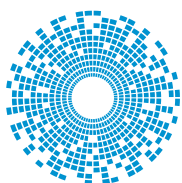


JOHNSON®

Non Magnetic Connectors Product Catalog



cinch
CONNECTIVITY SOLUTIONS
a bel group

NON-MAGNETIC RF CONNECTORS

Introduction



Johnson's Non-Magnetic Connector Additions Offer Solutions to MR Imaging Technology

Johnson®, a product line of Cinch Connectivity Solutions, has expanded the connector product groups in its popular line of Non-Magnetic RF coaxial connectors and cable assemblies.

MCX and MMCX micro-miniature connectors have been added to satisfy the needs of the RF coil manufacturers that are building smaller coils for MRI equipment. Customized flex coils and array coils can image smaller parts of the body such as wrists, feet, hands and other appendages.

The Non-Magnetic MCX and MMCX is the perfect micro-miniature connector for small multichannel coil packages as they provide a positive snap-on coupling design with high mating cycles for rugged, high density connectivity.

The Type N Non-Magnetic connector provides a perfect RF solution for high Tesla fields considered for future designs. These deep tissue MR images will require the rugged interface of the N connector as well as the tri-alloy plating to eliminate inter-modulation issues.

All the connectors in Johnson's Non-Magnetic line are made from high purity copper alloys assuring no ferrous materials are in the connectors manufactured. Cinch Connectivity Solutions continues to work with our customers to develop new solutions as the MR industry transitions to high-end field applications and improved resolution at greater physical depths within the body.

Products are offered through authorized distributors and international sales channels including a direct sales force and a network of manufacturers' representatives. For more information, please call (800) 247-8256.

About Johnson

Cinch Connectivity Solutions, located in Waseca, MN, manufactures Johnson® RF Connectors such as Ultra-miniature (UMC), Micro-miniature (MCX, MCX 75, MMCX and SMP), Sub-miniature (SMA, SMB, SMB Mini-75 Ohm, SMK) and Medium (Type N) in the most popular styles including PC Board Mount, End Launch, Bulkhead Mount and Cable Mounts (Flexible, Semi-rigid and Conformable).

Table of Contents

MMCX Non-Magnetic RF Connectors	2
MCX Non-Magnetic RF Connectors	6
SMA Non-Magnetic RF Connectors	11
SMB Non-Magnetic RF Connectors	15
Type N Non-Magnetic RF Connectors	19
Assembly Instructions	22
The Johnson Combination	
MRI Connectors and Modular Customization	30
Competitor Cross Reference	31



NON-MAGNETIC RF CONNECTORS

MMCX Non-Magnetic RF Connectors



ELECTRICAL SPECIFICATIONS

Impedance:	50 Ohms		
Frequency Range	0-6 GHz		
VSWR: (f = GHz)		Straight Cable Connectors	Right Angle Cable Connectors
	.047 dia flexible	1.20	1.14 + .07f
	RG-178, RG-316, RG-316 DS	1.20	1.25
Working Voltage	170 VRMS at sea level		
Dielectric Withstanding Voltage	500 VRMS at sea level		
Insulation Resistance	1000 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	1.5	N/A
Corona Level:	190 volts min at 70,000 feet		
Insertion Loss (dB maximum, tested at 1 GHz)			
	Straight Cable Connectors		0.1
	Right Angle Cable Connectors		0.2
	Uncabled Receptacles		N/A
RF Leakage (dB minimum tested at 2.5 GHz)			
	Flexible Cable Connectors		-60 dB
RF High Potential Withstanding Voltage	tested at 4 and 7 MHz		
	VRMS minimum		400

MECHANICAL SPECIFICATIONS

Engagement Design	Series MMCX		
Engagement Force	8 lbs. max axial engagement, 1.4 lbs. min axial disengagement		
Contact Retention	2.0 pounds min. axial force, 1 inch-ounce min. torque (uncabled receptacles)		
Cable Retention		Axial Force* (lbs)	Torque (in-oz)
	Connectors for .047 flexible	3.5	N/A
	Connectors for RG-178	7.0	N/A
	Connectors for RG-316	20.0	N/A
	Connectors for RG-316 DS	25.5	N/A
	Connectors for .086 Semi-Rigid	30.0	16
	*Or cable breaking strength whichever is less.		
Durability:	500 cycles minimum		

ENVIRONMENTAL SPECIFICATIONS (Meets or Exceeds the Applicable Paragraph of MIL-RF-39012)

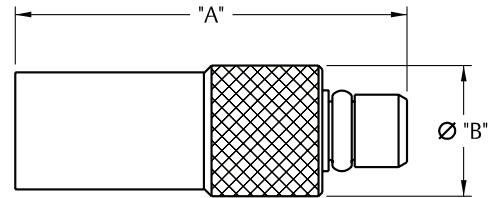
Temperature Range	-65°C to +165°C
Thermal Shock	MIL-STD-202, Method 107, Condition C (Except -55°C to 115°C)
Corrosion	MIL-STD-202, Method 101, Condition B
Shock	MIL-STD-202, Method 213, Condition B
Vibration	MIL-STD-202, Method 204, Condition D
Moisture Resistance	MIL-STD-202, Method 106

NON-MAGNETIC RF CONNECTORS



MMCX Non-Magnetic RF Connectors For Flexible Cable and PC Mount

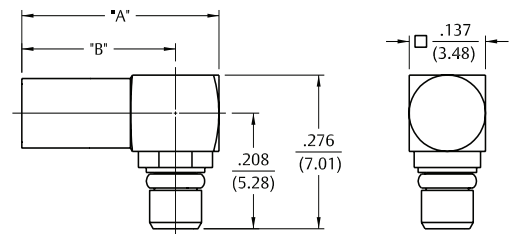
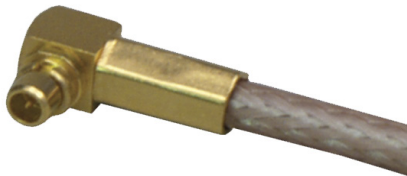
Straight Crimp Type Plug - Solder or Crimp Contact - Captivated Contact



Cable Type	Gold Plated	"A"	"B"	Termination
RG-316/U, 188, 161, 174	135-9403-001	.509 (12.93)	.173 (4.39)	Crimp Sleeve
RG-178/U, 196	135-9402-001	.462 (11.73)	.137 (3.48)	Crimp Insert
.047 Dia. Flex	135-9436-001	.462 (11.73)	.137 (3.48)	Crimp Insert

See assembly instructions page 22

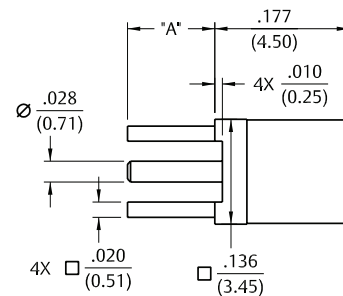
Right Angle Crimp Type Plug - Captivated Contact



Cable Type	Gold Plated	"A"	"B"	Termination
RG-316/U, 188, 187, 179, 161, 174	135-9403-101	.412 (10.46)	.334 (8.48)	Crimp Sleeve
RG-178/U, 196	135-9402-111	.412 (10.46)	.334 (8.48)	Crimp Sleeve
.047 Dia. Flex	135-9436-101	.354 (8.99)	.276 (6.98)	Crimp Insert

See assembly instructions page 23

Straight Jack Receptacle



Gold Plated	"A"
135-9701-201	.115 (2.92)
135-9701-211	.068 (1.73)

Mounting hole layout figure 1 on page 5

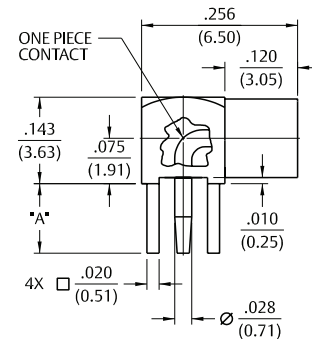


NON-MAGNETIC RF CONNECTORS



MMCX Non-Magnetic RF Connectors For PC Mount

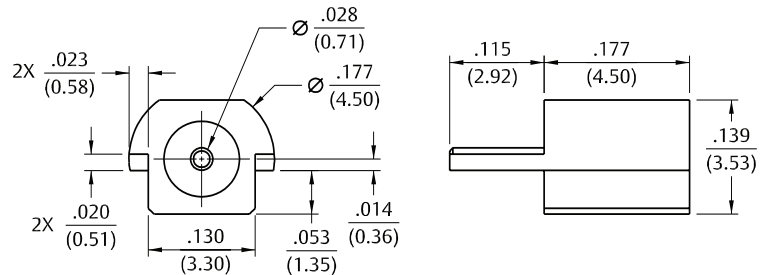
Right Angle Jack Receptacle



Gold Plated	"A"
135-9701-301	.155 (3.94)
135-9701-311	.068 (1.73)

Mounting hole layout figure 1 on page 5 below

End Launch Jack Receptacle - Surface Contact



Gold Plated	Packaging
135-9711-801	Stock
135-9711-802	Tape and Reel 1000 pcs/reel

