



DELTA
Electronics Mfg. Corp.



4.1 / 9.5
Mini DIN
Low PIM
Connectors



Applications

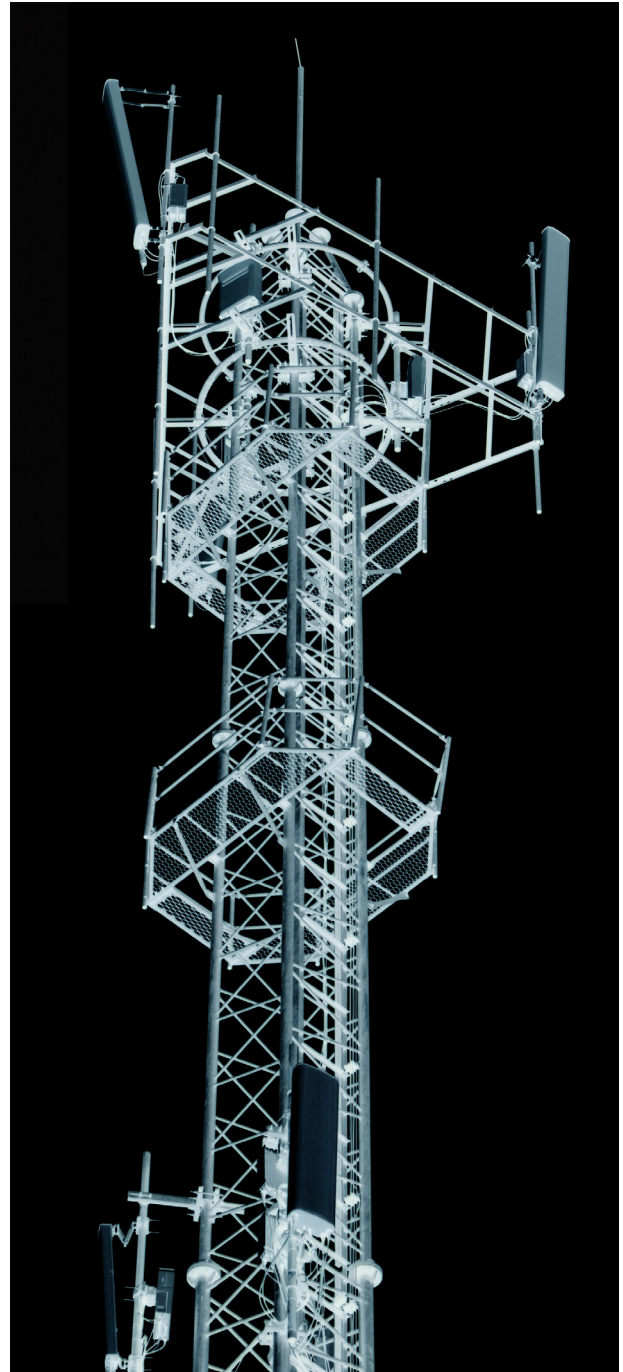
4.1/9.5 Mini DIN Application Notes

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

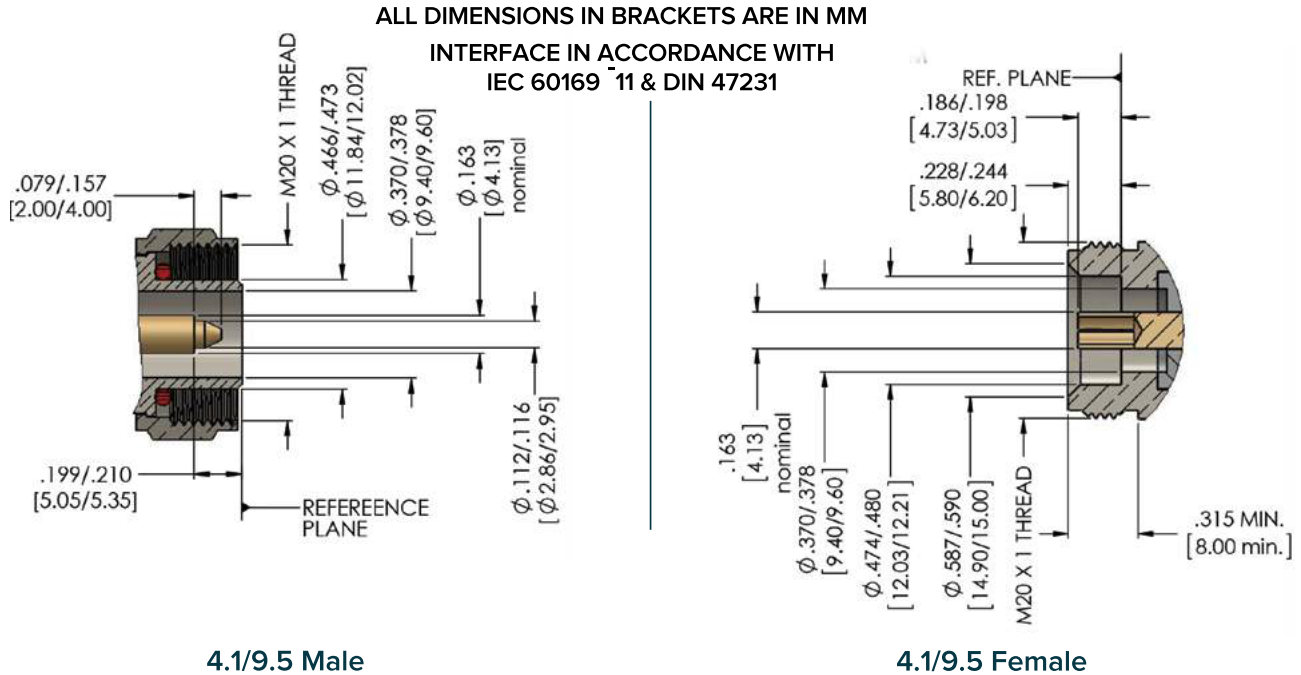
This catalog offers a wide range of standard 4.1/9.5 Mini DIN configurations, which includes male and female cable mounts, receptacles, in-series adapters and between series adapters. If you can't find a configuration that meets your requirements, please contact the factory for assistance.

IEC standardization (DIN 47231 or IEC 60169-11)

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Interfaces



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 D 1710
 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

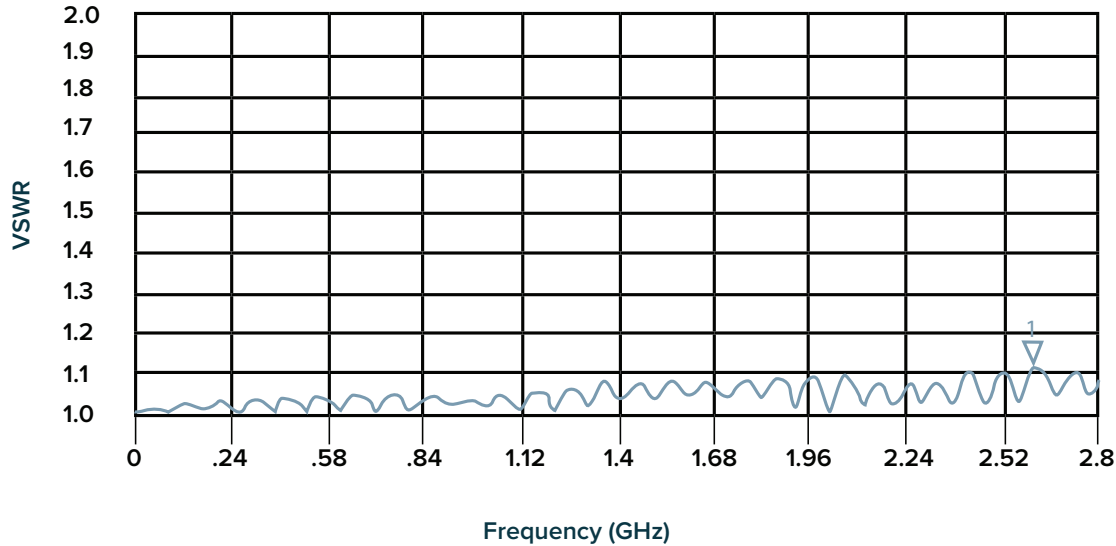
All other specifications are in accordance with the latest issues of DIN 47231 or IEC 60169-11 specifications.

