

### Description

APC stands for Amphenol Precision Connectors and was developed by Amphenol and Hewlett-Packard engineers. The Precision family is comprised of APC-2.4, APC-3.5, APC-N, APC-7.

Amphenol's APC is the first instrument-grade coaxial connector line to achieve repeatable TE11 mode resonance-free signal transmission from DC to 50 GHz with a minimum return loss of 26 dB.

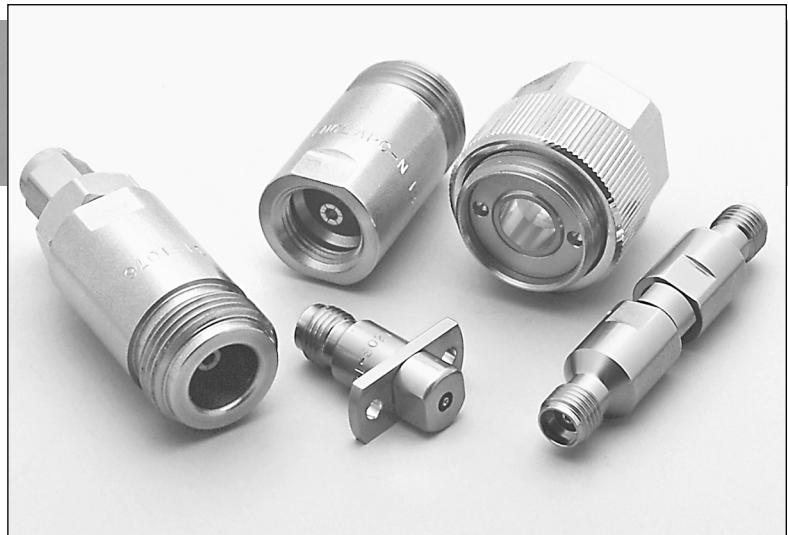
These 50 ohm connectors are designed primarily for use in test and measurement equipment where reliable performance through repeated connect/disconnect cycles is critical.

### Features/Benefits

- Interface dimensions which minimize distortion/deterioration of the mating surfaces.
- Fixed bead-contact assembly which prevents transmission of mating torques to circuit elements.
- M7x0.75 thread for coupling durability and small overall connector size.
- Mating sequence in which the outer conductors before the center contacts meet, eliminating female center contact damage during mating.
- Plug coupling nut that extends beyond the male center contact to protect the contact while in the unmated condition.

### Application

- Cable Assemblies
- Instrumentation
- Military
- Radio Astronomy
- Satcom



#### APC 2.4

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The initial Amphenol® APC-2.4™ offering includes the male and female connectors for termination to 2.4mm rigid coaxial airline and twenty-two between-series adapters for high performance transitions from the 2.4mm interface to six other microwave coaxial connectors: APC-3.5®, APC-7®, APC-N, SMA, and the Wiltron K - connector.™\*

\*K connector is a trademark of Wiltron Co.

**Features/Benefits**

- DC to 50 GHz — provides highly accurate measurements which eliminate the need for costly waveguide components
- M7 x .075 coupling — provides durability and small overall connector size
- Mating sequence outer connector first — eliminates female center conductor contact damage during mating
- Coupling nut extends beyond male center contact — protects center conductor while in the unmated condition

**Specifications**

**ELECTRICAL**

	Test Requirement
Impedance	50 ohms
Frequency range	DC-50 GHz
Return loss (min.)	
DC to 18 GHz:	>36 dB
18 to 26.5 GHz:	>32 dB
26.5 to 50 GHz:	>26 dB
Insertion loss:	≤0.06 dB
Contact resistance	
Inner:	< 1.5 milliohms
Outer:	< 0.8 milliohms
Voltage rating:	400 Vrms
Dielectric Withstanding	
Voltage (max.):	1200 Vrms
Max. power (watts @ sea level)	1000 W/ √f (MHz)

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

**ENVIRONMENTAL**

Temperature range	-70°C to + 80°C
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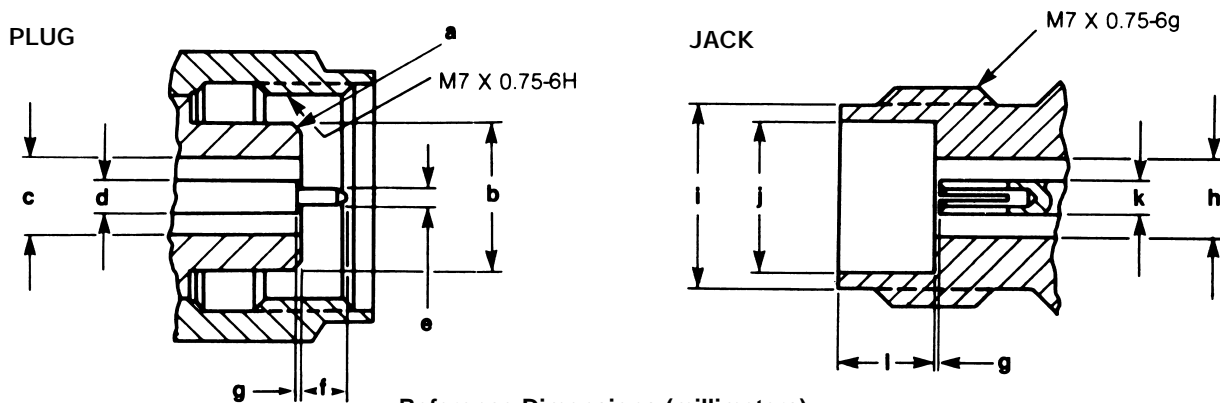
**MECHANICAL**

Mating	M7 x 0.75 threaded coupling
Recommended Mating torque	8 to 10 inch pounds (0.9 to 1.1 N-m)