Recommended land pattern figure 2 on page 5

Mounting Hole Layout

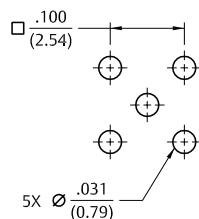


Fig 1

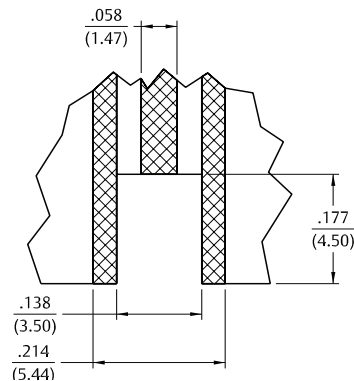


Fig 2

NON-MAGNETIC RF CONNECTORS

MCX Non-Magnetic RF Connectors



ELECTRICAL SPECIFICATIONS			
Impedance:		50 Ohms	
Frequency Range		0-6 GHz	
VSWR: (f = GHz)		Straight Cable Connectors	Right Angle Cable Connectors
	RG-178 cable	1.17 + .09f	1.07 + .06f
	RG-316 cable	13 + .04f	1.07 + .04f
	Uncabled Receptacles	N/A	N/A
Working Voltage (VRMS maximum)	Connectors for Cable Type	Sea Level	70K Feet
	RG-178	250	65
	RG-316	335	85
Dielectric Withstanding Voltage (VRMS minimum at sea level)	Connectors for RG-178, Uncabled Receptacles	750	
	Connectors for RG-316, Uncabled Receptacles	1000	
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
Corona Level (Volts minimum at 70,000 feet)	Connectors for RG-178 Uncabled Receptacles	190	
	Connectors for RG-316, Uncabled Receptacles	250	
Insertion Loss (dB maximum, tested at 1 GHz)	Straight Cable Connectors	0.1	
	Right Angle Cable Connectors	0.2	
	Uncabled Receptacles	N/A	
RF Leakage (dB minimum 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)		
	Connectors for RG 178	500	
	Connectors for RG 316	700	
	Uncabled Receptacles	600	

MECHANICAL SPECIFICATIONS			
Engagement Design	Compatible with CECC 22220, Series MCX		
Engagement / Disengagement Force	5.6 pounds maximum axial 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* (lbs)	Torque (in-oz)
	Connectors for RG178	10	N/A
	Connectors for RG316	20	N/A
	Connectors for RG316 DS	25	N/A
	*Or cable breaking strength whichever is less.		
Durability:	500 cycles minimum		

ENVIRONMENTAL SPECIFICATIONS (Meets or Exceeds the Applicable Paragraph of MIL-RF-39012)	
Temperature Range	-65°C to +165°C
Thermal Shock	MIL-STD-202, Method 107, Condition C (Except -55°C to 115°C)
Corrosion	MIL-STD-202, Method 101, Condition B
Shock	MIL-STD-202, Method 213, Condition B
Vibration	MIL-STD-202, Method 204, Condition D
Moisture Resistance	MIL-STD-202, Method 106

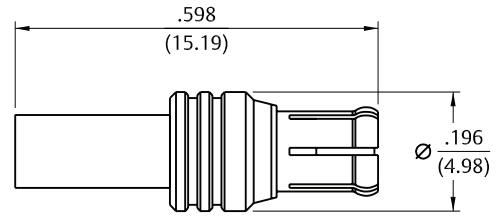


NON-MAGNETIC RF CONNECTORS

MCX Non-Magnetic RF Connectors



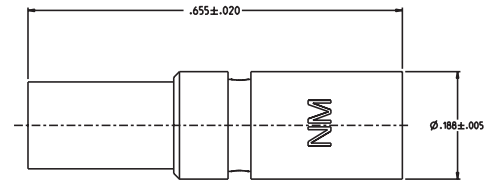
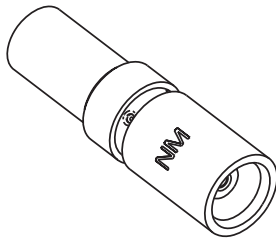
Straight Crimp Type Plug - Solder or Crimp Contact - Captivated Contact



Cable Type	Gold Plated
RG-178	133-9402-001
RG-316/U, 188, 174	133-9403-001
RG-316 DS, 188 DS	133-9404-001

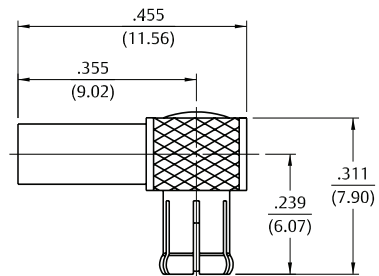
See assembly instructions page 24

Straight Crimp Type Jack Receptacle



Cable Type	Gold Plated
RG-316	133-9303-001

Right Angle Crimp Type Plug - Captivated



Cable Type	Gold Plated	Silver Plated
RG-316/U, 188, 174	133-9403-101	133-9403-104
RG-316 DS, 188 DS	133-9404-101	
RG-178/U, 196	133-9402-101	

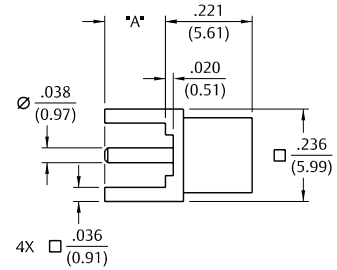
See assembly instructions page 24

NON-MAGNETIC RF CONNECTORS

MCX Non-Magnetic RF Connectors For Flexible Cables



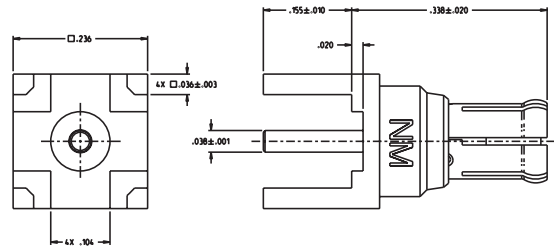
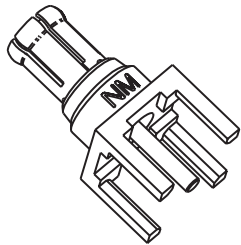
Straight Jack Receptacle



Gold Plated	Silver Plated	"A"
133-9701-201	133-9701-204	.155 (3.94)
133-9701-211		.110 (2.79)

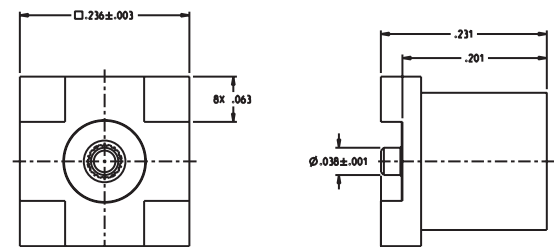
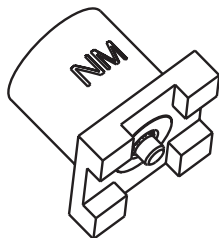
Mounting hole layout figure 4 on page 10

Straight Plug Receptacle, PCB Mount



Gold Plated
133-9801-201

Straight Surface Mount, Jack Assembly



Gold Plated
133-9711-201

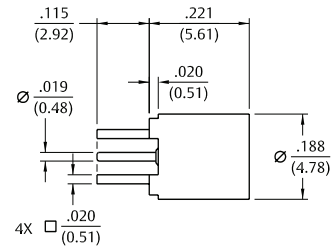


NON-MAGNETIC RF CONNECTORS



MCX Non-Magnetic RF Connectors For Flexible Cables

Straight Jack Receptacle - .100" Layout

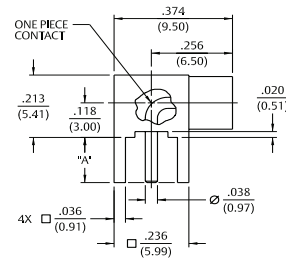


Gold Plated

133-9701-231

Mounting hole layout figure 3 on page 10

Right Angle Jack Receptacle



Gold Plated

133-9701-301

133-9701-311

Silver Plated

133-9701-304

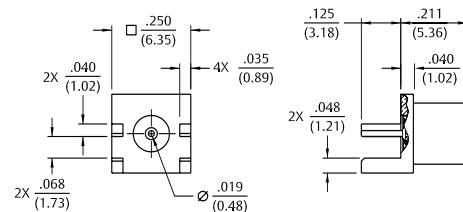
"A"

.155 (3.94)

.110 (2.79)

Mounting hole layout figure 4 on page 10

End Launch Jack Receptacle - Round Contact



Gold Plated

133-9701-801

Board Thickness

.062 (1.57)

