

3.5mm

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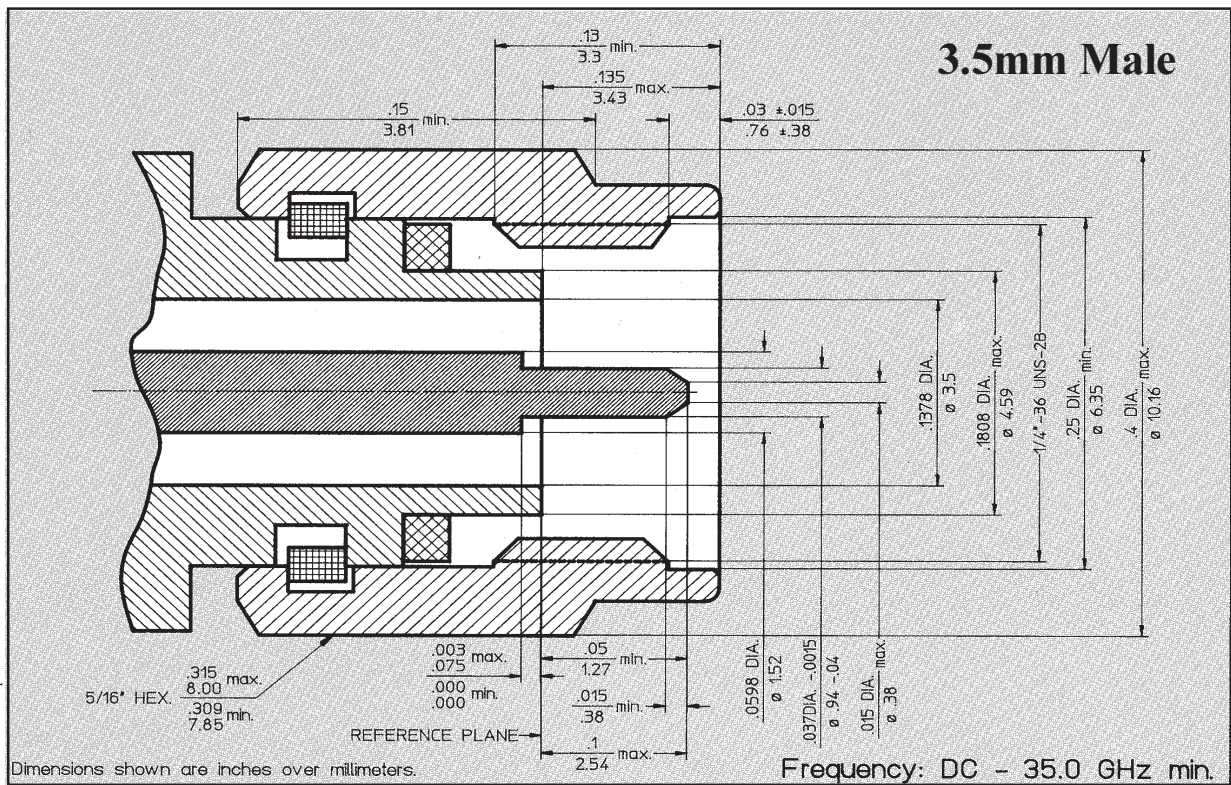
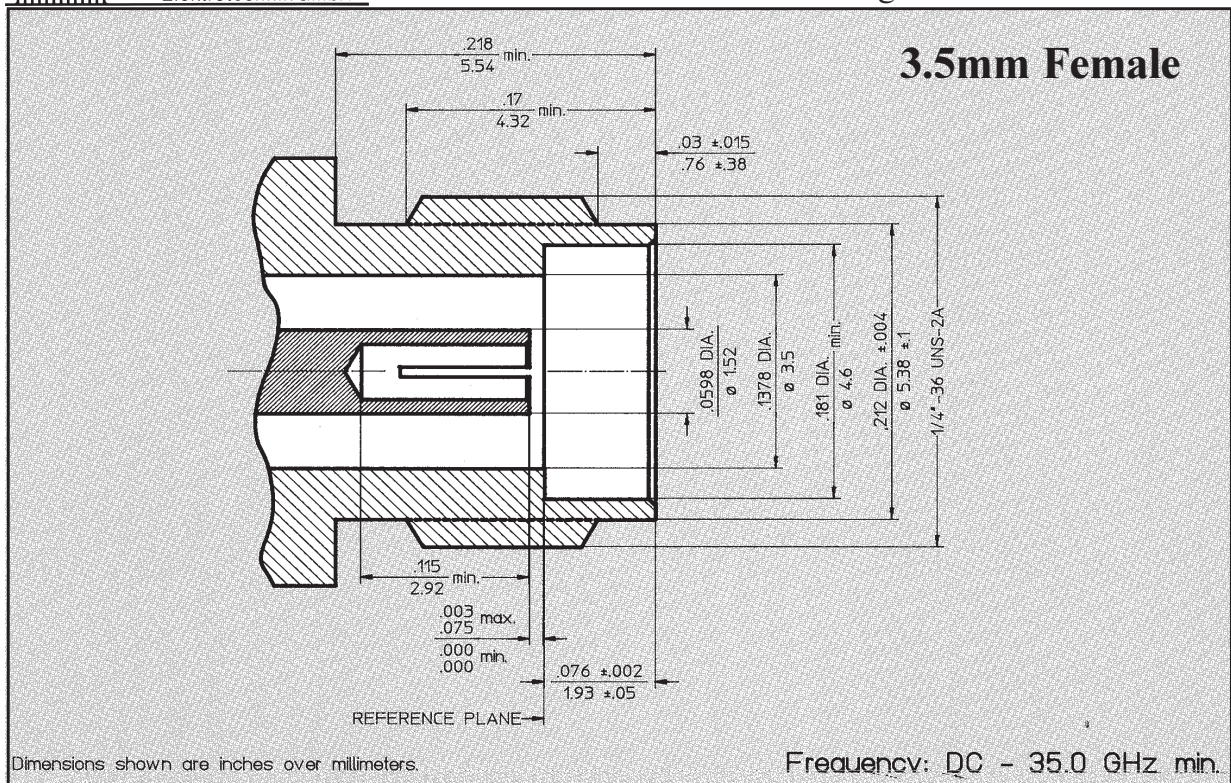
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APPENDIX

