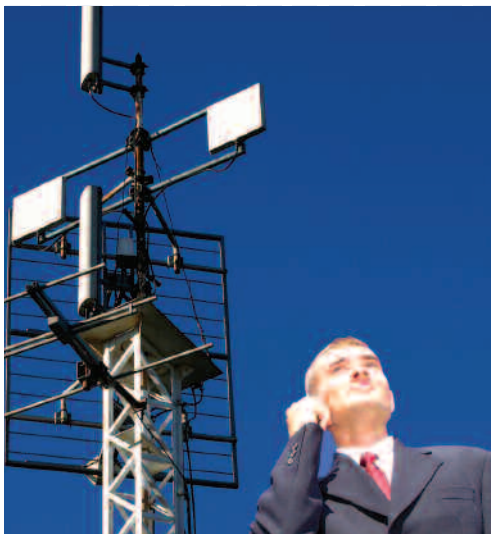


## *Type N Connectors*

*Product Catalog*



**Johnson® Type N Connectors** meet or exceed the performance requirements of MIL-PRF-39012. All designs are based on 50 ohm system impedance per MIL-STD-348, and operate at frequencies up to 11 GHz minimum.

## Applications

- Antennas
- Base stations
- Broadcast
- Cable assemblies
- Cellular
- Instrumentation
- Microwave Radio
- PCS
- Radar
- Radios
- RF and Microwave Components
- Satcom
- Surge Protection
- WLAN

## Features

- All contacts are plated with 50 micro-inches of Gold for excellent durability and high frequency performance
- Brass bodies are offered with Tri-alloy plating as the standard finish, and Gold where soldering is required
- Coupling nuts are hex shaped to allow the connectors to be tightened to specified mating torque
- Plug interfaces and bulkhead jack bodies include gaskets for environmental sealing
- Precision grade in-series adapters have very low return loss performance to 18 GHz
- Cabled contacts are captivated upon assembly
- Flexible cable contacts can be crimped or soldered
- Semi-rigid cabled connectors are capable of operation to 18 GHz
- Semi-rigid cabled plug connectors are available in one piece versions, requiring solder attachment only between the cable jacket and connector body

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## ELECTRICAL SPECIFICATIONS

**Impedance:** 50 Ohms

**Frequency Range:**

|                                       |          |
|---------------------------------------|----------|
| Flexible Cabled and Receptacles ..... | 0-11 GHz |
| Semi-Rigid Cabled and Adapters .....  | 0-18 GHz |

**VSWR:** (f = GHz)

|                                   |                       |                            |
|-----------------------------------|-----------------------|----------------------------|
| Straight Flexible Cabled .....    | 0-11 GHz              | 1.30 Max                   |
| Right Angle Flexible Cabled ..... | 0-9 GHz<br>1.35 MAX   | 9-11 GHz<br>1.50 Max       |
| RG-405 Semi-Rigid Plugs .....     | 0-11 GHz<br>1.07+.01f | 11-18 GHz<br><1.25 Typical |
| RG-402 Semi-Rigid Plugs .....     | 1.05+.01f             | <1.25 Typical              |
| RG-401 Semi-Rigid Plugs .....     | 1.06+.01f             | <1.25 Typical              |
| RG-405 Semi-Rigid Jacks .....     | 1.15+.02f             | <1.50 Typical              |
| RG-402 Semi-Rigid Jacks .....     | 1.10+.02f             | <1.50 Typical              |
| RG-401 Semi-Rigid Jacks .....     | 1.10+.02f             | <1.50 Typical              |

|                             |                       |
|-----------------------------|-----------------------|
| Adapters .....              | 0-18 GHz<br>1.05+.01f |
| Un-cabled Receptacles ..... | N/A                   |

**Insertion Loss:** (dB, tested at 9 GHz)

|                                      |                      |
|--------------------------------------|----------------------|
| Straight Flexible Cabled .....       | 0.15 Max             |
| Right Angle Flexible Cabled .....    | 0.30 Max             |
| Semi-Rigid Cabled and Adapters ..... | $0.05\sqrt{f}$ (GHz) |
| Un-cabled Receptacles .....          | N/A                  |

**Working Voltage:** (Vrms maximum)

|                                          | Sea Level | 70K Feet |
|------------------------------------------|-----------|----------|
| RG-316, 316DS Cabled .....               | 250       | 65       |
| RG-58, 142, 405 Cabled .....             | 335       | 85       |
| RG-402 Cabled .....                      | 500       | 125      |
| RG-213, 214, 401, LMR-400 Cabled .....   | 1000      | 250      |
| Un-cabled Receptacles and Adapters ..... | 1000      | 250      |

**Dielectric Withstanding Voltage:** (Vrms minimum)

|                                          | Sea Level |
|------------------------------------------|-----------|
| RG-316, 316DS Cabled .....               | 750       |
| RG-58, 142, 405 Cabled .....             | 1000      |
| RG-402 Cabled .....                      | 1500      |
| RG-213, 214, 401, LMR-400 Cabled .....   | 2500      |
| Un-cabled Receptacles and Adapters ..... | 2500      |

**Corona Level:** (Volts minimum)

|                                                     | 70K Feet |
|-----------------------------------------------------|----------|
| RG-316, 316DS Cabled .....                          | 190      |
| RG-58, 142, 405 Cabled .....                        | 250      |
| RG-402 Cabled .....                                 | 375      |
| RG-213, 214, 401, LMR-400 Cabled and Adapters ..... | 500      |
| Un-cabled Receptacles .....                         | N/A      |

## ELECTRICAL SPECIFICATIONS cont'd

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

|                                          |      |
|------------------------------------------|------|
| RG-316, 316DS Cabled .....               | 500  |
| RG-58, 142, 405 Cabled .....             | 670  |
| RG-402 Cabled .....                      | 1000 |
| RG-213, 214, 401, LMR-400 Cabled .....   | 1500 |
| Un-cabled Receptacles and Adapters ..... | 1500 |

**Insulation Resistance:** 5000 Megohms minimum

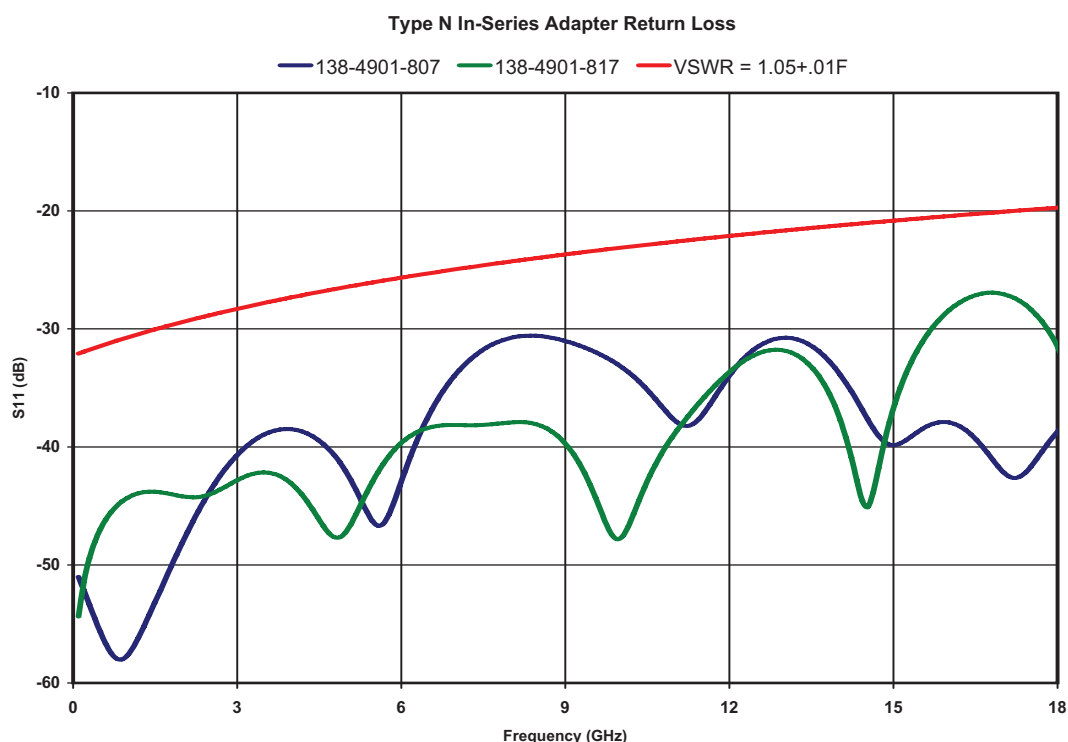
**Contact Resistance:** (milliohms maximum)

|                                            | <u>Initial</u> | <u>After Environmental</u> |
|--------------------------------------------|----------------|----------------------------|
| Center Contact                             |                |                            |
| Straight Cabled (non-captivated) .....     | 1.0            | 1.5                        |
| Straight Cabled (captivated) .....         | 2.5            | 3.0                        |
| Right Angle Cabled .....                   | 2.5            | 3.0                        |
| Un-cabled Receptacles and Adapters .....   | 1.0            | 1.5                        |
| Outer Contact .....                        | 0.2            | N/A                        |
| Braid to Body (Flexible Cabled Only) ..... | 0.05           | N/A                        |

**RF Leakage:** (dB minimum, tested at 2.5 GHz)

|                                      |     |
|--------------------------------------|-----|
| Cabled Connectors and Adapters ..... | -90 |
| Un-cabled Receptacles .....          | N/A |

**IMP3:** Typically <-90 dBm (tested per IEC Guidelines using 20W inputs swept over 1930-1990 MHz)



## MECHANICAL SPECIFICATIONS

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

|                                      | <u>Axial Force (lbs)</u> | <u>Torque (in-oz)</u> |
|--------------------------------------|--------------------------|-----------------------|
| Cabled Connectors and Adapters ..... | 6                        | N/A                   |
| Un-cabled Receptacles .....          | 6                        | 4                     |