NON-MAGNETIC RF CONNECTORS



MCX Non-Magnetic RF Connectors For PC Mount

Mounting Holes Layout

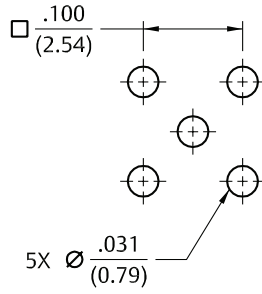


Fig 3

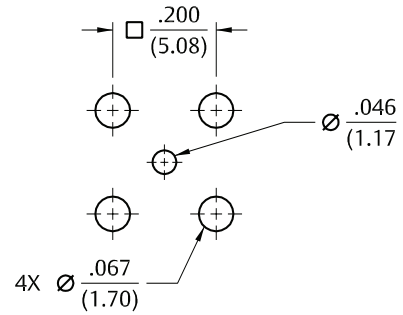


Fig 4

NON-MAGNETIC RF CONNECTORS



SMA Non-Magnetic RF Connectors

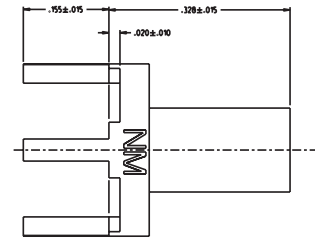
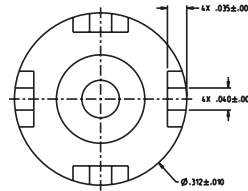
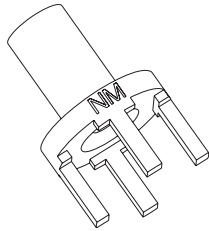
ELECTRICAL SPECIFICATIONS			
Impedance:			50 Ohms
Frequency Range	Flexible cable connectors Uncabled Receptacles		0-12.4 GHz 0-18.0 GHz
VSWR: (f = GHz)		Straight Cable Connectors	Right Angle Cable Connectors
	RG-316 RG-58 Uncabled Receptacles	1.15 + .02f 1.15 + .01f N/A	1.15 + .03f 1.15 + .02f N/A
Working Voltage (VRMS maximum)	Connectors for Cable Type	Sea Level	70K Feet
	RG-316 RG-58, Uncabled Receptacles	250 335	65 85
Dielectric Withstanding Voltage (VRMS minimum at sea level)			
	Connectors for RG-316 Connectors for RG-58, Uncabled Receptacles		750 1000
Insulation Resistance	5000 megohms minimum		
Contact Resistance (milliohms maximum)		Initial	After Environmental
	Center Contact (straight cabled connectors, uncabled receptacles) Center Contact (right angle cabled connectors) Outer Contact Braid to Body	3.0 4.0 2.0 0.5	4.0 6.0 N/A N/A
Corona Level (Volts minimum at 70,000 feet)			
	Connectors for RG-316 Connectors for RG-58, Uncabled Receptacles		190 250
Insertion Loss (dB maximum, tested at 1 GHz)			
	Straight Cable Connectors Right Angle Cable Connectors Uncabled Receptacles		0.06 √f(GHz), tested at 6 GHz 0.15 √f(GHz), tested at 6 GHz N/A
RF Leakage (dB minimum tested at 2.5 GHz)			
	Cable connectors Uncabled Receptacles		-60 dB N/A
RF High Potential Withstanding Voltage	(VRMS minimum, tested at 4 and 7 MHz)		
	Connectors for RG-316 Connectors for RG-58, Uncabled receptacles		500 670
MECHANICAL SPECIFICATIONS			
Engagement Design	MIL-STD-348, Series SMA		
Engagement / Disengagement Force	2 inch-pounds maximum		
Contact Retention	6 lb minimum axial force (captivated contacts); 4 inch-ounce minimum torque (uncabled receptacles)		
Mating Torque	7 to 10 inch-pounds		
Coupling Proof Torque	15 inch-pounds minimum		
Coupling Nut Retention	60 pounds minimum		
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 SPECIFICATIONS (Meets or Exceeds the Applicable Paragraph of MIL-RF-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		

NON-MAGNETIC RF CONNECTORS



SMA Non-Magnetic RF Connectors For Flexible and Semi-Rigid Cable

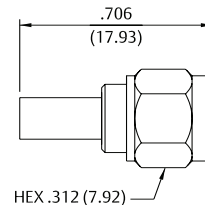
Straight Solder Type Plug, Semi Rigid Cable



Gold Plated

142-9003-201

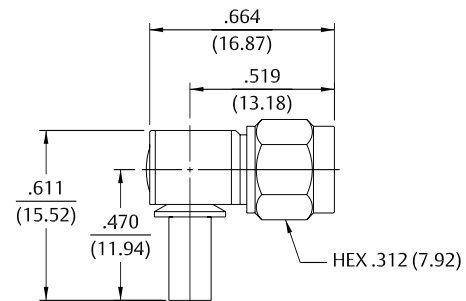
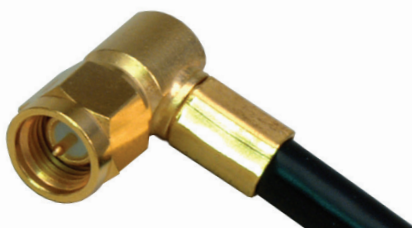
Straight Crimp Type Plug (3-piece) - Captivated Contact



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

See assembly instructions page 25

Right Angle Crimp Type Plug - Captivated Contact



Cable Type	VSWR & Freq. Range	Gold Plated	Silver Plated
RG-316/U, 188, 174	1.15 + .03f (GHz) 0-12.4 GHz	142-9403-101	142-9403-104
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	142-9407-104

See assembly instructions page 25

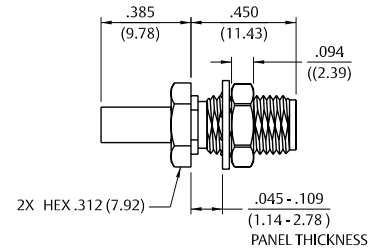
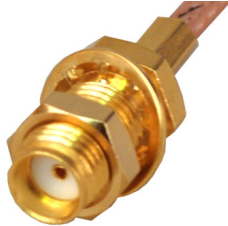


NON-MAGNETIC RF CONNECTORS

SMA Non-Magnetic RF Connectors For PC Mount



Straight Crimp Type Blukhead Jack (3-piece) - Captivated Contact

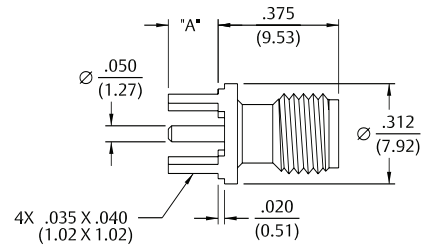


Cable Type	VSWR & Freq. Range	Gold Plated
RG-316/U, 188, 174	1.15 + .02f (GHz) 0-12.4 GHz	142-9303-411

See assembly instructions page 25

Mounting hole layout figure 5 on page 14

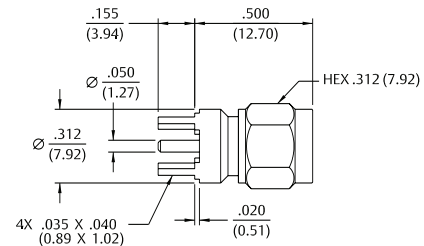
Straight Jack Receptacle



Frequency Range	Gold Plated	"A"
0-18 GHz	142-9701-201	.155 (3.94)
0-18 GHz	142-9701-211	.110 (2.79)

Mounting hole layout figure 6 on page 14

Straight Plug Receptacle



Frequency Range	Gold Plated
0-18 GHz	142-9801-201

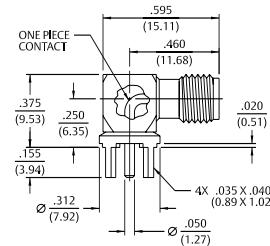
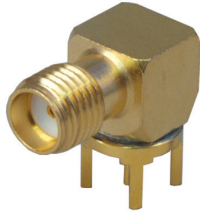
Mounting hole layout figure 6 on page 14

NON-MAGNETIC RF CONNECTORS



SMA Non-Magnetic RF Connectors For PC Mount

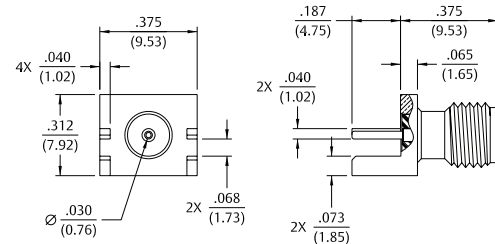
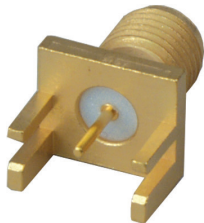
Right Angle Receptacle



Frequency Range	Gold Plated
0-18 GHz	142-9701-301

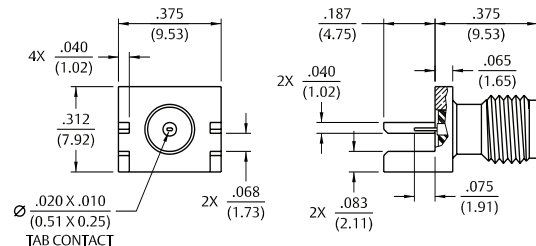
Mounting hole layout figure 6 on page 14

End Launch Receptacle - Round Contact



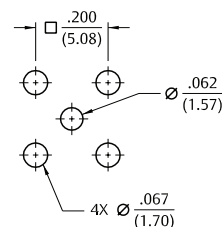
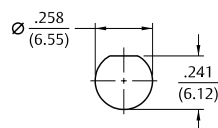
Frequency Range	Gold Plated	Board Thickness
0-10 GHz	142-9701-801	.062 (1.57)

End Launch Receptacle - Tab Contact



Frequency Range	Gold Plated	Board Thickness
0-10 GHz	142-9701-811	.062 (1.57)

Mounting hole layout



NON-MAGNETIC RF CONNECTORS



SMB Non-Magnetic RF Connectors

ELECTRICAL SPECIFICATIONS			
Impedance:			50 Ohms
Frequency Range	Connectors		0 - 4 GHz
VSWR: (f = GHz)		Straight Cable Connectors	Right Angle Cable Connectors
	RG-316 Uncabled Receptacles	1.25 + .04f N/A	1.35 + .04f N/A
Working Voltage (VRMS maximum)	Connectors for Cable Type	Sea Level	70K Feet
	RG-316, Uncabled Receptacles	335	85
Dielectric Withstanding Voltage (VRMS minimum at sea level)			
	Connectors for RG-316, Uncabled Receptacles		1000
Insulation Resistance			1000 megohms minimum
Contact Resistance (milliohms maximum)		Initial	After Environmental
	Center Contact (straight cabled connectors, uncabled receptacles)	6.0	8.0
	Center Contact (right angle cabled connectors)	12.0	16.0
	Outer Contact	1.0	1.5
	Braid to Body	.10	N/A
Corona Level (Volts minimum at 70,000 feet)			
	Connectors for RG-316 Uncabled Receptacles		250 N/A
Insertion Loss (dB maximum, tested at 1.5 GHz)			
	Straight Cable Connectors		0.3 dB
	Right Angle Cable Connectors		0.6 dB
	Uncabled Receptacles		N/A
RF Leakage (dB minimum tested at 2.5 GHz)			
	Cable Connectors Uncabled Receptacles		-55 dB N/A
RF High Potential Withstanding Voltage	(VRMS minimum, tested at 4 and 7 MHz)		
	Connectors for RG-316 Uncabled Receptacles		700 600

