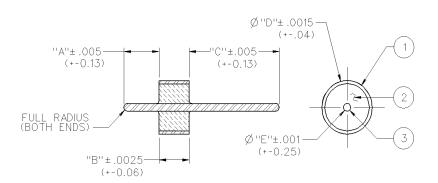
Hermetic Seal Feedthrough







Recommended Mounting Hole Detail

| PART NUMBER | ITEM 1 OUTER RING | ITEM 2 INSULATOR | ITEM 3 PIN | "A" | "B" | "C" | "D" | "E" |
|----------------|--|--|---|-------------|--------------|-------------|--------------|------------|
| 142-1000-001 | Kovar Gold pl .00005 min over Nickel pl .000005 min. | Glass Corning 7052 or equivalent | Kovar Gold pl .00005 min over Nickel pl .000005 min | .070 (1.78) | .0625 (1.59) | .180 (4.57) | .0985 (2.50) | .012 (.30) |
| 142-1000-002 | Kovar Gold pl .00005 min over Nickel pl .000005 min. | Glass Corning 7070 or equivalent | Kovar Gold pl .00005 min over Nickel pl .000005 min | .072 (1.83) | .0625 (1.59) | .180 (4.57) | .0985 (2.50) | .015 (.38) |
| 142-1000-003 | Kovar Gold pl .00005 min over Nickel pl .000005 min. | Glass Corning 7070 or equivalent | Kovar Gold pl .00005 min over Nickel pl .000005 min | .072 (1.83) | .0600 (1.52) | .180 (4.57) | .1100 (2.79) | .018 (.46) |
| 142-1000-004 | Kovar Gold pl .00005 min over Nickel pl .000005 min. | Glass Corning 7052 or equivalent | Kovar Gold pl .00005 min over Nickel pl .000005 min | .070 (1.78) | .0600 (1.52) | .203 (5.16) | .1580 (4.01) | .020 (.51) |

Mounting Hole Dimensions

| PART | PIN | | | AIR | TEFLON | |
|--------------|-------------|-------------|-------------|-------------|-------------|--|
| NUMBER | DIAMETER | "F" | "G" | "H" | "H" | |
| 142-1000-001 | .012 (0.30) | .063 (1.60) | .102 (2.59) | .028 (0.71) | .039 (0.99) | |
| 142-1000-002 | .015 (0.38) | .063 (1.60) | .102 (2.59) | .035 (0.89) | .049 (1.24) | |
| 142-1000-003 | .018 (0.46) | .060 (1.52) | .114 (2.90) | .042 (1.07) | .059 (1.50) | |
| 142-1000-004 | .020 (0.51) | .060 (1.52) | .162 (4.11) | .046 (1.17) | .065 (1.65) | |

Notes:

The hermetic seal should be mounted as flush as possible with the housing. Excessive recession will create a high impedance air gap which degrades electrical performance.

The use of an additional counterbore to accommodate a solder ring for seal mounting is not recommended. A slight chamfer may be used if care is taken to completely fill the area with solder - avoid air gaps.

Dimensions shown are given to achieve 50 Ohms with either air or a teflon insulator. A teflon insulator may be helpful in supporting small pin diameters.

Electrical:

Impedance: 50 Ohms

Frequency Range: DC to 26.5 GHz VSWR: Dependent upon application

Working Voltage: 250 Vrms max at sea level

Dielectric Withstanding Voltage: 500 Vrms min at sea

level

Insulation Resistance: 5000 Megohm min Insertion Loss: .015F dB max (F in GHz)

Environmental:

Hermeticity: 1x10⁻⁸ cc/sec at one atmosphere Solderability: MIL-STD-202, Method 209 Operating Temperature: -55° C to 165° C

SMA - 50 Ohm Connectors

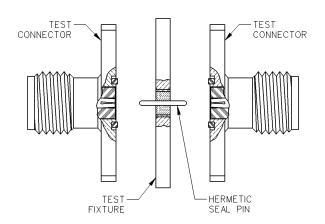
JOHNSON ComponentsTM
INCHES (MILLIMETERS)
CUSTOMER DRAWINGS AVAILABLE UPON REQUEST