3.5mm Specifications



The specifications below are general specifications for all 3.5 mm connectors. Specific Data for VSWR, Insertion Loss, R.F. leakage, etc., are available from the factory upon request. Specifications in the following table are recommended for any procurement documents or drawings. In the event of any conflict between these specifications and other documentation, these specifications shall govern. These specifications are subject to change according to the latest revision.

REQUIREMENT	GENERAL SPECIFICATIONS
GENERAL	
Standard Materials	STEEL corrosion resistant 1.4305 per DIN 17440 (QQ-S-764, class 303 or ASTM-A-582-80). ALUMINUM AlMg4.5Mn per DIN 1725, AlMgSi0.5 per DIN 1725, AlMgSi1 per DIN 1725 (6061-T6 per QQ-A-225/8). BRASS CuZn39Pb3 per DIN 17660 (UNS C 38500). COPPER BERYLLIUM 33-25 CuBe2Pb H per DIN 17666 (ASTM B 196). TFE Fluorocarbon per DIN 52900 (MIL-P-19468 and L-P403). SILICONE RUBBER per DIN 3771 (MIL-R-5847 and ZZ-R-765, Class II B,) Grade 50 - 75. BORRIUM NITRITE Dielectric for high power applications per inhouse specification.
Finish for COPPER BERYLLIUM STAINLESS STEEL ALUMINUM BRASS VARIOUS	Centre Contacts shall be gold plated to a minimum thickness of .00005 inch (1.25 µm) in accordance with ASTM B 488, Type 3, Code C, Class 1.25. shall be passivated per ASTM A 967. Conductive Parts shall have an iridited finish per MIL-C-5541. Other parts, such as Coupling Nuts and Back-Bodies shall be anodized per MIL-A-8625. .00003 inch (0.75 µm) min. gold plating per ASTM B 488, or nicle plating per QQ-N-290, as specified. Imoloy .0001 inch (2.5 µm) min. plating, consisting of 55% Copper / 20% Zinc / 25% Tin (on special request).
Design	The design shall be such that the outline dimensions in this catalog are met. In addition, the assembled connector shall meet the interface dimensions.
ELECTRICAL	
Frequency Range	DC - 35.0 GHz min.
Insulation Resistance	The insulation resistance is not applicable.
Voltage Standing Wave Ratio (VSWR)	1.01 + .004 * f (GHz)
Contact Resistance	The center contact resistance drop shall not exceed 2.0 milliohms and the outer contact resistance drop shall not exceed 0.4 milliohms.
Dielectric Withstanding Voltage	The magnitude of the test voltage shall be 1,000 volts rms at sea level.
RF High Potential Withstanding Voltage	The RF high potential withstanding voltage is 500 volts rms at 5 MHz. Leakage is not applicable.
RF Leakage	-(100 - f (GHz)) dB
Insertion Loss	(.03 SQT(f(GHz))) dB
MECHANICAL	
Connector Durability	The connector is to be tested and its mating connector shall be subjected to 1000 insertions and withdrawal cycles at 12 cycles per minute max. The connector shall show no evidence of mechanical failure and the connector shall meet the mating characteristic requirements.
Cable Retention Force	60 pounds (267 N) min.
Coupling Nut Retention Force	Not applicable for Female connectors. For male connectors, the axial force is 100 lbs (445 N) max.. The torque is 15 inch-pounds (1.7 Nm) max.
Force to Engage and Disengage Longitudinal Force max.	The torque required to engage and disengage shall not exceed 2 inch-pounds (0.226 Nm). Longitudinal force is not applicable.
Mating Characteristics	Mating Characteristics are not applicable.
Recommended Mating Torque	7 - 10 inch-pounds (0.8 - 1.13 Nm)
ENVIRONMENTAL	
Corrosion (Salt Spray)	Specification MIL-STD-202, Method 101, Test Condition B. The salt solution shall be 5%.
Vibration	Specification MIL-STD-202, Method 204, Test Condition D.
Shock	Specification MIL-STD-202, Method 213, Test Condition I.
Thermal Shock	Specification MIL-STD-202, Method 107, Test Condition B, except high temperature shall be + 200°C.
Moisture Resistance	Specification MIL-STD-202, Method 106. Step 7b (vibration) shall be omitted. Insulation resistance shall be 200 megohms min. within 5 minutes of removal from humidity.
Corona Level	The Corona Level is not applicable.