MECHANICAL SPECIFICATIONS			
Engagement Design	MIL-STD-348, Series SMB		
Engagement / Disengagement Force	2 pounds min to 14 pounds maximum axial force / 4 lb minimum axial force (captivated contacts)		
Contact Retention	4 lb minimum axial force (captivated contacts); 1 inch-ounce minimum torque (uncabled receptacles)		
Cable Retention		Axial Force* (lbs)	Torque (in-oz)
	Connectors for RG316 *Or cable breaking strength whichever is less.	20	N/A
Durability:	500 cycles minimum		

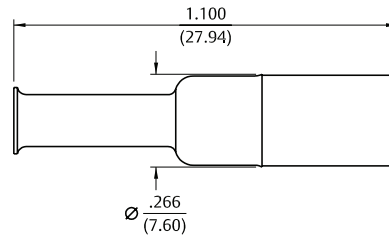
ENVIRONMENTAL SPECIFICATIONS (Meets or Exceeds the Applicable Paragraph of MIL-RF-39012)	
Temperature Range	-65°C to +165°C
Thermal Shock	MIL-STD-202, Method 107, Condition B
Corrosion	MIL-STD-202, Method 101, Condition B
Shock	MIL-STD-202, Method 213, Condition I

NON-MAGNETIC RF CONNECTORS



SMB Non-Magnetic RF Connectors For Flexible Cable

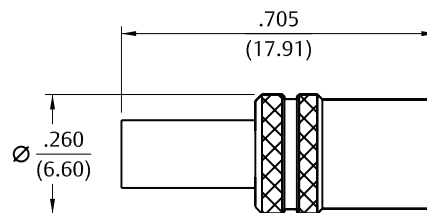
Straight Crimp Type Plug - Solder or Crimp Captivated Contact



Cable Type	Gold Plated
RG-316/U, 188, 174, 179, 187	131-9403-001
RG-316 DS, 188 DS, 179 DS, 187 DS	131-9404-001

See assembly instructions page 27

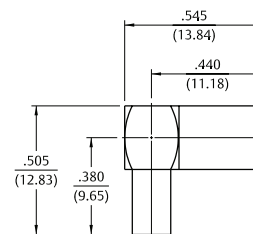
Straight Crimp Type Plug (3-piece), Solder or Crimp Captivated Contact



Cable Type	Gold Plated
RG-316/U, 188, 174, 179, 187	131-9403-021
RG-316 DS, 188 DS, 179 DS, 187 DS	131-9404-021

See assembly instructions page 27

Right Angle Crimp Type Plug - Captivated Contact



Cable Type	Gold Plated
RG-316/U, 188, 174, 179, 187	131-9403-101
RG-316 DS, 188 DS, 179 DS, 187 DS	131-9404-101

See assembly instructions page 27

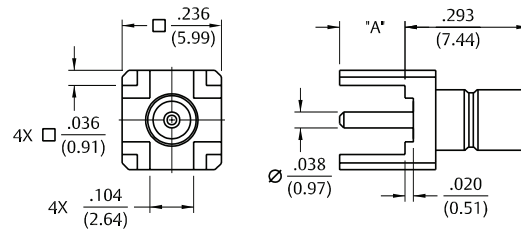


NON-MAGNETIC RF CONNECTORS



SMB Non-Magnetic RF Connectors For Flexible Cable

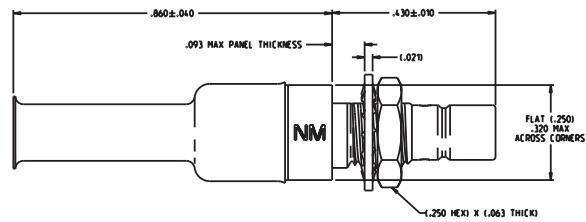
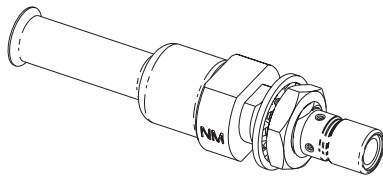
Straight Jack Receptacle



Gold Plated	"A"
131-9701-201	.155 (3.94)
131-9701-211	.095 (2.41)

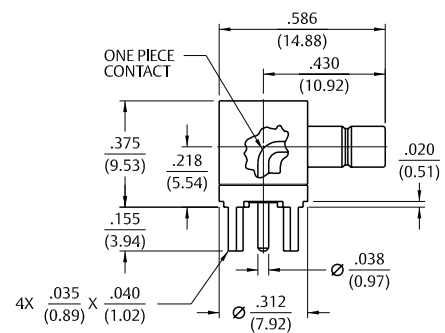
Mounting hole layout figure 7 on page 18

Straight Bulkhead Jack, Crimp Type, Flexible Cable



Gold Plated
131-9303-401

Right Angle Jack Receptacle



Gold Plated
131-9701-301

Mounting hole layout figure 7 on page 18

NON-MAGNETIC RF CONNECTORS



SMB Non-Magnetic RF Connectors For Flexible Cable

Mounting hole layout

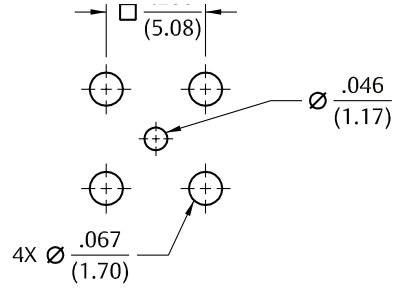


Fig 7

NON-MAGNETIC RF CONNECTORS



Type N Non-Magnetic RF Connectors

ELECTRICAL SPECIFICATIONS			
Impedance:			50 Ohms
Frequency Range	Flexible Cabled and Receptacles		0-11 GHz
VSWR: (f = GHz)			0-11 GHz
	Straight Flexible Cabled Uncabled Receptacles		1.3 max N/A
Working Voltage (VRMS maximum)	Connectors for Cable Type	Sea Level	70K Feet
	RG-55/U	335	85
	RG-214, LMR-400 Cabled	1000	250
	Uncabled Receptacles	1000	250
Dielectric Withstanding Voltage (VRMS minimum at sea level)			
	RG-55		1000
	RG-214, LMR-400 Cabled		2500
	Uncabled Receptacles		2500
Insulation Resistance	5000 megohms minimum		
Contact Resistance (milliohms maximum)		Initial	After Environmental
	Straight Cabled (non-captivated)	1.0	1.5
	Straight Cabled (captivated)	2.5	3.0
	Uncabled Receptacles	1.0	1.5
	Outer contact	0.2	N/A
	Braid to body	0.05	N/A
Corona Level (Volts minimum at 70,000 feet)			
	RG-55		250
	RG-214, LMR-400 Cabled		500
	Uncabled Receptacles		N/A
Insertion Loss (dB maximum, tested at 9 GHz)			
	Straight Cable Connectors		0.15 max
	Right Angle Cable Connectors		0.30 max
	Uncabled Receptacles		N/A
RF Leakage (dB minimum tested at 2.5 GHz)			
	Cable connectors		90
	Uncabled receptacles		N/A
RF High Potential Withstanding Voltage	(VRMS minimum, tested at 4 and 7 MHz)		
	RG-55		670
	RG-214, LMR-400 Cabled		1500
	Uncabled Receptacles		1500
IMP3			Typically < -90 dBm

(tested per IEC Guidelines using 20 W inputs swept over 1930-1990 MHz)

MECHANICAL SPECIFICATIONS			
		Axial Force (lbs)	Torque (in-oz)
	Cabled Connectors	6	N/A
	Uncabled Receptacles	6	4
Cable Retention (minimum*)		Axial Force (lbs)	Torque (in-oz)
	RG-55 Cabled	45	N/A
	RG-214, LMR-400 Cabled	90	N/A
	*Or cable breaking strength whichever is less.		

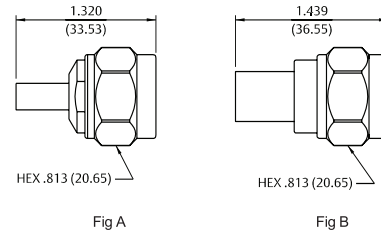
ENVIRONMENTAL SPECIFICATIONS			
Engagement Design	MIL-STD-348A, Series N	Bulkhead Mounting Nut Torque	15 inch-pounds recommended
Engagement / Disengagement Force	6 inch-pounds maximum	Coupling Proof Torque	15 inch-pounds minimum
Durability	500 Cycles minimum	Coupling Nut Retention	100 pounds minimum
Mating Torque	7 to 10 inch-pounds	Contact Retention	minimum - captivated contacts only

NON-MAGNETIC RF CONNECTORS



Type N Non-Magnetic RF Connectors For Flexible Cable

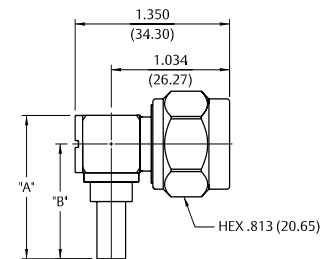
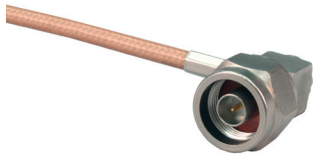
Straight Crimp Type Plug – Solder or Crimp Contact



Cable Type	VSWR & Freq. Range	Tri-Alloy Plated Figure
RG-55/U, 142, 223, 400	1.30 Max, 0-11 GHz	138-9408-007 A
LMR-400, BELDEN 9913	1.30 Max, 0-11 GHz	138-9449-007 B

See assembly instructions page 28

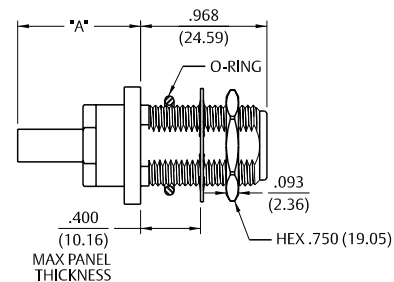
Right Angle Crimp Type Plug – Captivated Contact