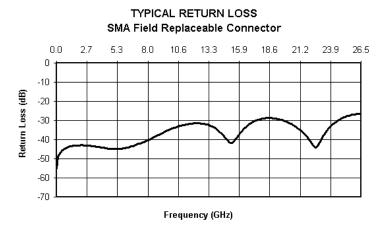
Field Replaceable - Application Notes

The field replaceable style of connector is known by many names in the industry, such as MIC launcher, hermetic seal launcher, spark plug launcher, etc. Some types, such as those known as "spark plugs", have the hermetic seal incorporated into the connector. These types require special welding to install and can not be replaced without destroying the hermeticity of the circuit housing. True field replaceable connectors, such as those manufactured by Johnson Components™, are easy to install and replace. Because the hermetic seal is not incorporated into the connector design, the connector can be removed and replaced without destroying the hermetic seal or the hermeticity of the circuit housing.

All of the above mentioned connector types perform the same basic function - creating a transition from microstrip circuitry to a coaxial transmission line. Whenever possible, the hermetic seal pin diameter should be chosen as close as possible to the microstrip trace width. For optimum electrical performance, the transition from the hermetic seal to the microstrip trace must be properly compensated. Compensation involves adjusting the microstrip trace width to minimize any impedance discontinuities found in the transition area.

The plot shown below is representative of the typical return loss of an Johnson Components[™] field replaceable connector. To produce the data shown below, a test fixture is created using the appropriate Johnson Components[™] hermetic seal. The fixture consists of a suitably thick spacer plate with the hermetic seal mounted flush to both surfaces. Two connectors are mounted back to back around the fixture and the VSWR of this test assembly is measured. The return loss data shown is equivalent to the square root of the measured VSWR of the test assembly. Since the connectors tested are of identical design, it can be stated with fair accuracy that the data shown represents the response of a single field replaceable connector and its transition to the hermetic seal.





Although Johnson Components[™] does not publish a VSWR specification for field replaceable connectors, typical connector VSWR can be expected to be less than 1.1 + .01f (f in GHz). A VSWR specification is not stated because an industry standard method for testing field replaceable connectors does not exist. The actual performance of the connector is dependent upon the application for the following reasons:

- 1. The choice of hermetic seal to be used by the customer is not specified by the connector manufacturer. Hermetic seals produced by different manufacturers will not have the same electrical characteristics. For optimum electrical performance, Johnson Components™ recommends the use of our standard 142-1000-001, 002, 003 and 004 hermetic seals for pin diameters of .012 (0.30), .015 (0.38), .018 (0.46) and .020 (0.51). Custom hermetic seal configurations can be quoted.
- 2. It is recommended that the hermetic seal be mounted flush with the circuit housing. Tolerance variations between the hermetic seal and machined housing do not always guarantee an optimum transition to the connector. Some manufacturers recommend an additional counterbore in the circuit housing to accommodate a solder washer during installation of the seal. Johnson Components™ does not recommend this type of installation because if the counterbore is not completely filled with solder, electrical discontinuities may be created.
- 3. The transition between the hermetic seal pin and the microstrip trace will affect electrical performance, as stated above. Several different methods of hermetic seal mounting and seal pin to microstrip trace attachment are used in the industry. Johnson Components™ can not recommend one method over the other as this is dependent upon the customer's application.

As always, quotes for non-standard field replaceable connectors and/or hermetic seals are welcome.