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

Test Data

VSWR

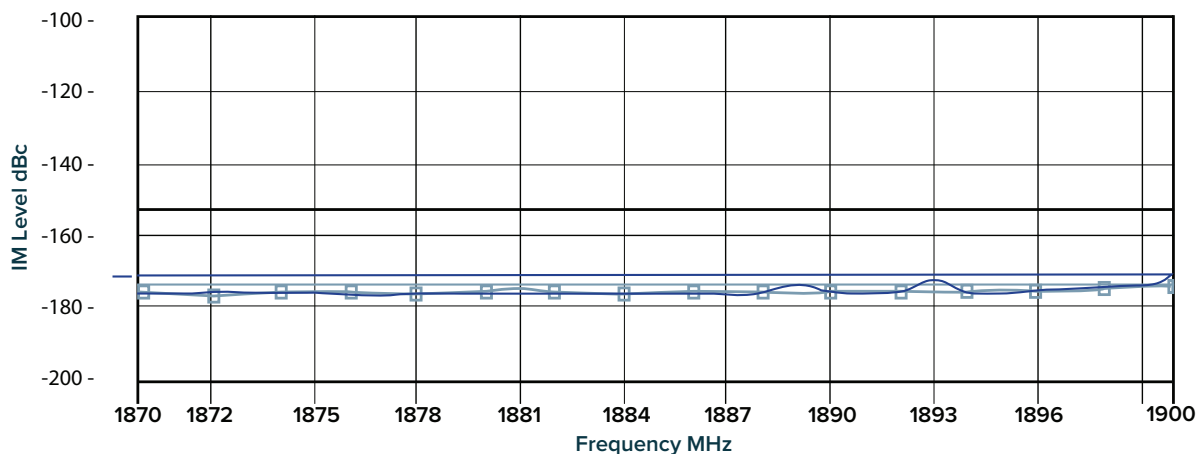
Marker 1: 1.1163 @ 2.808 GHz



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



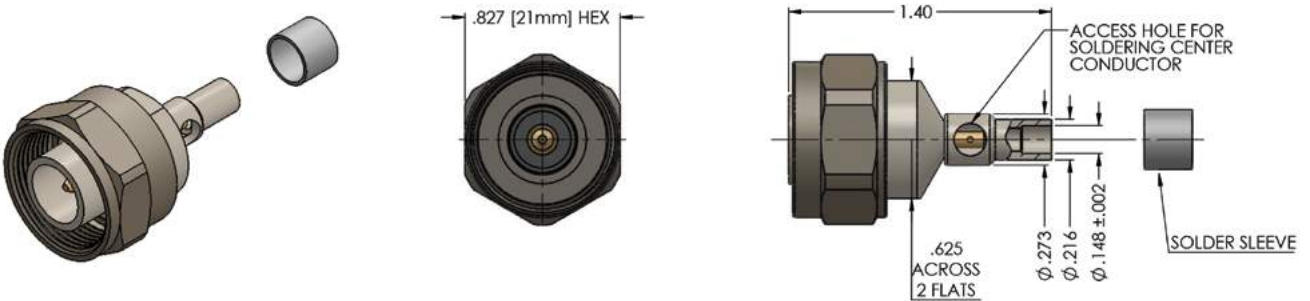
Passive Intermodulation measurements for the 4.1/9.5 Mini DIN were taken under the following test conditions: 4.1/9.5 Male to 4.1/9.5 Female Cable assembly with HABIA 402 NM FJ cable – 6" long. Attached to each end of the assembly was a 7/16 adapter – male & female. These were tested with 2 tones, 43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

Equipment used: Kaelus PIM Analyzer Model# 1900FE

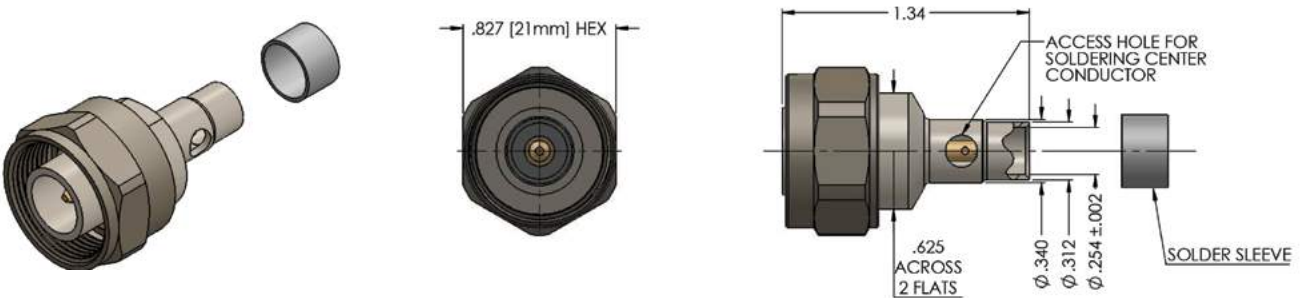
Direct Solder Plugs



9901025Q003-700
Direct Solder Plug for .086 Dia S/R Cable



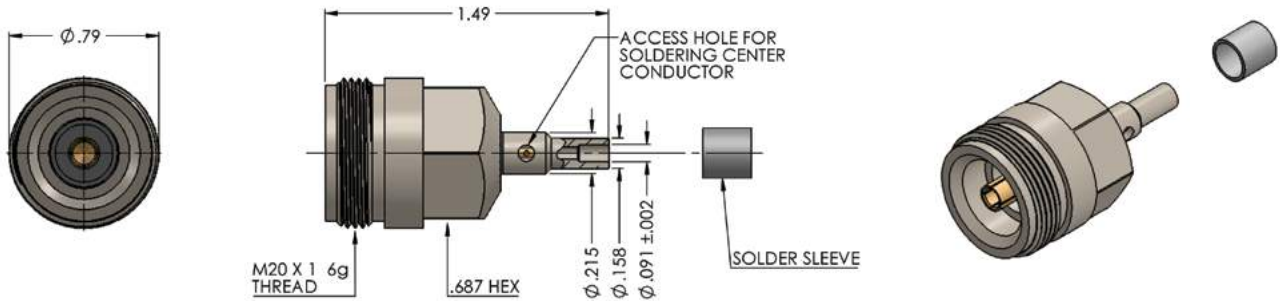
9901031Q003-700
Direct Solder Plug for .141 Dia S/R Cable