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3.5 mm Connectors

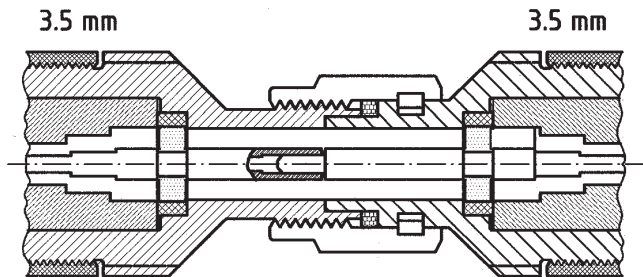


Fig. A - 3.5 mm Mating Surface

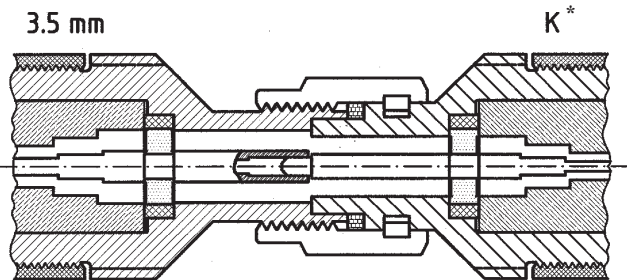


Fig. B - 3.5 mm Interface with the K* Connector

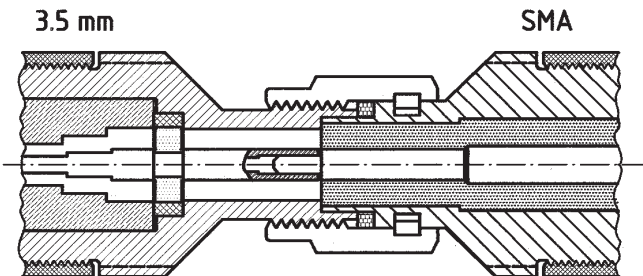


Fig. C - 3.5 mm Interface with the SMA Connector

About Series 3.5mm Connectors:

Spectrum's 3.5mm connectors are high performance, 50 ohm coaxial connectors, designed to exhibit low VSWR, low loss, and to be resonance free up to 34 GHz. The connectors are designed for use with 3.5mm airlines, 0.085" and 0.141" semi-rigid cable and certain high frequency, low loss flexible cables. Launcher, panel jacks and other configurations are available as well.

