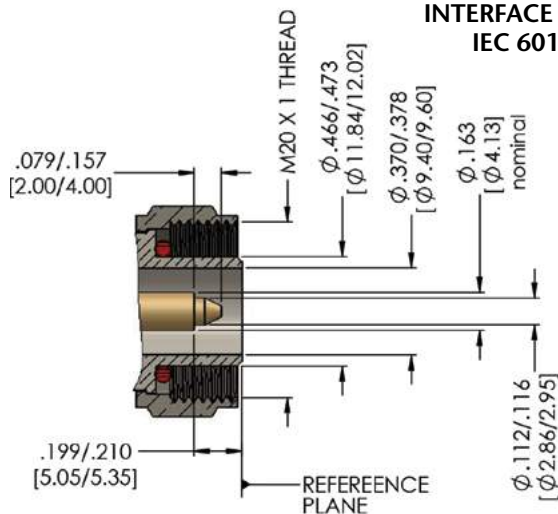
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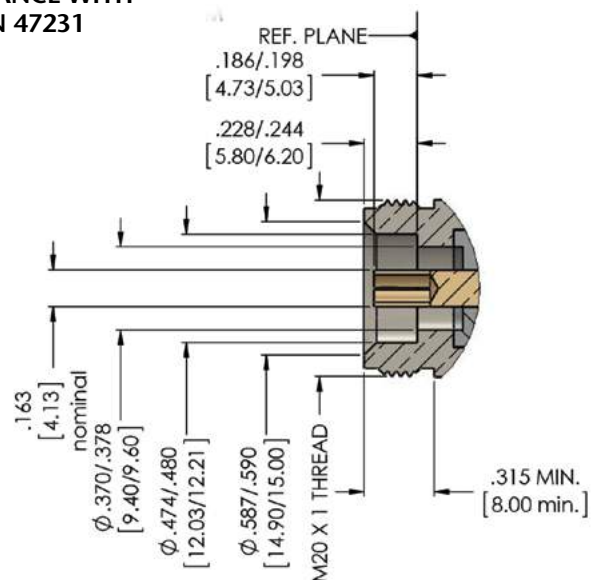


Interfaces

ALL DIMENSIONS IN BRACKETS ARE IN MM
INTERFACE IN ACCORDANCE WITH
IEC 60169-11 & DIN 47231



4.1/9.5 Male



4.1/9.5 Female

Electrical and Mechanical Specifications*

Electrical Specifications:

Frequency Range : DC – 14 GHz
Nominal Impedance: 50 Ohms
TYP. VSWR : 1.20 max thru 11 GHz ; 1.35 max thru 14 GHz
Insulation Resistance : 5,000 megohms min
DWV (@ sea level) : 2000 Vrms min
Power Handling (@ 1 GHz, sea level & ambient temp) : 1700W max
PIM: < -165 dBc (@ 1900 MHz, 2 carriers of +43dBm)

Mechanical Specifications:

Durability: 500 min
Recommended coupling torque: 20 - 25 Nm
Contact Retention: 6 lbs min axial

Environmental Specifications:

Temperature Range: -65° C to +125° C
Shock: Meets MIL-STD-202, Method 213, Condition G
Vibration: Meets MIL-STD-202, Method 204, Condition B
Altitude: Meets MIL-STD-202, Method 105, Condition C
Thermal Shock: Meets MIL-STD-202, Method 107, Condition B

Materials:

Male Contacts: Brass per ASTM B16
Female Contacts: Spring Brass per ASTM B16 or Phosphor Bronze per ASTM B139
Gaskets: Silicone Rubber per ZZ-R-765, Class II, Grade 70
Insulators: Teflon per ASTM D1710
All other components: Brass per ASTM B16

Finishes:

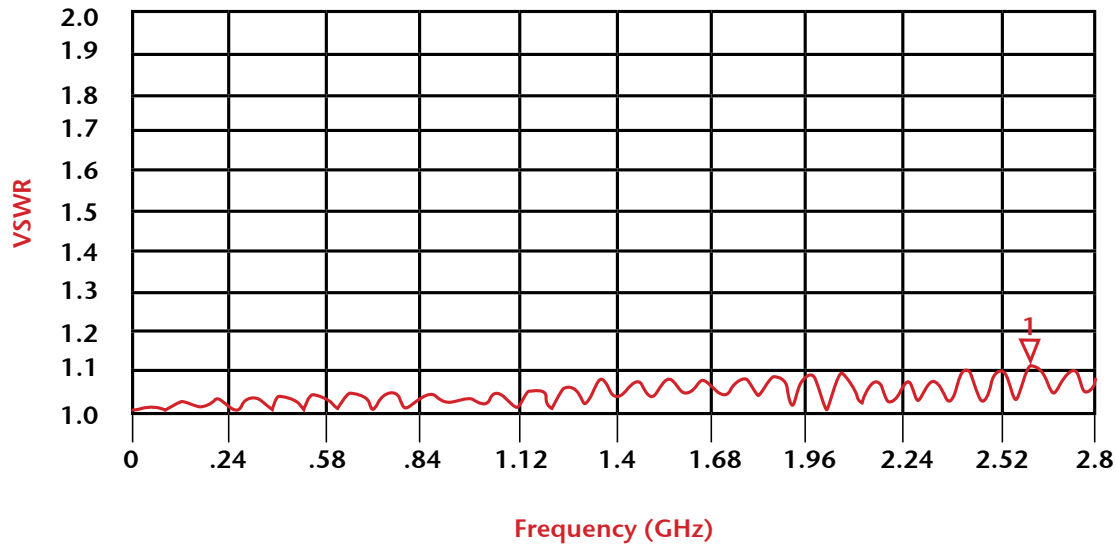
Contacts: Gold plate per ASTM B488 over Copper per SAE-AMS-2418 or Silver plate per ASTM B700.
Bodies: Albaloy plate (Tin/Zinc/Copper composite) per Delta specification 111197.
Coupling Nuts: Nickel plate per AMS-QQ-N-290
All other components: Albaloy plate (Tin/Zinc/Copper composite) per Delta specification 111197

All other specifications are in accordance with the latest issues of DIN 47231 or IEC 60169-11 specifications.

* These specifications are typical and may not apply to all connectors. Detailed specifications for individual connectors are available on request.