9901050Q003-700
Direct Solder Plug for .250 Dia S/R Cable

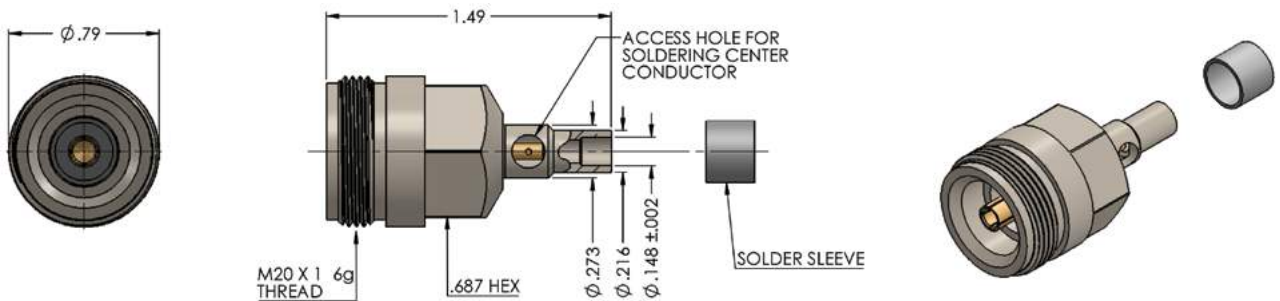
See page 16 for assembly instructions.

Direct Solder Jacks



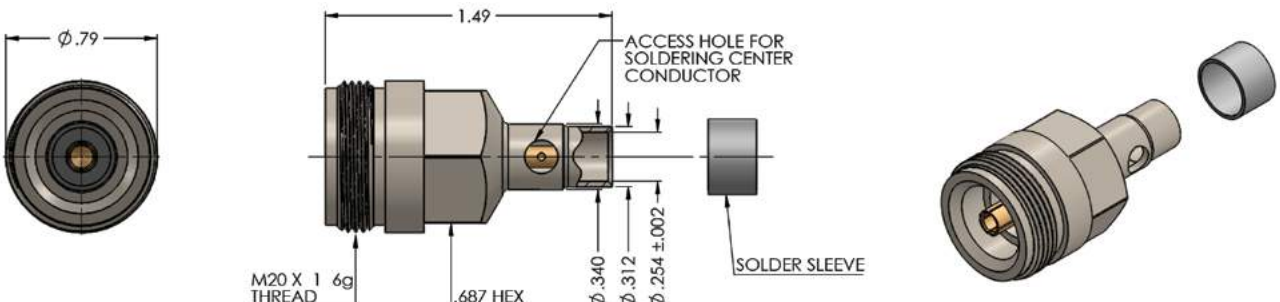
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Direct Solder Jack for .086 Dia S/R Cable



9908031Q003-700

Direct Solder Jack for .141 Dia S/R Cable

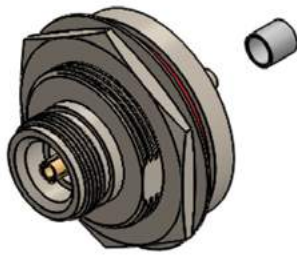


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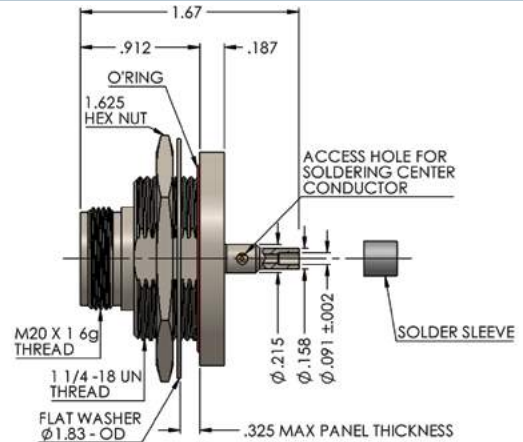
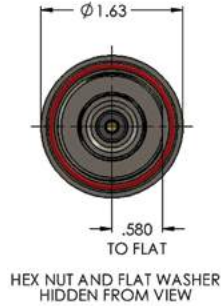
Direct Solder Jack for .250 Dia S/R Cable

See page 16 for assembly instructions.

Direct Solder Bulkhead Jacks

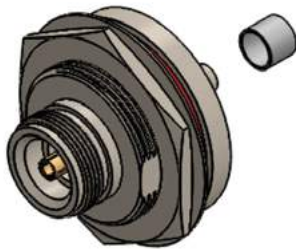


See page 17 for mounting hole detail.

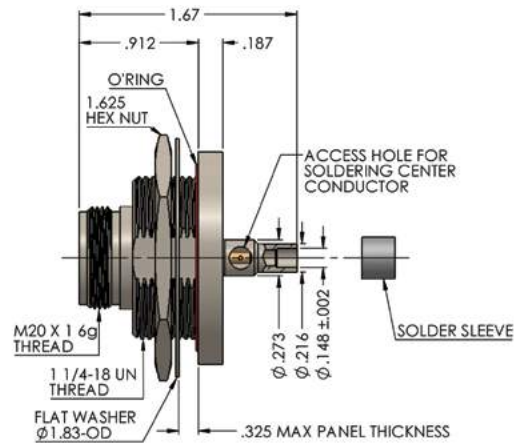
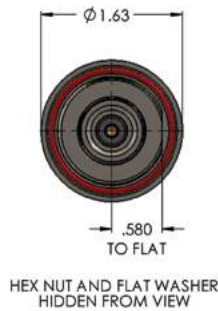


9916025Q911-700

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

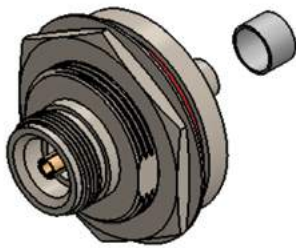


See page 17 for mounting hole detail.

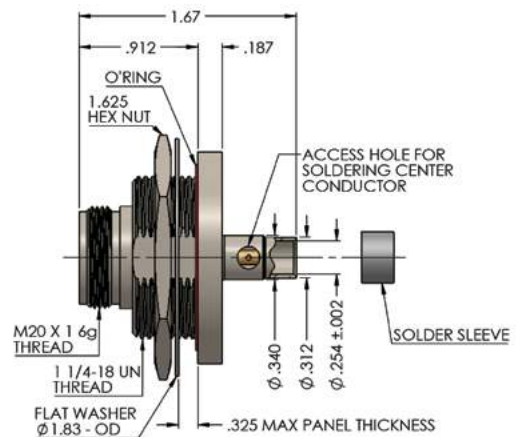
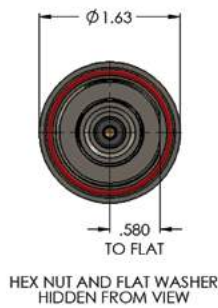


9916031Q911-700

Direct Solder Bulkhead Jack for .141 Dia S/R Cable



See page 17 for mounting hole detail.

