



Non Magnetic Connectors

Johnson Components builds coaxial connectors using innovative materials and design to provide Mil Spec Performance at a commercial price. Now we offer our Non Magnetic Connectors as a catalog and distributor item.

Johnson has provided custom non magnetic connectors to the Magnetic Resonance (MR) industry for years. Connector design is derived from many years of working with the MR companies in the Milwaukee, Wisconsin area.

The materials and finishes of our connectors meet the stringent limits of image and magnetic field distortion in an MR environment. The connector electrical performance exceeds the frequency requirements of the Receive/Transmit RF Coils in MR equipment.

Copper alloys of the body and contact parts are designed to provide unity permeability and control magnetic susceptibility. Gold finishes are altered to eliminate magnetic barrier layers and provide excellent corrosion resistance and wear characteristics.

We continue to work with our Customers as the MR industry transitions to high field solutions and improved image resolution at greater physical depths.

ELECTRICAL RATINGS

Impedance: 50 ohms

Frequency Range: Flexible cable connectors 0-12.4 GHz
Uncabled receptacles 0-18.0 GHz

VSWR: (f = GHz) Straight Cabled Connectors RA Cabled Connectors
RG-316 1.15 + .02f 1.15 + .03f
RG-58 1.15 + .01f 1.15 + .02f

Uncabled receptacles N/A

Working Voltage: (Vrms maximum)

Connectors for Cable Type

	Sea Level	70K Feet
RG-316	250	65
RG-58, uncabled receptacles	335	85

Dielectric Withstanding Voltage:

 (VRMS minimum at sea level)

Connectors for RG-316	750
Connectors for RG-58, uncabled receptacles	1000

Corona Level:

 (Volts minimum at 70,000 feet)†

Connectors for RG-316	190
Connectors for RG-58, uncabled receptacles	250

Insertion Loss:

 (dB maximum)

Straight flexible cable connectors	0.06 √f (GHz), tested at 6 GHz
Right angle flexible cable connectors	0.15 √f (GHz), tested at 6 GHz
Uncabled receptacles	N/A

Insulation Resistance:

 5000 megohms minimum

Contact Resistance:

 (milliohms maximum)

	Initial	After Environmental
Center contact (straight cabled connectors, uncabled receptacles) ...	3.0	4.0
Center contact (right angle cabled connectors)	4.0	6.0
Outer contact (all connectors)	2.0	N/A
Braid to body	0.5	N/A

RF Leakage:

 (dB minimum, tested at 2.5 GHz)

Flexible cable connectors	-60 dB
Uncabled receptacles	N/A

RF High Potential Withstanding Voltage:

 (Vrms minimum, tested at 4 and 7 MHz)†

Connectors for RG-316	500
Connectors for RG-58, uncabled receptacles	670

MECHANICAL RATINGS

Engagement Design: MIL-STD-348, Series SMA

Engagement/Disengagement Force: 2 inch-pounds maximum

Mating Torque: 7 to 10 inch-pounds

Coupling Proof Torque: 15 inch-pounds minimum

Coupling Nut Retention: 60 pounds minimum

Contact Retention: 6 lbs. minimum axial force (captivated contacts)
4 inch-ounce minimum torque (uncabled receptacles)

Cable Retention:

	Axial Force*(lbs)	Torque (in-oz)
Connectors for RG-316	20	N/A
Connectors for RG-58	40	N/A

*Or cable breaking strength whichever is less.

Durability: 500 cycles minimum

ENVIRONMENTAL RATINGS

 (Meets or exceed the applicable paragraph of MIL-C-39012)

Temperature Range: - 65°C to + 165°C

Thermal Shock: MIL-STD-202, Method 107, Condition B

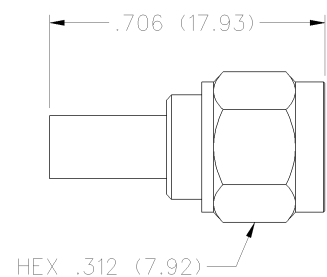
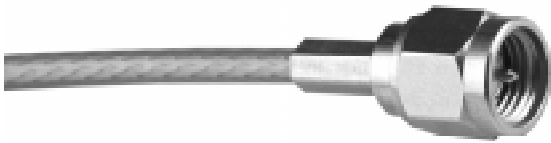
Corrosion: MIL-STD-202, Method 101, Condition B

Shock: MIL-STD-202, Method 213, Condition I

Vibration: MIL-STD-202, Method 204, Condition D

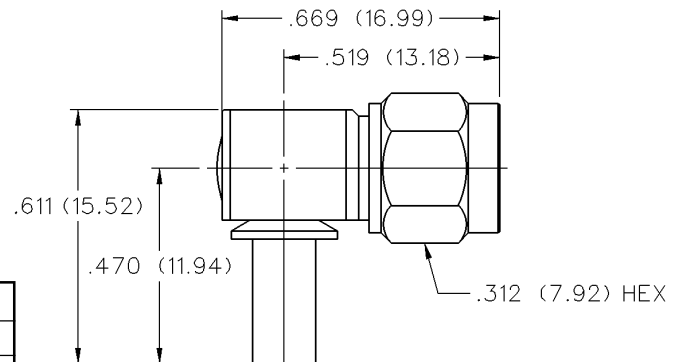
Moisture Resistance: MIL-STD-202, Method 106

Straight Crimp Type Plug (3-piece) - Captivated Contact



CABLE TYPE	VSWR & FREQ. RANGE	GOLD PLATED
RG-316/u, 188, 174	1.15 + .02f (GHz) 0-12.4 GHz	142-9403-011
RG-316 DS, 188 DS	1.15 + .02f (GHz) 0-12.4 GHz	142-9404-011
RG-58/u, 141	1.15 + .01f (GHz) 0-12.4 GHz	142-9407-001