**MATERIAL**

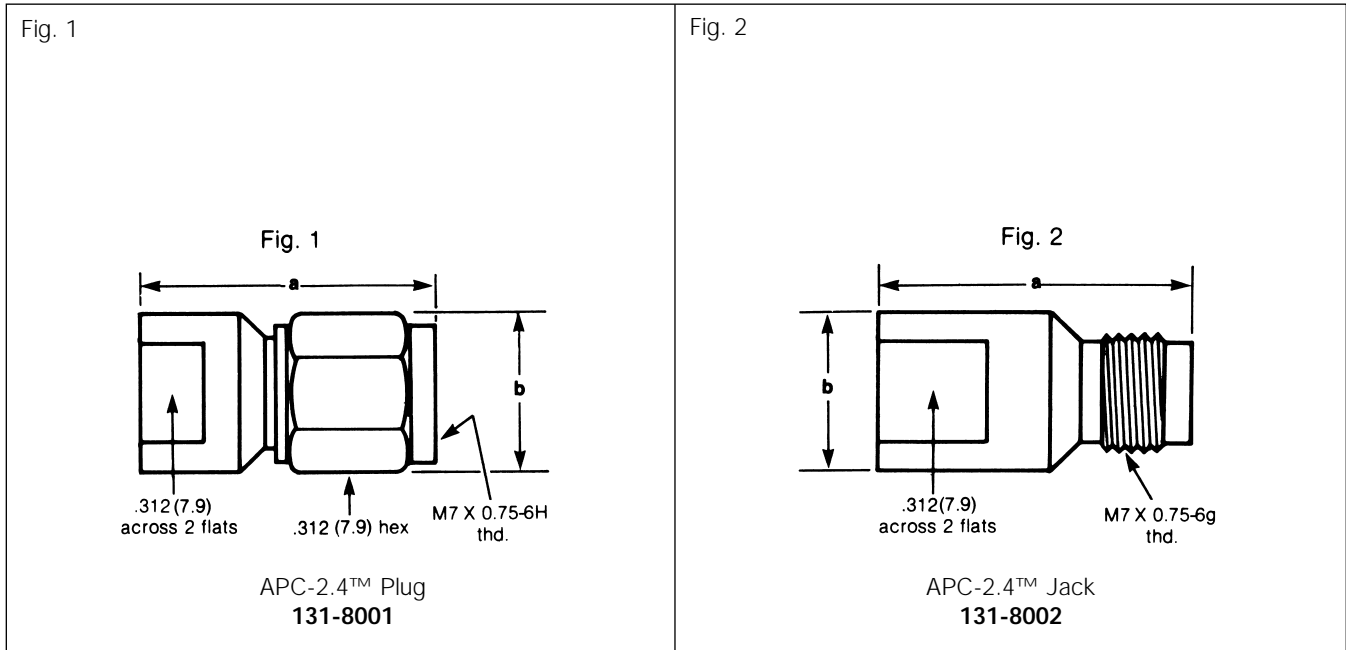
Body	Gold plated beryllium copper
Coupling Nut	Passivated stainless steel
Body	Gold plated beryllium copper

NOTE: For mated pair APC-2.4 connectors on 2.4mm airlines.

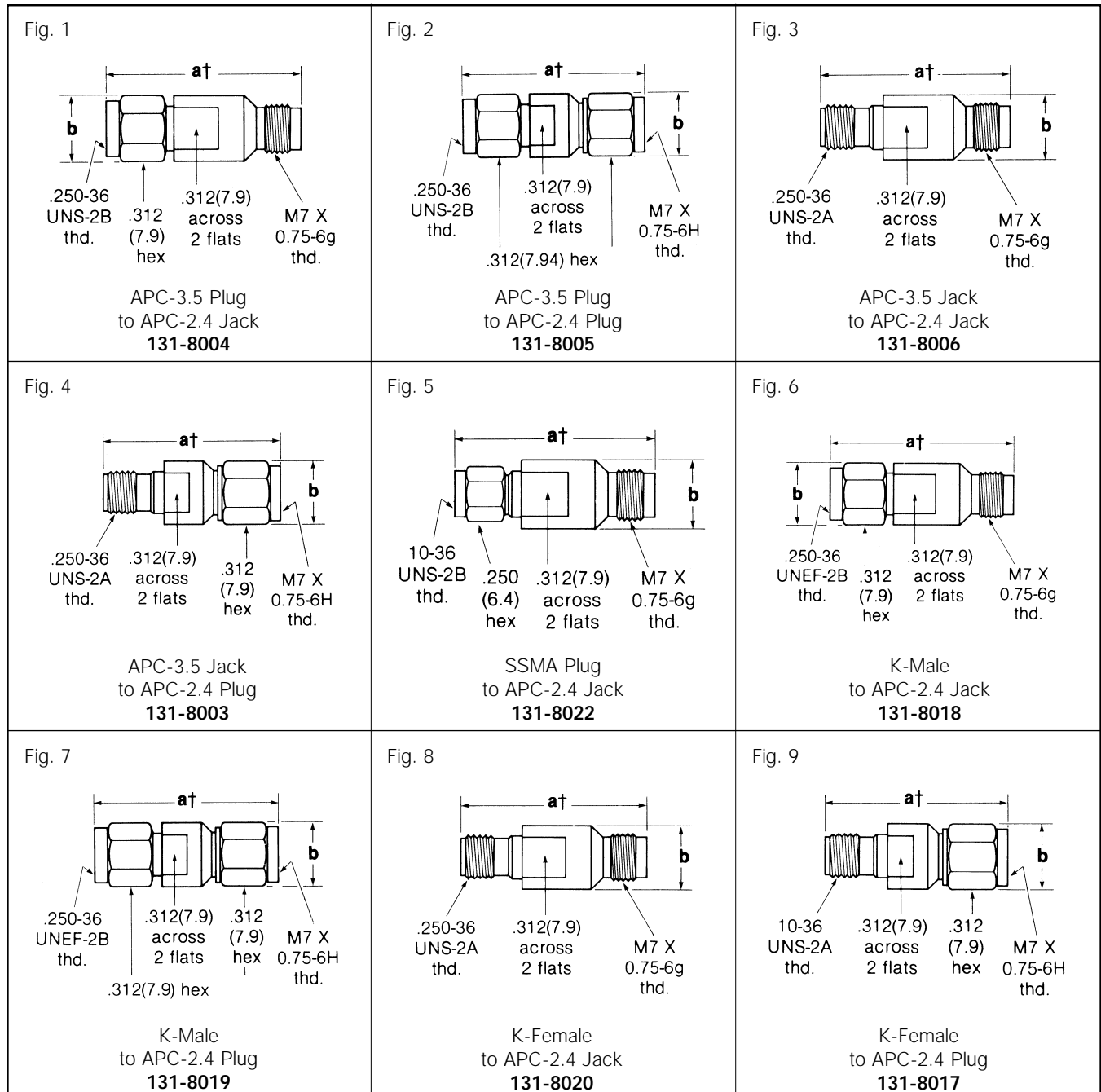


Reference Dimensions (millimeters)

a 0.25/0.36 x 45°	e ø 0.511 <sup>+0.005</sup>	i ø 5.84 <sup>+0.005</sup>
b ø 4.75 <sup>+0.025</sup>	f ø 1.39 <sup>+0.06</sup>	j ø 4.77 <sup>+0.0025</sup>
c ø 2.400 <sup>+0.005</sup>	g ø 0.000 <sup>+0.053</sup>	k ø 1.042 <sup>+0.0025</sup>
d ø 1.042 <sup>+0.0025</sup>	h ø 2.400 <sup>+0.005</sup>	l ø 3.05 <sup>+0.05</sup>



Description	Dimensions, Inches (mm)		CAI	Amphenol Number	Fig.
	a	b			
Plug	.665 (16.9)	.312 (7.9) hex	C65	<a href="#">131-8001</a>	1
Jack	.700 (17.8)	.360 (9.1) dia.	C65	<a href="#">131-8002</a>	2