### Cable Retention: (minimum\*)

|                                      | <u>Axial Force (lbs)</u> | <u>Torque (in-oz)</u> |
|--------------------------------------|--------------------------|-----------------------|
| RG-316 Cabled .....                  | 20                       | N/A                   |
| RG-316DS Cabled .....                | 30                       | N/A                   |
| RG-58 Cabled .....                   | 40                       | N/A                   |
| RG-142 Cabled .....                  | 45                       | N/A                   |
| RG-213, 214 and LMR-400 Cabled ..... | 90                       | N/A                   |
| RG-405 Cabled .....                  | 30                       | 16                    |
| RG-402 Cabled .....                  | 60                       | 55                    |
| RG-401 Cabled .....                  | 90                       | 80                    |

\* Or cable breaking strength, whichever is less

## ENVIRONMENTAL SPECIFICATIONS

(Meets or Exceeds the Applicable Paragraph of MIL-PRF-39012)

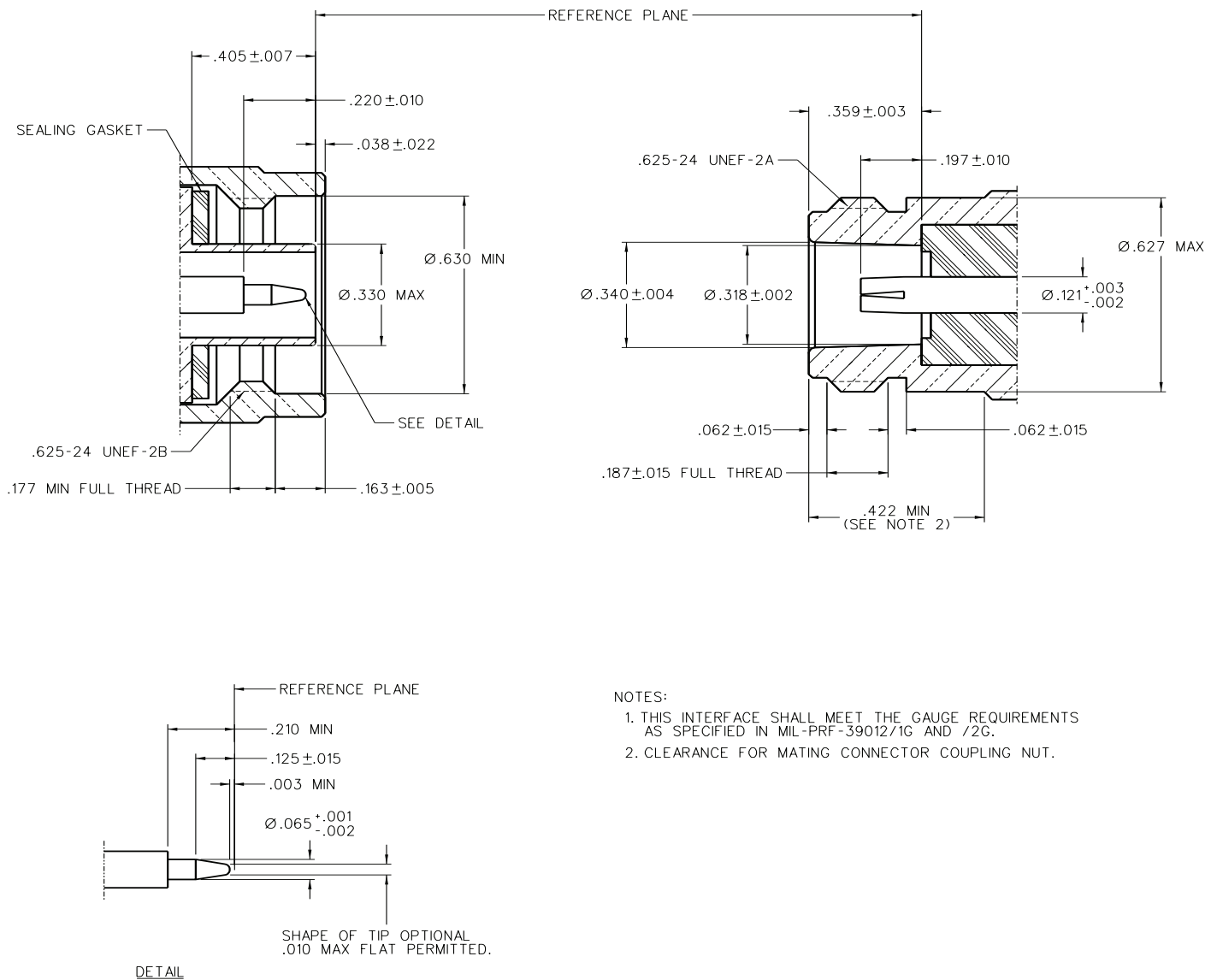
**Temperature Range:** -65°C to +165°C  
**Thermal Shock:** MIL-STD-202, Method 107, Condition B (except +85°C high temperature)  
**Corrosion:** MIL-STD-202, Method 101, Condition B  
**Shock:** MIL-STD-202, Method 213, Condition I  
**Vibration:** MIL-STD-202, Method 204, Condition B  
**Moisture Resistance:** MIL-STD-202, Method 106

## MATERIAL SPECIFICATIONS

**Bodies:** Crimp - Brass per ASTM B16, Tri-Alloy (Cu/Sn/Zn) plated (.0001" min)  
 Solder - Brass per ASTM B16, Gold plated\* per MIL-G-45204 (.00001" min)  
 Adapter - Brass per ASTM B16, Tri-Alloy (Cu/Sn/Zn) or Nickel per QQ-N-290 plated (.0001" min)  
**Contacts:** Male - Brass per ASTM B16, Gold plated\* per MIL-G-45204 (.00005" min)  
 Female - Beryllium Copper per ASTM B196, Gold plated\* per MIL-G-45204 (.00005" min)  
 Adapter - Beryllium Copper per ASTM B196, Gold plated\* per MIL-G-45204 (.00005" min)  
**Insulators:** PTFE Fluorocarbon per ASTM D1710 and ASTM D1457  
**Gaskets:** Silicon Rubber per ZZ-R-765  
**Crimp Sleeves:** Copper per ASTM A75, Tri-Alloy (Cu/Sn/Zn) plated (.0001" min)  
**End Caps:** Brass per ASTM B16, Tri-Alloy (Cu/Sn/Zn) plated (.0001" min)  
**Nut Retention Spring (Plugs):** Beryllium Copper per ASTM B196, un-plated  
**Mounting Nut (Bulkhead Jacks):** Brass per ASTM B16, Nickel plated per QQ-N-290 (.0001" min)  
**Lock Washer (Bulkhead Jacks):** Steel, Zinc plated (.0001" min)

\* All Gold plated parts include a .00005" minimum Nickel under plated barrier layer

## MATING ENGAGEMENT FOR TYPE N SERIES PER MIL-STD-348A



## MOUNTING HOLES

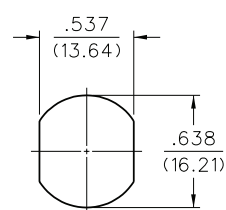


Fig 1

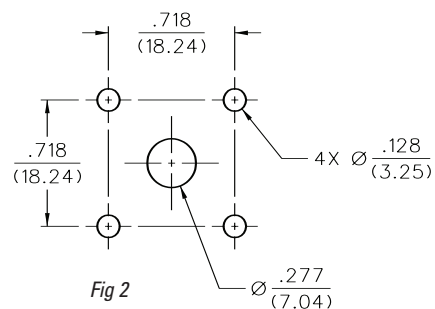
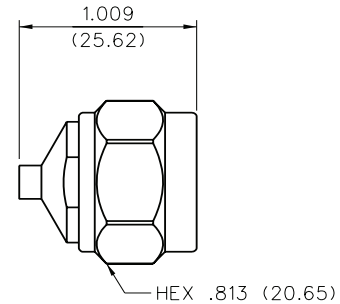


Fig 2

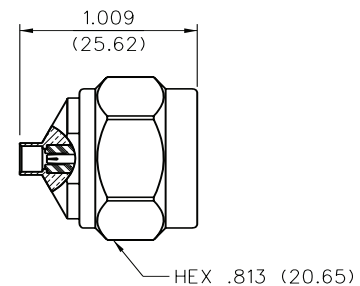
## Straight Solder Type Plug – With Solder Contact



| Cable Type              | VSWR & Freq. Range                                 | Gold Plated   |
|-------------------------|----------------------------------------------------|---------------|
| RG-405, .086 Semi-Rigid | 1.07+.01f (GHz), 0-11 GHz <1.25 Typical, 11-18 GHz | 138-4693-001* |
| RG-402, .141 Semi-Rigid | 1.05+.01f (GHz), 0-11 GHz <1.25 Typical, 11-18 GHz | 138-4694-001* |
| RG-401, .250 Semi-Rigid | 1.06+.01f (GHz), 0-11 GHz <1.25 Typical, 11-18 GHz | 138-4696-001* |

\* Tri-Alloy plated coupling nut

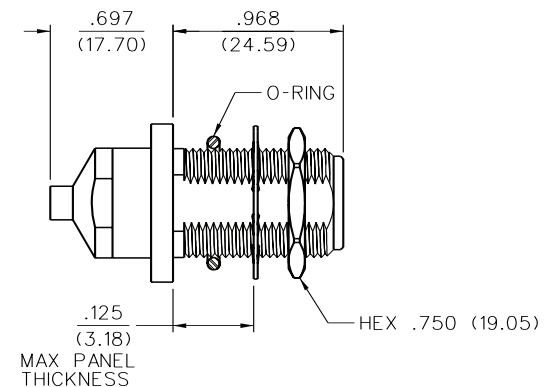
## Straight Solder Type Plug – Captivated Solderless Contact



| Cable Type              | VSWR & Freq. Range                                 | Gold Plated   |
|-------------------------|----------------------------------------------------|---------------|
| RG-405, .086 Semi-Rigid | 1.07+.01f (GHz), 0-11 GHz <1.25 Typical, 11-18 GHz | 138-4693-011* |
| RG-402, .141 Semi-Rigid | 1.05+.01f (GHz), 0-11 GHz <1.25 Typical, 11-18 GHz | 138-4694-011* |
| RG-401, .250 Semi-Rigid | 1.06+.01f (GHz), 0-11 GHz <1.25 Typical, 11-18 GHz | 138-4696-011* |