Right Angle Crimp Type Plug - Captivated Contact



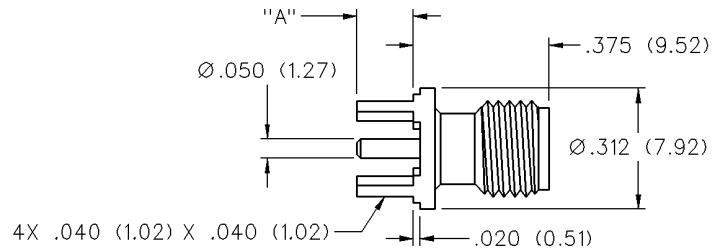
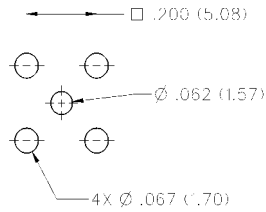
CABLE TYPE	VSWR & FREQ. RANGE	GOLD PLATED
RG-316/u, 188, 174	1.15 + .03f (GHz) 0-12.4 GHz	142-9403-101
RG-316 DS, 188 DS	1.15 + .03f (GHz) 0-12.4 GHz	142-9404-101
RG-58/u, 141	1.15 + .02f (GHz) 0-12.4 GHz	142-9407-101

SMA Non-Magnetic RF Connectors

PC Mount

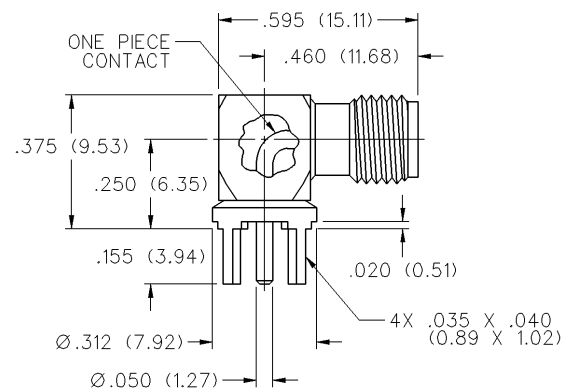
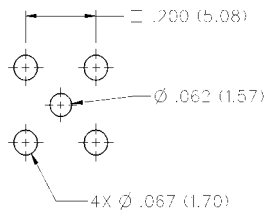
INCHES (MILLIMETERS)
CUSTOMER DRAWINGS AVAILABLE UPON REQUEST

Straight Jack Receptacle



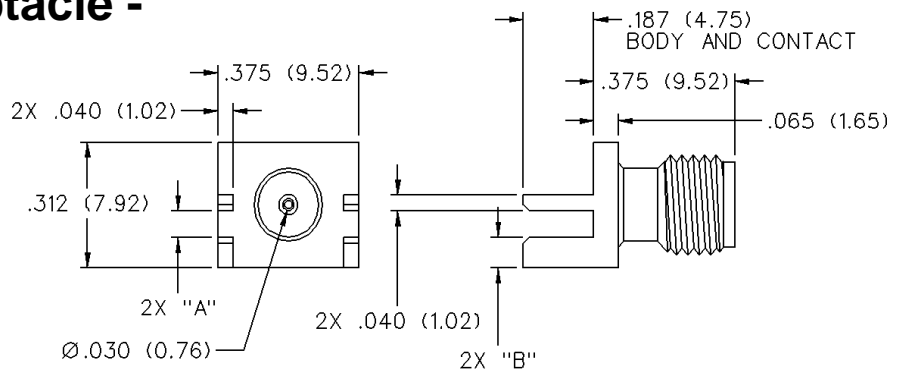
VSWR & FREQ. RANGE	GOLD PLATED	"A"
VSWR: N/A 0-18 GHz	142-9701-201	.155 (3.94)
VSWR: N/A 0-18 GHz	142-9701-211	.110 (2.79)

Right Angle Jack Receptacle



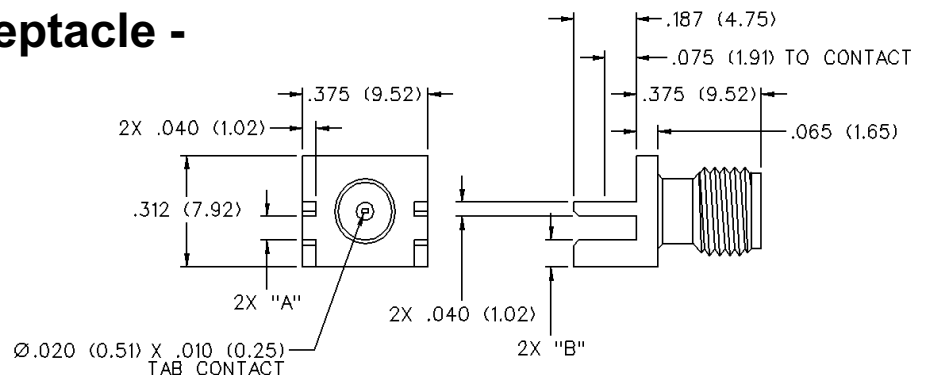
VSWR & FREQ. RANGE	GOLD PLATED
VSWR: N/A 0-18 GHz	142-9701-301

End Launch Jack Receptacle - Round Contact



VSWR & FREQ. RANGE	BOARD THICKNESS	GOLD PLATED	"A"	"B"
VSWR: N/A 0-18 GHz	.062 (1.57)	142-9701-801	.068 (1.73)	.073 (1.85)

End Launch Jack Receptacle - Tab Contact



VSWR & FREQ. RANGE	BOARD THICKNESS	GOLD PLATED	"A"	"B"
VSWR: N/A 0-18 GHz	.062 (1.57)	142-9701-811	.068 (1.73)	.083 (2.11)

