# Contents

Quick Connections eliminate the time consuming tightening, torquing and loosening of connectors. Quick Connections are needed during testing or in applications, where limited space requirements make tightening and torquing of a coupling nut difficult or impossible. Quick Connections cover eight connector series. Six of those nine connector series were designed by Spectrum Elektrotechnik GmbH: **Push-On** connectors of types **7/16**, **N**, **TNC** and **SMA** slide directly onto any female connector of the same series, allowing quick and easy connection and disconnection, guaranteeing repeatable performance, reduced test time and long life, operating over the full frequency range of the particular connector series with low insertion loss and excellent return loss.
The connector series of types **BMA**, **SBX**, **SBY** and **SMP** were developed for a wide range of microwave interconnect problems, mate applications for modularized packages, racks and panels and dense packaging. The series **SBX** and **SBY** were developed by Spectrum Elektrotechnik GmbH for high power interconnecting modules, while **BMA** and **SMP** are used for lower power applications, **SMP** especially for dense packaging.

Spectrum Elektrotechnik GmbH has engineered and manufactured for certain programs and applications, as those products were not available at that time, or not as standard from other vendors.

Please always keep in mind that Spectrum Elektrotechnik GmbH is a very innovative Company.

As it is our main goal to improve specification and performance of the products, Spectrum Elektrotechnik GmbH has to reserve the right to change specifications, design and any other information shown in this Handbook at any time without previous notice.

Because of the comprehensive information gathered in this volume, we call it a Handbook, hopefully the Handbook you like to work with best. If you find the time, we would appreciate your personal opinion about this Handbook.

# The Company

Spectrum Elektrotechnik GmbH was founded in 1981 and has become a leading supplier of state-of-the-art components used in RF and microwave technology, including connectors, adapters, cable assemblies, phase shifters, couplers, gain amplitude equalizers, terminations, and calibration kits. In addition, a number of complex and integrated components have been engineered and manufactured for specialized programs and various customers' special needs.

Throughout the world, Spectrum Elektrotechnik GmbH has established a reputation as a design, development, and manufacturing center. The company has attained recognition for setting standards, introducing new ideas into the field and its leadership in cutting-edge technologies.

## The Products

Spectrum's products are used in many commercial systems, including cellular applications, radios, SatCom/VSAT, satellites and space applications, test centers and wireless communication. Spectrum's products are also used in various defense applications including airborne radars, electronic intelligence, electronic warfare, jamming systems, and missile guidance. Wherever RF or microwave expertise and advanced manufacturing technologies are needed, you will find Spectrum Elektrotechnik GmbH.

## Capabilities and Facilities

The departments within the company have been set up as an intelligent network. This guarantees complete in-house control of every operation and procedure, including design, development, manufacturing, assembly and testing. Spectrum Elektrotechnik GmbH is small enough to react quickly to customer demands, yet large enough to handle large scale orders of important and unique programs in a timely manner. Spectrum has the capability to develop, manufacture, and test an extensive range of products meeting the highest standards of quality and performance.

As early as 1984, Spectrum Elektrotechnik GmbH introduced CAD design centers and CAD/CAM work stations to provide data to computer controlled machines. Spectrum employs the most advanced machines using test centers reaching 50.0 GHz from HP to 40.0 GHz from Wiltron. Because Spectrum's manufacturing and quality control comply with DIN - ISO 9000, the company meets strict requirements in commercial, avionics, military and Hi-Rel applications. A Final 100% Inspection is standard at Spectrum: Tests performed include electrical and physical performance, tolerances, workmanship, and compliance with applicable specifications.

## Support

An adequate and knowledgeable staff is always available to support the customers needs with respect to applications, engineering and sales. The staff acts as a team, undestanding product applications and specifications, as well as customers' needs, priorities and problems. A net of distributors assures immediate delivery of off-the shelf products. Authorized technically knowledgeable representatives provide immediate assistance to the customers.

# Terms and Conditions

## Ordering

All orders must include the Spectrum Elektrotechnik GmbH part number and a description of the item(s) ordered. If special features are required, describe them as completely as possible and include an engineering sketch. Orders may be placed directly with the factory in Munich or with any authorized Spectrum Elektrotechnik GmbH representative. Minimum factory order is DM 250.00.

## Acceptance of Orders

All orders are subject to acceptance at the discretion of the factory and with an order acknowledgment from Spectrum Elektrotechnik GmbH.

## Terms

Upon approval of credit, payment is due net 30 days from date of invoice. Late payments are subject to a 1.5 % monthly charge on past due balances.

## Shipments

Spectrum Elektrotechnik GmbH ships via the most expedient reliable carrier. Shipment ex works, Spectrum Elektrotechnik GmbH plant, will be sent freight prepaid and billed unless other prior arrangements are made. Spectrum Elektrotechnik GmbH will use any acceptable method of delivery specifically requested by the customer.

## Damaged Materials/Shortages

All orders should be inspected upon receipt for both completeness and receipt of materials in proper condition. All claims for shortages must be made within thirty (30) days after date of shipment of material from Spectrum Elektrotechnik GmbH plant. Title to goods passes to the buyer upon delivery to the carrier and risk of loss or damage shall thereafter rest with the buyer. Claims for damage or loss while material is in transit must be made against the carrier by the buyer.

## Cancellation

Cancellation of, or changes to an order acknowledged by Spectrum Elektrotechnik GmbH are accepted only upon terms that protect Spectrum Elektrotechnik GmbH against loss.

## Returns

Excess or unused material cannot be returned for credit without factory authorization. Such material is subject to a handling charge of not less than 15 % upon return and inspection of material at the factory. In no case will Spectrum Elektrotechnik GmbH authorize return of material beyond ninety (90) days after shipment from the factory. Credit for returned material is issued by Spectrum Elektrotechnik GmbH only to the original purchaser. Freight charges for returned material are the responsibility of the buyer.

## Defective Material

Claims for defective material or workmanship are subject to verification by Spectrum Elektrotechnik GmbH quality control, and must have prior factory authorization. Upon verification, Spectrum Elektrotechnik GmbH reserves the right to repair or replace, as deemed necessary.

## Prices / Specifications

Unless otherwise specified, prices quoted are ex works Spectrum Elektrotechnik GmbH plant. Both, prices and specifications are subject to modification without prior notice.

## Patent and Trademark Indemnity

Buyer agrees at buyer's expense to protect and defend seller against any and all claims of patent or trademark infringement arising from seller's compliance with buyer's designs or specifications or instruction and to hold seller harmless from all losses, damages, costs and expenses attributable to any such claim or claims. Seller shall have the right to approve or disapprove counsel designated by buyer to defend such claims.

## Warranty

**Spectrum Elektrotechnik GmbH warrants products of its manufacture to be free from defects in material and workmanship under conditions of normal use. If, within one year after delivery to the original owner, and after prepaid return by the original owner, any Spectrum Elektrotechnik GmbH product is found to be defective, Spectrum Elektrotechnik GmbH shall, at its option, repair or replace said defective item. This warranty does not apply to products which have been disassembled, modified or subjected to conditions exceeding applicable specifications or ratings.**

**Spectrum Elektrotechnik GmbH reserves the right to make design changes without notice on any of its products and without any obligation to make same or similar changes to items previously purchased. In no event does Spectrum Elektrotechnik GmbH assume liability for installation, labor or for consequential damages. This warranty is the extent of the obligation or liability assumed by Spectrum Elektrotechnik GmbH with respect to its products, and no other warranty or guarantee is either expressed or implied.**

# Quick Reference Guide by Sections

Spectrum Elektrotechnik GmbH

Spectrum Elektrotechnik GmbH

# Quick Reference Guide by Sections

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| **Cable Assemblies** |  | 211-264 |
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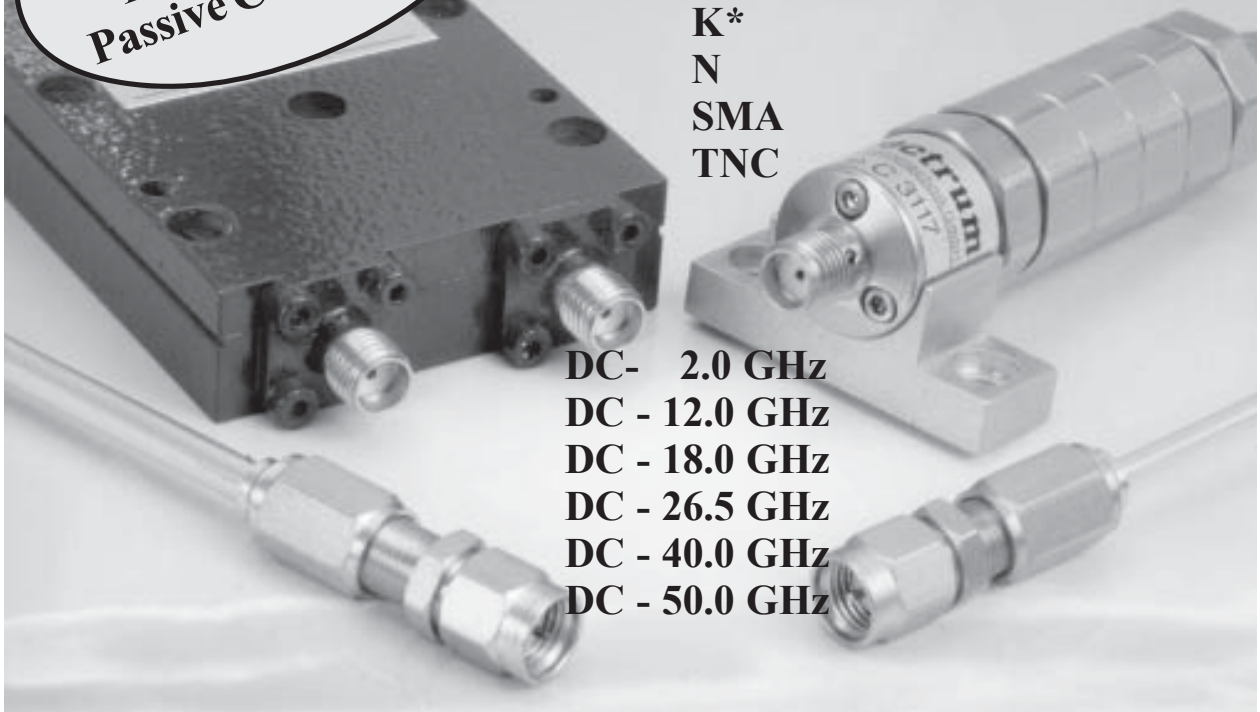
# Phase Shifters

Interested?
Please refer to
"The '98 Handbook
Passive Components"

**Available Connectors:**

**2.4mm**
**3.5mm**
**7mm**
**K***
**N**
**SMA**
**TNC**



**DC- 2.0 GHz**
**DC - 12.0 GHz**
**DC - 18.0 GHz**
**DC - 26.5 GHz**
**DC - 40.0 GHz**
**DC - 50.0 GHz**

**Please ask for our other Products in the Frequency Range of DC to 50.0 GHz:**

Adapters, ANA Test Cables, Antennas, Attenuators, Blind Mate Connectors, Circulators, CDM-Components, Coax Switches, Couplers, Custom Components, DC-Block Connectors & Adapters, Gain-Equalizers, Flexible Cable Assemblies, Isolators, Limiters, Mismatches, Multi Pin Connectors, Phase Shifters, Phase Stable Cable Assemblies, Precision Terminations, Push-On Connectors & Adapters, Semi Rigid Cable Assemblies, Waveguide Components, Waveguide to Coax Adapters, etc.

**Spectrum**
Elektrotechnik GmbH

**80905 Munich, Germany**
**P.O. Box 45 05 33**

**Fax ( 89 ) 354-804-90**
**Telephone: ( 89 ) 354-804-0**

* 'K' Connector is a trademark of Wiltron Company.

Spectrum Elektrotechnik GmbH

# INTRODUCTION TO PUSH-ON CONNECTORS & ADAPTERS



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# Push - On Connectors & Adapters

**INTRODUCTION:** PUSH-ON connectors do not use threaded coupling nuts, they are mated by just sliding together, allowing quick and easy connection and disconnection, guaranteeing repeatable performance, reduced test times and longevity. PUSH-ONs are designed with an automatic locking mechanism, and are also available with slotted beryllium copper outer conductor only, providing the necessary insertion and withdrawal force. PUSH-ONs can be purchased with float mount, and are suited then for axial and radial misalignment. The misalignment nature is obtained by a spring mechanism which separates the connector interface from the flange housing and allows it to float for blind mating purposes. PUSH-ON connectors can be divided into two groups:

**PUSH-ON CONNECTORS MATING WITH REGULAR FEMALE CONNECTORS**
**PUSH-ON CONNECTOR SERIES BY DESIGN**

**REGULAR CONNECTORS:** Male connectors of types 7/16, N, TNC and SMA are designed with threaded coupling nuts for safe attachment. Coupling these connectors means threading, tightening and torquing, then loosening and unthreading again. In various applications, e.g. during repetitive testing, the process for connecting and disconnecting may be more time consuming than the test cycle itself, especially when only fast go / no go tests are performed. Occasionally, limited space requirements make tightening and torquing of coupling nuts of regular connectors difficult, if not impossible.

**PUSH-ON CONNECTORS MATING WITH REGULAR FEMALE CONNECTORS:** To eliminate the time consuming tightening, torquing and loosening of regular connectors, Spectrum Elektrotechnik GmbH developed the push-on connectors, push-on connector savers and push-on adapters. The push-on connector is a male connector and does not use a threaded coupling nut. It slides directly onto any female connector of the same series, allowing quick and easy connection and disconnection, guaranteeing repeatable performance, reduced test times and long life, operating over the full frequency range of the particular connector series with low insertion loss and excellent return loss. Push-ons were designed for series **7/16, N, TNC** and **SMA**, and in different configurations, including **full locking**, **locking with non-locking rear nut**, and **non-locking**.

**FULL LOCKING PUSH-ON 7/16, N, AND TNC:** The coupling nut of the push-on, the lock nut, incorporates an intelligent mechanism, developed by Spectrum Elektrotechnik GmbH. Easily the push-on slides onto any female connector of the same connector series, and locks safely, when released. To disconnect simply push the lock nut forward again and keep in that position until the push-on connector is removed.
There are applications where longer connection is needed and where the connector must remain locked firmly. In such instances it must be assured that the push-on cannot be discon-

nected, not even by mistake. For that purpose a threaded rear nut is employed. With the rear nut engaged the connector cannot be pulled off, not even by mistake (Exception: no full locking version available in SMA.)

**LOCKING PUSH-ON 7/16, N, TNC AND SMA WITH NON-LOCKING REAR NUT:** The push-on connector operates exactly like the full locking version, with the exception that the rear nut cannot be engaged.

**NON-LOCKING PUSH-ON 7/16, N, TNC AND SMA:** The non-locking push-on connectors are recommended for short term testing, testing that usually takes only seconds. The non-locking push-on connector does not employ a lock nut, therefore does not grip onto the thread of the mating female connector. The outer conductor is slotted and made from beryllium copper, heat treated. Its insertion/withdrawal force keeps the connector in place. However, cables, especially of bigger dimensions, may pull off the push-on connector when there is no guiding and securing hand. These non-locking push-on connectors should only be used for short term testing with a guiding hand on the connector for safe connection.

**PUSH-ON CONNECTORS SAVERS AND ADAPTERS** were developed for attachment to cable assemblies which are terminated with regular connectors. The connector saver, or adapter is supplied with a standard connector on one side, and a push-on connector at the other end. The standard connector end engages with the standard connector of opposite sex at the cable assembly. The push-on end slides directly onto any standard female of the same sex configuration. Cable assemblies are modified in seconds, changed from a standard product to a state-of-the-art push-on assembly.
Some of these push-on connector savers and adapters are also available with float mount, and are suited for axial and radial misalignment. The misalignment nature of the adapter is obtained by a spring mechanism which separates the connector interface from the flange housing and allows it to float, as needed for blind mating purposes.
Push-on connector savers and adapters are available within and between the series **7/16**, **N**, **TNC** and **SMA**. They are normally supplied in **full locking** configuration, **locking with non-locking rear nut** and **non-locking**. (Exception: no full locking version available in SMA.)

**PUSH-ON CONNECTOR SERIES BY DESIGN:** Several connector series, such as **BMA, SBX, SBY** and **SMP** were developed for a wide variety of microwave interconnect problems, mate applications for modularized packages, racks and panels and dense packaging. The connector series, depending on size and design are used for low, moderate and high power applications. They are designed for multiple interconnects, maintaining reliable performance and long life.

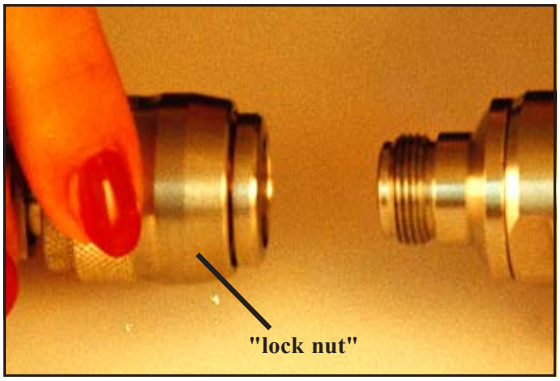
**THE BMA** is used for lower and moderate power microwave interconnect applications, mating solutions for modular packaging, interconnecting racks and panels. The BMA float mount female connectors are suited for axial and radial misalignment. The misalignment nature of the connector is obtained by a spring mechanism which separates the connector interface from the flange housing and allows it to float. BMA connectors are available for semi-rigid cables and flexible cables as well.

**THE SBX** (**S**pectrum-**B**lind Mate-**X**) connector was developed in 1993 for interconnecting high power microwave modules, using direct mount or floating rear mount, and is available as stripline connector, and as cable connector for certain standard semi-rigid cables and flexible cables as well. It operate up to 8.0 GHz. The connector is usually integrated into the housing of the component, therefore the connection normally cannot been seen from the outside. The SBX is specifically used for packaging and interconnecting those high power microwave modules, drawers and racks in state-of-the-art systems that do not allow longer system down time. Replacement of faulty high power microwave modules using the SBX can happen within seconds. The SBX float mount connectors are ideally suited for axial and radial misalignment. They employ a spring mechanism that separates the connector interface from the flange housing and allows the floating.

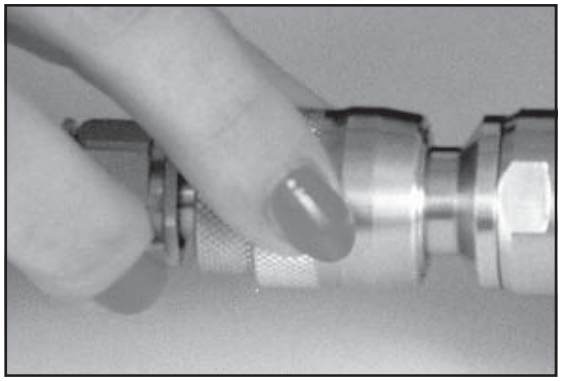
**THE SBY** (**S**pectrum-**B**lind Mate-**Y**) connector was developed in 1993 for the same program the SBX was needed and also used for interconnecting modules operating at high microwave power and is normally integrated into the housing of the component. The SBY connector is very similar to the SBX, the major difference is its smaller size and slightly different mechanical configuration. By design and due to the smaller physical dimensions it takes less power, but therefore operates to higher frequencies, namely 12.0 GHz.

**THE SMP** is a 2.4 mm connector, using solid dielectric interface. The connector is extremely small and therefore allows high density packaging. It was originally designed to permit the female connector to incline freely in direction while the mechanical and electrical connection remains maintained. The male connector is available in **smooth bore** for easy connection and disconnection, with **limited detent**, characterized by a certain insertion and withdrawal force, and with **full detent**, needing high insertion force and a substantial withdrawal force, usually requiring a tool for disconnection. The full detendet SMP connection is suitable for mobile applications, extreme shock and vibration requirements. SMP connectors are offered for applications to 18.0 GHz and 26.5 GHz, precision designs are even operating to 40.0 GHz. Spectrum´s SMP connectors are meeting interface dimensions to DESC specifications 94007 and 94008. Spectrum Elektrotechnik GmbH has developed SMP test connectors as well, and designed and manufactures SMP calibration kits. Spectrum´s SMP test connectors and calibration components are supplied with an additional thread that can be employed to ensure perfect and repeatable mating during calibration.

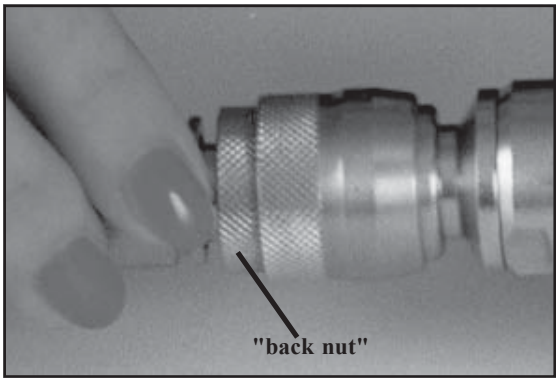
# Lockable PUSH-ONs, Handling Information



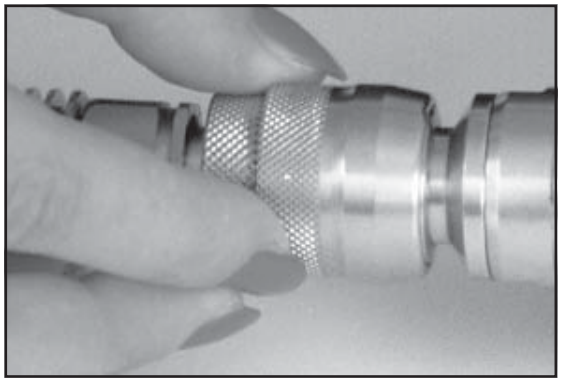

**1.** Place your fingers at the knurls of the "lock nut".



**2.** Push"lock nut" forward and engage the Push-On end of the adapter with the mating standard female. Ensure that back nut is released.

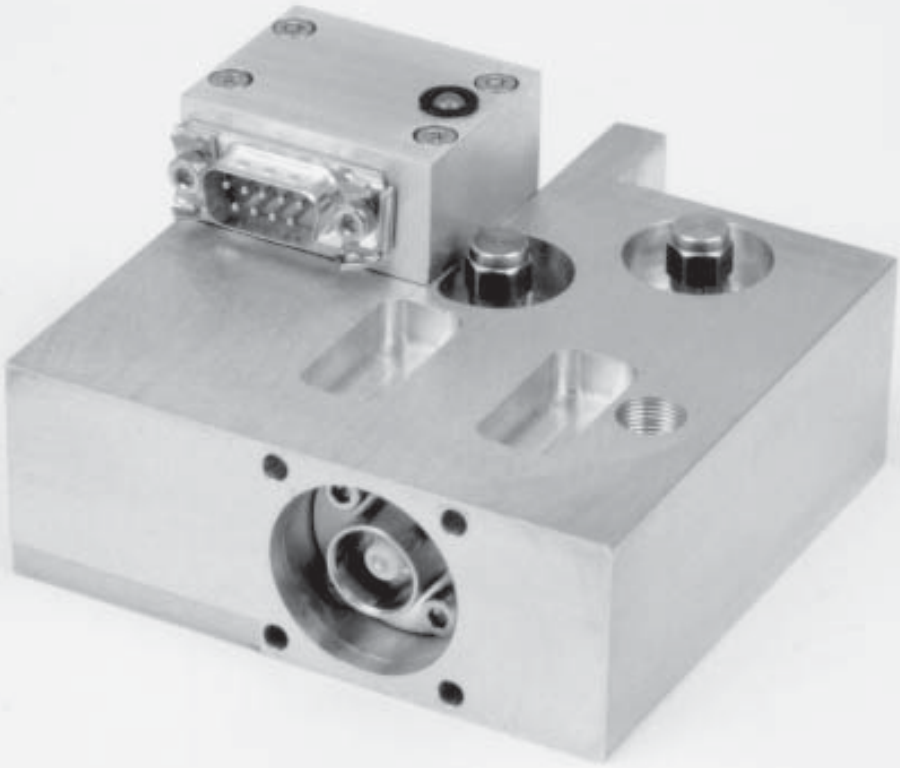



**3.** For operation in an ensured locking mode, push "back nut" onto "lock nut" and tighten.



**4.** To unlock: When "back nut" is in an unlocked mode, push "lock nut" forward and stop reverse movement by setting your fingers down onto the "back nut".

**5.** Pull the Push-On off.



# High Power Limiter, built on a modular bases, using the SBY - Connectors, Page 85

# 7/16 PUSH-ON

# 7/16 Push-On Connectors & Adapters

**PUSH-ON 7/16-TYPE CONNECTORS** eliminate time consuming tightening, torquing and loosening of 7/16-male connectors during testing or in applications where limited space requirements make tightening and torquing of a coupling nut difficult, if not impossible.

The 7/16 push-on slides directly onto any standard 7/16-female, allowing prompt connection and loosening. Three types of push-on 7/16 connectors are available: full-locking, locking with non-locking rear nut, and non-locking.

**Full Locking** push-on 7/16-Type connectors are recommended when longer testing is required and the connectors must be firmly locked so that they cannot be disconnected, even by mistake. **Locking with non-locking rear nut** 7/16-Type connectors are recommended where safe locking is necessary, but long term testing is not required. **Non-locking** push-on connectors are recommended for short period testing, testing that usually takes only seconds.

Push-On 7/16-Type connectors are available for termination with cables RG-142B/U, RG-400/U and RG-214/U. State-of-the-art high performance cables using push-on connectors are available as well, however, these high performance cable assemblies can only be purchased completely terminated; they can be found in the section "Cable Assemblies" starting on page 211 of this catalog.

**PUSH-ON 7/16-TYPE CONNECTOR SAVERS AND ADAPTERS**, were developed for attachment to cable assemblies which are terminated with regular connectors. The adapter has a standard connector on one side, and a push-on connector on the other end. The standard connector end of the adapter engages with the standard connector of the opposite sex at the cable assembly. These connnector savers and adapters modify cable assemblies in seconds, changing them from a standard product to a state-of-the-art push-on assembly.
Push-on adapters are available for a variety of connectors and both male and female sexes within the connector series. 7/16-type push-on connectors savers are supplied in **full locking**, **locking with non-locking rear nut** and **non-locking** configuration.

## FEATURES:

**REPEATABLE PERFORMANCE**
**SAFE LOCKING MECHANISM***
**REDUCED TEST TIME**

* on Full Locking and Locking Units

**LOW INSERTION LOSS**
**HIGH RETURN LOSS**
**DC-7.5 GHz**
**LONG LIFE**

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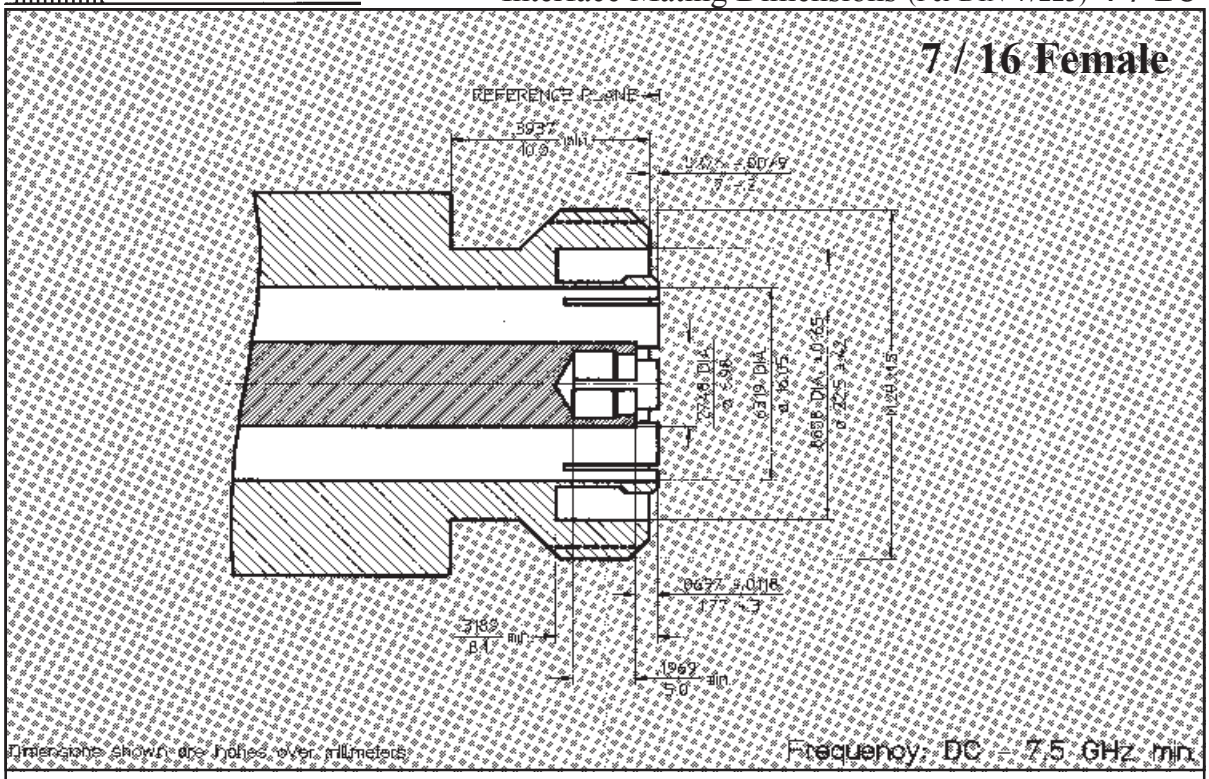
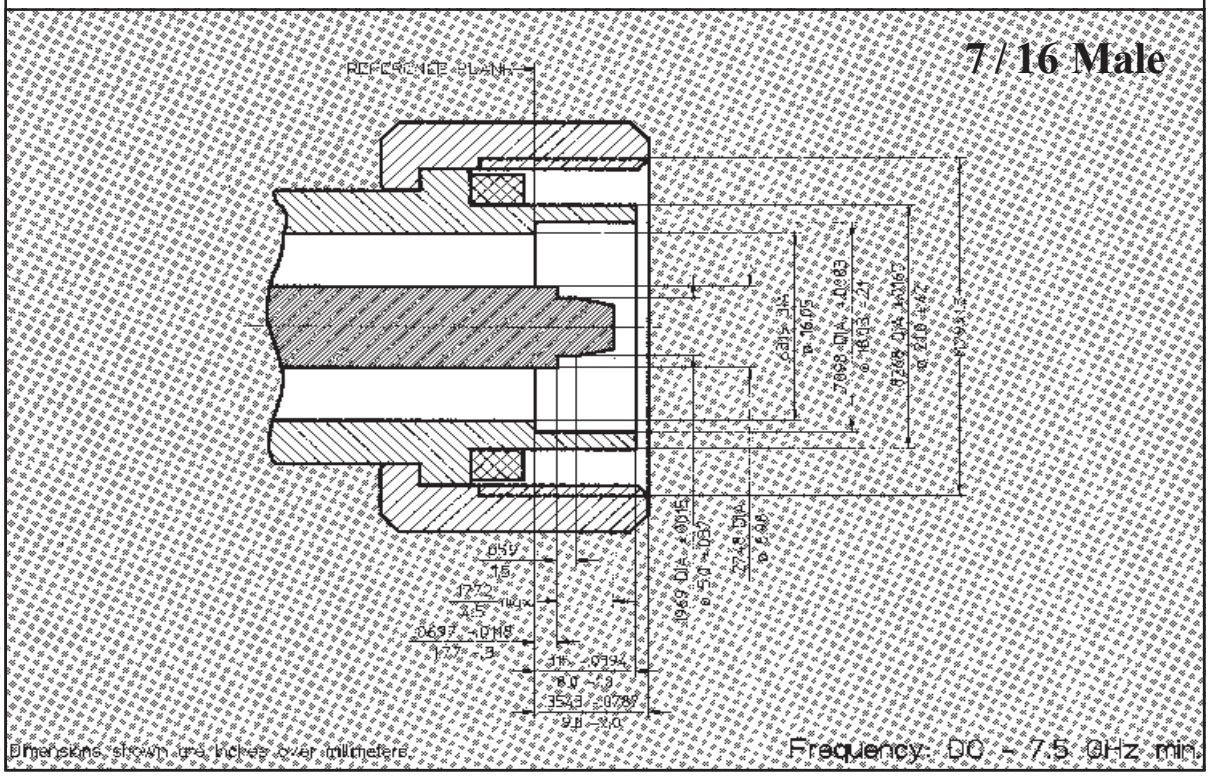
## 7 / 16 Female




## 7 / 16 Male

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# 7/16 PUSH-ON Specifications

The specifications below are general specifications for all 7/16 PUSH-ON connectors. Specifications in the following table are recommended for any procurement documents or drawings. In the event of any conflict, these specifications shall govern.The PUSH-ON Connectors were developed to eliminate the time consuming lightening, torquing and loosening of connectors during test. The connector slides directly onto any Female of the same connector style, allowing quick connecting and disconnecting. Its mechanism locks safely onto the standard thread of the Female connector.

| REQUIREMENT | | GENERAL SPECIFICATIONS |
|---|---|---|
| **GENERAL** | | |
| Standard Materials | | STEEL corrosion resistant 1.4305 per DIN 17440 (QQ-S-764, class 303 or ASTM-A-582-80).<br>ALUMINUM AlMg4.5Mn per DIN 1725, AlMgSi0.5 per DIN 1725, AlMgSi1 per DIN 1725 (6061-T6 per QQ-A-225/8).<br>BRASS CuZn39Pb3 per DIN 17660 (QQ-B-626, half hard).<br>COPPER BERYLLIUM 33-25 CuBe2Pb H per DIN 17666 (QQ-C-530).<br>TFE Fluorocarbon per DIN 52900 (MIL-P-19468 and L-P403).<br>SILICONE RUBBER per DIN 3771 (MIL-R-5847 and ZZ-R-765, Class II B,) Grade 50 - 75.<br>BORRIUM NITRITE Dielectric for high power applications per inhouse specification. |
| Finish for | COPPER BERYLLIUM | Center Contacts shall be gold plated to a minimum thickness of .00005 inch (1.27 µm) in accordance with MIL-G-45204, Type II, Grade C. Outer conductors shall be gold plated to a thickness of .00003 inch (0.8 µm) per MIL-G-45204 , Type II, Grade C, or silver plated to a thickness of .0001 inch (2.5 µm) per QQ-S-365. |
| | STAINLESS STEEL | Shall be passivated per QQ-P-35 or gold plated to a thickness of .00003 inch (0.8 µm) per MIL-G-45204, Type II, Grade C. |
| | ALUMINUM | Conductive Parts shall have an iridited finish per MIL-C-5541.<br>Other parts, such as Coupling Nuts and Back-Bodies shall be anodized per MIL-A-8625. |
| | BRASS | Gold plated to a thickness of .00003 inch (0.8 µm) min. per MIL-45204, Type II, Grade C, or nicle plated to a thickness of .0002 inch (5µm) per QQ-N-290, grade E, or silver plated to a thickness of .0001 inch (2.5 µm) per QQ-S-365. |
| | VARIOUS | Imoloy .0001 inch (2.5 µm) min. plating, consisting of 55% Copper / 20% Zinc / 25% Tin (on special request). |
| Design | | The design shall be such that the outline dimensions in this catalog are met. In addition, the assembled connector shall meet the interface dimensions. |
| **ELECTRICAL** | | |
| Frequency Range | | DC - 7.5 GHz min. |
| Insulation Resistance | | The insulation resistance shall not be less than 1.000 megohms. |
| Voltage Standing Wave Ratio (VSWR) | | 1.10 : 1 |
| Contact Resistance | | The center contact resistance drop shall not exceed 1.0 milliohms max. |
| Dielectric Withstanding Voltage | | The magnitude of the test voltage shall be 3.000 volts rms at 60 Hz. |
| RF High Potential Withstanding Voltage | | The RF high potential withstanding voltage is 4,000 volts rms at 5 MHz. |
| RF Leakage | | 90 dB max. to 3.0 GHz, -80 dB max. to 7.5 GHz |
| Insertion Loss | | 0.15 dB max. at 7.5 GHz |
| Impedance | | 50 Ohms Nominal |
| Corona Level Voltage | | 2800 Volts at 0 ft. |
| **MECHANICAL** | | |
| Connector Durability | | The connector is to be tested and its mating connector shall be subjected to 500 insertion min. Withdrawal cycles / minute are not applicable. The connector shall show no evidence of mechanical failure and the connector shall meet the mating characteristic requirements. |
| Temperature | | -55°C to +155°C |
| Force to Engage and Disengage | | The Force to Engage and Disengage is not applicable. |
| Longitudinal Force max. | | Longitudinal force is not applicable. |
| **ENVIRONMENTAL** | | |
| Corrosion (Salt Spray) | | Specification MIL-STD-202, Method 101, Test Condition B. The salt solution shall be 5%. |
| Vibration | | Specification MIL-STD-202, Method 204, Test Condition D. |
| Shock | | Specification MIL-STD-202, Method 213, Test Condition I. |
| Thermal Shock | | Specification MIL-STD-202, Method 107, Test Condition B, except high temperature shall be + 200°C. |
| Moisture Resistance | | Specification MIL-STD-202, Method 106. Step 7b (vibration) shall be omitted. Insulation resistance shall be 200 megohms min. within 5 minutes of removal from humidity. |

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# 7/16 PUSH-ON

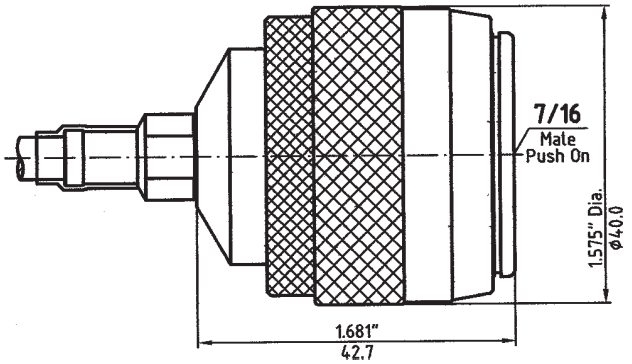
Spectrum Elektrotechnik GmbH

## Full Locking

DC - 7.5 GHz

| Connector Part No. | Flexible Cable Type | Cable Code | Connector Code |
|---|---|---|---|
| 7515-7S01-02 | RG-142B/U | 42 | 7S |
| 7515-7S02-02 | RG-400/U | 40 | |
| 7517-7S01-02 | RG-214/U | 21 | |

Connector outer conductor is passivated stainless steel. Center conductor is gold or/and silver plated.

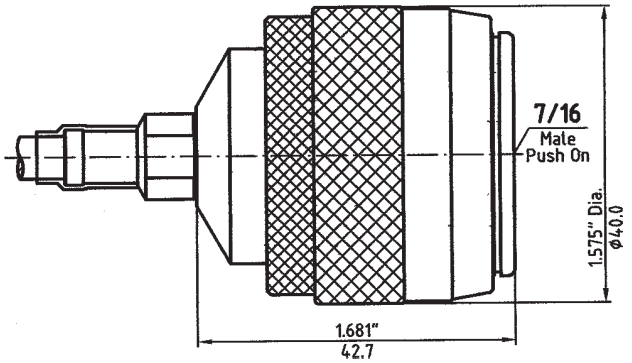



## Full Locking

DC - 7.5 GHz

| Connector Part No. | Flexible Cable Type | Cable Code | Connector Code |
|---|---|---|---|
| 7515-7SB1-13 | RG-142B/U | 42 | 7SB |
| 7515-7SB2-13 | RG-400/U | 40 | |
| 7517-7SB1-13 | RG-214/U | 21 | |

Connector outer conductor is brass silver plated for lower intermodulation products. Center conductor is gold or/and silver plated.Remaining parts are stainless steel for ruggedness.

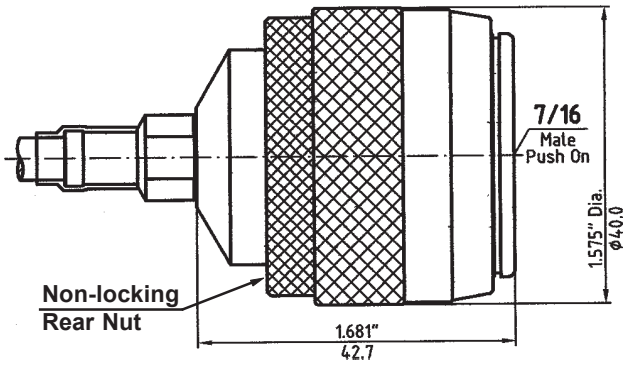



DC - 7.5 GHz

## Locking with Non-locking Rear Nut

| Connector Part No. | Flexible Cable Type | Cable Code | Connector Code |
|---|---|---|---|
| 7515-7R01-02 | RG-142B/U | 42 | 7R |
| 7515-7R02-02 | RG-400/U | 40 | |
| 7517-7R01-02 | RG-214/U | 21 | |

Connector outer conductor is passivated stainless steel. Center conductor is gold or/and silver plated.

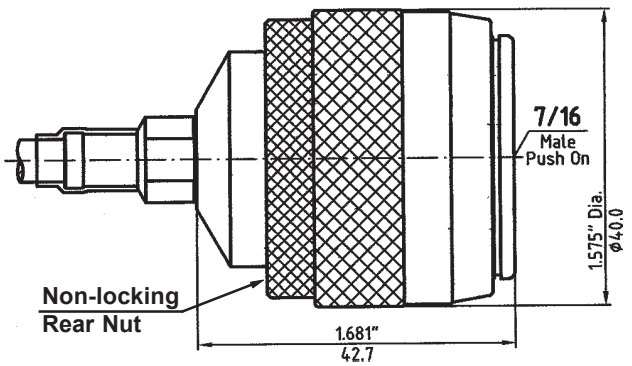



DC - 7.5 GHz

## Locking with Non-locking Rear Nut

| Connector Part No. | Flexible Cable Type | Cable Code | Connector Code |
|---|---|---|---|
| 7515-7RB1-13 | RG-142B/U | 42 | 7RB |
| 7515-7RB2-13 | RG-400/U | 40 | |
| 7517-7RB1-13 | RG-214/U | 21 | |

Connector outer conductor is brass silver plated for lower intermodulation products. Center conductor is gold or/and silver plated.Remaining parts are stainless steel for ruggedness.

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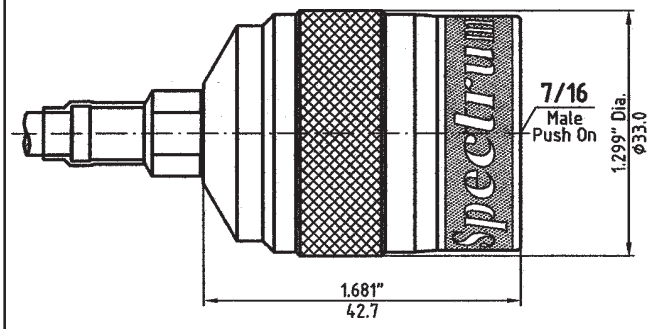
# PUSH-ON Connectors, Type 7/16

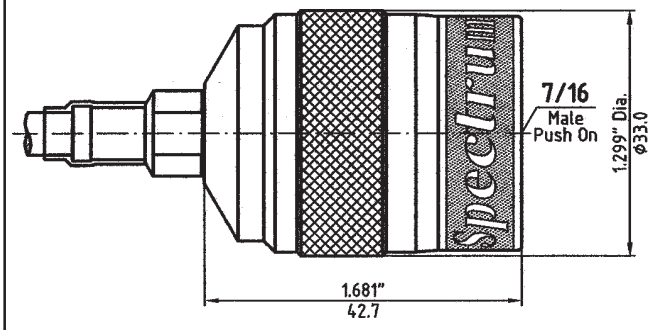



DC - 7.5 GHz

## NON Locking

| Connector Part No. | Flexible Cable Type | Cable Code | Connector Code |
|---|---|---|---|
| 7515-7N01-02 | RG-142B/U | 42 | 7N |
| 7515-7N02-02 | RG-400/U | 40 | |
| 7517-7N01-02 | RG-214/U | 21 | |

Connector outer conductor is passivated stainless steel. Center conductor is gold or/and silver plated.




DC - 7.5 GHz

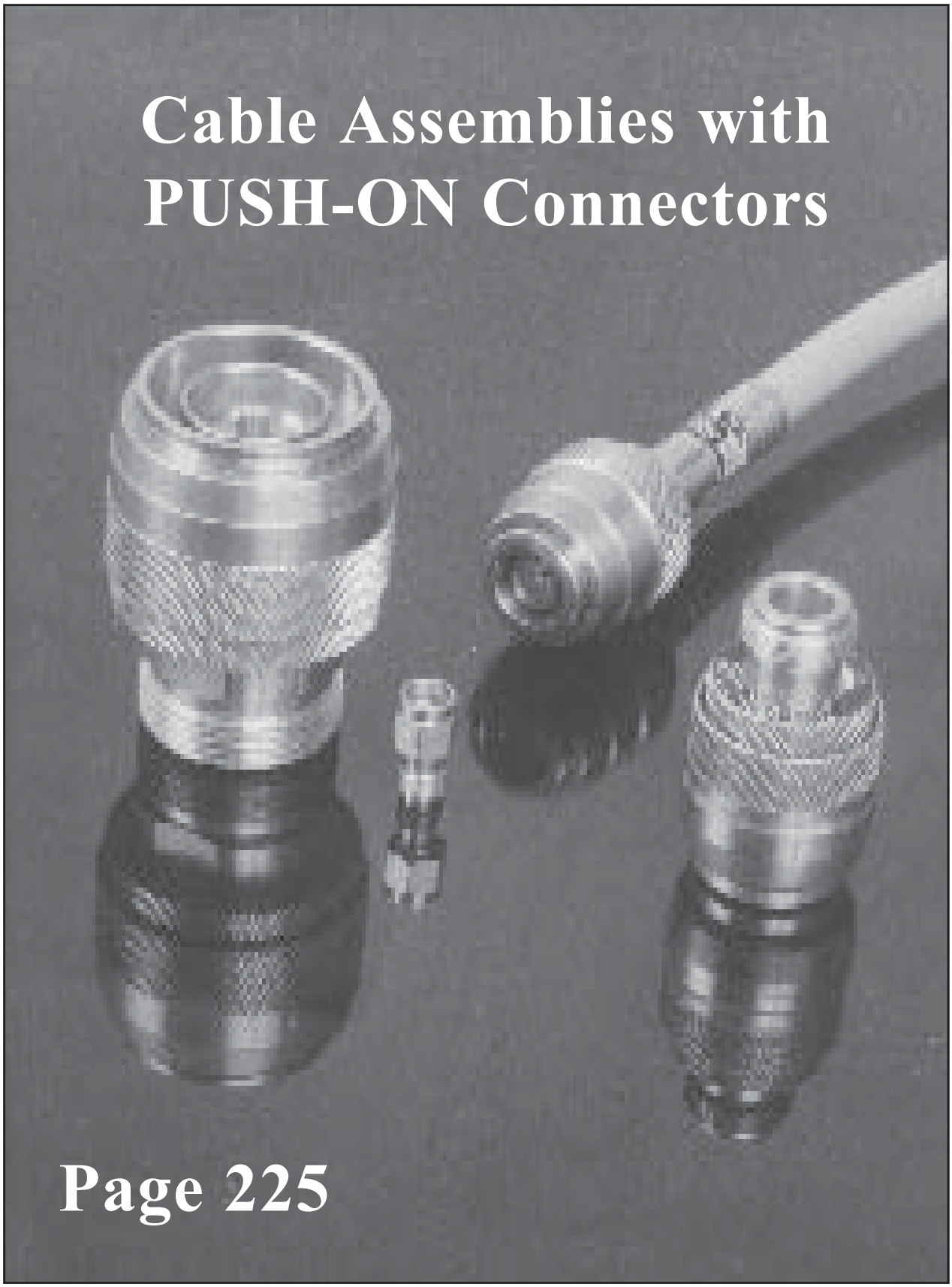
## NON Locking

| Connector Part No. | Flexible Cable Type | Cable Code | Connector Code |
|---|---|---|---|
| 7515-7NB1-13 | RG-142B/U | 42 | 7NB |
| 7515-7NB2-13 | RG-400/U | 40 | |
| 7517-7NB2-13 | RG-214/U | 21 | |

Connector outer conductor is brass silver plated for lower intermodulation products. Center conductor is gold or/and silver plated.Remaining parts are stainless steel for ruggedness.

Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per DIN 47223. For details please refer to the beginning of this section.

# Cable Assemblies with PUSH-ON Connectors



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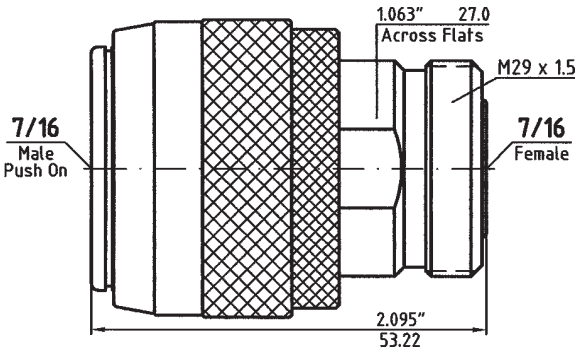
# 7/16 PUSH-ON

## Full Locking

| Adapter Part No. | 8001-7S76-02 |
|---|---|
| Connector Config. | 7/16 Push-On to 7/16-f |
| Frequency Range | DC to 7.5 GHz |
| VSWR | 1.10 : 1 max. |

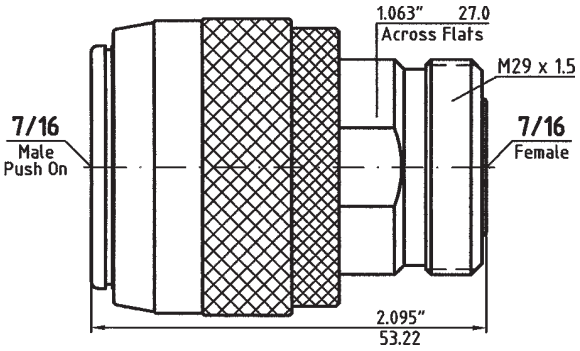
Connector outer conductor is passivated stainless steel. Center conductor is gold or/and silver plated.




## Full Locking

| Adapter Part No. | 8001-7S76-13 |
|---|---|
| Connector Config. | 7/16 Push-On to 7/16-f |
| Frequency Range | DC to 7.5 GHz |
| VSWR | 1.10 : 1 max. |

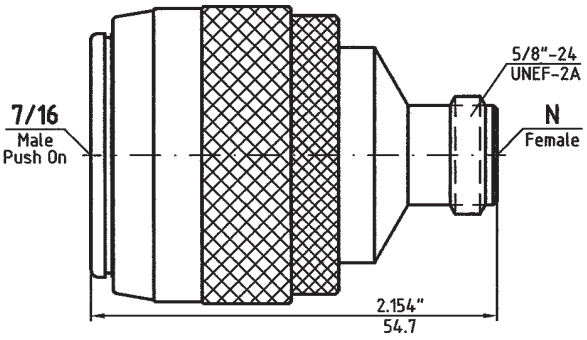
Connector outer conductor is brass silver plated for lower intermodulation products. Center conductor is gold or/and silver plated.Remaining parts are stainless steel for ruggedness.




## Full Locking

| Adapter Part No. | 8001-7S61-02 |
|---|---|
| Connector Config. | 7/16 Push-On to N-f |
| Frequency Range | DC to 7.5 GHz |
| VSWR | 1.10 : 1 max. |

Connector outer conductor is passivated stainless steel. Center conductor is gold or/and silver plated.




Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per MIL-C 39012, MIL-C-87104/2, MIL-C-3643, MIL-STD-348, IEC-169-7, IEC-457-2, DIN 47 223, DIN 47 226, DIN 47 298, where applicable. For details please refer to the beginning of this section.