**Test Data****VSWR**

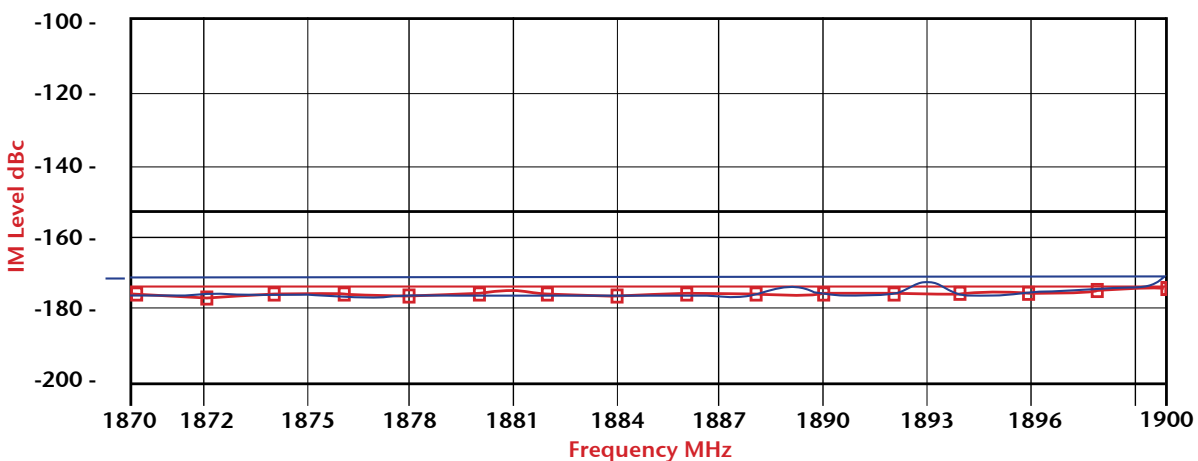
Marker 1: 1.1163 @ 2.808 GHz



VSWR measurements for the 4.1/9.5 Mini DIN were taken under the following test conditions:
7/16 female to 4.1/9.5 female adapter connected to a 4.1/9.5 male to 7/16 male adapter.
No gating. Frequency test was 0-3 GHz. Equipment Used: Anritsu Model# 37397C.

Passive Intermodulation (PIM) Performance

F2 Down — F1=1930.0 MHz, F2=1960.0 MHz; IM3=171.5 dBc at 1900.0
F1 Up — F1=1945.0 MHz, F2=1990.0 MHz; IM3=174.1 dBc at 1900.0

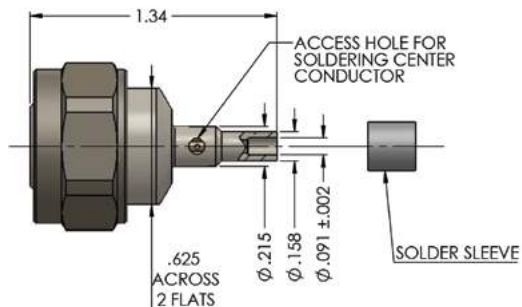
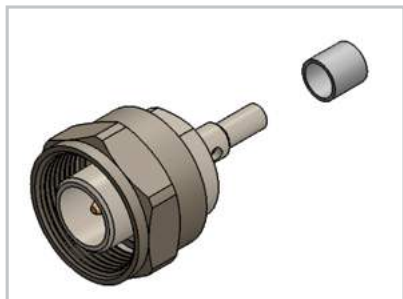


Passive Intermodulation measurements for the 4.1/9.5 Mini DIN were taken under the following test conditions: 4.1/9.5 Male to 4.1/9.5 Female Cable assembly with HABIA 402 NM FJ cable – 6" long. Attached to each end of the assembly was a 7/16 adapter – male & female. These were tested with 2 tones, 43 dBm (20W) – transmit band of 1930-1990 MHz – receive band of 1850-1910 MHz.

Equipment used: Kaelus PIM Analyzer Model# 1900FE

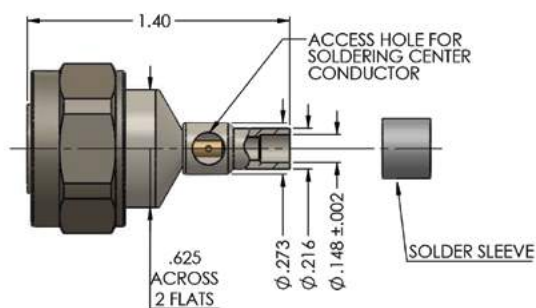
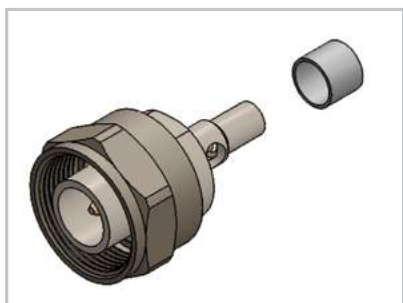


Direct Solder Plugs



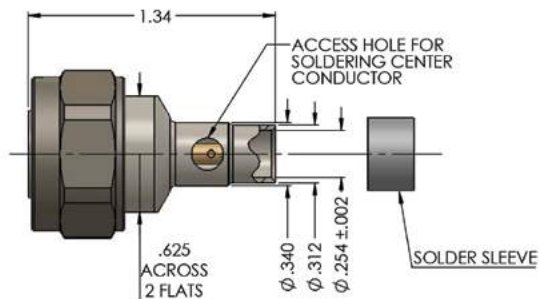
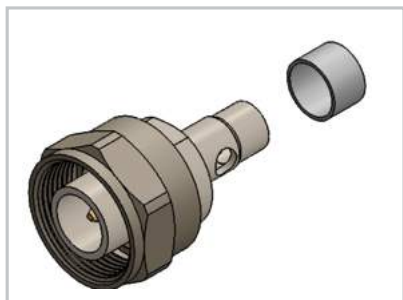
9901025Q003-700

Direct Solder Plug for .086 Dia S/R Cable



9901031Q003-700

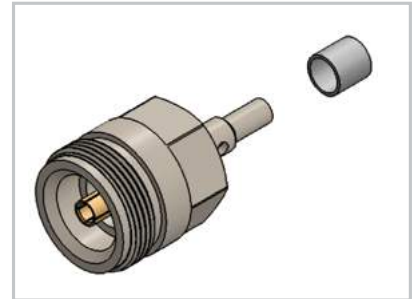
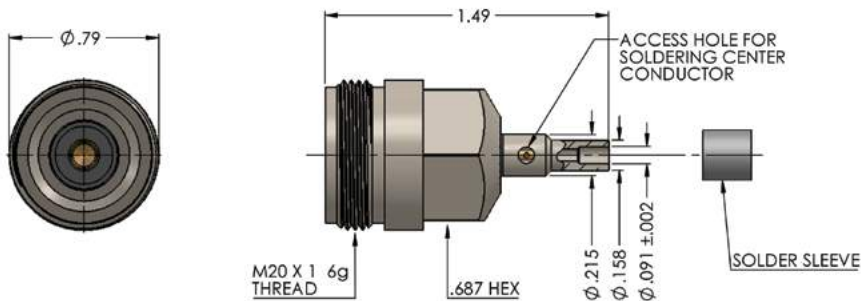
Direct Solder Plug for .141 Dia S/R Cable