ELECTRICAL RATINGS

Impedance: 50 Ohms

Frequency Range: 0-6 GHz

VSWR: (f = GHz)

	Straight Cabled Connectors	Right Angle Cabled Connectors
RG-316 cable	1.13 + .04f	1.07 + .04f
Uncabled receptacles		N/A

Working Voltage: (Vrms maximum)†

Connectors for Cable Type	Sea Level	70K Feet
RG-316	335	85

Dielectric Withstanding Voltage: (VRMS minimum at sea level)

Connectors for RG-316, uncabled receptacles	1000
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Corona Level: (Volts minimum at 70,000 feet)

Connectors for RG-316, uncabled receptacles	250
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Insertion Loss: (dB maximum, tested at 1 GHz)

Straight cable connectors	0.1 dB
Right angle cable connectors	0.2 dB
Uncabled receptacles	N/A

Insulation Resistance: 10,000 megohms minimum

Contact Resistance: (milliohms maximum)

	Initial	After Environmental
Center contact (straight cabled connectors, uncabled receptacles)	5.0	8.0
Center contact (right angle cabled connectors)	5.0	15.0
Outer contact	1.0	1.5
Braid to body	1.0	N/A

RF Leakage: (dB typical tested at 2.5 GHz)

Cable connectors	-55
Uncabled receptacles	N/A

RF High Potential Withstanding Voltage: (Vrms minimum, tested at 4 and 7 MHz)

Cabled connectors	700
Uncabled receptacles	600

MECHANICAL RATINGS

Engagement Design: Compatible with CECC 22220, Series MCX

Engagement Force: 5.6 pounds maximum axial force

Disengagement Force: 8 pounds maximum axial force, 1 pound min.

Contact Retention: 2.3 pounds min. axial force (captivated contacts)
1 inch-ounce min. torque (uncabled receptacles)

Cable Retention:	Axial Force* (pounds)	Torque (in-oz)
Connectors for RG316	20	N/A
Connectors for RG316DS	25	N/A

* or cable breaking strength whichever is less.

ENVIRONMENTAL RATINGS (Meets or exceed the applicable paragraph of MIL-PRF-39012)

Durability: 500 cycles minimum

Temperature Range: - 65°C to + 165°C

Thermal Shock: MIL-STD-202, Method 107, Condition F

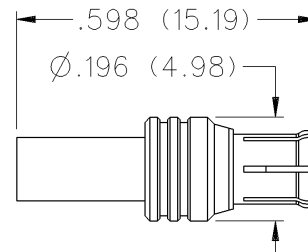
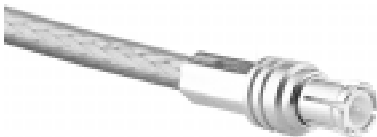
Corrosion: MIL-STD-202, Method 101, Condition B

Shock: MIL-STD-202, Method 213, Condition B

Vibration: MIL-STD-202, Method 204, Condition B

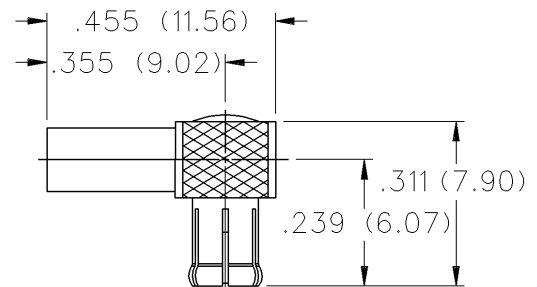
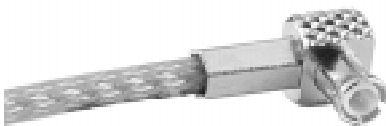
Moisture Resistance: MIL-STD-202, Method 106

Straight Crimp Type Plug - Solder or Crimp Contact - Captivated Contact



CABLE TYPE	GOLD PLATED
RG-316/u, 188, 174	133-9403-001
RG-316 DS, 188 DS	133-9404-001

Right Angle Crimp Type Plug - Captivated Contact



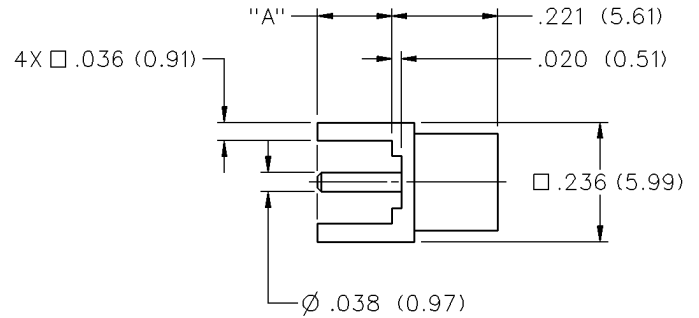
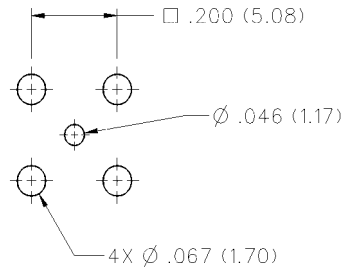
CABLE TYPE	GOLD PLATED
RG-316/u, 188, 174	133-9403-101
RG-316 DS, 188 DS	133-9404-101

MCX Non-Magnetic RF Connectors

PC Mount

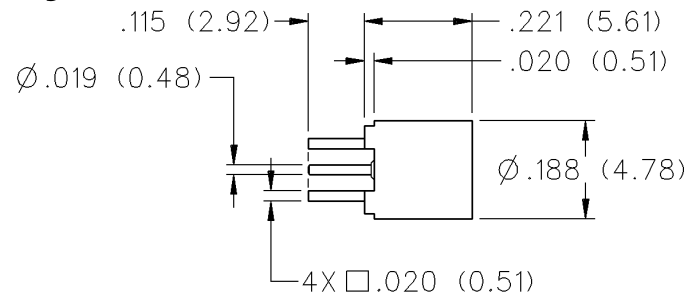
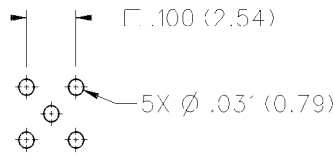
INCHES (MILLIMETERS)
CUSTOMER DRAWINGS AVAILABLE UPON REQUEST