**PRECISION APC-2.4™ STRAIGHT ADAPTERS BETWEEN SERIES**

Adapter Ends		Dimensions inches (mm)	Return Loss (minimum)	Amphenol Number	Fig.
APC-3.5 Plug	APC-2.4 Jack	.312 (7.9) hex	30 dB to 26.5 GHz/28 dB to 34 GHz	<a href="#">131-8004</a>	1
APC-3.5 Plug	APC-2.4 Plug	.312 (7.9) hex	30 dB to 26.5 GHz/28 dB to 34 GHz	<a href="#">131-8005</a>	2
APC-3.5 Jack	APC-2.4 Jack	.360 (9.14)	30 dB to 26.5 GHz/28 dB to 34 GHz	<a href="#">131-8006</a>	3
APC-3.5 Jack	APC-2.4 Plug	.312 (7.9) hex	30 dB to 26.5 GHz/28 dB to 34 GHz	<a href="#">131-8003</a>	4
SSMA Plug	APC-2.4 Jack	.360 (9.14)	29 dB to 18 GHz/26 dB to 24 GHz	<a href="#">131-8022</a>	5
K-Male	APC-2.4 Jack	.312 (7.9) hex	29 dB to 26.5 GHz/26 dB to 40 GHz	<a href="#">131-8018</a>	6
K-Male	APC-2.4 Plug	.312 (7.9) hex	29 dB to 26.5 GHz/26 dB to 40 GHz	<a href="#">131-8019</a>	7
K-Female	APC-2.4 Jack	.360 (9.14)	29 dB to 26.5 GHz/26 dB to 40 GHz	<a href="#">131-8020</a>	8
K-Female	APC-2.4 Plug	.312 (7.9) hex	29 dB to 26.5 GHz/26 dB to 40 GHz	<a href="#">131-8017</a>	9

† Envelope dimension a is a maximum of 1.5" (38.1mm) for all APC-2.4 adapters shown above. The length from reference plane to reference plane for each of these adapters is identical and equals .850" (21.6mm).

Amphenol® APC-3.5® connectors are a high performance, 50 ohm coaxial connector designed to exhibit low VSWR, low loss, and be resonance free to 34 GHz.

**Features/Benefits**

- Connectors are designed for use with 3.5mm rigid airline, .085 and .141 semi-rigid cable.
- Air dielectric mating face and thicker outer conductor shoulder.
- APC-3.5 design maintains mechanical and electrical integrity through repeated mating cycles.
- APC-3.5 will mate with SMA connectors.
- Provides VSWR performance typical of SMA mated pairs up to 18 GHz.

*Instructions for assembling APC-3.5 connectors to 3.5mm airline are given on page XX.*

**Specifications**

**ELECTRICAL**

	Test Requirement
Impedance	50 ohms
Frequency range	0-34 GHz
VSWR	Connectors on airline 1.01 + .004f (GHz)
Insertion loss (in dB)	.015 $\sqrt{f}$ (MHz)
RF Leakage	> 100 dB @ 26.5 GHz
Contact resistance	Inner: < 2.0 milliohms Outer: < 0.4 milliohms
Voltage rating:	500 Vrms
<u>Dielectric Withstanding</u> Voltage (max.):	1500 Vrms
<u>Max. power</u> (watts @ sea level)	2.5 kW / $\sqrt{f}$ (MHz) above 1 (MHz)

**ENVIRONMENTAL**

Mating	1/4-36 threaded coupling
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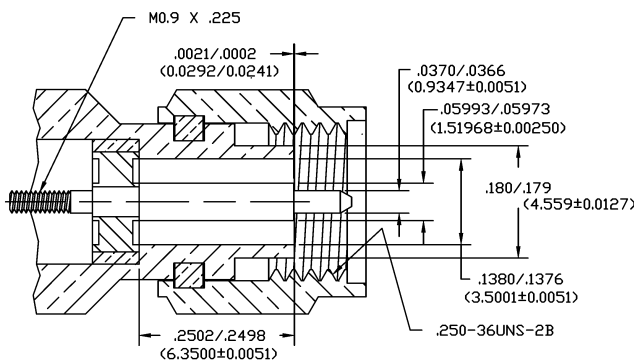
**MECHANICAL**

Body and Coupling Nut	Gold plated beryllium copper
Center Contacts	Gold plated beryllium copper

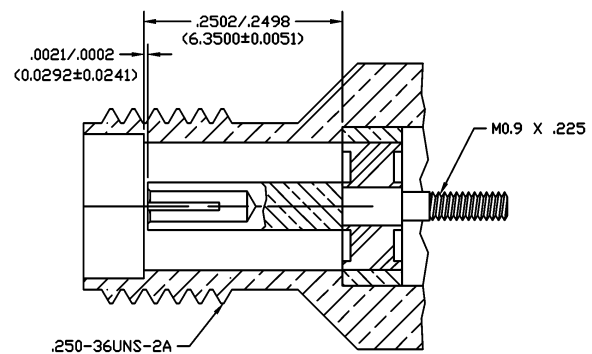
**MATERIAL**

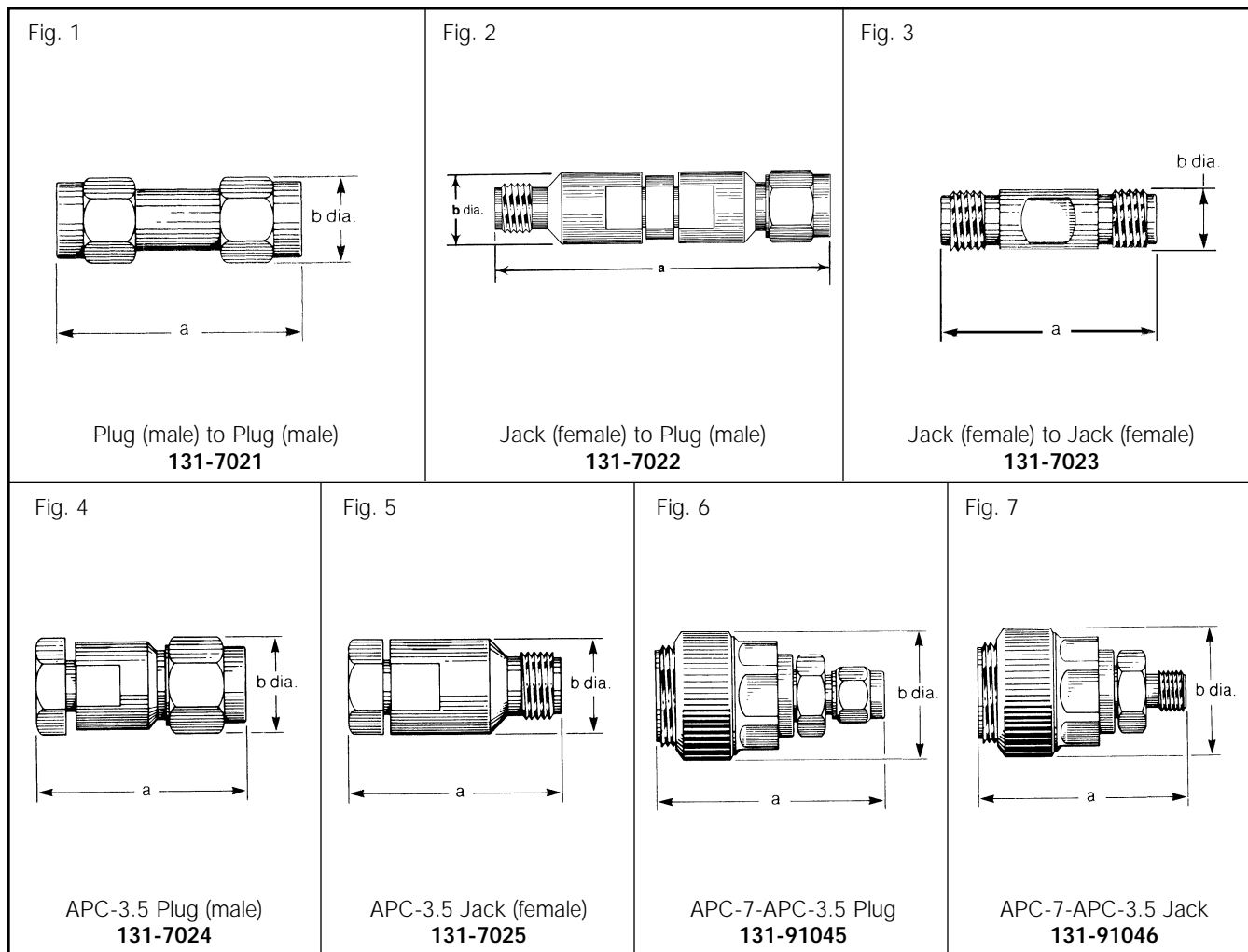
Temperature range	-65°C to + 85°C
Humidity	20 to 80% RH
Pressure	590 to 780 mm Hg