\* Tri-Alloy plated coupling nut

## Straight Solder Type Bulkhead Jack – With Solder Contact



| Cable Type              | VSWR & Freq. Range                                 | Gold Plated   |
|-------------------------|----------------------------------------------------|---------------|
| RG-405, .086 Semi-Rigid | 1.15+.02f (GHz), 0-11 GHz <1.50 Typical, 11-18 GHz | 138-4593-401* |
| RG-402, .141 Semi-Rigid | 1.10+.02f (GHz), 0-11 GHz <1.50 Typical, 11-18 GHz | 138-4594-401* |
| RG-401, .250 Semi-Rigid | 1.10+.02f (GHz), 0-11 GHz <1.50 Typical, 11-18 GHz | 138-4596-401* |

\* Tri-Alloy plated bulkhead jack body  
Mounting hole layout figure 1 on page 6

## Straight Crimp Type Plug – Solder or Crimp Contact

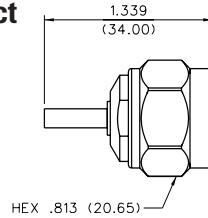


Fig 1

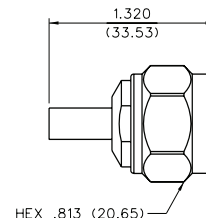


Fig 2

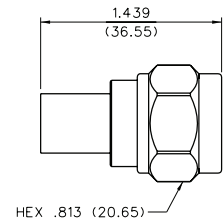


Fig 3

| Cable Type              | VSWR & Freq. Range | Tri-Alloy Plated | Figure |
|-------------------------|--------------------|------------------|--------|
| RG-161/U, 174, 188, 316 | 1.30 Max, 0-11 GHz | 138-4403-007     | 1      |
| RG-188 DS, RG-316 DS    | 1.30 Max, 0-11 GHz | 138-4404-007     | 1      |
| RG-58/U, 141, 303       | 1.30 Max, 0-11 GHz | 138-4407-007     | 2      |
| RG-55/U, 142, 223, 400  | 1.30 Max, 0-11 GHz | 138-4408-007     | 2      |
| RG-8/U, 213             | 1.30 Max, 0-11 GHz | 138-4416-007     | 3      |
| RG-9/U, 214             | 1.30 Max, 0-11 GHz | 138-4418-007     | 3      |
| LMR-400, BELDEN 9913    | 1.30 Max, 0-11 GHz | 138-4449-007     | 3      |

## Right Angle Crimp Type Plug – Captivated Contact

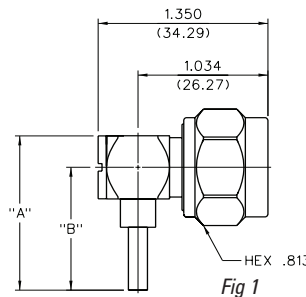
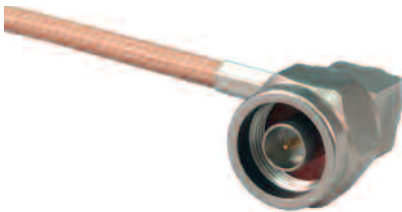


Fig 1

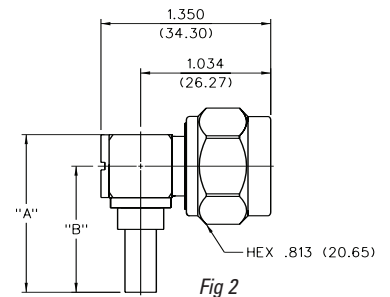
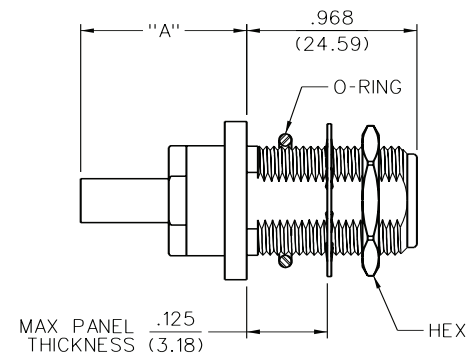


Fig 2

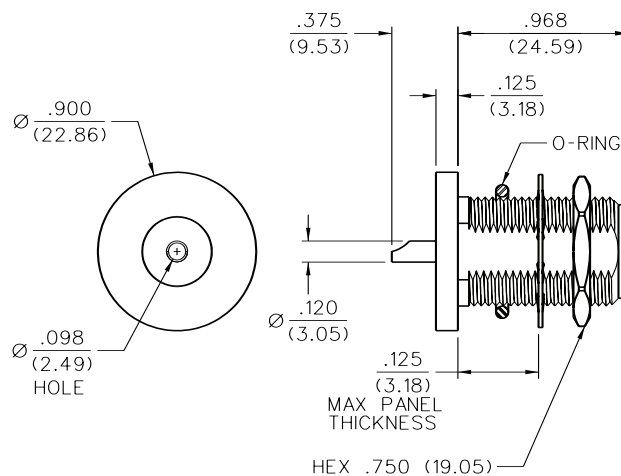
| Cable Type              | VSWR & Freq. Range                   | Tri-Alloy Plated | Figure | "A"           | "B"           |
|-------------------------|--------------------------------------|------------------|--------|---------------|---------------|
| RG-161/U, 174, 188, 316 | 1.35 Max, 0-9 GHz 1.50 Max, 9-11 GHz | 138-4403-107     | 1      | 1.227 (31.17) | .977 (24.82)  |
| RG-188 DS, RG-316 DS    | 1.35 Max, 0-9 GHz 1.50 Max, 9-11 GHz | 138-4404-107     | 1      | 1.227 (31.17) | .977 (24.82)  |
| RG-58/U, 141, 303       | 1.35 Max, 0-9 GHz 1.50 Max, 9-11 GHz | 138-4407-107     | 2      | 1.253 (31.83) | 1.003 (25.48) |
| RG-55/U, 142, 223, 400  | 1.35 Max, 0-9 GHz 1.50 Max, 9-11 GHz | 138-4408-107     | 2      | 1.253 (31.83) | 1.003 (25.48) |
| RG-8/U, 213             | 1.35 Max, 0-9 GHz 1.50 Max, 9-11 GHz | 138-4416-107     | 2      | 1.365 (34.67) | 1.115 (28.32) |
| RG-9/U, 214             | 1.35 Max, 0-9 GHz 1.50 Max, 9-11 GHz | 138-4418-107     | 2      | 1.365 (34.67) | 1.115 (28.32) |

## Straight Crimp Type Bulkhead Jack – Solder or Crimp Contact

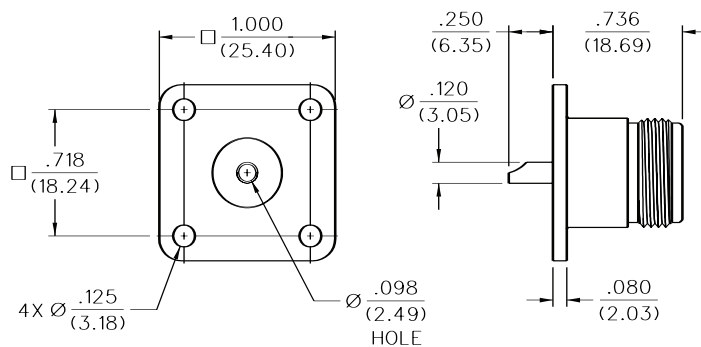


| Cable Type              | VSWR & Freq. Range | Tri-Alloy Plated | "A"          |
|-------------------------|--------------------|------------------|--------------|
| RG-161/U, 174, 188, 316 | 1.30 Max, 0-11 GHz | 138-4303-407     | .943 (23.95) |
| RG-188 DS, RG-316 DS    | 1.30 Max, 0-11 GHz | 138-4304-407     | .943 (23.95) |
| RG-58/U, 141, 303       | 1.30 Max, 0-11 GHz | 138-4307-407     | .943 (23.95) |
| RG-55/U, 142, 223, 400  | 1.30 Max, 0-11 GHz | 138-4308-407     | .943 (23.95) |
| RG-8/U, 213             | 1.30 Max, 0-11 GHz | 138-4316-407     | .997 (25.32) |
| RG-9/U, 214             | 1.30 Max, 0-11 GHz | 138-4318-407     | .997 (25.32) |
| LMR-400, BELDEN 9913    | 1.30 Max, 0-11 GHz | 138-4349-407     | .997 (25.32) |

Mounting hole layout figure 1 on page 6

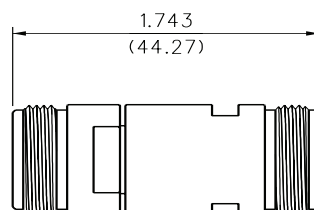


Mounting hole layout figure 1 on page 6



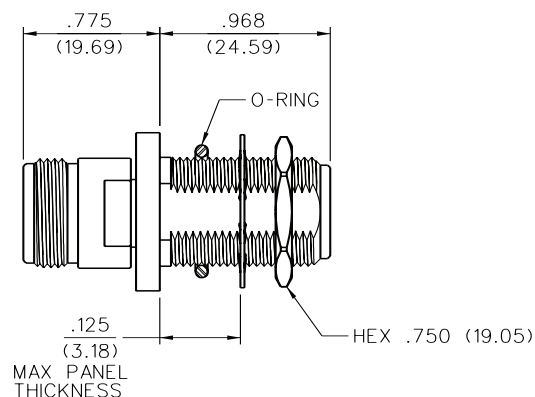
Mounting hole layout figure 2 on page 6

## Jack to Jack Adapter



| VSWR & Freq. Range        | Tri-Alloy Plated |
|---------------------------|------------------|
| 1.05+.01f (GHz), 0-18 GHz | 138-4901-807     |

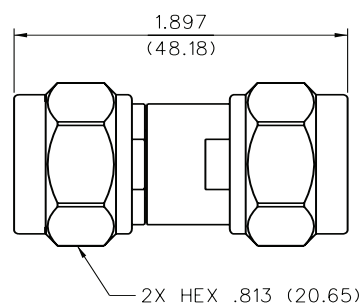
## Jack to Bulkhead Jack Adapter



| VSWR & Freq. Range        | Tri-Alloy Plated |
|---------------------------|------------------|
| 1.05+.01f (GHz), 0-18 GHz | 138-4901-407     |

Mounting hole layout figure 1 on page 6

## Plug to Plug Adapter



| VSWR & Freq. Range        | Tri-Alloy Plated |
|---------------------------|------------------|
| 1.05+.01f (GHz), 0-18 GHz | 138-4901-817     |