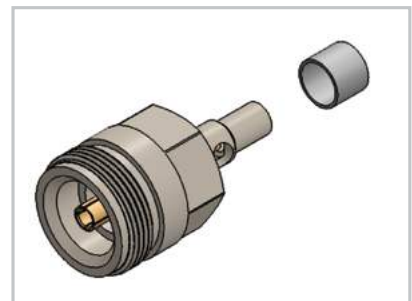
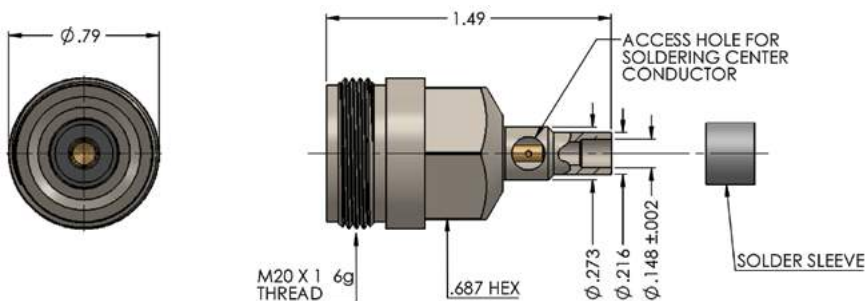
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Direct Solder Plug for .250 Dia S/R Cable

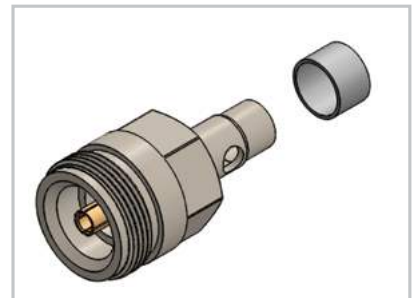
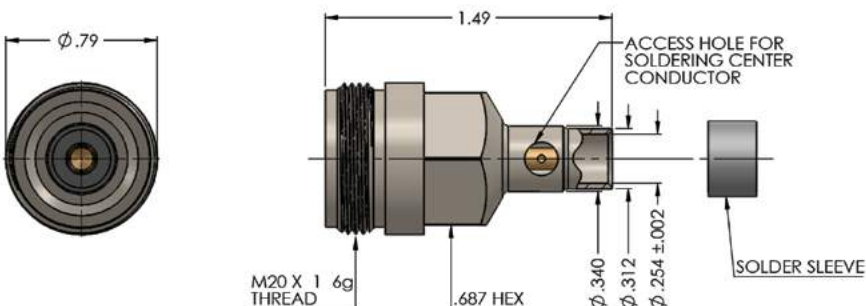
See page 16 for assembly instructions.

**Direct Solder Jacks****9908025Q003-700**

Direct Solder Jack for .086 Dia S/R Cable

**9908031Q003-700**

Direct Solder Jack for .141 Dia S/R Cable

**9908050Q003-700**

Direct Solder Jack for .250 Dia S/R Cable

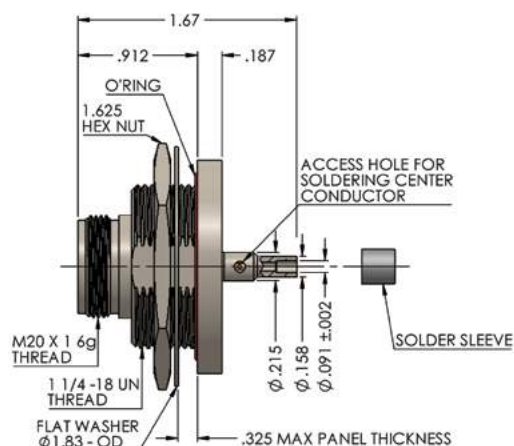
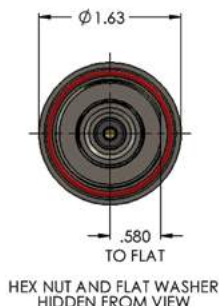
See page 16 for assembly instructions.



Direct Solder Bulkhead Jacks



See page 17 for mounting hole detail.

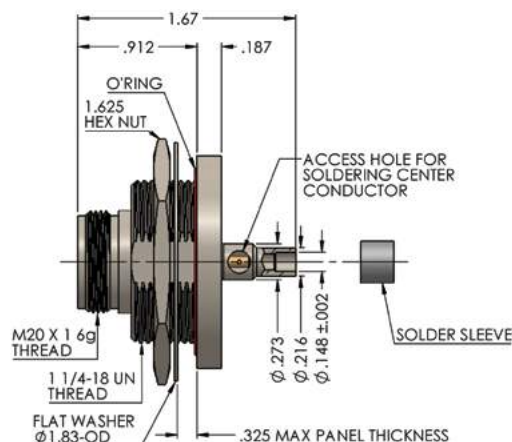
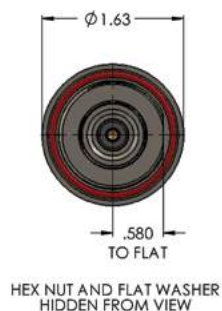


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Direct Solder Bulkhead Jack for .086 Dia S/R Cable

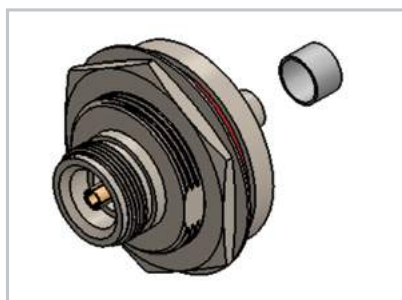


See page 17 for mounting hole detail.

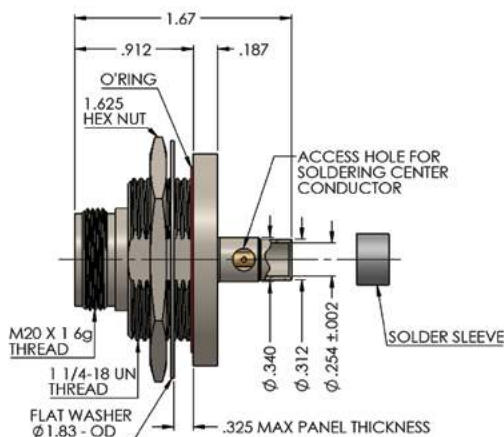
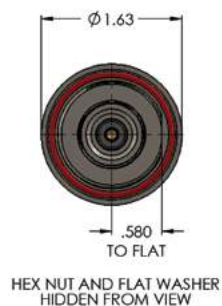


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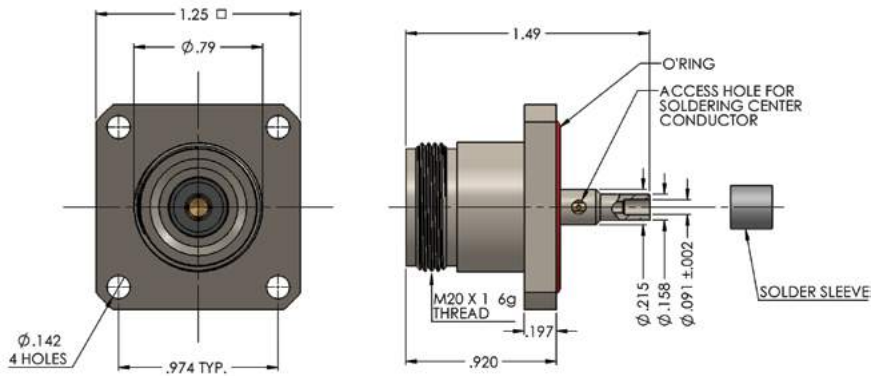
See page 17 for mounting hole detail.