The 3.5mm connector achieves its high performance through a number of design characteristics and close adherence to demanding production requirements. The interface dielectric of the 3.5mm Connector is air, thus alleviating many of the problems associated with other dielectrics. The center contact is supported by a narrow bead dielectric.

A design characteristic of the 3.5mm connector that warrants particular attention is the .020" shoulder dimension of the contacting surface of the outer conductor, illustrated in Figure A. This relatively thick wall will withstand high contact force, ensuring good connector repeatability, long life and low leakage. During tests to measure 3.5mm Connector repeatability, a single connector pair was subjected to 1,000 connect-disconnect cycles, each time tightened to a torque of 10 inch pounds (1.1 Nm). Only slight degradation began to appear at the conclusion of the test.

The ruggedness and reliability of the 3.5mm connector is particularly beneficial when applied to within series and between series adapters. As previously noted, the 3.5mm connector design with the air dielectric mating face and thicker outer conductor shoulder will maintain mechanical and electrical integrity through repeated mating cycles.

An important feature of the 3.5mm connector is its versatility. The connector is sexed and mates with series 2.92mm (K*) and SMA coaxial connectors, as illustrated in figures B and C.

When mated with 2.92mm (K*) connectors, optimum performance is achieved to 34 GHz, the point where the device limits of the 3.5mm connector dominate.

When mated to an SMA and used within the frequency range of the SMA series (which will be 18 GHz for a standard SMA, or 26 GHz for some precision SMA, and up to 30 GHz for a few special SMAs, developed by Spectrum), the VSWR performance will be typical of a mated pair of SMA connectors, as the performance of the worse connector always will dominate.

3.5mm Connector Accessory Products:

A number of products within the 3.5mm Connector series have been made available to facilitate the job of the test engineer. These include both within and between series adapters. A series of off-set shorts, opens and terminations are also available for automatic network analyser calibration. Factory prepared 3.5mm airline assemblies are also available to customer order.

Special order

Captivated bead/contact subassemblies are available for most 3.5 mm connectors. In addition, Spectrum is always pleased to discuss designs tailored to your specific application needs. Please consult the factory.

Material

Coupling Nut:	Passivated stainless steel
Body:	Passivated stainless steel, or gold plated stainless steel, or gold plated brass, depending on the design.
Center Contact:	Gold plated beryllium copper

CHARACTERISTICS*

ELECTRICAL	
Impedance	50 ohms
Frequency range	0 - 35 GHz
VSWR	1.01+ .004f (GHz)
Insertion loss (in dB)	.03 $\sqrt{f(\text{GHz})}$
RF leakage	> -(100 dB - f (GHz))
Contact resistance	Inner: <2.0 Milliohm
	Outer: <0.4 Milliohm ¹⁾
Dielectric withstanding Voltage (max.)	1000 VRMS
Max. power (watts at Sea level)	2.0 kW / $\sqrt{f(\text{MHz})}$
ENVIRONMENTAL	
Thermal limits	-65°C to +85°C
Humidity	20 to 80% RH
Pressure	590 to 780 mm Hg
MECHANICAL	
Mating	1/4-36 Threaded Coupling
MATERIAL	
Body and coupling nut	Passivated or gold plated stainless steel, or gold plated brass
Center contacts	Gold plated beryllium copper

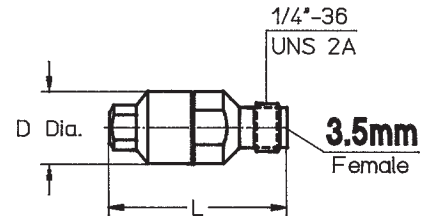
* These characteristics are typical and may not apply to all connectors.

¹⁾ For gold plated outer conductors.

3.5mm Semi - Rigid Cable Connectors

3.5mm-Female straight

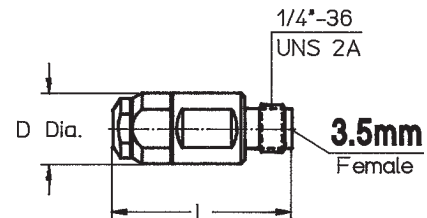
Connector Part No.	Semi Rigid Cable Type	Cable Part No.	D Dia.	L
2102-2103-02	0.086" Low Density PTFE	421-307	.433" 11.0	.925" 23.5
2102-2102-02	DIA. 0.086"	421-086	.433" 11.0	.925" 23.5



Connector outer conductor is passivated stainless steel.
Center conductor is beryllium copper gold plated.