## ASSEMBLY TOOLS

### Precision Ergonomic Hand Crimp Tool

Hand crimp tool and die sets include all hex sizes necessary for Type N connector applications. Ratchet tool action insures a complete crimp every time.



| Part No.     | Description                                                                                                                                                                                                                                     | Hex          | Width        |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|--------------|
| 140-0000-967 | Ergonomic Hand Crimp Tool Frame Only <ul style="list-style-type: none"> <li>• Longer handles for leverage</li> <li>• Padded and contoured to fit in hand</li> <li>• Precision ground die sets</li> <li>• 50,000 cycle lifespan frame</li> </ul> |              |              |
| 140-0000-990 | Die set for RG-316, 316 DS, 58, 142                                                                                                                                                                                                             | .068 (1.73)  | .090 (2.29)  |
|              |                                                                                                                                                                                                                                                 | .128 (3.25)  | .475 (12.07) |
|              |                                                                                                                                                                                                                                                 | .151 (3.83)  | .475 (12.07) |
|              |                                                                                                                                                                                                                                                 | .213 (5.41)  | .475 (12.07) |
| 140-0000-991 | Die set for RG-213, 214, LMR-4000                                                                                                                                                                                                               | .111 (2.82)  | .090 (2.29)  |
|              |                                                                                                                                                                                                                                                 | .116 (2.95)  | .090 (2.29)  |
|              |                                                                                                                                                                                                                                                 | .429 (10.90) | .475 (12.07) |

### Contact Hand Crimp Tool

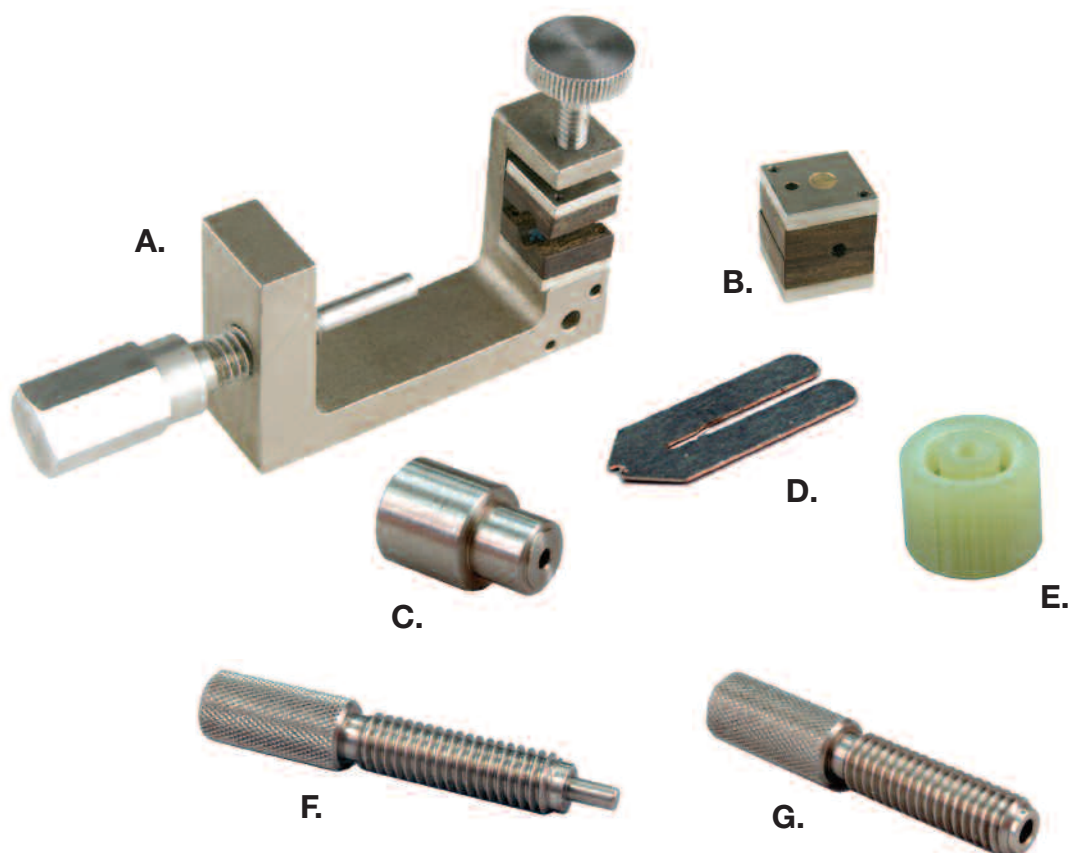
The micro contact crimp tool provides an accurate eight indent crimp on small diameter contacts. This crimp tool is used with the 140-0000-971 Variable Positioner. Set the crimp size in the adjustment window and position the variable locator to obtain an accurate repeatable crimp on the contact.



| Part No.     | Description | ASTRO Tool Part No. |
|--------------|-------------|---------------------|
| 140-0000-970 | Frame Only  | 612118-1            |
| 140-0000-971 | Positioner  | N/A                 |

## Semi-Rigid Assembly Tools

Accurate assembly of the Semi-Rigid Cabled Connectors is obtained with the tools listed below. Industry standard devices are used if possible for customer convenience and tool compatibility.

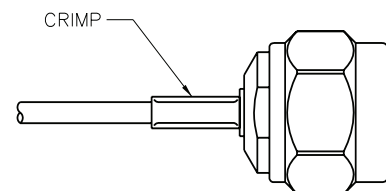
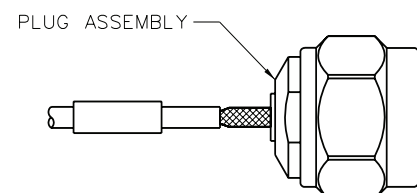
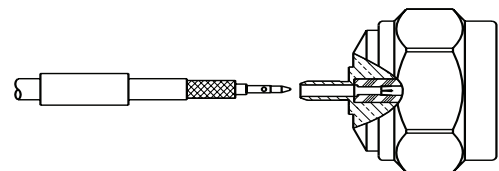
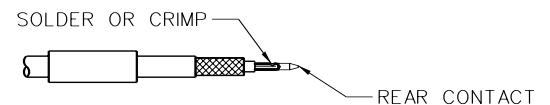
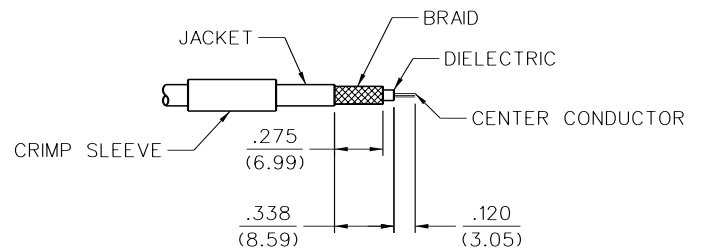
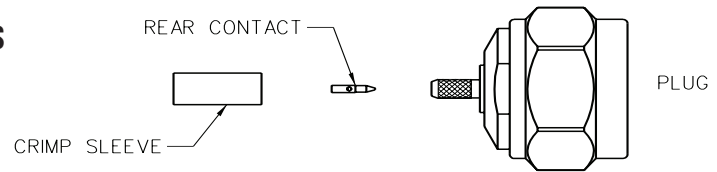


| Item | Part No.     | Description                                                          |
|------|--------------|----------------------------------------------------------------------|
| A    | 140-0000-962 | Soldering Vise (does not include inserts (B) or stop screws (F),(G)) |
| B    | 140-0000-964 | Semi-Rigid Cable Clamp Inserts for .086" OD Cable                    |
|      | 140-0000-965 | Semi-Rigid Cable Clamp Inserts for .141" OD Cable                    |
|      | 140-0000-986 | Semi-Rigid Cable Clamp Inserts for .250" OD Cable                    |
| C    | 140-0000-983 | Location Fixture for Type N Plug Connectors                          |
| D    | 140-0000-984 | Solder Shim for .086" & .141" OD Cable                               |
|      | 140-0000-985 | Solder Shim for .250" OD Cable                                       |
| E    | 140-0000-987 | Location Fixture for .086" OD Cable                                  |
|      | 140-0000-988 | Location Fixture for .141" OD Cable                                  |
|      | 140-0000-989 | Location Fixture for .250" OD Cable                                  |
| F    | 140-0000-981 | Stop Screw for Semi-Rigid Type N Plugs                               |
| G    | 140-0000-972 | Stop Screw for Semi-Rigid Type N Jacks                               |

## ASSEMBLY INSTRUCTIONS

### Type N Straight Plug Crimp Style for RG-316 and 316DS 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 rear contact onto cable as shown Rear contact should butt against cable dielectric during attachment.  
**Solder Attachment:** Solder rear contact to center conductor through solder hole using .020 (.051) diameter flux core solder wire. Use a minimum amount of solder for a good joint.  
**Crimp Attachment:** Crimp rear contact to center conductor using Johnson indent hand tool 140-0000-970. Crimp location should be centered between end of rear contact and solder hole using positioning tool 140-0000-971. Crimp attachment to solid center conductor cables is not recommended.
4. Flare braid and slide plug connector assembly over rear contact and under braid. Rear contact must engage fully with internal captivated plug contact. Cable jacket should be located near end of crimp stem when contacts are fully engaged.
5. 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.