SMA - 50 Ohm Connectors

Specifications



ELECTRICAL RATINGS

| Impedance: 50 ohms Frequency Range: Dummy loads Flexible cable connectors Uncabled receptacles, RA semi-rigid and adapt Straight semi-rigid cable connectors and | 0-1 ters0-1 | 2.4 GHz 8.0 GHz | Insertion Loss: (dB maximum) Straight flexible cable connectors and adapters | | |
|--|----------------|--|--|--|--|
| field replaceable connectors | 0-2 / Right | | connectors with contact 0.03 f (GHz), tested at 10 GHz Right angle semi-rigid cable | | |
| Cabled Connectors | | | connectors | | |
| RG-178 cable 1.20 + .025f | 1.20 + | | Straight semi-rigid cable | | |
| RG-316, LMR-100 cable 1.15 + .02f | 1.15 + | | connectors w/o contact 0.03 f (GHz), tested at 16 GHz | | |
| RG-58, LMR-195 cable 1.15 + .01f | 1.15 + | | Straight low loss flexible | | |
| RG-142 cable 1.15 + .01f | 1.15 + | | cable connectors 0.06 f (GHz), tested at 1 GHz | | |
| LMR-200, LMR-240 cable 1.10 + .03f | 1.10 + | | Right Angle low loss flexible | | |
| .086 semi-rigid | 1.18 + | | cable connectors 0.15 | | |
| .141 semi-rigid (w/contact) 1.05 + .008f | 1.15 + | .0151 | Uncabled receptacles, field replaceable, dummy loads | | |
| .141 semi-rigid (w/o contact) 1.035 + .005f | .r 1 | 05 ± 01f | Insulation Resistance: 5000 megohms minimum Contact Resistance: (milliohms maximum) Initial After Environmental | | |
| Jack-bulkhead jack adapter and plug-plug adapte Jack-jack adapter and plug-jack adapter | .۱ | .05 + .011 | Center contact (straight cabled connectors | | |
| Uncabled receptacles, dummy loads | | | and uncabled receptacles) | | |
| Field replaceable (see page 59) | | | Center contact (right angle cabled | | |
| Working Voltage: (Vrms maximum) [†] | | ۱۹// ۱ | connectors and adapters)4.0 6.0 | | |
| Connectors for Cable Type | Sea Level 7 | 70K Feet | Field replaceable connectors | | |
| Connectors for Cable Type RG-178 | 170 | 45 | Outer contact (all connectors) | | |
| RG-316; LMR-100, 195, 200 | 250 | 65 | Braid to body (gold plated connectors) 0.5 N/A | | |
| RG-58, RG-142, LMR-240, .086 semi-rigid, | | | Braid to body (nickel plated connectors) 5.0 N/A | | |
| uncabled receptacles, .141 semi-rigid w/o conf | | 85 | *N/A where the cable center conductor is used as a contact | | |
| .141 semi-rigid with contact and adapters | 500 | 125 | RF Leakage: (dB minimum, tested at 2.5 GHz) | | |
| Dummy loads | | | Flexible cable connectors, adapters and .141 semi-rigid | | |
| Dielectric Withstanding Voltage: (VRMS minim | | | connectors w/o contact60 dB | | |
| Connectors for RG-178 | | | Field replaceable w/o EMI gasket70 dB | | |
| Connectors for RG-316; LMR-100, 195, 200 | | 750 | .086 semi-rigid connectors and .141 semi-rigid connectors | | |
| Connectors for RG-58, RG-142, LMR-240, .086 | | | with contact, and field replaceable with EMI Gasket90 dB | | |
| field replaceable, uncabled receptacles | | | Two-way adapters90 dB | | |
| Connectors for .141 semi-rigid with contact and | | | Uncabled receptacles, dummy loads | | |
| Connectors for .141 semi-rigid w/o contact, dur | nmy loads | N/A | RF High Potential Withstanding Voltage: (Vrms minimum, tested at 4 | | |
| Corona Level: (Volts minimum at 70,000 feet) [†] Connectors for RG-178 | | 125 | and 7 MHz) [†] Connectors for RG-178 | | |
| Connectors for RG-176 | | | Connectors for RG-316; LMR-100, 195, 200 | | |
| Connectors for RG-58, RG-142, LMR-240, 086 | | 190 | Connectors for RG-58, RG-142, LMR-240, .086 semi-rigid, | | |
| uncabled receptacles, .141 semi-rigid w/o conta | | 250 | .141 semi-rigid cable w/o contact, uncabled receptacles | | |
| Connectors for .141 semi-rigid with contact and | | Connectors for .141 semi-rigid with contact and adapters | | | |
| Dummy loads | | Power Rating (Dummy Load): 0.5 watt @ + 25°C, derated to 0.25 watt @ | | | |
| , | | | +125°C | | |
| | | | | | |