Straight Jack Receptacle



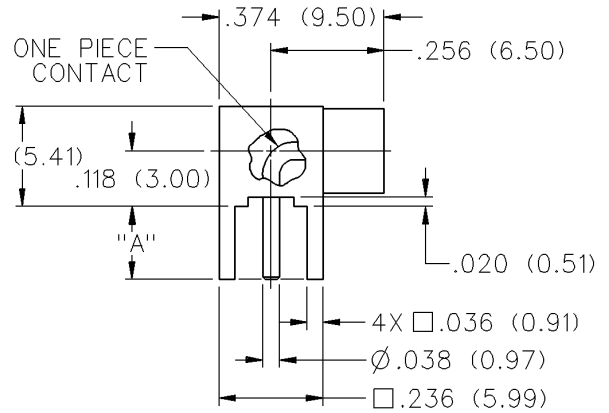
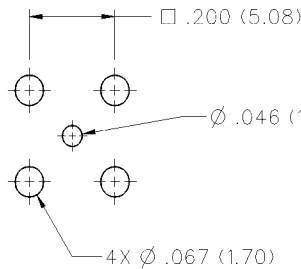
DIMENSION "A"	GOLD PLATED
.155 (3.94)	133-9701-201
.110 (2.79)	133-9701-211

Straight Jack Receptacle - .100" Layout



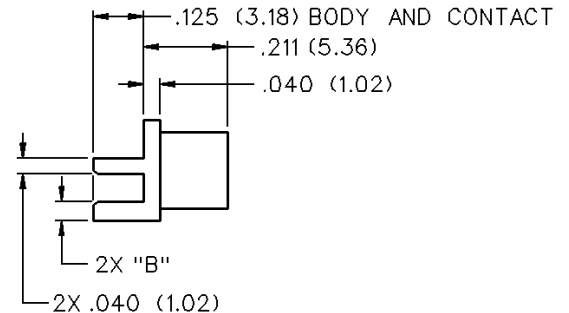
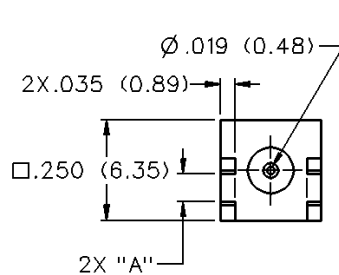
GOLD PLATED
133-9701-231

Right Angle Jack Receptacle



"A"	GOLD PLATED
.155 (3.94)	133-9701-301
.110 (2.79)	133-9701-311

End Launch Jack Receptacle - Round Contact



BOARD THICKNESS	GOLD PLATED	"A"	"B"
.062 (1.57)	133-9701-801	.068 (1.73)	.048 (1.22)

ELECTRICAL RATINGS

Impedance: 50 ohms

Frequency Range: 0-4 GHz

VSWR: (f = GHz)

	Straight Cabled	Right Angle Cabled
RG-316	1.25 + .04f	1.35 + .04f
Uncabled receptacles	N/A	

Working Voltage: (Vrms maximum)†

Connectors for Cable Type	Sea Level	70K Feet
RG-316, uncabled connectors	335	85

Dielectric Withstanding Voltage: (VRMS minimum at sea level)†

Connectors for RG-316, uncabled receptacles	1000
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Corona Level: (Volts minimum at 70,000 feet)†

Connectors for RG-316	250
Uncabled receptacles	N/A

Insertion Loss: (dB maximum, tested at 1.5 GHz)

Straight cable connectors	0.30 dB
Right angle cable connectors	0.60 dB
Uncabled receptacles	N/A

Insulation Resistance: 1000 megohms minimum

Contact Resistance: (milliohms maximum)

	Initial	After Environmental
Center contact (straight cabled connectors and uncabled receptacles)	6.0	8.0
Center contact (right angle cabled connectors)	12.0	16.0
Outer contact (gold plated connectors)	1.0	1.5
Braid to body (gold plated connectors)	1.0	N/A

RF Leakage: (dB minimum tested at 2.5 GHz)

Cable connectors	-55 dB
Uncabled receptacles	N/A

RF High Potential Withstanding Voltage: (Vrms minimum, tested at 4 and 7 MHz)†

Connectors for RG-316	700
Uncabled receptacles	600

Power Rating (Dummy Load): 0.5 watt @ +25°C, derated to 0.25 watt @ +125° C

MECHANICAL RATINGS

Engagement Design: MIL-STD-348, Series SMB

Engagement/Disengagement Force: 2 pounds min to 14 pounds maximum axial force

Contact Retention: 4 lbs. min axial force (captivated contacts)
1 inch-ounce min torque (uncabled receptacles)

Cable Retention:	Axial Force* (pounds)	Torque (in-oz)
Connectors for RG-316	20	N/A

*or cable breaking strength whichever is less.