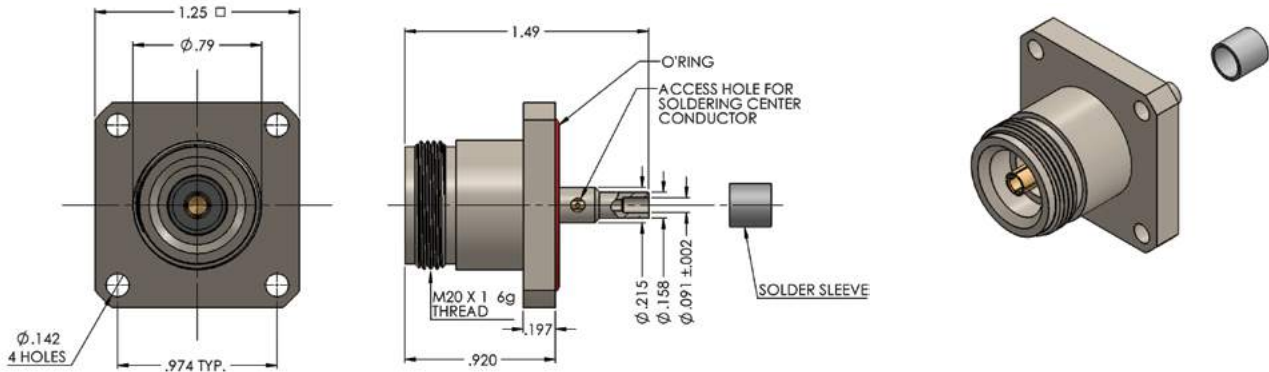


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Direct Solder Bulkhead Jack for .250 Dia S/R Cable

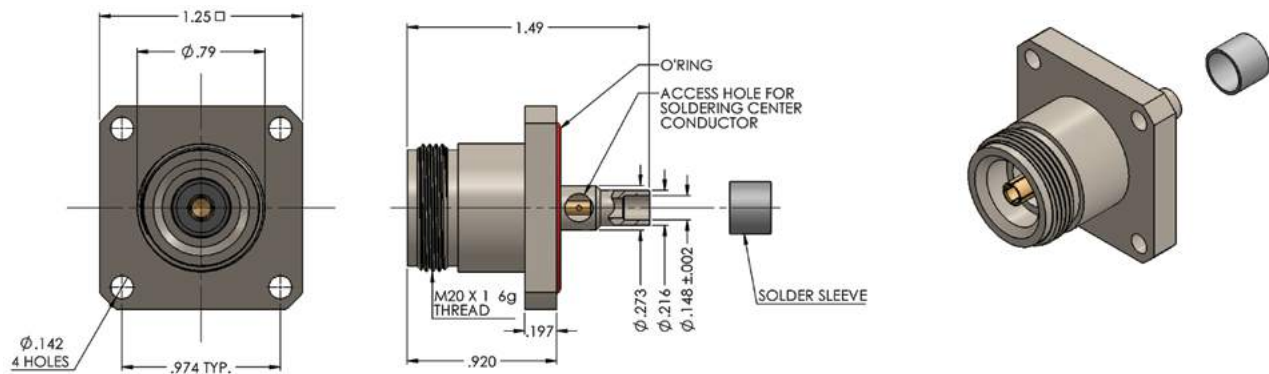
See page 16 for assembly instructions.

Direct Solder Panel Mount Jacks



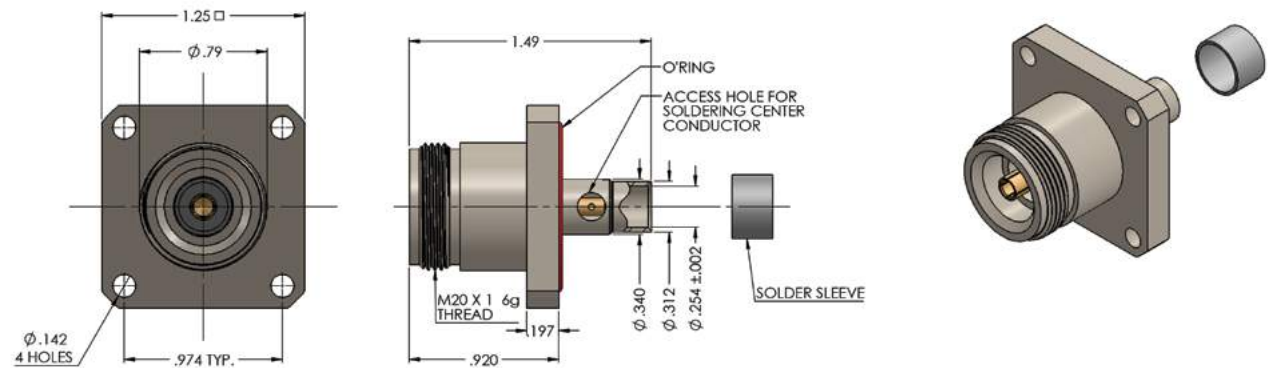
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Direct Solder Panel Mount Jack for .086 Dia S/R Cable



9911031Q911-700

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

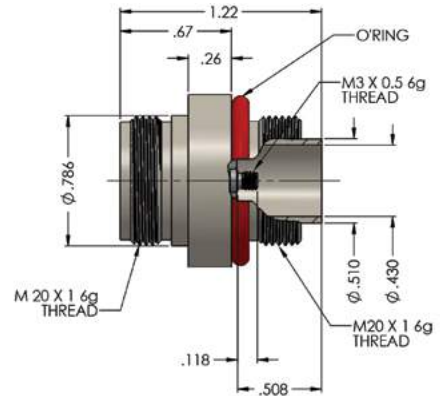
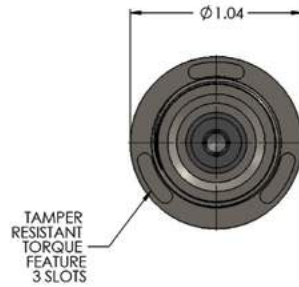
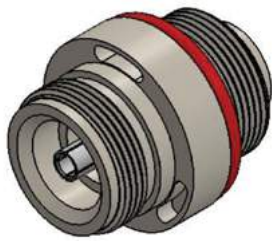


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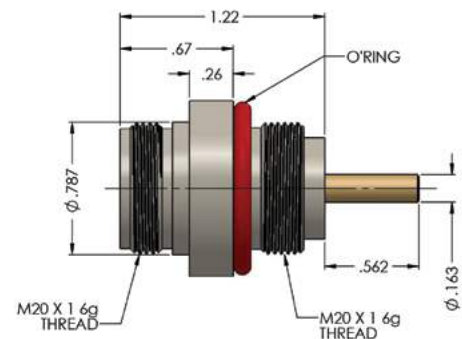
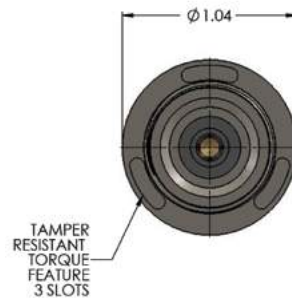
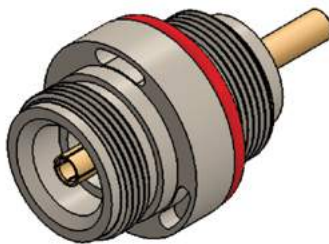
Direct Solder Panel Mount Jack for .250 Dia S/R Cable

See page 16 for assembly instructions.