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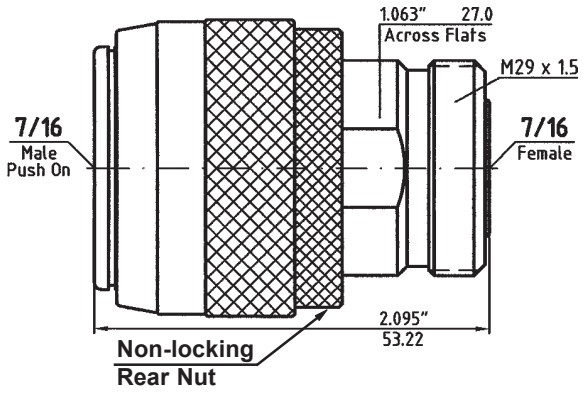
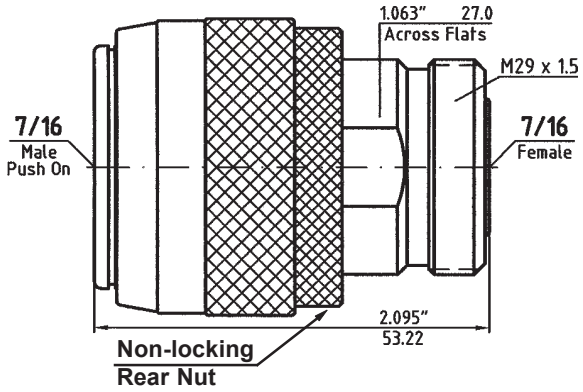



## Locking with Non-locking Rear Nut

| Adapter Part No. | 8001-7R76-02 |
|---|---|
| Connector Config. | 7/16 Push-On to 7/16-f |
| Frequency Range | DC to 7.5 GHz |
| VSWR | 1.10 : 1 max. |

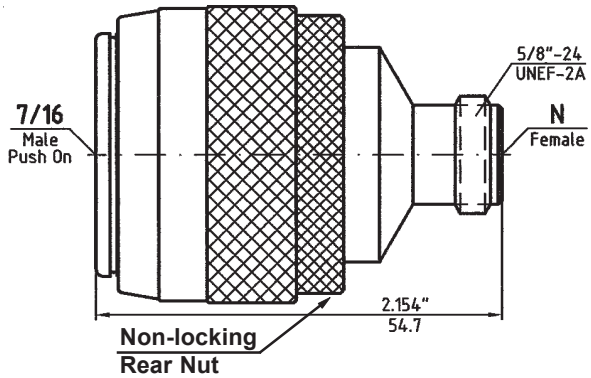
Connector outer conductor is passivated stainless steel. Center conductor is gold or/and silver plated.




## Locking with Non-locking Rear Nut

| Adapter Part No. | 8001-7R76-13 |
|---|---|
| Connector Config. | 7/16 Push-On to 7/16-f |
| Frequency Range | DC to 7.5 GHz |
| VSWR | 1.10 : 1 max. |

Connector outer conductor is brass silver plated for lower intermodulation products. Center conductor is gold or/and silver plated.Remaining parts are stainless steel for ruggedness.




## Locking with Non-locking Rear Nut

| Adapter Part No. | 8001-7R61-02 |
|---|---|
| Connector Config. | 7/16 Push-On to N-f |
| Frequency Range | DC to 7.5 GHz |
| VSWR | 1.10 : 1 max. |

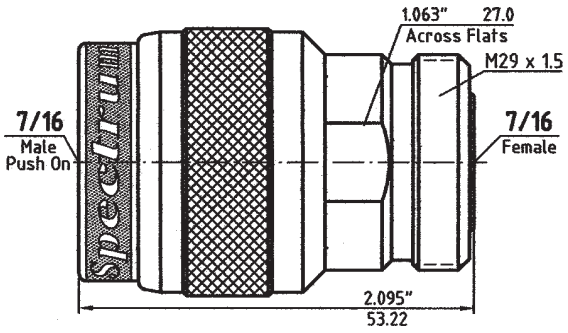
Connector outer conductor is passivated stainless steel. Center conductor is gold or/and silver plated.

Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per MIL-C 39012, MIL-C-87104/2, MIL-C-3643, MIL-STD-348, IEC-169-7, IEC-457-2, DIN 47 223, DIN 47 226, DIN 47 298, where applicable. For details please refer to the beginning of this section.

## NON Locking

| Adapter Part No. | 8001-7N76-02 |
|---|---|
| Connector Config. | 7/16 Push-On to 7/16-f |
| Frequency Range | DC to 7.5 GHz |
| VSWR | 1.10 : 1 max. |

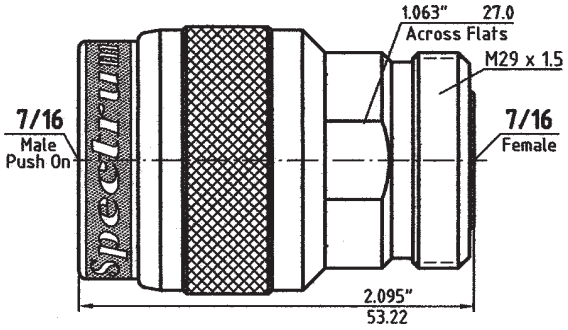
Connector outer conductor is passivated stainless steel.
Center conductor is gold or/and silver plated.




## NON Locking

| Adapter Part No. | 8001-7N76-13 |
|---|---|
| Connector Config. | 7/16 Push-On to 7/16-f |
| Frequency Range | DC to 7.5 GHz |
| VSWR | 1.10 : 1 max. |

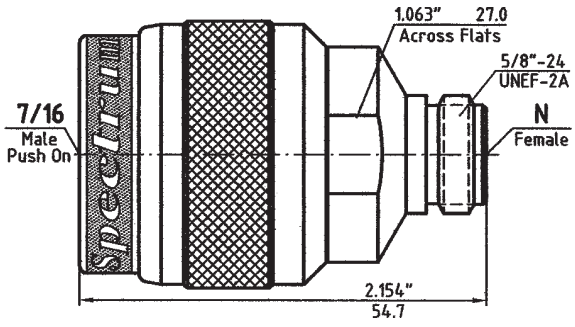
Connector outer conductor is brass silver plated for lower intermodulation products. Center conductor is gold or/and silverplated.Remaining parts are stainless steel for ruggedness.




## NON Locking

| Adapter Part No. | 8001-7N61-02 |
|---|---|
| Connector Config. | 7/16 Push-On to N-f |
| Frequency Range | DC to 7.5 GHz |
| VSWR | 1.10 : 1 max. |

Connector outer conductor is passivated stainless steel.
Center conductor is gold or/and silver plated.




Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per MIL-C 39012, MIL-C-87104/2, MIL-C-3643, MIL-STD-348, IEC-169-7, IEC-457-2, DIN 47 223, DIN 47 226, DIN 47 298, where applicable. For details please refer to the beginning of this section.

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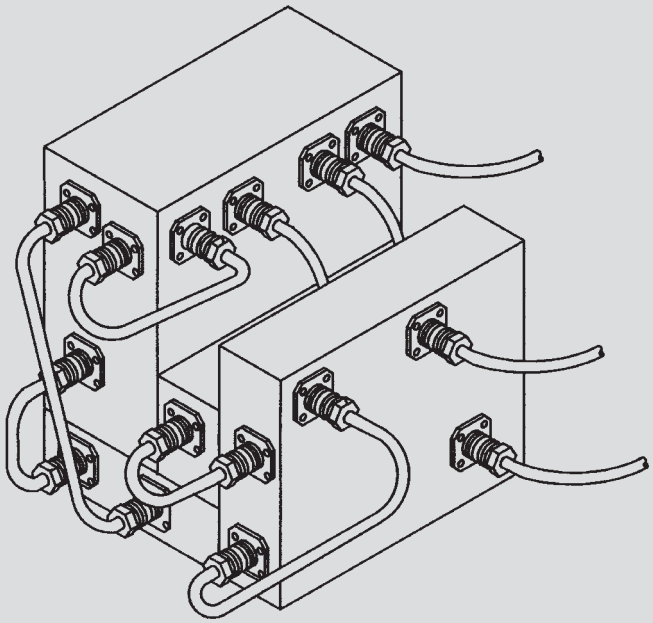
# BMA



# BMA Applications & Features

**BMA** (**B**lind **M**ate-**A**) push-on connectors were developed for interconnecting microwave modules, using direct mount or floating rear mount. They were created almost 30 years ago and are used in several programs. Today they are mostly replaced by the newer push-on connector designs. **BMA** connectors meet microwave requirements, combined with the multiple interconnecting option. The connectors can be integrated into, or attached to the housing of the component. **BMA** connectors are used for packaging and interconnecting those power microwave modules, drawers and racks in state-of-the-art systems that do not allow longer system down time. **BMA** push-on connectors allow replacement of faulty high power microwave modules within seconds. To secure the modules, a typical method of interlocking is using lock screws.

**BMA** (**B**lind **M**ate-**A**) female connectors are available, offering radial misalignment with the mating plug connector. A spring mechanism separates the connector interface from the flange housing and allows floating for blind mating purposes.

**BMA** (**B**lind **M**ate-**A**) connectors are designed for moderate power at higher frequencies, operating to 22.0 GHz.

**BMA** (**B**lind **M**ate-**A**) connectors are also available as cable connectors for several standard **semi-rigid** cables, **low density semi-rigid** cables, standard **flexible** cables and **low density flexible** cables. The availability of **BMA** connectors allows easy interconnection of microwave components. Standard units are available in bulkhead or panel mount designs for solder and/or compression clamp attachment. Female cable connectors can be obtained in float or rigid mount. **BMA** float mount connectors are ideally suited for axial and radial misalignment. They employ a spring mechanism that separates the connector interface from the flange housing and allows the floating. Radial float mount connectors are used for applications requiring a radial misalignment of more than +/- 0.02 inches (0.5mm).

Test equipment is usually not supplied with **BMA** test port connectors. Therefore an adequate number of between series instrument grade adapters to other important connector series are available, such as N and SMA.

Spectrum Elektrotechnik GmbH is a very innovative company, offering special services in engineering in order to meet the customer's needs to perfection.
Spectrum Elektrotechnik GmbH has developed the **SBX** (**S**pectrum-**B**lind Mate-**X**) push-on connectors and the the **SBY** (**S**pectrum-**B**lind Mate-**Y**) push-on connectors for interconnecting high power microwave modules, using direct mount or floating rear mount.
Spectrum Elektrotechnik GmbH manufactures the **SMP** (**S**ub-**M**iniature-**P**ush-On) connector, which is a 2.4 mm connector, using solid dielectric interface. And Spectrum has developed calibration kits for the SMP connector series to be used with the ANA´s of HP and Wiltron.

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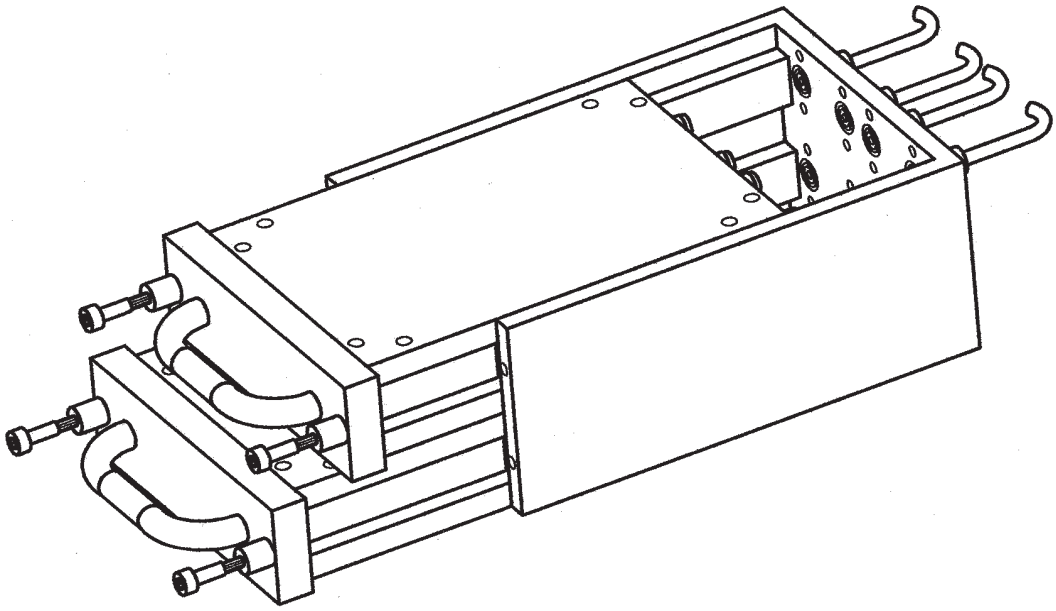
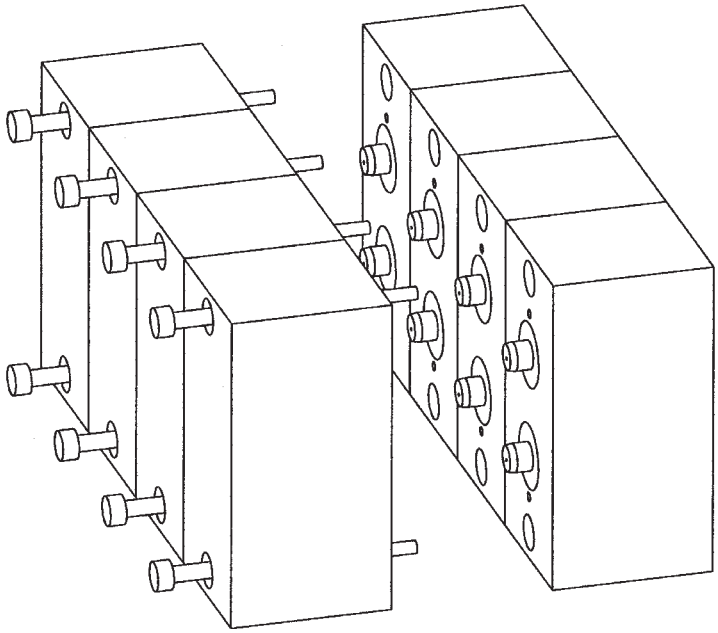
# Applications & Features, Type BMA

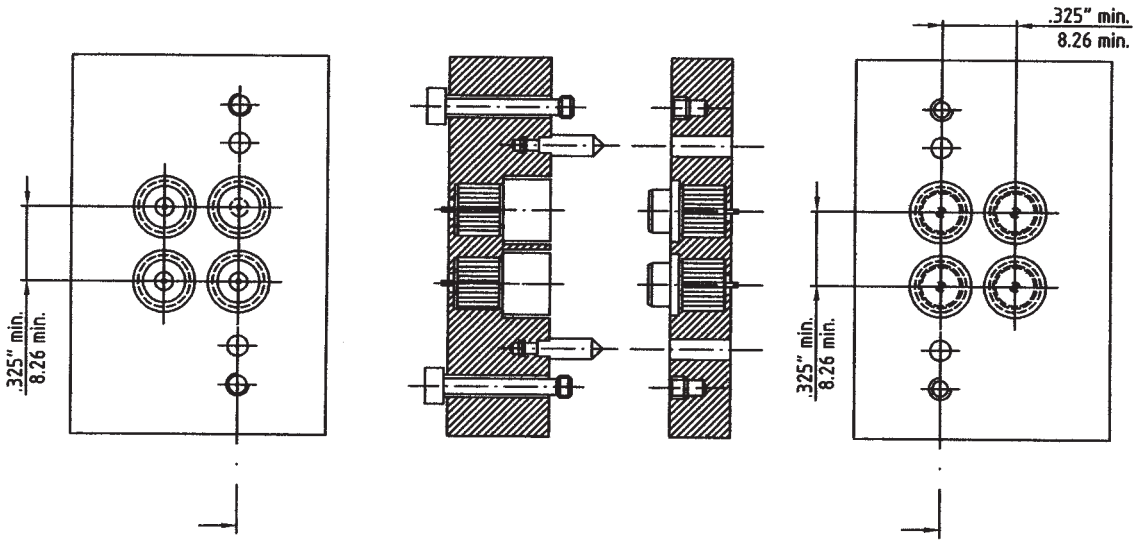
When using blind mate connectors in an application, careful consideration has to be given to choosing the right connector series, the appropriate connector model within that series, and the correct mounting features. Spectrum Elektrotechnik Gmbh does offer besides the **BMA** series, also **SBX**, **SBY** and **SMP** blind mate connectors, and all those series are shown in this Handbook. This makes it easy for the customer to identify the best connector or connectors for his system. A system also may use several or all of the blind mate connectors offered. Important parameters for identifying the proper connector and its series are:

* **Power requirement**
* **Operating frequency**
* **Rigid or float mount connectors**
* **Connector-to-connector fixed tolerances**
* **Connector-to-connector float tolerances**
* **Mating forces**
* **Float mount spring loading**
* **Connector packaging density in multiple connector arrays**
* **Panel deflection**





For applications such as modularized MIC to MIC packages, rigid mount connectors are recommended, as dense packaging is usually required, and relatively tight tolerances can be held. The axial and radial float tolerances of the BMA interface is used to accommodate misalignment. A typical method of interlocking modules is using jack screws, as shown.

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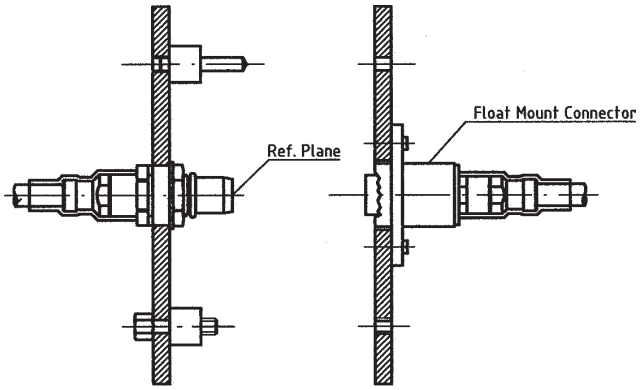
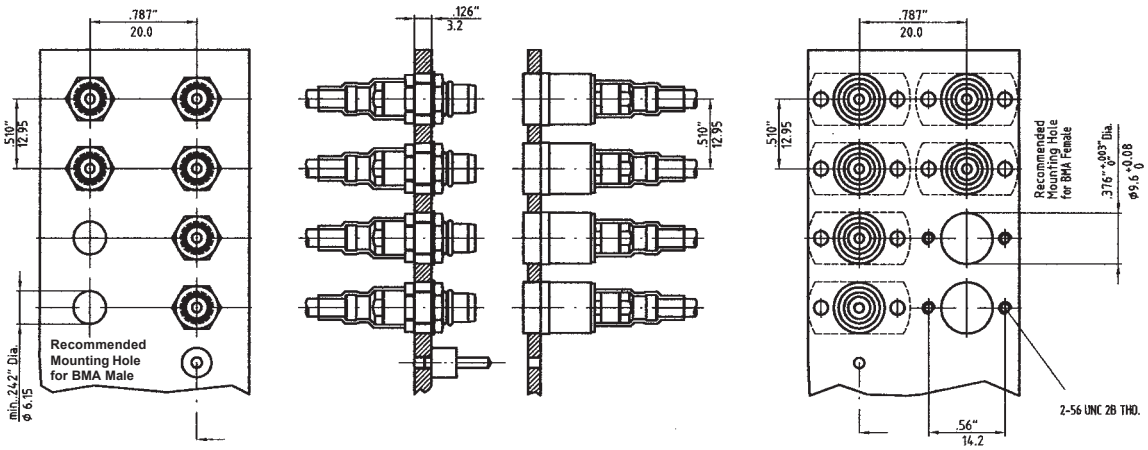



**BMA** (**B**lind **M**ate-**A**) female connectors are available, offering radial misalignment with the mating plug connector. A spring mechanism separates the connector interface from the flange housing and allows floating for blind mating purposes. The spring mechanism is aligning the mating connectors, therefore the forces are transmitted to the mounting panel. Under extreme mismatch conditions the mating forces can be considerably high when using several connectors. This can cause bowing of the mounting panel.




The possible packaging of an array of float mount BMA connectors is illustrated above. The typical method of interlocking modules by using jack screws, is demonstrated as well.

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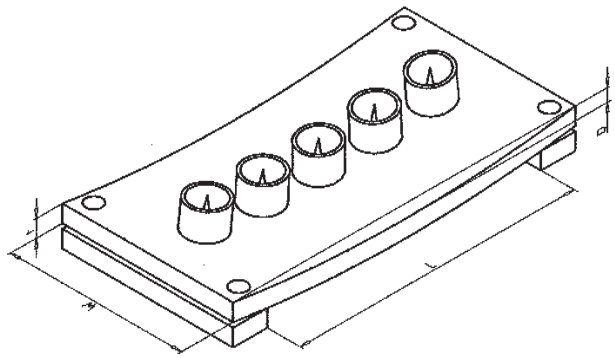
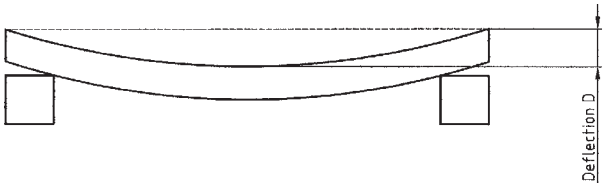
When using several BMA blind mate connectors at a component, on a module to motherboard or rack or panel application, the design must take into consideration the interface mating forces to engage and disengage the connectors, and the spring pre-load forces in floating mount cases.Disregarding this, distortion of mounting plates and panels can occur, preventing proper mating of the connectors, resulting into degraded performance of the component. Considering the panel or motherboard as a beam under deflection can be used as a good approximation for calculating the amount of distortion or bowing. But it has to be noted that the formulas and tables given below and to the right are not taken into consideration when forces are being applied from different angles, or operation in the event of additional stress because of the occurrence of multiple forces.






**Material Properties**

| Material | Yield Strength $R_y$ | | Modulus of Elasticity E | |
|---|---|---|---|---|
| | PSI | N/mm² | PSI | N/mm² |
| Al Mg 3 | 10,200...14,500 | 70 ... 100 | 10.3 x $10^6$ | 71,000 |
| Al Mg 4.5 Mn | 18,100 | 125 | 10.2 x $10^6$ | 70,000 |
| Al Mg Si 0.5 | 23,200 | 160 | 10.2 x $10^6$ | 70,000 |
| Al Mg Si 1 | 16,000...37,000 | 110...255 | 10.2 x $10^6$ | 70,000 |
| Al Mg Si Pb | 40,000 | 275 | 10.2 x $10^6$ | 70,000 |
| | | | | |
| X5 CrNi 18 9 (1.4301) | 50,800 | 350 | 30.5 x $10^6$ | 210,000 |
| X12 CrNiS 18 8 (1.4305) | 58,100 | 400 | 30.5 x $10^6$ | 210,000 |
| X10 CrNiMoTi 18 10 (1.4571) | 138,000 | 950 | 30.5 x $10^6$ | 210,000 |
| | | | | |
| Fe 360 B (St 37-2) | 34,100 | 235 | 30.5 x $10^6$ | 210,000 |
| Fe 590-2 (St 60-2) | 48,600 | 335 | 30.5 x $10^6$ | 210,000 |

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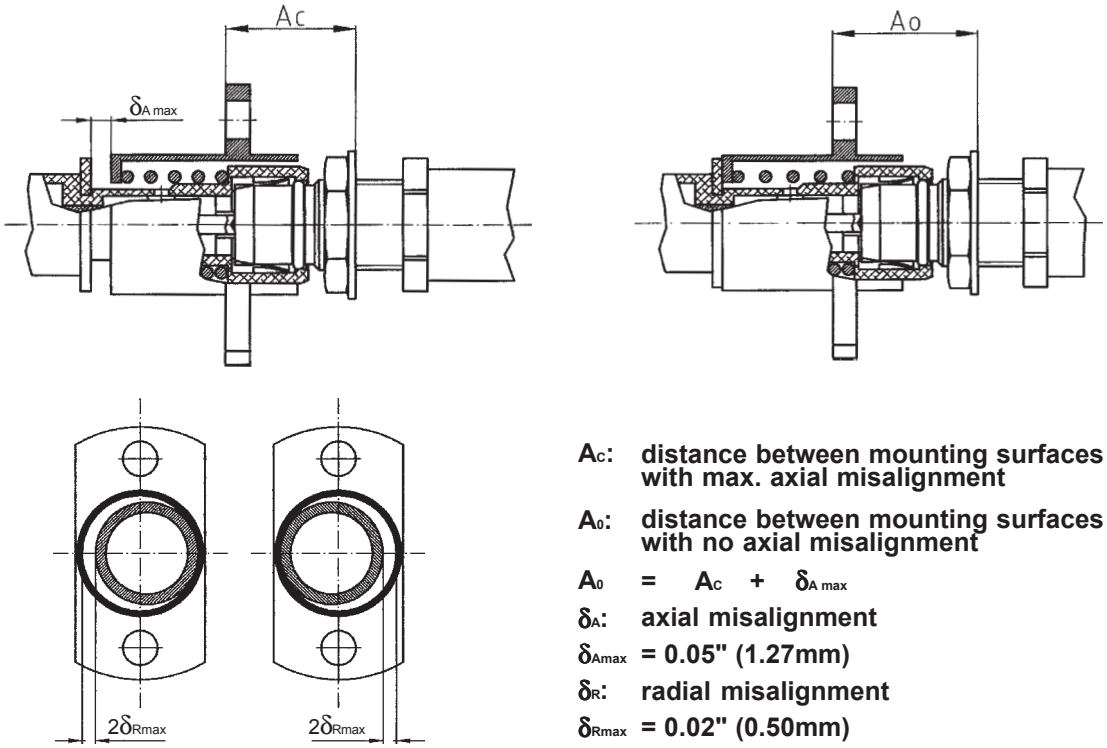



**$A_C$: distance between mounting surfaces with max. axial misalignment**

**$A_0$: distance between mounting surfaces with no axial misalignment**

**$A_0 = A_C + \delta_{A\,max}$**

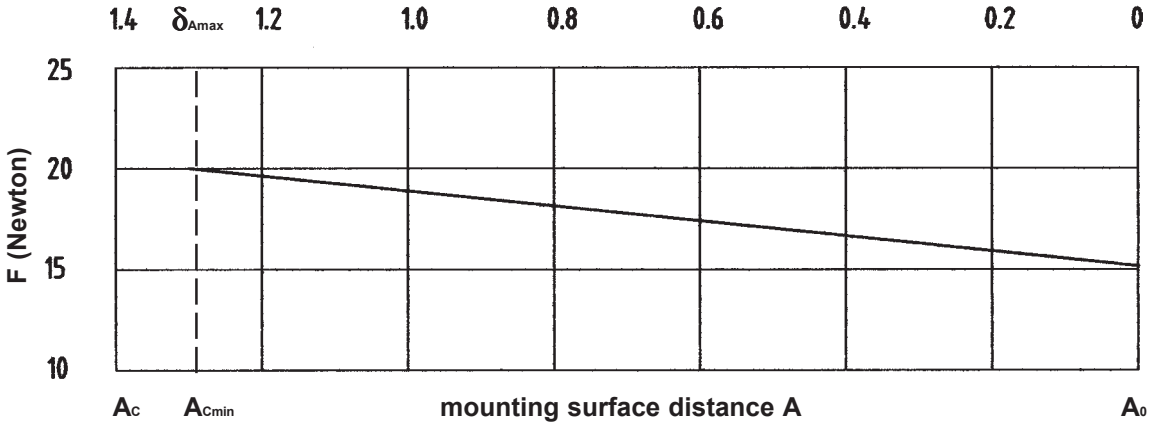
**$\delta_A$: axial misalignment**

**$\delta_{Amax}$ = 0.05" (1.27mm)**

**$\delta_R$: radial misalignment**

**$\delta_{Rmax}$ = 0.02" (0.50mm)**

**BMA** (**B**lind **M**ate-**A**) female connectors are available, offering radial misalignment with the mating plug connector. A spring mechanism separates the connector interface from the flange housing and allows floating for blind mating purposes. The spring mechanism is aligning the mating connectors, therefore the forces are transmitted to the mounting panel. Under extreme mismatch conditions the mating forces can be considerably high when using several connectors. This can cause bowing of the mounting panel.



| | Formulae | |
|---|---|---|
| **Ultimate Moment of Resistance** $M_u \left[mm^3\right]$ | $M_u = \frac{wt^2}{6}$ | **w** = width of the panel [mm]<br>**t** = thickness of the panel[mm] |
| **Moment of a Beam** $I \left[mm^3\right]$ | $I = \frac{wt^3}{12}$ | **w** = width of the panel mm]<br>**t** = thickness of the panel [mm] |
| **Maximum Deflection** $D \left[mm\right]$ | $D < \frac{\Sigma F_D L^3}{48 E I}$ | $\Sigma F_D$ = Sum of all forces applied to the plate [N]<br>**L** = Length of the panel [mm]<br>**E** = Modulus of Elasticity $\left[\frac{N}{mm^2}\right]$<br>**I** = Moment of Inertia [mm⁴] |
| **Ultimate Tensile Stress** $O \left[\frac{N}{mm^2}\right]$ | $O < \frac{\Sigma F_D L}{4 M_u}$<br>The tensile stress must be less than the yield strength. | $\Sigma F_D$ = Sum of all forces applied to the panel [N]<br>**L** = Length of the panel [mm]<br>$M_u$ = Ultimate Moment of Resistance [mm³] |

## EXAMPLE, USING 4 PIECES FLOAT MOUNT BMA CONNECTORS:

**Mating Force of BMA: 3.4 N** $\Sigma F_{M(4\ connectors)} = 4 \times 3.4N = 13.6\ N$

But: The maximum force for 1.27 mm axial misalignement, which is the maximum possible displacement, reads 20N, as shown in the diagram on page 33. Therefore the greater displacement force will be used in the following calculations instead:

**Max. Displacement Force of BMA: 20.0 N** $\Sigma F_{D(4\ connectors)} = 4 \times 20N = 80\ N$

**Aluminum mounting panel of Al Mg Si 0.5:** $L \times w \times t = 100mm \times 12.7mm \times 6.35mm.$

**Modulus of Elasticity:** $E = 70{,}000\ N/mm^2$

**Yield Strength:** $R_y = 160\ N/mm^2$, as shown in the table.

**UltimateMoment of Resistance:** $M_u = \frac{wt^2}{6} = \frac{12.7mm \times (6.35mm)^2}{6} = 85.3\ mm^2$

**Moment of a Beam:** $I = \frac{wt^3}{12} = \frac{12.7mm \times (6.35mm)^3}{12} = 271.0\ mm^4$

**Maximum Deflection:** $D < \frac{\Sigma F_D L^3}{48 E I} = \frac{80.0N \times (100mm)^3}{48 \times 70{,}000N/mm^2 \times 271.0mm^4} = 0.09\ mm$

**Ultimate Tensile Stress:** $O < \frac{\Sigma F_D L}{4 M_U} = \frac{80.0N \times 100mm}{4 \times 85.3\ mm^3} = 23.4\ N/mm^2$

The maximum deflection calculated in this example is less than the max. allowable axial misalignment of 1.27mm, as allowed by definition for the BMA float mount. Additional, in the calculation it is assumed that the forces of all 4 connectors are applying in the center of the panel. Therefore additional forces, as contributed by radial misalignment, transverse and shearing forces may be disregarded. The use of the panel choosen in this example for 4 BMA´s seems to be very safe for this application.

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# Specifications, Type BMA

The specifications below are general specifications for all BMA connectors. Specific Data for VSWR, Insertion loss, R.F. leakage etc., are available from the factory upon request. Specifications in the following table are recommended for any procurement documents or drawings. In the event of any conflict between these specifications and other documentation, these specifications shall govern. These specifications are subject to change according to the latest revision.

| REQUIREMENT | | GENERAL SPECIFICATIONS |
|---|---|---|
| **GENERAL** | | |
| Standard Materials | | STEEL corrosion resistant 1.4305 per DIN 17440 (QQ-S-764, class 303 or ASTM-A-582-80).<br>ALUMINUM AlMg4.5Mn per DIN 1725, AlMgSi0.5 per DIN 1725, AlMgSi1 per DIN 1725 (6061-T6 per QQ-A-225/8).<br>BRASS CuZn39Pb3 per DIN 17660 (QQ-B-626, half hard).<br>COPPER BERYLLIUM 33-25 CuBe2Pb H per DIN 17666 (QQ-C-530).<br>TFE Fluorocarbon per DIN 52900 (MIL-P-19468 and L-P403).<br>SILICONE RUBBER per DIN 3771 (MIL-R-5847 and ZZ-R-765, Class II B,) Grade 50 - 75.<br>BORRIUM NITRITE Dielectric for high power applications per inhouse specification. |
| Finish for | COPPER BERYLLIUM | Center Contacts shall be gold plated to a minimum thickness of .00005 inch (1.27 µm) in accordance with MIL-G-45204, Type II, Grade C. Outer conductors shall be gold plated to a thickness of .00003 inch (0.8 µm) per MIL-G-45204 , Type II, Grade C, or silver plated to a thickness of .0001 inch (2.5 µm) per QQ-S-365. |
| | STAINLESS STEEL | Shall be passivated per QQ-P-35 or gold plated to a thickness of .00003 inch (0.8 µm) per MIL-G-45204, Type II, Grade C. |
| | ALUMINUM | Conductive Parts shall have an iridited finish per MIL-C-5541.<br>Other parts, such as Coupling Nuts and Back-Bodies shall be anodized per MIL-A-8625. |
| | BRASS | Gold plated to a thickness of .00003 inch (0.8 µm) min. per MIL-45204, Type II, Grade C, or nicle plated to a thickness of .0002 inch (5µm) per QQ-N-290, grade E, or silver plated to a thickness of .0001 inch (2.5 µm) per QQ-S-365. |
| | VARIOUS | Imoloy .0001 inch (2.5 µm) min. plating, consisting of 55% Copper / 20% Zinc / 25% Tin (on special request). |
| Design | | The design shall be such that the outline dimensions in this catalog are met. In addition, the assembled connector shall meet the interface dimensions. |
| **ELECTRICAL** | | |
| Frequency Range | | DC - 22.0 GHz min. |
| Insulation Resistance | | The insulation resistance shall not be less than 5.000 megohms. |
| Voltage Standing Wave Ratio (VSWR) | | 1.05 + 0.009 * f (GHz) |
| Contact Resistance | | The center contact resistance drop shall not exceed 2.0 milliohms and the outer contact resistance drop shall not exceed 2.0 milliohms. |
| Dielectric Withstanding Voltage | | The magnitude of the test voltage shall be 1.000 volts rms at sea level. |
| RF High Potential Withstanding Voltage | | The RF high potential withstanding voltage is 1.000 volts rms at 5 MHz. Leakage is not applicable. |
| RF Leakage | | RF Leakage is not applicable |
| Insertion Loss | | (.05 SQT(f(GHz))) dB |
| **MECHANICAL** | | |
| Connector Durability | | The connector is to be tested and its mating connector shall be subjected to 500 insertion min. Withdrawal cycles / minute are not applicable. The connector shall show no evidence of mechanical failure and the connector shall meet the mating characteristic requirements. |
| Cable Retention Force | | 6 pounds (26.7 N) min. |
| Coupling Nut Retention Force | | Not applicable for Female connectors. For male connectors, the axial force is 6 lbs (26,7 N) max. |
| Force to Engage and Disengage | | The torque required to engage shall not exceed 3 lbs. (13.4 N). The disengage force shall not exceed 1.5 lbs. (6.7 N) max. |
| Mating Characteristics | | See interface dimensions shown on next page. Applicable to Females only: oversize pin .0373 inch (0.09 mm) max. dia., .045inch (1.15 mm) deep; insertion force max. with min. dia. pin is not applicable; withdrawal force 1.0 oz (2.8 N) min. with .0355 inch (0.9 mm) max. dia. pin. |
| Recommended Mating Torque | | Recommended Mating Torque is not applicable. |
| **ENVIRONMENTAL** | | |
| Corrosion (Salt Spray) | | Specification MIL-STD-202, Method 101, Test Condition B. The salt solution shall be 5%. |
| Vibration | | Specification MIL-STD-202, Method 204, Test Condition D. |
| Shock | | Specification MIL-STD-202, Method 213, Test Condition I. |
| Thermal Shock | | Specification MIL-STD-202, Method 107, Test Condition B, except high temperature shall be + 200°C. |
| Moisture Resistance | | Specification MIL-STD-202, Method 106. Step 7b (vibration) shall be omitted. Insulation resistance shall be 200 megohms min. within 5 minutes of removal from humidity. |
| Corona Level | | The connector shall not exhibit breakdown (corona) when the applied voltage is 335 volts rms and the altitude is 70.000 feet. |

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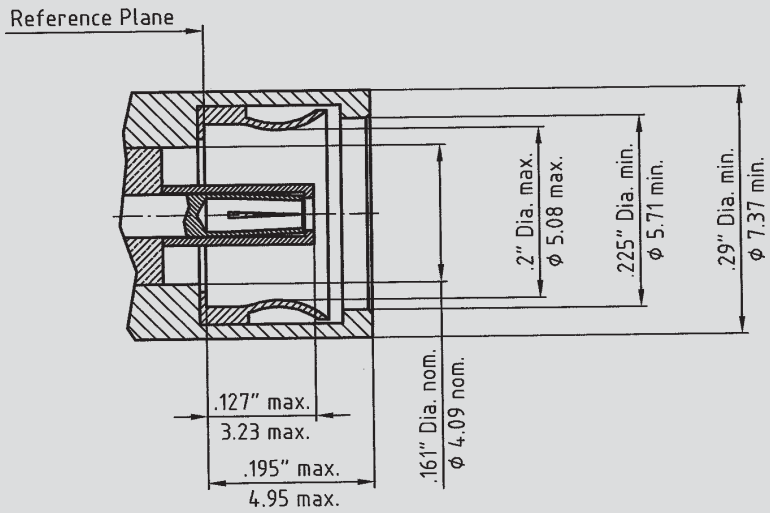
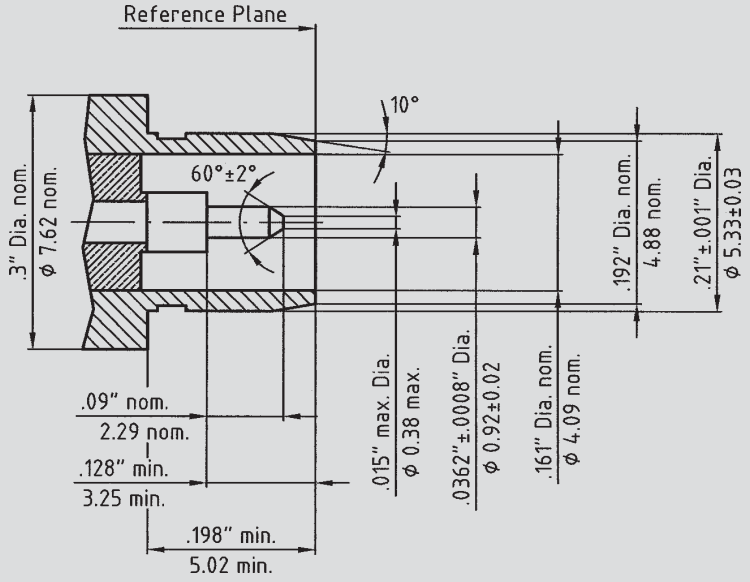
## BMA Female




Dimensions shown are inches over millimeters.

Frequency: DC - 22.0 GHz min.

## BMA Male




Dimensions shown are inches over millimeters.

Frequency: DC - 22.0 GHz min.

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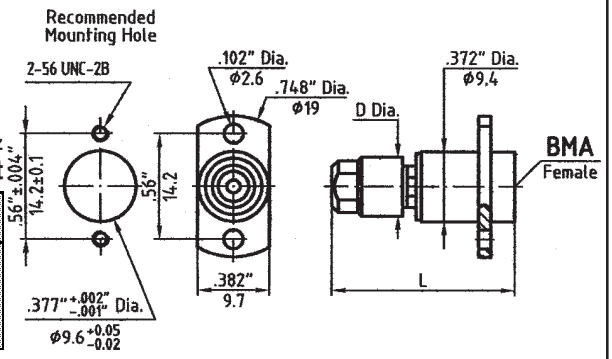
# BMA

DC - 22.0 GHz

## BMA Flange Mount Cable Jack Floating Rear Mount

| Connector Part No. | S/R Cable | Cable Part No. | Ø D | L | Conn. Code |
|---|---|---|---|---|---|
| 2302-6201-02 | .085" | 421-086<br>421-086-1<br>421-086-3 | .248"<br>6.3 | .89"<br>22.6 | BF |
| 2303-6201-02 | .141" | 421-669<br>421-669-1<br>421-669-3 | .354"<br>9.0 | .969"<br>24.6 | |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.

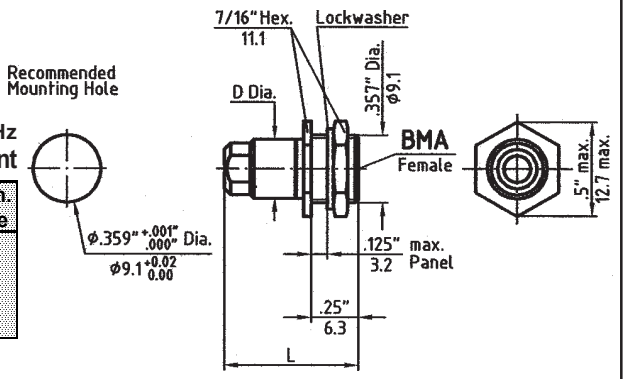



DC - 22.0 GHz

## BMA Bulkhead Feedthrough Cable Jack Rigid Rear Mount

| Connector Part No. | S/R Cable | Cable Part No. | Ø D | L | Conn. Code |
|---|---|---|---|---|---|
| 2302-6101-02 | .085" | 421-086<br>421-086-1<br>421-086-3 | .248"<br>6.3 | .89"<br>22.6 | BB |
| 2303-6101-02 | .141" | 421-669<br>421-669-1<br>421-669-3 | .354"<br>9.0 | .969"<br>24.6 | |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.

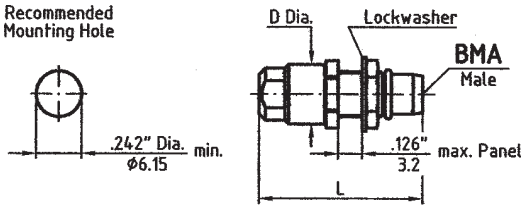



DC - 22.0 GHz

## BMA Bulkhead Feedthrough Cable Plug Rear Mount

| Connector Part No. | S/R Cable | Cable Part No. | Ø D | L | Conn. Code |
|---|---|---|---|---|---|
| 2302-1101-02 | .085" | 421-086<br>421-086-1<br>421-086-3 | .248"<br>6.3 | .787"<br>20.0 | BM |
| 2303-1101-02 | .141" | 421-669<br>421-669-1<br>421-669-3 | .354"<br>9.0 | .866"<br>22.0 | |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.




Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per Spectrum Elektrotechnik GmbH Specifications. For details please refer to the beginning of this section.

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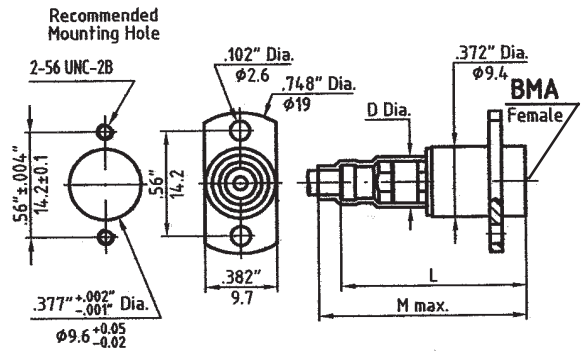
## BMA Flange Mount Cable Jack Floating Rear Mount

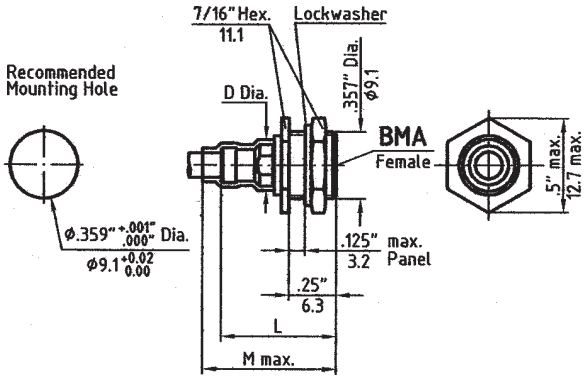



DC - 18.0 GHz

| Connector Part No. | Cable Type | Cable Code | L | M | Conn. Code |
|---|---|---|---|---|---|
| 2313-6201-02 | RD-316/U | 32 | 1.079" 27.4 | 3.071" 78.0 | BF |
| 2315-6202-02 | RG-142B/U | 42 | 1.661" 42.2 | 3.35" 85.0 | |
| 2312-6202-02 | RG-178B/U | 78 | 1.079" 27.4 | 3.071" 78.0 | |
| 2315-6204-02 | RG-223/U | 23 | 1.661" 42.2 | 3.35" 85.0 | |
| 2313-6202-02 | RG-316/U | 31 | 1.079" 27.4 | 3.071" 78.0 | |
| 2315-6203-02 | RG-400/U | 40 | 1.661" 42.2 | 3.35" 85.0 | |

Connector outer conductor is passivated stainless steel. Center conductor is gold plated. Dimensions shown are inches over millimeters.

## BMA Bulkhead Feedthrough Cable Jack Rigid Rear Mount

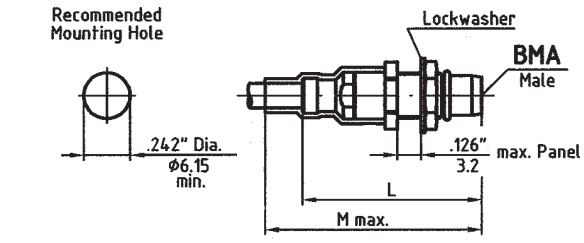



DC - 18.0 GHz

| Connector Part No. | Cable Type | Cable Code | L | M | Conn. Code |
|---|---|---|---|---|---|
| 2313-6101-02 | RD-316/U | 32 | .965" 24.5 | 2.95" 75.0 | BB |
| 2315-6101-02 | RG-142B/U | 42 | 1.661" 42.2 | 3.35" 85.0 | |
| 2312-6102-02 | RG-178B/U | 78 | .965" 24.5 | 2.95" 75.0 | |
| 2315-6102-02 | RG-223/U | 23 | 1.661" 42.2 | 3.35" 85.0 | |
| 2313-6102-02 | RG-316/U | 31 | .965" 24.5 | 2.95" 75.0 | |
| 2315-6103-02 | RG-400/U | 40 | 1.661" 42.2 | 3.35" 85.0 | |

Connector outer conductor is passivated stainless steel. Center conductor is gold plated. Dimensions shown are inches over millimeters.

## BMA Bulkhead Feedthrough Cable Plug Rear Mount




DC - 18.0 GHz

| Connector Part No. | Cable Type | Cable Code | L | M | Conn. Code |
|---|---|---|---|---|---|
| 2313-1101-02 | RD-316/U | 32 | .965" 24.5 | 2.95" 75.0 | BM |
| 2315-1102-02 | RG-142B/U | 42 | 1.26" 32.0 | 3.35" 85.0 | |
| 2312-1102-02 | RG-178B/U | 78 | .965" 24.5 | 2.95" 75.0 | |
| 2315-1104-02 | RG-223/U | 23 | 1.26" 32.0 | 3.35" 85.0 | |
| 2313-1102-02 | RG-316/U | 31 | .965" 24.5 | 2.95" 75.0 | |
| 2315-1103-02 | RG-400/U | 40 | 1.26" 32.0 | 3.35" 85.0 | |

Connector outer conductor is passivated stainless steel. Center conductor is gold plated. Dimensions shown are inches over millimeters.

Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per Spectrum Elektrotechnik GmbH Specifications. For details please refer to the beginning of this section.

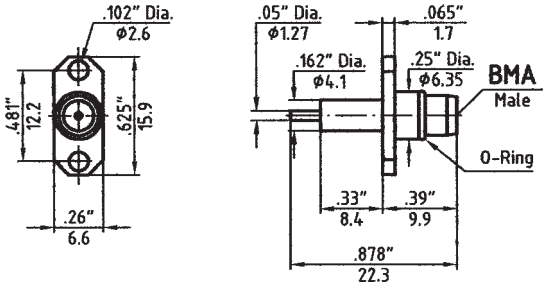
# BMA Circuit Board Connectors

Spectrum Elektrotechnik GmbH

### BMA Male Flange Mount Tab Termination

| Connector Part No. | 2399-6301-02 |
|---|---|
| Frequency Range | DC to 22.0 GHz |

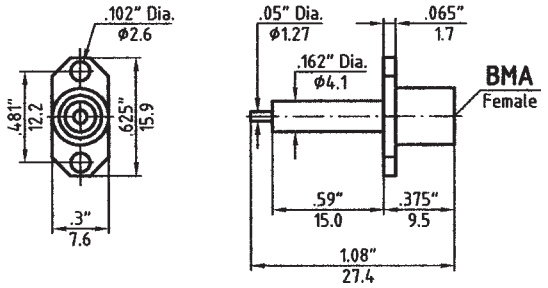
Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.




### BMA Female Flange Mount Tab Termination

| Connector Part No. | 2399-6201-02 |
|---|---|
| Frequency Range | DC to 22.0 GHz |

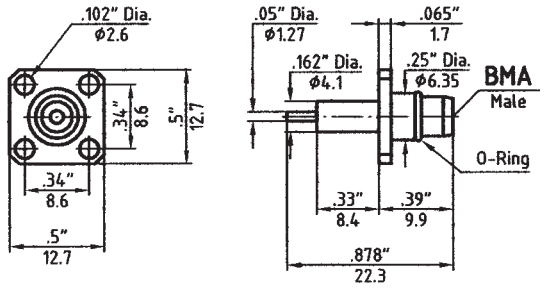
Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.




### BMA Male Flange Mount Tab Termination

| Connector Part No. | 2399-7001-02 |
|---|---|
| Frequency Range | DC to 22.0 GHz |

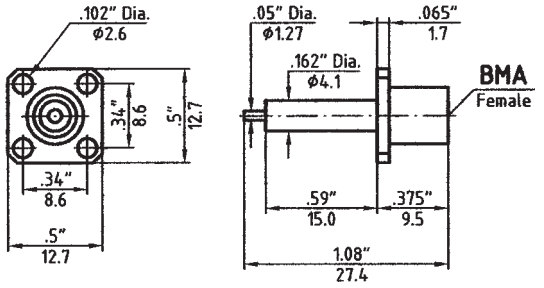
Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.




### BMA Female Flange Mount Tab Termination

| Connector Part No. | 2399-6001-02 |
|---|---|
| Frequency Range | DC to 22.0 GHz |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.




Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per Spectrum Elektrotechnik GmbH Specifications. For details please refer to the beginning of this section.

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# BMA

## 1. BMA Specifications/Interface Dimensions

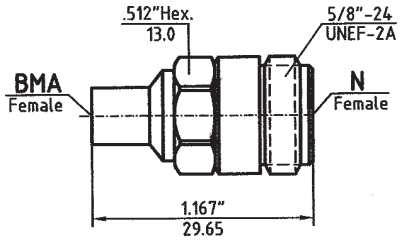
## 2. Connectors of Type N PUSH-ON

| | | | |
|---|---|---|---|
| 3. | | | |
| | **Full Locking** | | |
| | | | |
| | **Non Locking** | | |
| | **Float Mount Non Locking** | **to N** | |

# BMA Between-Series Adapters

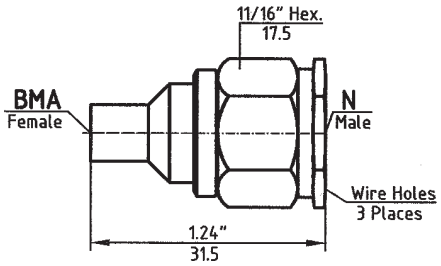
| Adapter Part No. | 8001-BW61-02 |
|---|---|
| Connector Config. | BMA-f to N-f |
| Frequency Range | DC to 18.0 GHz |
| VSWR | 1.06 + 0.005 x f (GHz) |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.



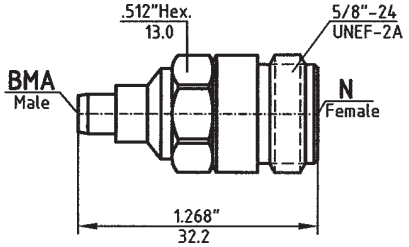

| Adapter Part No. | 8001-BW51-02 |
|---|---|
| Connector Config. | BMA-f to N-m |
| Frequency Range | DC to 18.0 GHz |
| VSWR | 1.06 + 0.005 x f (GHz) |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.