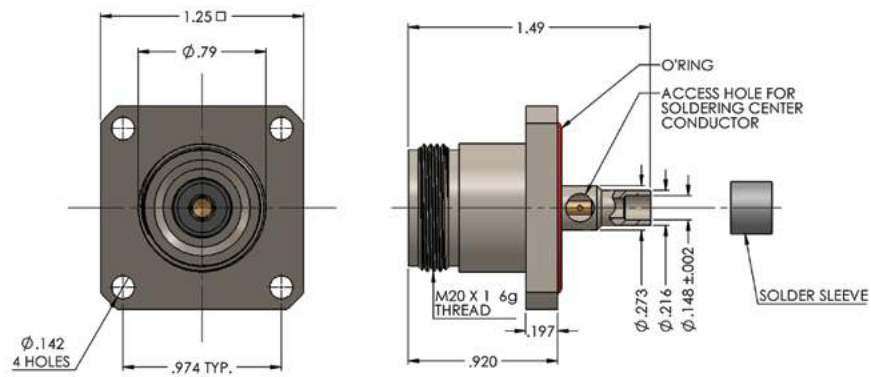
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Direct Solder Bulkhead Jack for .250 Dia S/R Cable

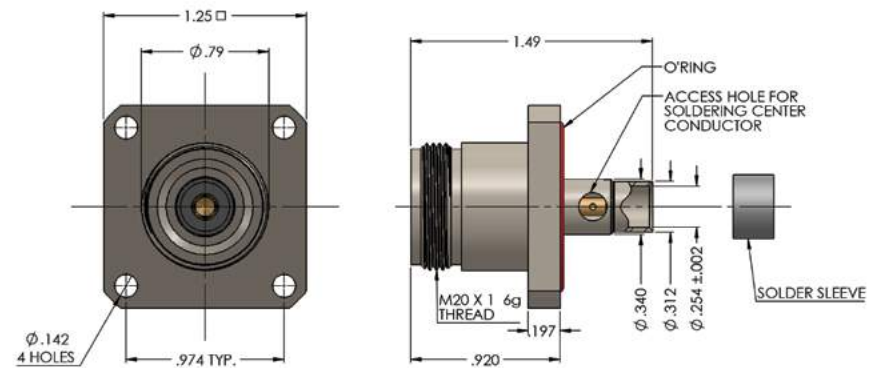
See page 16 for assembly instructions.

**Direct Solder Panel Mount Jacks****9911025Q911-700**

Direct Solder Panel Mount Jack for .086 Dia S/R Cable

**9911031Q911-700**

Direct Solder Panel Mount Jack for .141 Dia S/R Cable

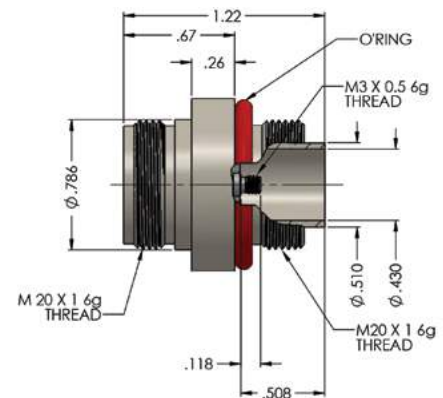
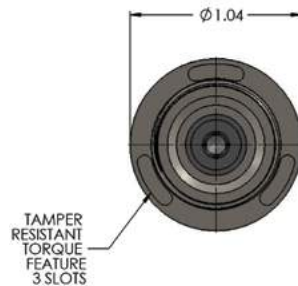
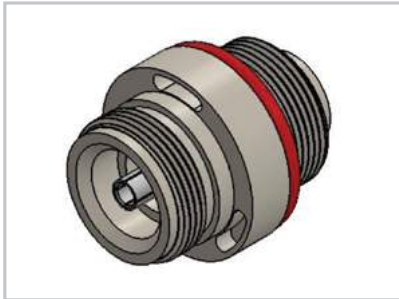
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Direct Solder Panel Mount Jack for .250 Dia S/R Cable

See page 16 for assembly instructions.

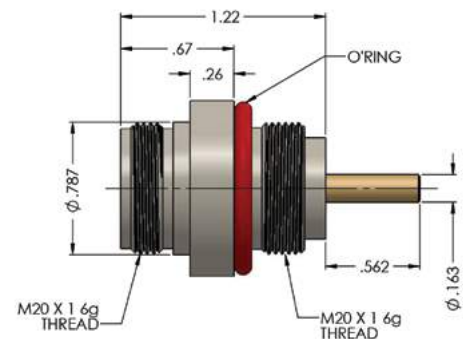
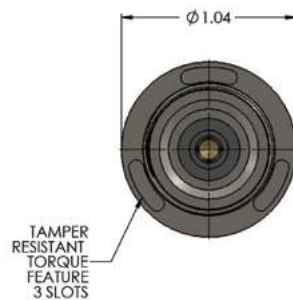
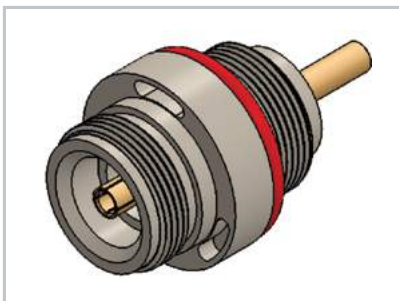


Thread-In Jack Receptacles



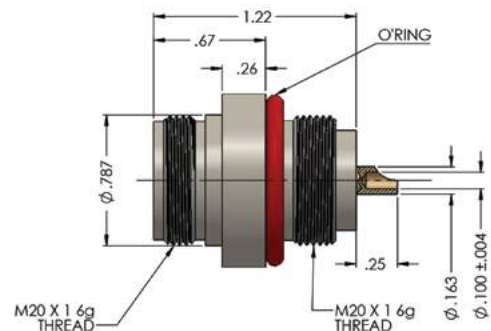
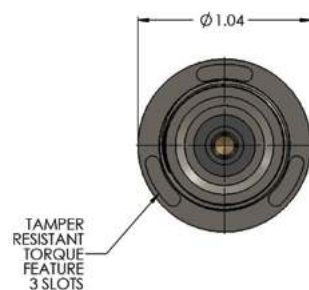
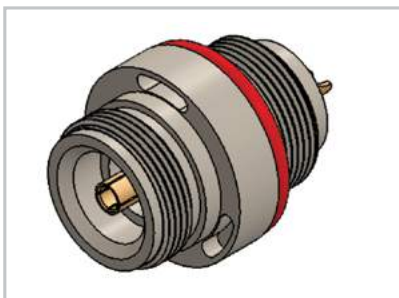
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Thread-In Jack Receptacle M3 Thread