3.5mm-Female straight

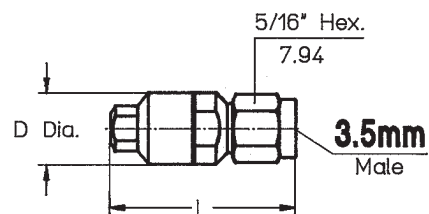
Connector Part No.	Semi Rigid Cable Type	Cable Part No.	D Dia.	L
2103-2101-02	DIA. 0.141"	421-669	.374" 9.5	.933" 23.7
2103-2103-02	0.141" Low Density PTFE	421-298	.374" 9.5	.933" 23.7



Connector outer conductor is passivated stainless steel.
Center conductor is beryllium copper gold plated.

3.5mm-Male straight

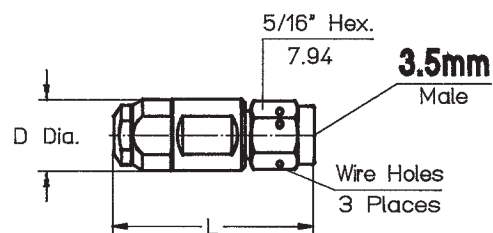
Connector Part No.	Semi Rigid Cable Type	Cable Part No.	D Dia.	L
2102-1101-02	0.086" Low Density PTFE	421-307	.433" 11.0	.964" 24.5
2102-1103-02	DIA. 0.086"	421-086	.433" 11.0	.964" 24.5



Connector outer conductor is passivated stainless steel.
Center conductor is beryllium copper gold plated.

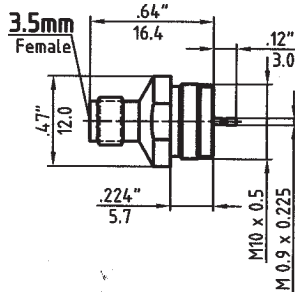
3.5mm-Male straight

Connector Part No.	Semi Rigid Cable Type	Cable Part No.	D Dia.	L
2103-1104-02	DIA. 0.141"	421-669	.374" 9.5	1.039" 26.4
2103-1103-02	0.141" Low Density PTFE	421-298	.374" 9.5	1.039" 26.4



Connector outer conductor is passivated stainless steel.
Center conductor is beryllium copper gold plated.

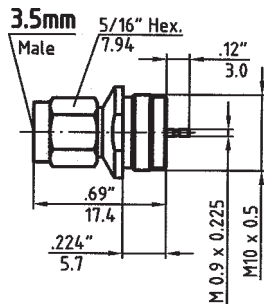
3.5mm-Female Waveguide Coupling Connector



Connector Part No.
2199-5501-02

Connector outer conductor is passivated stainless steel.
Center conductor is beryllium copper gold plated.

3.5mm-Male Waveguide Coupling Connector



Connector Part No.
2199-5601-02

Connector outer conductor is passivated stainless steel.
Center conductor is beryllium copper gold plated.

3.5mm Connectors for Flexible Cable Assemblies?

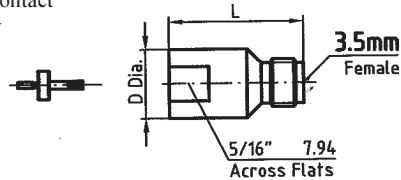
A variety of connectors are available, designed for Spectrum's state-of-the-art Flexible Cables. For these Cable Assemblies please refer to "The '97 Handbook Cable Assemblies", or please request detailed product information to your needs:

Telephone: +49-89-3548-040
Facsimile: +49-89-3548-0490
e-mail: specelek@CompuServe.com
<http://www.spectrum-et.com>

3.5 mm Airline Connectors

3.5mm-Female straight

Female contact assembly

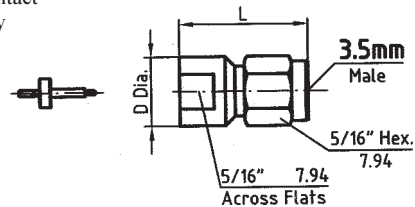


Connector Part No.	D Dia.	L
21AL-2101-00	.374" 9.5	.622" 15.8

Connector outer conductor is brass gold plated. Center conductor is beryllium copper gold plated.