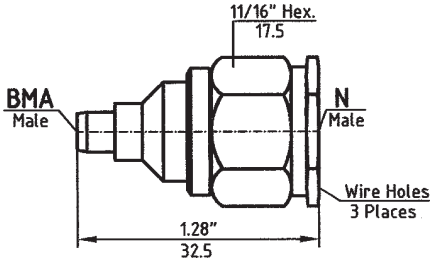

| Adapter Part No. | 8001-BM61-02 |
|---|---|
| Connector Config. | BMA-m to N-f |
| Frequency Range | DC to 18.0 GHz |
| VSWR | 1.06 + 0.005 x f (GHz) |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.




| Adapter Part No. | 8001-BM51-02 |
|---|---|
| Connector Config. | BMA-m to N-m |
| Frequency Range | DC to 18.0 GHz |
| VSWR | 1.06 + 0.005 x f (GHz) |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.




Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per MIL-C 39012, MIL-C-87104/2, MIL-C-3643, MIL-STD-348, IEC-169-7, IEC-457-2, DIN 47 223, DIN 47 226, DIN 47 298, Spectrum Elekrotechnik GmbH Specifications, where applicable. For details please refer to the beginning of this section.

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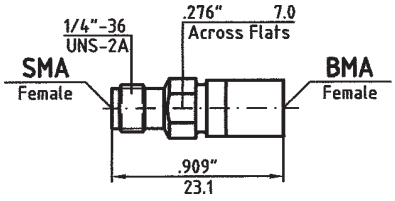
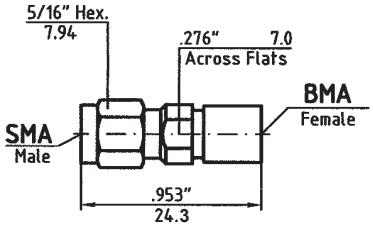
# Between-Series Adapters, Type BMA



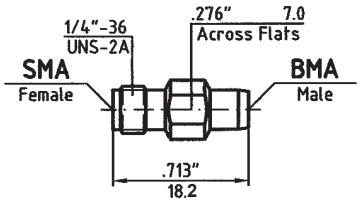

| Adapter Part No. | 8001-BW21-02 |
|---|---|
| Connector Config. | BMA-f to SMA-f |
| Frequency Range | DC to 18.0 GHz |
| VSWR | 1.06 + 0.005 x f (GHz) |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.



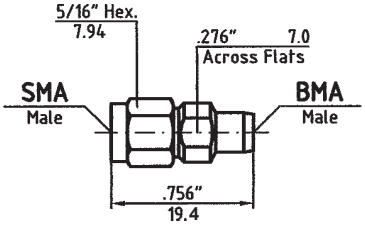

| Adapter Part No. | 8001-BW11-02 |
|---|---|
| Connector Config. | BMA-f to SMA-m |
| Frequency Range | DC to 18.0 GHz |
| VSWR | 1.06 + 0.005 x f (GHz) |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.




| Adapter Part No. | 8001-BM21-02 |
|---|---|
| Connector Config. | BMA-m to SMA-f |
| Frequency Range | DC to 18.0 GHz |
| VSWR | 1.06 + 0.005 x f (GHz) |

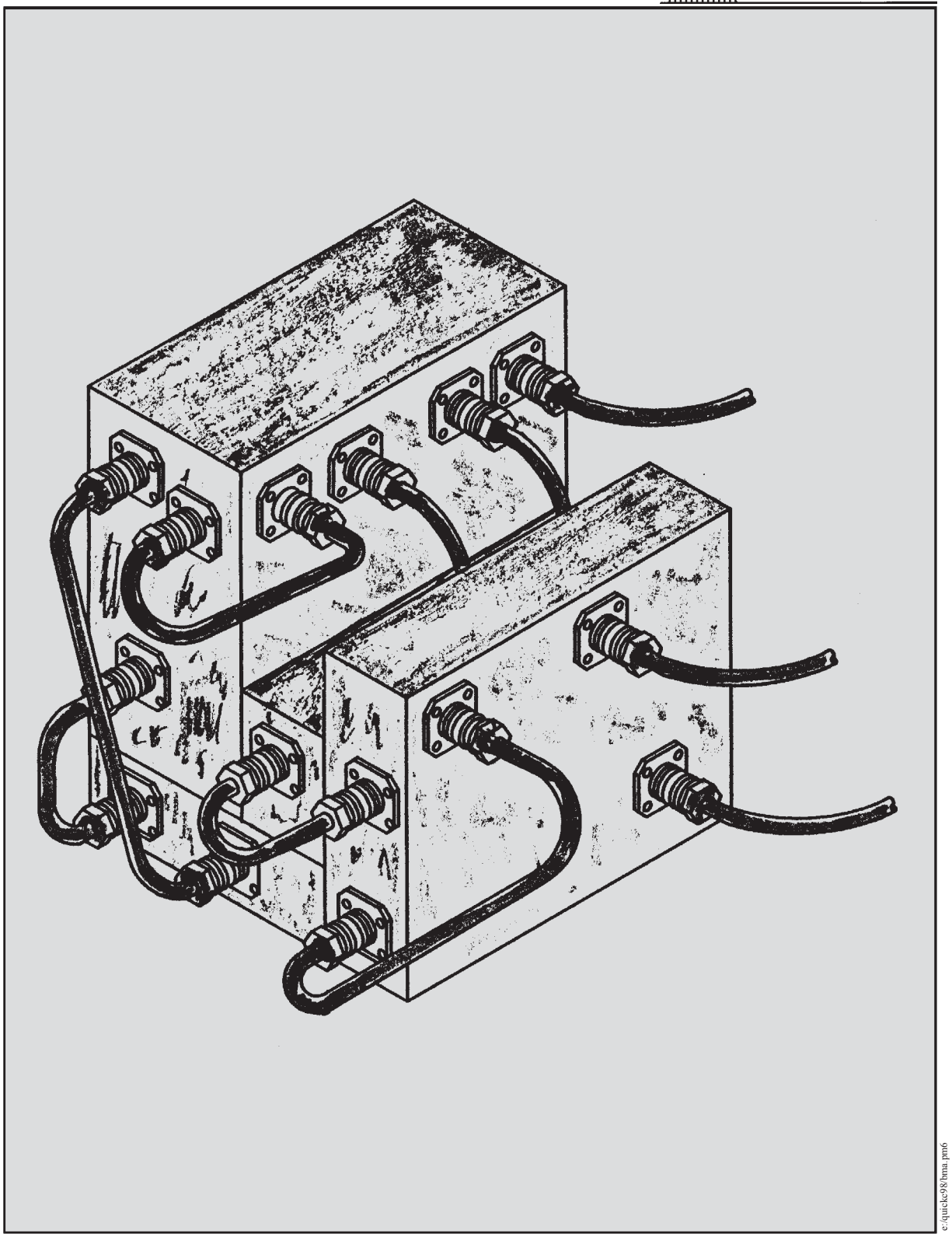
Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.




| Adapter Part No. | 8001-BM11-02 |
|---|---|
| Connector Config. | BMA-m to SMA-m |
| Frequency Range | DC to 18.0 GHz |
| VSWR | 1.06 + 0.005 x f (GHz) |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.

Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per MIL-C 39012, MIL-C-87104/2, MIL-C-3643, MIL-STD-348, IEC-169-7, IEC-457-2, DIN 47 223, DIN 47 226, DIN 47 298, Spectrum Elekrotechnik GmbH Specifications, where applicable. For details please refer to the beginning of this section.



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# N PUSH-ON

# N Push-On Connectors & Adapters

**PUSH-ON N-TYPE CONNECTORS** eliminate time consuming tightening, torquing and loosening of N-male connectors during testing or in applications where limited space requirements make tightening and torquing of a coupling nut difficult, if not impossible.

The N push-on slides directly onto any standard N-female, allowing prompt connection and loosening. Three types of push-on N connectors are available: full-locking, locking with non-locking rear nut, and non-locking.

**Full Locking** push-on N-Type connectors are recommended when longer testing is required and the connectors must be firmly locked so that they cannot be disconnected, even by mistake. **Locking with non-locking rear nut** N-Type connectors are recommended where safe locking is necessary, but long term testing is not required. **Non-locking** push-on connectors are recommended for short period testing, testing that usually takes only seconds.

Push-On N-Type connectors are available for termination with cables RG-142B/U, RG-400/U and RG-214/U. State-of-the-art high performance cables using push-on connectors are available as well, however, these high performance cable assemblies can only be purchased completely terminated; they can be found in the section "Cable Assemblies" on pages 231-233 of this catalog.

**PUSH-ON N-TYPE CONNECTOR SAVERS AND ADAPTERS**, were developed for attachment to cable assemblies which are terminated with regular connectors. The adapter has a standard connector on one side, and a push-on connector on the other end. The standard connector end of the adapter engages with the standard connector of the opposite sex at the cable assembly. These connnector savers and adapters modify cable assemblies in seconds, changing them from a standard product to a state-of-the-art push-on assembly.
Push-on adapters are available for a variety of connectors and both male and female sexes within the connector series. N-type push-on connectors savers are supplied in **full locking**, **locking with non-locking rear nut** and **non-locking** configuration.

## FEATURES:

**REPEATABLE PERFORMANCE**
**SAFE LOCKING MECHANISM***
**REDUCED TEST TIME**

* on Full Locking and Locking Units

**LOW INSERTION LOSS**
**HIGH RETURN LOSS**
**DC-18.0 GHz**
**LONG LIFE**

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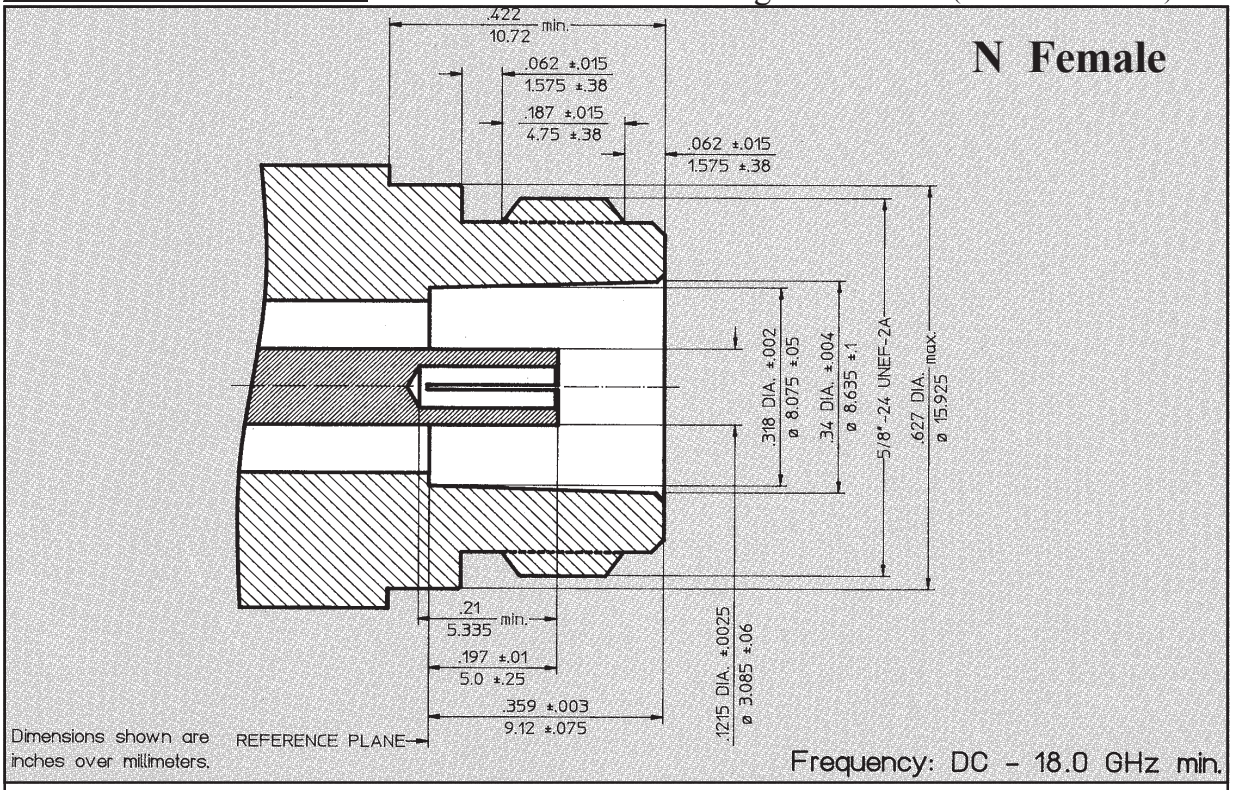
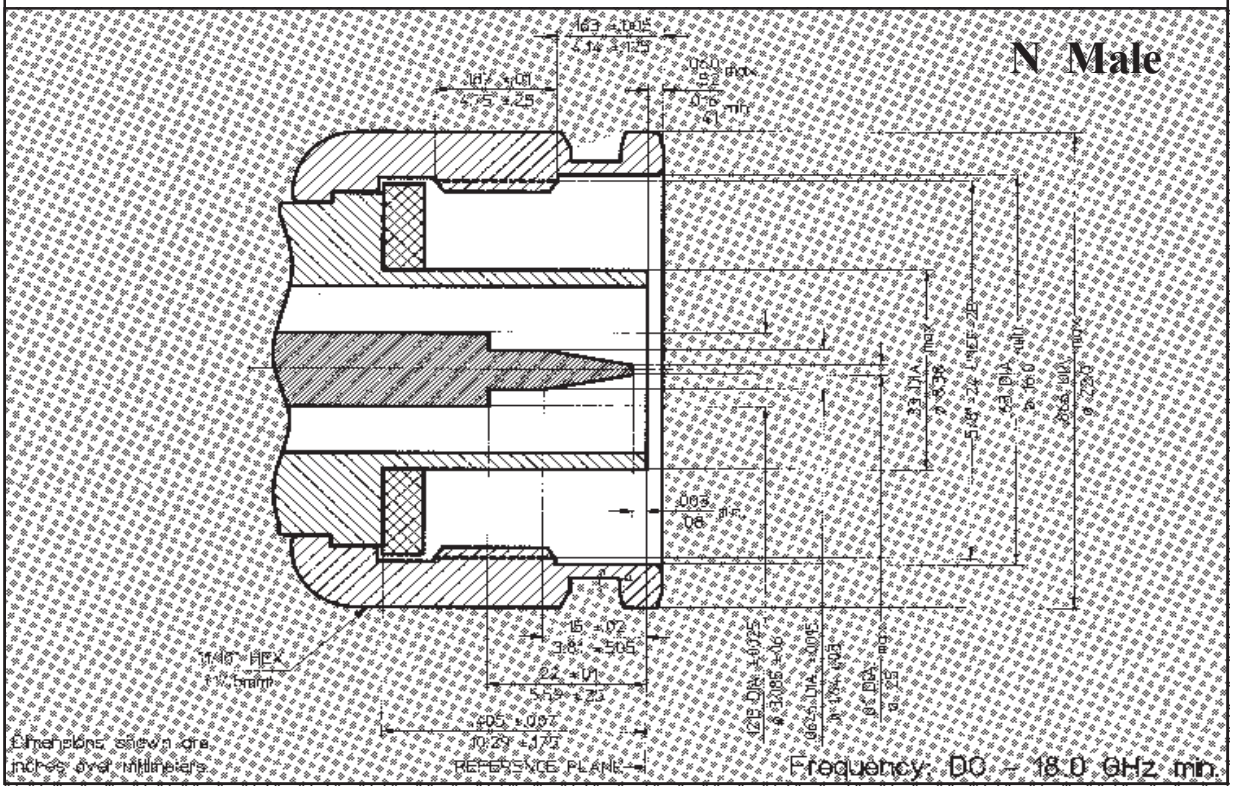
## N Female




## N Male

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# N PUSH-ON Specifications to MIL-C-39012

The specifications below are general specifications for all N PUSH-ON connectors. Specifications in the following table are recommended for any procurement documents or drawings. In the event of any conflict, these specifications shall govern.The PUSH-ON Connectors were developed to eliminate the time consuming lightening, torquing and loosening of connectors during test. The connector slides directly onto any Female of the same connector style, allowing quick connecting and disconnecting. Its mechanism locks safely onto the standard thread of the Female connector.

| REQUIREMENT | | REQUIREMENT PARAGRAPH | GENERAL SPECIFICATIONS |
|---|---|---|---|
| **GENERAL** | | | |
| Standard Materials | | 3.3 | STEEL corrosion resistant 1.4305 per DIN 17440 (QQ-S-764, class 303 or ASTM-A-582-80).<br>ALUMINUM AlMg4.5Mn per DIN 1725, AlMgSi0.5 per DIN 1725, AlMgSi1 per DIN 1725 (6061-T6 per QQ-A-225/8).<br>BRASS CuZn39Pb3 per DIN 17660 (QQ-B-626, half hard).<br>COPPER BERYLLIUM 33-25 CuBe2Pb H per DIN 17666 (QQ-C-530).<br>TFE Fluorocarbon per DIN 52900 (MIL-P-19468 and L-P403).<br>SILICONE RUBBER per DIN 3771 (MIL-R-5847 and ZZ-R-765, Class II B,) Grade 50 - 75.<br>BORRIUM NITRITE Dielectric for high power applications per inhouse specification. |
| Finish for | COPPER BERYLLIUM | 3.3.1 | Center Contacts shall be gold plated to a minimum thickness of .00005 inch (1.27 µm) in accordance with MIL-G-45204, Type II, Grade C. Outer conductors shall be gold plated to a thickness of .00003 inch (0.8 µm) per MIL-G-45204 , Type II, Grade C, or silver plated to a thickness of .0001 inch (2.5 µm) per QQ-S-365. |
| | STAINLESS STEEL | | Shall be passivated per QQ-P-35 or gold plated to a thickness of .00003 inch (0.8 µm) per MIL-G-45204, Type II, Grade C. |
| | ALUMINUM | | Conductive Parts shall have an iridited finish per MIL-C-5541.<br>Other parts, such as Coupling Nuts and Back-Bodies shall be anodized per MIL-A-8625. |
| | BRASS | | Gold plated to a thickness of .00003 inch (0.8 µm) min. per MIL-45204, Type II, Grade C, or nicle plated to a thickness of .0002 inch (5µm) per QQ-N-290, grade E, or silver plated to a thickness of .0001 inch (2.5 µm) per QQ-S-365. |
| | VARIOUS | | Imoloy .0001 inch (2.5 µm) min. plating, consisting of 55% Copper / 20% Zinc / 25% Tin (on special request). |
| Design | | 3.4 | The design shall be such that the outline dimensions in this catalog are met. In addition, the assembled connector shall meet the interface dimensions. |
| **ELECTRICAL** | | | |
| Frequency Range | | | DC - 18.0 GHz min. |
| Insulation Resistance | | 3.11 | The insulation resistance shall not be less than 5.000 megohms. |
| Voltage Standing Wave Ratio (VSWR) | | 3.14 | 1.15 : 1 |
| Contact Resistance | | 3.16 | The center contact resistance drop shall not exceed 1.0 milliohms max. |
| Dielectric Withstanding Voltage | | 3.17 | The magnitude of the test voltage shall be 2500 volts rms at 60 Hz. |
| RF High Potential Withstanding Voltage | | 3.23 | The RF high potential withstanding voltage is 1,500 volts rms at 5 MHz. |
| RF Leakage | | 3.26 | -90 dB max. to 3.0 GHz, -75 dB max. to 18.0 GHz |
| Insertion Loss | | 3.27 | 0.2 dB max. at 18.0 GHz |
| Impedance | | | 50 Ohms Nominal |
| Corona Level Voltage | | | 500 Volts at 70,000 ft. |
| **MECHANICAL** | | | |
| Connector Durability | | 3.15 | The connector is to be tested and its mating connector shall be subjected to 500 insertion min. Withdrawal cycles / minute are not applicable. The connector shall show no evidence of mechanical failure and the connector shall meet the mating characteristic requirements. |
| Temperature | | | -65°C to +100°C |
| Force to Engage and Disengage | | 3.5.1 | The Force to Engage and Disengage is not applicable. |
| Longitudinal Force max. | | | Longitudinal force shall not exceed 6 inch-pounds (0.678 Nm). |
| **ENVIRONMENTAL** | | | |
| Corrosion (Salt Spray) | | 3.13 | Specification MIL-STD-202, Method 101, Test Condition B. The salt solution shall be 5%. |
| Vibration | | 3.18 | Specification MIL-STD-202, Method 204, Test Condition D. |
| Shock | | 3.19 | Specification MIL-STD-202, Method 213, Test Condition I. |
| Thermal Shock | | 3.20 | Specification MIL-STD-202, Method 107, Test Condition B, except high temperature shall be + 200°C. |
| Moisture Resistance | | 3.21 | Specification MIL-STD-202, Method 106. Step 7b (vibration) shall be omitted. Insulation resistance shall be 200 megohms min. within 5 minutes of removal from humidity. |

# N PUSH-ON

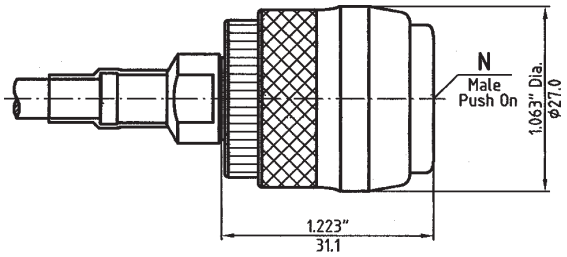
Spectrum Elektrotechnik GmbH

## Full Locking

DC - 18.0 GHz

| Connector Part No. | Flexible Cable Type | Cable Code | Connector Code |
|---|---|---|---|
| 3015-NS05-02 | RG-142B/U | 42 | NS |
| 3015-NS06-02 | RG-400/U | 40 | |
| 3017-NS04-02 | RG-214/U | 21 | |

Connector outer conductor is passivated stainless steel. Center conductor is gold plated.

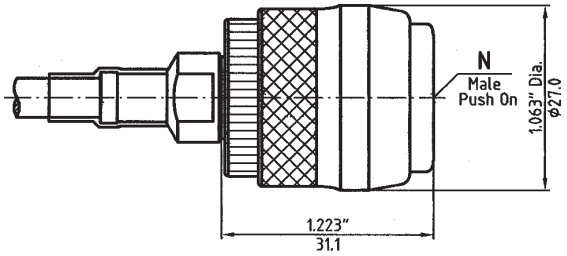



## Full Locking

DC - 18.0 GHz

| Connector Part No. | Flexible Cable Type | Cable Code | Connector Code |
|---|---|---|---|
| 3015-NSB1-13 | RG-142B/U | 42 | NSB |
| 3015-NSB2-13 | RG-400/U | 40 | |
| 3017-NSB1-13 | RG-214/U | 21 | |

Connector outer conductor is brass/beryllium copper silver plated for lower intermodulation products. Center conductor is gold plated. Remaining parts are stainless steel for ruggedness.



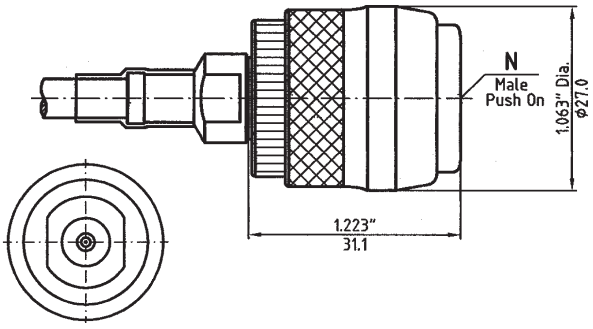

## Full Locking

DC - 18.0 GHz

| Connector Part No. | Flexible Cable Type | Cable Code | Connector Code |
|---|---|---|---|
| 3015-NDS1-02 | RG-142B/U | 42 | NDS |
| 3015-NDS2-02 | RG-400/U | 40 | |
| 3017-NDS1-02 | RG-214/U | 21 | |

Connector outer conductor is passivated stainless steel. Center conductor is gold plated.

Double "D"



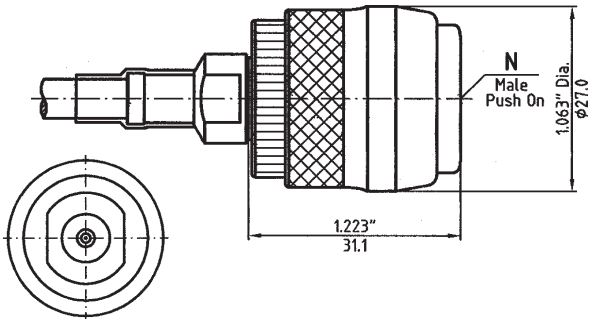

## Full Locking

DC - 18.0 GHz

| Connector Part No. | Flexible Cable Type | Cable Code | Connector Code |
|---|---|---|---|
| 3015-NDB1-13 | RG-142B/U | 42 | NDB |
| 3015-NDB2-13 | RG-400/U | 40 | |
| 3017-NDB1-13 | RG-214/U | 21 | |

Connector outer conductor is brass/beryllium copper silver plated for lower intermodulation products. Center conductor is gold plated. Remaining parts are stainless steel for ruggedness.

Double "D"

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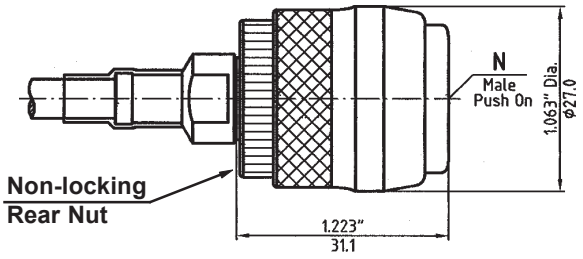
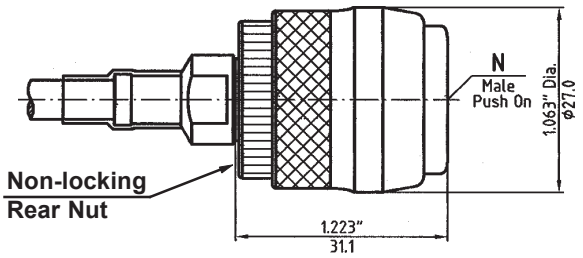



DC - 18.0 GHz

## Locking with Non-locking Rear Nut

| Connector Part No. | Flexible Cable Type | Cable Code | Connector Code |
|---|---|---|---|
| 3015-NL01-02 | RG-142B/U | 42 | NL |
| 3015-NL02-02 | RG-400/U | 40 | |
| 3017-NL01-02 | RG-214/U | 21 | |

Connector outer conductor is passivated stainless steel. Center conductor is gold plated.



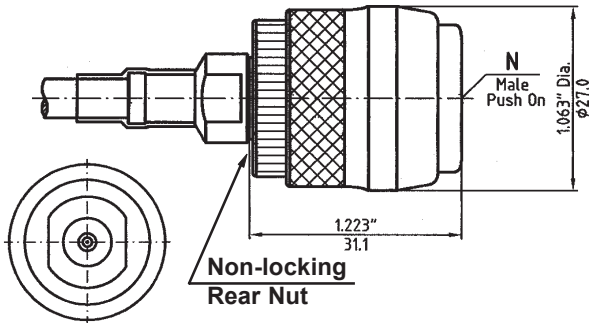

DC - 18.0 GHz

## Locking with Non-locking Rear Nut

| Connector Part No. | Flexible Cable Type | Cable Code | Connector Code |
|---|---|---|---|
| 3015-NLB1-13 | RG-142B/U | 42 | NLB |
| 3015-NLB2-13 | RG-400/U | 40 | |
| 3017-NLB1-13 | RG-214/U | 21 | |

Connector outer conductor is brass/beryllium copper silver plated for lower intermodulation products. Center conductor is gold plated. Remaining parts are stainless steel for ruggedness.

Double "D"



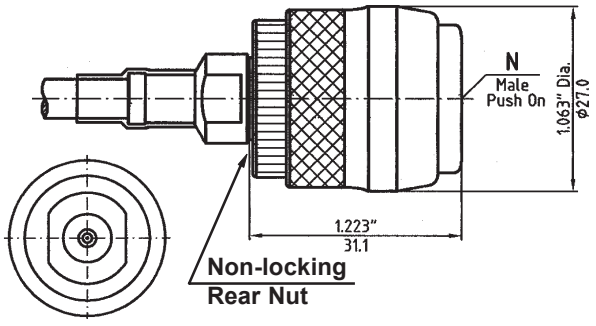

DC - 18.0 GHz

## Locking with Non-locking Rear Nut

| Connector Part No. | Flexible Cable Type | Cable Code | Connector Code |
|---|---|---|---|
| 3015-NDL1-02 | RG-142B/U | 42 | NDL |
| 3015-NDL2-02 | RG-400/U | 40 | |
| 3017-NDL1-02 | RG-214/U | 21 | |

Connector outer conductor is passivated stainless steel. Center conductor is gold plated.

Double "D"




DC - 18.0 GHz

## Locking with Non-locking Rear Nut

| Connector Part No. | Flexible Cable Type | Cable Code | Connector Code |
|---|---|---|---|
| 3015-NDC1-13 | RG-142B/U | 42 | NDC |
| 3015-NDC2-13 | RG-400/U | 40 | |
| 3017-NDC1-13 | RG-214/U | 21 | |

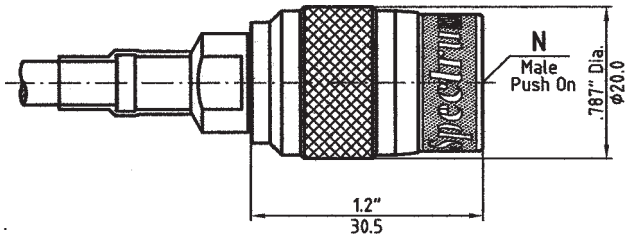
Connector outer conductor is brass/beryllium copper silver plated for lower intermodulation products. Center conductor is gold plated. Remaining parts are stainless steel for ruggedness.

## NON Locking

**DC - 18.0 GHz**

| Connector Part No. | Flexible Cable Type | Cable Code | Connector Code |
|---|---|---|---|
| 3015-NN01-02 | RG-142B/U | 42 | NN |
| 3015-NN02-02 | RG-400/U | 40 | |
| 3017-NN01-02 | RG-214/U | 21 | |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.

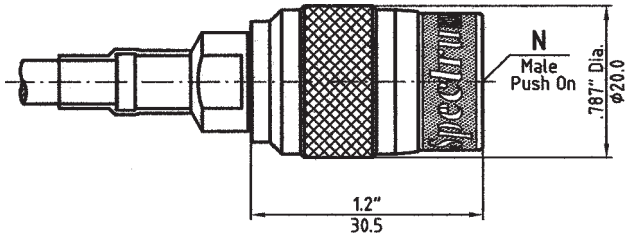



## NON Locking

**DC - 18.0 GHz**

| Connector Part No. | Flexible Cable Type | Cable Code | Connector Code |
|---|---|---|---|
| 3015-NNB1-13 | RG-142B/U | 42 | NNB |
| 3015-NNB2-13 | RG-400/U | 40 | |
| 3017-NNB1-13 | RG-214/U | 21 | |

Connector outer conductor is brass/beryllium copper silver plated for lower intermodulation products. Center conductor is gold plated. Remaining parts are stainless steel for ruggedness.




Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per MIL-C-39012. For details please refer to the beginning of this section.

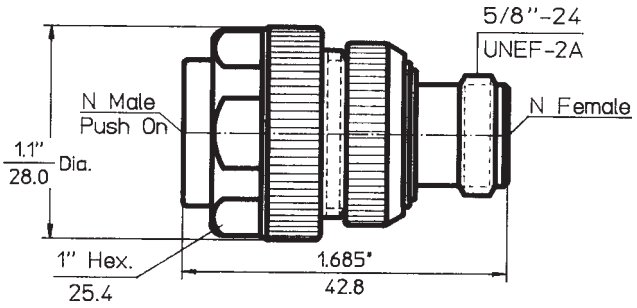
# N

# PUSH-ON

## Full Locking

| Adapter Part No. | 8001-NS61-02 |
|---|---|
| Connector Config. | N Push-On to N-f |
| Frequency Range | DC to 18.0 GHz |
| VSWR | 1.06 + 0.005 x f (GHz) |

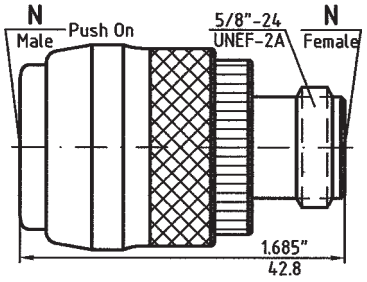
Connector outer conductor is passivated stainless steel. Center conductor is gold plated.




## Full Locking

| Adapter Part No. | 8002-NS61-02 |
|---|---|
| Connector Config. | N Push-On to N-f |
| Frequency Range | DC to 18.0 GHz |
| VSWR | 1.06 + 0.005 x f (GHz) |

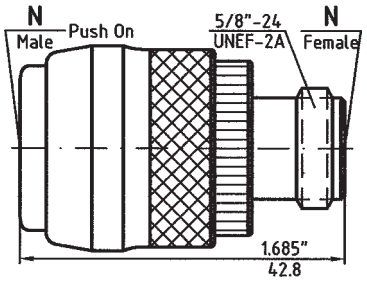
Connector outer conductor is passivated stainless steel. Center conductor is gold plated.




## Full Locking

| Adapter Part No. | 8002-NS61-13 |
|---|---|
| Connector Config. | N Push-On to N-f |
| Frequency Range | DC to 18.0 GHz |
| VSWR | 1.06 + 0.005 x f (GHz) |

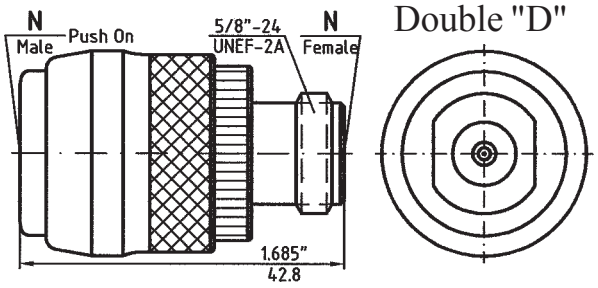
Connector outer conductor is brass/beryllium copper silver plated for lower intermodulation products. Center conductor is gold plated. Remaining parts are stainless steel for ruggedness.




## Full Locking

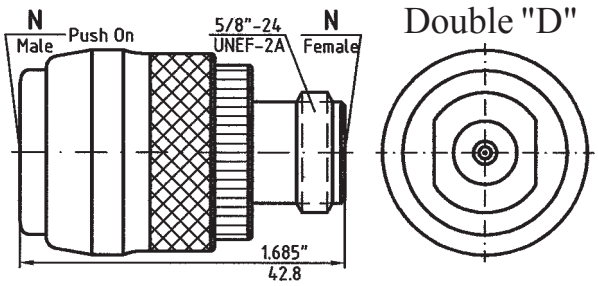
| Adapter Part No. | 8003-NS61-02 |
|---|---|
| Connector Config. | N Push-On to N-f |
| Frequency Range | DC to 18.0 GHz |
| VSWR | 1.06 + 0.005 x f (GHz) |

Connector outer conductor is passivated stainless steel. Center conductor is gold plated.




Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per MIL-C 39012, MIL-C-87104/2, MIL-C-3643, MIL-STD-348, IEC-169-7, IEC-457-2, DIN 47 223, DIN 47 226, DIN 47 298, where applicable. For details please refer to the beginning of this section.

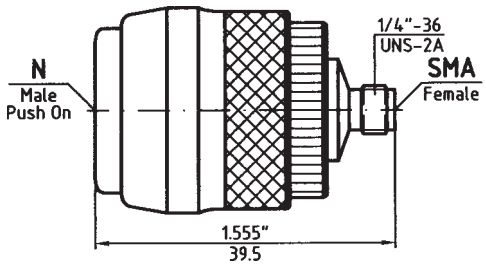
## Full Locking




| Adapter Part No. | 8003-NS61-13 |
|---|---|
| Connector Config. | N Push-On to N-f |
| Frequency Range | DC to 18.0 GHz |
| VSWR | 1.06 + 0.005 x f (GHz) |

Connector outer conductor is brass/beryllium copper silver plated for lower intermodulation products. Center conductor is gold plated. Remaining parts are stainless steel for ruggedness.

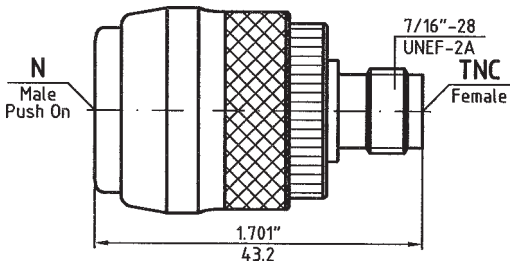
## Full Locking




| Adapter Part No. | 8001-NS21-02 |
|---|---|
| Connector Config. | N Push-On to SMA-f |
| Frequency Range | DC to 18.0 GHz |
| VSWR | 1.06 + 0.005 x f (GHz) |

Connector outer conductor is passivated stainless steel. Center conductor is gold plated.

## Full Locking




| Adapter Part No. | 8001-NS41-02 |
|---|---|
| Connector Config. | N Push-On to TNC-f |
| Frequency Range | DC to 18.0 GHz |
| VSWR | 1.06 + 0.005 x f (GHz) |

Connector outer conductor is passivated stainless steel. Center conductor is gold plated.

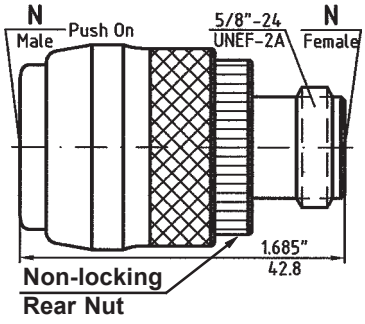
Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per MIL-C 39012, MIL-C-87104/2, MIL-C-3643, MIL-STD-348, IEC-169-7, IEC-457-2, DIN 47 223, DIN 47 226, DIN 47 298, where applicable. For details please refer to the beginning of this section.

# N Push-On Adapters

## Locking with Non-locking Rear Nut

| Adapter Part No. | 8002-NL61-02 |
|---|---|
| Connector Config. | N Push-On to N-f |
| Frequency Range | DC to 18.0 GHz |
| VSWR | 1.06 + 0.005 x f (GHz) |

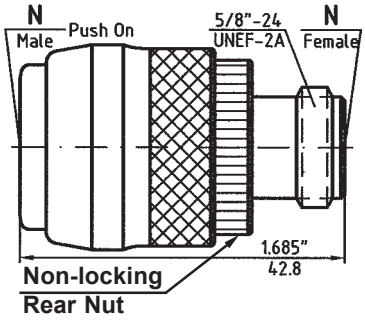
Connector outer conductor is passivated stainless steel. Center conductor is gold plated.




## Locking with Non-locking Rear Nut

| Adapter Part No. | 8002-NL61-13 |
|---|---|
| Connector Config. | N Push-On to N-f |
| Frequency Range | DC to 18.0 GHz |
| VSWR | 1.06 + 0.005 x f (GHz) |

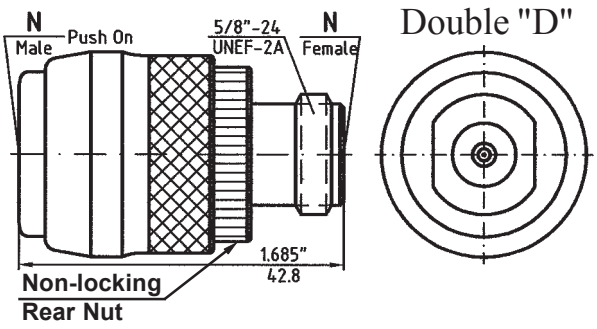
Connector outer conductor is brass/beryllium copper silver plated for lower intermodulation products. Center conductor is gold plated. Remaining parts are stainless steel for ruggedness.




## Locking with Non-locking Rear Nut

| Adapter Part No. | 8003-NL61-02 |
|---|---|
| Connector Config. | N Push-On to N-f |
| Frequency Range | DC to 18.0 GHz |
| VSWR | 1.06 + 0.005 x f (GHz) |

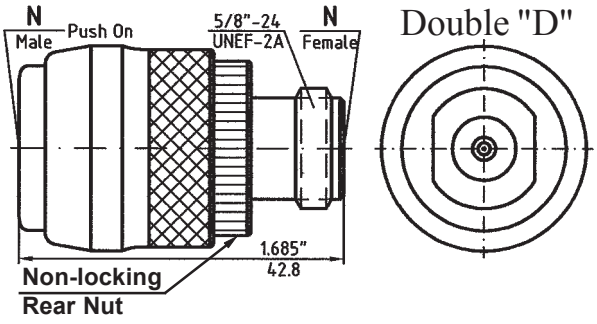
Connector outer conductor is passivated stainless steel. Center conductor is gold plated.



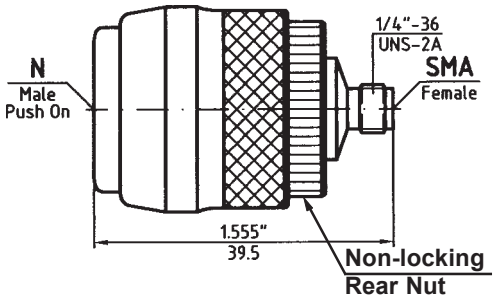

## Locking with Non-locking Rear Nut

| Adapter Part No. | 8003-NL61-13 |
|---|---|
| Connector Config. | N Push-On to N-f |
| Frequency Range | DC to 18.0 GHz |
| VSWR | 1.06 + 0.005 x f (GHz) |

Connector outer conductor is brass/beryllium copper silver plated for lower intermodulation products. Center conductor is gold plated. Remaining parts are stainless steel for ruggedness.



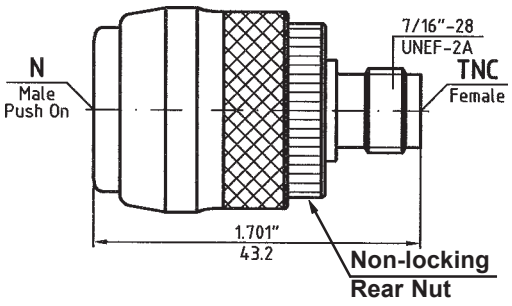

Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per MIL-C 39012, MIL-C-87104/2, MIL-C-3643, MIL-STD-348, IEC-169-7, IEC-457-2, DIN 47 223, DIN 47 226, DIN 47 298, where applicable. For details please refer to the beginning of this section.




## Locking with Non-locking Rear Nut

| Adapter Part No. | 8001-NL21-02 |
|---|---|
| Connector Config. | N Push-On to SMA-f |
| Frequency Range | DC to 18.0 GHz |
| VSWR | 1.06 + 0.005 x f (GHz) |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.




## Locking with Non-locking Rear Nut

| Adapter Part No. | 8001-NL41-02 |
|---|---|
| Connector Config. | N Push-On to TNC-f |
| Frequency Range | DC to 18.0 GHz |
| VSWR | 1.06 + 0.005 x f (GHz) |

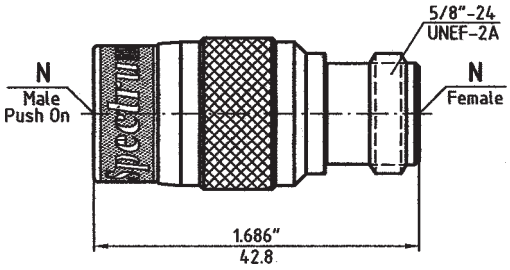
Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.

Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per MIL-C 39012, MIL-C-87104/2, MIL-C-3643, MIL-STD-348, IEC-169-7, IEC-457-2, DIN 47 223, DIN 47 226, DIN 47 298, where applicable. For details please refer to the beginning of this section.

## NON Locking

| Adapter Part No. | 8001-NN61-02 |
|---|---|
| Connector Config. | N Push-On to N-f |
| Frequency Range | DC to 18.0 GHz |
| VSWR | 1.06 + 0.005 x f (GHz) |

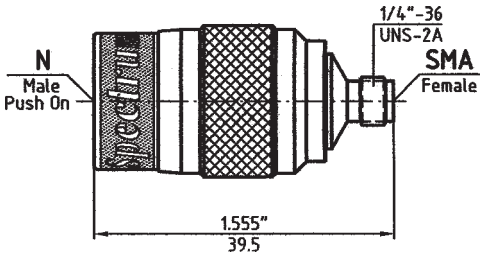
Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.




## NON Locking

| Adapter Part No. | 8001-NN21-02 |
|---|---|
| Connector Config. | N Push-On to SMA-f |
| Frequency Range | DC to 18.0 GHz |
| VSWR | 1.06 + 0.005 x f (GHz) |

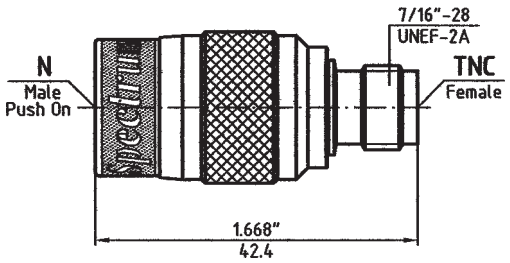
Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.




## NON Locking

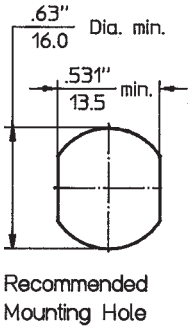
| Adapter Part No. | 8001-NN41-02 |
|---|---|
| Connector Config. | N Push-On to TNC-f |
| Frequency Range | DC to 18.0 GHz |
| VSWR | 1.06 + 0.005 x f (GHz) |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.

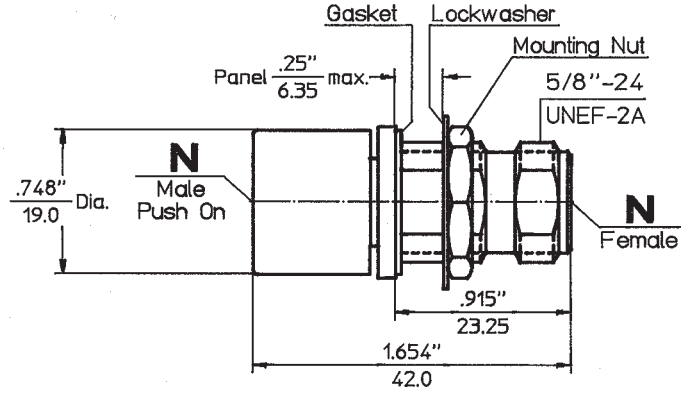



Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per MIL-C 39012, MIL-C-87104/2, MIL-C-3643, MIL-STD-348, IEC-169-7, IEC-457-2, DIN 47 223, DIN 47 226, DIN 47 298, where applicable. For details please refer to the beginning of this section.

# Float Mount Push-On Adapters, Type N




Recommended Mounting Hole




**N Push-On Bulkhead Feedthrough Floating Connector Saver**

| Adapter Part No. | 8004-NS61-05 |
|---|---|
| Connector Config. | N Push-On to N-f |
| Frequency Range | DC to 14.0 GHz |
| VSWR | 1.15 : 1 |

Connector outer conductor is brass nicle plated.
Center conductor is gold plated.

## Float Mount Application Notes can be supplied on request.

Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per MIL-C 39012, MIL-C-87104/2, MIL-C-3643, MIL-STD-348, IEC-169-7, IEC-457-2, DIN 47 223, DIN 47 226, DIN 47 298, where applicable. For details please refer to the beginning of this section.

# N Push-On Adapters



Spectrum Elektrotechnik GmbH P.O. Box 45 05 33, 80905 Munich, Germany **Tel. (89) 354 804-0, Fax (89) 354 804-90** (Country Code: 49)

# SBX

# SBX Applications & Features

**SBX** (**S**pectrum-**B**lind Mate-**X**) push-on connectors were developed in 1993 for interconnecting high power microwave modules, using direct mount or floating rear mount. **SBX** high performance connectors meet high power requirements, combined with microwave multiple interconnects. The connectors can be integrated into the housing of the component so that the connection even cannot been recognized from the outside. **SBX** connectors are specifically used for packaging and interconnecting those power microwave modules, drawers and racks in state-of-the-art systems that do not allow longer system down time. **SBX** push-on connectors allow replacement of faulty high power microwave modules within seconds. A typical method of interlocking modules is using lock screws.

**SBX** (**S**pectrum-**B**lind Mate-**X**) female connectors are available, offering radial misalignment with the mating plug connector. A spring mechanism separates the connector interface from the flange housing and allows floating for blind mating purposes.

**SBX** (**S**pectrum-**B**lind Mate-**X**) connectors are designed for high power at moderate frequency, operating to 8.0 GHz. Precision design leads to lowest VSWR. Excellent electrical performance means little reflected power, which is the prerequisite for superior performance at higher power applications.

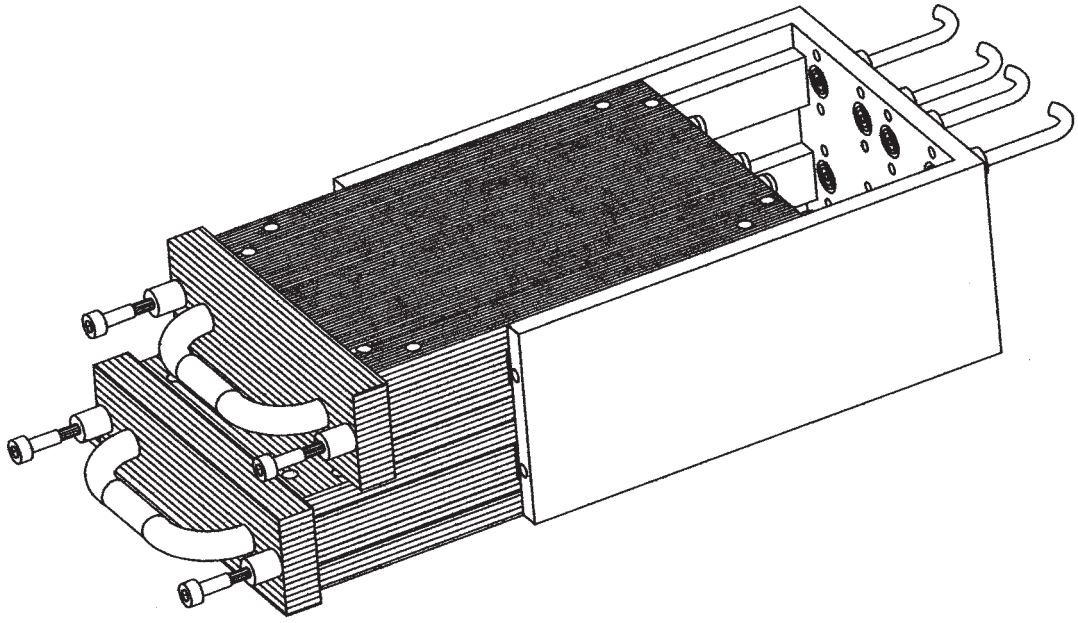
**SBX** (**S**pectrum-**B**lind Mate-**X**) connectors are also available as cable connectors for several standard **semi-rigid** cables, **low density semi-rigid** cables, standard **flexible** cables and **low density flexible** cables. The availability of **SBX** connectors allows easy interconnection of microwave power components. Standard units are available in bulkhead or panel mount designs for solder and compression clamp attachment. Female cable connectors can be obtained in float or rigid mount. **SBX** float mount connectors are ideally suited for axial and radial misalignment. They employ a spring mechanism that separates the connector interface from the flange housing and allows the floating. Radial float mount connectors are used for applications requiring a radial misalignment of more than +/- 0.045" inches (1.14mm).

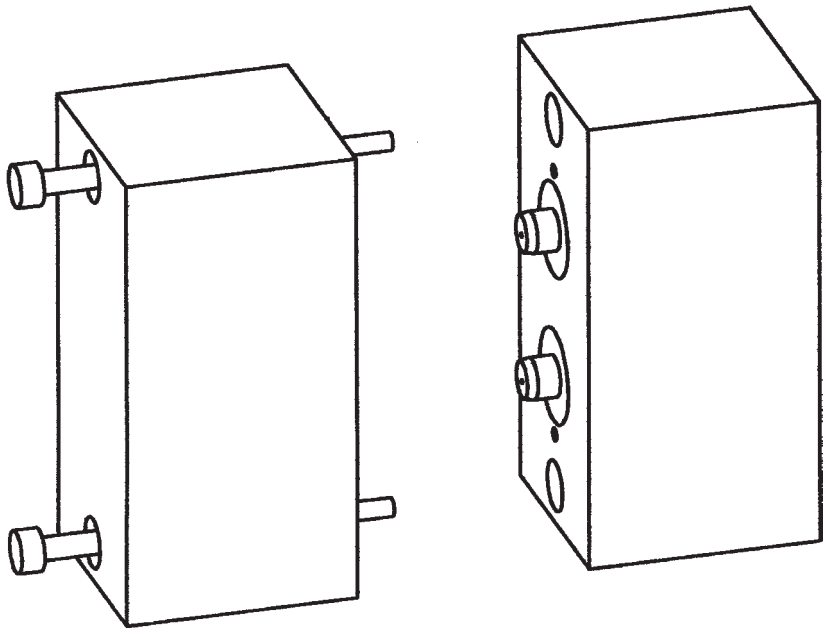
Some test equipment may not be supplied with **SBX** test port connectors. Therefore an adequate number of between series instrument grade adapters to other important connector series are available, such as 7/16, N and SMA.
**SBX** float mount adapters are available to 7/16 and N. Those adapters are of particular interest in applications where components are using several **SBX** connectors in parallel, as mounting tolerances and misalignment have to be taken into consideration, and connection at the other end of the adapter is supposed to be made by cable assemblies using those other standard connectors of types 7/16 or N.
Spectrum Elektrotechnik GmbH is a very innovative company, offering special services in engineering in order to meet the customer's needs to perfection.