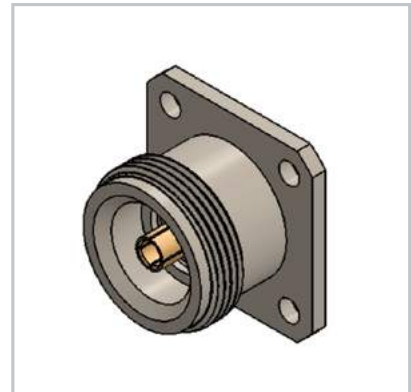
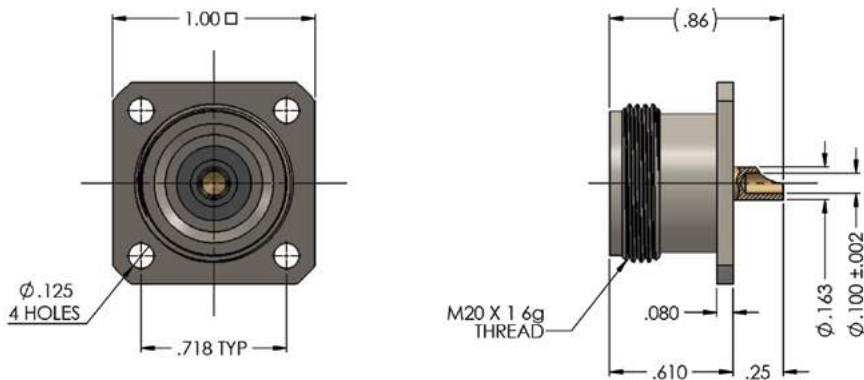
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Thread-In Jack Receptacle Post Contact

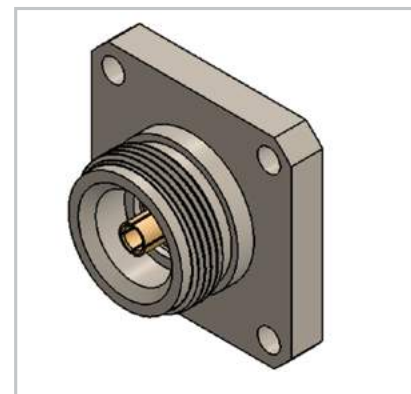
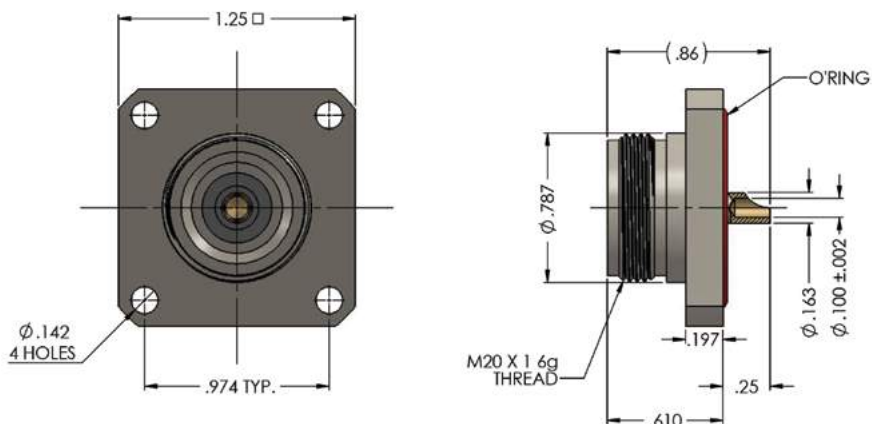


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Thread-In Jack Receptacle Solder Pot

**Panel Jack Receptacles****9943000Q331-700**

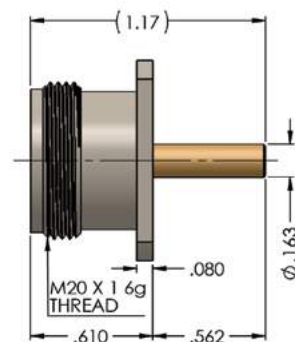
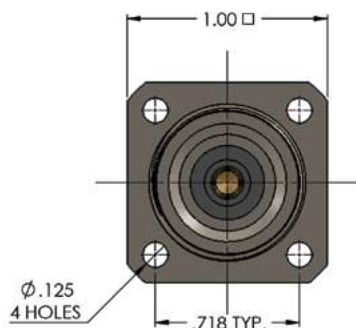
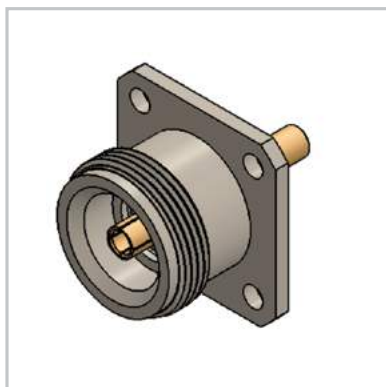
Panel Jack Receptacles - 1.00 in Square Flange, Solder Pot

**9943000Q911-700**

Panel Jack Receptacles - 1.25 in Square Flange, Solder Pot

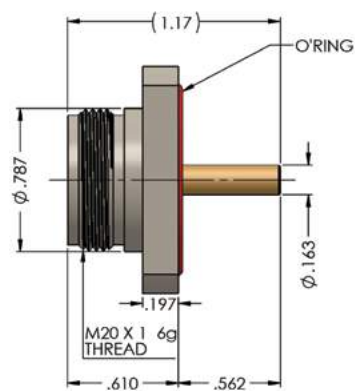
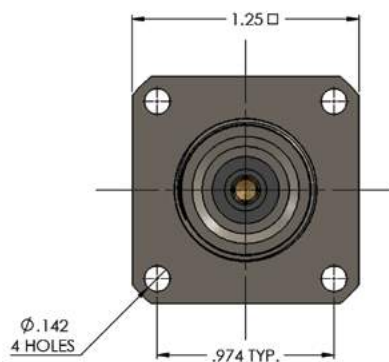
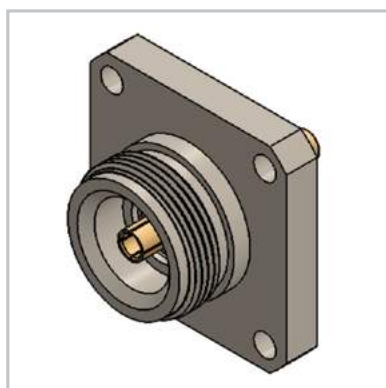