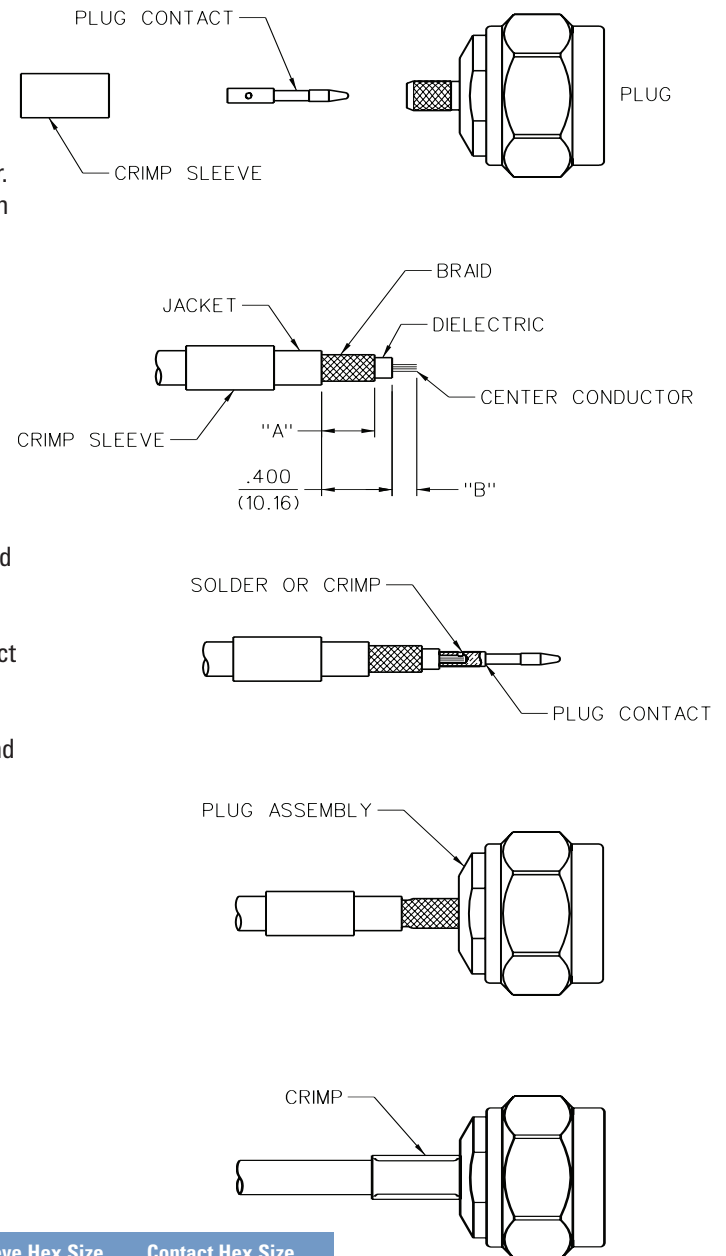


| Cable Group             | Part No.     | Crimp Sleeve Hex Size | Contact Crimp |
|-------------------------|--------------|-----------------------|---------------|
| RG-316/U, 161, 174, 188 | 138-4403-007 | .128 (3.25)           | 8 INDENT      |
| RG-316 DS, 188 DS       | 138-4404-007 | .151 (3.84)           | 8 INDENT      |

| Tool         | Assembly     |
|--------------|--------------|
| Crimp Frame  | 140-0000-967 |
| Die Set      | 140-0000-990 |
| Contact Tool | 140-0000-970 |
| Positioner   | 140-0000-971 |

## Type N Straight Plug Crimp Style for RG-58, 142, 213, 214 and LMR-400 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 (.051) 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.

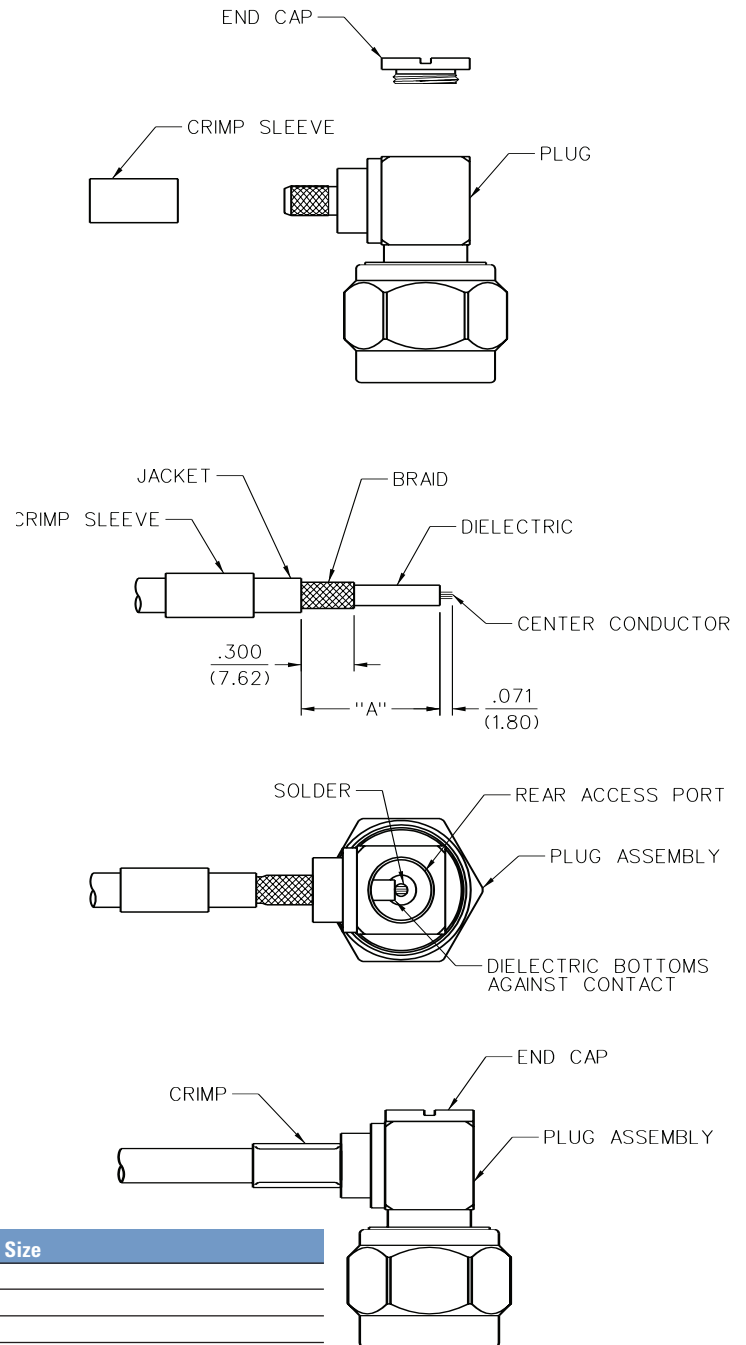


| Cable Group            | Part No.     | "A"         | "B"         | Crimp Sleeve Hex Size | Contact Hex Size |
|------------------------|--------------|-------------|-------------|-----------------------|------------------|
| RG-58/U, 141, 303      | 138-4407-007 | .301 (7.65) | .140 (3.56) | .213 (5.41)           | .068 (1.73)      |
| RG-55/U, 142, 223, 400 | 138-4408-007 | .301 (7.65) | .140 (3.56) | .213 (5.41)           | .068 (1.73)      |
| RG-8, 213              | 138-4416-007 | .385 (9.78) | .170 (4.32) | .429 (10.90)          | .111 (2.82)      |
| RG-9, 214              | 138-4418-007 | .385 (9.78) | .170 (4.32) | .429 (10.90)          | .111 (2.82)      |
| LMR-400, BELDEN 9913   | 138-4449-007 | .385 (9.78) | .170 (4.32) | .429 (10.90)          | .116 (2.95)      |

| Tool        | Assembly          |                        |
|-------------|-------------------|------------------------|
|             | 138-4407/4408-007 | 138-4416/4418/4449-007 |
| Crimp Frame | 140-0000-967      | 140-0000-967           |
| Die Set     | 140-0000-990      | 140-0000-991           |

## Type N Right Angle Plug Crimp Style for RG-316, 316DS, 58, and 142 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. 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.

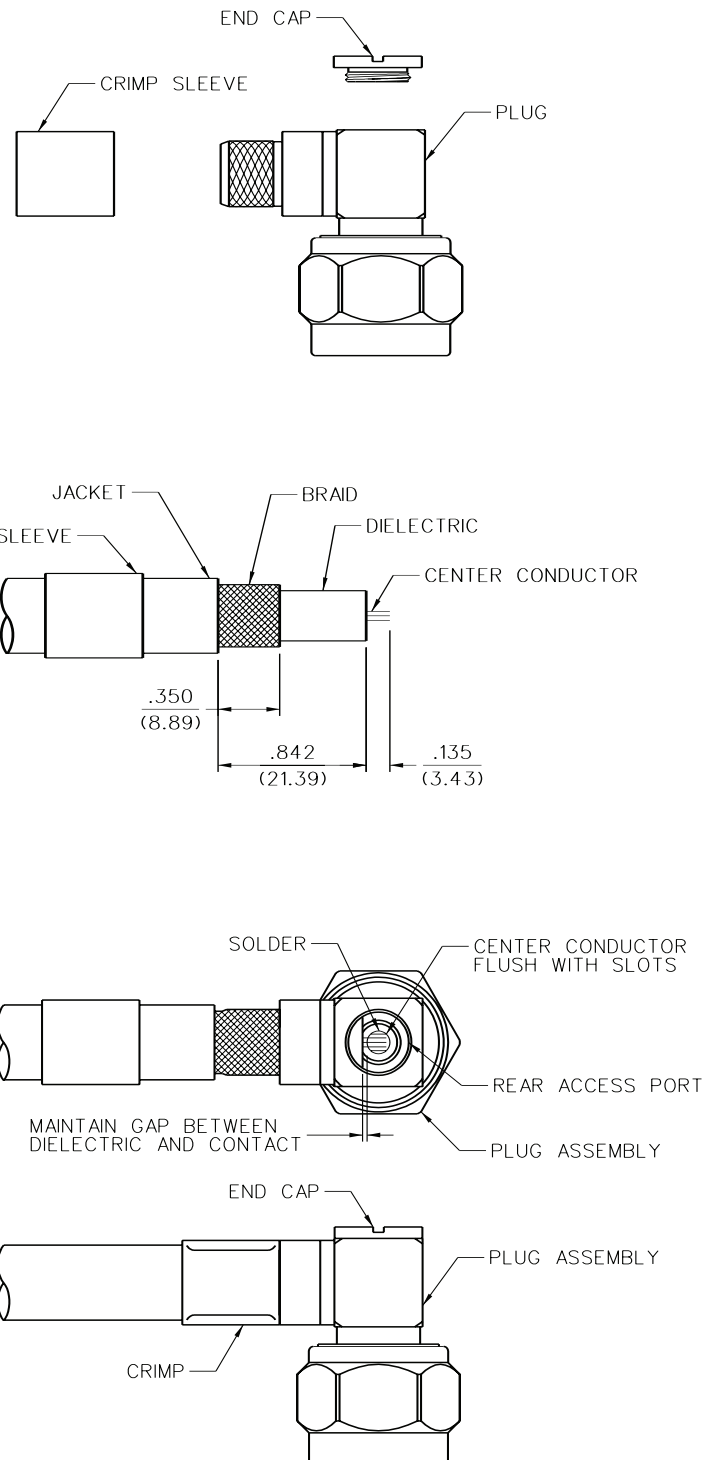


| Cable Group             | Part No.     | "A"          | Crimp Sleeve Hex Size |
|-------------------------|--------------|--------------|-----------------------|
| RG-316/U, 161, 174, 188 | 138-4403-107 | .755 (19.18) | .128 (3.25)           |
| RG-316 DS, 188 DS       | 138-4404-107 | .755 (19.18) | .151 (3.84)           |
| RG-58/U, 141, 303       | 138-4407-107 | .788 (20.02) | .213 (5.41)           |
| RG-55/U, 142, 223, 400  | 138-4408-107 | .788 (20.02) | .213 (5.41)           |

| Tool        | Assembly     |
|-------------|--------------|
| Crimp Frame | 140-0000-967 |
| Die Set     | 140-0000-990 |