Cable Type	VSWR & Freq. Range	Tri-Alloy Plated	"A"	"B"	
RG-55/U, 142, 223, 400	1.35 Max, 0-9 GHz	1.50 Max, 9-11 GHz	138-9408-107	1.253 (31.83)	1.003 (25.48)
RG-9/U, 214	1.35 Max, 0-9 GHz	1.50 Max, 9-11 GHz	138-9418-107	1.365 (34.67)	1.115 (28.32)

See assembly instructions page 28

Straight Crimp Type Bulkhead Jack – Solder or Crimp Contact



Cable Type	VSWR & Freq. Range	Tri-Alloy Plated	"A"
RG-55/U, 142, 223, 400	1.30 Max, 0-11 GHz	138-9308-407	.943 (23.95)
LMR-400, BELDEN 9913	1.30 Max, 0-11 GHz	138-9349-407	.997 (25.32)

See assembly instructions page 28

Mounting hole layout figure 8 on page 21

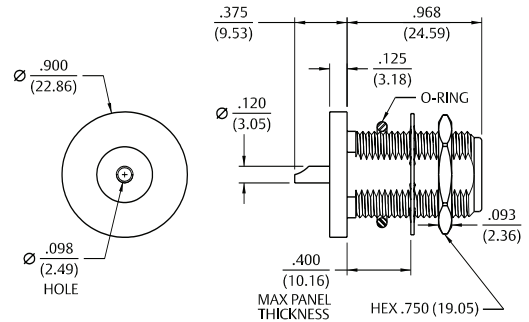


NON-MAGNETIC RF CONNECTORS



Type N Non-Magnetic RF Connectors For Bulkhead and Flange Mount

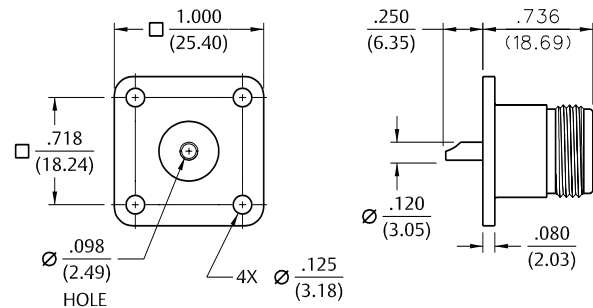
Rear Mount Bulkhead Jack Receptacle



Freq. Range	Tri-Alloy Plated
0-11 GHz	138-9701-407

Mounting hole layout figure 8 on page 21 (below)

4-Hole Flange Mount Jack Receptacle – Flush Dielectric



Freq. Range	Tri-Alloy Plated
0-11 GHz	138-9701-607

Mounting hole layout figure 8 on page 21 (below)

Mounting Hole Layout

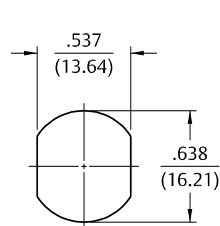


Fig 8

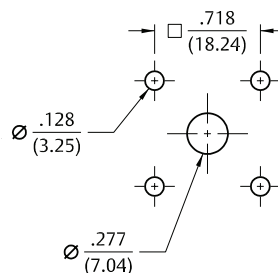


Fig 9

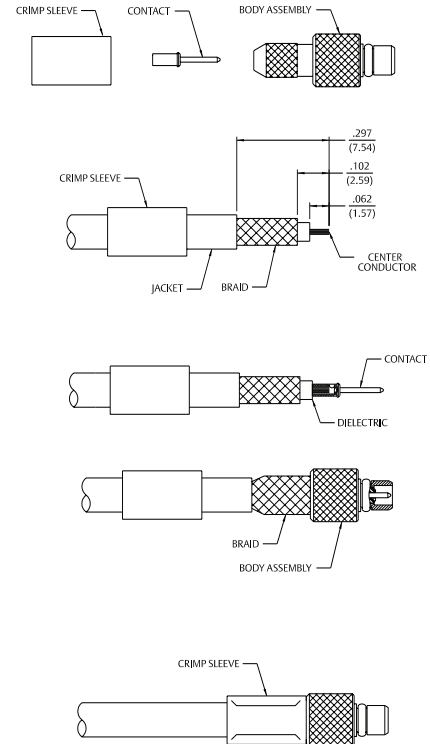
NON-MAGNETIC RF CONNECTORS



MMCX Non-Magnetic RF Connectors Assembly Instructions

MMCX Straight Plug for RG-316 and RG-316 DS Size Flexible Cable

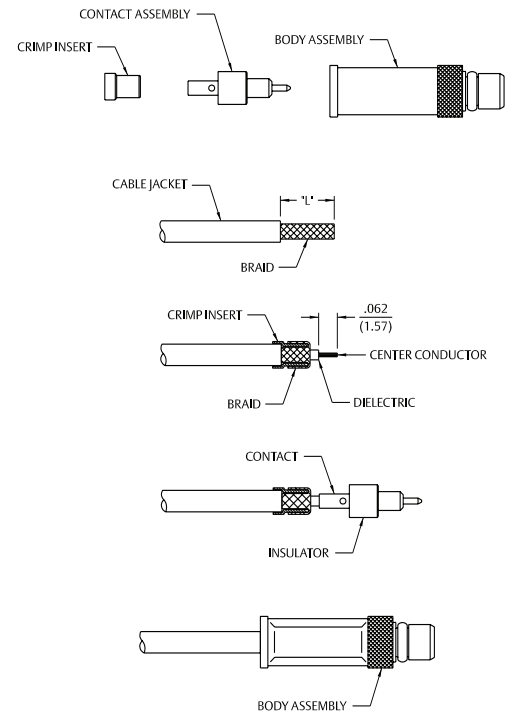
1. Identify connector parts. (3 piece parts)
2. Strip cable jacket to dimensions shown. Do not nick braid or center conductor during strip operations. Tin center conductor if contact will be solder attached. Do not tin center conductor if contact is to be crimp attached. Slide crimp sleeve onto cable jacket.
3. Assemble contact onto cable as shown.
Solder attachment:
 Solder contact to center conductor. Care should be taken that excess solder is not applied.
Crimp attachment:
 Crimp contact to center conductor using Johnson 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 cables is not recommended.
4. Slide body assembly over contact and under braid, then seat firmly onto contact as shown. The body assembly will “snap” over the contact barb. The cable may have to be held in a soft jawed clamping fixture. Slide crimp sleeve forward and crimp using recommended crimp die hex.



Cable Group	Part No.	Crimp Die Hex
RG-316/u, 188, 174	135-9403-001	.128 (3.25)
RG-316 DS, 188 DS	135-9404-001	.151 (3.83)

MMCX Straight Plug for .047 (1.19) Diameter and RG-178 Size Flexible Cable

1. Identify piece parts. (3 piece parts)
2. Strip cable jacket to dimensions shown. Do not nick braid or center conductor during strip operations.
3. Slide crimp insert over braid and against jacket, fold braid around crimp insert as shown. Strip dielectric to dimension shown. Tin center conductor if contact is to be soldered attached. Do not tin center conductor if contact is to be crimp attached.
4. Assemble contact assembly onto cable as shown.
Solder attachment:
 Solder contact to center conductor. Care should be taken that excess solder is not applied.
Crimp attachment:
 Crimp contact to center conductor using Johnson 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 cables is not recommended.
5. Slide body assembly over contact and crimp insert, then seat firmly as shown. Crimp body using recommended crimp die hex. Maintain forward pressure on cable while crimping.



Cable Group	Part No.	"L"	Crimp Die Hex
.047 Flexible	135-9436-001	.135 (3.43)	.105 (2.67) x .250 (6.35) W
RG-178/U, 196	135-9402-001	.184 (4.67)	.105 (2.67) x .250 (6.35) W



NON-MAGNETIC RF CONNECTORS

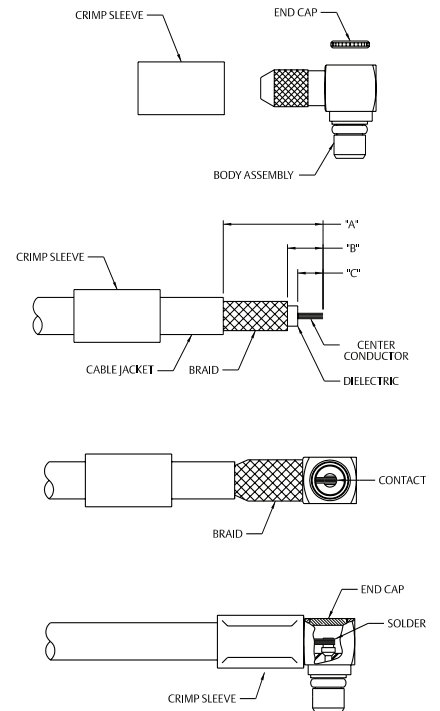


MMCX Non-Magnetic RF Connectors Assembly Instructions

MMCX Right Angle Plug for RG-178 and RG-316 Size Flexible Cable

1. Identify piece parts. (3 piece parts)
2. Strip cable jacket to dimensions shown. Do not nick braid or center conductor during strip operations. Tin center conductor. Slide crimp sleeve onto cable jacket.
3. Flair braid and assemble crimp stem of body subassembly under braid onto cable making certain that the cable center conductor enters contact slot as shown. Arrange braid uniformly around crimp stem. Slide crimp sleeve over braid and crimp securely using recommended crimp hex.
4. Solder center conductor to contact through rear access port. Use a minimum amount of solder for a full fillet joint.
5. Press end cap into body access port using .156 (3.96) diameter flat punch or Johnson assembly tool 141-0000-910.