Durability: 500 cycles minimum

ENVIRONMENTAL RATINGS

(Meets or exceed the applicable paragraph of MIL-PRF-39012)

Temperature Range: - 65°C to + 165°C

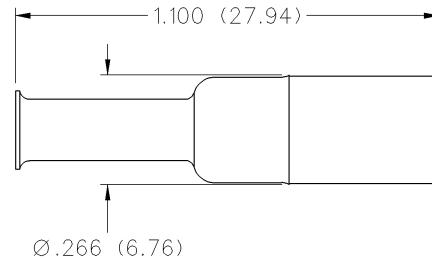
Thermal Shock: MIL-STD-202, Method 107, Condition B

Corrosion: MIL-STD-202, Method 101, Condition B

Shock: MIL-STD-202, Method 213, Condition B

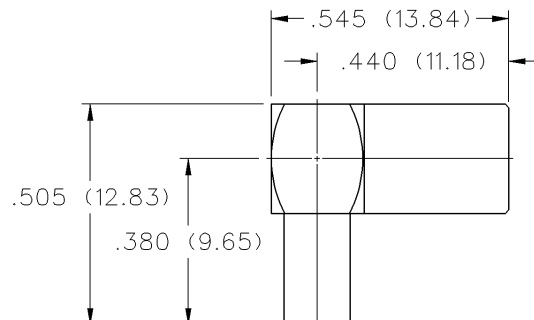
Vibration: MIL-STD-202, Method 204, Condition B

Straight Crimp Type Plug - Solder or Crimp Captivated Contact



CABLE TYPE	GOLD PLATED
RG-316/u, 188, 174, 179, 187	131-9403-001
RG-316DS, 188 DS, 179 DS, 187 DS	131-9404-001

Right Angle Crimp Type Plug - Captivated Contact



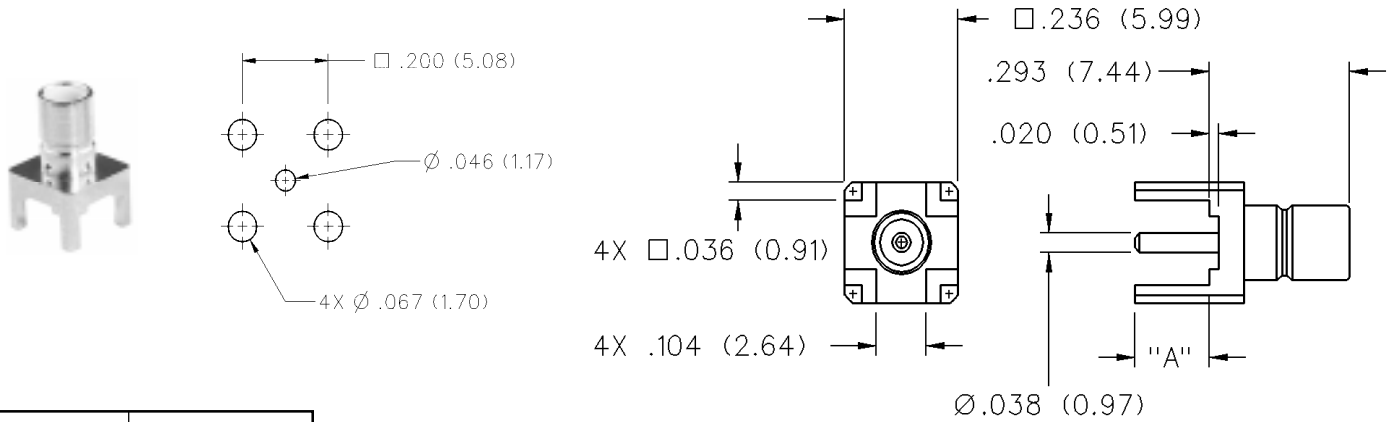
CABLE TYPE	GOLD PLATED
RG-316/u, 188, 174, 179, 187	131-9403-101
RG-316DS, 188 DS, 179 DS, 187 DS	131-9404-101