Panel Jack Receptacles



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Panel Jack Receptacle - 1.00 in Square Flange, Post Contact

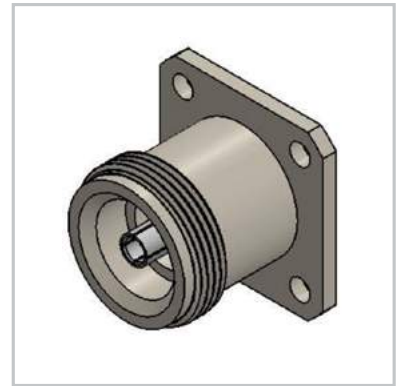
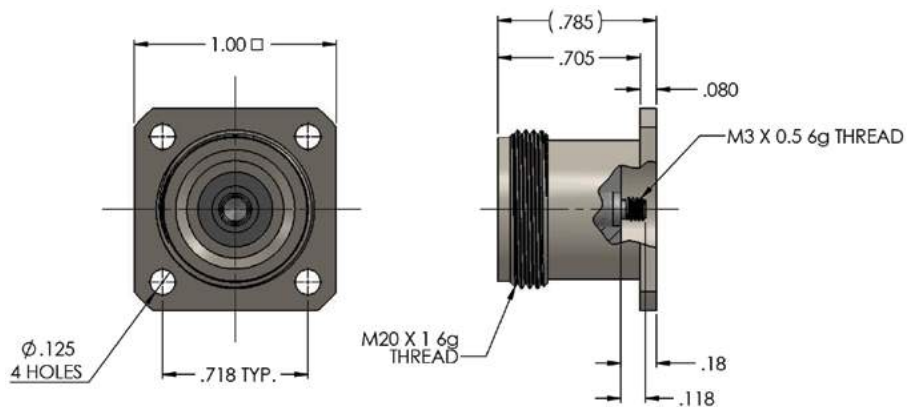


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Panel Jack Receptacle - 1.25 in Square Flange, Post Contact

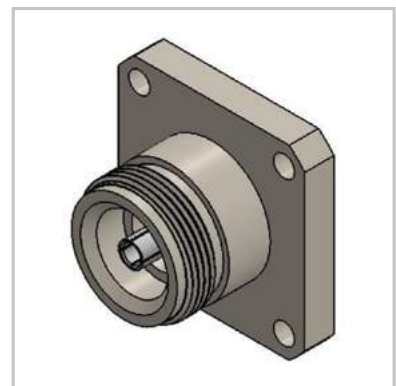
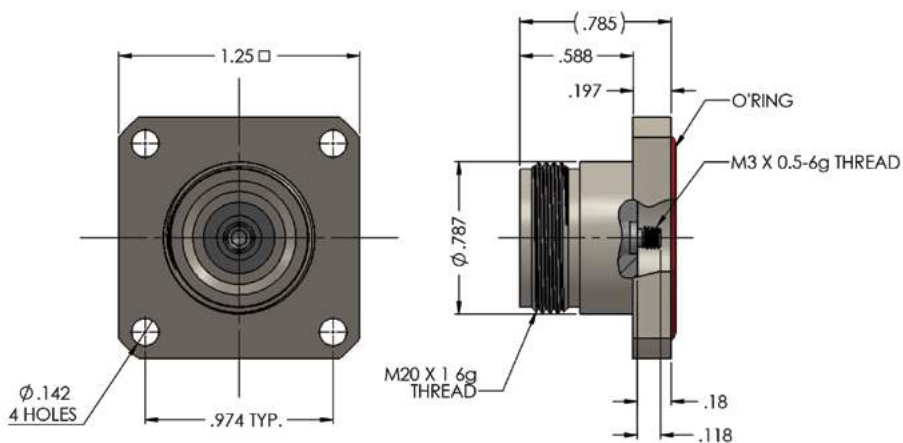


Panel Jack Receptacles



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Panel Jack Receptacle - 1.00 in Square Flange, M3 Thread

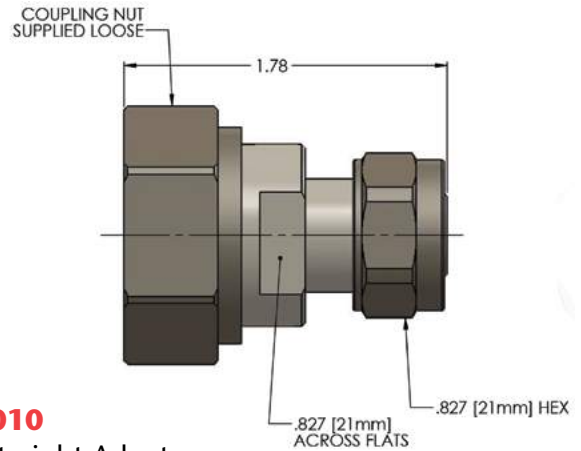
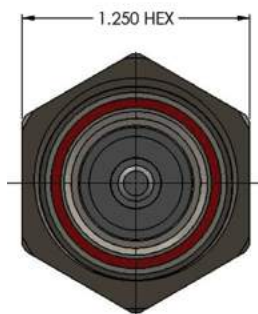
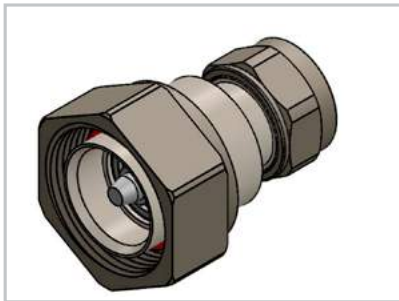


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Panel Jack Receptacle - 1.25 in Square Flange, M3 Thread

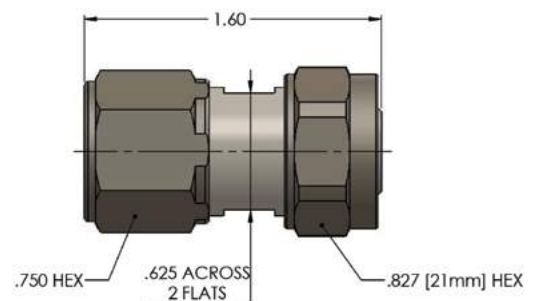
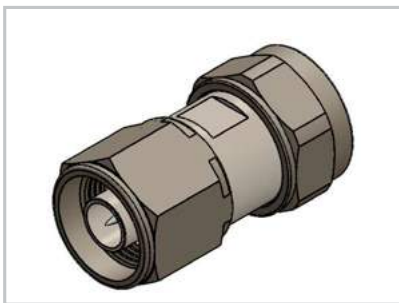