# Applications & Features, Type SBX

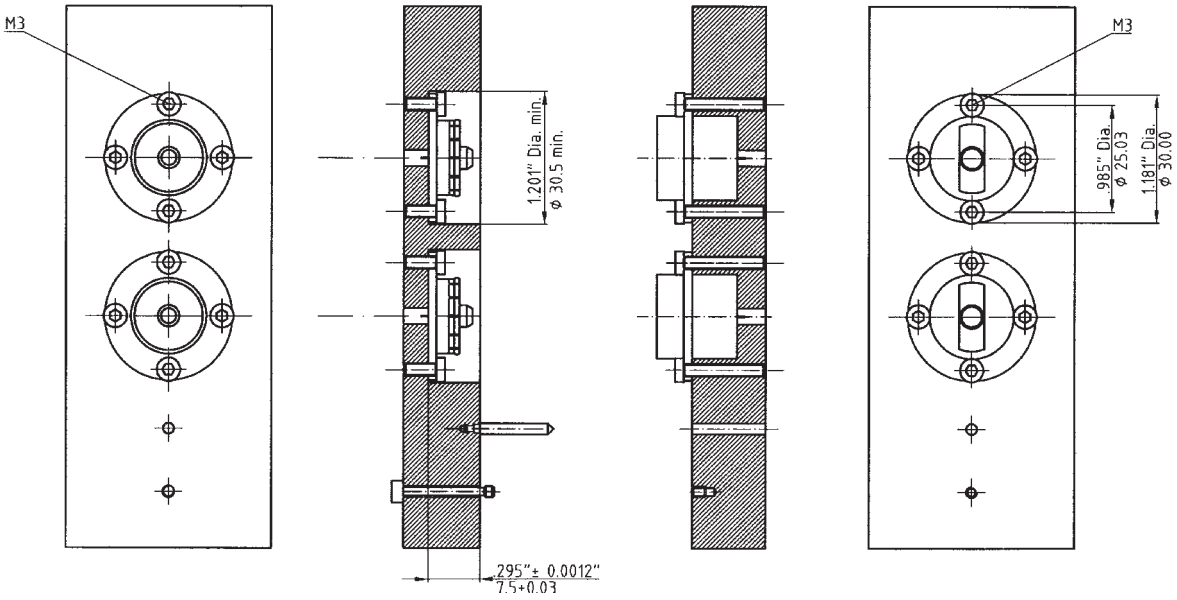
When using blind mate connectors in an application, careful consideration has to be given to choosing the right connector series, the appropriate connector model within that series, and the correct mounting features. Spectrum Elektrotechnik Gmbh does offer besides the **SBX** series, also **SBY**, **BMA** and **SMP** blind mate connectors, and all those series are shown in this Handbook. This makes it easy for the customer to identify the best connector or connectors for his system. A system also may use several or all of the blind mate connectors offered. Important parameters for identifying the proper connector and its series are:

* **Power requirement**
* **Operating frequency**
* **Rigid or float mount connectors**
* **Connector-to-connector fixed tolerances**
* **Connector-to-connector float tolerances**
* **Mating forces**
* **Float mount spring loading**
* **Connector packaging density in multiple connector arrays**
* **Panel deflection**





For applications such as modularized MIC to MIC packages, only rigid mount connectors can be used. Relatively tight tolerances need to be held, as the rigid mount SBX does not accomodate radial misalignment. Axial misalignment should be avoided when the connector is used in high power environment. As in most case only one SBX connector per module is used as power input or output, the interlocking screws can accomodated certain misalignment. A typical method of interlocking modules is using jack screws.

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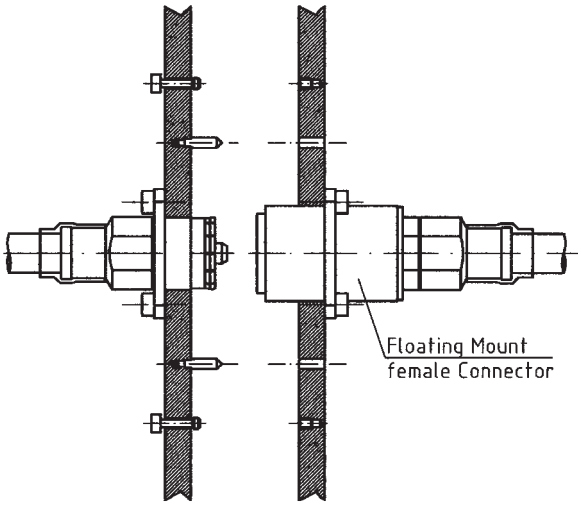
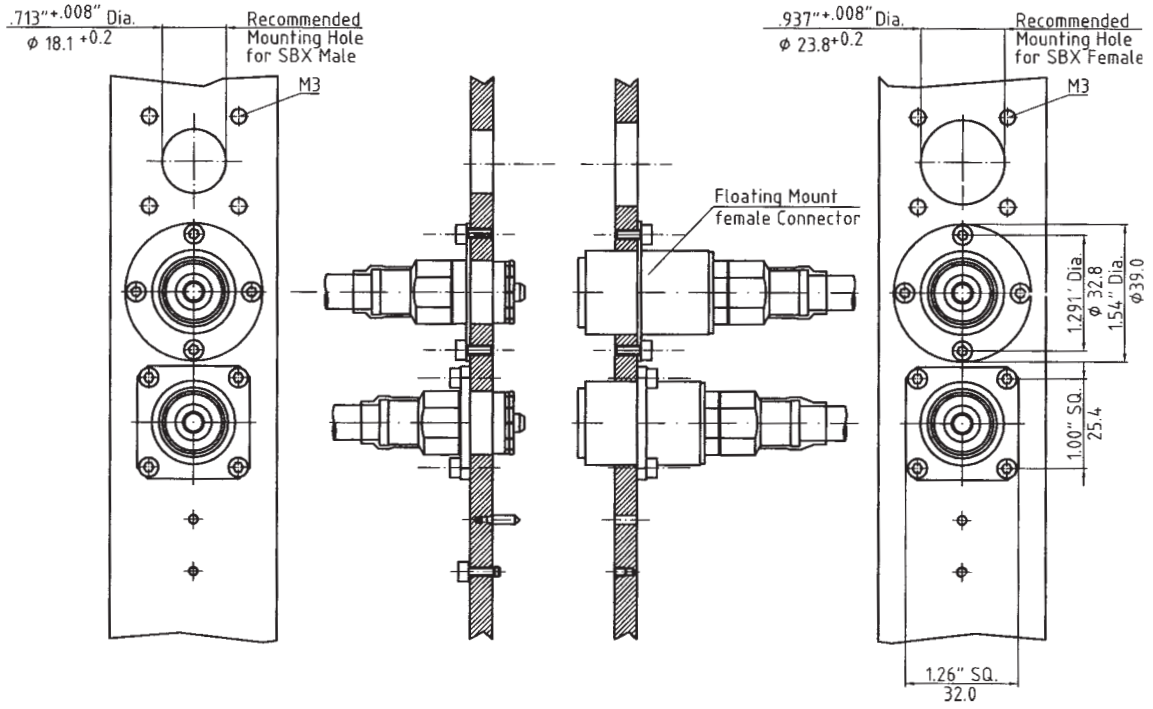
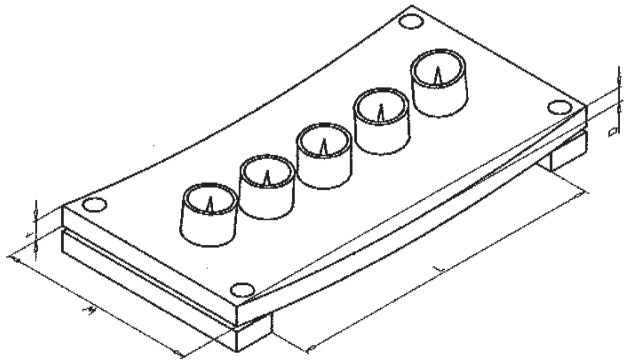
# Float Mount Applications & Features, Type SBX

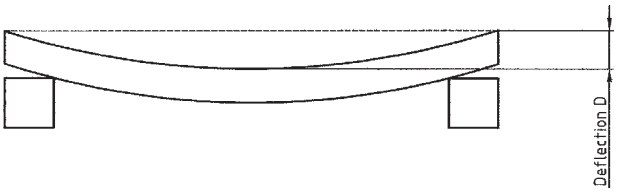



**SBX** (**S**pectrum **B**lind Mate-**X**) female connectors are available, offering radial misalignment with the mating plug connector. A spring mechanism separates the connector interface from the flange housing and allows floating for blind mating purposes. The spring mechanism is aligning the mating connectors, therefore the forces are transmitted to the mounting panel. Under extreme mismatch conditions the mating forces can be considerably high when using several connectors. This can cause bowing of the mounting panel.



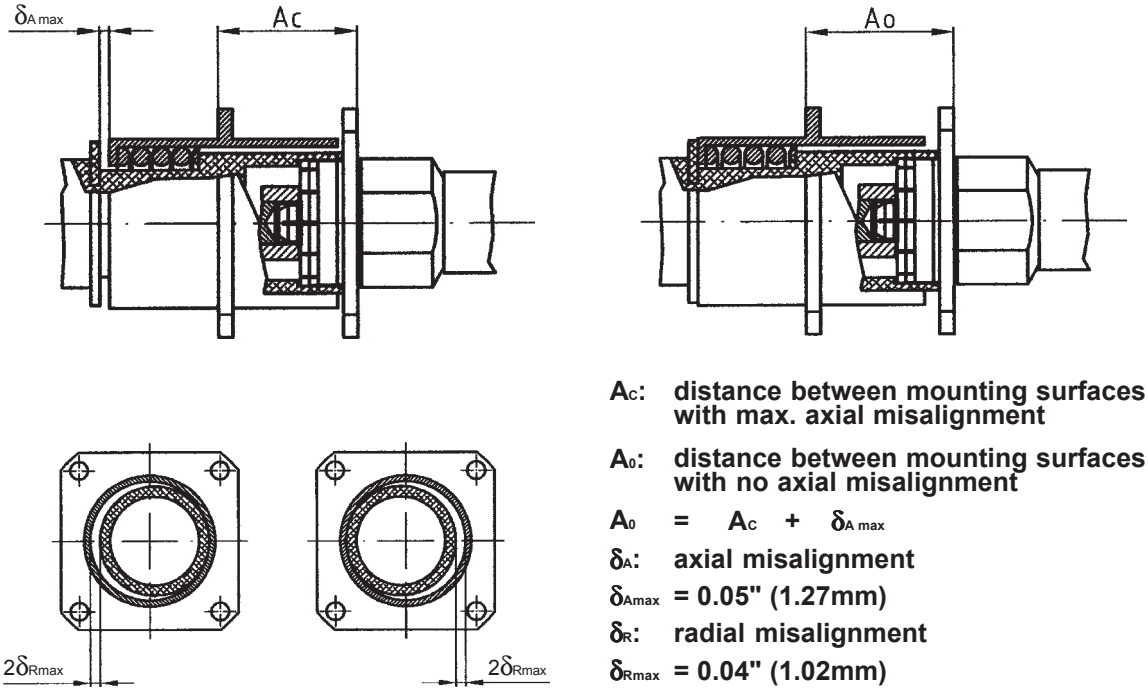
When using several SBX blind mate connectors at a component, on a module to motherboard or rack or panel application, the design must take into consideration the interface mating forces to engage and disengage the connectors, and the spring pre-load forces in floating mount cases.Disregarding this, distortion of mounting plates and panels can occur, preventing proper mating of the connectors, resulting into degraded performance of the component. Considering the panel or motherboard as a beam under deflection can be used as a good approximation for calculating the amount of distortion or bowing. But it has to be noted that the formulas and tables given below and to the right are not taken into consideration when forces are being applied from different angles, or operation in the event of additional stress because of the occurrence of multiple forces.






**Material Properties**

| Material | Yield Strength $R_y$ | | Modulus of Elasticity E | |
|---|---|---|---|---|
| | PSI | N/mm² | PSI | N/mm² |
| Al Mg 3 | 10,200...14,500 | 70 ... 100 | 10.3 x $10^6$ | 71,000 |
| Al Mg 4.5 Mn | 18,100 | 125 | 10.2 x $10^6$ | 70,000 |
| Al Mg Si 0.5 | 23,200 | 160 | 10.2 x $10^6$ | 70,000 |
| Al Mg Si 1 | 16,000...37,000 | 110...255 | 10.2 x $10^6$ | 70,000 |
| Al Mg Si Pb | 40,000 | 275 | 10.2 x $10^6$ | 70,000 |
| | | | | |
| X5 CrNi 18 9 (1.4301) | 50,800 | 350 | 30.5 x $10^6$ | 210,000 |
| X12 CrNiS 18 8 (1.4305) | 58,100 | 400 | 30.5 x $10^6$ | 210,000 |
| X10 CrNiMoTi 18 10 (1.4571) | 138,000 | 950 | 30.5 x $10^6$ | 210,000 |
| | | | | |
| Fe 360 B (St 37-2) | 34,100 | 235 | 30.5 x $10^6$ | 210,000 |
| Fe 590-2 (St 60-2) | 48,600 | 335 | 30.5 x $10^6$ | 210,000 |




**$A_C$:** distance between mounting surfaces with max. axial misalignment

**$A_0$:** distance between mounting surfaces with no axial misalignment

**$A_0 = A_C + \delta_{A\,max}$**

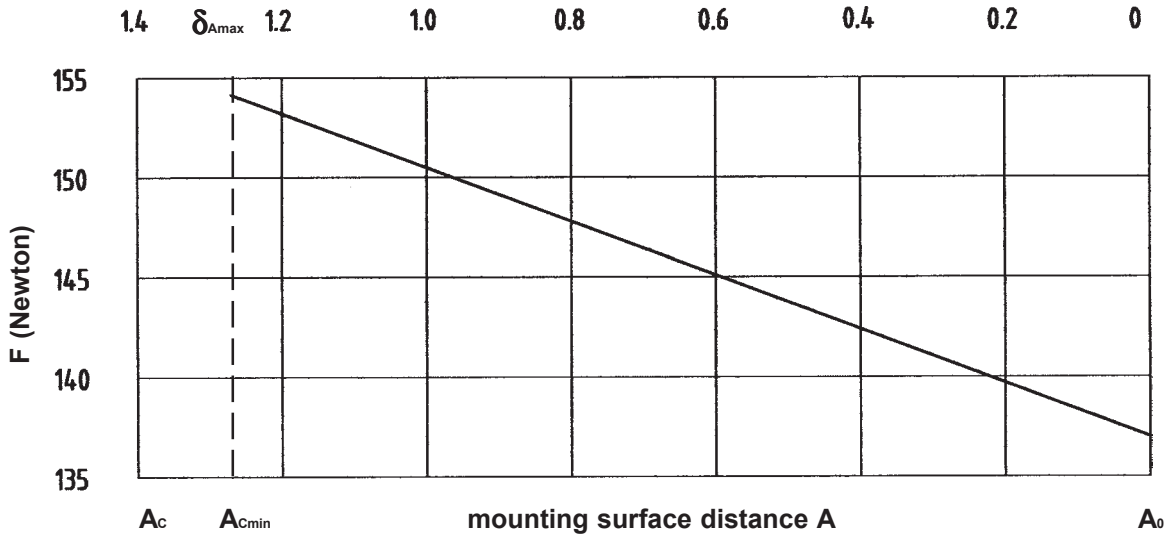
**$\delta_A$:** axial misalignment

**$\delta_{Amax}$ = 0.05" (1.27mm)**

**$\delta_R$:** radial misalignment

**$\delta_{Rmax}$ = 0.04" (1.02mm)**

**SBX** (**S**pectrum **B**lind Mate-**X**) female connectors are available, offering radial misalignment with the mating plug connector. A spring mechanism separates the connector interface from the flange housing and allows floating for blind mating purposes. The spring mechanism is aligning the mating connectors, therefore the forces are transmitted to the mounting panel. Under extreme mismatch conditions the mating forces can be considerably high when using several connectors. This can cause bowing of the mounting panel.



| | Formulae | |
|---|---|---|
| **Ultimate Moment of Resistance** $M_u \left[mm^3\right]$ | $M_u = \frac{wt^2}{6}$ | **w** = width of the panel [mm]<br>**t** = thickness of the panel[mm] |
| **Moment of a Beam** $I \left[mm^3\right]$ | $I = \frac{wt^3}{12}$ | **w** = width of the panel mm]<br>**t** = thickness of the panel [mm] |
| **Maximum Deflection** $D \left[mm\right]$ | $D < \frac{\Sigma F_D L^3}{48 E I}$ | $\Sigma F_D$ = Sum of all forces applied to the plate [N]<br>**L** = Length of the panel [mm]<br>**E** = Modulus of Elasticity $\left[\frac{N}{mm^2}\right]$<br>**I** = Moment of Inertia [mm⁴] |
| **Ultimate Tensile Stress** $O \left[\frac{N}{mm^2}\right]$ | $O < \frac{\Sigma F_D L}{4 M_u}$<br>The tensile stress must be less than the yield strength. | $\Sigma F_D$ = Sum of all forces applied to the panel [N]<br>**L** = Length of the panel [mm]<br>$M_u$ = Ultimate Moment of Resistance [mm³] |

**EXAMPLE, USING 2 PIECES FLOAT MOUNT SBX CONNECTORS:**

**Mating Force of SBX: 130 N** $\Sigma F_{M(2\ connectors)} = 2 \times 130N = 260\ N$

But: The maximum force for 1.27 mm axial misalignement, which is the maximum possible displacement, reads 154N, as shown in the diagram on page 67. Therefore the greater displacement force will be used in the following calculations instead:

**Max. Displacement Force of SBX: 154.0 N** $\Sigma F_{D(2\ connectors)} = 2 \times 154N = 308\ N$

**Aluminum mounting panel of Al Mg Si 0.5:** $L \times w \times t = 100mm \times 12.7mm \times 6.35mm.$

**Modulus of Elasticity:** $E = 70{,}000\ N/mm^2$

**Yield Strength:** $R_y = 160\ N/mm^2$, as shown in the table.

**UltimateMoment of Resistance:** $M_u = \frac{wt^2}{6} = \frac{12.7mm \times (6.35mm)^2}{6} = 85.3\ mm^2$

**Moment of a Beam:** $I = \frac{wt^3}{12} = \frac{12.7mm \times (6.35mm)^3}{12} = 271.0\ mm^4$

**Maximum Deflection:** $D < \frac{\Sigma F_D L^3}{48 E I} = \frac{308.0N \times (100mm)^3}{48 \times 70{,}000N/mm^2 \times 271.0mm^4} = 0.34\ mm$

**Ultimate Tensile Stress:** $O < \frac{\Sigma F_D L}{4 M_U} = \frac{308.0N \times 100mm}{4 \times 85.3\ mm^3} = 90{,}3\ N/mm^2$

The maximum deflection calculated in this example is less than the max. allowable axial misalignment of 1.27mm, as allowed by definition for the SBX float mount. Additional, in the calculation it is assumed that the forces of all 2 connectors are applying in the center of the panel. Therefore additional forces, as contributed by radial misalignment, transverse and shearing forces may be disregarded. The use of the panel choosen in this example for 2 SBX´s seems to be very safe for this application.

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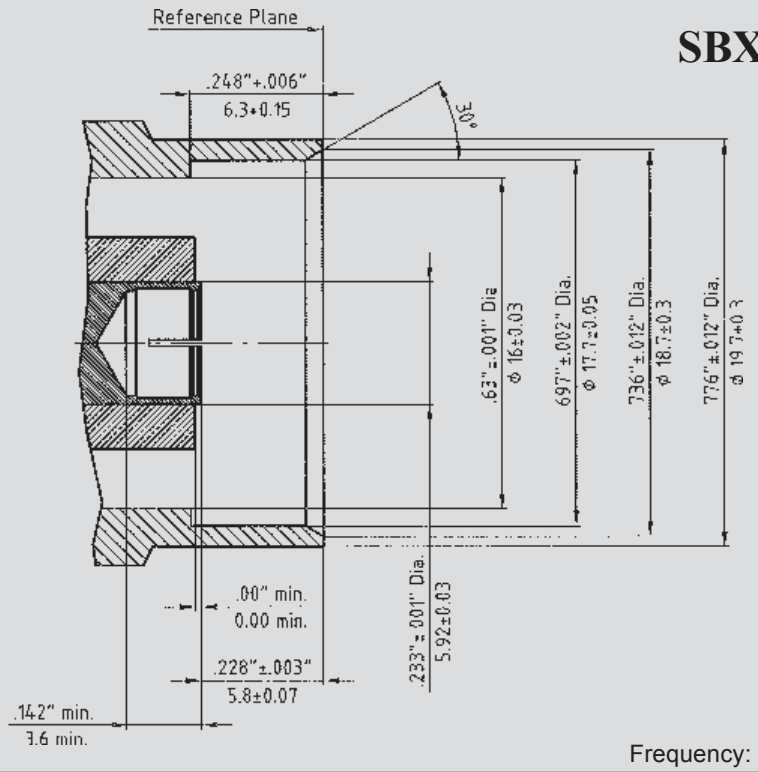
Spectrum Elektrotechnik GmbH

# Specifications, Type SBX

The specifications below are general specifications for all SBX connectors. Specific Data for VSWR, Insertion loss, R.F. leakage etc., are available from the factory upon request. Specifications in the following table are recommended for any procurement documents or drawings. In the event of any conflict between these specifications and other documentation, these specifications shall govern. These specifications are subject to change according to the latest revision.

| REQUIREMENT | | GENERAL SPECIFICATIONS |
|---|---|---|
| **GENERAL** | | |
| Standard Materials | | STEEL corrosion resistant 1.4305 per DIN 17440 (QQ-S-764, class 303 or ASTM-A-582-80).<br>ALUMINUM AlMg4.5Mn per DIN 1725, AlMgSi0.5 per DIN 1725, AlMgSi1 per DIN 1725 (6061-T6 per QQ-A-225/8).<br>BRASS CuZn39Pb3 per DIN 17660 (QQ-B-626, half hard).<br>COPPER BERYLLIUM 33-25 CuBe2Pb H per DIN 17666 (QQ-C-530).<br>TFE Fluorocarbon per DIN 52900 (MIL-P-19468 and L-P403).<br>SILICONE RUBBER per DIN 3771 (MIL-R-5847 and ZZ-R-765, Class II B,) Grade 50 - 75.<br>BORRIUM NITRITE Dielectric for high power applications per inhouse specification. |
| Finish for | COPPER BERYLLIUM | Center Contacts shall be gold plated to a minimum thickness of .00005 inch (1.27 µm) in accordance with MIL-G-45204, Type II, Grade C. Outer conductors shall be gold plated to a thickness of .00003 inch (0.8 µm) per MIL-G-45204 , Type II, Grade C, or silver plated to a thickness of .0001 inch (2.5 µm) per QQ-S-365. |
| | STAINLESS STEEL | Shall be passivated per QQ-P-35 or gold plated to a thickness of .00003 inch (0.8 µm) per MIL-G-45204, Type II, Grade C. |
| | ALUMINUM | Conductive Parts shall have an iridited finish per MIL-C-5541.<br>Other parts, such as Coupling Nuts and Back-Bodies shall be anodized per MIL-A-8625. |
| | BRASS | Gold plated to a thickness of .00003 inch (0.8 µm) min. per MIL-45204, Type II, Grade C, or nicle plated to a thickness of .0002 inch (5µm) per QQ-N-290, grade E, or silver plated to a thickness of .0001 inch (2.5 µm) per QQ-S-365. |
| | VARIOUS | Imoloy .0001 inch (2.5 µm) min. plating, consisting of 55% Copper / 20% Zinc / 25% Tin (on special request). |
| Design | | The design shall be such that the outline dimensions in this catalog are met. In addition, the assembled connector shall meet the interface dimensions. |
| **ELECTRICAL** | | |
| Frequency Range | | DC - 8.0 GHz min. |
| Insulation Resistance | | The insulation resistance shall not be less than 5.000 megohms. |
| Voltage Standing Wave Ratio (VSWR) | | 1.015 + .003 * f (GHz) |
| Contact Resistance | | The center contact resistance drop shall not exceed 0,8 milliohms and the outer contact resistance drop shall not exceed 1.5 milliohms. |
| Dielectric Withstanding Voltage | | The magnitude of the test voltage shall be 4,000 volts rms at sea level. |
| RF High Potential Withstanding Voltage | | The RF high potential withstanding voltage is 2,500 volts rms at 5 MHz. Leakage is not applicable. |
| RF Leakage | | RF Leakage is not applicable |
| Insertion Loss | | (.05 SQT(f(GHz))) dB |
| **MECHANICAL** | | |
| Connector Durability | | The connector is to be tested and its mating connector shall be subjected to 5000 insertions. Withdrawal cycles not applicable. The connector shall show no evidence of mechanical failure and the connector shall meet the mating characteristic requirements. |
| Cable Retention Force | | Cable Retention Force is not applicable. |
| Coupling Nut Retention Force | | Coupling Nut Retention Force is not applicable. |
| Force to Engage and Disengage | | Force to engage and disengage is not applicable. |
| Longitudinal Force max. | | Longitudinal force is not applicable. |
| Mating Characteristics | | Mating Characteristics are not applicable |
| Recommended Mating Torque | | Recommended Mating Torque is not applicable. |
| **ENVIRONMENTAL** | | |
| Corrosion (Salt Spray) | | Specification MIL-STD-202, Method 101, Test Condition B. The salt solution shall be 5%. |
| Vibration | | Specification MIL-STD-202, Method 204, Test Condition B. |
| Shock | | Specification MIL-STD-202, Method 213, Test Condition 1. |
| Thermal Shock | | Specification MIL-STD-202, Method 107, Test Condition B, except high temperature shall be + 200°C. |
| Moisture Resistance | | Specification MIL-STD-202, Method 106. Step 7b (vibration) shall be omitted. Insulation resistance shall be 200 megohms min. within 5 minutes of removal from humidity. |
| Corona Level | | The connector shall not exhibit breakdown (corona) when the applied voltage is 750 volts rms and the altitude is 70,000 feet. |

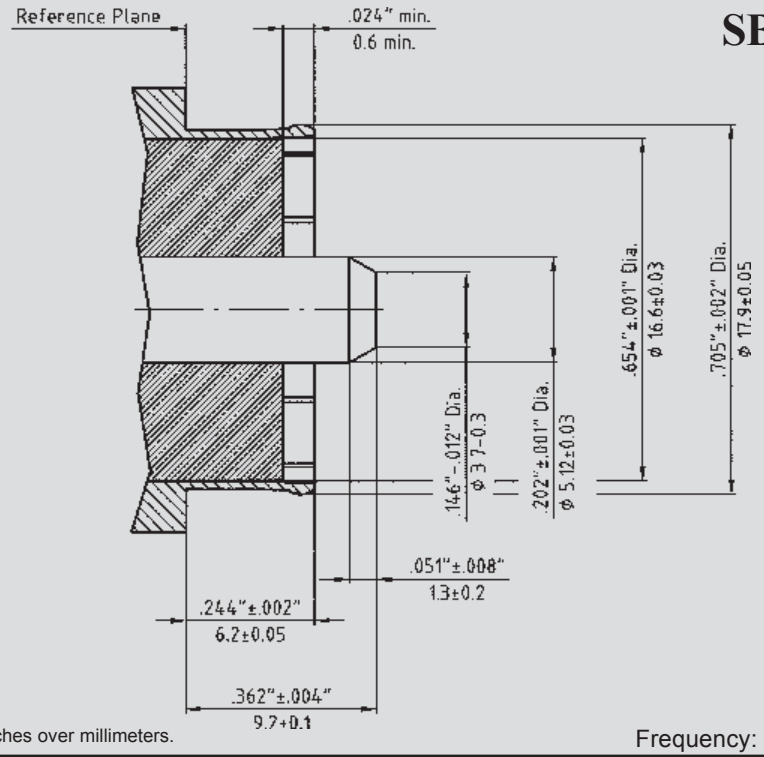
## SBX Female




Dimensions shown are inches over millimeters.

Frequency: DC - 8.0 GHz min.

## SBX Male




Dimensions shown are inches over millimeters.

Frequency: DC - 8.0 GHz min.

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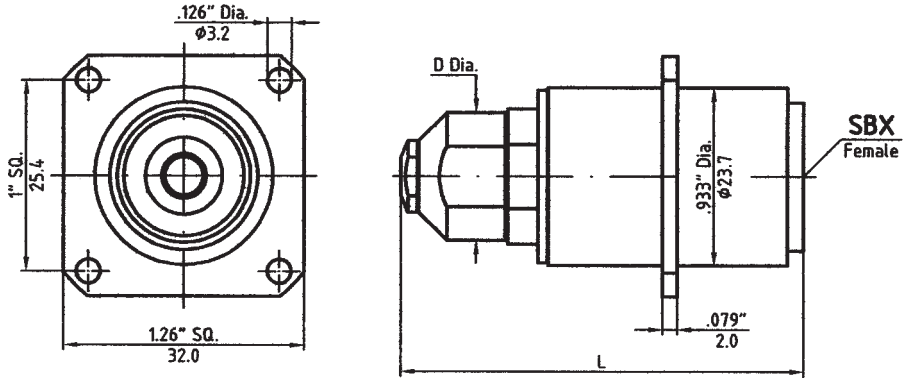
# SBX

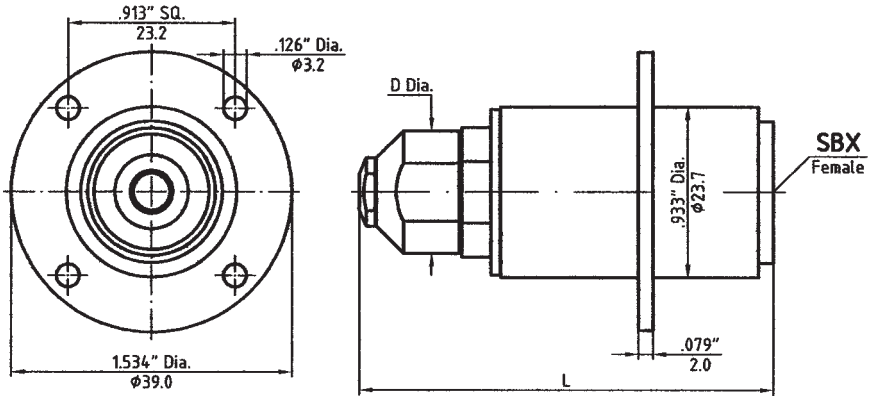



DC - 8.0 GHz

## SBX-Female Float Mount for Semi-Rigid Cables

| Connector Part No. | S/R Cable | Cable Part No. | L | Ø D | Conn. Code |
|---|---|---|---|---|---|
| 7803-6001-02 | .141" | 421-669<br>421-669-1<br>421-669-3 | In Development | | XF4 |
| 7806-6001-02 | .250" | 421-252<br>421-252-1<br>421-252-3 | 2.228"<br>56.6 | .63"<br>16.0 | |
| 7806-6002-02 | .250" LL | 421-336<br>421-336-1<br>421-336-3 | 2.228"<br>56.6 | .63"<br>16.0 | |

Connector outer conductor is passivated stainless steel. Center conductor is gold plated. LL= Low density dielectric.



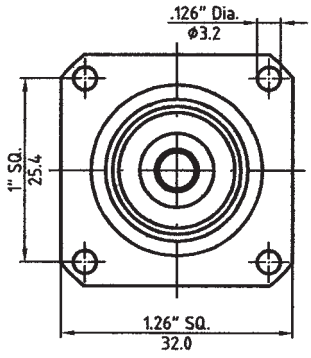

DC - 8.0 GHz

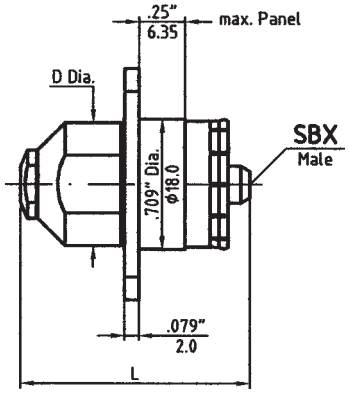
## SBX-Female Float Mount for Semi-Rigid Cables

| Connector Part No. | S/R Cable | Cable Part No. | L | Ø D | Conn. Code |
|---|---|---|---|---|---|
| 7803-6002-02 | .141" | 421-669<br>421-669-1<br>421-669-3 | In Development | | XFR |
| 7806-6003-02 | .250" | 421-252<br>421-252-1<br>421-252-3 | 2.228"<br>56.6 | .63"<br>16.0 | |
| 7806-6004-02 | .250" LL | 421-336<br>421-336-1<br>421-336-3 | 2.228"<br>56.6 | .63"<br>16.0 | |

Connector outer conductor is passivated stainless steel. Center conductor is gold plated. LL= Low density dielectric.

Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per Spectrum Elektrotechnik GmbH Specifications. For details please refer to the beginning of this section.



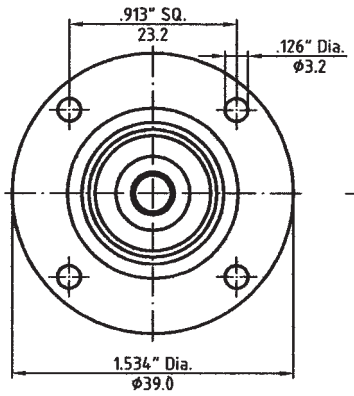



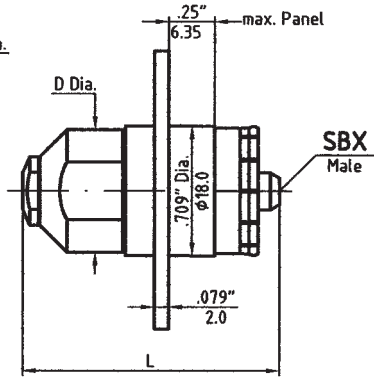

**DC - 8.0 GHz**

## SBX-Male Flange Mount for Semi-Rigid Cables

| Connector Part No. | S/R Cable | Cable Part No. | L | Ø D | Conn. Code |
|---|---|---|---|---|---|
| 7803-7002-02 | .141" | 421-669<br>421-669-1<br>421-669-3 | In Development | | XM4 |
| 7806-7003-02 | .250" | 421-252<br>421-252-1<br>421-252-3 | 1.366"<br>34.7 | .63"<br>16.0 | |
| 7806-7004-02 | .250" LL | 421-336<br>421-336-1<br>421-336-3 | 1.366"<br>34.7 | .63"<br>16.0 | |

Connector outer conductor is passivated stainless steel. Center conductor is gold plated. LL= Low density dielectric.




**DC - 8.0 GHz**

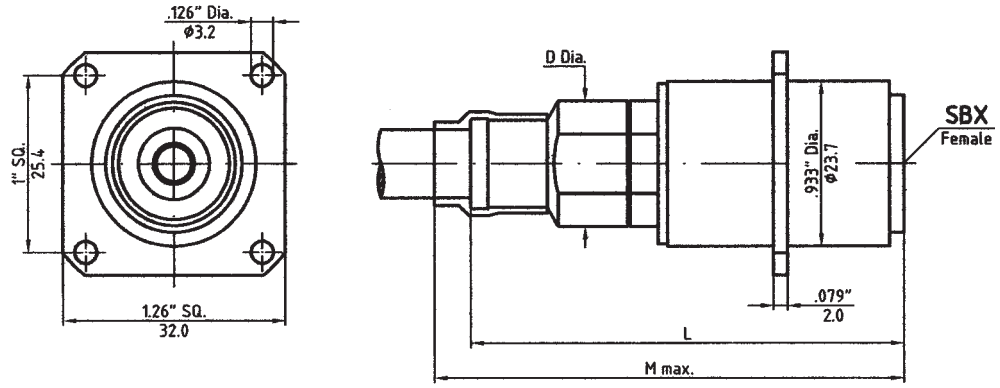
## SBX-Male Flange Mount for Semi-Rigid Cables

| Connector Part No. | S/R Cable | Cable Part No. | L | Ø D | Conn. Code |
|---|---|---|---|---|---|
| 7803-7001-02 | .141" | 421-669<br>421-669-1<br>421-669-3 | In Development | | XMR |
| 7806-7001-02 | .250" | 421-252<br>421-252-1<br>421-252-3 | 1.366"<br>34.7 | .63"<br>16.0 | |
| 7806-7002-02 | .250" LL | 421-336<br>421-336-1<br>421-336-3 | 1.366"<br>34.7 | .63"<br>16.0 | |

Connector outer conductor is passivated stainless steel. Center conductor is gold plated. LL= Low density dielectric.

Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per Spectrum Elektrotechnik GmbH Specifications. For details please refer to the beginning of this section.

# SBX Flex. Cable Float Mount Connectors

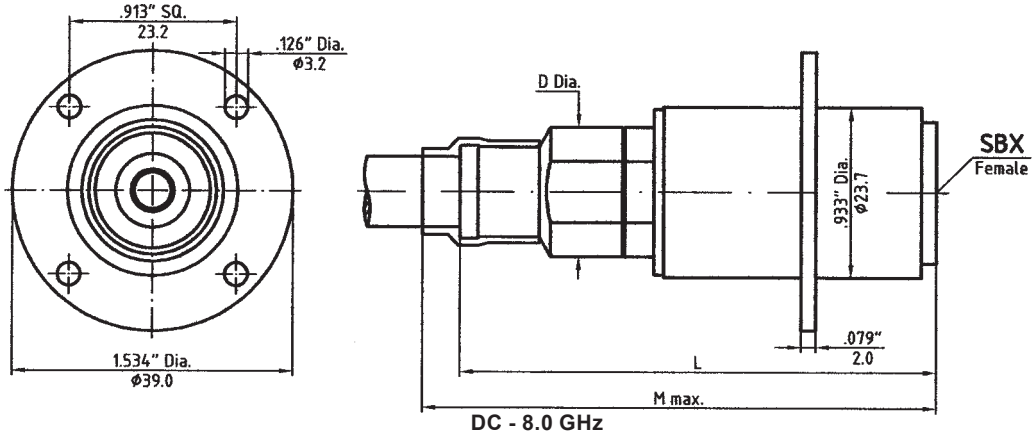



DC - 8.0 GHz

## SBX-Female Float Mount for Flexible Cables

| Connector Part No. | Cable Type | Cable Code | L | M | Ø D Dia. | Conn. Code |
|---|---|---|---|---|---|---|
| 7815-6001-02 | RG-142B/U | 42 | In Development | | | XF4 |
| 7815-6002-02 | RG-400/U | 40 | In Development | | | |
| 7817-6001-02 | RG-214/U | 21 | 2.567" 65.2 | 4.33" 110.0 | .709" 18.0 | |

Connector outer conductor is passivated stainless steel. Center conductor is gold plated.




DC - 8.0 GHz

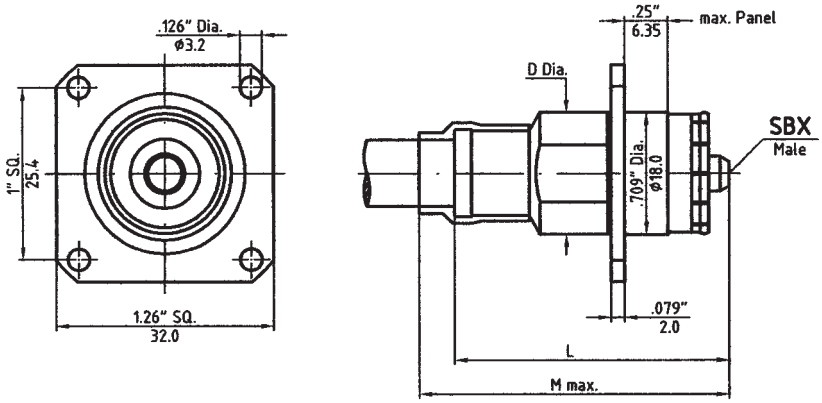
## SBX-Female Float Mount for Flexible Cables

| Connector Part No. | Cable Type | Cable Code | L | M | Ø D Dia. | Conn. Code |
|---|---|---|---|---|---|---|
| 7815-6003-02 | RG-142B/U | 42 | In Development | | | XFR |
| 7815-6004-02 | RG-400/U | 40 | In Development | | | |
| 7817-6002-02 | RG-214/U | 21 | 2.567" 65.2 | 4.33" 110.0 | .709" 18.0 | |

Connector outer conductor is passivated stainless steel. Center conductor is gold plated.

Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per Spectrum Elektrotechnik GmbH Specifications. For details please refer to the beginning of this section.

c:/quikc98/sbx1.pm6

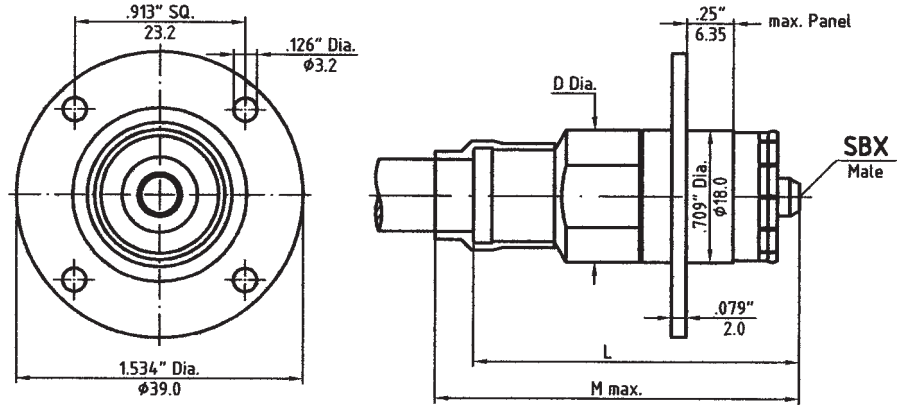



**DC - 8.0 GHz**

## SBX-Male Float Mount for Flexible Cables

| Connector Part No. | Cable Type | Cable Code | L | M | Ø D Dia. | Conn. Code |
|---|---|---|---|---|---|---|
| 7815-7003-02 | RG-142B/U | 42 | In Development | | | XM4 |
| 7815-7004-02 | RG-400/U | 40 | In Development | | | |
| 7817-7002-02 | RG-214/U | 21 | 2.228" 56.6 | 4.133" 105.0 | .709" 18.0 | |

Connector outer conductor is passivated stainless steel. Center conductor is gold plated.




**DC - 8.0 GHz**

## SBX-Male Float Mount for Flexible Cables

| Connector Part No. | Cable Type | Cable Code | L | M | Ø D Dia. | Conn. Code |
|---|---|---|---|---|---|---|
| 7815-7001-02 | RG-142B/U | 42 | In Development | | | XMR |
| 7815-7002-02 | RG-400/U | 40 | In Development | | | |
| 7817-7001-02 | RG-214/U | 21 | 2.228" 56.6 | 4.133" 105.0 | .709" 18.0 | |

Connector outer conductor is passivated stainless steel. Center conductor is gold plated.

Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per Spectrum Elektrotechnik GmbH Specifications. For details please refer to the beginning of this section.

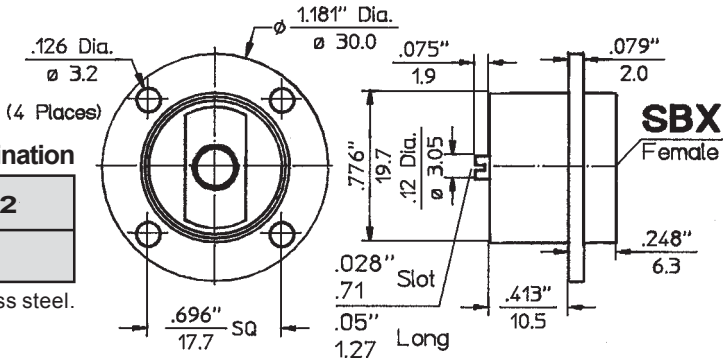
# SBX Circuit Board Connectors

Spectrum Elektrotechnik GmbH

### SBX Female Flange Mount Slotted Termination

| Connector Part No. | 7899-6002-02 |
|---|---|
| Frequency Range | DC to 8.0 GHz |

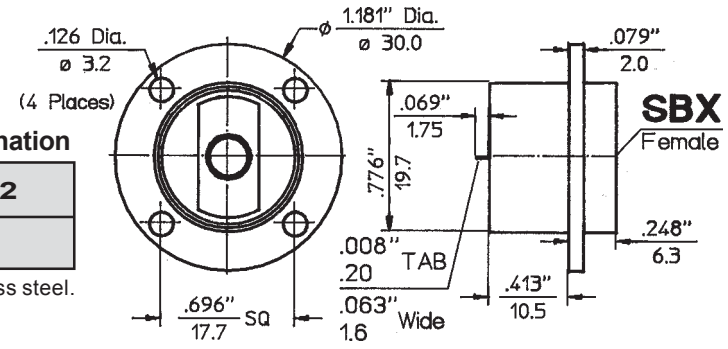
Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.




### SBX Female Flange Mount Tab Termination

| Connector Part No. | 7899-6003-02 |
|---|---|
| Frequency Range | DC to 8.0 GHz |

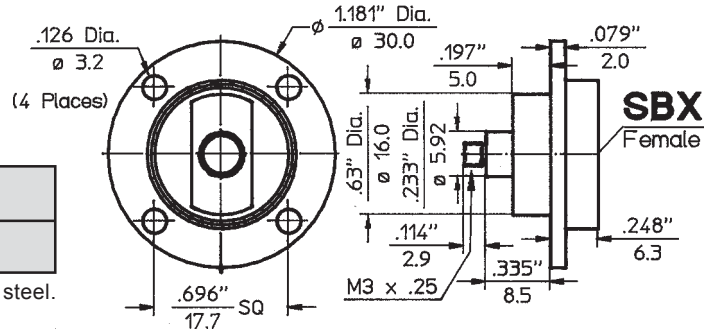
Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.




### SBX Female Flange Mount

| Connector Part No. | 7899-6001-02 |
|---|---|
| Frequency Range | DC to 8.0 GHz |

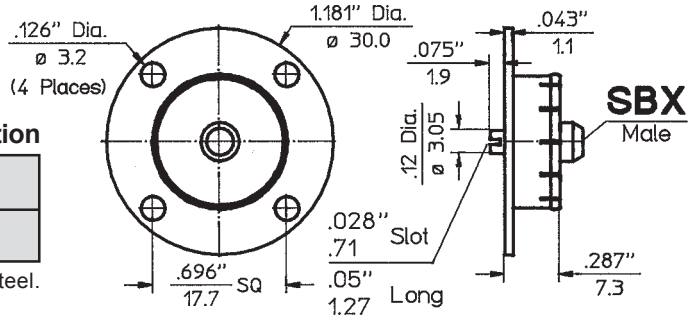
Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.




### SBX Male Flange Mount Slotted Termination

| Connector Part No. | 7899-7001-02 |
|---|---|
| Frequency Range | DC to 8.0 GHz |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.




Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per Spectrum Elektrotechnik GmbH Specifications. For details please refer to the beginning of this section.

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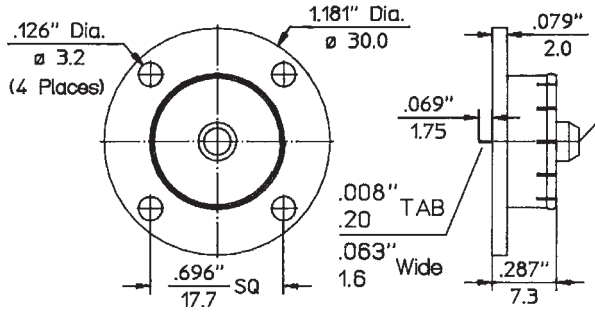
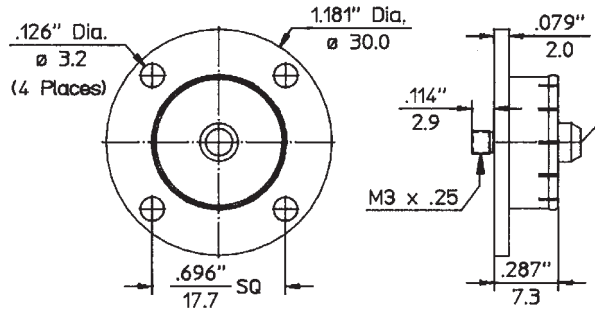



**SBX**
Male

### SBX Male Flange Mount Tab Termination

| Connector Part No. | 7899-7003-02 |
|---|---|
| Frequency Range | DC to 8.0 GHz |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.




**SBX**
Male

### SBX Male Flange Mount

| Connector Part No. | 7899-7002-02 |
|---|---|
| Frequency Range | DC to 8.0 GHz |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.

Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per Spectrum Elektrotechnik GmbH Specifications. For details please refer to the beginning of this section.

# SBX Float Mount Connectors

Spectrum Elektrotechnik GmbH

**Instrument Grade Adapters are designed for excellent performance. The designs are state-of-the-art, engineered to perfection!**

c:/quikc98/sbx2.pm6

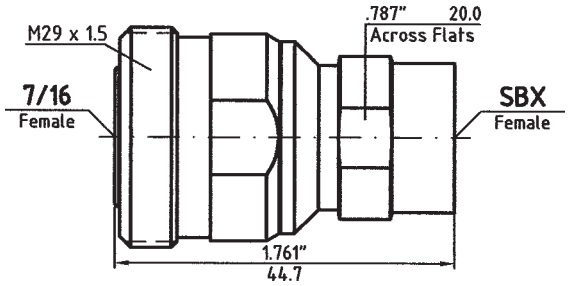

Spectrum Elektrotechnik GmbH P.O. Box 45 05 33, 80905 Munich, Germany **Tel. (89) 354 804-0, Fax (89) 354 804-90** (Country Code: 49)

# SBX

# SBX Between-Series Adapters

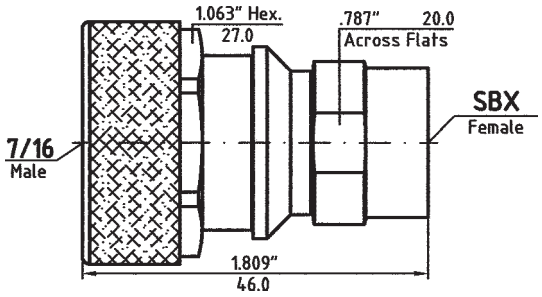
| Adapter Part No. | 8001-XF76-02 |
|---|---|
| Connector Config. | SBX-f to 7/16-f |
| Frequency Range | DC to 7.5 GHz |
| VSWR | 1.06 + 0.005 x f (GHz) |

Connector outer conductor is passivated stainless steel.
Center conductor is gold or/and silver plated.



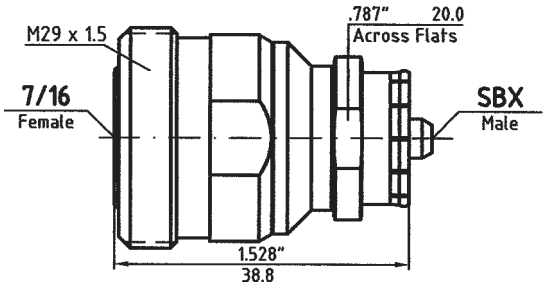

| Adapter Part No. | 8001-XF75-02 |
|---|---|
| Connector Config. | SBX-f to 7/16-m |
| Frequency Range | DC to 7.5 GHz |
| VSWR | 1.06 + 0.005 x f (GHz) |

Connector outer conductor is passivated stainless steel.
Center conductor is gold or/and silver plated.