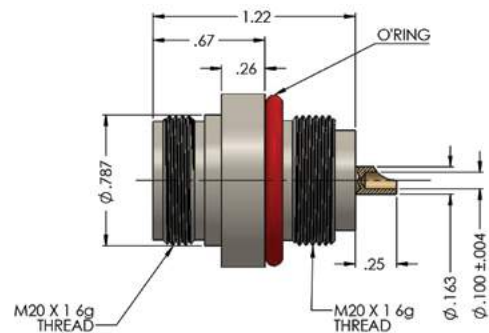
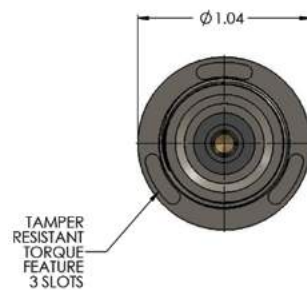
Thread-In Jack Receptacles



9920000Q911-700
Thread-In Jack Receptacle M3 Thread

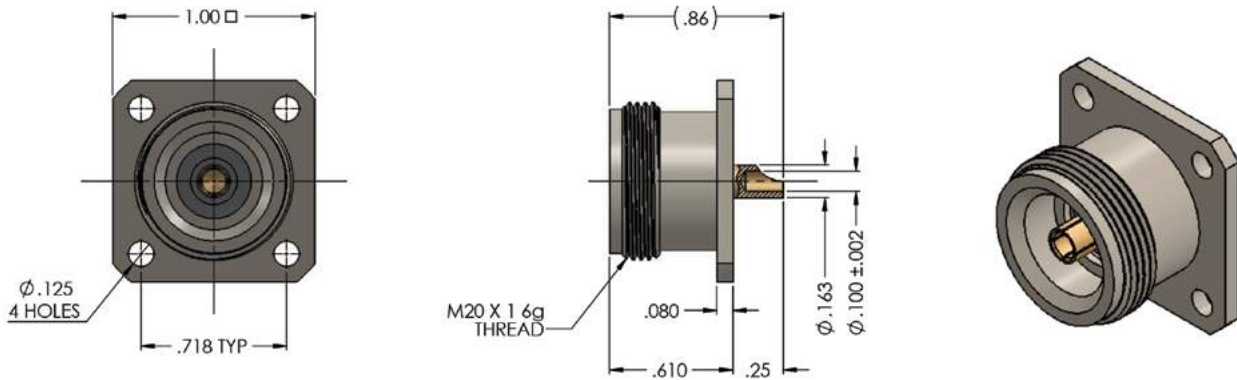


9920000Q911-701
Thread-In Jack Receptacle Post Contact



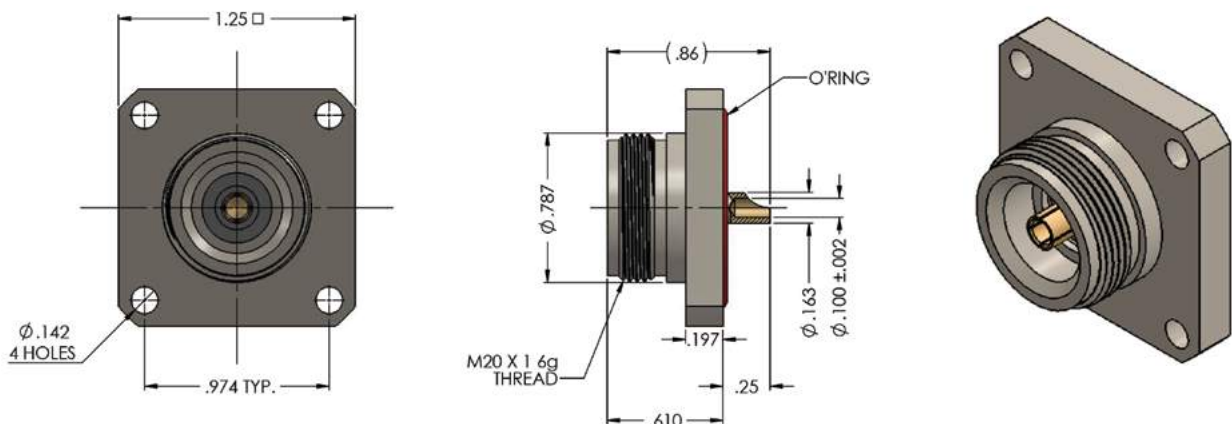
9920000Q911-702
Thread-In Jack Receptacle Solder Pot

Panel Jack Receptacles



9943000Q331-700

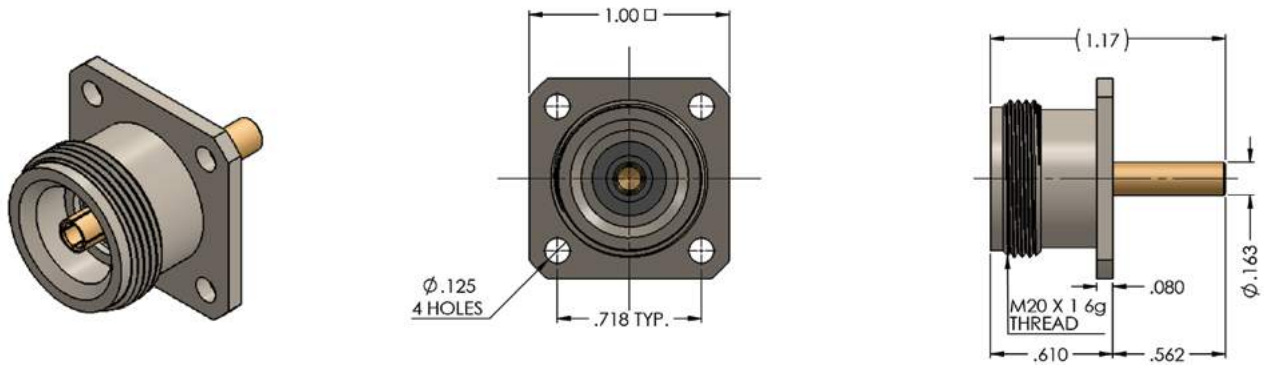
Panel Jack Receptacles - 1.00 in Square Flange, Solder Pot



9943000Q911-700

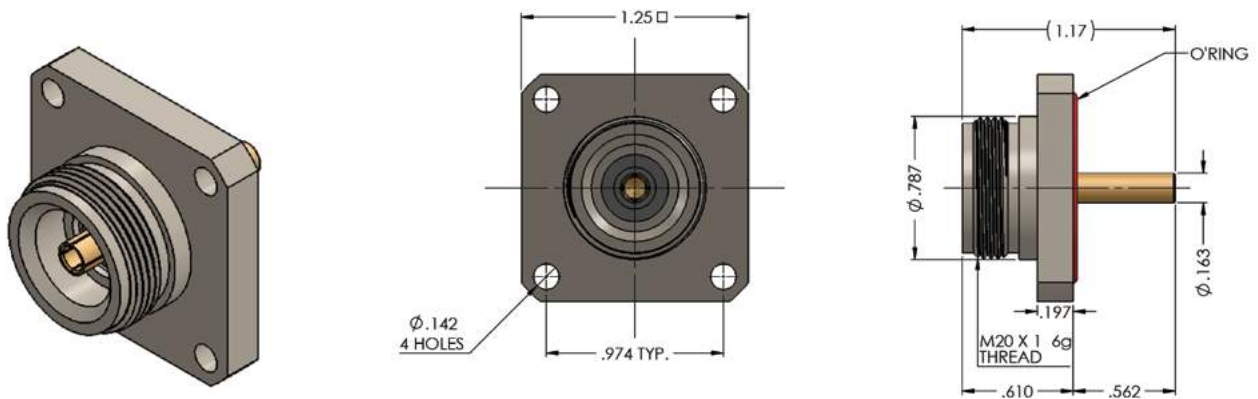
Panel Jack Receptacles - 1.25 in Square Flange, Solder Pot