MECHANICAL RATINGS

| Engagement Design: MIL-C-39012, Series SMA Engagement/Disengagement Force: 2 inch-pounds maximum Mating Torque: 7 to 10 inch-pounds Bulkhead Mounting Nut Torque: 15 inch-pounds Coupling Proof Torque: 15 inch-pounds minimum Coupling Nut Retention: 60 pounds minimum Contact Retention: 6 lbs. minimum axial force (captivated contacts) 4 inch-punce minimum torque (uncabled recentacles) | Cable Retention: Connectors for RG-178 | 0 20 30 40 45 30 60 | Torque (in-oz) N/A N/A N/A N/A N/A N/A 16 55 |
|--|--|------------------------------------|--|
| 4 inch-ounce minimum torque (uncabled receptacles) | *Or cable breaking strength whic Durability: 500 cycles minimum | hever is less. | 00 |

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

Temperature Range: - 65°C to + 165°C Thermal Shock: MIL-STD-202, Method 107, Condition B Corrosion: MIL-STD-202, Method 101, Condition B

Shock: MIL-STD-202, Method 213, Condition I Vibration: MIL-STD-202, Method 204, Condition D Moisture Resistance: MIL-STD-202, Method 106

100 cycles minimum for .141 semi-rigid connectors w/o contact

†Avoid user injury due to misapplication. See safety advisory definitions inside front cover.

SMA - 50 Ohm Connectors

Specifications



MATERIAL SPECIFICATIONS

Bodies: Brass per QQ-B-626, gold plated* per MIL-G-45204 .00001" min. or nickel plated per QQ-N-290

Contacts: Male - brass per QQ-B-626, gold plated per MIL-G-45204 .00003" min.

Female - beryllium copper per QQ-C-530, gold plated per MIL-G-45204 .00003" min.

Nut Retention Spring: Beryllium copper per QQ-C-533. Unplated

Insulators: PTFE fluorocarbon per ASTM D 1710 and ASTM D 1457 or Tefzel per ASTM D 3159 or PFA 340 per ASTM

Expansion Caps: Brass per QQ-B-613, gold plated per MIL-G-45204 .00001" min. or nickel plated per QQ-N-290

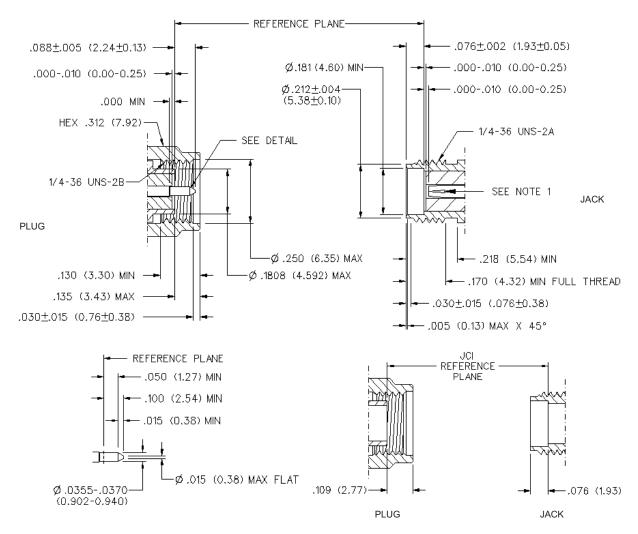
Crimp Sleeves: Copper per WW-T-799 or brass per QQ-B-613, gold plated per MIL-G-45204 .00001" min. or nickel plated per QQ-N-290 **Mounting Hardware:** Brass per QQ-B-626 or QQ-B-613, gold plated per MIL-G-45204 .00001" min. or nickel plated per QQ-N-290

Seal Rings: Silicone rubber per ZZ-R-765

EMI Gaskets: Conductive silicone rubber per MIL-G-83528, Type M

* All gold plated parts include a .00005" min. nickel underplate barrier layer.

Mating Engagement for SMA Series per MIL-C-39012



NOTES

1. ID OF CONTACT TO MEET VSWR, CONTACT RESISTANCE AND INSERTION WITHDRAWAL FORCES WHEN MATED WITH DIA .0355-.0370 MALE PIN.