**PLUG**



**JACK**





**ADAPTERS WITHIN SERIES**

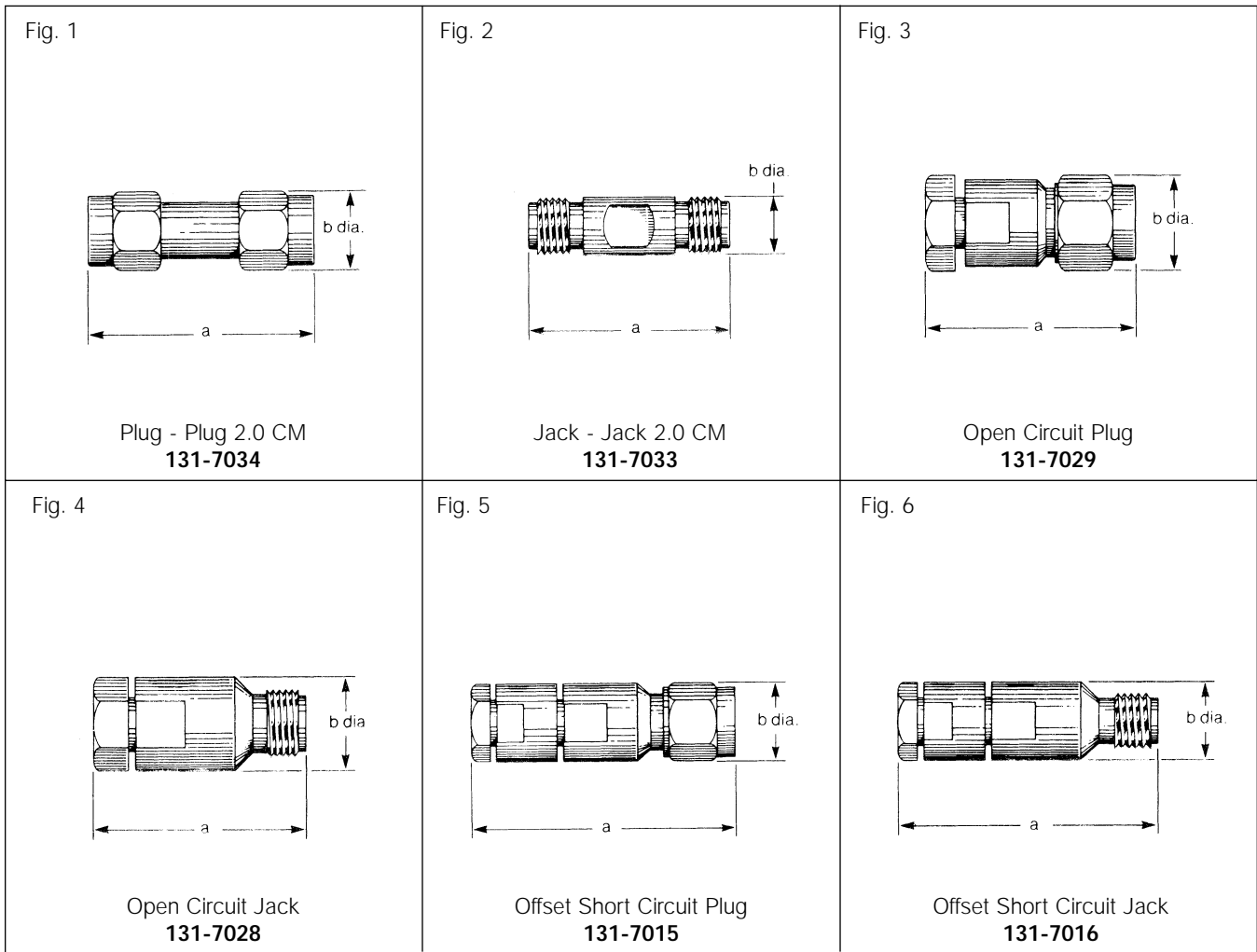
Description	Dimensions, Inches (mm)		Amphenol Number	Fig.
	a	b		
Plug (male) — Plug (male)	1.78 (45.3)	.360 (9.1)	131-7021	1
Jack (female) — Plug (male)	1.75 (44.5)	.360 (9.1)	131-7022	2
Jack (female) — Jack (female)	1.71 (43.5)	.360 (9.1)	131-7023	3

**SHORT CIRCUIT TERMINATION**

Description	Dimensions, Inches (mm)		CAI	Amphenol Number	Fig.
	a	b			
APC-3.5 Plug (male)	.902 (23.0)	.360 (9.1)	C66	131-7024	4
APC-3.5 Jack (female)	.862 (21.9)	.360 (9.1)	C66	131-7025	5

**ADAPTERS**

Description	Dimensions, Inches (mm)		Amphenol Number	Fig.
	a	b		
APC-7-APC-3.5 Plug	1.567 (39.8)	.875 (22.2)	131-91045	6
APC-7-APC-3.5 Jack	1.483 (37.7)	.875 (22.2)	131-91046	7