SMB Non-Magnetic RF Connectors

PC Mount

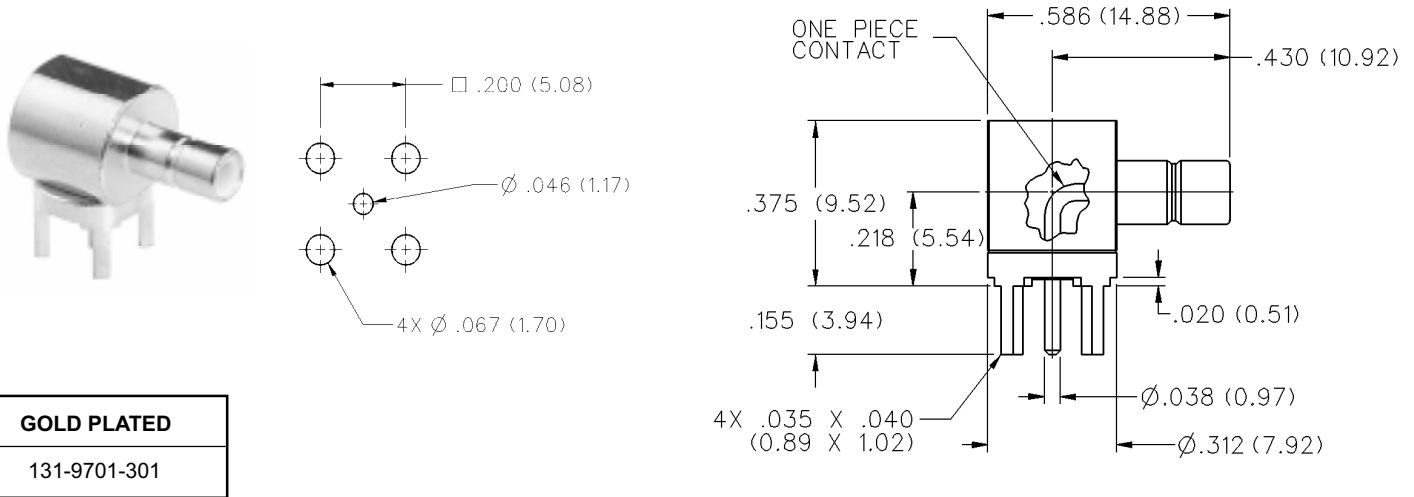
INCHES (MILLIMETERS)
CUSTOMER DRAWINGS AVAILABLE UPON REQUEST

Straight Jack Receptacle



"A"	GOLD PLATED
.155 (3.94)	131-9701-201
.095 (2.41)	131-9701-211

Right Angle Jack Receptacle

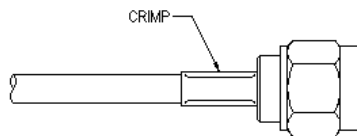
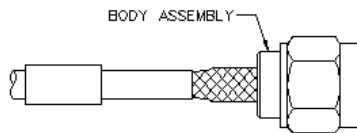
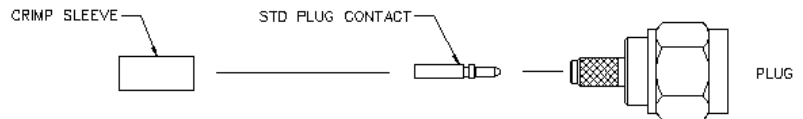
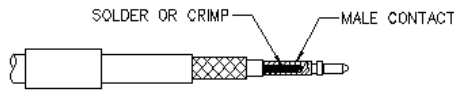
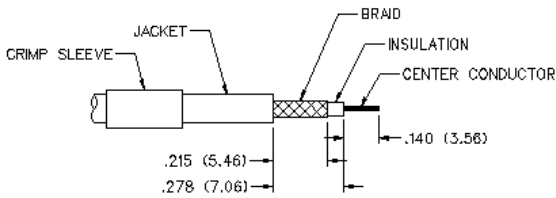


GOLD PLATED
131-9701-301

SMA Non-Magnetic RF Connectors Cable Assembly Instructions

SMA Type Straight Plugs For Flexible Cable - Crimp or Solder Contacts

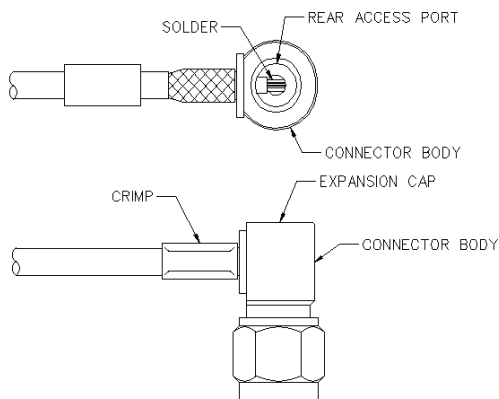
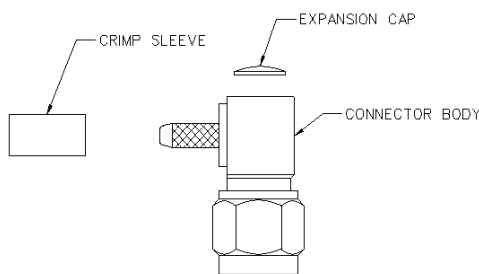
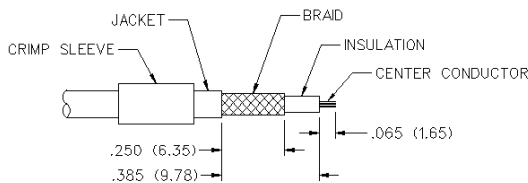
CABLE GROUP	PART NUMBER	CRIMP HEX
RG-316/u, 188, 174	142-9403-011	.128 (3.25)
RG-316 DS, 188 DS	142-9404-011	.151 (3.83)
RG-58/u, 141	142-9407-011	.213 (5.41)



1. Identify connector parts. (3 piece parts)
2. Strip cable to dimensions shown. Do not nick braid or center conductor. Tin center conductor if contact will be solder attached. Do not tin center conductor if contact is to be crimp attached. When stripping LMR-100 low loss cable, remove foil back to where cable jacket is stripped. A wire stripper of correct size is recommended for this step. Slide heat shrink (as applicable) and crimp sleeve onto jacket of cable.
3. Assemble contact onto cable as shown.
Solder Attachment: Solder contact to center conductor through solder hole using .020 (0.51) diameter solder. Use a minimum amount of solder for a good joint.
Crimp Attachment: Crimp contact to center conductor using Johnson Components™ Hand Tool 144-0000-910, setting #2, with positioner 141-0000-907. Crimp location should be centered between end of contact and X-hole. Crimp attachment to solid center conductor cables is not recommended.
4. Flare braid and slide body assembly over contact and under braid. Then seat body assembly firmly onto contact. The cable may have to be held in a clamping fixture. Arrange braid uniformly around crimp stem. Slide crimp sleeve forward and crimp using recommended crimp tool. Slide heat shrink forward and shrink (as applicable).

SMA Crimp Type Right Angle Plugs For Flexible Cable

CABLE GROUP	PART NUMBER	CRIMP HEX
RG-316/u, 188, 174	142-9403-101	.128 (3.25)
RG-316 DS, 188 DS	142-9404-101	.151 (3.83)
RG-58/u, 141	142-9407-101	.213 (5.41)

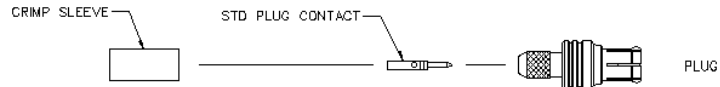
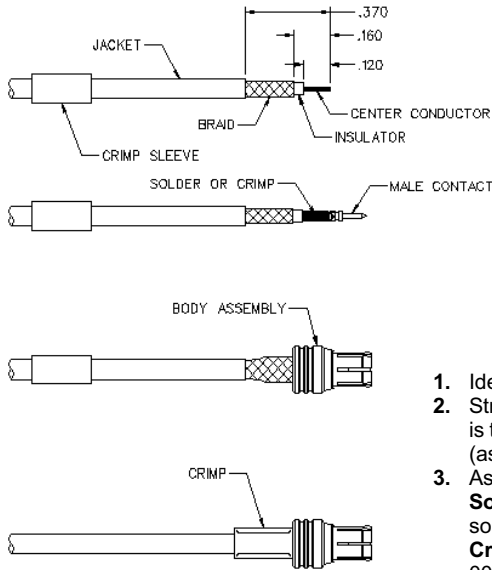