## Type N Right Angle Plug Crimp Style for RG-213 and 214 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. Slide crimp sleeve onto jacket of cable.
3. Flare braid and slide plug connector assembly over cable dielectric and under braid. Make sure center conductor is contained within plug contact as shown. Center conductor should not protrude above slots in plug contact and cable dielectric should not touch plug contact. Solder center conductor to plug 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.

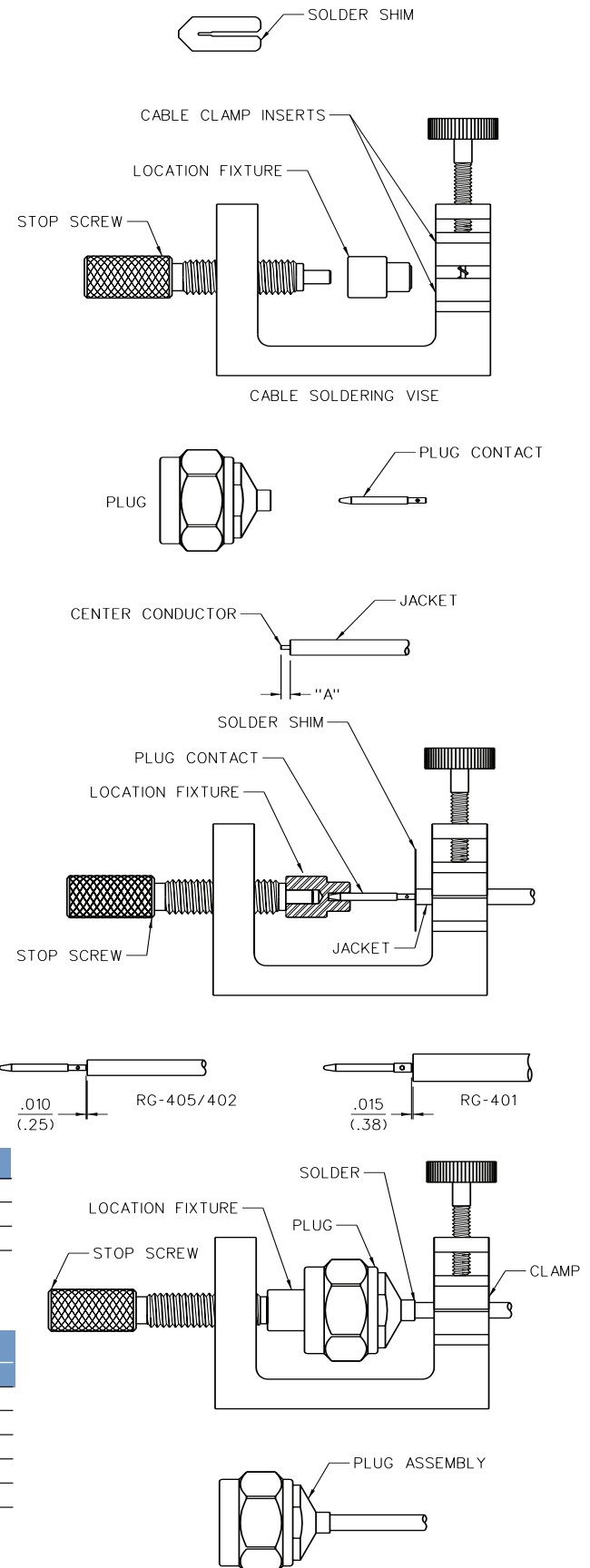


| Cable Group | Part No.     | Crimp Sleeve Hex Size |
|-------------|--------------|-----------------------|
| RG-8, 213   | 138-4416-107 | .429 (10.90)          |
| RG-9, 214   | 138-4418-107 | .429 (10.90)          |

| Tool        | Assembly     |
|-------------|--------------|
| Crimp Frame | 140-0000-967 |
| Die Set     | 140-0000-991 |

## Type N Straight Plug Solder Style for Semi-Rigid Cable

1. Identify connector parts (2 piece parts) and tools (5 piece parts).
2. Strip cable jacket and dielectric to dimension shown. Do not nick center conductor. Clean all debris from cable.
3. Place plug contact onto center conductor, insert appropriate sized solder shim between cable jacket and contact.
4. Insert contact into location fixture and clamp cable in vise. Tighten stop screw until light pressure is applied between contact, solder shim and cable jacket.
5. Solder contact to center conductor through solder hole using .020 (.051) diameter flux core solder wire. Use a minimum amount of solder for a good joint.
6. After solder joint has cooled, loosen stop screw and remove solder shim. Remove cable from vise and remove any excess solder from contact with a sharp blade and clean all debris from contact and cable.
7. Insert contact and cable into plug connector assembly, making sure cable jacket bottoms out against internal shoulder of connector assembly. Insert location fixture into connector assembly and clamp cable in vise. Tighten stop screw until light pressure is applied between connector assembly and cable jacket.
8. Solder connector body to cable jacket, using a minimum amount of solder for a full fillet joint. Allow assembly to cool before removing connector from vise.

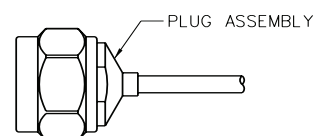
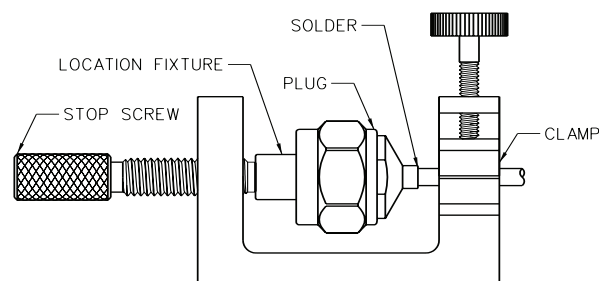
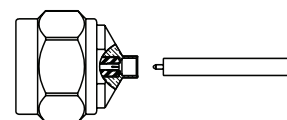
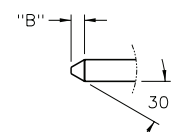
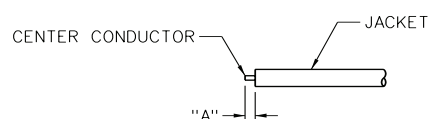
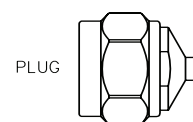
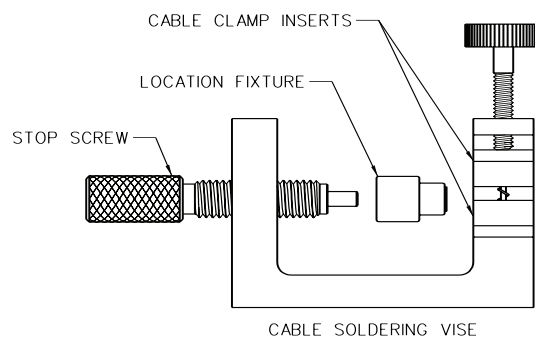


| Cable Group             | Part No.     | "A"         |
|-------------------------|--------------|-------------|
| RG-405, .086 Semi-Rigid | 138-4693-001 | .085 (2.16) |
| RG-402, .141 Semi-Rigid | 138-4694-001 | .085 (2.16) |
| RG-401, .250 Semi-Rigid | 138-4696-001 | .100 (2.54) |

| Tool             | Assembly     |              |              |
|------------------|--------------|--------------|--------------|
|                  | 138-4693-001 | 138-4694-001 | 138-4696-001 |
| Solder Shim      | 140-0000-984 | 140-0000-984 | 140-0000-985 |
| Location Fixture | 140-0000-983 | 140-0000-983 | 140-0000-983 |
| Cable Vise       | 140-0000-962 | 140-0000-962 | 140-0000-962 |
| Clamp Inserts    | 140-0000-964 | 140-0000-965 | 140-0000-986 |
| Stop Screw       | 140-0000-981 | 140-0000-981 | 140-0000-981 |

## Type N Straight Plug One Piece Style for Semi-Rigid Cable

1. Identify connector and tools (4 piece parts).
2. Strip cable jacket and dielectric to dimension shown. Do not nick center conductor.
3. Bevel end of cable center conductor per appropriate dimensional profile.
4. Clean all debris from prepared cable and insert cable into connector assembly, making sure cable jacket bottoms out against internal shoulder of connector assembly and center conductor engages with internal captivated plug contact.
5. Insert location fixture into connector assembly and clamp cable in vise. Tighten stop screw until light pressure is applied between connector assembly and cable jacket.
6. Solder connector body to cable jacket, using a minimum amount of solder for a full fillet joint. Allow assembly to cool before removing connector from vise.