Between Series Adapters



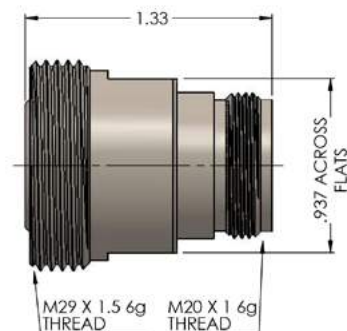
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7/16 Plug To 4.1/9.5 Plug - Straight Adapter



2227000Q001-011

N Plug To 4.1/9.5 Plug - Straight Adapter

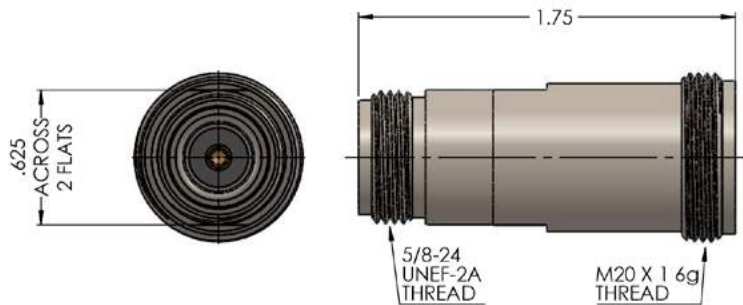


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7/16 Jack To Mini-DIN 4.1/9.5 Jack - Straight Adapter

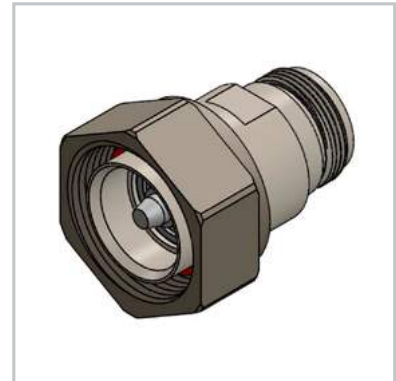
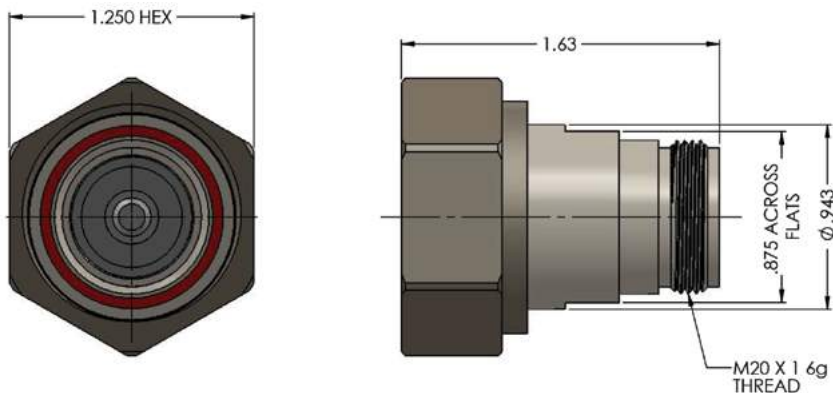


Between Series Adapters



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Type N Jack To Mini-DIN 4.1/9.5 Jack - Straight Adapter

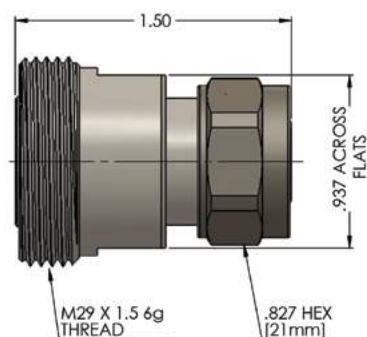
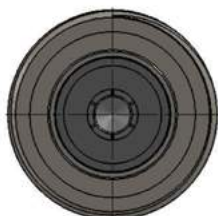


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7/16 Plug To 4.1/9.5 Jack - Straight Adapter

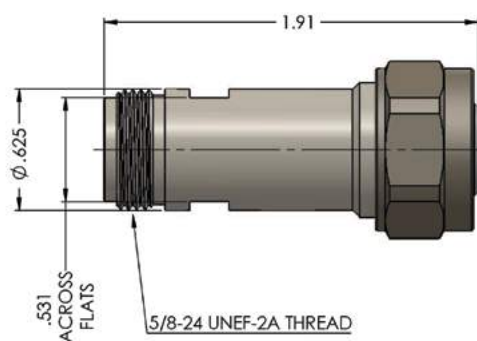


Between Series Adapters



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7/16 Jack To 4.1/9.5 Plug - Straight Adapter

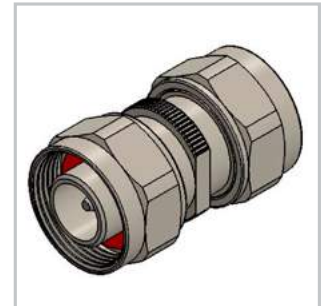
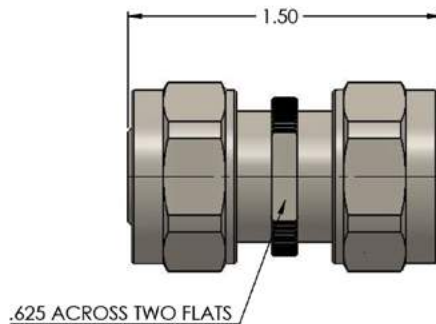
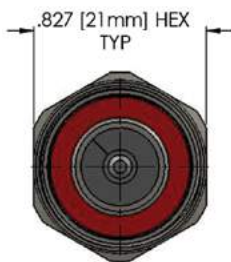


2234000Q001-284

N Jack To 4.1/9.5 Plug - Straight Adapter

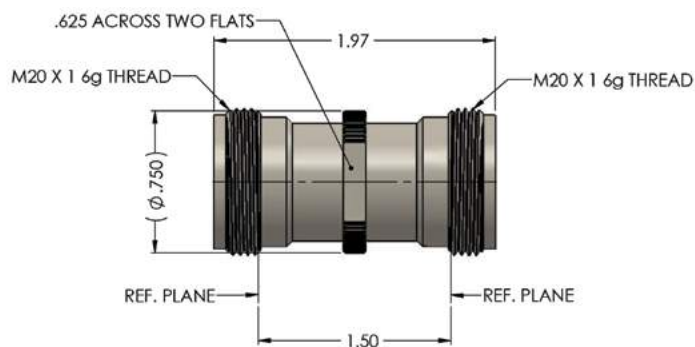


In-Series Adapters



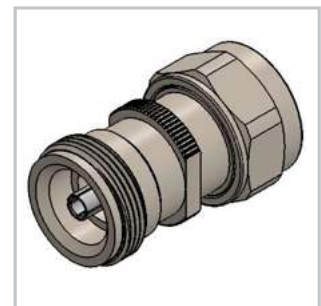
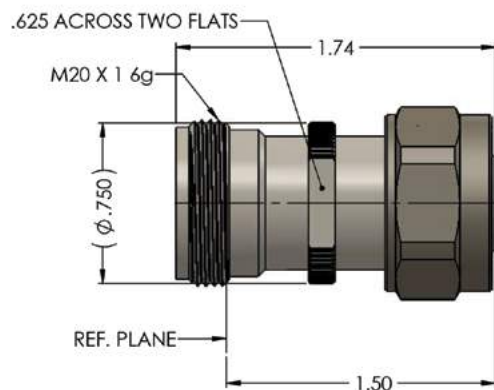
9927000Q001-000