Panel Jack Receptacles



9958000Q331-700

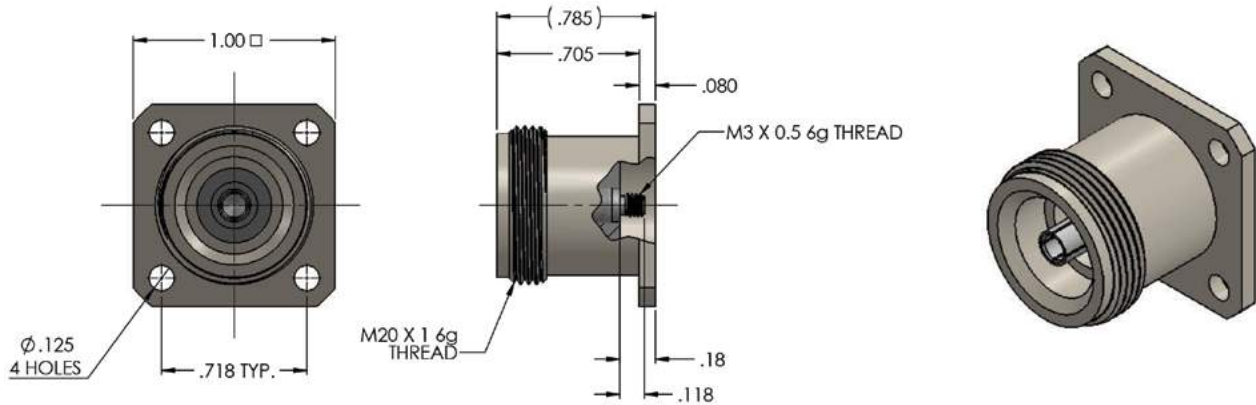
Panel Jack Receptacle - 1.00 in Square Flange, Post Contact



9958000Q911-700

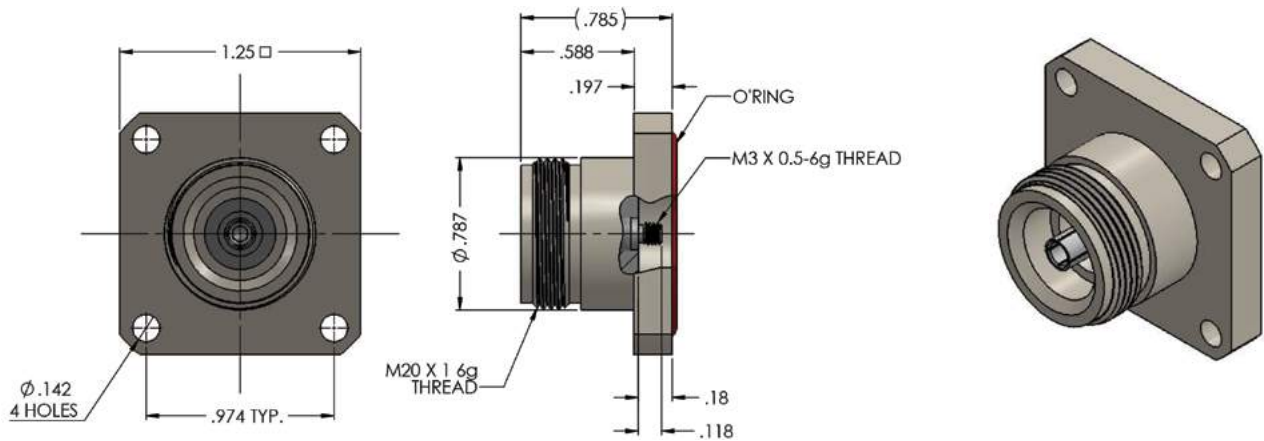
Panel Jack Receptacle - 1.25 in Square Flange, Post Contact

Panel Jack Receptacles



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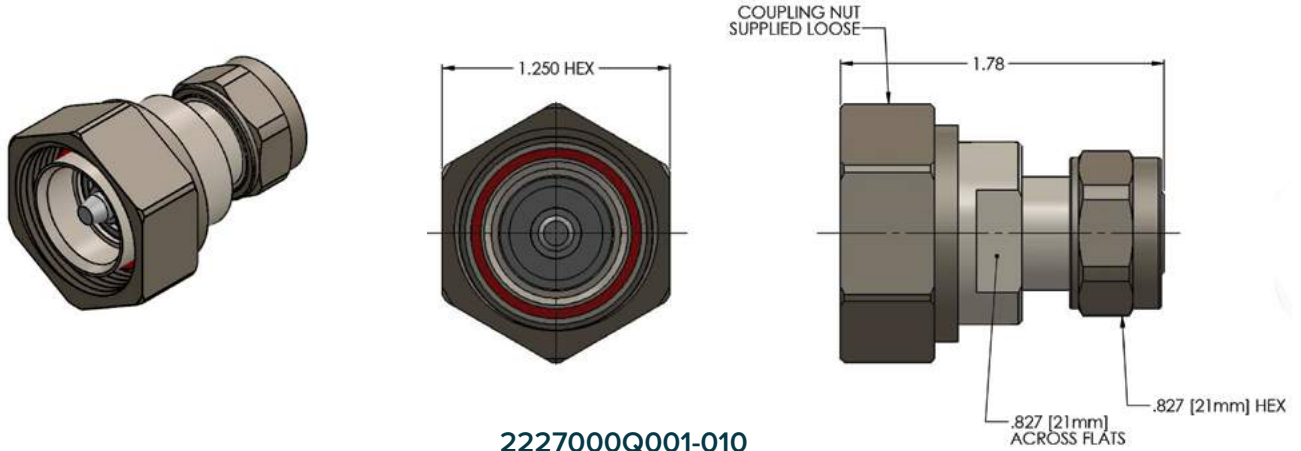
Panel Jack Receptacle - 1.00 in Square Flange, M3 Thread



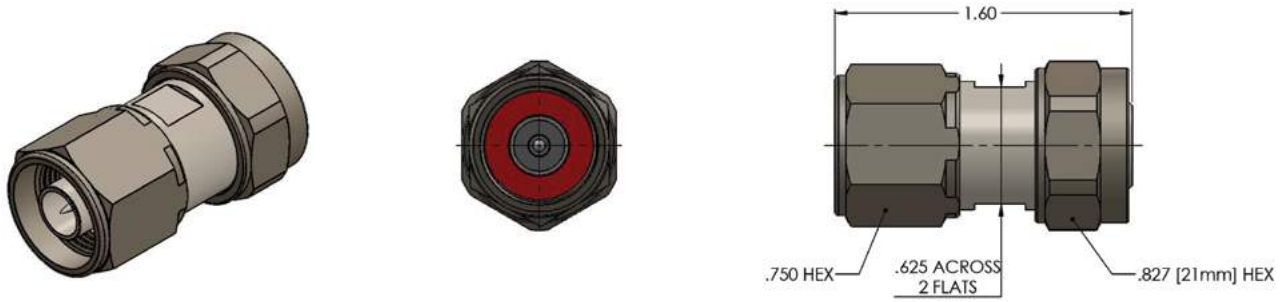
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Panel Jack Receptacle - 1.25 in Square Flange, M3 Thread