### AIRLINE ASSEMBLIES

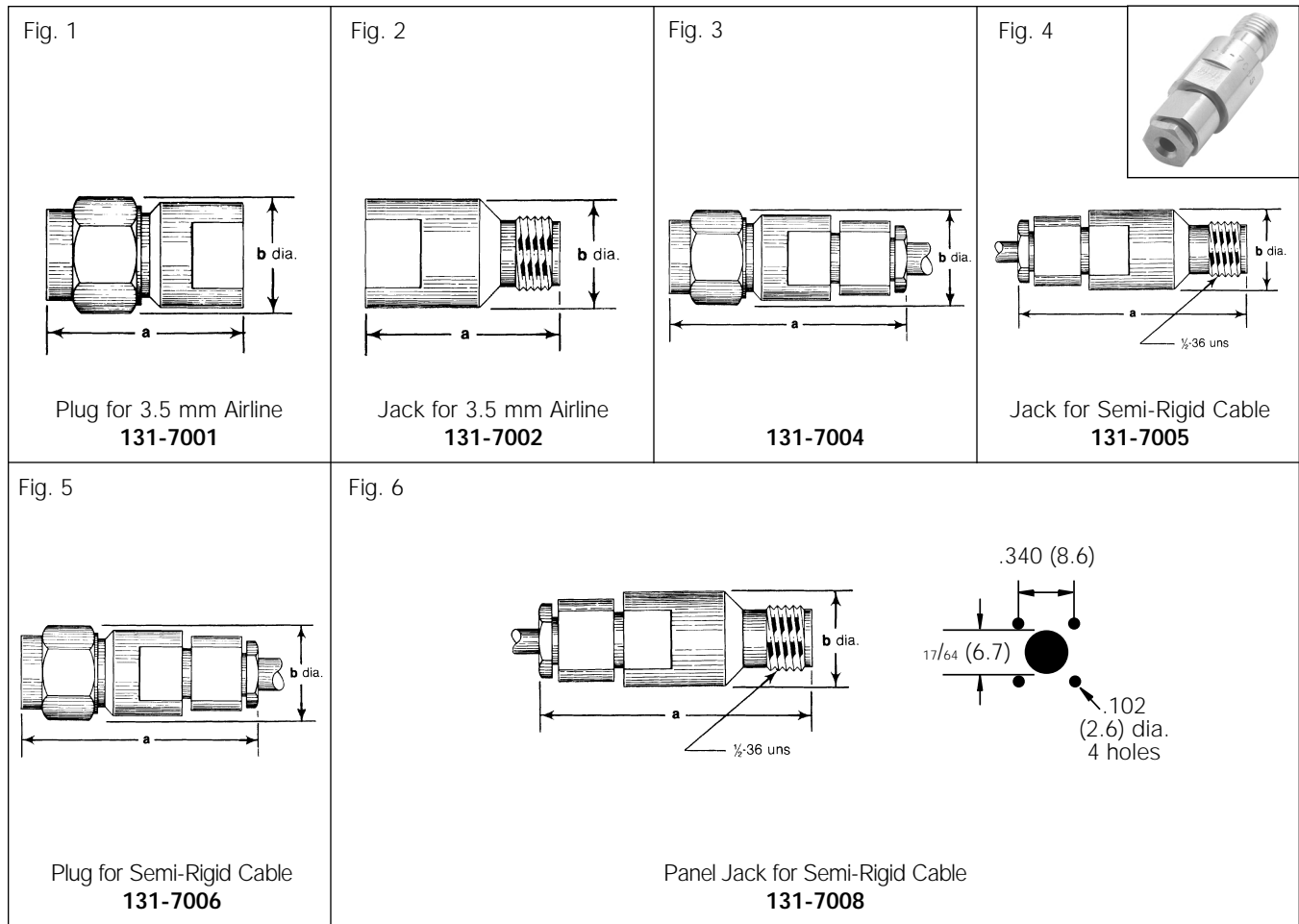
Description	Dimensions, Inches (mm)		Amphenol Number	Fig.
	a	b		
Plug - Plug 2.0 CM	1.07 (27.3)	.360 (9.1)	131-7034	1
Jack - Jack 2.0 CM	.939 (23.9)	.250 (6.4)	131-7033	2

### OPEN CIRCUIT TERMINATION

Description	Dimensions, Inches (mm)		CAI	Amphenol Number	Fig.
	a	b			
Plug	.902 (23.0)	.360 (9.1)	C66	131-7029	3
Jack	.862 (21.9)	.360 (9.1)	C66	131-7028	4

### OFFSET SHORT CIRCUIT TERMINATION

Description	Dimensions, Inches (mm)		CAI	Amphenol Number	Fig.
	a	b			
Plug (2-4 GHz)	1.801 (45.7)	.360 (9.1)	C66	131-7015-1	5
Plug (4-8 GHz)	1.306 (33.2)	.360 (9.1)	C66	131-7015-2	5
Plug (8-12.4 GHz)	1.206 (30.6)	.360 (9.1)	C66	131-7015-3	5
Plug (12.4-18 GHz)	1.206 (30.6)	.360 (9.1)	C66	131-7015-4	5
Jack (2-4 GHz)	1.766 (44.9)	.360 (9.1)	C66	131-7016-1	6
Jack (4-8 GHz)	1.271 (32.3)	.360 (9.1)	C66	131-7016-2	6
Jack (8-12.4 GHz)	1.171 (29.7)	.360 (9.1)	C66	131-7016-3	6
Jack (12.4-18 GHz)	1.171 (29.7)	.360 (9.1)	C66	131-7016-4	6



**PLUGS • JACKS • PANEL JACKS**

Cable	Inner Attachment	Cable Termination	Dimensions Inches (mm)			CAI	Construction Notes	Amphenol Number	Fig.
			a	b	c				
3.5mm Airline	Plug (male)	Screw Thds.	.799 (20.3)	.312 (7.9)	—	C66	—	131-7001	1
	Jack (female)	Screw Thds.	.761 (19.3)	.321 (9.1)	—	C66	—	131-7002	2
Rg-405 (.085" Dia. Metal) Jacketed, Semi-Rigid Cable	Plug (male)	Solder	1.104 (28.0)	.312 (7.9)	—	C66	—	131-7004	3
	Jack (female)	Solder	1.069 (27.2)	.360 (9.1)	—	C66	—	131-7005	4
	Panel Jack	Solder	1.069 (27.2)	.500 (12.7)	.335/.315 (8.3 ± 0.3)	C66	Mtg. Hole Z/max. panel thick .085 (2.2)	131-7008	6
Rg-402 (.141" Dia. Metal) Jacketed, Semi-Rigid Cable	Plug (male)	Solder	1.104 (28.0)	.312 (7.9)	—	C66	—	131-7006	5
	Jack (female)	Solder	1.069 (27.2)	.360 (9.1)	—	C66	—	131-7007	—



## APC-7™ Coaxial Connectors

Amphenol® APC-7™ connectors are precision devices which provide long life and accurate, repeatable performance in test and instrumentation applications.

### Features/Benefits

- Primarily for use with rigid 7mm airline (7mm = the inner diameter of the airline outer conductor).
- Designs are also available for use with .250 semi-rigid cable, and RG-214/U flexible cable.
- Coupling mechanism is sexless thus permitting any two APC-7 connectors to be mated.
- A certified test report of VSWR will be provided when a mated pair of APC-7 connectors is ordered (131 - 91050).