3.5mm-Male straight

Male contact assembly



Connector Part No.	D Dia.	L
21AL-1101-00	.370" 9.4	.732" 18.6

Connector outer conductor is brass gold plated. Center conductor is beryllium copper gold plated.

You need a very special connector ? Please call your nearest Spectrum Representative. Or please contact our Engineering or Marketing Staff for immediate support at:

Telephone: +49-89-3548-040

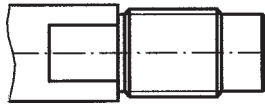
Facsimile: +49-89-3548-0490

e-mail: specelek@CompuServe.com

<http://www.spectrum-et.com>

Airline Outer Conductor

Airline Inner Conductor

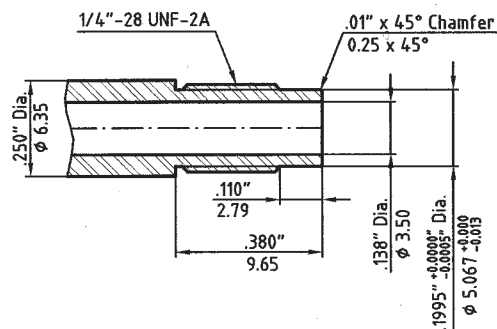


Airline preparation:

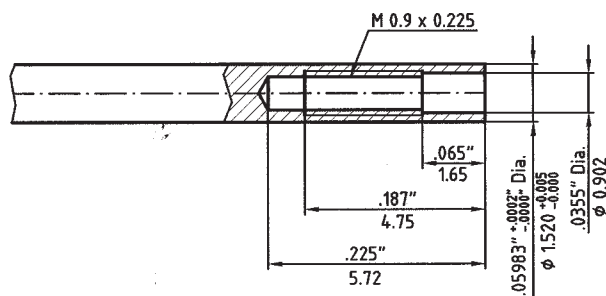
Prepare outer and center conductors to dimensions shown. Strict adherence to dimensional tolerances is required for utmost performance.

Dimensions

Outer Conductor (Scale 2:1)

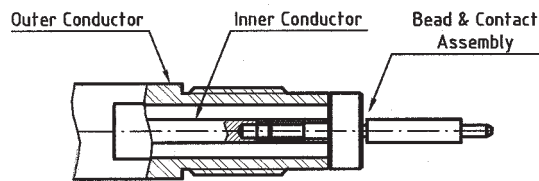
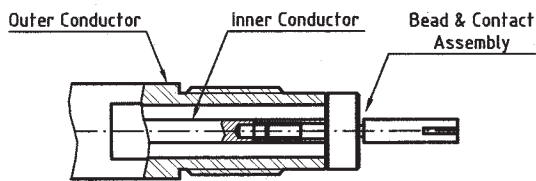


Inner Conductor (Scale 5:1)



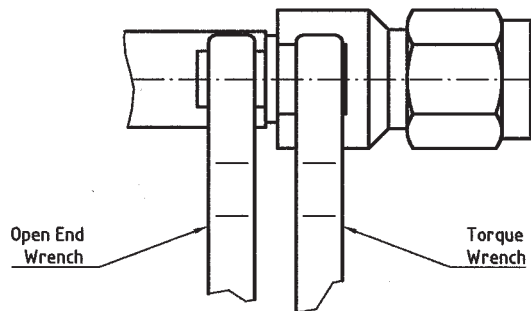
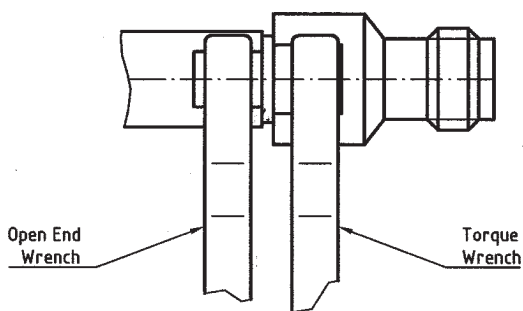
Assembly Female

Assembly Male



Connector Assembly:

Thread center conductor assembly into airline center conductor until finger tight and place into airline outer conductor as shown. Carefully guide the connector housing over the center conductor assembly and onto the airline outer conductor. Seat the airline outer conductor in the assembly. Thread the body assembly until it is finger tight.



Secure the assembly by wrench tightening the connector housing to the airline outer conductor with torque of 30 inch pounds (3.39 Nm).