1. Identify connector parts. (3 piece parts)
2. Strip cable to dimensions shown. Do not nick braid or center conductor. When stripping LMR-100 low loss cable, remove foil back to where cable jacket is stripped. A wire stripper of correct size is recommended for this step. Twist stranded center conductor into tight bundle and tin (optional). Slide crimp sleeve onto cable as shown.
3. Flare braid and slide cable into body making certain that the cable insulation bottoms on center contact. Solder center conductor to contact through the rear access port. Use a minimum amount of solder for a full fillet joint. **.020 (0.51) diameter solder is recommended.**
4. Arrange braid uniformly around crimp stem. Slide crimp sleeve over braid and crimp securely using recommended crimp tool. Place expansion cap in access port and seat with .187 (4.75) diameter flat punch. Shrink heat shrink tubing over crimp sleeve if applicable.

MCX Non-Magnetic RF Connectors Cable Assembly Instructions

MCX Crimp Type Straight Connectors For Flexible Cable

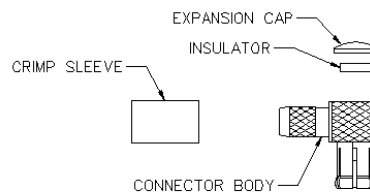
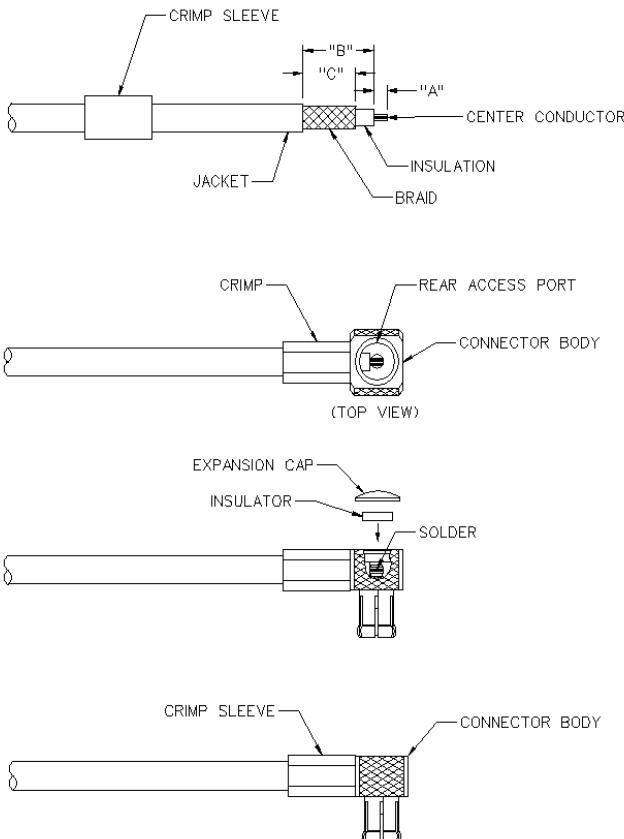
CABLE GROUP	PART NUMBER	CRIMP HEX
RG-316/u, 188, 174	133-9403-001	.128 (3.25)
RG-316DS, 188DS	133-9404-001	.151 (3.83)



1. Identify connector parts. (3 piece parts)
2. Strip cable to dimensions shown. Do not nick braid or center conductor. Tin center conductor if contact is to be solder attached. Do not tin center conductor if contact is to be crimp attached. Slide heat shrink (as applicable) and crimp sleeve onto jacket of cable.
3. Assemble contact onto cable as shown.
Solder attachment. Solder contact to center conductor through solder hole using .020 (0.51) diameter solder. Use a minimum of solder for a good joint.
Crimp attachment. Crimp contact to center conductor using Johnson Components™ hand tool 140-0000-952 and die set 140-0000-953. Crimp location should be centered between end of contact and cross hole. Crimp attachment to solid center conductor cable is not recommended.
4. Flair braid and slide body assembly over contact and under braid. Then seat body assembly firmly onto contact. The cable may have to be held in a clamping fixture. Arrange braid uniformly around crimp stem. Slide crimp sleeve forward and crimp using recommended crimp tool. Slide heat shrink forward and shrink (as applicable).