*NOTE: A fluted nut design is provided as an option to APC-7 connectors. To order the fluted nut configuration, simply delete the "9" from the core part number; for example:*

131-91051 Hex Knurled Nut  
131-1051 Fluted Nut

## Specifications

### ELECTRICAL

	Test Requirement
Impedance	50 ohms
Frequency range	0-18 GHz
VSWR	Connectors on airline $1.003 + .002f$ (GHz)
Insertion loss (in dB)	$< 7 \times 10^{-3} \sqrt{f}$ (MHz) example: 0.028 dB at 16.0 GHz)
RF Leakage	< signal inside coaxial line by ratio > 120 dB
Electrical length	.693 inches (1.76 cm)
Contact resistance	Inner: < 1.0 milliohms Outer: < 0.1 milliohms
Voltage rating:	1000 Vrms
Dielectric Withstanding Voltage (max.):	2500 Vrms
Max. power (watts @ sea level)	Above 1 MHz = $10kW / \sqrt{f}$ (MHz) up to 1 MHz = 10kW

### ENVIRONMENTAL

Mating	Sexless, coplanar by means of threaded ring housed within coupling nut
Life	> 5000 connect/disconnect operations

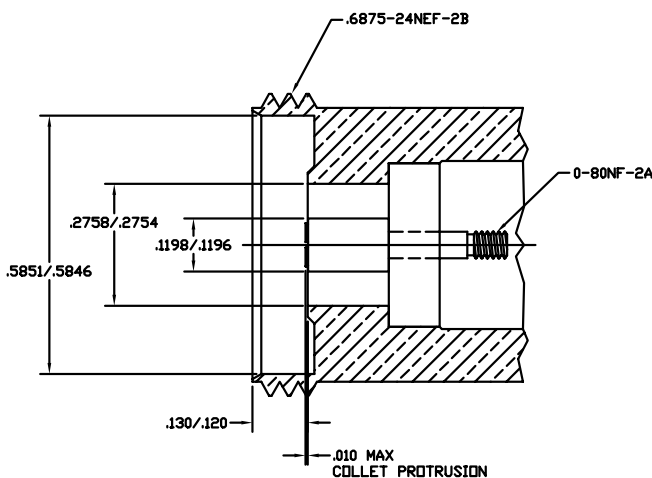
### MECHANICAL

Coupling mechanism	Stainless steel
Body	Gold plated beryllium copper
Center Contacts	Gold plated beryllium copper
Dielectric support	Air-polyphenylene oxide composite
Clamping components	Nickel plated brass
Crimp ferrule	Nickel plated copper

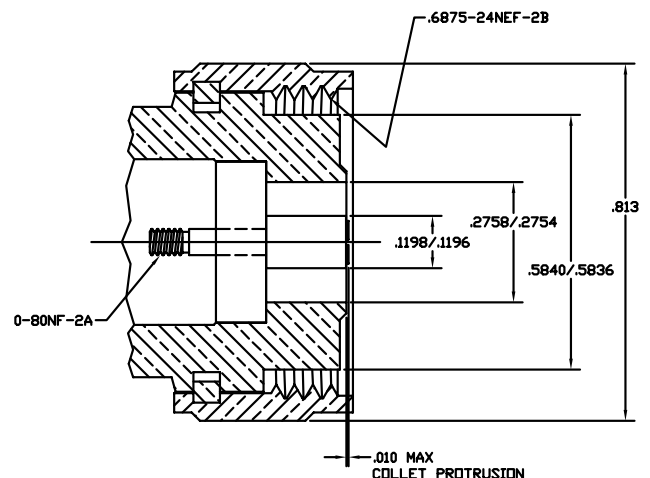
### MATERIAL

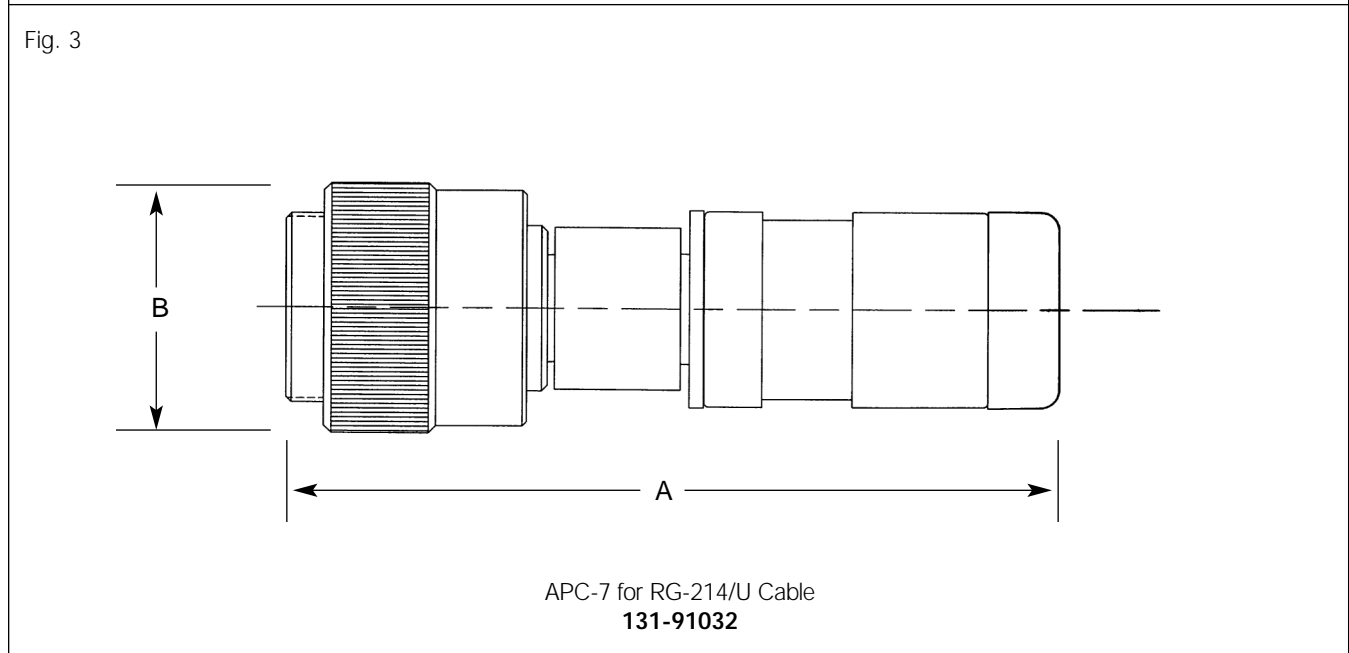
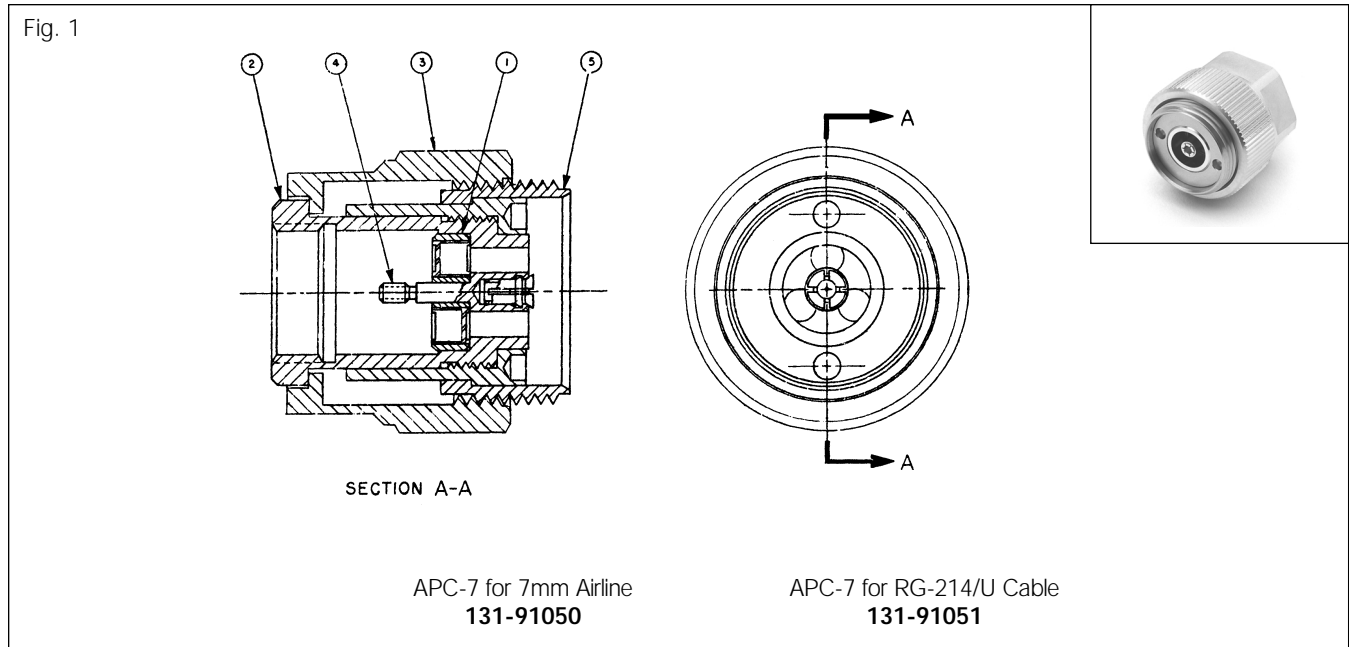
Temperature range	Storage: -65°C to + 85°C Operating: -13°C to + 33°C
Humidity	20 to 80% RH
Pressure	590 to 780 mm Hg