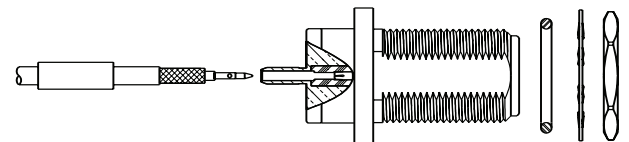
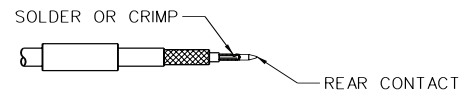
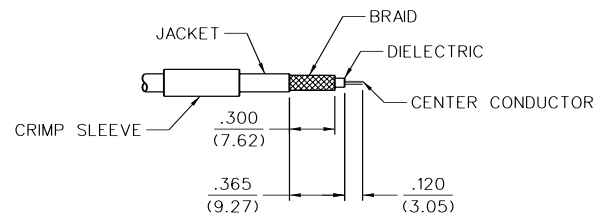
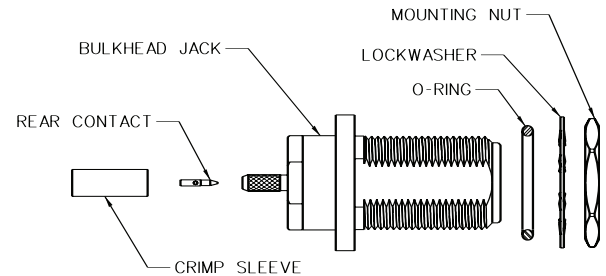


| Cable Group             | Part No.     | "A"         | "B"         |
|-------------------------|--------------|-------------|-------------|
| RG-405, .086 Semi-Rigid | 138-4693-011 | .085 (2.16) | .014 (0.36) |
| RG-402, .141 Semi-Rigid | 138-4694-011 | .085 (2.16) | .022 (0.56) |
| RG-401, .250 Semi-Rigid | 138-4696-011 | .150 (3.81) | .045 (1.14) |

| Tool             | Assembly     |              |              |
|------------------|--------------|--------------|--------------|
|                  | 138-4693-011 | 138-4694-011 | 138-4696-011 |
| Location Fixture | 140-0000-983 | 140-0000-983 | 140-0000-983 |
| Cable Vise       | 140-0000-962 | 140-0000-962 | 140-0000-962 |
| Clamp Inserts    | 140-0000-964 | 140-0000-965 | 140-0000-986 |
| Stop Screw       | 140-0000-981 | 140-0000-981 | 140-0000-981 |

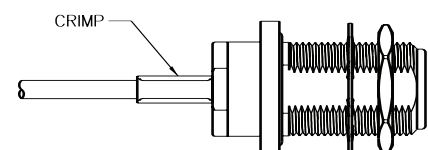
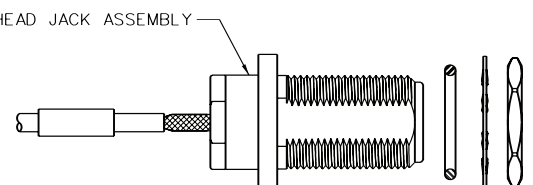
## Type N Bulkhead Jack Crimp Style for RG-316 and 316DS Flexible Cable

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 rear contact onto cable as shown. Rear contact should butt against cable dielectric during attachment.  
**Solder Attachment:** Solder rear contact to center conductor through solder hole using .020 (.051) diameter flux core solder wire. Use a minimum amount of solder for a good joint.  
**Crimp Attachment:** Crimp rear contact to center conductor using Johnson indent hand tool 140-0000-970. Crimp location should be centered between end of rear contact and solder hole using positioning tool 140-0000-971. Crimp attachment to solid center conductor cables is not recommended.
4. Flare braid and slide bulkhead jack connector assembly over rear contact and under braid. Rear contact must engage fully with internal captivated jack contact. Cable jacket should be located near end of crimp stem when contacts are fully engaged.
5. 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.
6. Add gasket, lock washer and mounting nut when installing connector to panel.



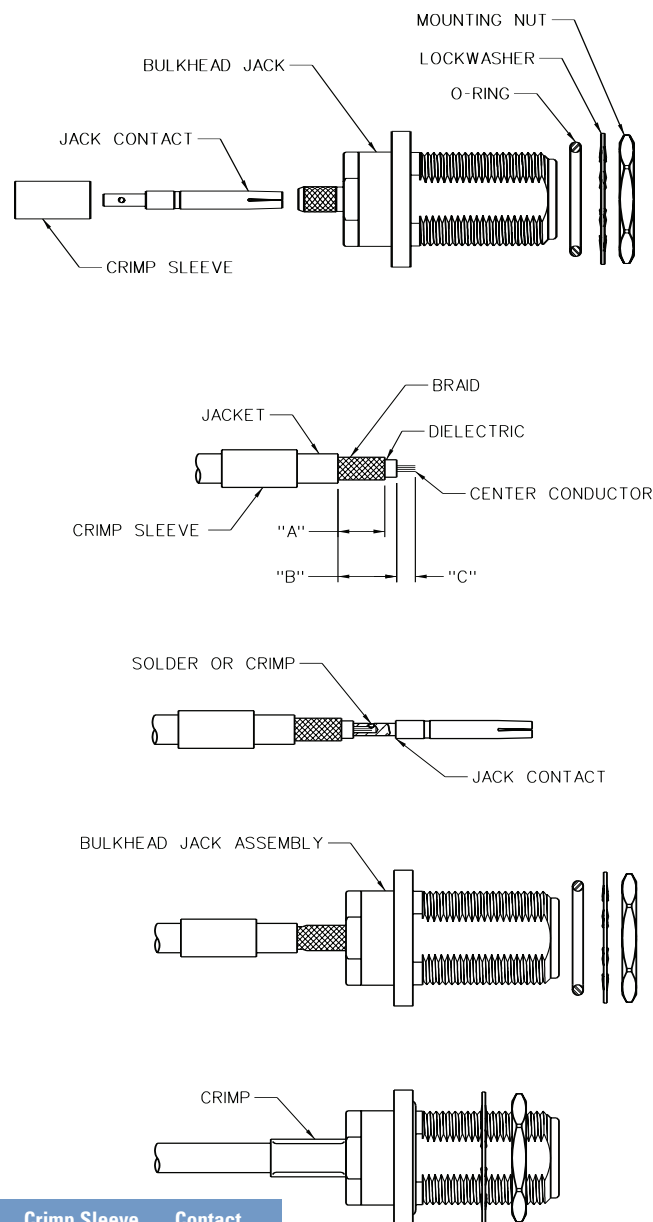
| Cable Group             | Part No.     | Crimp Sleeve Hex Size | Contact Crimp |
|-------------------------|--------------|-----------------------|---------------|
| RG-316/U, 161, 174, 188 | 138-4303-407 | .128 (3.25)           | 8 INDENT      |
| RG-316 DS, 188 DS       | 138-4304-407 | .151 (3.84)           | 8 INDENT      |

| Tool         | Assembly          |
|--------------|-------------------|
|              | 138-4303/4304-407 |
| Crimp Frame  | 140-0000-967      |
| Die Set      | 140-0000-990      |
| Contact Tool | 140-0000-970      |
| Positioner   | 140-0000-971      |



## Type N Bulkhead Jack Crimp Style for RG-58, 142, 213, 214 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 (.051) 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.

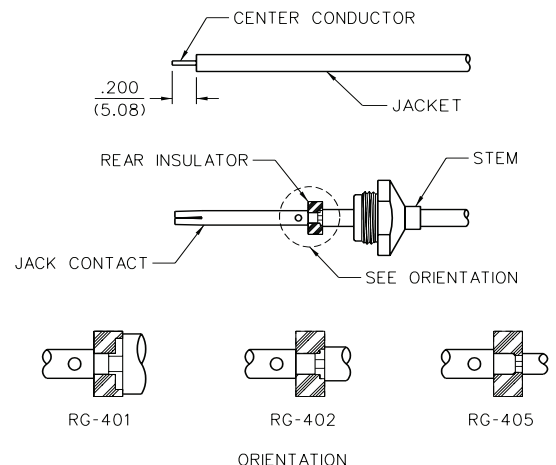
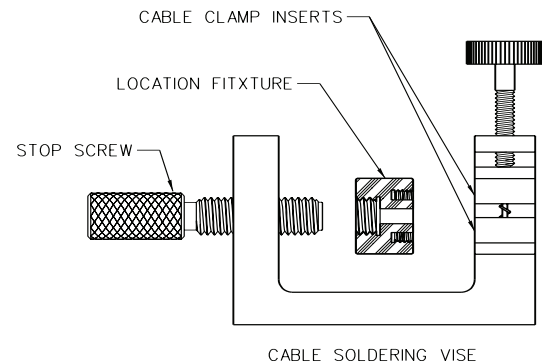
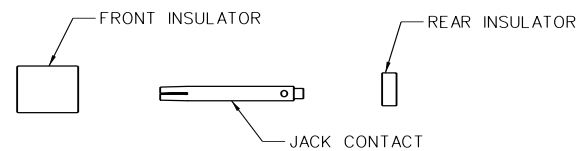
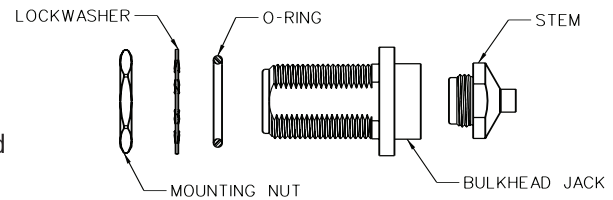


| Cable Group            | Part No.     | "A"         | "B"          | "C"         | Crimp Sleeve Hex Size | Contact Hex Size |
|------------------------|--------------|-------------|--------------|-------------|-----------------------|------------------|
| RG-58/U, 141, 303      | 138-4307-407 | .310 (7.87) | .389 (9.88)  | .135 (3.43) | .213 (5.41)           | .068 (1.73)      |
| RG-55/U, 142, 223, 400 | 138-4308-407 | .310 (7.87) | .389 (9.88)  | .135 (3.43) | .213 (5.41)           | .068 (1.73)      |
| RG-8, 213              | 138-4316-407 | .385 (9.78) | .400 (10.16) | .165 (4.19) | .429 (10.90)          | .111 (2.82)      |
| RG-9, 214              | 138-4318-407 | .385 (9.78) | .400 (10.16) | .165 (4.19) | .429 (10.90)          | .111 (2.82)      |
| LMR-400, BELDEN 9913   | 138-4349-407 | .385 (9.78) | .400 (10.16) | .165 (4.19) | .429 (10.90)          | .116 (2.95)      |

| Tool        | Assembly          |                        |
|-------------|-------------------|------------------------|
|             | 138-4307/4308-407 | 138-4316/4318/4349-407 |
| Crimp Frame | 140-0000-967      | 140-0000-967           |
| Die Set     | 140-0000-990      | 140-0000-991           |