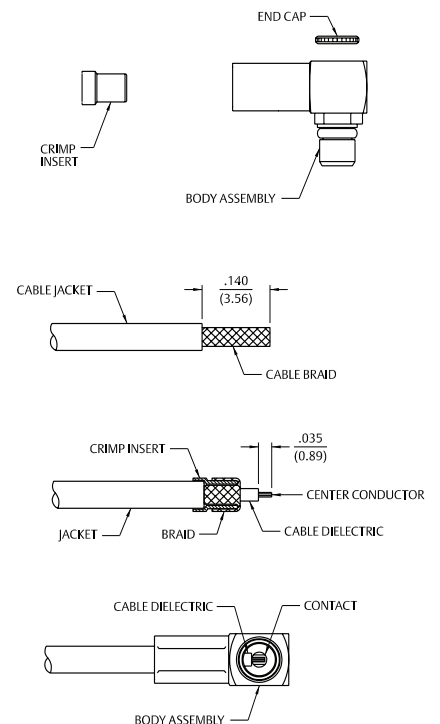
Cable Group	Part No.	Crimp Die Hex	"A"	"B"	"C"
RG-178, 196	135-9402-111	.105 (2.67)	.310	.100	.035
RG-316/U, 188, 187, 179	135-9403-101	.128 (3.25)	.295	.105	.075



MMCX Right Angle Plug for .047 (1.20) Diameter Size Flexible Cable with Crimp Insert

1. Identify piece parts. (3 piece parts)
2. Strip cable jacket to dimensions shown. Do not nick braid or center conductor during strip operations.
3. Slide crimp insert over braid and against jacket. Fold braid around crimp insert as shown. Strip cable dielectric to dimension shown. Tin center conductor.
4. Slide body assembly over cable and crimp insert, then seat firmly so cable dielectric butts against contact as shown. Crimp body using recommended crimp hex. Maintain forward pressure on cable while crimping.
5. Solder contact to center conductor through rear access port. Use a minimum amount of solder for a full fillet joint.
6. Press end cap into access port using .156 (3.96) diameter flat punch or Johnson assembly tool 141-0000-910.

Cable Group	Part No.	Crimp Die Hex
.047 Flexible	135-9436-101	.105 (2.67)



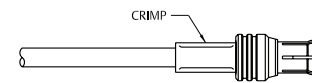
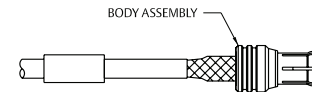
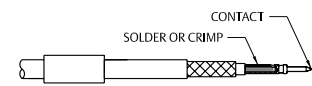
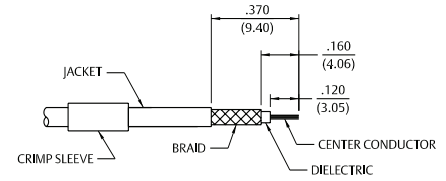
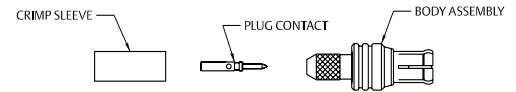
NON-MAGNETIC RF CONNECTORS



MCX Non-Magnetic RF Connectors Assembly Instructions

MCX Crimp Type Straight Connectors for Flexible Cable

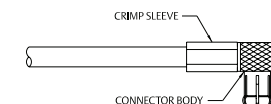
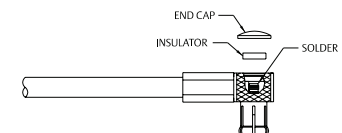
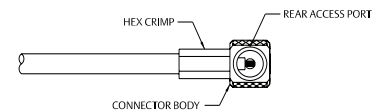
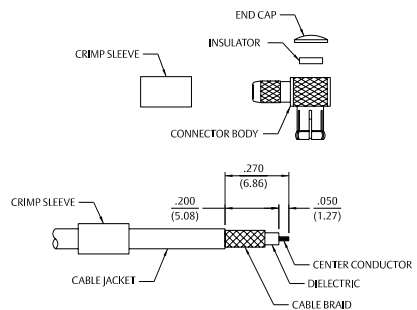
1. Identify connector parts. (3 piece parts)
2. Strip cable to dimensions shown. Do not nick braid or center conductor. Tin center conductor if contact is to be solder attached. Do not tin center conductor if contact is to be crimp attached. Slide heat shrink (as applicable) and crimp sleeve onto jacket 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 a miniature 8 indent tool 140-0000-970 with positioner 140-0000-971. 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. (RG-178 is non-captivated, RG-316 incorporates snap-fit captivation.) 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).



Cable Group	Part No.	Crimp Die Hex
RG-316/U, 188, 174	133-9403-001	.128 (3.25)
RG-316 DS, 188 DS	133-9404-001	.151 (3.83)

MCX Crimp Type Right Angle Plugs for Flexible Cable

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 as shown.
3. Flare braid and slide cable into body making certain that the cable dielectric bottoms against center contact. Solder: 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. .015 (0.38) diameter solder is recommended. Crimp: Crimp Contact Attachment Crimp contact using 41-0000-924 dieset in 144-0000-900 tool frame.
4. Arrange braid uniformly around crimp stem. Slide crimp sleeve over braid and access ports. Crimp securely using recommended hex size and crimp tool.



Cable Group	Part No.	Crimp Die Hex
RG-316/U, 188, 174	133-9403-101/104	.128(3.25)
RG-316 DS, 188 DS	133-9404-101	.151(3.83)
RG-178	133-9402-101	.105(2.67)



NON-MAGNETIC RF CONNECTORS

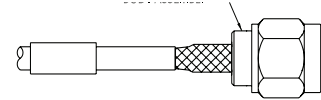
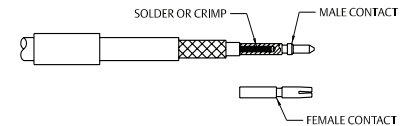
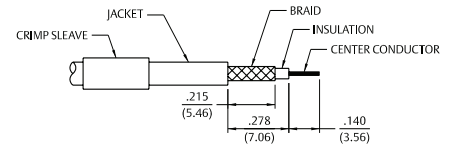
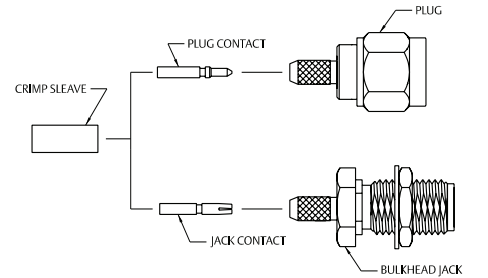


SMA Non-Magnetic RF Connectors Assembly Instructions

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

1. Identify connector parts. (3 piece parts—except bulkhead)
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. 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 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).

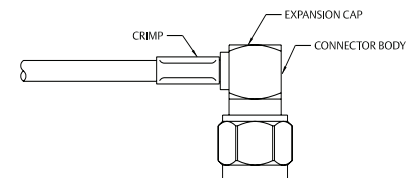
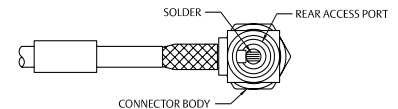
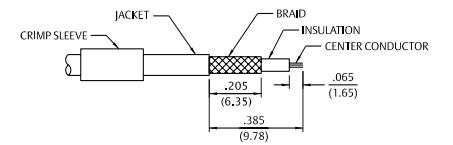
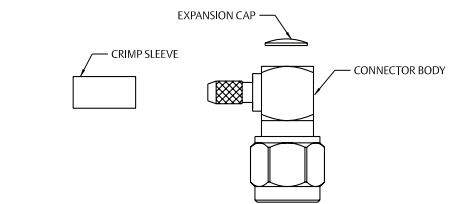
Cable Group	Part No.	Crimp Sleeve Hex Size
RG-316/U, 188, 174	142-9403-011	.128 (3.25)
RG-316 DS, 188 DS	142-9404-011	.151 (3.83)
RG-58/U, 141	142-9407-001	.213 (5.41)



SMA Crimp Type Right Angle Plugs for Flexible Cable

1. Identify connector parts. (3 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 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.

Cable Group	Part No.	Crimp Sleeve Hex Size
RG-316/U, 188, 174	142-9403-101/104	.128 (3.25)
RG-316 DS, 188 DS	142-9404-101	.151 (3.83)
RG-58/U, 141	142-9407-101/104	.213 (5.41)



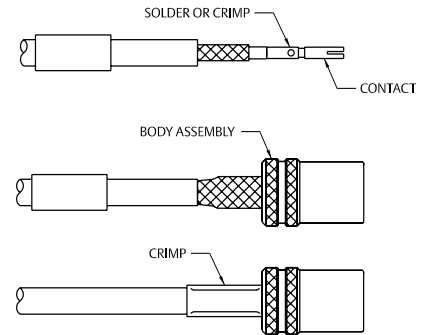
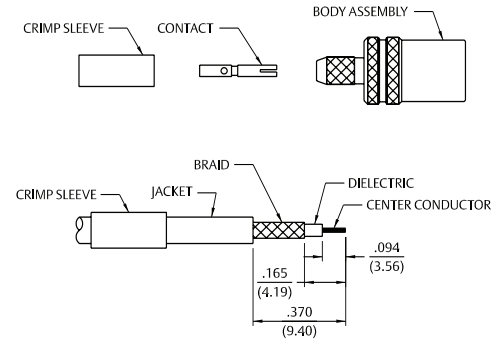
NON-MAGNETIC RF CONNECTORS



SMB Non-Magnetic RF Connectors Assembly Instructions

SMB 3-Piece Straight Plugs

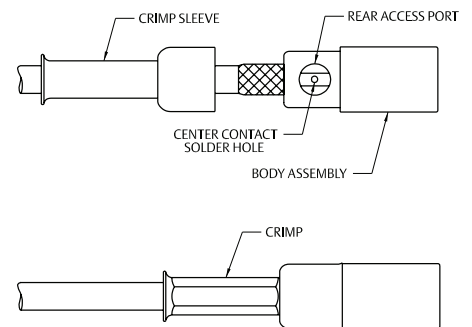
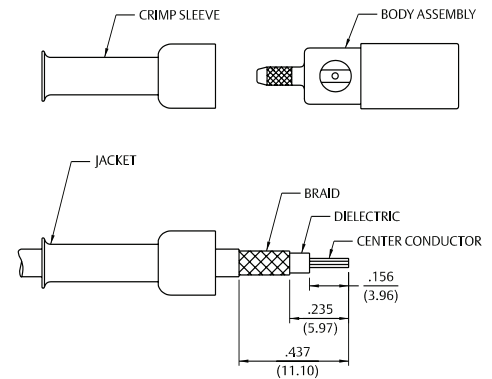
1. Identify connector parts. (3 piece parts): Crimp sleeve, body assembly and contact
2. Strip cable to dimensions shown. Do not nick braid or center conductor. Tin center conductor if contact will be solder attached. Do not tin center conductor if contact is to be crimp attached. Slide heat shrink (as 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 .015 (0.38) diameter solder. Use a minimum amount of solder for a good joint.
Crimp Attachment: A miniature 8 indent crimp tool 140-0000-970 is recommended. Crimp location should be centered between end of contact and X-hole using positioner 140-0000-971. 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).