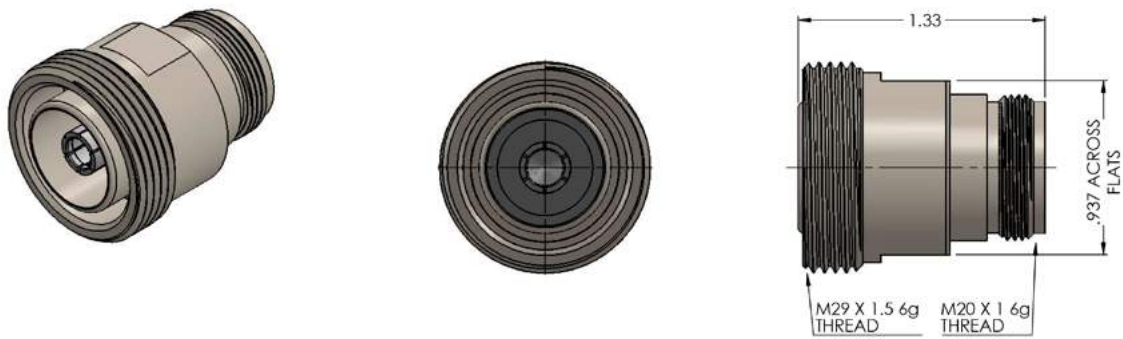
Between Series Adapters



2227000Q001-010
7/16 Plug To 4.1/9.5 Plug - Straight Adapter

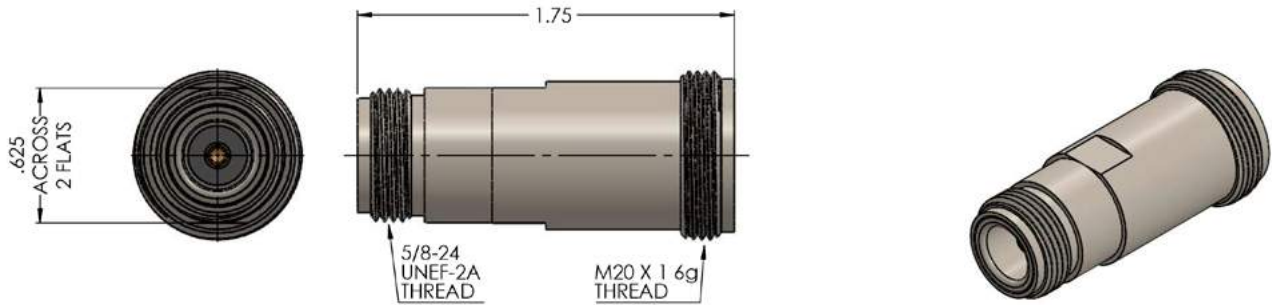


2227000Q001-011
N Plug To 4.1/9.5 Plug - Straight Adapter



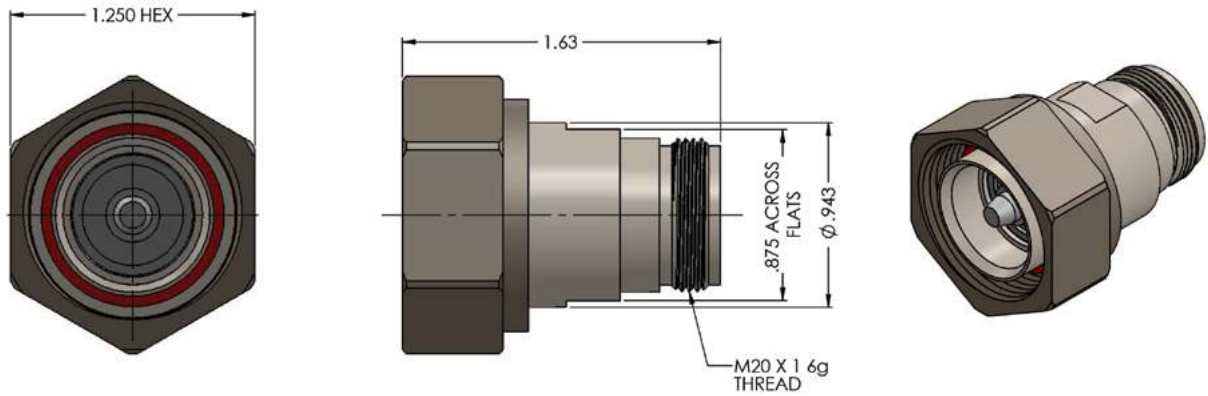
2228000Q001-052
7/16 Jack To Mini-DIN 4.1/9.5 Jack - Straight Adapter

Between Series Adapters



2228000Q001-053

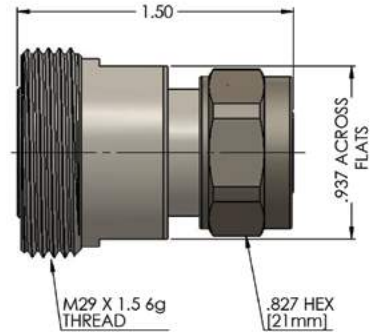
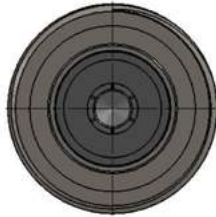
Type N Jack To Mini-DIN 4.1/9.5 Jack - Straight Adapter



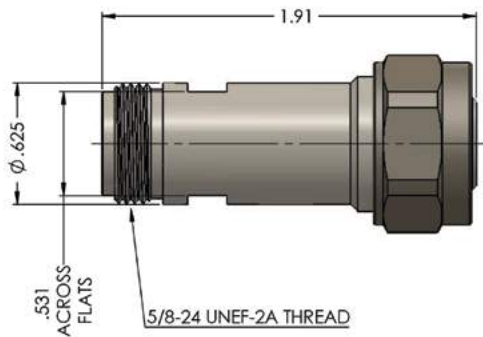
2234000Q001-281

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

Between Series Adapters

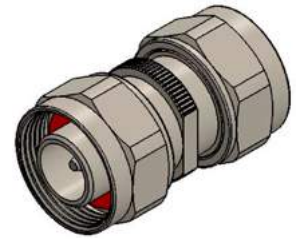
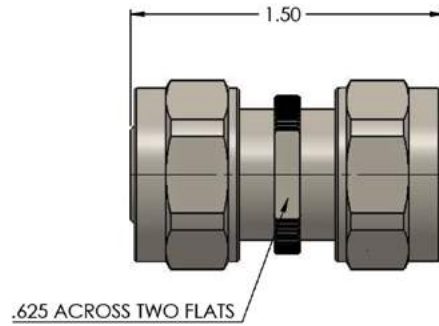