## Type N Bulkhead Jack Solder Style for Semi-Rigid Cable

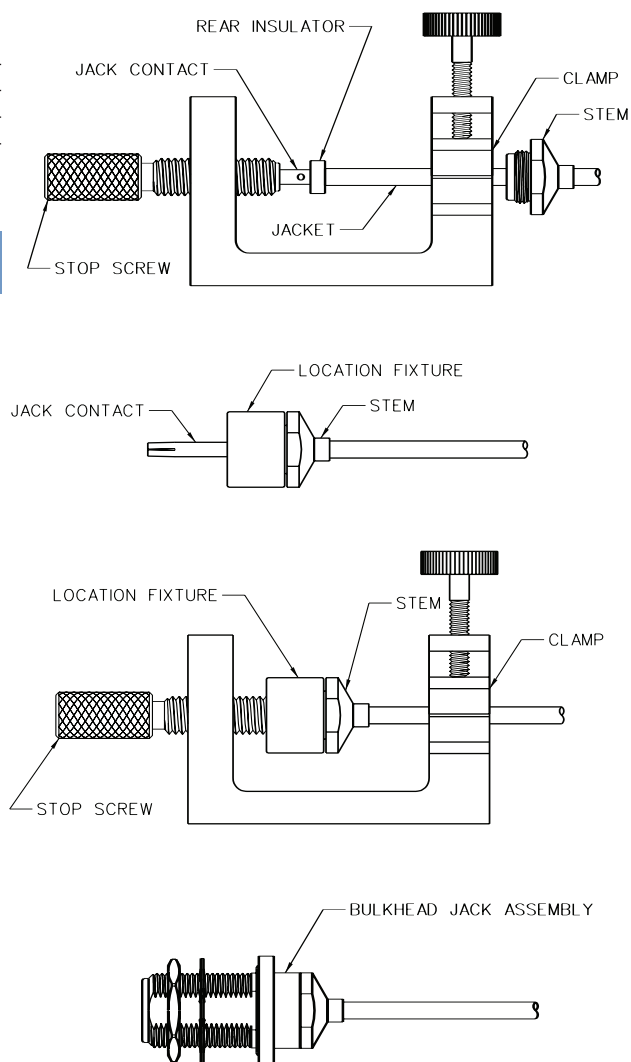
1. Identify connector parts (8 piece parts) and tools (4 piece parts).
2. Strip cable jacket and dielectric to dimension shown. Do not nick center conductor. Clean all debris from cable.
3. Slide stem over cable jacket, keeping stem correctly oriented to end of cable.
4. Insert jack contact into rear insulator. Make sure insulator is correctly oriented to contact. Place jack contact and rear insulator onto center conductor, keeping insulator correctly oriented between cable jacket and contact.
5. Slide stem away from jack contact. Insert contact into stop screw and clamp cable in vise. Tighten stop screw until light pressure is applied between jack contact, rear insulator and cable jacket.
6. Solder jack contact to center conductor through solder hole using .020 (.051) diameter flux core solder wire. Use a minimum amount of solder for a good joint.
7. After solder joint has cooled, remove cable from vise and remove any excess solder from jack contact with a sharp blade and clean all debris from contact and rear insulator.
8. Slide stem over rear insulator and tighten stem into location fixture until stem bottoms out.
9. Insert cable into vise, but do not clamp. Insert jack contact into stop screw and tighten location fixture until stop screw bottoms out. Clamp cable in vise.
10. Solder stem to cable jacket, using a minimum amount of solder for a full fillet joint. Allow assembly to cool before removing from vise.
11. After solder joint has cooled, un-clamp cable and remove location fixture from stop screw and cable assembly. Insert front insulator into bulkhead jack body. Insert cable assembly into body and tighten to 25-30 in-lbs.
12. Add gasket, lock washer and mounting nut when installing connector to panel.



## Type N Bulkhead Jack Solder Style for Semi-Rigid Cable (cont'd)

| Cable Group             | Part No.     |
|-------------------------|--------------|
| RG-405, .086 Semi-Rigid | 138-4593-401 |
| RG-402, .141 Semi-Rigid | 138-4594-401 |
| RG-401, .250 Semi-Rigid | 138-4596-401 |

| Tool             | Assembly     |              |              |
|------------------|--------------|--------------|--------------|
|                  | 138-4593-401 | 138-4594-401 | 138-4596-401 |
| Stop Screw       | 140-0000-972 | 140-0000-972 | 140-0000-972 |
| Cable Vise       | 140-0000-962 | 140-0000-962 | 140-0000-962 |
| Clamp Inserts    | 140-0000-964 | 140-0000-965 | 140-0000-986 |
| Location Fixture | 140-0000-987 | 140-0000-988 | 140-0000-989 |



## COMPETITOR CROSS REFERENCE

| Johnson      | Radiall    | M/A-Com       | Amphenol     | Tyco/Amp    | Telegartner | Rosenberger  | Huber-Suhner |
|--------------|------------|---------------|--------------|-------------|-------------|--------------|--------------|
| 138-4303-407 | R161311300 | 3004-7388-10  | 82-6156      |             |             | 53K507-802N3 |              |
| 138-4304-407 | R161311300 |               |              |             |             | 53K507-803N3 |              |
| 138-4307-407 | R161329000 | 3004-7341-10  | 82-5378      | 1-225667-2  | J01021A0147 | 53K507-106N3 | 24N-50-3-11C |
| 138-4308-407 | R161329200 | 3004-7341-10  | 82-5373      | 225363-2    | J01021A0148 | 53K507-108N3 | 24N-50-3-12C |
| 138-4316-407 | R161331000 | N15H61H001X99 | 82-346-RFX   | 225094-2    | J01021A0060 | 53K501-115N3 | 24N-50-7-14C |
| 138-4318-407 | R161331200 | N15H61H004X99 |              | 225667-1    | J01021A0092 | 53K501-117N3 | 24N-50-7-15C |
| 138-4349-407 | R161331060 |               | 82-6143-1000 |             |             |              |              |
| 138-4403-007 | R161072000 | 3031-7338-10  |              |             | J01020A0103 | 53S107-802N3 |              |
| 138-4403-107 | R161181000 |               | 82-6048-1000 |             | J01020A0040 |              |              |
| 138-4404-007 | R161072000 |               |              |             | J01020A0104 | 53S107-803N3 |              |
| 138-4404-107 | R161181300 |               |              |             | J01020A0039 |              |              |
| 138-4407-007 | R161082000 | 3031-7358-10  | 82-5375      | 1-225661-2  | J01010A0108 | 53S107-106N3 | 11N-50-3-28C |
| 138-4407-107 | R161182000 |               |              | 1-225669-2  | J01020A0035 | 53S205-315N3 | 16N-50-3-26C |
| 138-4408-007 | R161083000 | 3031-7341-10  | 82-5370      | 225699-1    | J01020A0113 | 53S107-108N3 | 11N-50-3-29C |
| 138-4408-107 | R161183000 |               | 82-4442      | 225365-2    | J01020A0036 | 53S205-317N3 | 16N-50-3-27C |
| 138-4416-007 | R161075000 | N15A61H001X99 | 82-340       | 225661-2    | J01020A0107 | 53S101-115N3 | 11N-50-7-43C |
| 138-4416-107 | R161184000 | N15B61H001X99 | 82-336       | 225669-2    | J01020A0046 |              | 16N-50-7-30C |
| 138-4418-007 | R161088000 | N15A61H004X99 | 82-332       | 225661-1    | J01020A0110 | 53S101-115N3 | 11N-50-7-44C |
| 138-4418-107 | R161186000 | N15B61H004X99 | 82-4440-1001 | 225669-1    | J01020A0045 |              | 16N-50-7-31C |
| 138-4449-007 | R161075060 |               | 82-340-1052  |             | J01020A0127 | 53S101-1N9N3 |              |
| 138-4593-401 | R161335200 | 3004-7985-00  | 82-6093-RFX  | 228658-2    | J01021H0087 | 52K504-271N3 | 24N-50-2-14  |
| 138-4594-401 | R161336000 | 3004-7941-00  | 82-6097-RFX  | 228658-1    | J01021A0151 | 53K504-272N3 | 24N-50-3-14  |
| 138-4596-401 | R161337200 |               | 82-6162      |             | J01021A0109 | 53K504-273N3 | 24N-50-5-39C |
| 138-4693-001 | R161050300 | 3001-7985-00  |              | 1057094-1   |             |              | 11N-50-2-14  |
| 138-4693-011 | R161050300 | 3001-7985-00  |              |             |             |              | 11N-50-2-14  |
| 138-4694-001 | R161051000 | 3001-7941-00  | 82-5955-RFX  | 1057088-1   | J01020A0109 | 53S101-272B1 | 11N-50-3-13  |
| 138-4694-011 | R161051000 | 3001-7941-00  | 82-5955-RFX  |             | J01020A0109 | 53S101-272B1 | 11N-50-3-13  |
| 138-4696-001 | R161054000 |               | 82-6124      |             | J01020A0112 | 53S101-273B1 | 11N-50-5-39C |
| 138-4696-011 | R161054000 |               | 82-6124      |             | J01020A0112 | 53S101-273B1 | 11N-50-5-39C |
| 138-4701-407 | R161586137 | N15M35999X99  |              |             | J01021A1084 | 53K505-200N3 |              |
| 138-4701-607 | R161404000 | 3052-0000-10  | 82-97        | 1-1337418-0 | J01021A1082 | 53K401-200N3 | 23N-50-0-23  |
| 138-4901-407 | R161730000 | N15R07999X99  | 82-66        |             | J01024A1088 | 53K501-K00N3 | 34N-50-0-51  |
| 138-4901-807 | R161705000 | 3680-0000-02  | 82-101       | 227945-2    | J01024A1092 | 53K101-K00N3 | 31N-50-0-51  |
| 138-4901-817 | R161703000 | 3681-0000-02  | 82-100       | 1058661-1   | J01024A1094 | 53K101-S00N3 | 32N-50-0-51  |

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## About Emerson Network Power Connectivity Solutions

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