### PLUG



### JACK





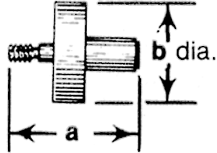
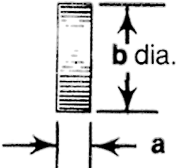
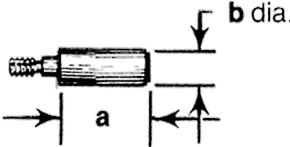
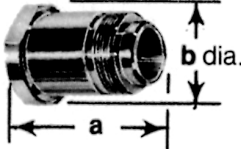
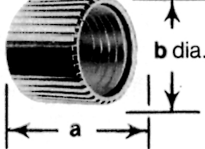
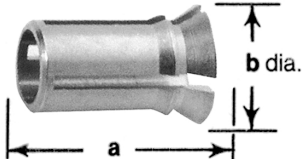
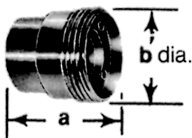
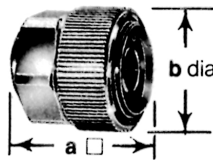
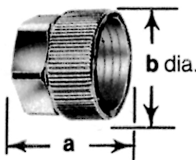
**APC-7™ COAXIAL**

The electrical length of the APC-7 connector is 1.76 cm

For Use With	Dimensions, Inches (mm)		Connector Affixment	Max. VSWR for Mated Pair	CAI	Amphenol Number	Fig.
	A □	B					
7mm Airline	.922 (23.4)	.865 (22.0)	Threaded Airline	1.003 + .002F (GHz)	C67	<a href="#">131-91050</a> ■	1
	.922 (23.4)	.865 (22.0)	Threaded Airline	1.003 + .002F (GHz)	C67	<a href="#">131-91051</a>	2
RG-214/U Cable	2.594 (65.9)	.865 (22.0)	Braided Clamp	1.15 + 12.4 (GHz)	C67	<a href="#">131-91032</a>	3

Part numbers listed are for one (1) connector except #131-91050 ■

□ Overall length with retainer in extended position

<p>Fig. 1</p>  <p>Bead Contact Sub-Assembly <b>131-1052</b></p>	<p>Fig. 2</p>  <p>Bead <b>131-1053</b></p>	<p>Fig. 3</p>  <p>Contact Sub-Assembly <b>131-1054</b></p>
<p>Fig. 4</p>  <p>Body <b>131-122</b></p>	<p>Fig. 5</p>  <p>Optional Fluted Nut <b>131-126</b></p>	<p>Fig. 6</p>  <p>Collet <b>131-129</b></p>
<p>Fig. 7</p>  <p>Retainer Sub-Assembly <b>131-131</b></p>	<p>Fig. 8</p>  <p>Nut, Body &amp; Assembly Sub-Assembly <b>131-91057</b></p>	<p>Fig. 9</p>  <p>Coupling Nut Standard Hex. <b>131-926</b></p>

**COMPONENTS AND SUB-ASSEMBLIES**

Description	Dimensions, Inches (mm)		Amphenol Number	Fig.
	a	b		
Bead-contact sub-assembly	.461 (11.7)	.370 (9.4)	<a href="#">131-1052</a>	1
Bead	.116 (3.0)	.370 (9.4)	<a href="#">131-1053</a>	2
Contact (Collet & Collet holder) sub-assembly	.183 (4.6)	.120 (3.0)	<a href="#">131-1054</a>	3
Body for 7mm Airline	.800 (20.3)	.576 (14.6)	<a href="#">131-122</a>	4
Optional Fluted Coupling Nut	.702 (17.8)	.812 (20.6)	<a href="#">131-126</a>	5
Collet	.149 (3.8)	.103 (2.6)	<a href="#">131-129</a>	6
Retainer sub-assembly	.676 (17.2)	.687 (17.5)	<a href="#">131-131</a>	7
Coupling Nut — Retainer body sub-assembly for 7mm Airline (131-91051 less bead-contact S/A)	.921 (23.4)	.865 (22.0)	<a href="#">131-91057</a>	8
Standard Hex coupling nut	.702 (17.8)	.865 (22.0)	<a href="#">131-926</a>	9

**APC-N Coaxial Connectors**

Amphenol® APC-N connectors can be used interchangeably with the APC-7 on rigid air line or equipment and mates with all other Type N connectors.