2234000Q001-282
7/16 Jack To 4.1/9.5 Plug - Straight Adapter

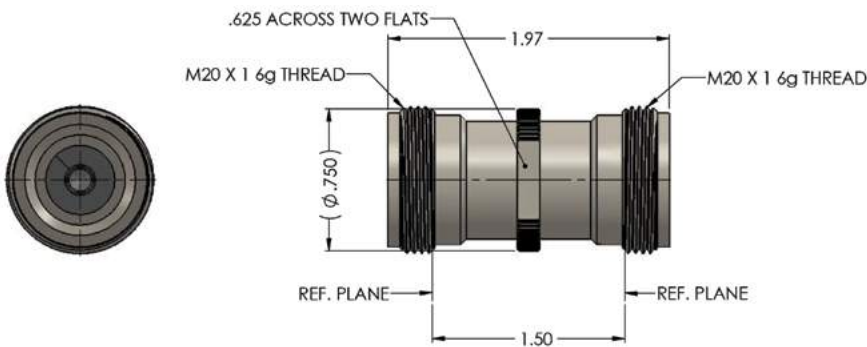


2234000Q001-284
N Jack To 4.1/9.5 Plug - Straight Adapter

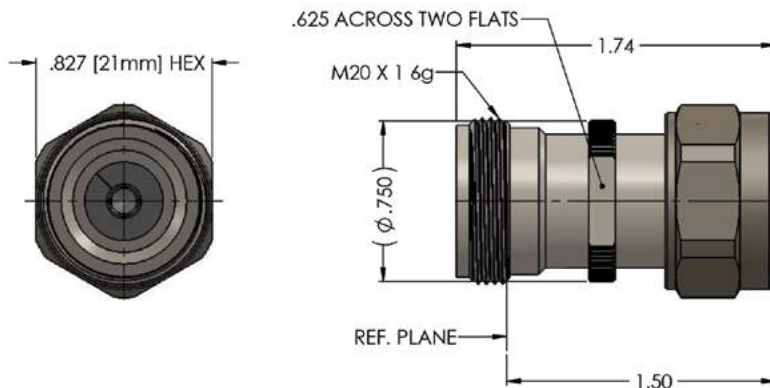
In-Series Adapters



9927000Q001-000
4.1/9.5 Plug To 4.1/9.5 Plug - Straight Adapter



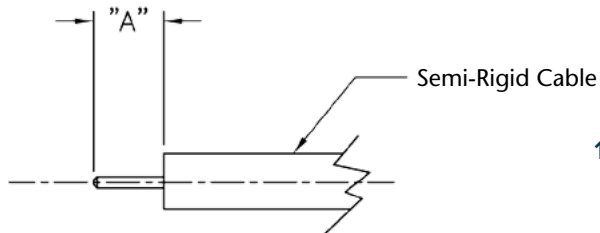
9928000Q001-000
4.1/9.5 Jack To 4.1/9.5 Jack - Straight Adapter



9934000Q001-000
4.1/9.5 Jack To 4.1/9.5 Plug - Straight Adapter

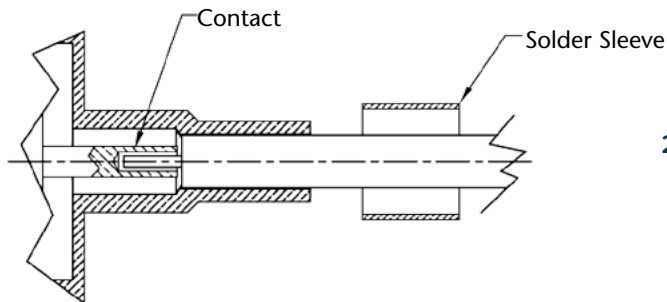
Cable Connector Assembly Procedures

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

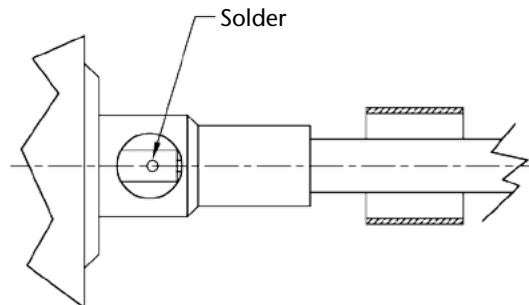


1. Trim cable to dimensions shown. Remove any burrs from outer and center conductor.

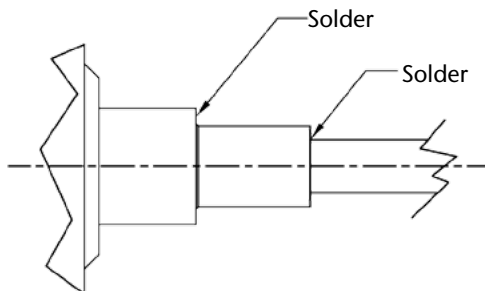
Recommended Cable Cutting Dimensions



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

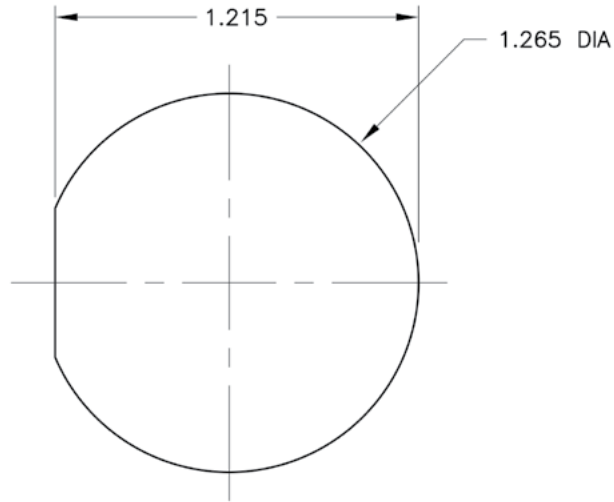


3. Solder center conductor to contact body through radial hole in tail.



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

Mounting Hole Information



Recommended
Mounting Hole
For 9916XXXQ911 - 700

Index by Delta Part Number

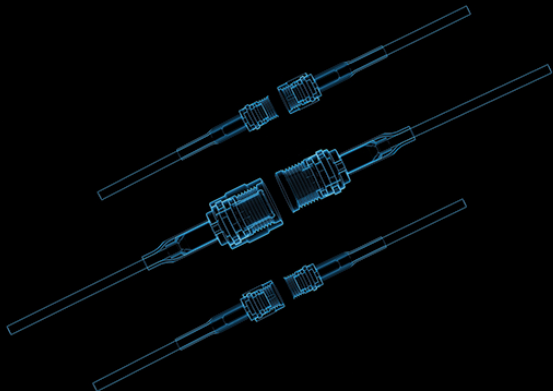
Delta P/N	Page	Delta P/N	Page
2227000Q001-010	13	9916025Q911-700	7
2227000Q001-011	13	9916031Q911-700	7
2228000Q001-052	13	9916050Q911-700	7
2228000Q001-053	14	9920000Q911-700	9
2234000Q001-281	14	9920000Q911-701	9
2234000Q001-282	15	9920000Q911-702	9
2234000Q001-284	15	9927000Q001-000	16
9901025Q003-700	5	9928000Q001-000	16
9901031Q003-700	5	9934000Q001-000	16
9901050Q003-700	5	9943000Q331-700	10
9908025Q003-700	6	9943000Q911-700	10
9908031Q003-700	6	9958000Q331-700	11
9908050Q003-700	6	9958000Q331-701	12
9911025Q911-700	8	9958000Q911-700	11
9911031Q911-700	8	9958000Q911-701	12
9911050Q911-700	8		



CREATE



COLLABORATE



CONNECT



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