4.1/9.5 Plug To 4.1/9.5 Plug - Straight Adapter



9928000Q001-000

4.1/9.5 Jack To 4.1/9.5 Jack - Straight Adapter



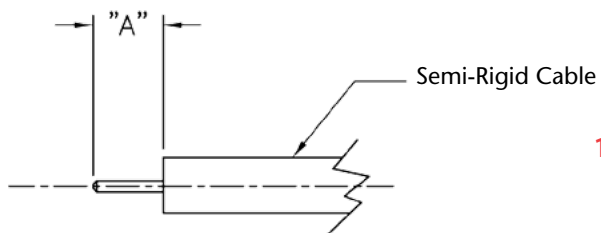
9934000Q001-000

4.1/9.5 Jack To 4.1/9.5 Plug - Straight Adapter



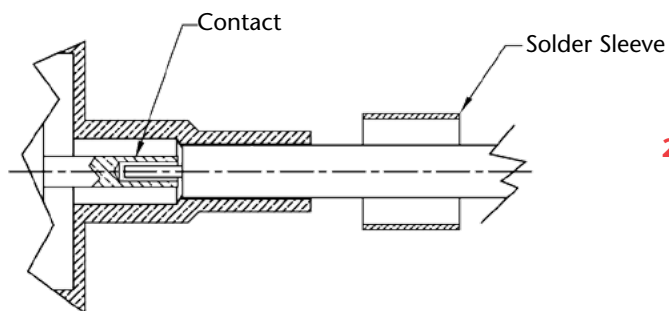
Cable Connector Assembly Procedures

Trim Dimensions	
A	Cable Type
.090	.086 S/R - Semi-flex
.150	.141 S/R - Semi-flex
.250	.250 S/R - Semi-flex

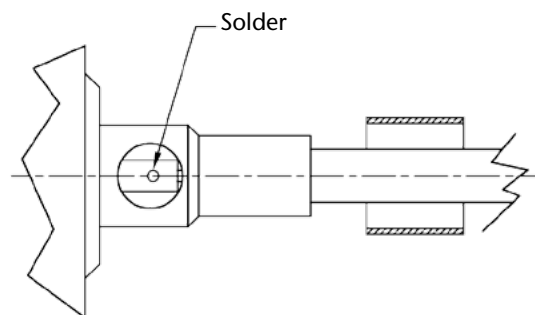


1. Trim cable to dimensions shown. Remove any burrs from outer and center conductor.

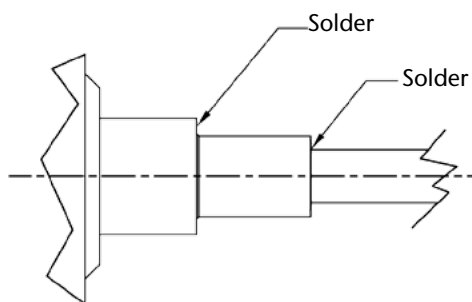
Recommended Cable Cutting Dimensions



2. Slide solder sleeve over cable.
Press cable into connector as shown.
Make certain center conductor is seated contact.



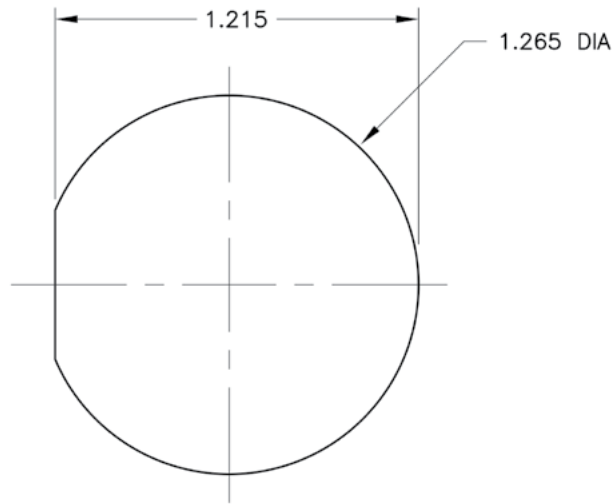
3. Solder center conductor to contact body through radial hole in tail.



4. Solder semi-rigid cable to tail.
Slide solder sleeve over opening and solder.



Mounting Hole Information



Recommended
Mounting Hole
For 9916XXXQ911 - 700

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2228000Q001-052	12	9916050Q911-700	6
2228000Q001-053	13	9920000Q911-700	8
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2234000Q001-282	14	9920000Q911-702	8
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About Delta Electronics Manufacturing Corporation

AS9100 Rev C / ISO 9001:2008 Certified



From our early New England roots to our current global manufacturing presence, we have consistently grown with, and adapted to, the ever changing requirements of the coaxial connector market. Beginning as a manufacturer of UHF frequency connectors, our growth in product lines and manufacturing capability now positions us as a premier connector supplier, with one of the broadest ranges of products in the industry.

Along with our product line expansion, we recognized the need to keep pace with innovations such as Lean Manufacturing, precision CNC turning centers, and sophisticated CAD/CAM and HFSS modeling software, all geared toward providing our customers the highest quality products available, with quick delivery and competitive prices.

In recognition of our customers' need to streamline their processes, we launched our "Value Added" services, providing finished cable assemblies and integrated connectorized components that help our customers optimize their production and eliminate overhead.

Another "Value-Added" service is our new, fully automated electroplating facility, incorporating robotic handling and computerized process controls and testing, increasing our capability to perform contract plating of a wide variety of component parts with the same quality and consistency featured on our connectors.

Call us for all your coaxial connector needs - We make over 80 different series to match your requirements exactly, including:

- 1.0/2.3 • 4.1/9.5 Mini DIN • 7/16
- Adapters Between Series*
- BMA • BMMA • BNC* • BNC Push-on • C
- Cable Assemblies • E-Line Brass SMA • GHV
- GR874 • HN • LC-LT • MC-Card • MCX • MMCX
- MHV • MHF/U.FL • N* • QDS • QDL • QMA • SC
- SM • SMA • SMA 26.5 GHz • SMA 27 GHz • SMB
- SMC • SMD • SMK (2.92 mm) • SMP • SMPM • SSMC • TNC* • TPS • Triaxial BNC, C, N, TNC
- Twinax BNC, HN, TNC • Twinax HV
- Twinax 3/4-20 • 75Ω BNC, TNC • 70Ω N • UHF
- U.FL

*M39012/M55339 QPL available

4.1/9.5 v1.0 5/14

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