MCX Crimp Type Right Angle Plugs For Flexible Cable

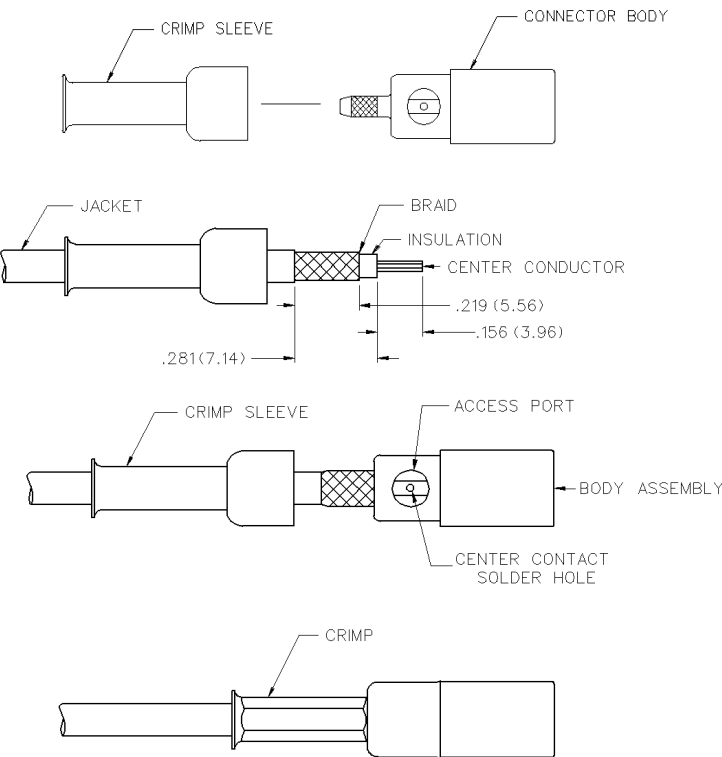
CABLE GROUP	PART NUMBER	"A"	"B"	"C"	CRIMP HEX
RG-316/u, 188, 174	133-9403-101	.050 (1.27)	.270 (6.86)	.200 (5.08)	.128 (3.25)
RG-316DS, 188DS	133-9404-101	.050 (1.27)	.270 (6.86)	.200 (5.08)	.151 (3.83)



1. Identify connector parts. (4 piece parts)
2. Strip cable to dimensions shown. Do not nick braid or center conductor. A wire stripper of correct size is recommended for this step. Twist stranded center conductor into tight bundle and tin (optional). Slide crimp sleeve onto cable shown.
3. Flair braid and slide cable into body making certain that the cable insulation bottoms on center contact. Arrange braid uniformly around crimp stem. Slide crimp sleeve over braid and crimp securely using recommended crimp tool.
4. Solder center conductor to contact through rear access port. Use a minimum amount of solder for a full fillet joint. **.020 (0.51) diameter solder is recommended.**
5. Assemble insulator if applicable then place expansion cap in access port and seat with .156 (3.96) diameter flat punch or MCX hand assembly tool 141-0000-908. Shrink heat shrink tubing over crimp sleeve if applicable.

SMB Non-Magnetic RF Connectors Cable Assembly Instructions

SMB Straight Crimp Type Straight Plugs For Flexible Cable



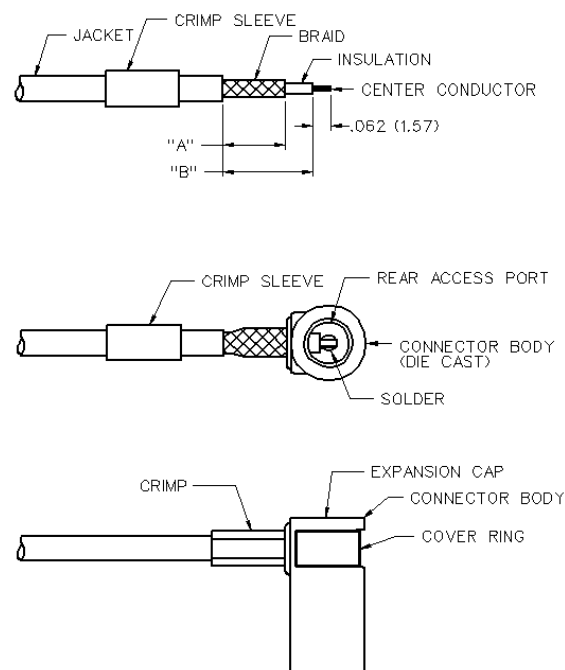
CABLE GROUP	PART NUMBER	CRIMP HEX
RG-316/u, 188, 174, 179, 187	131-9403-001	.128 (3.25)
RG-316 DS, 188 DS, 179 DS, 187 DS	131-9404-001	.151 (3.83)

1. Identify connector parts. (2 piece parts)
2. Strip cable to dimensions shown. Do not nick braid or center conductor. A wire stripper of correct size is recommended for this step. Twist stranded center conductor into tight bundle and tin. Slide crimp sleeve onto cable as shown.
3. Flare braid and slide cable into body making certain that the cable insulation bottoms in center contact.

Solder Attachment: Solder center conductor to contact through the side access ports and hole in center contact. Use a minimum amount of solder for a full fillet joint. **.020 (0.51) diameter solder is recommended.**

Crimp 50 Ohm connector contacts with 141-0000-911 dieset in 144-900 tool frame. Crimp 75 Ohm connector contacts with 141-0000-924 dieset in 144-0000-900 tool frame.

SMB Right Angle Crimp Type Straight Plugs For Flexible Cable



CABLE GROUP	PART NUMBER	"A"	"B"	CRIMP HEX
RG-316/u, 188, 174, 179, 187	131-9403-101/116	.177 (4.50)	.289 (7.34)	.128 (3.25)
RG-316 DS, 188 DS, 179 DS, 187 DS	131-9404-101/116	.177 (4.50)	.289 (7.34)	.151 (3.83)

1. Identify connector parts. (4 piece parts: crimp sleeve, body assembly, expansion cap and covering ring. Die cast body only.)
2. Strip cable to dimensions shown. Do not nick braid or center conductor. A wire stripper of correct size is recommended for this step. Twist stranded center conductor into tight bundle and tin (optional). Slide crimp sleeve onto cable as shown.
3. Flare braid and slide cable into body assembly making certain that the cable insulation bottoms on center contact. Solder center conductor to contact through the rear and side access ports. Use a minimum amount of solder for a good joint. **.020 (0.51) diameter solder is recommended.**
4. Arrange braid uniformly around crimp stem of body assembly. Slide crimp sleeve over braid and crimp securely using recommended crimp tool. Place expansion cap in access port and seat with a .125 (3.17) diameter flat punch. Snap cover ring over side access port.