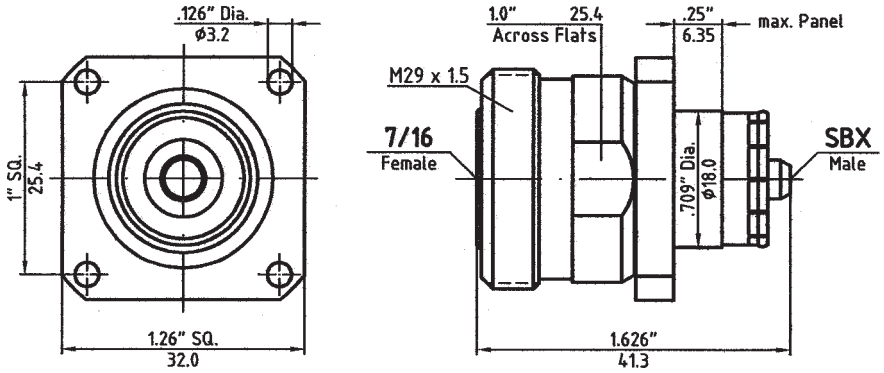

| Adapter Part No. | 8001-XM76-02 |
|---|---|
| Connector Config. | SBX-m to 7/16-f |
| Frequency Range | DC to 7.5 GHz |
| VSWR | 1.06 + 0.005 x f (GHz) |

Connector outer conductor is passivated stainless steel.
Center conductor is gold or/and silver plated.



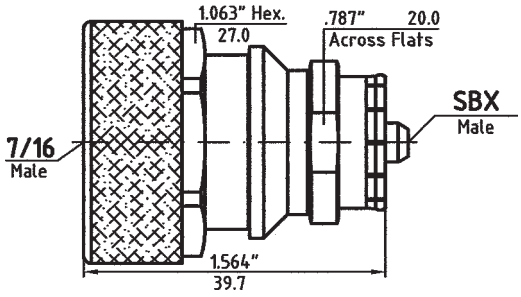

Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per MIL-C 39012, MIL-C-87104/2, MIL-C-3643, MIL-STD-348, IEC-169-7, IEC-457-2, DIN 47 223, DIN 47 226, DIN 47 298, where applicable. For details please refer to the beginning of this section.

# Between-Series Adapters, Type SBX



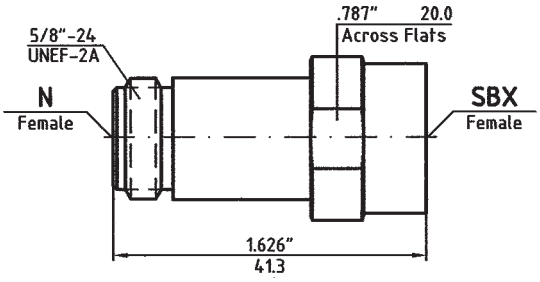

| Adapter Part No. | 8002-XM76-02 |
|---|---|
| Connector Config. | SBX-m to 7/16-f |
| Frequency Range | DC to 7.5 GHz |
| VSWR | 1.06 + 0.005 x f (GHz) |

Connector outer conductor is passivated stainless steel.
Center conductor is gold or/and silver plated.




| Adapter Part No. | 8001-XM75-02 |
|---|---|
| Connector Config. | SBX-m to 7/16-m |
| Frequency Range | DC to 7.5 GHz |
| VSWR | 1.06 + 0.005 x f (GHz) |

Connector outer conductor is passivated stainless steel.
Center conductor is gold or/and silver plated.




| Adapter Part No. | 8001-XF61-02 |
|---|---|
| Connector Config. | SBX-f to N-f |
| Frequency Range | DC to 8.0 GHz |
| VSWR | 1.06 + 0.01 x f (GHz) |

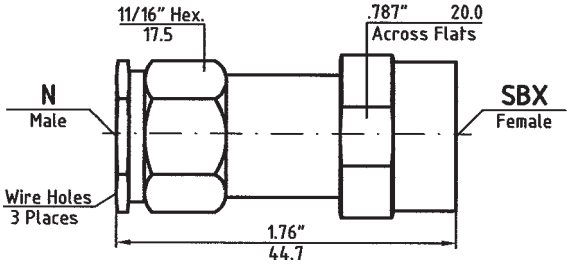
Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.

Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per MIL-C 39012, MIL-C-87104/2, MIL-C-3643, MIL-STD-348, IEC-169-7, IEC-457-2, DIN 47 223, DIN 47 226, DIN 47 298, where applicable. For details please refer to the beginning of this section.

# SBX Between-Series Adapters

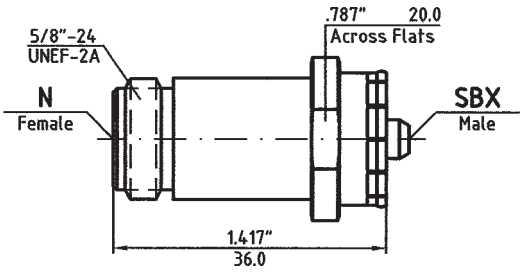
| Adapter Part No. | 8001-XF51-02 |
|---|---|
| Connector Config. | SBX-f to N-f |
| Frequency Range | DC to 8.0 GHz |
| VSWR | 1.06 + 0.01 x f (GHz) |

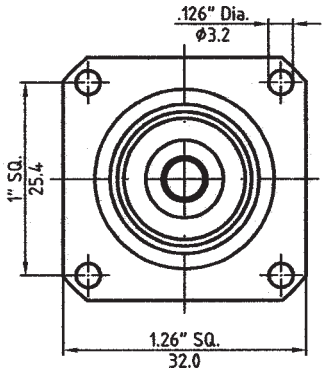
Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.

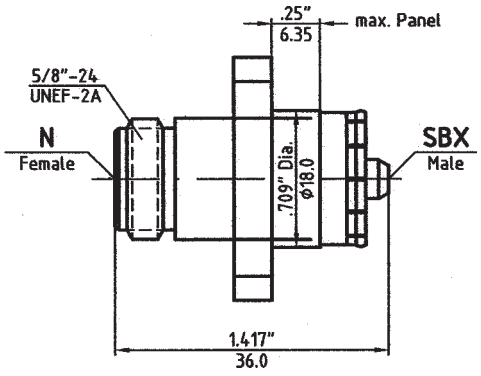



| Adapter Part No. | 8001-XM61-02 |
|---|---|
| Connector Config. | SBX-m to N-f |
| Frequency Range | DC to 8.0 GHz |
| VSWR | 1.06 + 0.01 x f (GHz) |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.



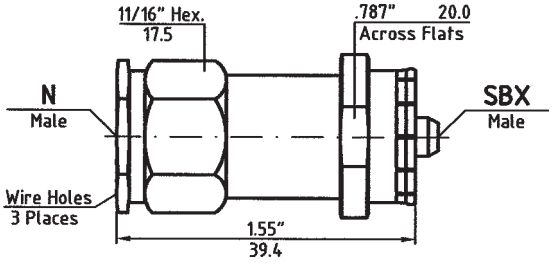




| Adapter Part No. | 8002-XM61-02 |
|---|---|
| Connector Config. | SBX-m to N-f |
| Frequency Range | DC to 8.0 GHz |
| VSWR | 1.06 + 0.01 x f (GHz) |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.

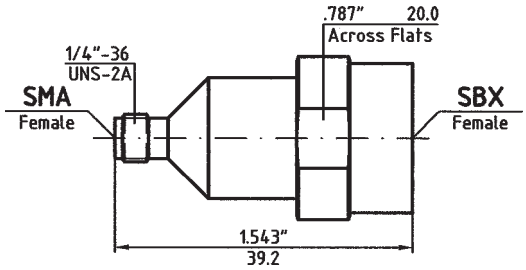
Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per MIL-C 39012, MIL-C-87104/2, MIL-C-3643, MIL-STD-348, IEC-169-7, IEC-457-2, DIN 47 223, DIN 47 226, DIN 47 298, where applicable. For details please refer to the beginning of this section.

# Between-Series Adapters, Type SBX



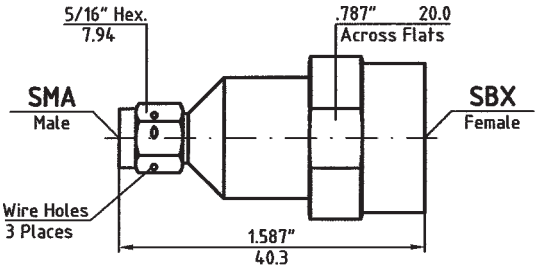

| Adapter Part No. | 8001-XM51-02 |
|---|---|
| Connector Config. | SBX-m to N-f |
| Frequency Range | DC to 8.0 GHz |
| VSWR | 1.06 + 0.01 x f (GHz) |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.



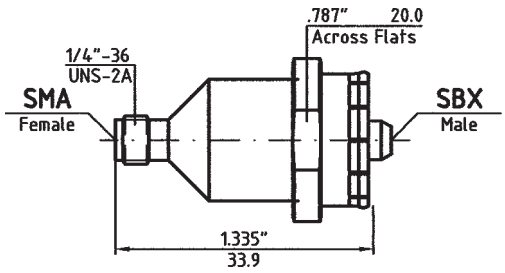

| Adapter Part No. | 8001-XF21-02 |
|---|---|
| Connector Config. | SBX-f to SMA-f |
| Frequency Range | DC to 8.0 GHz |
| VSWR | 1.06 + 0.005 x f (GHz) |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.



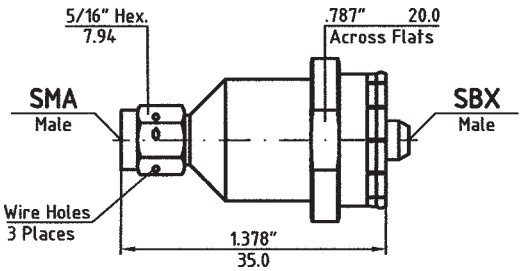

| Adapter Part No. | 8001-XF11-02 |
|---|---|
| Connector Config. | SBX-f to SMA-f |
| Frequency Range | DC to 8.0 GHz |
| VSWR | 1.06 + 0.005 x f (GHz) |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.




| Adapter Part No. | 8001-XM21-02 |
|---|---|
| Connector Config. | SBX-m to SMA-f |
| Frequency Range | DC to 8.0 GHz |
| VSWR | 1.06 + 0.005 x f (GHz) |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.




| Adapter Part No. | 8001-XM11-02 |
|---|---|
| Connector Config. | SBX-m to SMA-m |
| Frequency Range | DC to 8.0 GHz |
| VSWR | 1.06 + 0.005 x f (GHz) |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.

Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per MIL-C 39012, MIL-C-87104/2, MIL-C-3643, MIL-STD-348, IEC-169-7, IEC-457-2, DIN 47 223, DIN 47 226, DIN 47 298, where applicable. For details please refer to the beginning of this section.

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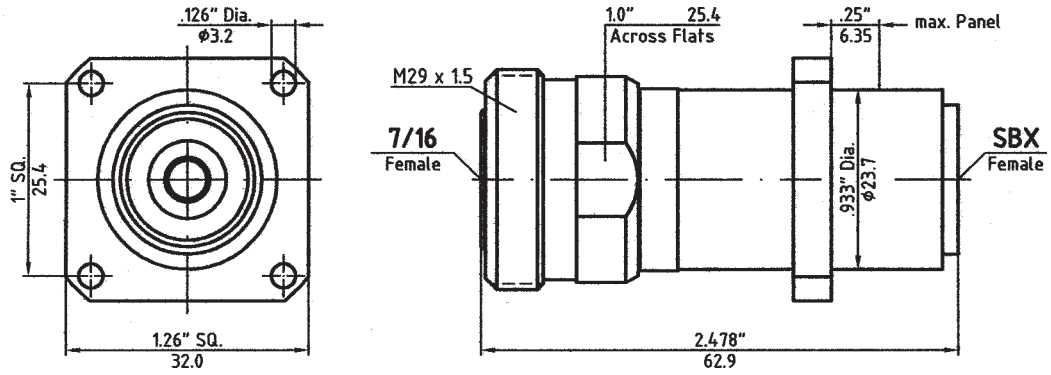
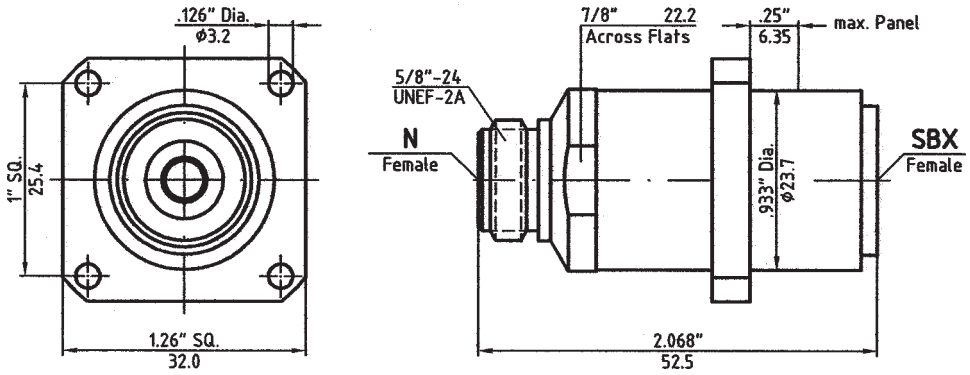
# SBX Float Mount Adapters




| Adapter Part No. | 8002-XF76-02 |
|---|---|
| Connector Config. | SBX-f to 7/16-f |
| Frequency Range | DC to 7.5 GHz |
| VSWR | 1.06 + 0.005 x f (GHz) |

Connector outer conductor is passivated stainless steel.
Center conductor is gold or/and silver plated.




| Adapter Part No. | 8002-XF61-02 |
|---|---|
| Connector Config. | SBX-f to N-f |
| Frequency Range | DC to 8.0 GHz |
| VSWR | 1.06 + 0.01 x f (GHz) |

Connector outer conductor is passivated stainless steel.
Center conductor is gold or/and silver plated.

Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per MIL-C 39012, MIL-C-87104/2, MIL-C-3643, MIL-STD-348, IEC-169-7, IEC-457-2, DIN 47 223, DIN 47 226, DIN 47 298, where applicable. For details please refer to the beginning of this section.

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# SBY

# SBY Applications & Features

**SBY** (**S**pectrum-**B**lind Mate-**Y**) push-on connectors were developed in 1993 for the same program the SBX was needed, interconnecting high power microwave modules, using direct mount or floating rear mount. **SBY** high performance connectors meet high power requirements, combined with microwave multiple interconnects. The connectors can be integrated into the housing of the component so that the connection even cannot been recognized from the outside. **SBY** connectors are specifically used for packaging and interconnecting those power microwave modules, drawers and racks in state-of-the-art systems that do not allow longer system down time. **SBY** push-on connectors allow replacement of faulty high power microwave modules within seconds. A typical method of interlocking modules is using lock screws.

**SBY** (**S**pectrum-**B**lind Mate-**Y**) female connectors are available, offering radial misalignment with the mating plug connector. A spring mechanism separates the connector interface from the flange housing and allows floating for blind mating purposes.

**SBY** (**S**pectrum-**B**lind Mate-**Y**) connectors are designed for high power, operating to 12.0 GHz. Precision design leads to lowest VSWR. Excellent electrical performance means little reflected power, which is the prerequisite for superior performance at higher power applications.

**SBY** (**S**pectrum-**B**lind Mate-**Y**) connectors are also available as cable connectors for several standard **semi-rigid** cables, **low density semi-rigid** cables, standard **flexible** cables and **low density flexible** cables. The availability of **SBY** connectors allows easy interconnection of microwave power components. Standard units are available in bulkhead or panel mount designs for solder and compression clamp attachment. Female cable connectors can be obtained in float or rigid mount. **SBY** float mount connectors are ideally suited for axial and radial misalignment. They employ a spring mechanism that separates the connector interface from the flange housing and allows the floating. Radial float mount connectors are used for applications requiring a radial misalignment of more than +/- 0.045 inches (1.14mm).

Some test equipment may not be supplied with **SBY** test port connectors. Therefore an adequate number of between series instrument grade adapters to other important connector series are available, such as 7/16, N and SMA.
**SBY** float mount adapters are available to 7/16 and N. Those adapters are of particular interest in applications where components are using several **SBY** connectors in parallel, as mounting tolerances and misalignment have to be taken into consideration, and connection at the other end of the adapter is supposed to be made by cable assemblies using those other standard connectors of types 7/16 or N.
Spectrum Elektrotechnik GmbH is a very innovative company, offering special services in engineering in order to meet the customer's needs to perfection.

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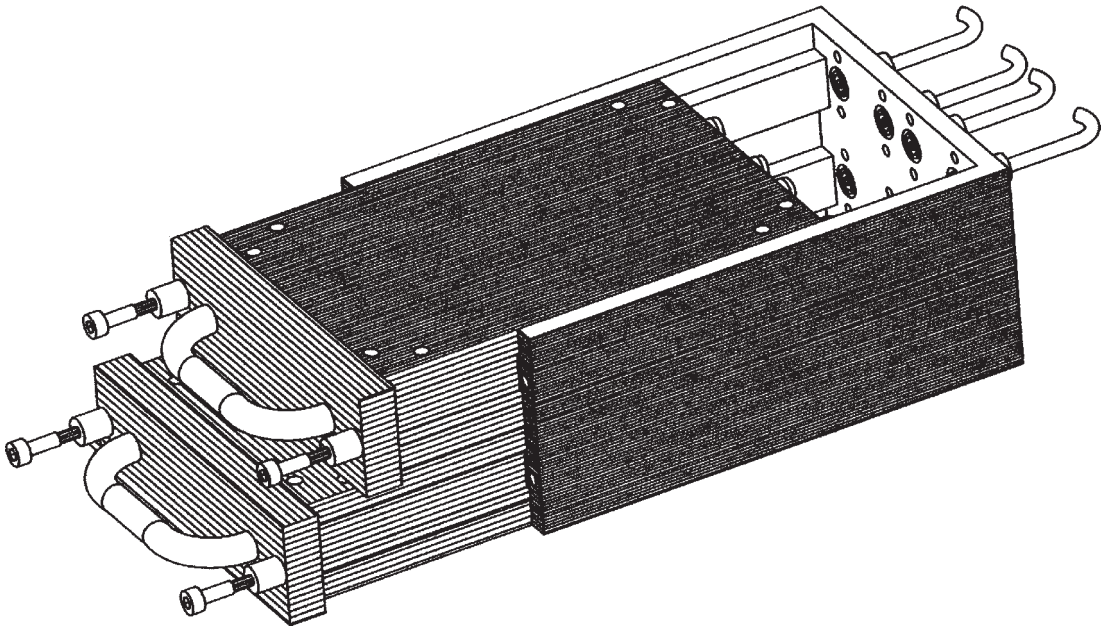
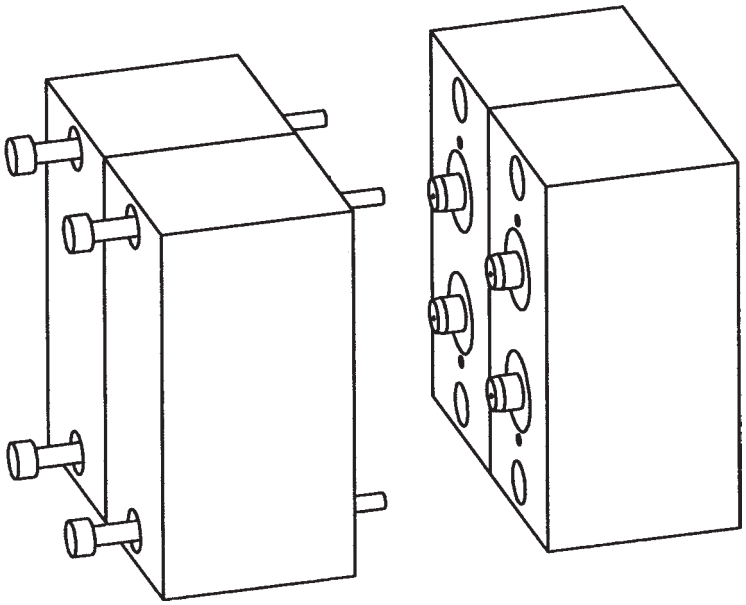
# Applications & Features, Type SBY

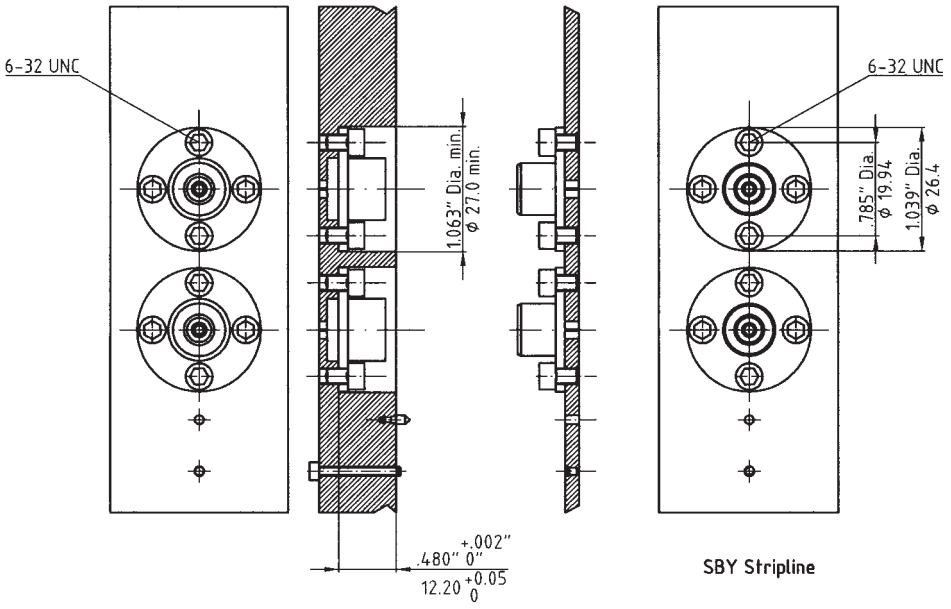
When using blind mate connectors in an application, careful consideration has to be given to choosing the right connector series, the appropriate connector model within that series, and the correct mounting features. Spectrum Elektrotechnik Gmbh does offer besides the **SBY** series, also **SBX**, **BMA** and **SMP** blind mate connectors, and all those series are shown in this Handbook. This makes it easy for the customer to identify the best connector or connectors for his system. A system also may use several or all of the blind mate connectors offered. Important parameters for identifying the proper connector and its series are:

* **Power requirement**
* **Operating frequency**
* **Rigid or float mount connectors**
* **Connector-to-connector fixed tolerances**
* **Connector-to-connector float tolerances**
* **Mating forces**
* **Float mount spring loading**
* **Connector packaging density in multiple connector arrays**
* **Panel deflection**





For applications such as modularized MIC to MIC packages, only rigid mount connectors can be used. Relatively tight tolerances need to be held, as the rigid mount SBY does not accomodate radial misalignment. Axial misalignment should be avoided when the connector is used in high power environment. As in most case only one SBY connector per module is used as power input or output, the interlocking screws can accomodated certain misalignment. A typical method of interlocking modules is using jack screws.

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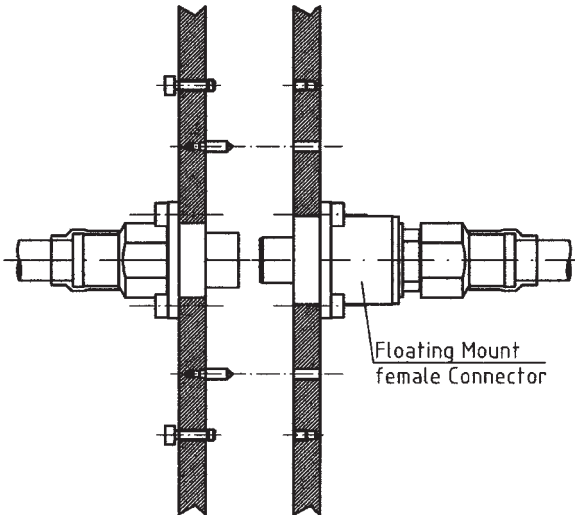
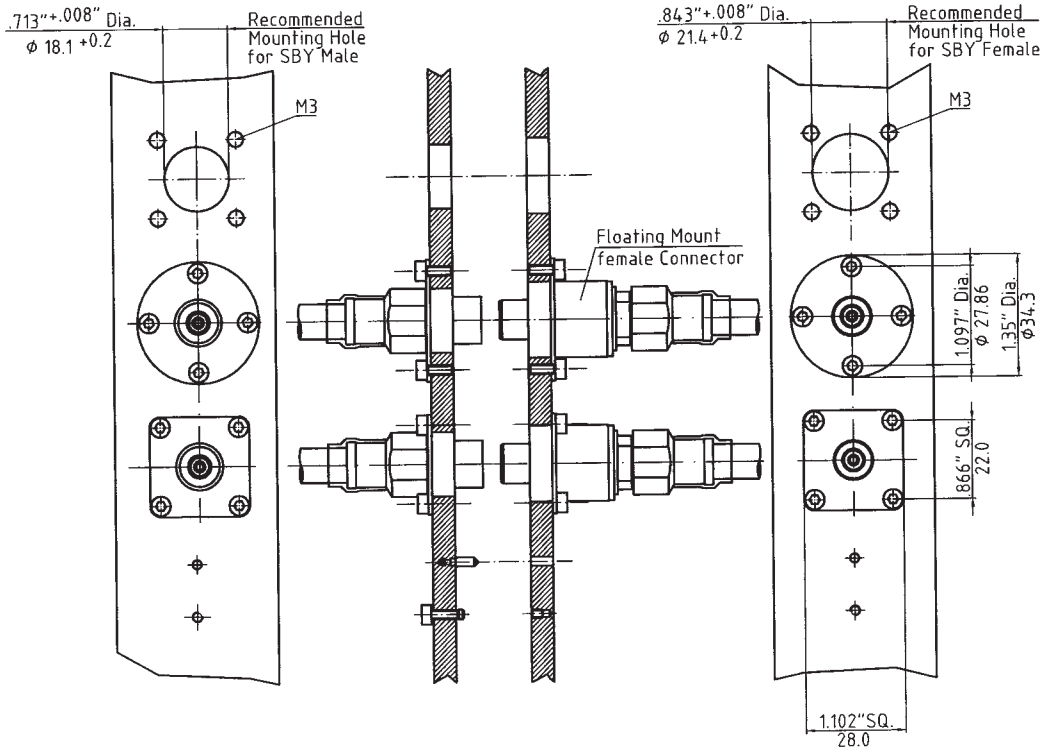
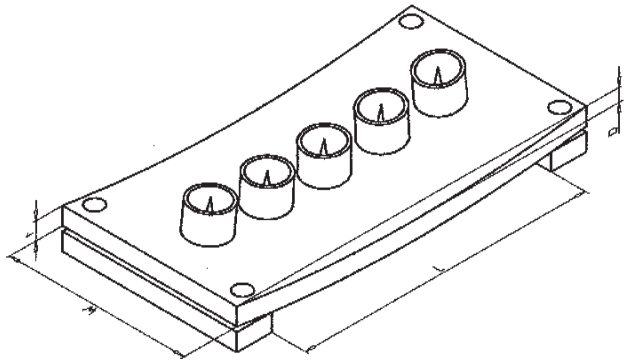
# Float Mount Applications & Features, Type SBY

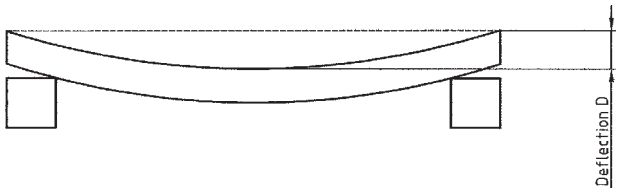



**SBY** (**S**pectrum **B**lind Mate-**Y**) female connectors are available, offering radial misalignment with the mating plug connector. A spring mechanism separates the connector interface from the flange housing and allows floating for blind mating purposes. The spring mechanism is aligning the mating connectors, therefore the forces are transmitted to the mounting panel. Under extreme mismatch conditions the mating forces can be considerably high when using several connectors. This can cause bowing of the mounting panel.



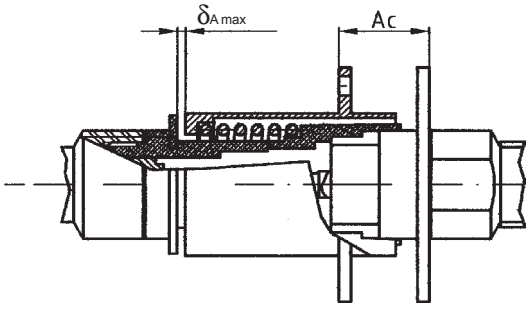
When using several SBY blind mate connectors at a component, on a module to motherboard or rack or panel application, the design must take into consideration the interface mating forces to engage and disengage the connectors, and the spring pre-load forces in floating mount cases.Disregarding this, distortion of mounting plates and panels can occur, preventing proper mating of the connectors, resulting into degraded performance of the component. Considering the panel or motherboard as a beam under deflection can be used as a good approximation for calculating the amount of distortion or bowing. But it has to be noted that the formulas and tables given below and to the right are not taken into consideration when forces are being applied from different angles, or operation in the event of additional stress because of the occurrence of multiple forces.

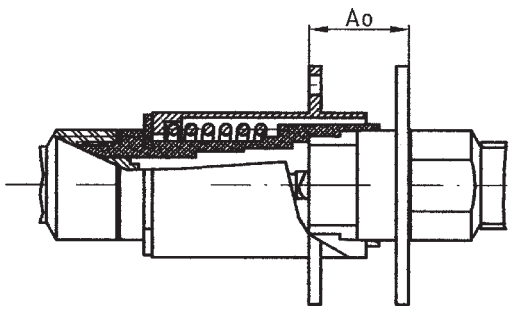


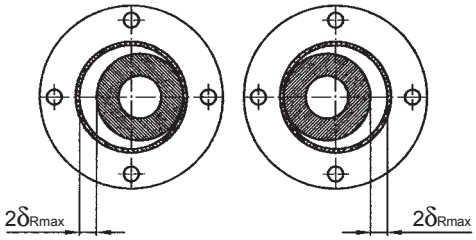



**Material Properties**

| Material | Yield Strength $R_y$ | | Modulus of Elasticity E | |
|---|---|---|---|---|
| | PSI | N/mm² | PSI | N/mm² |
| Al Mg 3 | 10,200...14,500 | 70 ... 100 | 10.3 x $10^6$ | 71,000 |
| Al Mg 4.5 Mn | 18,100 | 125 | 10.2 x $10^6$ | 70,000 |
| Al Mg Si 0.5 | 23,200 | 160 | 10.2 x $10^6$ | 70,000 |
| Al Mg Si 1 | 16,000...37,000 | 110...255 | 10.2 x $10^6$ | 70,000 |
| Al Mg Si Pb | 40,000 | 275 | 10.2 x $10^6$ | 70,000 |
| | | | | |
| X5 CrNi 18 9 (1.4301) | 50,800 | 350 | 30.5 x $10^6$ | 210,000 |
| X12 CrNiS 18 8 (1.4305) | 58,100 | 400 | 30.5 x $10^6$ | 210,000 |
| X10 CrNiMoTi 18 10 (1.4571) | 138,000 | 950 | 30.5 x $10^6$ | 210,000 |
| | | | | |
| Fe 360 B (St 37-2) | 34,100 | 235 | 30.5 x $10^6$ | 210,000 |
| Fe 590-2 (St 60-2) | 48,600 | 335 | 30.5 x $10^6$ | 210,000 |




**$A_C$: distance between mounting surfaces with max. axial misalignment**

**$A_0$: distance between mounting surfaces with no axial misalignment**

**$A_0 = A_C + \delta_{A\,max}$**

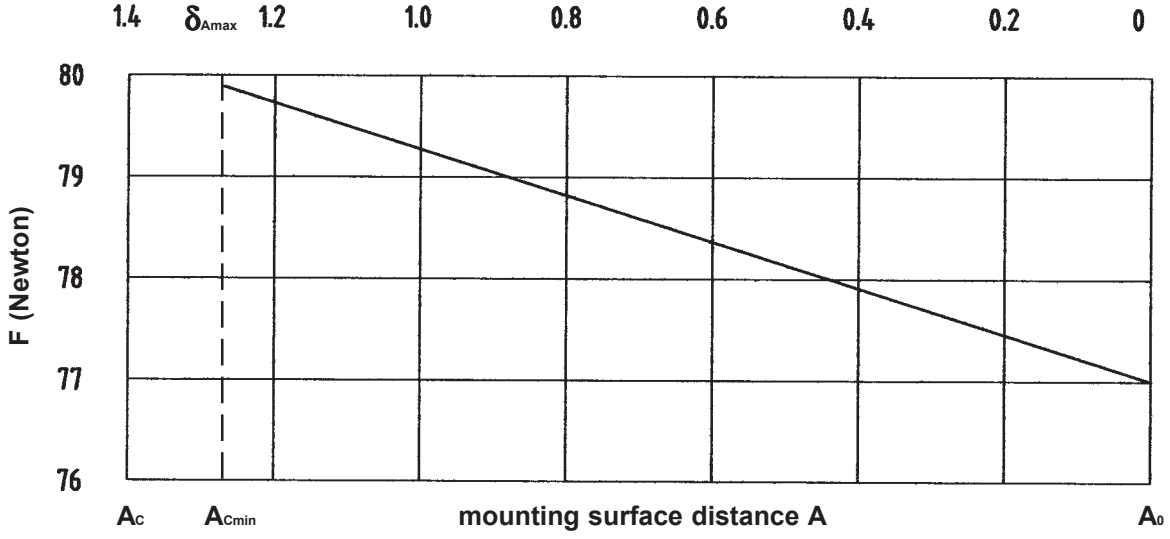
**$\delta_A$: axial misalignment**

**$\delta_{Amax}$ = 0.05" (1.27mm)**

**$\delta_R$: radial misalignment**

**$\delta_{Rmax}$ = 0.04" (1.02mm)**

**SBY** (**S**pectrum **B**lind Mate-**Y**) female connectors are available, offering radial misalignment with the mating plug connector. A spring mechanism separates the connector interface from the flange housing and allows floating for blind mating purposes. The spring mechanism is aligning the mating connectors, therefore the forces are transmitted to the mounting panel. Under extreme mismatch conditions the mating forces can be considerably high when using several connectors. This can cause bowing of the mounting panel.



| | Formulae | |
|---|---|---|
| **Ultimate Moment of Resistance** $M_u \left[mm^3\right]$ | $M_u = \frac{wt^2}{6}$ | **w** = width of the panel [mm]<br>**t** = thickness of the panel[mm] |
| **Moment of a Beam** $I \left[mm^3\right]$ | $I = \frac{wt^3}{12}$ | **w** = width of the panel mm]<br>**t** = thickness of the panel [mm] |
| **Maximum Deflection** $D \left[mm\right]$ | $D < \frac{\Sigma F_D L^3}{48 E I}$ | $\Sigma F_D$ = Sum of all forces applied to the plate [N]<br>**L** = Length of the panel [mm]<br>**E** = Modulus of Elasticity $\left[\frac{N}{mm^2}\right]$<br>**I** = Moment of Inertia [mm⁴] |
| **Ultimate Tensile Stress** $O \left[\frac{N}{mm^2}\right]$ | $O < \frac{\Sigma F_D L}{4 M_u}$<br>The tensile stress must be less than the yield strength. | $\Sigma F_D$ = Sum of all forces applied to the panel [N]<br>**L** = Length of the panel [mm]<br>$M_u$ = Ultimate Moment of Resistance [mm³] |

**EXAMPLE, USING 2 PIECES FLOAT MOUNT SBY CONNECTORS:**

**Mating Force of SBY: 70 N** $\Sigma F_{M(2\ connectors)} = 2 \times 70N = 140\ N$

But: The maximum force for 1.27 mm axial misalignement, which is the maximum possible displacement, reads 154N, as shown in the diagram on page 91. Therefore the greater displacement force will be used in the following calculations instead:

**Max. Displacement Force of SBY: 79.9 N** $\Sigma F_{D(2\ connectors)} = 2 \times 79.9N = 159.8\ N$

**Aluminum mounting panel of Al Mg Si 0.5:** **L x w x t = 100mm x 12.7mm x 6.35mm.**

**Modulus of Elasticity:** $E = 70{,}000\ N/mm^2$

**Yield Strength:** $R_y = 160\ N/mm^2$, as shown in the table.

**UltimateMoment of Resistance:** $M_u = \frac{wt^2}{6} = \frac{12.7mm \times (6.35mm)^2}{6} = 85.3\ mm^2$

**Moment of a Beam:** $I = \frac{wt^3}{12} = \frac{12.7mm \times (6.35mm)^2}{12} = 271.0\ mm^4$

**Maximum Deflection:** $D < \frac{\Sigma F_D L^3}{48 E I} = \frac{159.8N \times (100mm)^3}{48 \times 70{,}000N/mm^2 \times 271.0mm^4} = 0.18\ mm$

**Ultimate Tensile Stress:** $O < \frac{\Sigma F_D L}{4 M_U} = \frac{159.8N \times 100mm}{4 \times 85.3\ mm^3} = 46.8\ N/mm^2$

The maximum deflection calculated in this example is less than the max. allowable axial misalignment of 1.27mm, as allowed by definition for the SBY float mount. Additional, in the calculation it is assumed that the forces of all 2 connectors are applying in the center of the panel. Therefore additional forces, as contributed by radial misalignment, transverse and shearing forces may be disregarded. The use of the panel choosen in this example for 2 SBY´s seems to be very safe for this application.

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# Specifications, Type SBY

The specifications below are general specifications for all SBY connectors. Specific Data for VSWR, Insertion loss, R.F. leakage etc., are available from the factory upon request. Specifications in the following table are recommended for any procurement documents or drawings. In the event of any conflict between these specifications and other documentation, these specifications shall govern. These specifications are subject to change according to the latest revision.

| REQUIREMENT | | GENERAL SPECIFICATIONS |
|---|---|---|
| **GENERAL** | | |
| Standard Materials | | STEEL corrosion resistant 1.4305 per DIN 17440 (QQ-S-764, class 303 or ASTM-A-582-80).<br>ALUMINUM AlMg4.5Mn per DIN 1725, AlMgSi0.5 per DIN 1725, AlMgSi1 per DIN 1725 (6061-T6 per QQ-A-225/8).<br>BRASS CuZn39Pb3 per DIN 17660 (QQ-B-626, half hard).<br>COPPER BERYLLIUM 33-25 CuBe2Pb H per DIN 17666 (QQ-C-530).<br>TFE Fluorocarbon per DIN 52900 (MIL-P-19468 and L-P403).<br>SILICONE RUBBER per DIN 3771 (MIL-R-5847 and ZZ-R-765, Class II B,) Grade 50 - 75.<br>BORRIUM NITRITE Dielectric for high power applications per inhouse specification. |
| Finish for | COPPER BERYLLIUM | Center Contacts shall be gold plated to a minimum thickness of .00005 inch (1.27 µm) in accordance with MIL-G-45204, Type II, Grade C. Outer conductors shall be gold plated to a thickness of .00003 inch (0.8 µm) per MIL-G-45204 , Type II, Grade C, or silver plated to a thickness of .0001 inch (2.5 µm) per QQ-S-365. |
| | STAINLESS STEEL | Shall be passivated per QQ-P-35 or gold plated to a thickness of .00003 inch (0.8 µm) per MIL-G-45204, Type II, Grade C. |
| | ALUMINUM | Conductive Parts shall have an iridited finish per MIL-C-5541.<br>Other parts, such as Coupling Nuts and Back-Bodies shall be anodized per MIL-A-8625. |
| | BRASS | Gold plated to a thickness of .00003 inch (0.8 µm) min. per MIL-45204, Type II, Grade C, or nicle plated to a thickness of .0002 inch (5µm) per QQ-N-290, grade E, or silver plated to a thickness of .0001 inch (2.5 µm) per QQ-S-365. |
| | VARIOUS | Imoloy .0001 inch (2.5 µm) min. plating, consisting of 55% Copper / 20% Zinc / 25% Tin (on special request). |
| Design | | The design shall be such that the outline dimensions in this catalog are met. In addition, the assembled connector shall meet the interface dimensions. |
| **ELECTRICAL** | | |
| Frequency Range | | DC - 12.0 GHz min. |
| Insulation Resistance | | The insulation resistance shall not be less than 5.000 megohms. |
| Voltage Standing Wave Ratio (VSWR) | | 1.015 + .003 * f (GHz) |
| Contact Resistance | | The center contact resistance drop shall not exceed 1.0 milliohms and the outer contact resistance drop shall not exceed 1.5 milliohms. |
| Dielectric Withstanding Voltage | | The magnitude of the test voltage shall be 2.300 volts rms at sea level. |
| RF High Potential Withstanding Voltage | | The RF high potential withstanding voltage is 1.300 volts rms at 5 MHz. Leakage is not applicable. |
| RF Leakage | | RF Leakage is not applicable |
| Insertion Loss | | (.05 SQT(f(GHz))) dB |
| **MECHANICAL** | | |
| Connector Durability | | The connector is to be tested and its mating connector shall be subjected to 5000 insertions. Withdrawal cycles not applicable. The connector shall show no evidence of mechanical failure and the connector shall meet the mating characteristic requirements. |
| Cable Retention Force | | Cable Retention Force is not applicable. |
| Coupling Nut Retention Force | | Coupling Nut Retention Force is not applicable. |
| Force to Engage and Disengage | | Force to engage and disengage is not applicable. |
| Longitudinal Force max. | | Longitudinal force is not applicable. |
| Mating Characteristics | | Mating Characteristics are not applicable |
| Recommended Mating Torque | | Recommended Mating Torque is not applicable. |
| **ENVIRONMENTAL** | | |
| Corrosion (Salt Spray) | | Specification MIL-STD-202, Method 101, Test Condition B. The salt solution shall be 5%. |
| Vibration | | Specification MIL-STD-202, Method 204, Test Condition B. |
| Shock | | Specification MIL-STD-202, Method 213, Test Condition I. |
| Thermal Shock | | Specification MIL-STD-202, Method 107, Test Condition B, except high temperature shall be + 200°C. |
| Moisture Resistance | | Specification MIL-STD-202, Method 106. Step 7b (vibration) shall be omitted. Insulation resistance shall be 200 megohms min. within 5 minutes of removal from humidity. |
| Corona Level | | The connector shall not exhibit breakdown (corona) when the applied voltage is 2800 volts rms and the altitude is 0 feet. |

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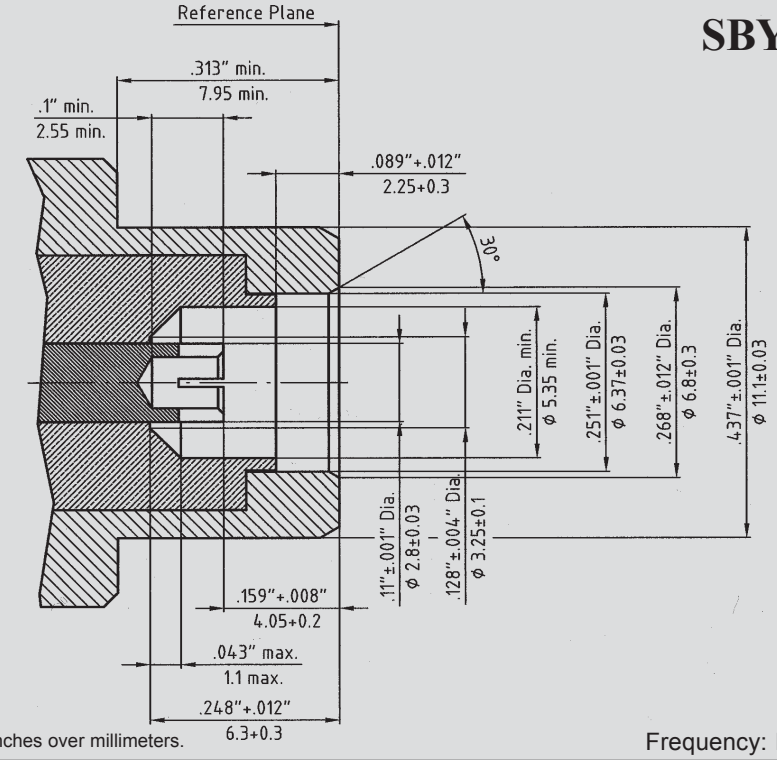
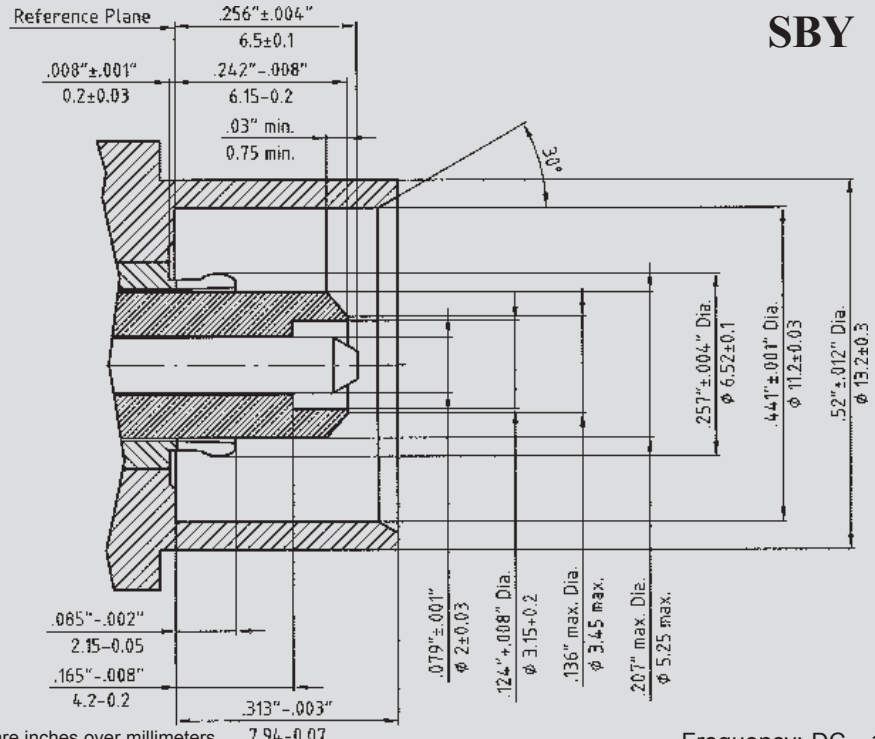
## SBY Female




Dimensions shown are inches over millimeters.

Frequency: DC - 12.0 GHz min.

## SBY Male




Dimensions shown are inches over millimeters.

Frequency: DC - 12.0 GHz min.

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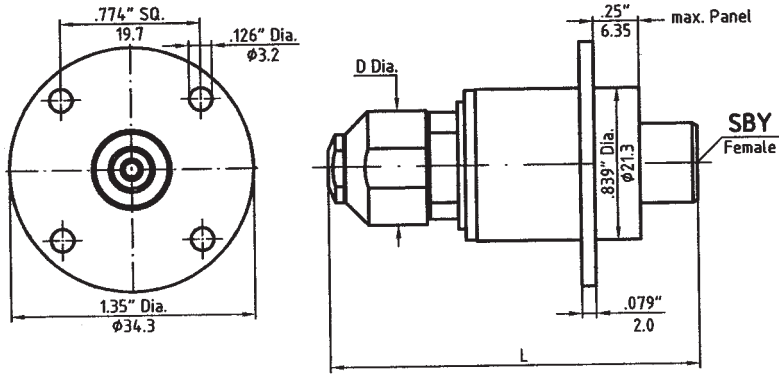
# SBY

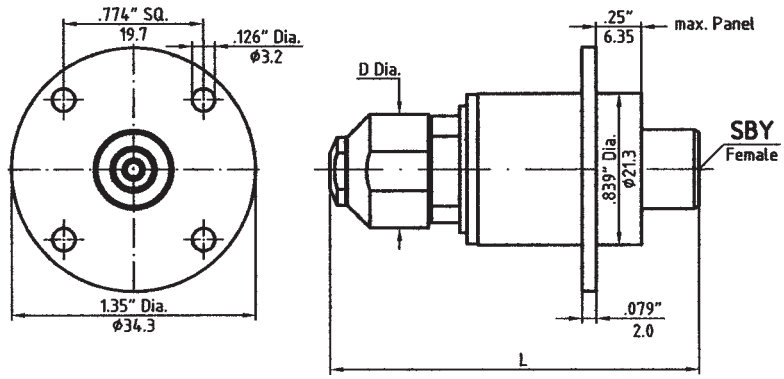



DC - 12.0 GHz

## SBY-Female Float Mount for Semi-Rigid Cables

| Connector Part No. | S/R Cable | Cable Part No. | L | Ø D | Conn. Code |
|---|---|---|---|---|---|
| 7903-6001-02 | .141" | 421-669<br>421-669-1<br>421-669-3 | In Development | | YF4 |
| 7906-6001-02 | .250" | 421-252<br>421-252-1<br>421-252-3 | 2.008"<br>51.0 | .63"<br>16.0 | |
| 7906-6002-02 | .250" LL | 421-336<br>421-336-1<br>421-336-3 | 2.008"<br>51.0 | .63"<br>16.0 | |

Connector outer conductor is passivated stainless steel. Center conductor is gold plated. LL= Low density dielectric.



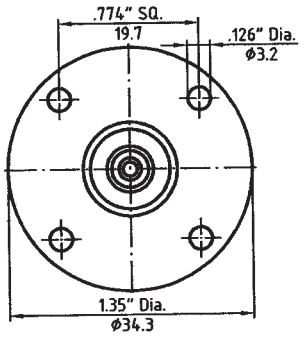

DC - 12.0 GHz

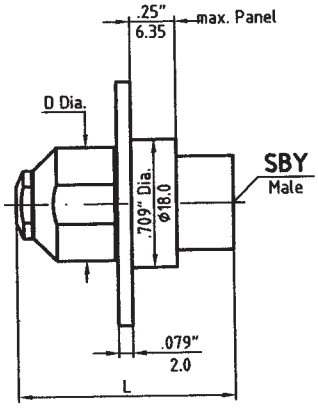
## SBY-Female Float Mount for Semi-Rigid Cables

| Connector Part No. | S/R Cable | Cable Part No. | L | Ø D | Conn. Code |
|---|---|---|---|---|---|
| 7903-6002-02 | .141" | 421-669<br>421-669-1<br>421-669-3 | In Development | | YFR |
| 7906-6003-02 | .250" | 421-252<br>421-252-1<br>421-252-3 | 2.008"<br>51.0 | .63"<br>16.0 | |
| 7906-6004-02 | .250" LL | 421-336<br>421-336-1<br>421-336-3 | 2.008"<br>51.0 | .63"<br>16.0 | |

Connector outer conductor is passivated stainless steel. Center conductor is gold plated. LL= Low density dielectric.

Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per Spectrum Elektrotechnik GmbH Specifications. For details please refer to the beginning of this section.




**DC - 12.0 GHz**

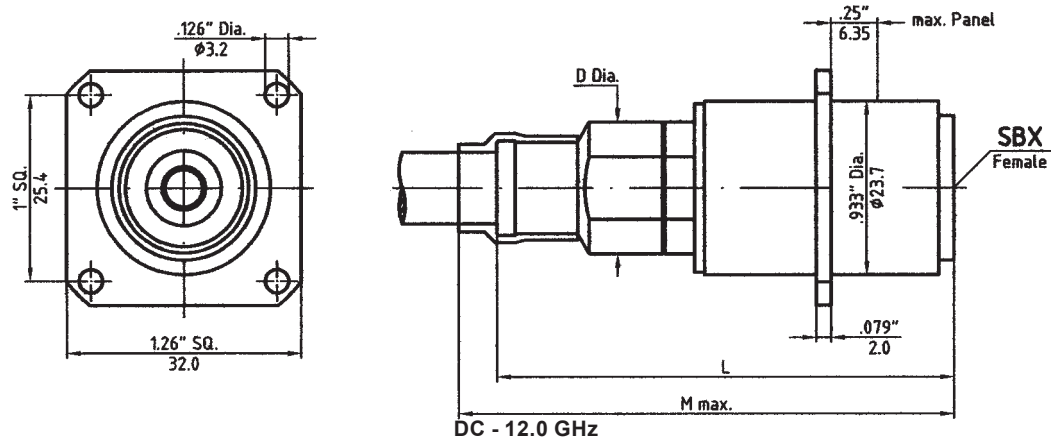
## SBY-Male for Semi-Rigid Cables

| Connector Part No. | S/R Cable | Cable Part No. | L | Ø D | Conn. Code |
|---|---|---|---|---|---|
| 7903-7001-02 | .141" | 421-669<br>421-669-1<br>421-669-3 | In Development | | YM |
| 7906-7001-02 | .250" | 421-252<br>421-252-1<br>421-252-3 | 1.165"<br>29.6 | .63"<br>16.0 | |
| 7906-7002-02 | .250" LL | 421-336<br>421-336-1<br>421-336-3 | 1.165"<br>29.6 | .63"<br>16.0 | |

Connector outer conductor is passivated stainless steel. Center conductor is gold plated. LL= Low density dielectric.

Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per Spectrum Elektrotechnik GmbH Specifications. For details please refer to the beginning of this section.

# SBY Flexible Cable Float Mount Connectors

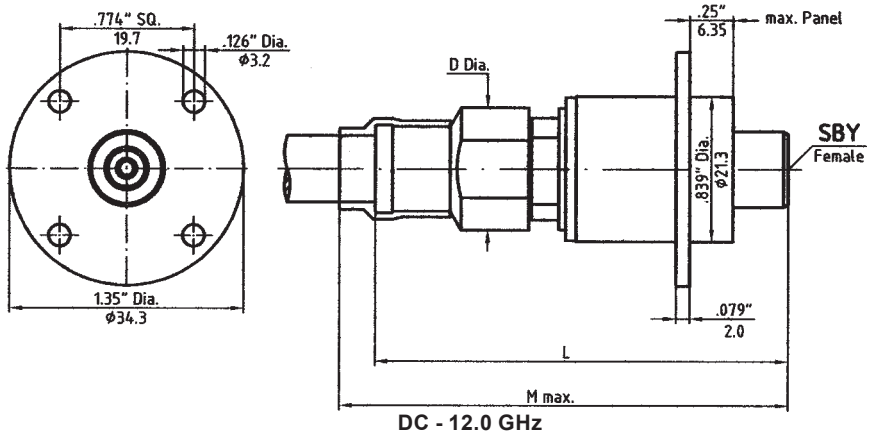



DC - 12.0 GHz

## SBY-Female Float Mount for Flexible Cables

| Connector Part No. | Cable Type | Cable Code | L | M | Ø D Dia. | Conn. Code |
|---|---|---|---|---|---|---|
| 7915-6001-02 | RG-142B/U | 42 | In Development | | | YF4 |
| 7915-6002-02 | RG-400/U | 40 | In Development | | | |
| 7917-6001-02 | RG-214/U | 21 | 2.346" 59.6 | 4.134" 105.0 | .709" 18.0 | |

Connector outer conductor is passivated stainless steel. Center conductor is gold plated.




DC - 12.0 GHz

## SBY-Female Float Mount for Flexible Cables

| Connector Part No. | Cable Type | Cable Code | L | M | Ø D Dia. | Conn. Code |
|---|---|---|---|---|---|---|
| 7915-6003-02 | RG-142B/U | 42 | In Development | | | YFR |
| 7915-6004-02 | RG-400/U | 40 | In Development | | | |
| 7917-6002-02 | RG-214/U | 21 | 2.346" 59.6 | 4.134" 105.0 | .709" 18.0 | |

Connector outer conductor is passivated stainless steel. Center conductor is gold plated.

Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per Spectrum Elektrotechnik GmbH Specifications. For details please refer to the beginning of this section.

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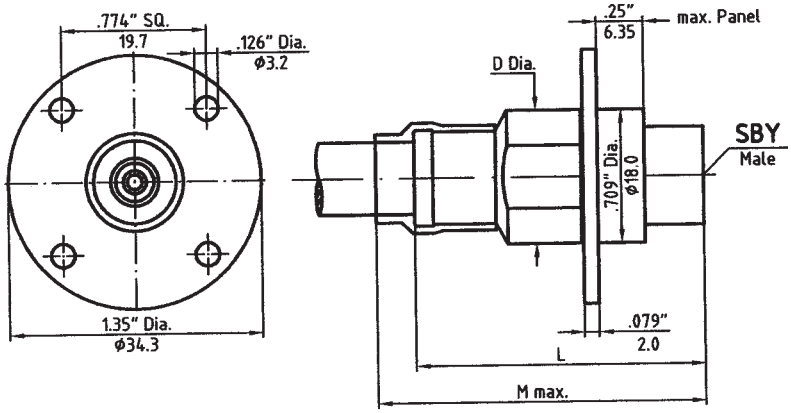
# Flexible Cable Connectors, Type SBY




**DC - 12.0 GHz**

## SBY-Male for Flexible Cables

| Connector Part No. | Cable Type | Cable Code | L | M | Ø D Dia. | Conn. Code |
|---|---|---|---|---|---|---|
| 7915-7001-02 | RG-142B/U | 42 | In Development | | | YM |
| 7915-7002-02 | RG-400/U | 40 | In Development | | | |
| 7917-7001-02 | RG-214/U | 21 | 1.409" 35.8 | 3.228" 82.0 | .709" 18.0 | |

Connector outer conductor is passivated stainless steel. Center conductor is gold plated.

Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per Spectrum Elektrotechnik GmbH Specifications. For details please refer to the beginning of this section.

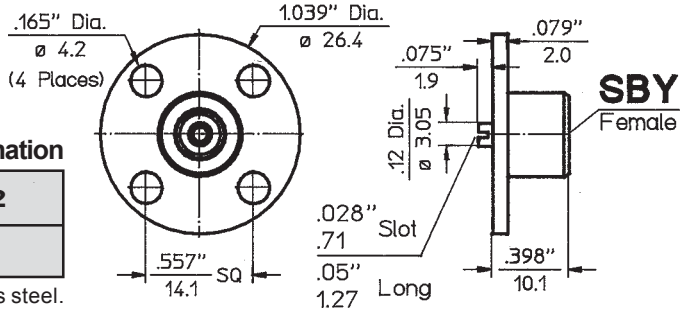
# SBY Circuit Board Connectors

Spectrum Elektrotechnik GmbH

### SBY Female Flange Mount Slotted Termination

| Connector Part No. | 7999-7002-02 |
|---|---|
| Frequency Range | DC - 12.0 GHz |

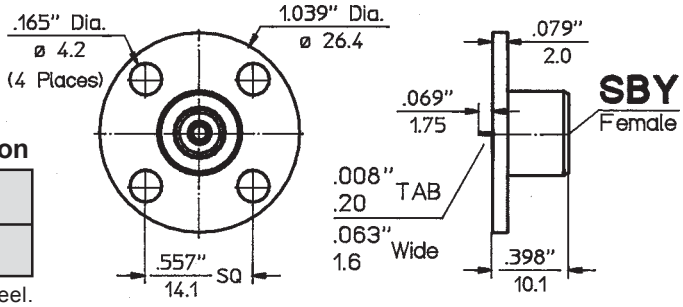
Connector outer conductor is passivated stainless steel.
Center conductor is gold or/and silver plated.




### SBY Female Flange Mount Tab Termination

| Connector Part No. | 7999-7003-02 |
|---|---|
| Frequency Range | DC - 12.0 GHz |

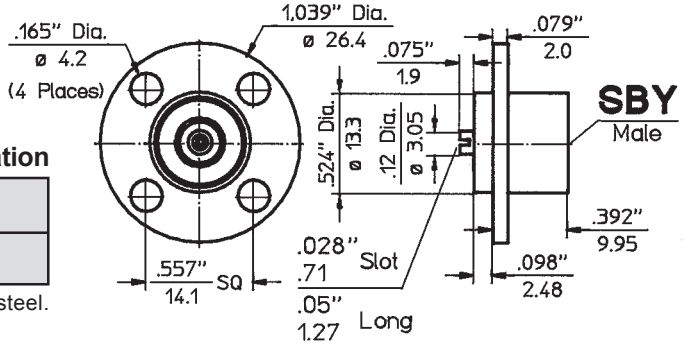
Connector outer conductor is passivated stainless steel.
Center conductor is gold or/and silver plated.




### SBY Male Flange Mount Slotted Termination

| Connector Part No. | 7999-6003-02 |
|---|---|
| Frequency Range | DC - 12.0 GHz |

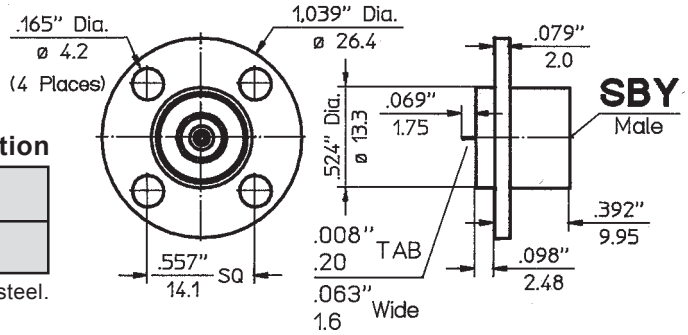
Connector outer conductor is passivated stainless steel.
Center conductor is gold or/and silver plated.




### SBY Male Flange Mount Tab Termination

| Connector Part No. | 7999-6002-02 |
|---|---|
| Frequency Range | DC - 12.0 GHz |

Connector outer conductor is passivated stainless steel.
Center conductor is gold or/and silver plated.




Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per Spectrum Elektrotechnik GmbH Specifications. For details please refer to the beginning of this section.

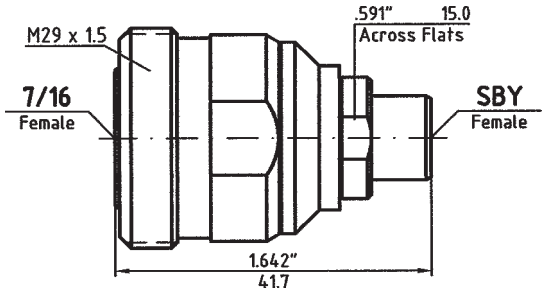
c:/quikc98/sby.pm6

# SBY

# SBY Between-Series Adapters

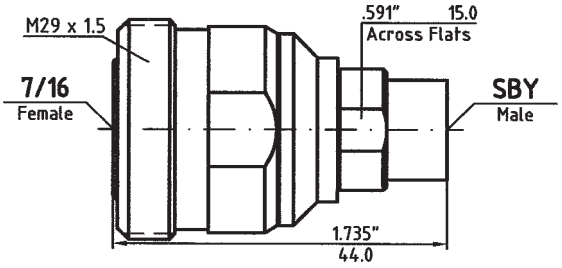
| Adapter Part No. | 8001-YF76-02 |
|---|---|
| Connector Config. | SBY-f to 7/16-f |
| Frequency Range | DC to 7.5 GHz |
| VSWR | 1.06 + 0.005 x f (GHz) |

Connector outer conductor is passivated stainless steel.
Center conductor is gold or/and silver plated.



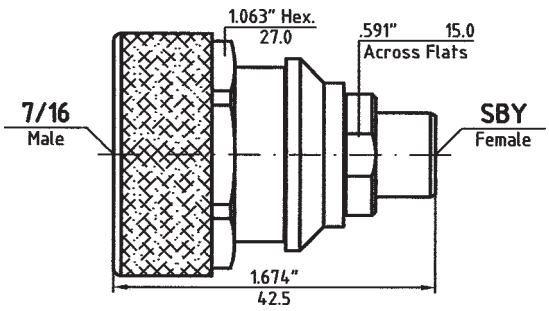

| Adapter Part No. | 8001-YM76-02 |
|---|---|
| Connector Config. | SBY-m to 7/16-f |
| Frequency Range | DC to 7.5 GHz |
| VSWR | 1.06 + 0.005 x f (GHz) |

Connector outer conductor is passivated stainless steel.
Center conductor is gold or/and silver plated.



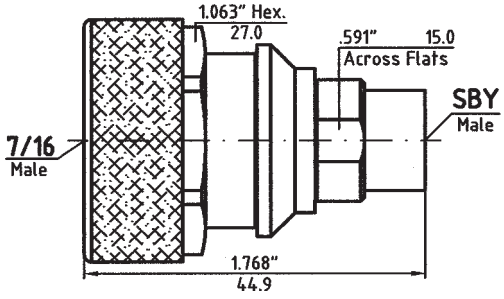

| Adapter Part No. | 8001-YF75-02 |
|---|---|
| Connector Config. | SBY-f to 7/16-m |
| Frequency Range | DC to 7.5 GHz |
| VSWR | 1.06 + 0.005 x f (GHz) |

Connector outer conductor is passivated stainless steel.
Center conductor is gold or/and silver plated.



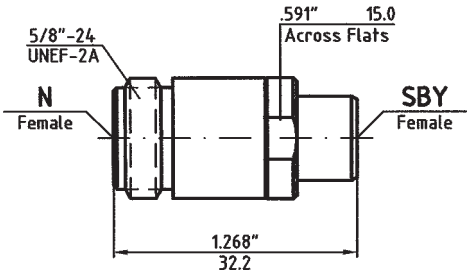

| Adapter Part No. | 8001-YM75-02 |
|---|---|
| Connector Config. | SBY-m to 7/16-m |
| Frequency Range | DC to 7.5 GHz |
| VSWR | 1.06 + 0.005 x f (GHz) |

Connector outer conductor is passivated stainless steel.
Center conductor is gold or/and silver plated.



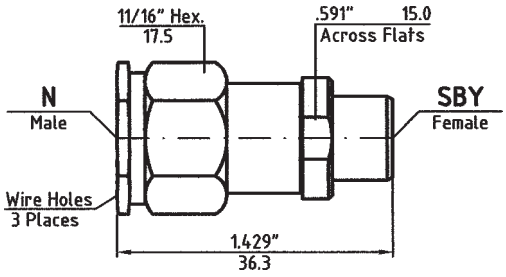

Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per MIL-C 39012, MIL-C-87104/2, MIL-C-3643, MIL-STD-348, IEC-169-7, IEC-457-2, DIN 47 223, DIN 47 226, DIN 47 298, where applicable. For details please refer to the beginning of this section.

# Between-Series Adapters, Type SBY



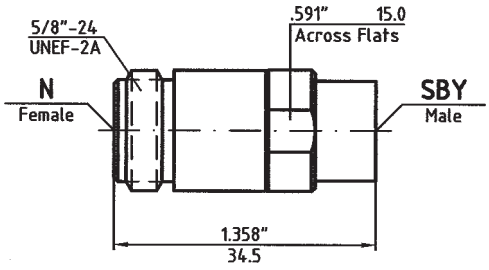

| Adapter Part No. | 8001-YF61-02 |
|---|---|
| Connector Config. | SBY-f to N-f |
| Frequency Range | DC to 12.0 GHz |
| VSWR | 1.03 + 0.01 x f (GHz) |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.




| Adapter Part No. | 8001-YF51-02 |
|---|---|
| Connector Config. | SBY-f to N-m |
| Frequency Range | DC to 12.0 GHz |
| VSWR | 1.03 + 0.01 x f (GHz) |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.

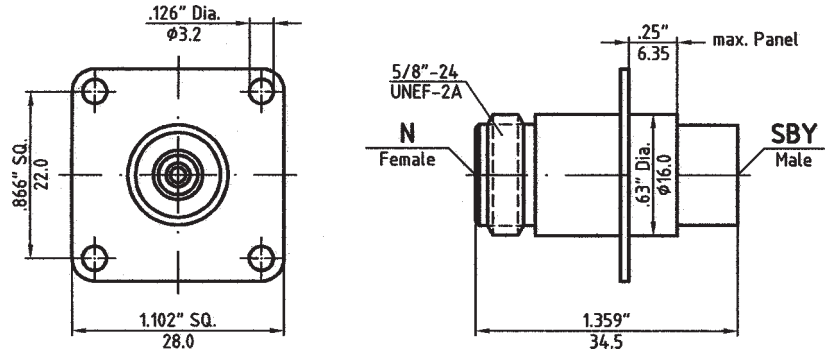



| Adapter Part No. | 8001-YM61-02 |
|---|---|
| Connector Config. | SBY-m to N-f |
| Frequency Range | DC to 12.0 GHz |
| VSWR | 1.03 + 0.01 x f (GHz) |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.

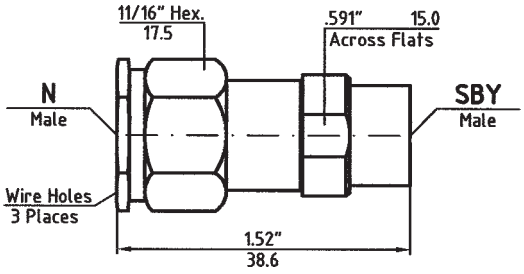
Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per MIL-C 39012, MIL-C-87104/2, MIL-C-3643, MIL-STD-348, IEC-169-7, IEC-457-2, DIN 47 223, DIN 47 226, DIN 47 298, where applicable. For details please refer to the beginning of this section.

# SBY Between-Series Adapters



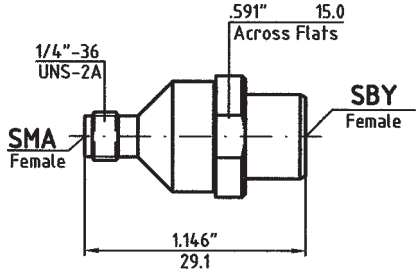

| Adapter Part No. | 8002-YM61-02 |
|---|---|
| Connector Config. | SBY-m to N-f |
| Frequency Range | DC to 12.0 GHz |
| VSWR | 1.03 + 0.01 x f (GHz) |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.




| Adapter Part No. | 8001-YM51-02 |
|---|---|
| Connector Config. | SBY-m to N-m |
| Frequency Range | DC to 12 GHz |
| VSWR | 1.03 + 0.01 x f (GHz) |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.

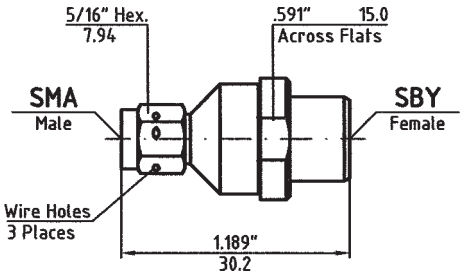



| Adapter Part No. | 8001-YF21-02 |
|---|---|
| Connector Config. | SBY-f to SMA-f |
| Frequency Range | DC to 12.0 GHz |
| VSWR | 1.06 + 0.005 x f (GHz) |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.

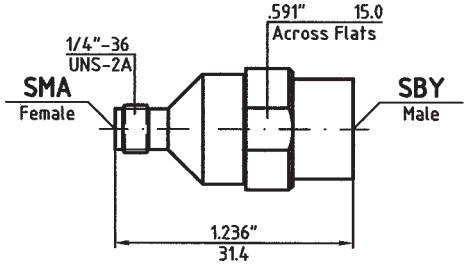
Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per MIL-C 39012, MIL-C-87104/2, MIL-C-3643, MIL-STD-348, IEC-169-7, IEC-457-2, DIN 47 223, DIN 47 226, DIN 47 298, where applicable. For details please refer to the beginning of this section.

# Between-Series Adapters, Type SBY



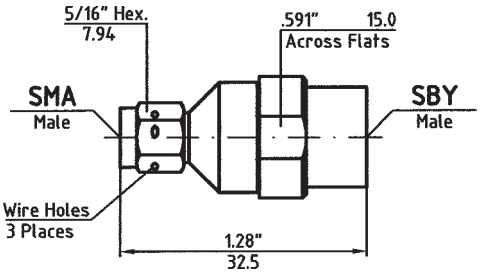

| Adapter Part No. | 8001-YF11-02 |
|---|---|
| Connector Config. | SBY-f to SMA-m |
| Frequency Range | DC to 12.0 GHz |
| VSWR | 1.06 + 0.005 x f (GHz) |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.




| Adapter Part No. | 8001-YM21-02 |
|---|---|
| Connector Config. | SBY-m to SMA-f |
| Frequency Range | DC to 12.0 GHz |
| VSWR | 1.06 + 0.005 x f (GHz) |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.

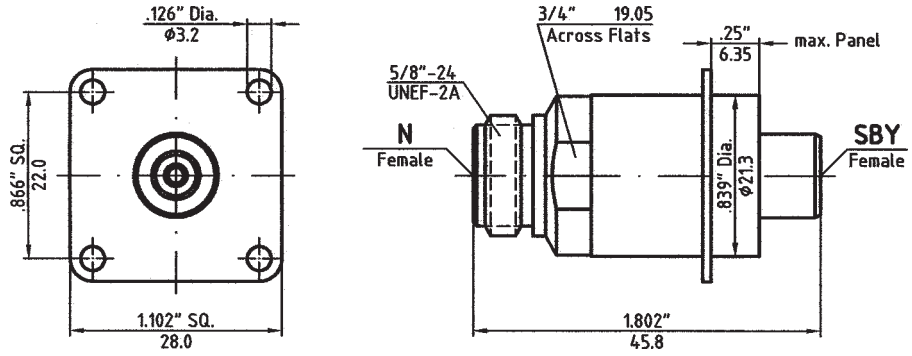



| Adapter Part No. | 8001-YM11-02 |
|---|---|
| Connector Config. | SBY-m to SMA-m |
| Frequency Range | DC to 12.0 GHz |
| VSWR | 1.06 + 0.005 x f (GHz) |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.

Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per MIL-C 39012, MIL-C-87104/2, MIL-C-3643, MIL-STD-348, IEC-169-7, IEC-457-2, DIN 47 223, DIN 47 226, DIN 47 298, where applicable. For details please refer to the beginning of this section.

# SBY Float Mount Adapters




| Adapter Part No. | 8002-YF61-02 |
|---|---|
| Connector Config. | SBY-f to N-f |
| Frequency Range | DC to 12.0 GHz |
| VSWR | 1.03 + 0.01 x f (GHz) |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.

Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per MIL-C 39012, MIL-C-87104/2, MIL-C-3643, MIL-STD-348, IEC-169-7, IEC-457-2, DIN 47 223, DIN 47 226, DIN 47 298, where applicable. For details please refer to the beginning of this section.

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# SMA

# PUSH-ON

# SMA Push-On Connectors & Adapters

**PUSH-ON SMA-TYPE CONNECTORS** eliminate time consuming tightening, torquing and loosening of SMA-male connectors during testing or in applications where limited space requirements make tightening and torquing of a coupling nut difficult, if not impossible.

The SMA push-on slides directly onto any standard SMA-female, allowing prompt connection and loosening. Three types of push-on SMA connectors are available: full-locking, locking with non-locking rear nut, and non-locking.

**Full Locking** push-on SMA-Type connectors are recommended when longer testing is required and the connectors must be firmly locked so that they cannot be disconnected, even by mistake. **Locking with non-locking rear nut** SMA-Type connectors are recommended where safe locking is necessary, but long term testing is not required. **Non-locking** push-on connectors are recommended for short period testing, testing that usually takes only seconds.

Push-On SMA-Type connectors are available for termination with cables RG-142B/U, RG-400/U and RG-214/U. State-of-the-art high performance cables using push-on connectors are available as well, however, these high performance cable assemblies are only available completely terminated; they can be found in the section "Cable Assemblies" on pages 234-236 of this catalog.

**PUSH-ON SMA-TYPE CONNECTOR SAVERS**, or adapters, were developed for attachment to cable assemblies which are terminated with regular connectors. The adapter has a standard connector on one side, and a push-on connector on the other end. The standard connector end of the adapter engages with the standard connector of the opposite sex at the cable assembly. These connnector savers modify cable assemblies in seconds, changing them from a standard product to a state-of-the-art push-on assembly.
Push-on adapters are availabe for a variety of connectors and both male and female sexes within the connector series. SMA-type push-on connectors savers are supplied in **locking with non-locking rear nut** and **non-locking** configuration.

## FEATURES:

**REPEATABLE PERFORMANCE**
**SAFE LOCKING MECHANISM***
**REDUCED TEST TIME**

* on Full Locking and Locking Units

**LOW INSERTION LOSS**
**HIGH RETURN LOSS**
**DC- 26.5 GHz**
**LONG LIFE**

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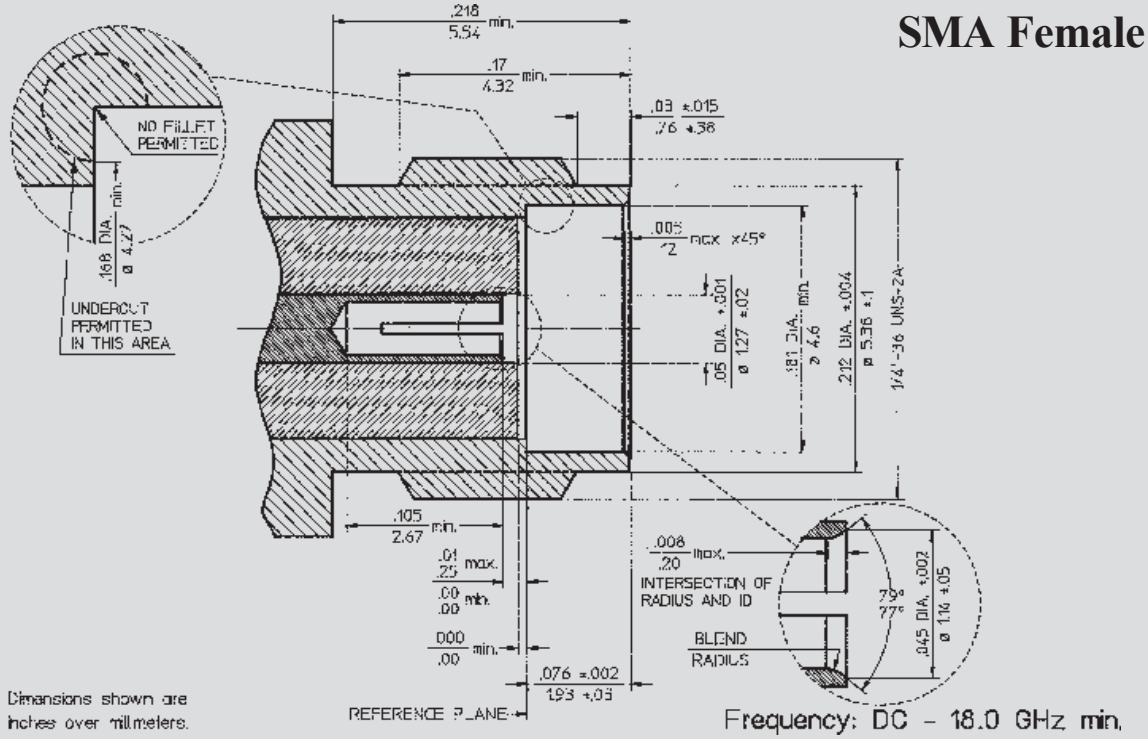
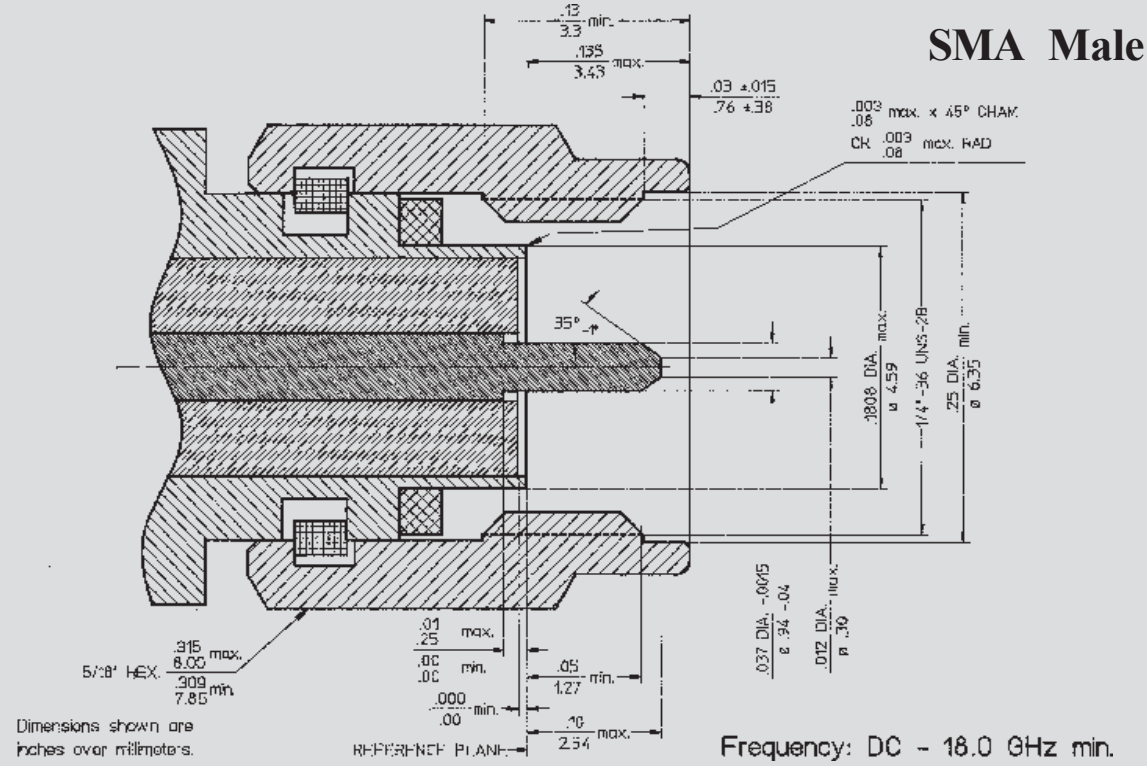
## SMA Female




## SMA Male

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# SMA PUSH-ON Specifications to MIL-C-39012

The specifications below are general specifications for all SMA PUSH-ON connectors. Specifications in the following table are recommended for any procurement documents or drawings. In the event of any conflict, these specifications shall govern.The PUSH-ON Connectors were developed to eliminate the time consuming lightening, torquing and loosening of connectors during test. The connector slides directly onto any Female of the same connector style, allowing quick connecting and disconnecting. Its mechanism locks safely onto the standard thread of the Female connector.

| REQUIREMENT | | REQUIREMENT PARAGRAPH | GENERAL SPECIFICATIONS |
|---|---|---|---|
| **GENERAL** | | | |
| Standard Materials | | 3.3 | STEEL corrosion resistant 1.4305 per DIN 17440 (QQ-S-764, class 303 or ASTM-A-582-80).<br>ALUMINUM AlMg4.5Mn per DIN 1725, AlMgSi0.5 per DIN 1725, AlMgSi1 per DIN 1725 (6061-T6 per QQ-A-225/8).<br>BRASS CuZn39Pb3 per DIN 17660 (QQ-B-626, half hard).<br>COPPER BERYLLIUM 33-25 CuBe2Pb H per DIN 17666 (QQ-C-530).<br>TFE Fluorocarbon per DIN 52900 (MIL-P-19468 and L-P403).<br>SILICONE RUBBER per DIN 3771 (MIL-R-5847 and ZZ-R-765, Class II B,) Grade 50 - 75.<br>BORRIUM NITRITE Dielectric for high power applications per inhouse specification. |
| Finish for | COPPER BERYLLIUM | 3.3.1 | Center Contacts shall be gold plated to a minimum thickness of .00005 inch (1.27 µm) in accordance with MIL-G-45204, Type II, Grade C. Outer conductors shall be gold plated to a thickness of .00003 inch (0.8 µm) per MIL-G-45204 , Type II, Grade C, or silver plated to a thickness of .0001 inch (2.5 µm) per QQ-S-365. |
| | STAINLESS STEEL | | Shall be passivated per QQ-P-35 or gold plated to a thickness of .00003 inch (0.8 µm) per MIL-G-45204, Type II, Grade C. |
| | ALUMINUM | | Conductive Parts shall have an iridited finish per MIL-C-5541.<br>Other parts, such as Coupling Nuts and Back-Bodies shall be anodized per MIL-A-8625. |
| | BRASS | | Gold plated to a thickness of .00003 inch (0.8 µm) min. per MIL-45204, Type II, Grade C, or nicle plated to a thickness of .0002 inch (5µm) per QQ-N-290, grade E, or silver plated to a thickness of .0001 inch (2.5 µm) per QQ-S-365. |
| | VARIOUS | | Imoloy .0001 inch (2.5 µm) min. plating, consisting of 55% Copper / 20% Zinc / 25% Tin (on special request). |
| Design | | 3.4 | The design shall be such that the outline dimensions in this catalog are met. In addition, the assembled connector shall meet the interface dimensions. |
| **ELECTRICAL** | | | |
| Frequency Range | | | DC - 26.5 GHz min. |
| Insulation Resistance | | 3.11 | The insulation resistance shall not be less than 5.000 megohms. |
| Voltage Standing Wave Ratio (VSWR) | | 3.14 | 1.15 : 1 (DC - 18.0 GHz), 1.20 : 1 (18.0 - 26.5 GHz). |
| Contact Resistance | | 3.16 | The center contact resistance drop shall not exceed 3.0 milliohms max. |
| Dielectric Withstanding Voltage | | 3.17 | The magnitude of the test voltage shall be 1500 volts rms at 60 Hz. |
| RF High Potential Withstanding Voltage | | 3.23 | The RF high potential withstanding voltage is 1,000 volts rms at 5 MHz. |
| RF Leakage | | 3.26 | -80 dB max. to 3.0 GHz, -65 dB max. to 26.5 GHz |
| Insertion Loss | | 3.27 | 0.3 dB max. at 18.0 GHz |
| Impedance | | | 50 Ohms Nominal |
| Corona Level Voltage | | | 250 Volts at 70,000 ft. |
| **MECHANICAL** | | | |
| Connector Durability | | 3.15 | The connector is to be tested and its mating connector shall be subjected to 500 insertion min. Withdrawal cycles / minute are not applicable. The connector shall show no evidence of mechanical failure and the connector shall meet the mating characteristic requirements. |
| Temperature | | | -65°C to +165°C |
| Force to Engage and Disengage | | 3.5.1 | The Force to Engage and Disengage shall not exceed 2 inch-pounds (0.226 Nm). |
| Longitudinal Force max. | | | Longitudinal force is not applicable. |
| **ENVIRONMENTAL** | | | |
| Corrosion (Salt Spray) | | 3.13 | Specification MIL-STD-202, Method 101, Test Condition B. The salt solution shall be 5%. |
| Vibration | | 3.18 | Specification MIL-STD-202, Method 204, Test Condition D. |
| Shock | | 3.19 | Specification MIL-STD-202, Method 213, Test Condition I. |
| Thermal Shock | | 3.20 | Specification MIL-STD-202, Method 107, Test Condition B, except high temperature shall be + 200°C. |
| Moisture Resistance | | 3.21 | Specification MIL-STD-202, Method 106. Step 7b (vibration) shall be omitted. Insulation resistance shall be 200 megohms min. within 5 minutes of removal from humidity. |

# SMA

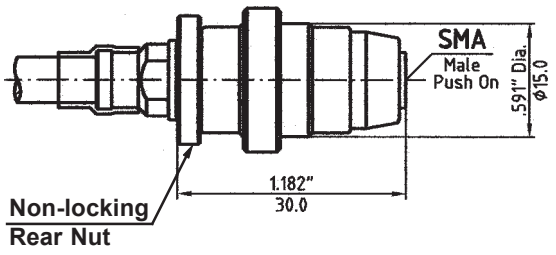
# PUSH-ON

DC - 18.0 GHz

## Locking with Non-locking Rear Nut

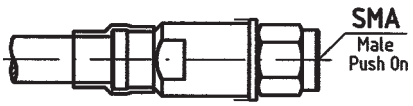
| Connector Part No. | Flexible Cable Type | Cable Code | Connector Code |
|---|---|---|---|
| 2013-SM01-02 | RG-316/U | 32 | SML |
| 2015-SM01-02 | RG-400/U | 40 | |
| 2015-SM02-02 | RG-142B/U | 42 | |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.




Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per MIL-C-39012. For details please refer to the beginning of this section.

# PUSH-ON Connectors, Type SMA

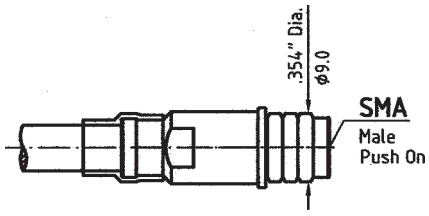



DC - 18.0 GHz

## NON Locking

| Connector Part No. | Flexible Cable Type | Cable Code | Connector Code |
|---|---|---|---|
| 2013-SM02-02 | RG-316/U | 32 | SM |
| 2015-SM03-02 | RG-400/U | 40 | |
| 2015-SM04-02 | RG-142B/U | 42 | |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.

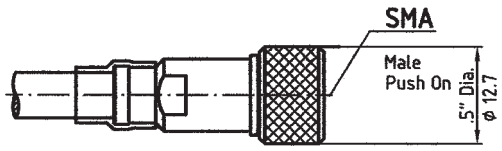



DC - 18.0 GHz

## NON Locking

| Connector Part No. | Flexible Cable Type | Cable Code | Connector Code |
|---|---|---|---|
| 2013-SM03-02 | RG-316/U | 32 | SMR |
| 2015-SM05-02 | RG-400/U | 40 | |
| 2015-SM06-02 | RG-142B/U | 42 | |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.




## NON Locking

| Connector Part No. | Flexible Cable Type | Cable Code | Connector Code |
|---|---|---|---|
| 2013-SM04-02 | RG-316/U | 32 | SMM |
| 2015-SM07-02 | RG-400/U | 40 | |
| 2015-SM08-02 | RG-142B/U | 42 | |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.

Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per MIL-C-39012.
For details please refer to the beginning of this section.

# The Phase Adjuster !

## DC to 40.0 GHz !

## VSWR 1.20:1 max.*!

* for P/N LS-P140-KFKM !

**Interested?**
**Please refer to**
**The '98 Handbook**
**Components**


**You need DC to 50.0 GHz? It shouldn´t be a major problem, we are already working on it! You need Phase Adjusters for lower frequency applications: DC-2, DC-12, DC-18, DC-26.5 GHz? We have these standard units too, maybe ex stock!**

**Please ask for our Products in the Frequency Range of DC to 50 GHz:**
Adapters, ANA Test Cables, Antennas, Attenuators, Blind Mate Connectors, Circulators, CDM-Components, Connectors (RF), Couplers, Custom Components, DC-Block Connectors & Adapters, Gain-Equalizers, Flexible Cable Assemblies, Isolators, Limiters, Mismatches, Multi Pin Connectors, Phase Shifters, Phase Stable Cable Assemblies, Precision Terminations, Push-On Connectors & Adapters, Semi Rigid Cable, Switches, Waveguide Components, Waveguide to Coax Adapters, etc.

**Spectrum** Elektrotechnik GmbH

**80905 Munich, Germany**
**P.O. Box 45 05 33**

**Fax: {49} (89) 354-804-90, Telephone: {49} (89) 354-804-0**

phas0596

# SMA

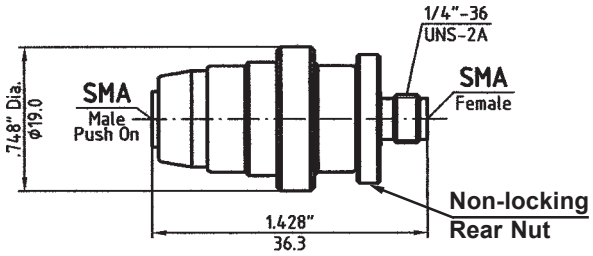
# PUSH-ON

DC - 18.0 GHz

## Locking with Non-locking Rear Nut

| Adapter Part No. | 8006-SM21-02 |
|---|---|
| Connector Config. | SMA Push-On to SMA-f |
| Frequency Range | DC to 26.5 GHz |
| VSWR | 1.20 : 1 max. |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.

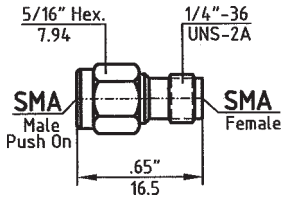



Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per MIL-C 39012, MIL-C-87104/2, MIL-C-3643, MIL-STD-348, IEC-169-7, IEC-457-2, DIN 47 223, DIN 47 226, DIN 47 298, where applicable. For details please refer to the beginning of this section.

# NON Locking

| Adapter Part No. | 8001-SM21-02 |
|---|---|
| Connector Config. | SMA Push-On to SMA-f |
| Frequency Range | DC to 26.5 GHz |
| VSWR | 1.20 : 1 max. |

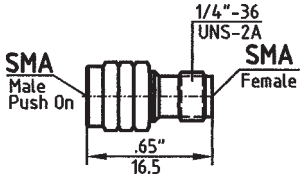
Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.




# NON Locking

| Adapter Part No. | 8003-SM21-02 |
|---|---|
| Connector Config. | SMA Push-On to SMA-f |
| Frequency Range | DC to 26.5 GHz |
| VSWR | 1.20 : 1 max. |

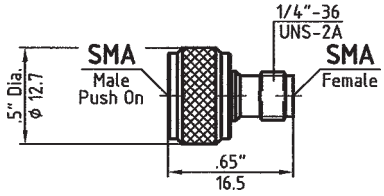
Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.




# NON Locking

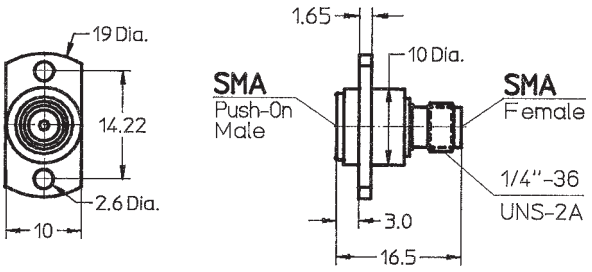
| Adapter Part No. | 8005-SM21-02 |
|---|---|
| Connector Config. | SMA Push-On to SMA-f |
| Frequency Range | DC to 26.5 GHz |
| VSWR | 1.20 : 1 max. |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.




**Easier Handling with the enlarged coupling nut.**

Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per MIL-C 39012, MIL-C-87104/2, MIL-C-3643, MIL-STD-348, IEC-169-7, IEC-457-2, DIN 47 223, DIN 47 226, DIN 47 298, where applicable. For details please refer to the beginning of this section.




**SMA Push-On Two Hole Flange Mount**
**Floating Rear Mount Connector Saver**

## NON Locking

| Adapter Part No. | 8004-SM21-02 |
|---|---|
| Connector Config. | SMA Push-On to SMA-f |
| Frequency Range | DC to 26.5 GHz |
| VSWR | 1.20 : 1 max. |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.

# Float Mount Application Notes can be supplied on request.

Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per MIL-C 39012, MIL-C-87104/2, MIL-C-3643, MIL-STD-348, IEC-169-7, IEC-457-2, DIN 47 223, DIN 47 226, DIN 47 298, where applicable. For details please refer to the beginning of this section.

Spectrum Elektrotechnik GmbH

# SMA Reverse Sex PUSH-ON

# SMA Reverse Sex Push-On Connectors & Adapters

**PUSH-ON SMA REVERSE SEX-TYPE CONNECTORS** eliminate time consuming tightening, torquing and loosening of SMA-male connectors during testing or in applications where limited space requirements make tightening and torquing of a coupling nut difficult, if not impossible.

The SMA Reverse Sex push-on slides directly onto any standard SMA Reverse Sex-female, allowing prompt connection and loosening. Three types of push-on SMA Reverse Sex connectors are available: full-locking, locking with non-locking rear nut, and non-locking.

**Full Locking** push-on SMA Reverse Sex-Type connectors are recommended when longer testing is required and the connectors must be firmly locked so that they cannot be disconnected, even by mistake. **Locking with non-locking rear nut** SMA Reverse Sex-Type connectors are recommended where safe locking is necessary, but long term testing is not required. **Non-locking** push-on connectors are recommended for short period testing, testing that usually takes only seconds.

Push-On SMA Reverse Sex-Type connectors are available for termination with cables RG-142B/U, RG-400/U and RG-214/U. State-of-the-art high performance cables using push-on connectors are available as well, however, these high performance cable assemblies are only available completely terminated; they can be found in the section "Cable Assemblies" on pages 235-236 of this catalog.

**PUSH-ON SMA REVERSE SEX-TYPE CONNECTOR SAVERS**, or adapters, were developed for attachment to cable assemblies which are terminated with regular connectors. The adapter has a standard connector on one side, and a push-on connector on the other end. The standard connector end of the adapter engages with the standard connector of the opposite sex at the cable assembly. These connnector savers modify cable assemblies in seconds, changing them from a standard product to a state-of-the-art push-on assembly.
Push-on adapters are availabe for a variety of connectors and both male and female sexes within the connector series. SMA Reverse Sex-type push-on connectors savers are supplied in **locking with non-locking rear nut** and **non-locking** configuration.

## FEATURES:

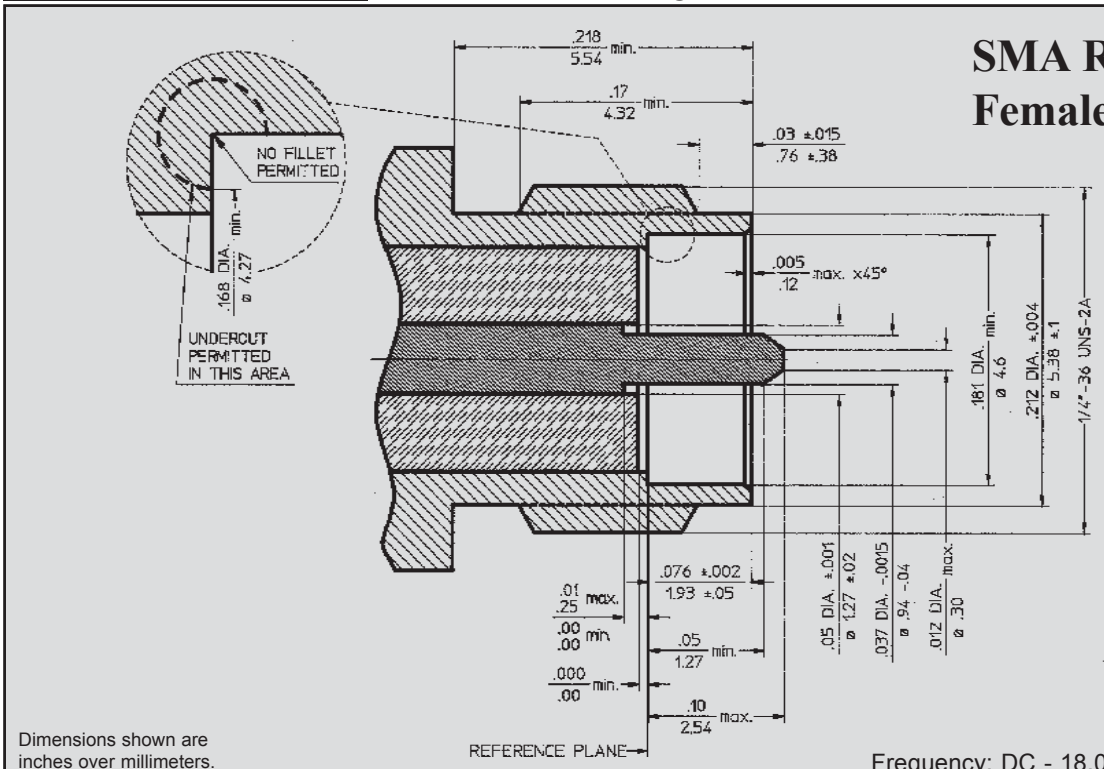
**REPEATABLE PERFORMANCE**
**SAFE LOCKING MECHANISM***
**REDUCED TEST TIME**

* on Full Locking and Locking Units

**LOW INSERTION LOSS**
**HIGH RETURN LOSS**
**DC- 26.5 GHz**
**LONG LIFE**

c:/quick-98/sma-push.pm6

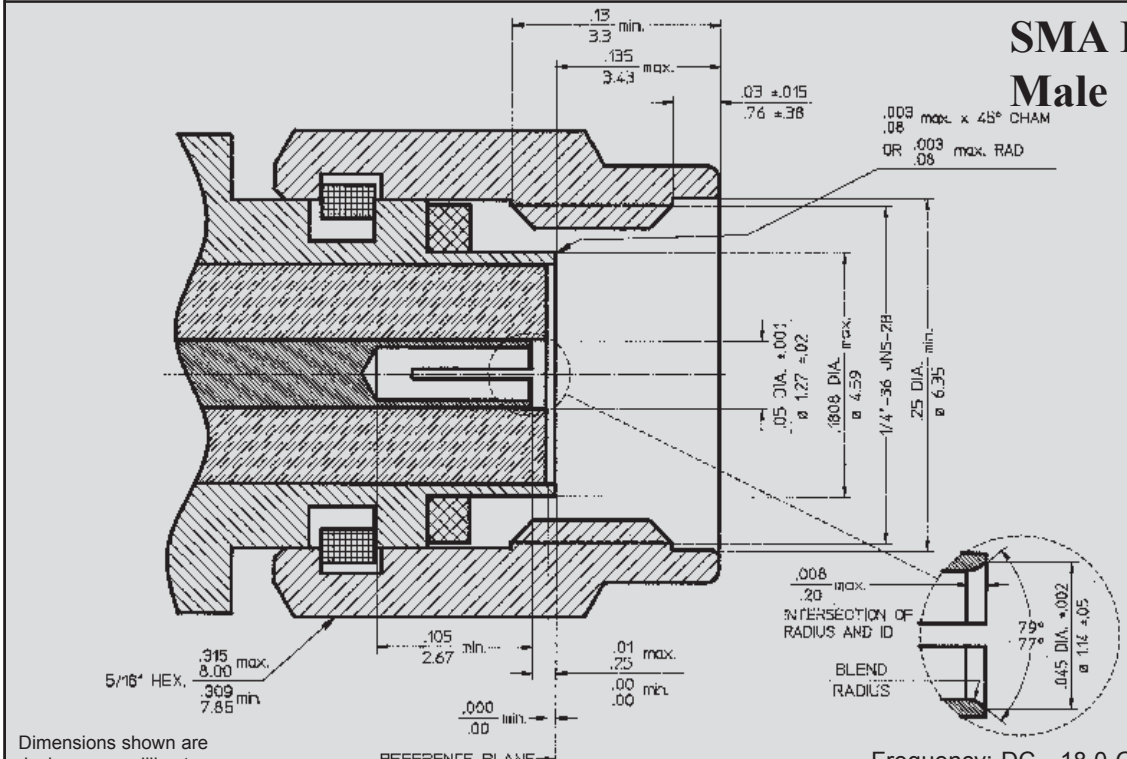
## SMA R Female




Dimensions shown are inches over millimeters.

Frequency: DC - 18.0 GHz min.

## SMA R Male




Dimensions shown are inches over millimeters.

Frequency: DC - 18.0 GHz min.