Cable Group	Part No.	Crimp Sleeve Hex Size
RG-316/U, 188, 174, 179, 187	131-9403-021	.128 (3.25)
RG-316 DS, 188 DS, 179 DS, 187 DS	131-9404-021	.151 (3.83)

SMB Straight Crimp Type Straight Plugs for Flexible Cable

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 dielectric bottoms against 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 Attachment: Crimp contacts with 141-0000-911 dieset in 144-0000-900 tool frame.



Cable Group	Part No.	Crimp Sleeve Hex Size
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)

NON-MAGNETIC RF CONNECTORS

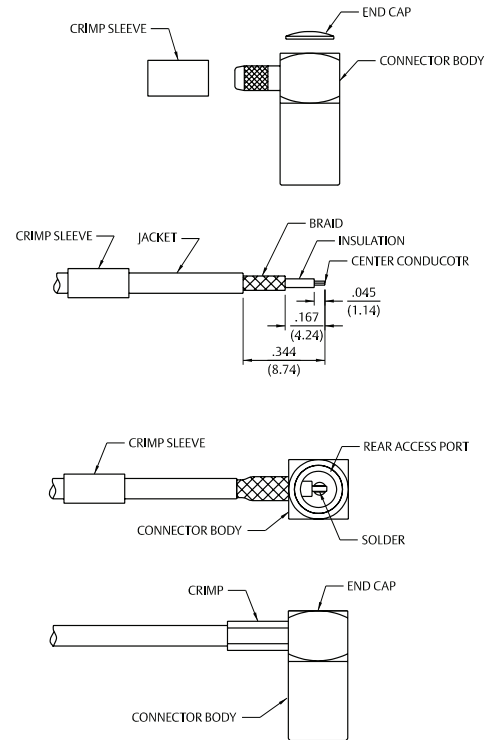


SMB Non-Magnetic RF Connectors Assembly Instructions

SMB Right Angle Crimp Type Straight Plugs for Flexible Cable

1. Identify connector parts. (3 piece parts: crimp sleeve, body assembly and expansion cap.)
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. Arrange braid uniformly around crimp stem of body assembly. Slide crimp sleeve over braid and crimp securely using recommended crimp tool.
4. 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. Place expansion cap in access port and seat with a .125 (3.17) diameter flat punch. Snap cover ring over side access port.

Cable Group	Part No.	Crimp Sleeve HeSize
RG-316/U, 188, 174, 179,187	131-9403-101	.128 (3.25)
RG-316 DS, 188 DS, 179 DS, 187 DS	131-9404-101	.151 (3.83)



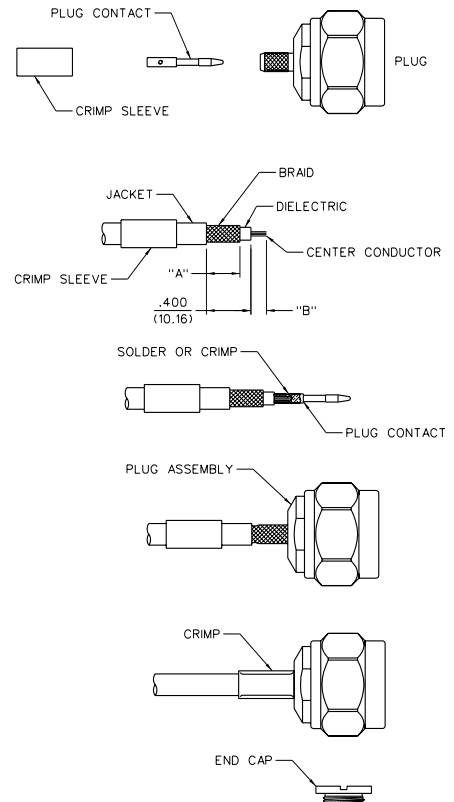
NON-MAGNETIC RF CONNECTORS



Type N Non-Magnetic RF Connectors Assembly Instructions

Type N Straight Plug Crimp Style for Flexible Cable

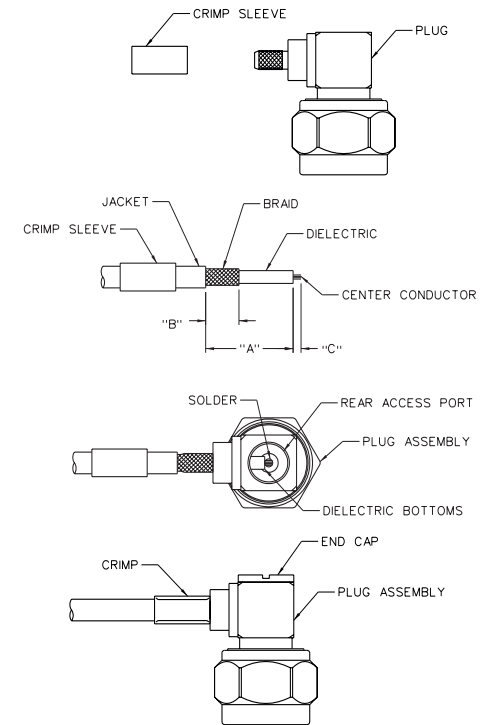
1. Identify connector parts (3 piece parts).
2. Strip cable to dimensions shown. Do not nick center conductor. A wire stripper of correct size is recommended for this step. Tin center conductor if contact will be solder attached. Do not tin center conductor if contact will be crimp attached. Slide crimp sleeve onto jacket of cable.
3. Assemble plug contact onto cable as shown. Plug contact should butt against cable dielectric during attachment.
Solder Attachment: Solder plug contact to center conductor through solder hole using .020 (0.51) diameter flux core solder wire. Use a minimum amount of solder for a good joint.
Crimp Attachment: Crimp plug contact to center conductor using Johnson ergonomic hand crimp frame 140-0000-967 with recommended hex size die set. Crimp location should be on end of plug contact next to cable dielectric. Crimp attachment to solid center conductor cables is not recommended.
4. Flare braid and slide plug connector assembly over plug contact and under braid. Seat plug connector assembly firmly onto contact. Arrange braid uniformly around crimp stem. Slide crimp sleeve forward and crimp using Johnson ergonomic hand crimp frame 140-0000-967 with recommended hex size die set. Maintain forward pressure on cable while crimping.



Cable Group	Part No.	"A"	"B"	Sleeve Hex	Contact Hex
RG-55/U, 142, 223, 400	138-9408-007	.301 (7.65)	.140 (3.56)	.213 (5.41)	.068 (1.73)
LMR-400, BELDEN 9913	138-9449-007	.385 (9.78)	.170 (4.32)	.429 (10.90)	.116 (2.95)

Type N Right Angle Plug Crimp Style For Flexible Cable

1. Identify connector parts (3 piece parts).
2. Strip cable to dimensions shown. Do not nick 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 jacket of cable.
3. Flare braid and slide plug connector assembly over cable dielectric and under braid. Make sure cable dielectric bottoms against plug contact as shown for RG-55/U cable group. Maintain a slight gap between Dielectric and Contact for Cable Group RG-9. Solder center conductor to contact through rear access port. Use a minimum amount of solder for a full fillet joint.
4. Arrange braid uniformly around crimp stem. Slide crimp sleeve forward and crimp using Johnson ergonomic hand crimp frame 140-0000-967 with recommended hex size die set. Screw end cap into access port.