VSWR for a mated pair of APC-N connectors is 1.06 through 12.4 GHz and 1.08 through 18 GHz.

**Specifications**

**ELECTRICAL**

	Test Requirement
Impedance	50 ohms ± 0.1 Ohms
Frequency range	0-18 GHz
VSWR	Connectors on airline 1.08 max. to 18 (GHz)
Insertion loss (in dB)	$< 3 \times 10^{-2} \sqrt{f \text{ (GHz)}}$
RF Leakage	< signal inside coaxial line by ratio > 90 dB
Contact resistance	Inner: < 10 milliohms Outer: < 1.1 milliohms
Voltage rating:	1000 Vrms
Dielectric Withstanding	
Voltage (max.):	2500 Vrms
Max. power (watts @ sea level)	Above 1 MHz = 10kW/ $\sqrt{f \text{ (MHz)}}$ up to 1 MHz = 10kW

**MECHANICAL**

Mating	<sup>11</sup> / <sub>16</sub> -24 threaded coupling. Mating dimensions are MIL-C-39012 Class II nominal with tighter tolerances. The APC-N mates with all existing Type N connectors including MIL-C-71
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**MATERIAL**

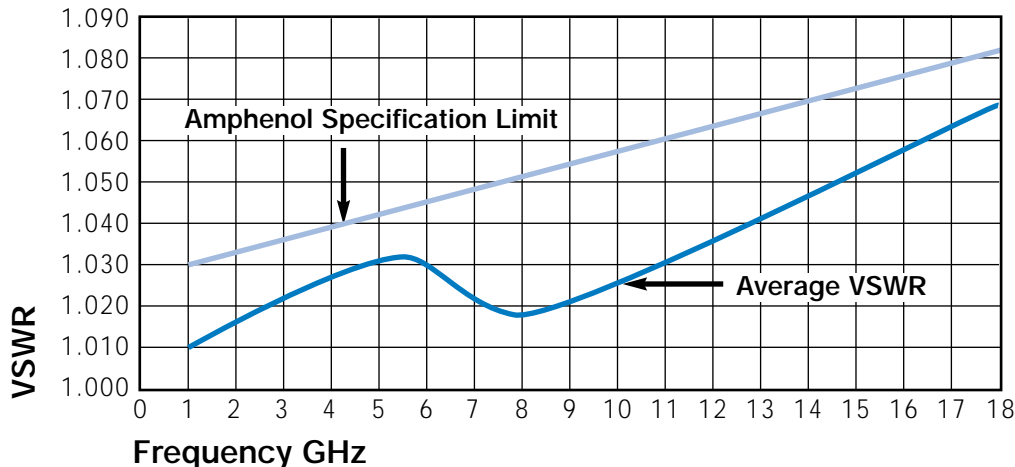
Body & coupling nut	Stainless steel
Center Contacts	Gold plated beryllium copper
Bead Assembly	Air-polyphenelene oxide composite
Clamping components	Nickel plated brass
Crimp ferrule	Nickel plated copper

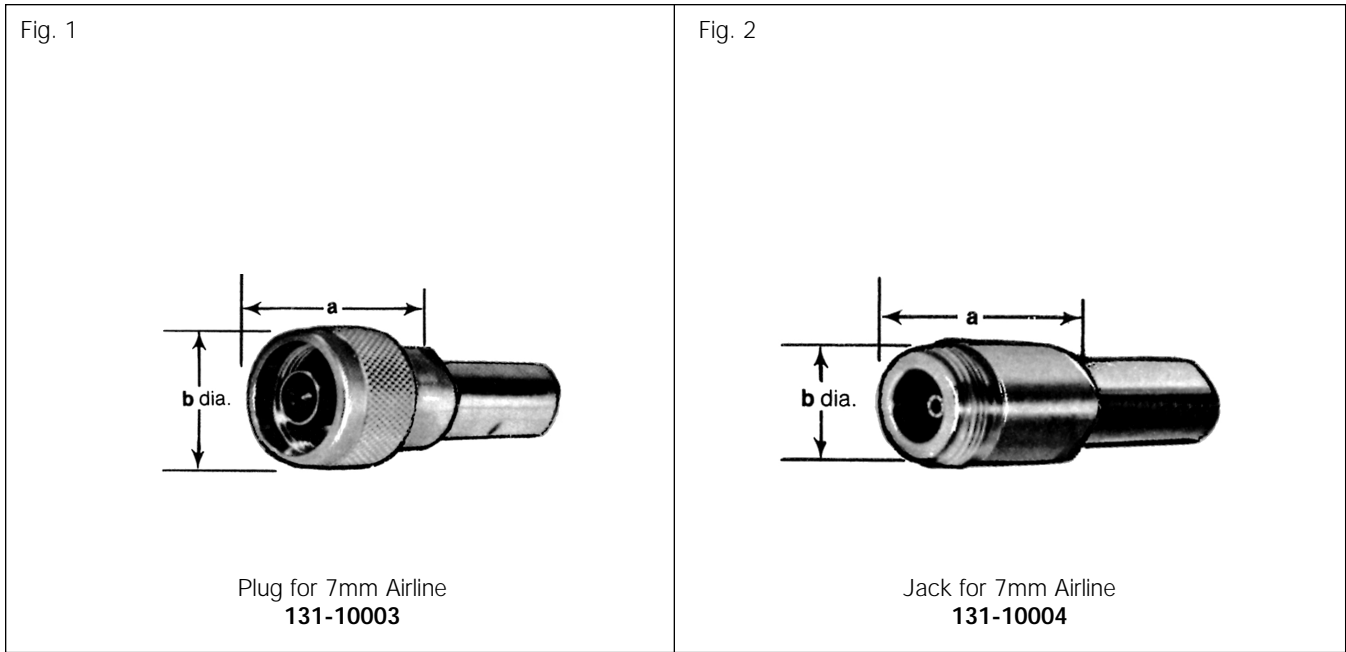
**ENVIRONMENTAL**

Temperature range	Storage: -55°C to + 70°C Operating: -13°C to + 33°C
Humidity	20 to 80% RH
Pressure	590 to 780 mm Hg

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

**VSWR of a mated pair of APC-N connectors**





**PLUG**

For Use With	Dimensions, Inches (mm)		Connector Affixment	Max. VSWR for Mated Pair	CAI	Amphenol Number	Fig.
	a	b					
7mm Airline	1.141 (29.0)	.813 (20.6)	Threaded Airline	1.08 + 18 (GHz)	C67	<a href="#">131-10003</a>	1

**JACK**

For Use With	Dimensions, Inches (mm)		Connector Affixment	Max. VSWR for Mated Pair	CAI	Amphenol Number	Fig.
	a	b					
7mm Airline	1.099 (27.9)	.620 (15.7)	Threaded Airline	1.08 + 18 (GHz)	C67	<a href="#">131-10004</a>	2