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# SMA Reverse Sex PUSH-ON Specifications

The specifications below are general specifications for all SMA Reverse Sex PUSH-ON connectors. Specifications in the following table are recommended for any procurement documents or drawings. In the event of any conflict, these specifications shall govern.The PUSH-ON Connectors were developed to eliminate the time consuming lightening, torquing and loosening of connectors during test. The connector slides directly onto any Female of the same connector style, allowing quick connecting and disconnecting. Its mechanism locks safely onto the standard thread of the Female connector.

| REQUIREMENT | | GENERAL SPECIFICATIONS |
|---|---|---|
| **GENERAL** | | |
| Standard Materials | | STEEL corrosion resistant 1.4305 per DIN 17440 (QQ-S-764, class 303 or ASTM-A-582-80).<br>ALUMINUM AlMg4.5Mn per DIN 1725, AlMgSi0.5 per DIN 1725, AlMgSi1 per DIN 1725 (6061-T6 per QQ-A-225/8).<br>BRASS CuZn39Pb3 per DIN 17660 (QQ-B-626, half hard).<br>COPPER BERYLLIUM 33-25 CuBe2Pb H per DIN 17666 (QQ-C-530).<br>TFE Fluorocarbon per DIN 52900 (MIL-P-19468 and L-P403).<br>SILICONE RUBBER per DIN 3771 (MIL-R-5847 and ZZ-R-765, Class II B,) Grade 50 - 75.<br>BORRIUM NITRITE Dielectric for high power applications per inhouse specification. |
| Finish for | COPPER BERYLLIUM | Center Contacts shall be gold plated to a minimum thickness of .00005 inch (1.27 µm) in accordance with MIL-G-45204, Type II, Grade C. Outer conductors shall be gold plated to a thickness of .00003 inch (0.8 µm) per MIL-G-45204 , Type II, Grade C, or silver plated to a thickness of .0001 inch (2.5 µm) per QQ-S-365. |
| | STAINLESS STEEL | Shall be passivated per QQ-P-35 or gold plated to a thickness of .00003 inch (0.8 µm) per MIL-G-45204, Type II, Grade C. |
| | ALUMINUM | Conductive Parts shall have an iridited finish per MIL-C-5541.<br>Other parts, such as Coupling Nuts and Back-Bodies shall be anodized per MIL-A-8625. |
| | BRASS | Gold plated to a thickness of .00003 inch (0.8 µm) min. per MIL-45204, Type II, Grade C, or nicle plated to a thickness of .0002 inch (5µm) per QQ-N-290, grade E, or silver plated to a thickness of .0001 inch (2.5 µm) per QQ-S-365. |
| | VARIOUS | Imoloy .0001 inch (2.5 µm) min. plating, consisting of 55% Copper / 20% Zinc / 25% Tin (on special request). |
| Design | | The design shall be such that the outline dimensions in this catalog are met. In addition, the assembled connector shall meet the interface dimensions. |
| **ELECTRICAL** | | |
| Frequency Range | | DC - 26.5 GHz min. |
| Insulation Resistance | | The insulation resistance shall not be less than 5.000 megohms. |
| Voltage Standing Wave Ratio (VSWR) | | 1.15 : 1 (DC - 18.0 GHz), 1.20 : 1 (18.0 - 26.5 GHz). |
| Contact Resistance | | The center contact resistance drop shall not exceed 3.0 milliohms max. |
| Dielectric Withstanding Voltage | | The magnitude of the test voltage shall be 1500 volts rms at 60 Hz. |
| RF High Potential Withstanding Voltage | | The RF high potential withstanding voltage is 1,000 volts rms at 5 MHz. |
| RF Leakage | | -80 dB max. to 3.0 GHz, -65 dB max. to 26.5 GHz |
| Insertion Loss | | 0.3 dB max. at 18.0 GHz |
| Impedance | | 50 Ohms Nominal |
| Corona Level Voltage | | 250 Volts at 70,000 ft. |
| **MECHANICAL** | | |
| Connector Durability | | The connector is to be tested and its mating connector shall be subjected to 500 insertion min. Withdrawal cycles / minute are not applicable. The connector shall show no evidence of mechanical failure and the connector shall meet the mating characteristic requirements. |
| Temperature | | -65°C to +165°C |
| Force to Engage and Disengage | | The Force to Engage and Disengage shall not exceed 2 inch-pounds (0.226 Nm). |
| Longitudinal Force max. | | Longitudinal force is not applicable. |
| **ENVIRONMENTAL** | | |
| Corrosion (Salt Spray) | | Specification MIL-STD-202, Method 101, Test Condition B. The salt solution shall be 5%. |
| Vibration | | Specification MIL-STD-202, Method 204, Test Condition D. |
| Shock | | Specification MIL-STD-202, Method 213, Test Condition I. |
| Thermal Shock | | Specification MIL-STD-202, Method 107, Test Condition B, except high temperature shall be + 200°C. |
| Moisture Resistance | | Specification MIL-STD-202, Method 106. Step 7b (vibration) shall be omitted. Insulation resistance shall be 200 megohms min. within 5 minutes of removal from humidity. |

Spectrum Elektrotechnik GmbH

# SMA
# Reverse Sex
# PUSH-ON





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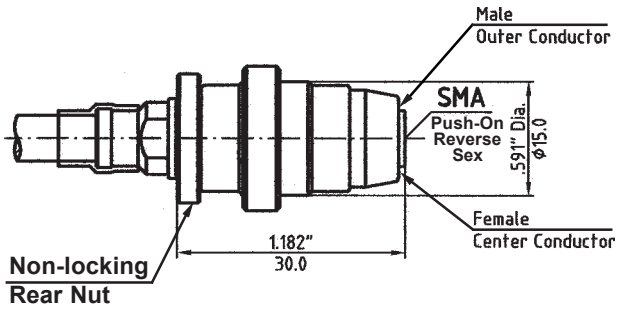
DC - 18.0 GHz

## Locking with Non-locking Rear Nut

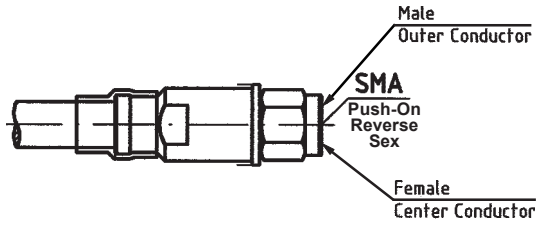
| Connector Part No. | Flexible Cable Type | Cable Code | Connector Code |
|---|---|---|---|
| 2R13-RM01-02 | RG-316/U | 32 | RML |
| 2R15-RM01-02 | RG-400/U | 40 | |
| 2R15-RM02-02 | RG-142B/U | 42 | |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.




Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per Spectrum Elektrotechnik GmbH Specifications. For details please refer to the beginning of this section.

# PUSH-ON Connectors, Type SMA Reverse Sex

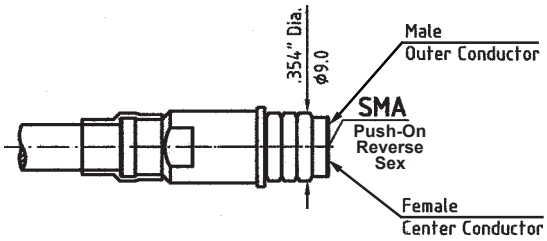



DC - 18.0 GHz

## NON Locking

| Connector Part No. | Flexible Cable Type | Cable Code | Connector Code |
|---|---|---|---|
| 2R13-RM02-02 | RG-316/U | 32 | RM |
| 2R15-RM03-02 | RG-400/U | 40 | |
| 2R15-RM04-02 | RG-142B/U | 42 | |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.

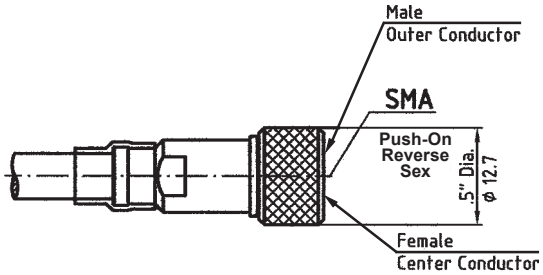



DC - 18.0 GHz

## NON Locking

| Connector Part No. | Flexible Cable Type | Cable Code | Connector Code |
|---|---|---|---|
| 2R13-RM03-02 | RG-316/U | 32 | RMR |
| 2R15-RM05-02 | RG-400/U | 40 | |
| 2R15-RM06-02 | RG-142B/U | 42 | |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.




DC - 18.0 GHz

## NON Locking

| Connector Part No. | Flexible Cable Type | Cable Code | Connector Code |
|---|---|---|---|
| 2R13-RM04-02 | RG-316/U | 32 | RMM |
| 2R15-RM07-02 | RG-400/U | 40 | |
| 2R15-RM08-02 | RG-142B/U | 42 | |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.

Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per Spectrum Elektrotechnik GmbH Specifications. For details please refer to the beginning of this section.

Interested?
Please refer to
" The '98 Handbook
Passive Components".

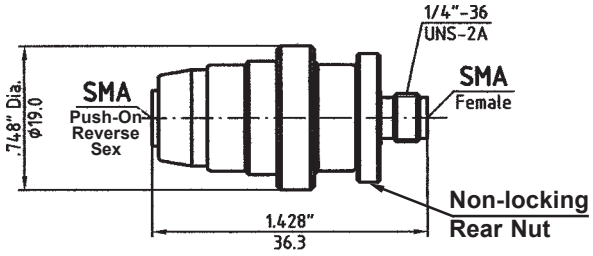
# DC - Block Connectors

# SMA Reverse Sex PUSH-ON

## Locking with Non-locking Rear Nut

| Adapter Part No. | 8006-RM21-02 |
|---|---|
| Connector Config. | "SMA Reverse Sex Push-On" to SMA-f |
| Frequency Range | DC to 26.5 GHz |
| VSWR | 1.20 : 1 max. |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.

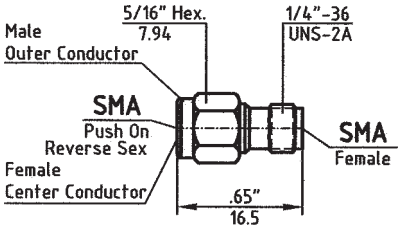



Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per MIL-C 39012, MIL-C-87104/2, MIL-C-3643, MIL-STD-348, IEC-169-7, IEC-457-2, DIN 47 223, DIN 47 226, DIN 47 298, where applicable. For details please refer to the beginning of this section.

# NON Locking

| Adapter Part No. | 8001-RM21-02 |
|---|---|
| Connector Config. | "SMA Reverse Sex Push-On" to SMA-f |
| Frequency Range | DC to 18.0 GHz |
| VSWR | 1.20 : 1 max. |

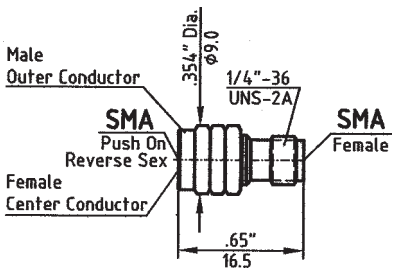
Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.




# NON Locking

| Adapter Part No. | 8003-RM21-02 |
|---|---|
| Connector Config. | "SMA Reverse Sex Push-On" to SMA-f |
| Frequency Range | DC to 18.0 GHz |
| VSWR | 1.20 : 1 max. |

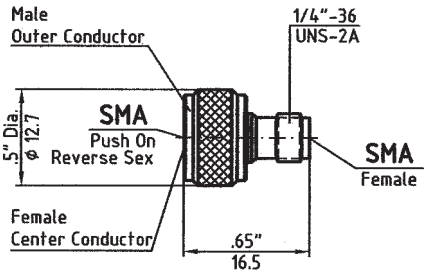
Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.




# NON Locking

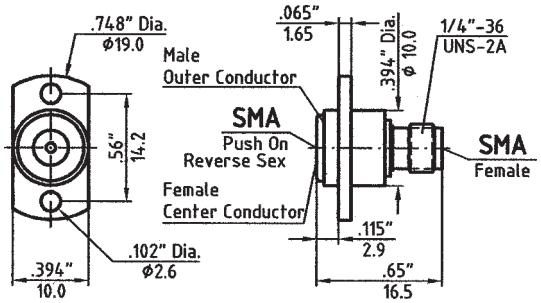
| Adapter Part No. | 8005-RM21-02 |
|---|---|
| Connector Config. | "SMA Reverse Sex Push-On" to SMA-f |
| Frequency Range | DC to 18.0 GHz |
| VSWR | 1.20 : 1 max. |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.




**Easier Handling with the enlarged coupling nut.**

Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per MIL-C 39012, MIL-C-87104/2, MIL-C-3643, MIL-STD-348, IEC-169-7, IEC-457-2, DIN 47 223, DIN 47 226, DIN 47 298, where applicable. For details please refer to the beginning of this section.




**SMA Reverse Sex Push-On Two Hole Flange Mount Floating Rear Mount Connector Saver**

## NON Locking

| Adapter Part No. | 8004-RM21-02 |
|---|---|
| Connector Config. | "SMA Reverse Sex Push-On" to SMA-f |
| Frequency Range | DC to 18.0 GHz |
| VSWR | 1.20 : 1 max. |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.

# Float Mount Application Notes

# can be supplied on request.

Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per MIL-C 39012, MIL-C-87104/2, MIL-C-3643, MIL-STD-348, IEC-169-7, IEC-457-2, DIN 47 223, DIN 47 226, DIN 47 298, where applicable. For details please refer to the beginning of this section.

# SMP

# Push-On Connectors & Adapters of Type SMP

**THE SMP** (**S**ub-**M**iniature-**P**ush-On) is a 2.4 mm connector, using solid dielectric interface. The connector is extremely small and therefore allows high density packaging. It was originally designed to permit the female connector to incline freely in direction while the mechanical and electrical connection remains maintained. The male connector is available in **smooth bore** for easy connection and disconnection, with **limited detent**, characterized by a certain insertion and withdrawal force, and with **full detent**, needing high insertion force and a substantial withdrawal force, usually requiring a tool for disconnection. The full detended SMP connection is suitable for mobile applications, extreme shock and vibration requirements. SMP connectors are offered for applications to 18.0 GHz and 26.5 GHz, precision designs are even operating to 40.0 GHz. Spectrum´s SMP connectors are meeting interface dimensions to DESC specifications 94007 and 94008. Spectrum Elektrotechnik GmbH has developed SMP test connectors as well, and designed and manufactures SMP calibration kits. Spectrums SMP test connectors and calibration components are supplied with an additional thread that can be employed to ensure perfect and repeatable mating during calibration.

**SMP** (**S**ub-**M**iniature-**P**ush-On) connectors are specifically used for packaging and interconnecting low power microwave modules, drawers and racks in state-of-the-art systems that do not allow longer system down time, and are built on a modular basis. **SMP** push-on connectors allow replacement of faulty microwave modules within seconds. A typical method of interlocking modules is using lock screws.

**SMP** (**S**ub-**M**iniature-**P**ush-On) connectors are also available as cable connectors for several smaller standard **semi-rigid** cables of diameters 0.047" and 0.085", **low density semi-rigid** cables, standard **flexible** cables and **low density flexible** cables. The availability of **SMP** connectors allows easy interconnection of microwave power components. Standard units are available as straight or mitred right angled connectors, in bulkhead or panel mount or flanged designs for solder or compression clamp attachment.

**SMP** (**S**ub-**M**iniature-**P**ush-On) connectors can be obtained hermetically sealed for pressing or threading into the component housing,

**SMP** (**S**ub-**M**iniature-**P**ush-On) connectors are available as circuit board connectors, in a variety of straight, mitred right angle and flange mount designs.

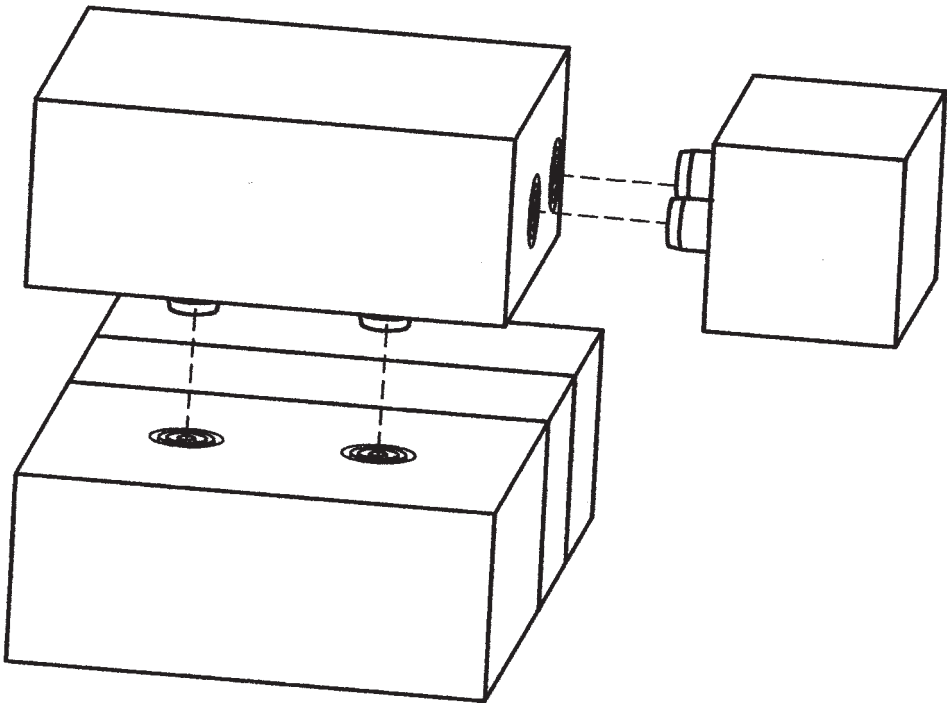
Some test equipment may not be supplied with **SMP** test port connectors. Therefore an adequate number of between series instrument grade adapters to other important connector series are available, such as 2.9mm, 7mm and SMA.

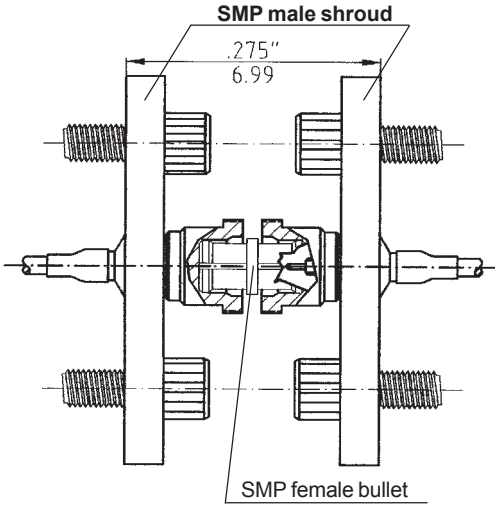
Spectrum Elektrotechnik GmbH is a very innovative company, offering special services in engineering in order to meet the customer's needs to perfection.

# Applications & Features, Type SMP

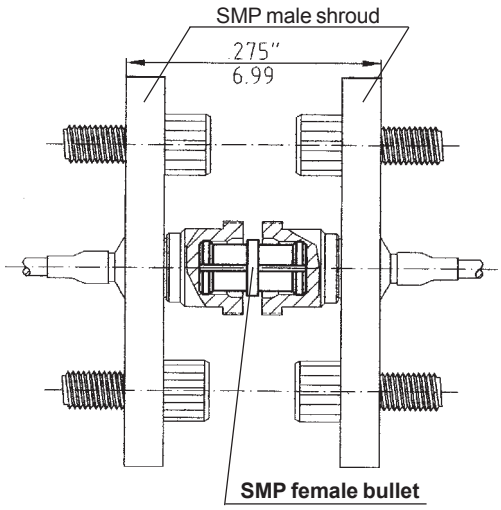
When using blind mate connectors in an application, careful consideration has to be given to choosing the right connector series, the appropriate connector model within that series, and the correct mounting features. Spectrum Elektrotechnik Gmbh does offer besides the **SMP** series, also **BMA** and **SBX, SBY** blind mate connectors, and all those series are shown in this Handbook. This makes it easy for the customer to identify the best connector or connectors for his system. A system also may use several or all of the blind mate connectors offered. Important parameters for identifying the proper connector and its series are:

* **Power requirement**
* **Operating frequency**
* **Rigid or float mount connectors**
* **Connector-to-connector fixed tolerances**
* **Connector-to-connector float tolerances**
* **Mating forces**
* **Float mount spring loading**
* **Connector packaging density in multiple connector arrays**
* **Panel deflection**

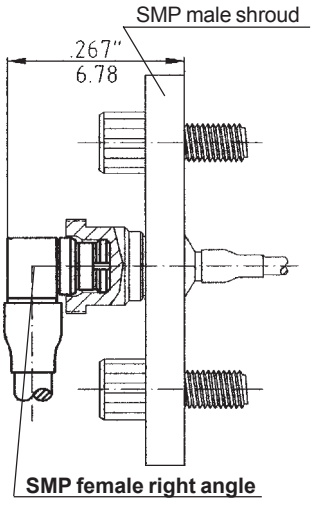





**SHROUDS:**
The male flange mount SMP connector is called the "**shroud**". It is mounted to modules and connects at the other end to cable or stripline, etc. Inserting the "bullet" between two **shrouds** provides a typical module to module separation of 0.275 inches ( 7.0 mm ). The "**shrouds**" are made of passivated stainless steel and surround a center conductor of 0.015 inches ( 0.38 mm ). **Shrouds** are available full detent, limited detent, or with smooth bore. For specifications, or further details please refer to the SMP specifications at the beginning of this section.

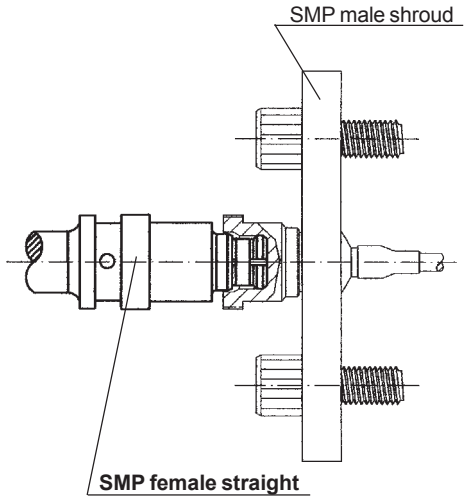



**BULLETS:**
The SMP female/female adapter is called the "**bullet**". It mates with the SMP male connector. Inserting the "**bullet**" between two male flange mount connectors, the "shrouds", provides a typical module to module separation of 0.275 inches (7.0 mm). Shorter or longer versions of "**bullets**" are available, or can be designed upon customer request. The outer and center conductors of the "**bullets**" are made from beryllium copper, heat treated and gold plated. For specifications, or further details please refer to the SMP specifications at the beginning of this section.

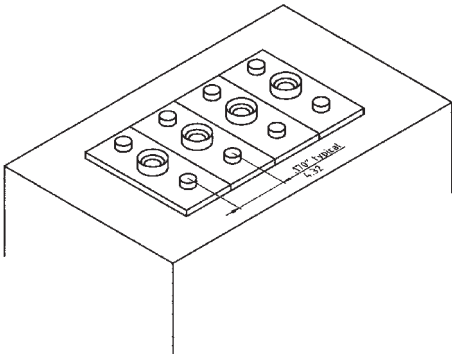



**RIGHT ANGLE CONNECTORS:**
SMP **female right angle connectors** are availabe for semi rigid cable and for flexible cable as well. They are usually connecting to modules, e.g. mating with the SMP flange mount male connector, the shroud. The right angle connectors are needed for limited space requirements. Very short right angle connectors with lowest profile were developed for even tighter space requirements. For the mating shroud it has to be decided carefully, whether full detent, limited detent or smooth bore should be used. This depends mainly on the application. A test cable being connected/disconnected many times will prefer smooth bore, while the use in mobile equipment may require full detent.

# Applications & Features, Type SMP

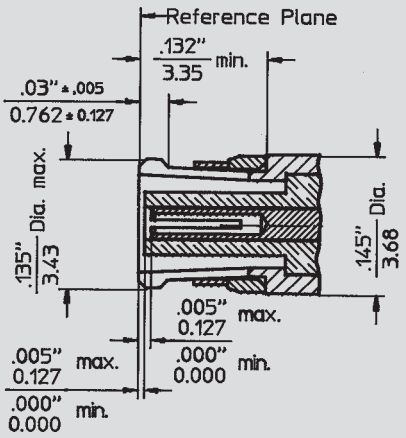



**Straight Connectors:**
SMP **female straight connectors** are availabe for semi rigid cable and for flexible cable as well. They are usually connecting to modules, e.g. mating with the SMP flange mount male connector, the shroud. A variety of mating shrouds are available. It has to be decided carefully, whether a shroud with full detent, limited detent or smooth bore should be used. It depends mainly on the application. A test cable being connected/disconnected many times will prefer smooth bore, while the use in mobile equipment may require full detent.



**Dense Packaging:**
The SMP miniature high performance interconnect system reduces space requirements. It allows for dense packaging with connector spacing as close as 0.170 inches ( 4.3mm ). For applications that require hermetic sealing, the flange end mounts over 0.015 inches ( 0.38mm) glass seal pin.

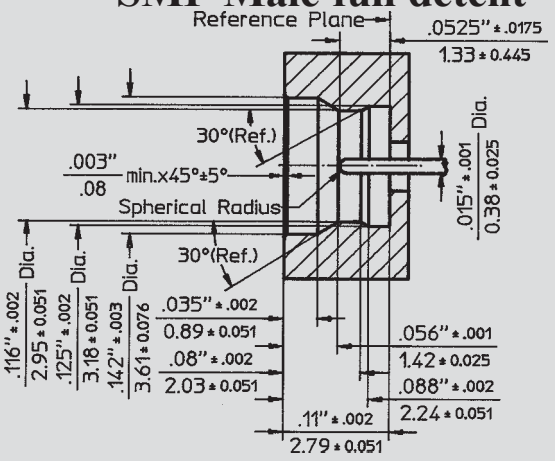
## SMP Female



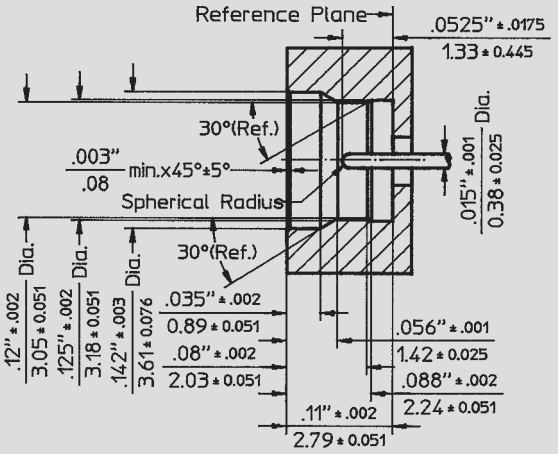

Dimensions shown are inches over millimeters.

Frequency: DC - 40.0 GHz min.

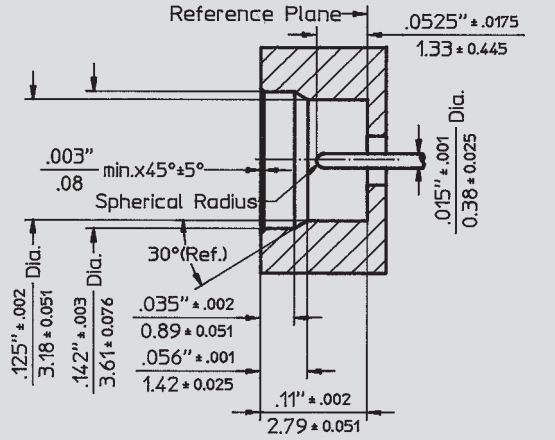
## SMP Male full detent



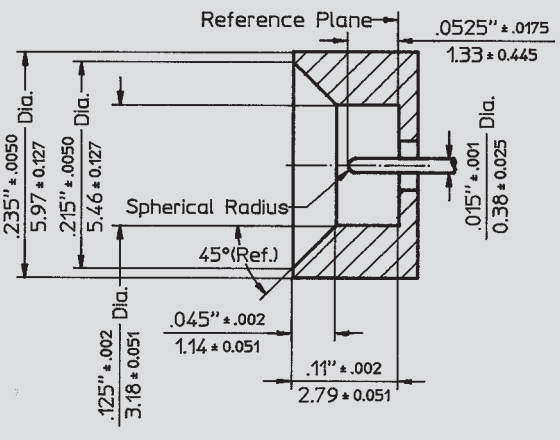

## SMP Male limited detent




## SMP Male smooth bore




## SMP Male

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Spectrum Elektrotechnik GmbH

# Specifications SMP

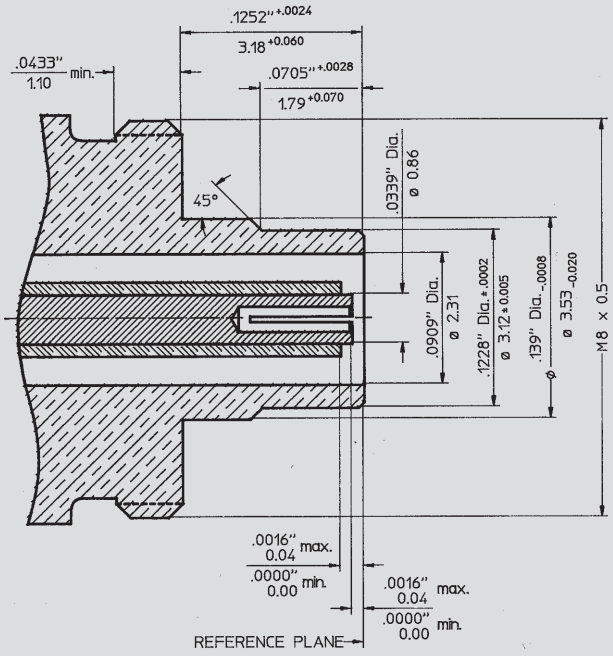
The specifications below are general specifications for all SMP connectors. Specific Data for VSWR, Insertion loss, R.F. leakage etc., are available from the factory upon request. Specifications in the following table are recommended for any procurement documents or drawings. In the event of any conflict between these specifications and General Specifications DESC 94007 and DESC 94008, these specifications shall govern. These specifications are subject to change according to the latest revision.

| REQUIREMENT | | GENERAL SPECIFICATIONS |
|---|---|---|
| **GENERAL** | | |
| Standard Materials | | STEEL corrosion resistant 1.4305 per DIN 17440 (QQ-S-764, class 303 or ASTM-A-582-80).<br>ALUMINUM AlMg4.5Mn per DIN 1725, AlMgSi0.5 per DIN 1725, AlMgSi1 per DIN 1725 (6061-T6 per QQ-A-225/8).<br>BRASS CuZn39Pb3 per DIN 17660 (QQ-B-626, half hard).<br>COPPER BERYLLIUM 33-25 CuBe2Pb H per DIN 17666 (QQ-C-530).<br>TFE Fluorocarbon per DIN 52900 (MIL-P-19468 and L-P403).<br>SILICONE RUBBER per DIN 3771 (MIL-R-5847 and ZZ-R-765, Class II B,) Grade 50 - 75.<br>BORRIUM NITRITE Dielectric for high power applications per inhouse specification. |
| Finish for | COPPER BERYLLIUM | Center Contacts shall be gold plated to a minimum thickness of .00005 inch (1.27 µm) in accordance with MIL-G-45204, Type II, Grade C. Outer conductors shall be gold plated to a thickness of .00003 inch (0.8 µm) per MIL-G-45204 , Type II, Grade C, or silver plated to a thickness of .0001 inch (2.5 µm) per QQ-S-365. |
| | STAINLESS STEEL | Shall be passivated per QQ-P-35 or gold plated to a thickness of .00003 inch (0.8 µm) per MIL-G-45204, Type II, Grade C. |
| | ALUMINUM | Conductive Parts shall have an iridited finish per MIL-C-5541.<br>Other parts, such as Coupling Nuts and Back-Bodies shall be anodized per MIL-A-8625. |
| | BRASS | Gold plated to a thickness of .00003 inch (0.8 µm) min. per MIL-45204, Type II, Grade C, or nicle plated to a thickness of .0002 inch (5µm) per QQ-N-290, grade E, or silver plated to a thickness of .0001 inch (2.5 µm) per QQ-S-365. |
| | VARIOUS | Imoloy .0001 inch (2.5 µm) min. plating, consisting of 55% Copper / 20% Zinc / 25% Tin (on special request). |
| Design | | The design shall be such that the outline dimensions in this catalog are met. In addition, the assembled connector shall meet the interface dimensions. |
| **ELECTRICAL** | | |
| Frequency Range | | DC - 40.0 GHz min. |
| Insulation Resistance | | The insulation resistance shall not be less than 5.000 megaohms. |
| Voltage Standing Wave Ratio (VSWR) | | 1.5 : 1 max. to 40.0 GHz. |
| Contact Resistance | | The center contact resistance drop is 6.0 milliohms max. |
| Dielectric Withstanding Voltage | | The magnitude of the test voltage shall be 500 volts rms at sea level. |
| RF High Potential Withstanding Voltage | | The RF high potential withstanding voltage is 325 volts rms at 5 MHz. Leakage is not applicable. |
| RF Leakage | | RF Leakage is not applicable. |
| Insertion Loss | | (.10 SQT(f(GHz))) dB |
| **MECHANICAL** | | |
| Connector Durability | | The connector is to be tested and its mating connector shall be subjected to 100 insertions min.. Withdrawal cycles /minute are not applicable. The connector shall show no evidence of mechanical failure and the connector shall meet the mating characteristic requirements. |
| Cable Retention Force | | 20 pounds (88.9 N) min. |
| Coupling Nut Retention Force | | Not applicable. |
| Force to Engage and Disengage Longitudinal Force max. | | The torque required to engage shall not exceed 15 lbs. (66.7 N). The disengage torque shall not exceed 2 lbs. (8.9 N) min. (full detent). |
| Mating Characteristics | | Not applicable. |
| Recommended Mating Torque | | Recommended Mating Torque is not applicable. |
| **ENVIRONMENTAL** | | |
| Corrosion (Salt Spray) | | Specification MIL-STD-202, Method 101, Test Condition B. The salt solution shall be 5%. |
| Vibration | | Specification MIL-STD-202, Method 204, Test Condition D. |
| Shock | | Specification MIL-STD-202, Method 213, Test Condition I. |
| Thermal Shock | | Specification MIL-STD-202, Method 107, Test Condition B, rating -65 °C to +165 °C. |
| Moisture Resistance | | Specification MIL-STD-202, Method 106. Step 7b (vibration) shall be omitted. Insulation resistance shall be 200 megohms min. within 5 minutes of removal from humidity. |
| Corona Level | | The connector shall not exhibit breakdown (corona) when the applied voltage is 190 volts rms and the altitude is 70,000 feet. |

Spectrum Elektrotechnik GmbH

## SMP Female

Interface

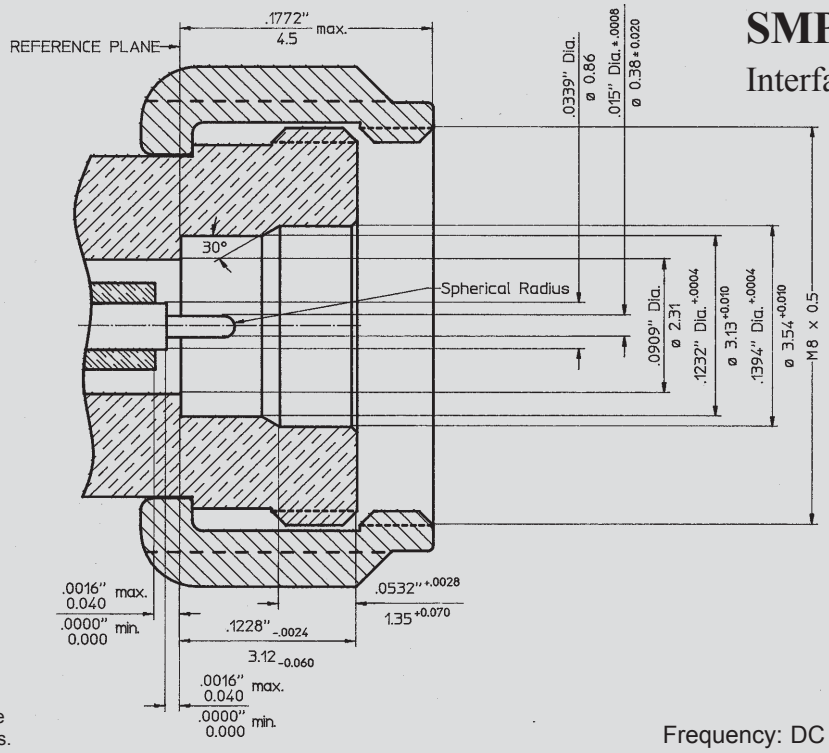



Dimensions shown are inches over millimeters.

Frequency: DC - 40.0 GHz min.

## SMP Male

Interface Precision




Dimensions shown are inches over millimeters.

Frequency: DC - 40.0 GHz min.

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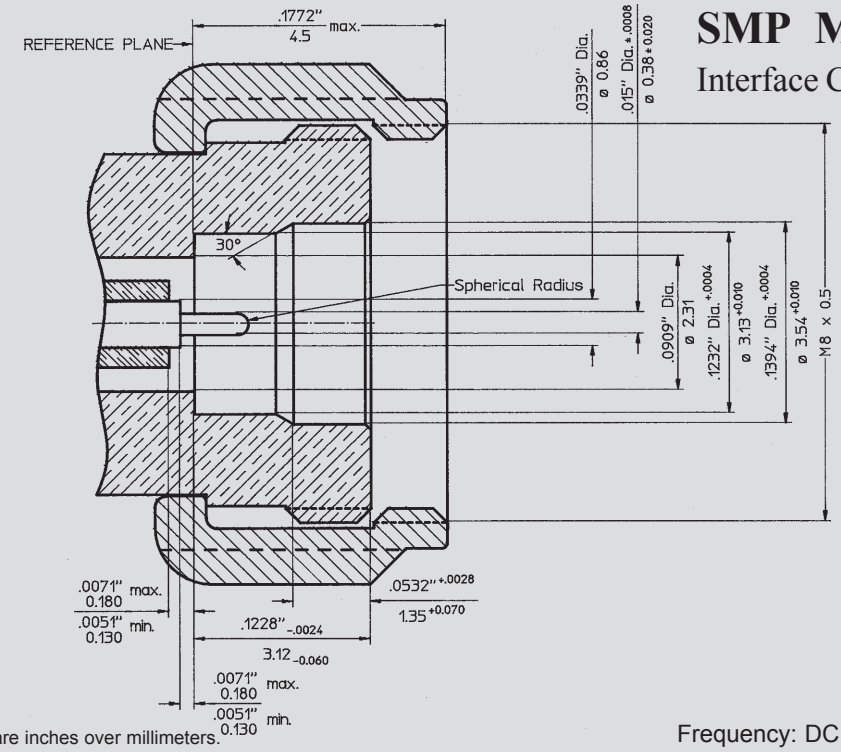
## SMP Male

Interface Commercial




Dimensions shown are inches over millimeters.

Frequency: DC - 40.0 GHz min.

Spectrum Elektrotechnik GmbH has developed an SMP Calibration System that allows testing SMP connectors with guaranteed repeatability. To ensure proper mating, the SMP Test Connectors employ additional threading, ensuring perfect and repeatable mating, avoiding uncertainties that cannot be prevented with pure snap on connectors. The connectors will mate properly with standard SMP connectors.

To the left and above Spectrum Elektrotechnik GmbH has documented the interface mating dimensions of the test connectors. The commercial test connector, as specified above, was mainly needed during the time when the DESC Specification still allowed protruding center contacts and dielectrics.

# SMP Test Connector Specifications

The specifications below are general specifications for all SMP Test Connectors. Specific Data for VSWR, Insertion loss, R.F. leakage etc., are available from the factory upon request. Specifications in the following table are recommended for any procurement documents or drawings. In the event of any conflict between these specifications and other documentation, these specifications shall govern. These specifications are subject to change according to the latest revision.

| REQUIREMENT | | GENERAL SPECIFICATIONS |
|---|---|---|
| **GENERAL** | | |
| Standard Materials | | STEEL corrosion resistant 1.4305 per DIN 17440 (QQ-S-764, class 303 or ASTM-A-582-80).<br>ALUMINUM AlMg4.5Mn per DIN 1725, AlMgSi0.5 per DIN 1725, AlMgSi1 per DIN 1725 (6061-T6 per QQ-A-225/8).<br>BRASS CuZn39Pb3 per DIN 17660 (QQ-B-626, half hard).<br>COPPER BERYLLIUM 33-25 CuBe2Pb H per DIN 17666 (QQ-C-530).<br>TFE Fluorocarbon per DIN 52900 (MIL-P-19468 and L-P403).<br>SILICONE RUBBER per DIN 3771 (MIL-R-5847 and ZZ-R-765, Class II B,) Grade 50 - 75.<br>BORRIUM NITRITE Dielectric for high power applications per inhouse specification. |
| Finish for | COPPER BERYLLIUM | Center Contacts shall be gold plated to a minimum thickness of .00005 inch (1.27 µm) in accordance with MIL-G-45204, Type II, Grade C. Outer conductors shall be gold plated to a thickness of .00003 inch (0.8 µm) per MIL-G-45204 , Type II, Grade C, or silver plated to a thickness of .0001 inch (2.5 µm) per QQ-S-365. |
| | STAINLESS STEEL | Shall be passivated per QQ-P-35 or gold plated to a thickness of .00003 inch (0.8 µm) per MIL-G-45204, Type II, Grade C. |
| | ALUMINUM | Conductive Parts shall have an iridited finish per MIL-C-5541.<br>Other parts, such as Coupling Nuts and Back-Bodies shall be anodized per MIL-A-8625. |
| | BRASS | Gold plated to a thickness of .00003 inch (0.8 µm) min. per MIL-45204, Type II, Grade C, or nicle plated to a thickness of .0002 inch (5µm) per QQ-N-290, grade E, or silver plated to a thickness of .0001 inch (2.5 µm) per QQ-S-365. |
| | VARIOUS | Imoloy .0001 inch (2.5 µm) min. plating, consisting of 55% Copper / 20% Zinc / 25% Tin (on special request). |
| Design | | The design shall be such that the outline dimensions in this catalog are met. In addition, the assembled connector shall meet the interface dimensions. |
| **ELECTRICAL** | | |
| Frequency Range | | DC - 18.0 GHz min. & DC - 40.0 GHz min. |
| Insulation Resistance | | The insulation resistance shall not be less than 5.000 megaohms. |
| Voltage Standing Wave Ratio (VSWR) | | 1.02 + .005 x f(GHz) |
| Contact Resistance | | The center contact resistance drop is 6.0 milliohms max. |
| Dielectric Withstanding Voltage | | The magnitude of the test voltage shall be 500 volts rms at sea level. |
| RF High Potential Withstanding Voltage | | The RF high potential withstanding voltage is 325 volts rms at 5 MHz. Leakage is not applicable. |
| RF Leakage | | RF Leakage is not applicable. |
| Insertion Loss | | (.05 SQT(f(GHz))) dB |
| **MECHANICAL** | | |
| Connector Durability | | The connector is to be tested and its mating connector shall be subjected to 100 insertions min.. Withdrawal cycles /minute are not applicable. The connector shall show no evidence of mechanical failure and the connector shall meet the mating characteristic requirements. |
| Cable Retention Force | | 20 pounds (88.9 N) min. |
| Coupling Nut Retention Force | | Not applicable. |
| Force to Engage and Disengage Longitudinal Force max. | | The torque required to engage shall not exceed 15 lbs. (66.7 N). The disengage torque shall not exceed 2 lbs. (8.9 N) min. (full detent). |
| Mating Characteristics | | Not applicable. |
| Recommended Mating Torque | | 6.2 inch-pounds (0.7 Nm) |
| **ENVIRONMENTAL** | | |
| Corrosion (Salt Spray) | | Specification MIL-STD-202, Method 101, Test Condition B. The salt solution shall be 5%. |
| Vibration | | Specification MIL-STD-202, Method 204, Test Condition D. |
| Shock | | Specification MIL-STD-202, Method 213, Test Condition I. |
| Thermal Shock | | Specification MIL-STD-202, Method 107, Test Condition B, rating -65 °C to +165 °C. |
| Moisture Resistance | | Specification MIL-STD-202, Method 106. Step 7b (vibration) shall be omitted. Insulation resistance shall be 200 megohms min. within 5 minutes of removal from humidity. |
| Corona Level | | The connector shall not exhibit breakdown (corona) when the applied voltage is 190 volts rms and the altitude is 70,000 feet. |

# SMP

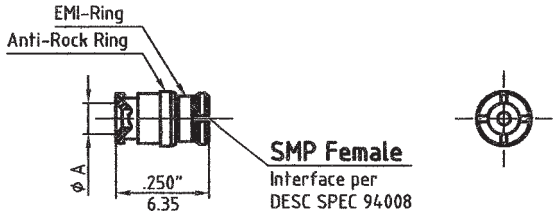
# SMP Semi-Rigid Cable Connectors

DC - 18.0 GHz

## SMP female straight for Semi-Rigid Cable

| Connector Part No. | S/R Cable | Cable Part No. | Ø A min. | Conn. Code |
|---|---|---|---|---|
| 1102-2101-04 | .047" | 421-047<br>421-047-1<br>421-047-3 | .049"<br>1.24 | SPF |
| 1102-2102-04 | .047" LL | 421-047L<br>421-047L-1<br>421-047L-3 | .049"<br>1.24 | |
| 1103-2102-04 | .085" | 421-086<br>421-086-1<br>421-086-3 | .088"<br>2.24 | |
| 1103-2103-04 | .085" LL | 421-307<br>421-307-1<br>421-307-3 | .088"<br>2.24 | |

Connector outer conductor and center contact are beryllium copper gold plated. LL= Low density dielectric.

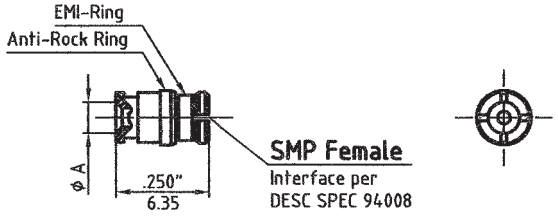



DC - 26.5 GHz

## SMP female straight for Semi-Rigid Cable

| Connector Part No. | S/R Cable | Cable Part No. | Ø A min. | Conn. Code |
|---|---|---|---|---|
| 1103-2106-04 | .085" | 421-086<br>421-086-1<br>421-086-3 | .088"<br>2.24 | SPE |
| 1103-2107-04 | .085" LL | 421-307<br>421-307-1<br>421-307-3 | .088"<br>2.24 | |

Connector outer conductor and center contact are beryllium copper gold plated. LL= Low density dielectric.

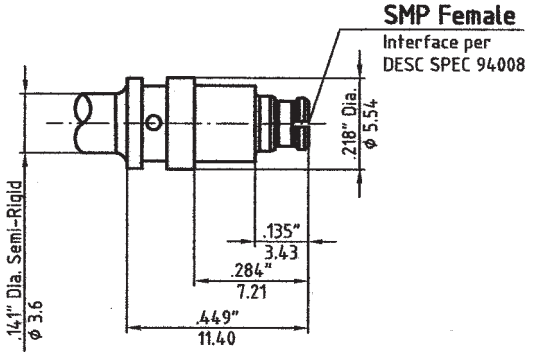



DC - 18.0 GHz

## SMP connector assembly female for S/R Cable

| Connector Part No. | S/R Cable | Cable Part No. | Ø A min. | Conn. Code |
|---|---|---|---|---|
| 1103-2108-04 | .141" | 421-669 | .049"<br>1.24 | SPF |

Connector outer conductor and center contact are beryllium copper gold plated.

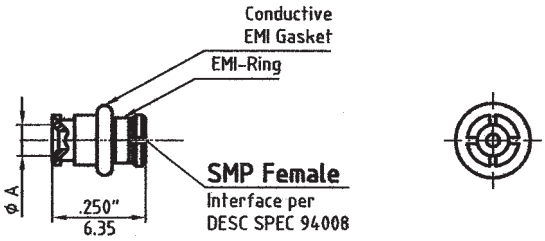



DC - 18.0 GHz

## SMP female straight for Semi-Rigid Cable

| Connector Part No. | S/R Cable | Cable Part No. | Ø A min. | Conn. Code |
|---|---|---|---|---|
| 1102-2103-04 | .047" | 421-047<br>421-047-1<br>421-047-3 | .049"<br>1.24 | SPG |
| 1102-2104-04 | .047" LL | 421-047L<br>421-047L-1<br>421-047L-3 | .049"<br>1.24 | |
| 1103-2104-04 | .085" | 421-086<br>421-086-1<br>421-086-3 | .088"<br>2.24 | |
| 1103-2105-04 | .085" LL | 421-307<br>421-307-1<br>421-307-3 | .088"<br>2.24 | |

Connector outer conductor and center contact are beryllium copper gold plated. LL= Low density dielectric.




Dimensions shown are inches over millimeters. Standard units are beryllium copper gold plated (last two digits of the P/N are -04), or stainless steel gold plated (last two digits of the P/N are -00). Interface mating dimensions and specifications, as issued by DESC 94007 and DESC 94008. For details please refer to the beginning of this section.

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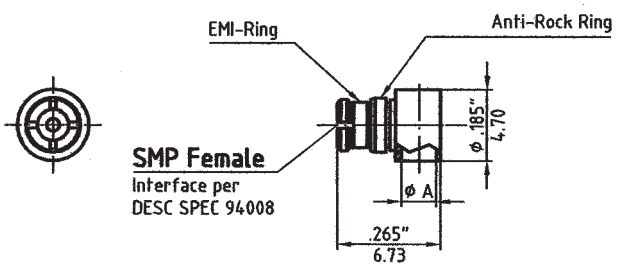
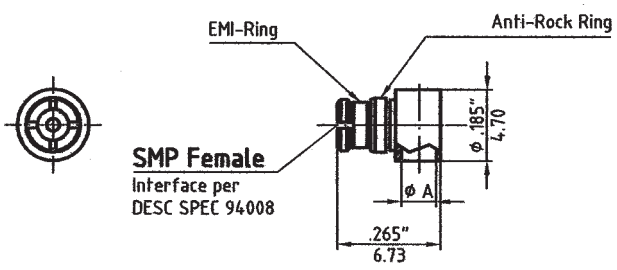



**DC - 12.0 GHz**

## SMP female right angle for Semi-Rigid Cable

| Connector Part No. | S/R Cable | Cable Part No. | Ø A min. | Conn. Code |
|---|---|---|---|---|
| **1102-3401-04** | **.047"** | 421-047<br>421-047-1<br>421-047-3 | .049"<br>1.24 | SPQ |
| **1102-3402-04** | **.047" LL** | 421-047L<br>421-047L-1<br>421-047L-3 | .049"<br>1.24 | |
| **1103-3401-04** | **.085"** | 421-086<br>421-086-1<br>421-086-3 | .088"<br>2.24 | |
| **1103-3402-04** | **.085" LL** | 421-307<br>421-307-1<br>421-307-3 | .088"<br>2.24 | |

Connector outer conductor and center contact are beryllium copper gold plated. LL= Low density dielectric.

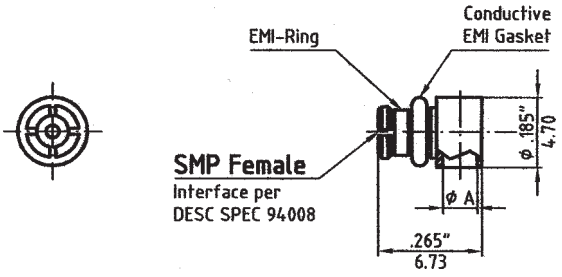



**DC - 18.0 GHz**

## SMP female right angle for Semi-Rigid Cable

| Connector Part No. | S/R Cable | Cable Part No. | Ø A min. | Conn. Code |
|---|---|---|---|---|
| **1103-3417-04** | **.085"** | 421-086<br>421-086-1<br>421-086-3 | .088"<br>2.24 | SPQ |
| **1103-3418-04** | **.085" LL** | 421-307<br>421-307-1<br>421-307-3 | .088"<br>2.24 | |

Connector outer conductor and center contact are beryllium copper gold plated. LL= Low density dielectric.




**DC - 12.0 GHz**

## SMP female right angle for Semi-Rigid Cable

| Connector Part No. | S/R Cable | Cable Part No. | Ø A min. | Conn. Code |
|---|---|---|---|---|
| **1102-3403-04** | **.047"** | 421-047<br>421-047-1<br>421-047-3 | .049"<br>1.24 | SPD |
| **1102-3404-04** | **.047" LL** | 421-047L<br>421-047L-1<br>421-047L-3 | .049"<br>1.24 | |
| **1103-3403-04** | **.085"** | 421-086<br>421-086-1<br>421-086-3 | .088"<br>2.24 | |
| **1103-3404-04** | **.085" LL** | 421-307<br>421-307-1<br>421-307-3 | .088"<br>2.24 | |

Connector outer conductor and center contact are beryllium copper gold plated. LL= Low density dielectric.

Dimensions shown are inches over millimeters. Standard units are beryllium copper gold plated (last two digits of the P/N are -04), or stainless steel gold plated (last two digits of the P/N are -00). Interface mating dimensions and specifications, as issued by DESC 94007 and DESC 94008. For details please refer to the beginning of this section.

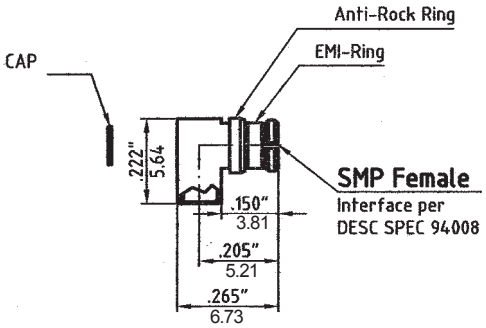
# SMP Semi-Rigid Cable Connectors

DC - 18.0 GHz

## SMP female right angle for Semi-Rigid Cable

| Connector Part No. | S/R Cable | Cable Part No. | Ø A min. | Conn. Code |
|---|---|---|---|---|
| 1103-3419-04 | .085" | 421-086<br>421-086-1<br>421-086-3 | .088"<br>2.24 | SPH |

Connector outer conductor and center contact are beryllium copper gold plated.