Cable Group	Part No.	"A"	"B"	"C"	Crimp Sleeve Hex Size
RG-55/U, 142, 223, 400	138-9408-107	.788 (20.02)	.300 (7.62)	.071 (1.80)	.213 (5.41)
RG-9, 214	138-9418-107	.429 (10.90)	.350 (8.89)	.135 (3.43)	.429 (10.90)



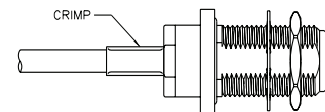
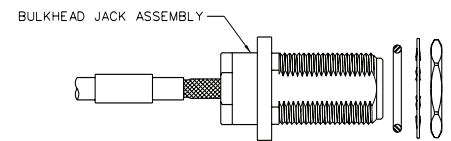
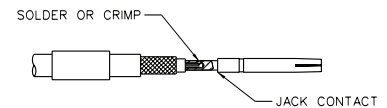
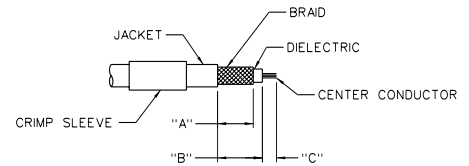
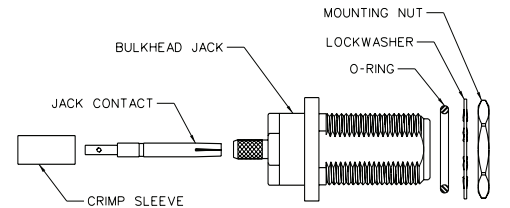
NON-MAGNETIC RF CONNECTORS



Type N Non-Magnetic RF Connectors Assembly Instructions

Type N Bulkhead Jack Crimp Style for 142, and LMR-400 Flexible Cable

1. Identify connector parts (6 piece parts).
2. Strip cable to dimensions shown. Do not nick center conductor. A wire stripper of correct size is recommended for this step. Tin center conductor if contact will be solder attached. Do not tin center conductor if contact will be crimp attached. Slide crimp sleeve onto jacket of cable.
3. Assemble jack contact onto cable as shown. Jack contact should butt against cable dielectric during attachment.
 Solder Attachment: Solder jack contact to center conductor through solder hole using .020 (0.51) diameter flux core solder wire. Use a minimum amount of solder for a good joint.
 Crimp Attachment: Crimp jack contact to center conductor using Johnson ergonomic hand crimp frame 140-0000-967 with recommended hex size die set. Crimp location should be on end of jack contact next to cable dielectric. Crimp attachment to solid center conductor cables is not recommended.
4. Flare braid and slide bulkhead jack connector assembly over jack contact and under braid. Seat bulkhead jack connector assembly firmly onto contact. Arrange braid uniformly around crimp stem. Slide crimp sleeve forward and crimp using Johnson ergonomic hand crimp frame 140-0000-967 with recommended hex size die set. Maintain forward pressure on cable while crimping.
5. Add gasket, lock washer and mounting nut when installing connector to panel.



Tool	Assembly	
	138-9308-407	138-9349-407
Crimp Frame	140-0000-967	140-0000-967
Die Set	140-0000-990	140-0000-991

Cable Group	Part No.	"A"	"B"	"C"	Crimp Sleeve Hex Size	Contact Hex Size
RG-55/U, 142, 223, 400	138-9308-407	.310 (7.87)	.389 (9.88)	.135 (3.43)	.213 (5.41)	.068 (1.73)
LMR-400, BELDEN 9913	138-9349-407	.385 (9.78)	.400 (10.16)	.165 (4.19)	.429 (10.90)	.116 (2.95)

NON-MAGNETIC RF CONNECTORS



MRI Connectors and Modular Customization

MRI Connectors and Modular Customization

Johnson, a product line of Cinch Connectivity Solutions, offers the Medical Industry a combination of expertise in Non-Magnetic and Custom Modular Connectivity.

A broad line of Non-Magnetic connector families is available for high density RF signal transmission in the MR Lab environment. MMCX, MCX, SMA, SMB and N Type coaxial Interfaces can be employed to both deliver the power and return multi-coil imaging resolution.

MMCX multi-pack modules can provide .150" (3.81mm) center to center coax arrays that terminate to micro-coaxial cables. Modules can be configured as rails, blocks and cable handles that provide rapid RF coil hookup and change out.

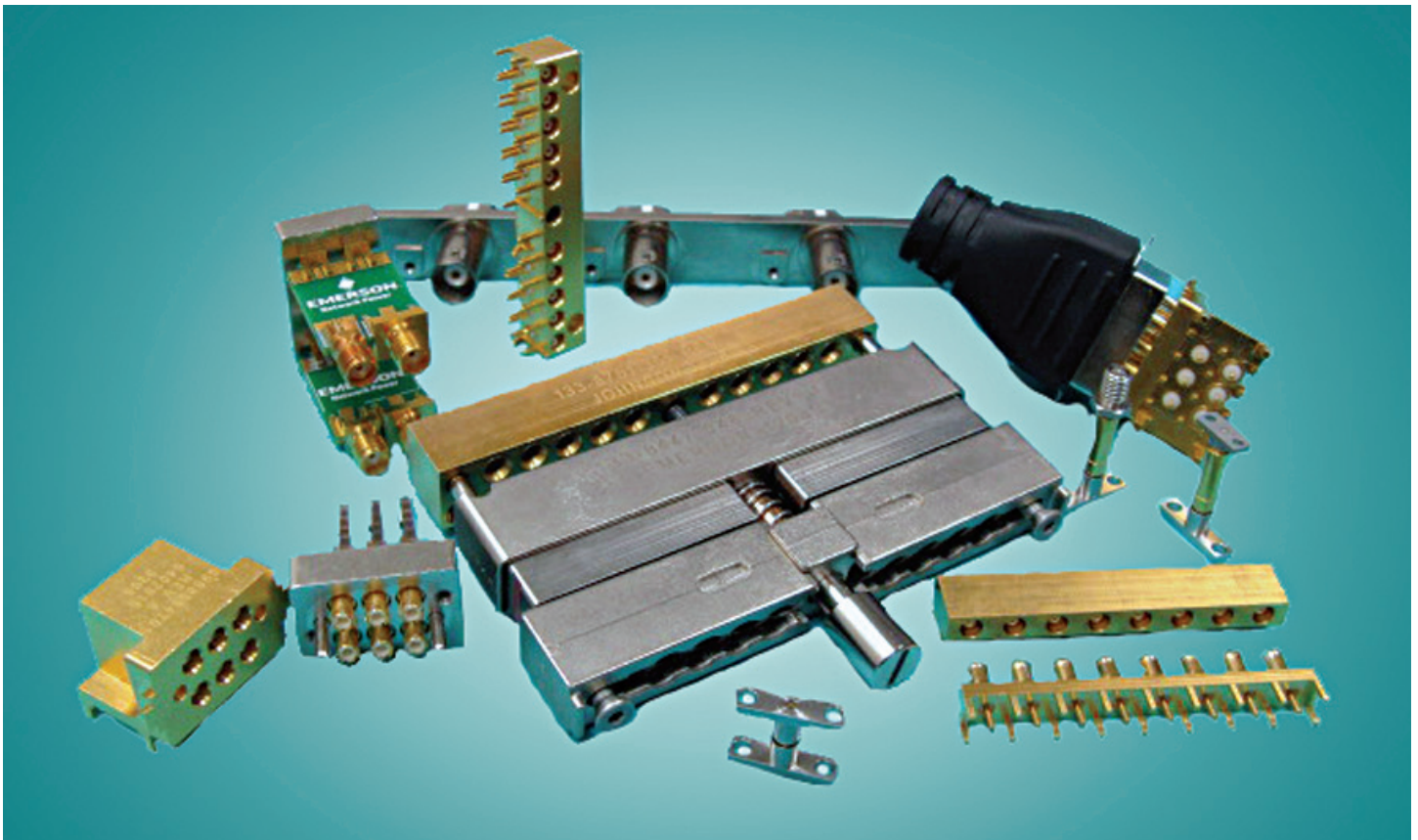
Johnson's vertically integrated production facility guarantees near unity permeability of raw materials, plating and packaging. Non-Magnetic quality is specified in high purity materials and monitored throughout the connector build process.

Cinch Connectivity Solutions continues to work with our customers to develop new solutions as the MR industry transitions to high-end field applications and improved resolution at greater physical depths within the body.

Products are offered through authorized distributors and International sales channels including a direct sales force and a network of manufacturers' representatives. For more information, please call (800) 247-8256.

About Johnson®

Cinch Connectivity Solutions, located in Waseca, MN, manufactures Johnson® RF Connectors such as Ultra-miniature (UMC), Microminiature (MCX, MCX 75, MMCX and SMP), Sub-miniature (SMA, SMB, SMB Mini-75 Ohm, SMK) and Medium (Type N) in the most popular styles including PC Board Mount, End Launch, Bulkhead Mount and Cable Mounts (Flexible, Semi-rigid and Conformable).



NON-MAGNETIC RF CONNECTORS



Competitor Cross Reference

Competitor Cross Reference

Johnson P/N	Competitor P/N	Competitor
135-9403-001	908-NM41300	Amphenol
135-9402-001	908-NM41200	Amphenol
135-9403-101	908-NM43300	Amphenol
135-9402-111	908-NM43200	Amphenol
135-9701-201	908-NM22106	Amphenol
135-9701-301	908-NM24100	Amphenol
133-9403-001	919-NM101P-51S	Amphenol
133-9403-101	919-NM104P-51A	Amphenol
133-9402-101	919-NM109J-51P	Amphenol
133-9701-201	919-NM109J-51P	Amphenol
131-9403-021	903NM285P-51S	Amphenol
131-9403-101	903-NM289P-51A	Amphenol
131-9701-201	903-NM415J-51P	Amphenol

Johnson P/N	Competitor P/N	Competitor
135-9402-111	R110 170 117	Radiall
135-9701-201	R110 426 097	Radiall
142-9407-001	R125 075 097	Radiall
142-9403-101	R125 172 167	Radiall
142-9701-201	R125 426 067	Radiall
131-9403-021	R114 082 097	Radiall
131-9403-101	R114 186 097	Radiall



About Bel

Bel (www.belfuse.com) designs, manufactures and markets a broad array of products that power, protect and connect electronic circuits. These products are primarily used in the networking, telecommunications, computing, military and aerospace, transportation and broadcasting industries.

Bel's product groups include Magnetic Solutions (integrated connector modules, power transformers, power inductors and discrete components), Power Solutions and Protection (front-end, board-mount and industrial power products, module products and circuit protection), and Connectivity Solutions (expanded beam fiber optic, copper-based, RF and RJ connectors and cable assemblies). The Company operates facilities around the world.



Asia Pacific
+86 21 5442 7668
ccs.asia.sales@as.cinch.com

Europe, Middle East & Africa
+44 (0) 1245 342060
CinchConnectivity@eu.cinch.com

North America
+1 507.833.8822
ccsorders@us.cinch.com
cinch.com