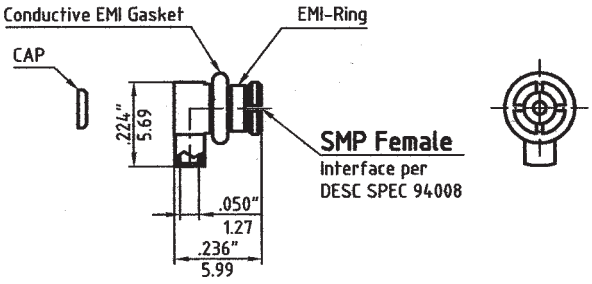



DC - 18.0 GHz

## SMP female right angle for Semi-Rigid Cable

| Connector Part No. | S/R Cable | Cable Part No. | Ø A min. | Conn. Code |
|---|---|---|---|---|
| 1102-3417-04 | .047" | 421-047<br>421-047-1<br>421-047-3 | .049"<br>1.24 | SPH |

Connector outer conductor and center contact are beryllium copper gold plated.

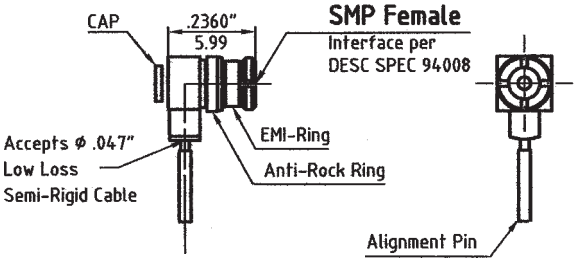



DC - 18.0 GHz

## SMP female right angle to .047" LL (1.19mm) for Semi-Rigid Cable

| Connector Part No. | S/R Cable | Cable Part No. | Ø A min. | Conn. Code |
|---|---|---|---|---|
| 1102-3418-04 | .047" LL | 421-047L<br>421-047L-1<br>421-047L-3 | .049"<br>1.24 | SPJ |

Connector outer conductor and center contact are beryllium copper gold plated. LL= Low density dielectric.

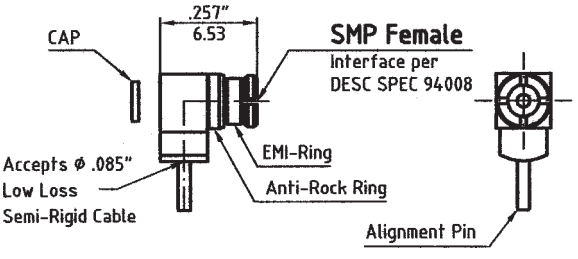



DC - 18.0 GHz

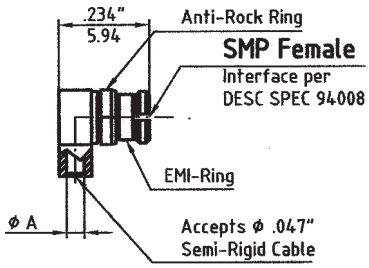
## SMP female right angle to .085" LL (2.16mm) for Semi-Rigid Cable

| Connector Part No. | S/R Cable | Cable Part No. | Ø A min. | Conn. Code |
|---|---|---|---|---|
| 1103-3420-04 | .085" LL | 421-307<br>421-307-1<br>421-307-3 | .088"<br>2.24 | SPJ |

Connector outer conductor and center contact are beryllium copper gold plated. LL= Low density dielectric.




Dimensions shown are inches over millimeters. Standard units are beryllium copper gold plated (last two digits of the P/N are -04), or stainless steel gold plated (last two digits of the P/N are -00). Interface mating dimensions and specifications, as issued by DESC 94007 and DESC 94008. For details please refer to the beginning of this section.

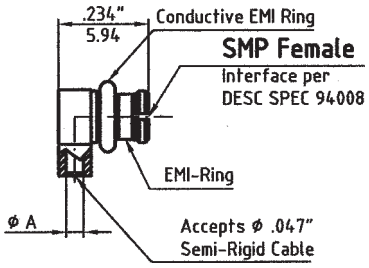



**DC - 18.0 GHz**

### SMP female right angle connector for Semi-Rigid Cable

| Connector Part No. | S/R Cable | Cable Part No. | Ø A min. | Conn. Code |
|---|---|---|---|---|
| 1102-3413-04 | .047" | 421-047<br>421-047-1<br>421-047-3 | .049"<br>1.24 | SPQ |
| 1102-3414-04 | .047" LL | 421-047L<br>421-047L-1<br>421-047L-3 | .049"<br>1.24 | |

Connector outer conductor and center contact are beryllium copper gold plated. LL= Low density dielectric.

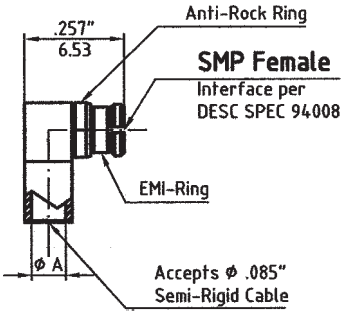



**DC - 18.0 GHz**

### SMP female right angle connector for Semi-Rigid Cable

| Connector Part No. | S/R Cable | Cable Part No. | Ø A min. | Conn. Code |
|---|---|---|---|---|
| 1102-3415-04 | .047" | 421-047<br>421-047-1<br>421-047-3 | .049"<br>1.24 | SPD |
| 1102-3416-04 | .047" LL | 421-047L<br>421-047L-1<br>421-047L-3 | .049"<br>1.24 | |

Connector outer conductor and center contact are beryllium copper gold plated. LL= Low density dielectric.

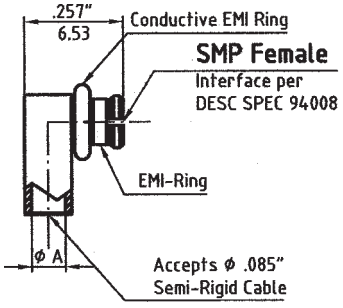



**DC - 18.0 GHz**

### SMP female right angle connector for Semi-Rigid Cable

| Connector Part No. | S/R Cable | Cable Part No. | Ø A min. | Conn. Code |
|---|---|---|---|---|
| 1103-3413-04 | .085" | 421-086<br>421-086-1<br>421-086-3 | .088"<br>2.24 | SPQ |
| 1103-3414-04 | .085" LL | 421-307<br>421-307-1<br>421-307-3 | .088"<br>2.24 | |

Connector outer conductor and center contact are beryllium copper gold plated. LL= Low density dielectric.




**DC - 18.0 GHz**

### SMP female right angle connector for Semi-Rigid Cable

| Connector Part No. | S/R Cable | Cable Part No. | Ø A min. | Conn. Code |
|---|---|---|---|---|
| 1103-3415-04 | .085" | 421-086<br>421-086-1<br>421-086-3 | .088"<br>2.24 | SPD |
| 1103-3416-04 | .085" LL | 421-307<br>421-307-1<br>421-307-3 | .088"<br>2.24 | |

Connector outer conductor and center contact are beryllium copper gold plated. LL= Low density dielectric.

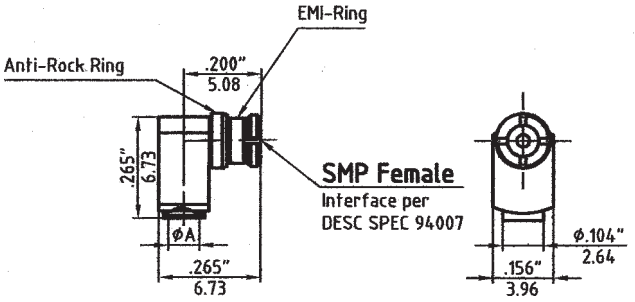
Dimensions shown are inches over millimeters. Standard units are beryllium copper gold plated (last two digits of the P/N are -04), or stainless steel gold plated (last two digits of the P/N are -00). Interface mating dimensions and specifications, as issued by DESC 94007 and DESC 94008. For details please refer to the beginning of this section.

DC - 18.0 GHz

## SMP female right angle for Semi-Rigid Cable

| Connector Part No. | S/R Cable | Cable Part No. | Ø A min. | Conn. Code |
|---|---|---|---|---|
| 1102-3405-04 | .047" | 421-047<br>421-047-1<br>421-047-3 | .049"<br>1.24 | SPA |
| 1102-3406-04 | .047" LL | 421-047L<br>421-047L-1<br>421-047L-3 | .049"<br>1.24 | |
| 1103-3405-04 | .085" | 421-086<br>421-086-1<br>421-086-3 | .088"<br>2.24 | |
| 1103-3406-04 | .085" LL | 421-307<br>421-307-1<br>421-307-3 | .088"<br>2.24 | |

Connector outer conductor and center contact are beryllium copper gold plated. LL= Low density dielectric.

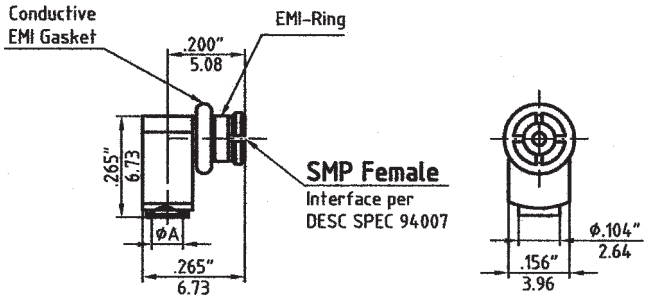



DC - 18.0 GHz

## SMP female right angle for Semi-Rigid Cable

| Connector Part No. | S/R Cable | Cable Part No. | Ø A min. | Conn. Code |
|---|---|---|---|---|
| 1102-3407-04 | .047" | 421-047<br>421-047-1<br>421-047-3 | .049"<br>1.24 | SPB |
| 1102-3408-04 | .047" LL | 421-047L<br>421-047L-1<br>421-047L-3 | .049"<br>1.24 | |
| 1103-3407-04 | .085" | 421-086<br>421-086-1<br>421-086-3 | .088"<br>2.24 | |
| 1103-3408-04 | .085" LL | 421-307<br>421-307-1<br>421-307-3 | .088"<br>2.24 | |

Connector outer conductor and center contact are beryllium copper gold plated. LL= Low density dielectric.

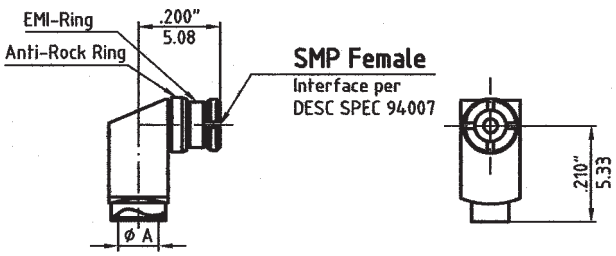



DC - 26.5 GHz

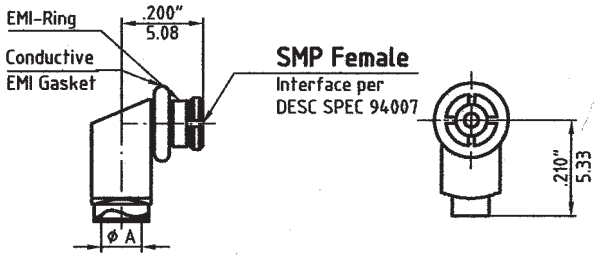
## SMP female right angle for Semi-Rigid Cable

| Connector Part No. | S/R Cable | Cable Part No. | Ø A min. | Conn. Code |
|---|---|---|---|---|
| 1102-3409-04 | .047" | 421-047<br>421-047-1<br>421-047-3 | .049"<br>1.24 | SPR |
| 1102-3410-04 | .047" LL | 421-047L<br>421-047L-1<br>421-047L-3 | .049"<br>1.24 | |
| 1103-3409-04 | .085" | 421-086<br>421-086-1<br>421-086-3 | .088"<br>2.24 | |
| 1103-3410-04 | .085" LL | 421-307<br>421-307-1<br>421-307-3 | .088"<br>2.24 | |

Connector outer conductor and center contact are beryllium copper gold plated. LL= Low density dielectric.




Dimensions shown are inches over millimeters. Standard units are beryllium copper gold plated (last two digits of the P/N are -04), or stainless steel gold plated (last two digits of the P/N are -00). Interface mating dimensions and specifications, as issued by DESC 94007 and DESC 94008. For details please refer to the beginning of this section.

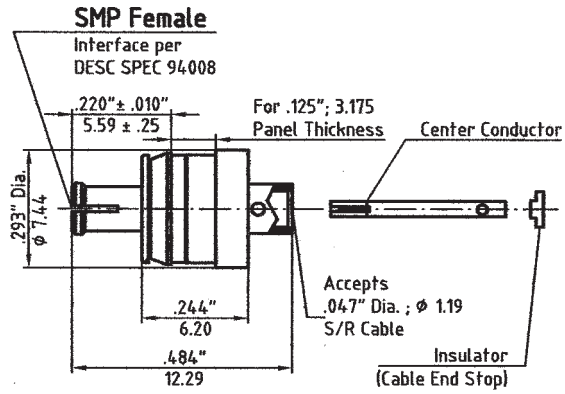



**DC - 26.5 GHz**

## SMP female right angle for Semi-Rigid Cable

| Connector Part No. | S/R Cable | Cable Part No. | Ø A min. | Conn. Code |
|---|---|---|---|---|
| **1102-3411-04** | **.047"** | 421-047<br>421-047-1<br>421-047-3 | .049"<br>1.24 | SPC |
| **1102-3412-04** | **.047" LL** | 421-047L<br>421-047L-1<br>421-047L-3 | .049"<br>1.24 | |
| **1103-3411-04** | **.085"** | 421-086<br>421-086-1<br>421-086-3 | .088"<br>2.24 | |
| **1103-3412-04** | **.085" LL** | 421-307<br>421-307-1<br>421-307-3 | .088"<br>2.24 | |

Connector outer conductor and center contact are beryllium copper gold plated. LL= Low density dielectric.

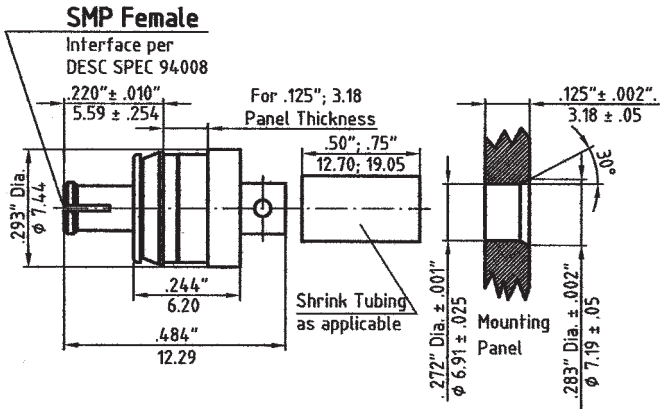



**DC - 18.0 GHz**

## SMP female float mount for .047" (1.19mm) Semi-Rigid Cable

| Connector Part No. | S/R Cable | Cable Part No. | Ø A min. | Conn. Code |
|---|---|---|---|---|
| **1102-6505-04** | **.047"** | 421-047<br>421-047-1<br>421-047-3 | .049"<br>1.24 | SPN |

Connector outer conductor and center contact are beryllium copper gold plated. LL= Low density dielectric.



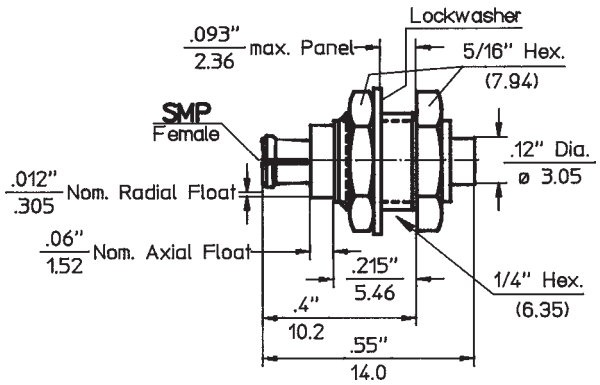

**DC - 18.0 GHz**

## SMP female Float Mount .125" (3.18mm) Panel for Semi-Rigid Cable

| Connector Part No. | S/R Cable | Cable Part No. | Conn. Code |
|---|---|---|---|
| **1102-6501-04** | **.047"** | 421-047<br>421-047-1<br>421-047-3 | SPT |
| **1102-6502-04** | **.047" LL** | 421-047L<br>421-047L-1<br>421-047L-3 | |
| **1103-6501-04** | **.085"** | 421-086<br>421-086-1<br>421-086-3 | |
| **1103-6502-04** | **.085" LL** | 421-307<br>421-307-1<br>421-307-3 | |

Connector outer conductor is stainless steel gold plated. Center conductor is berryllium copper gold plated. LL= Low density dielectric.

Dimensions shown are inches over millimeters. Standard units are beryllium copper gold plated (last two digits of the P/N are -04), or stainless steel gold plated (last two digits of the P/N are -00). Interface mating dimensions and specifications, as issued by DESC 94007 and DESC 94008. For details please refer to the beginning of this section.



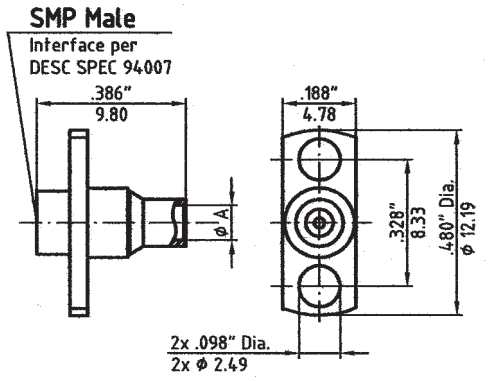

DC - 18.0 GHz

### SMP female bulkhead float mount for Semi-Rigid Cable

| Connector Part No. | S/R Cable | Cable Part No. | Ø A min. | Conn. Code |
|---|---|---|---|---|
| **1103-6503-02** | **.085"** | 421-086<br>421-086-1<br>421-086-3 | .088"<br>2.24 | SPU |

Connector outer conductor and center contact are beryllium copper gold plated.

| Connector Part No. | S/R Cable | Cable Part No. | Inter-face | Ø A min. | Conn. Code |
|---|---|---|---|---|---|
| **11F2-6301-00** | **.047"** | 421-047<br>421-047-1<br>421-047-3 | Full detent | .049"<br>1.24 | SRF |
| **11L2-6301-00** | **.047"** | 421-047<br>421-047-1<br>421-047-3 | Limited detent | .049"<br>1.24 | SRL |
| **11S2-6301-00** | **.047"** | 421-047<br>421-047-1<br>421-047-3 | Smooth bore | .049"<br>1.24 | SRS |
| **11F2-6302-00** | **.047" LL** | 421-047L<br>421-047L-1<br>421-047L-3 | Full detent | .049"<br>1.24 | SRF |
| **11L2-6302-00** | **.047" LL** | 421-047L<br>421-047L-1<br>421-047L-3 | Limited detent | .049"<br>1.24 | SRL |
| **11S2-6302-00** | **.047" LL** | 421-047L<br>421-047L-1<br>421-047L-3 | Smooth bore | .049"<br>1.24 | SRS |
| **11F3-6301-00** | **.085"** | 421-086<br>421-086-1<br>421-086-3 | Full detent | .088"<br>2.24 | SRF |
| **11L3-6301-00** | **.085"** | 421-086<br>421-086-1<br>421-086-3 | Limited detent | .088"<br>2.24 | SRL |
| **11S3-6301-00** | **.085"** | 421-086<br>421-086-1<br>421-086-3 | Smooth bore | .088"<br>2.24 | SRS |
| **11F3-6302-00** | **.085" LL** | 421-307<br>421-307-1<br>421-307-3 | Full detent | .088"<br>2.24 | SRF |
| **11L3-6302-00** | **.085" LL** | 421-307<br>421-307-1<br>421-307-3 | Limited detent | .088"<br>2.24 | SRL |
| **11S3-6302-00** | **.085" LL** | 421-307<br>421-307-1<br>421-307-3 | Smooth bore | .088"<br>2.24 | SRS |

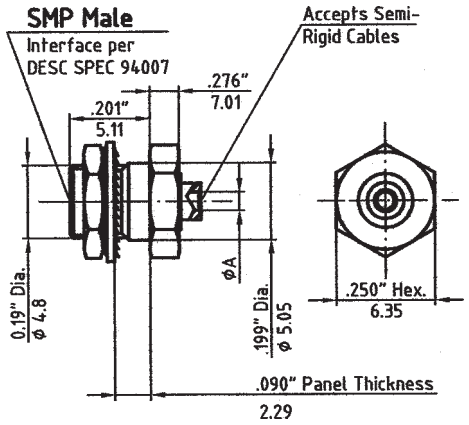



DC - 18.0 GHz

### SMP male straight for Semi-Rigid Cable

Connector outer conductor is stainless steel gold plated. Center conductor is berryllium copper gold plated. LL= Low density dielectric.

Dimensions shown are inches over millimeters. Standard units are beryllium copper gold plated (last two digits of the P/N are -04), or stainless steel gold plated (last two digits of the P/N are -00). Interface mating dimensions and specifications, as issued by DESC 94007 and DESC 94008. For details please refer to the beginning of this section.

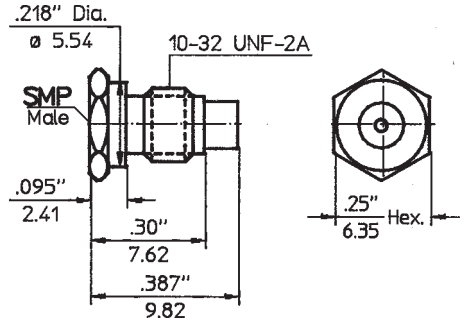



**DC - 18.0 GHz**

## SMP male Bulkhead for Semi-Rigid Cable

Connector outer conductor is stainless steel gold plated. Center conductor is berryllium copper gold plated. LL= Low density dielectric.

| Connector Part No. | S/R Cable | Cable Part No. | Inter-face | Ø A min. | Conn. Code |
|---|---|---|---|---|---|
| **11F2-6401-00** | **.047"** | 421-047<br>421-047-1<br>421-047-3 | Full detent | .049"<br>1.24 | STF |
| **11L2-6401-00** | **.047"** | 421-047<br>421-047-1<br>421-047-3 | Limited detent | .049"<br>1.24 | STL |
| **11S2-6401-00** | **.047"** | 421-047<br>421-047-1<br>421-047-3 | Smooth bore | .049"<br>1.24 | STS |
| **11F2-6402-00** | **.047" LL** | 421-047L<br>421-047L-1<br>421-047L-3 | Full detent | .049"<br>1.24 | STF |
| **11L2-6402-00** | **.047" LL** | 421-047L<br>421-047L-1<br>421-047L-3 | Limited detent | .049"<br>1.24 | STL |
| **11S2-6402-00** | **.047" LL** | 421-047L<br>421-047L-1<br>421-047L-3 | Smooth bore | .049"<br>1.24 | STS |
| **11F3-6401-00** | **.085"** | 421-086<br>421-086-1<br>421-086-3 | Full detent | .088"<br>2.24 | STF |
| **11L3-6401-00** | **.085"** | 421-086<br>421-086-1<br>421-086-3 | Limited detent | .088"<br>2.24 | STL |
| **11S3-6401-00** | **.085"** | 421-086<br>421-086-1<br>421-086-3 | Smooth bore | .088"<br>2.24 | STS |
| **11F3-6402-00** | **.085" LL** | 421-307<br>421-307-1<br>421-307-3 | Full detent | .088"<br>2.24 | STF |
| **11L3-6402-00** | **.085" LL** | 421-307<br>421-307-1<br>421-307-3 | Limited detent | .088"<br>2.24 | STL |
| **11S3-6402-00** | **.085" LL** | 421-307<br>421-307-1<br>421-307-3 | Smooth bore | .088"<br>2.24 | STS |




smooth bore

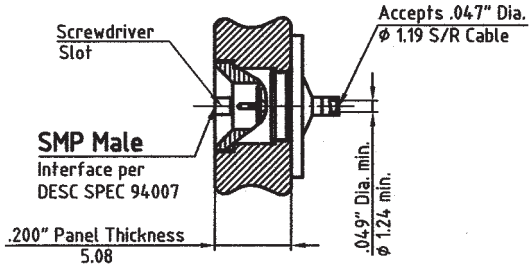
**DC - 18.0 GHz**

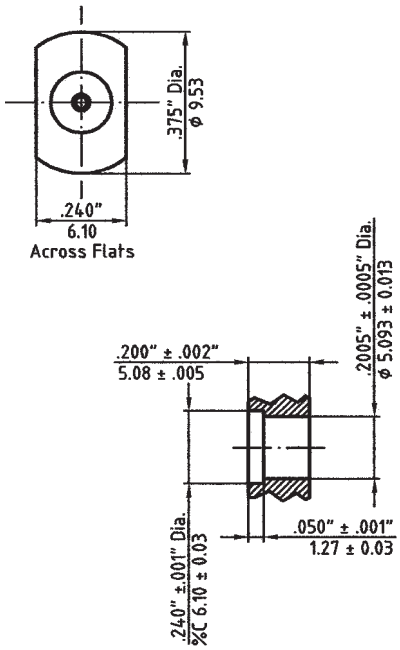
## SMP male Bulkhead for Semi-Rigid Cable

| Connector Part No. | S/R Cable | Cable Part No. | Ø A min. | Conn. Code |
|---|---|---|---|---|
| **11S3-6407-00** | **.085"** | 421-086<br>421-086-1<br>421-086-3 | .088"<br>2.24 | SPW |
| **11S3-6408-00** | **.085" LL** | 421-307<br>421-307-1<br>421-307-3 | .088"<br>2.24 | |

Connector outer conductor is stainless steel gold plated. Center conductor is berryllium copper gold plated. LL= Low density dielectric.

Dimensions shown are inches over millimeters. Standard units are beryllium copper gold plated (last two digits of the P/N are -04), or stainless steel gold plated (last two digits of the P/N are -00). Interface mating dimensions and specifications, as issued by DESC 94007 and DESC 94008. For details please refer to the beginning of this section.



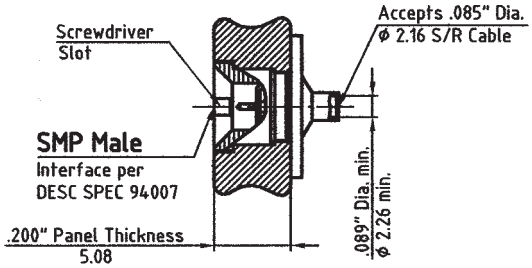

smooth bore

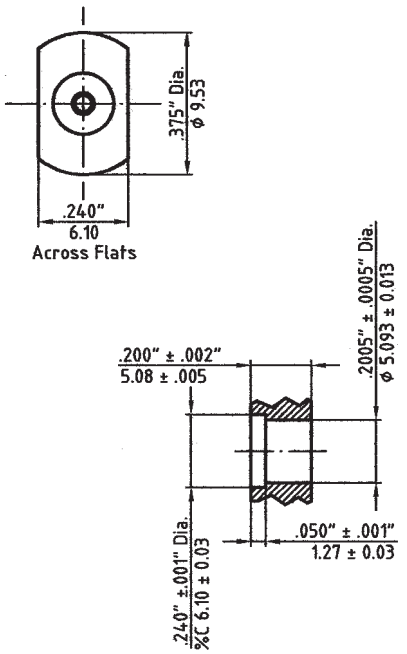
**DC - 18.0 GHz**

### SMP male panel mount for .047" (1.19mm) for Semi-Rigid Cable

| Connector Part No. | S/R Cable | Cable Part No. | Ø A min. | Conn. Code |
|---|---|---|---|---|
| **1102-6601-00** | **.047"** | 421-047<br>421-047-1<br>421-047-3 | .049"<br>1.24 | SPS |

Connector outer conductor is stainless steel gold plated.
Center conductor is beryllium copper gold plated.




smooth bore

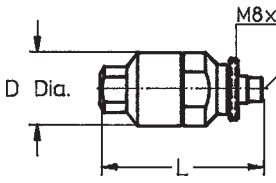
**DC - 18.0 GHz**

### SMP male panel mount for .085" (2.16mm) for Semi-Rigid Cable

| Connector Part No. | S/R Cable | Cable Part No. | Ø A min. | Conn. Code |
|---|---|---|---|---|
| **1103-6601-00** | **.085"** | 421-086<br>421-086-1<br>421-086-3 | .088"<br>2.24 | SPS |

Connector outer conductor is stainless steel gold plated.
Center conductor is beryllium copper gold plated.

Dimensions shown are inches over millimeters. Standard units are beryllium copper gold plated (last two digits of the P/N are -04), or stainless steel gold plated (last two digits of the P/N are -00). Interface mating dimensions and specifications, as issued by DESC 94007 and DESC 94008. For details please refer to the beginning of this section.



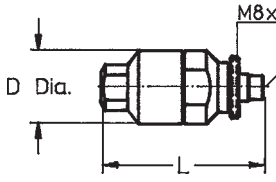

Test Connector to connect with SMP-m smooth bore

**DC - 18.0 GHz**

### SMP female Test Connector for Semi-Rigid Cable

| Connector Part No. | S/R Cable | Cable Part No. | Ø D | L | Conn. Code |
|---|---|---|---|---|---|
| 11S3-21J1-02 | .085" | 421-086<br>421-086-1<br>421-086-3 | .433"<br>11.0 | .846"<br>21.5 | TJ |
| 11S3-21J2-02 | .085" LL | 421-307<br>421-307-1<br>421-307-3 | .433"<br>11.0 | .846"<br>21.5 | |

Connector outer conductor is passivated stainless steel. Center conductor is beryllium copper gold plated. LL= Low density dielectric.



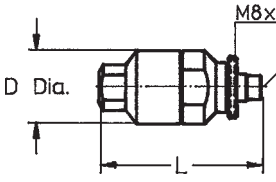

Test Connector to connect with SMP-m limited detent

**DC - 18.0 GHz**

### SMP female Test Connector - limited detent for Semi-Rigid Cable

| Connector Part No. | S/R Cable | Cable Part No. | Ø D | L | Conn. Code |
|---|---|---|---|---|---|
| 11L3-21J1-02 | .085" | 421-086<br>421-086-1<br>421-086-3 | .433"<br>11.0 | .846"<br>21.5 | TJL |
| 11L3-21J2-02 | .085" LL | 421-307<br>421-307-1<br>421-307-3 | .433"<br>11.0 | .846"<br>21.5 | |

Connector outer conductor is passivated stainless steel. Center conductor is beryllium copper gold plated. LL= Low density dielectric.




Test Connector to connect with SMP-m full detent

**DC - 18.0 GHz**

### SMP female Test Connector - full detent for Semi-Rgid Cable

| Connector Part No. | S/R Cable | Cable Part No. | Ø D | L | Conn. Code |
|---|---|---|---|---|---|
| 11F3-21J1-02 | .085" | 421-086<br>421-086-1<br>421-086-3 | .433"<br>11.0 | .846"<br>21.5 | TJF |
| 11F3-21J2-02 | .085" LL | 421-307<br>421-307-1<br>421-307-3 | .433"<br>11.0 | .846"<br>21.5 | |

Connector outer conductor is passivated stainless steel. Center conductor is beryllium copper gold plated. LL= Low density dielectric.

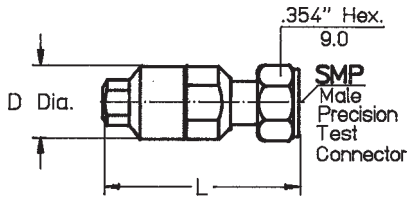
Dimensions shown are inches over millimeters. Standard units are beryllium copper gold plated (last two digits of the P/N are -04), or stainless steel gold plated (last two digits of the P/N are -00). Interface mating dimensions and specifications, as issued by Spectrum Elektrotechnik GmbH. For details please refer to the beginning of this section.

DC - 18.0 GHz

## SMP male Precision Test Connector for Semi-Rigid Cable

| Connector Part No. | S/R Cable | Cable Part No. | Ø D | L | Conn. Code |
|---|---|---|---|---|---|
| 11S3-21P1-02 | .085" | 421-086<br>421-086-1<br>421-086-3 | .433"<br>11.0 | 1.021"<br>25.9 | TP |
| 11S3-21P2-02 | .085" LL | 421-307<br>421-307-1<br>421-307-3 | .433"<br>11.0 | 1.021"<br>25.9 | |

Connector outer conductor is passivated stainless steel. Center conductor is beryllium copper gold plated. LL= Low density dielectric.

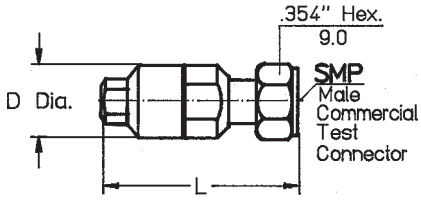



DC - 18.0 GHz

## SMP male Commercial Test Connector for Semi-Rigid Cable

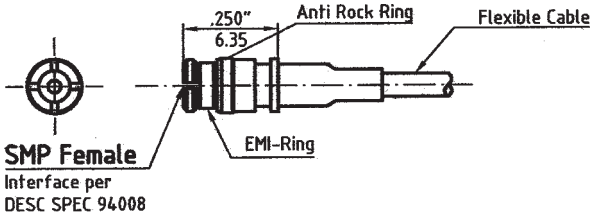
| Connector Part No. | S/R Cable | Cable Part No. | Ø D | L | Conn. Code |
|---|---|---|---|---|---|
| 11S3-21C1-02 | .085" | 421-086<br>421-086-1<br>421-086-3 | .433"<br>11.0 | 1.021"<br>25.9 | TPC |
| 11S3-21C2-02 | .085" LL | 421-307<br>421-307-1<br>421-307-3 | .433"<br>11.0 | 1.021"<br>25.9 | |

Connector outer conductor is passivated stainless steel. Center conductor is beryllium copper gold plated. LL= Low density dielectric.




Dimensions shown are inches over millimeters. Standard units are beryllium copper gold plated (last two digits of the P/N are -04), or stainless steel gold plated (last two digits of the P/N are -00). Interface mating dimensions and specifications, as issued by Spectrum Elektrotechnik GmbH. For details please refer to the beginning of this section.

# Flexible Cable Connectors, Type SMP

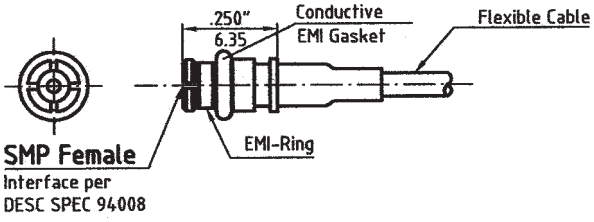



**DC - 3.0 GHz** (because of cable limitations). Flexible high performance cable assemblies to higher frequencies available on request.

## SMP female straight to Flexible Cable

| Connector Part No. | Cable Part No. | Cable Code | Conn. Code |
|---|---|---|---|
| **1113-2101-04** | **RG-178B/U** | 78 | SPF |
| **1113-2103-04** | **RD-178B/U** | 78D | |
| **1113-2102-04** | **RG-316/U** | 31 | |
| **1113-2104-04** | **RD-316/U** | 32 | |

Connector outer conductor and center contact are beryllium copper gold plated.

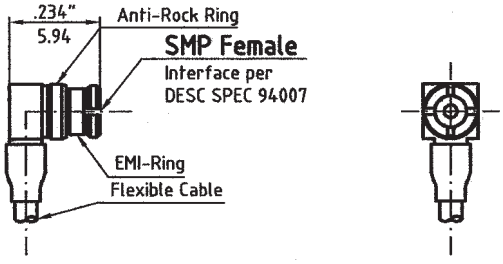



**DC - 3.0 GHz** (because of cable limitations). Flexible high performance cable assemblies to higher frequencies available on request.

## SMP female straight for Flexible Cable

| Connector Part No. | Cable Part No. | Cable Code | Conn. Code |
|---|---|---|---|
| **1113-2105-04** | **RG-178B/U** | 78 | SPG |
| **1113-2107-04** | **RD-178B/U** | 78D | |
| **1113-2106-04** | **RG-316/U** | 31 | |
| **1113-2108-04** | **RD-316/U** | 32 | |

Connector outer conductor and center contact are beryllium copper gold plated.




**DC - 3.0 GHz** (because of cable limitations). Flexible high performance cable assemblies to higher frequencies available on request.

## SMP female right angle connector for Flexible Cable

| Connector Part No. | Cable Part No. | Cable Code | Conn. Code |
|---|---|---|---|
| **1113-3409-04** | **RG-178B/U** | 78 | SPQ |
| **1113-3410-04** | **RD-178B/U** | 78D | |

Connector outer conductor and center contact are beryllium copper gold plated.

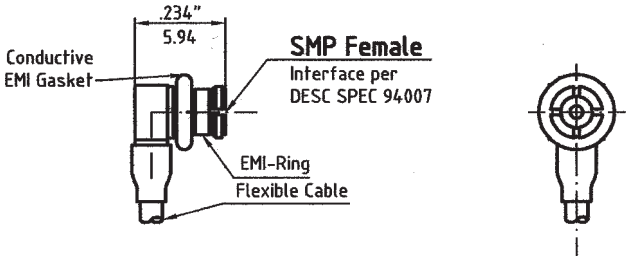
Dimensions shown are inches over millimeters. Standard units are beryllium copper gold plated (last two digits of the P/N are -04), or stainless steel gold plated (last two digits of the P/N are -00). Interface mating dimensions and specifications, as issued by DESC 94007 and DESC 94008. For details please refer to the beginning of this section.

**DC - 3.0 GHz** (because of cable limitations). Flexible high performance cable assemblies to higher frequencies available on request.

### SMP female right angle connector for Flexible Cable

| Connector Part No. | Cable Part No. | Cable Code | Conn. Code |
|---|---|---|---|
| 1113-3413-04 | RG-178B/U | 78 | SPD |
| 1113-3414-04 | RD-178B/U | 78D | |

Connector outer conductor and center contact are beryllium copper gold plated.

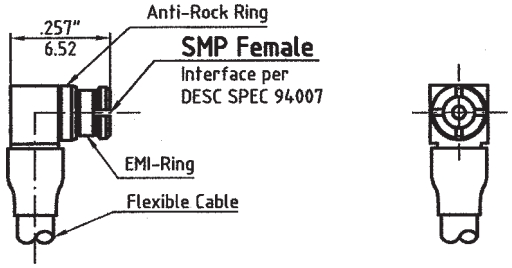



**DC - 3.0 GHz** (because of cable limitations). Flexible high performance cable assemblies to higher frequencies available on request.

### SMP female right angle connector for Flexible Cable

| Connector Part No. | Cable Part No. | Cable Code | Conn. Code |
|---|---|---|---|
| 1113-3411-04 | RG-316/U | 31 | SPQ |
| 1113-3412-04 | RD-316/U | 32 | |

Connector outer conductor and center contact are beryllium copper gold plated.

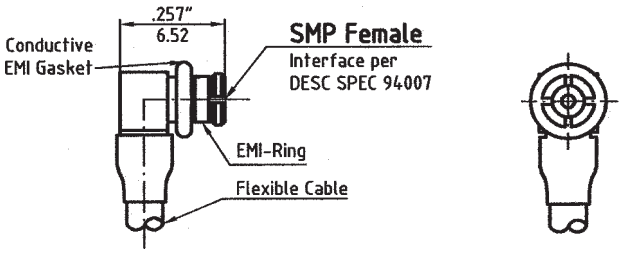



**DC - 3.0 GHz** (because of cable limitations). Flexible high performance cable assemblies to higher frequencies available on request.

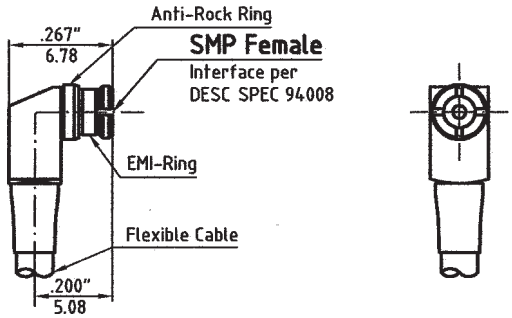
### SMP female right angle connector for Flexible Cable

| Connector Part No. | Cable Part No. | Cable Code | Conn. Code |
|---|---|---|---|
| 1113-3415-04 | RG-316/U | 31 | SPD |
| 1113-3416-04 | RD-316/U | 32 | |

Connector outer conductor and center contact are beryllium copper gold plated.




Dimensions shown are inches over millimeters. Standard units are beryllium copper gold plated (last two digits of the P/N are -04), or stainless steel gold plated (last two digits of the P/N are -00). Interface mating dimensions and specifications, as issued by DESC 94007 and DESC 94008. For details please refer to the beginning of this section.

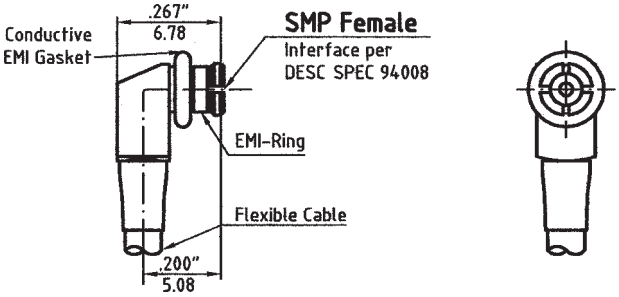



**DC - 3.0 GHz** (because of cable limitations). Flexible high performance cable assemblies to higher frequencies available on request.

### SMP female right angle connector for Flexible Cable

| Connector Part No. | Cable Part No. | Cable Code | Conn. Code |
|---|---|---|---|
| **1113-3401-04** | **RG-178B/U** | 78 | SPR |
| **1113-3403-04** | **RD-178B/U** | 78D | |
| **1113-3402-04** | **RG-316/U** | 31 | |
| **1113-3404-04** | **RD-316/U** | 32 | |

Connector outer conductor and center contact are beryllium copper gold plated.

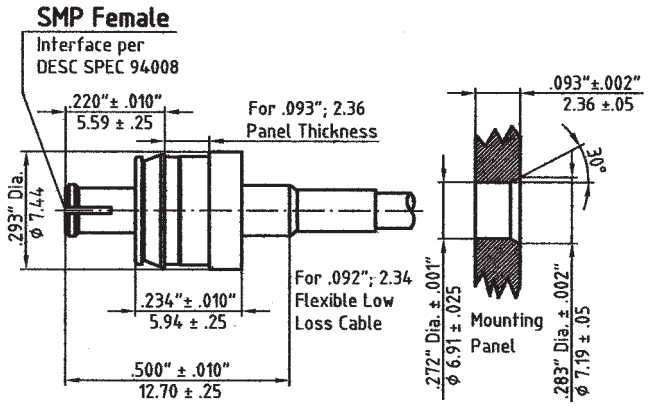



**DC - 3.0 GHz** (because of cable limitations). Flexible high performance cable assemblies to higher frequencies available on request.

### SMP female right angle connector for Flexible Cable

| Connector Part No. | Cable Part No. | Cable Code | Conn. Code |
|---|---|---|---|
| **1113-3405-04** | **RG-178B/U** | 78 | SPC |
| **1113-3407-04** | **RD-178B/U** | 78D | |
| **1113-3406-04** | **RG-316/U** | 31 | |
| **1113-3408-04** | **RD-316/U** | 32 | |

Connector outer conductor and center contact are beryllium copper gold plated.



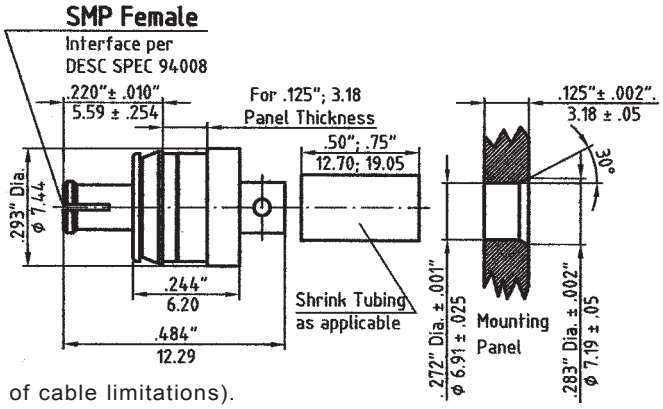

**DC - 3.0 GHz** (because of cable limitations). Flexible high performance cable assemblies to higher frequencies available on request.

### SMP female Float Mount .092" (2.3mm) Panel for Flexible Cable

| Connector Part No. | Cable Part No. | Cable Code | Conn. Code |
|---|---|---|---|
| **1113-6502-04** | **RG-316/U** | 31 | SPP |

Connector outer conductor and center contact are beryllium copper gold plated.

Dimensions shown are inches over millimeters. Standard units are beryllium copper gold plated (last two digits of the P/N are -04), or stainless steel gold plated (last two digits of the P/N are -00). Interface mating dimensions and specifications, as issued by DESC 94007 and DESC 94008. For details please refer to the beginning of this section.



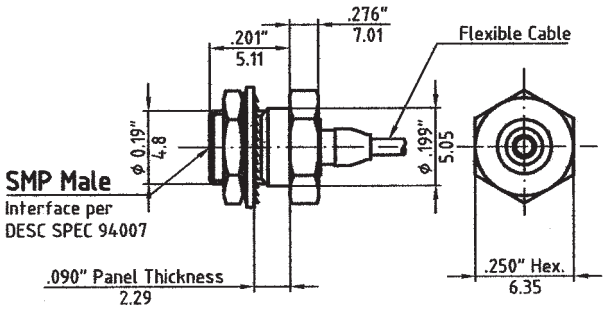

**DC - 3.0 GHz** (because of cable limitations). Flexible high performance cable assemblies to higher frequencies available on request.

### SMP female Float Mount .125" (3.18mm) Panel for Flexible Cable

| Connector Part No. | Cable Part No. | Cable Code | Conn. Code |
|---|---|---|---|
| 1113-6501-04 | RG-316/U | 31 | SPT |

Connector outer conductor and center contact are beryllium copper gold plated.

| Connector Part No. | Cable Part No. | Cable Code | Inter-face | Conn. Code |
|---|---|---|---|---|
| 11F3-6405-00 | RG-178B/U | 78 | Full detent | STF |
| 11L3-6405-00 | RG-178B/U | 78 | Limited detent | STL |
| 11S3-6405-00 | RG-178B/U | 78 | Smooth bore | STS |
| 11F3-6406-00 | RD-178B/U | 78D | Full detent | STF |
| 11L3-6406-00 | RD-178B/U | 78D | Limited detent | STL |
| 11S3-6406-00 | RD-178B/U | 78D | Smooth bore | STS |
| 11F3-6403-00 | RG-316/U | 31 | Full detent | STF |
| 11L3-6403-00 | RG-316/U | 31 | Limited detent | STL |
| 11S3-6403-00 | RG-316/U | 31 | Smooth bore | STS |
| 11F3-6404-00 | RD-316/U | 32 | Full detent | STF |
| 11L3-6404-00 | RD-316/U | 32 | Limited detent | STL |
| 11S3-6404-00 | RD-316/U | 32 | Smooth bore | STS |

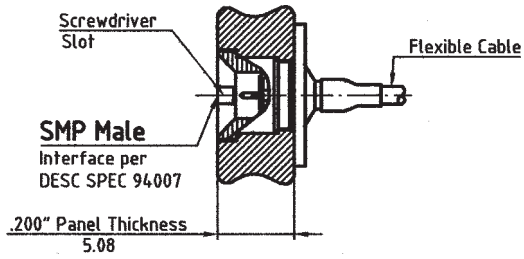



**DC - 3.0 GHz** (because of cable limitations). Flexible high performance cable assemblies to higher frequencies available on request.

### SMP male bulkhead for Flexible Cable

Connector outer conductor is stainless steel gold plated. Center conductor is beryllium copper gold plated.

Dimensions shown are inches over millimeters. Standard units are beryllium copper gold plated (last two digits of the P/N are -04), or stainless steel gold plated (last two digits of the P/N are -00). Interface mating dimensions and specifications, as issued by DESC 94007 and DESC 94008. For details please refer to the beginning of this section.




smooth bore
**DC - 3.0 GHz** (because of cable limitations). Flexible high performance cable assemblies to higher frequencies available on request.

### SMP male panel mount for Flexible Cables

| Connector Part No. | Cable Part No. | Cable Code | Conn. Code |
|---|---|---|---|
| **1113-6601-00** | **RG-178B/U** | 78 | SPS |
| **1113-6602-00** | **RD-178B/U** | 78D | |
| **1113-6603-00** | **RG-316/U** | 31 | |
| **1113-6604-00** | **RD-316/U** | 32 | |

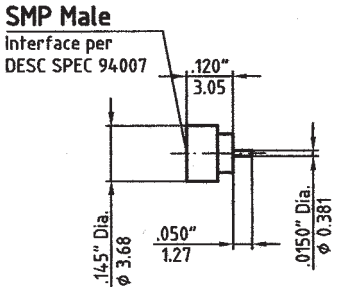
Connector outer conductor and center contact are beryllium copper gold plated.

Dimensions shown are inches over millimeters. Standard units are beryllium copper gold plated (last two digits of the P/N are -04), or stainless steel gold plated (last two digits of the P/N are -00). Interface mating dimensions and specifications, as issued by DESC 94007 and DESC 94008. For details please refer to the beginning of this section.

**SMP male hermetic** DC - 18.0 GHz

| Connector Part No. | Interface |
|---|---|
| 11F9-5401-40 | full detent |
| 11L9-5401-40 | limited detent |
| 11S9-5401-40 | smooth bore |

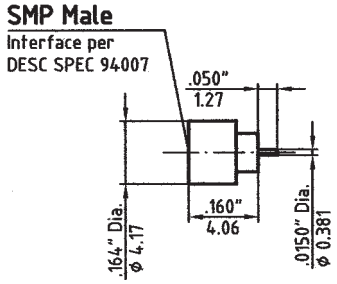
Connector outer conductor is kovar gold plated.
Center conductor is gold plated.




**SMP male hermetic** DC - 18.0 GHz

| Connector Part No. | Interface |
|---|---|
| 11F9-5402-40 | full detent |
| 11L9-5402-40 | limited detent |
| 11S9-5402-40 | smooth bore |

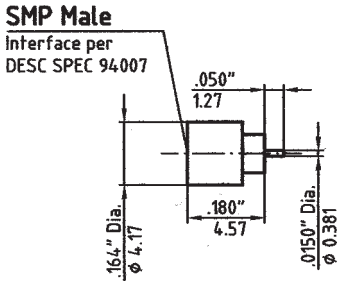
Connector outer conductor is kovar gold plated.
Center conductor is gold plated.



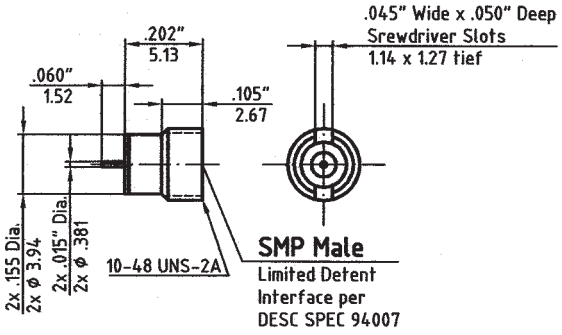

**SMP male hermetic** DC - 18.0 GHz

| Connector Part No. | Interface |
|---|---|
| 11F9-5403-40 | full detent |
| 11L9-5403-40 | limited detent |
| 11S9-5403-40 | smooth bore |

Connector outer conductor is kovar gold plated.
Center conductor is gold plated.




Dimensions shown are inches over millimeters. Standard units are beryllium copper gold plated (last two digits of the P/N are -04), or stainless steel gold plated (last two digits of the P/N are -00). Interface mating dimensions and specifications, as issued by DESC 94007 and DESC 94008. For details please refer to the beginning of this section.

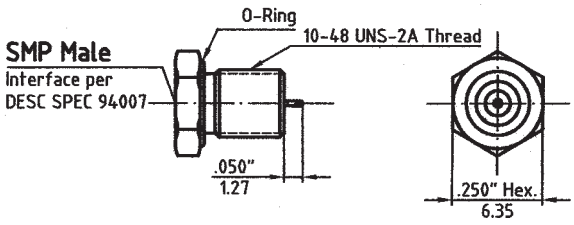



**DC - 18.0 GHz**

### SMP male (hermetic) thread-in style to straight termination

| Connector Part No. | Interface |
|---|---|
| 11L9-5404-40 | limited detent |

Connector outer conductor is kovar gold plataed.
Center conductor is gold plated.



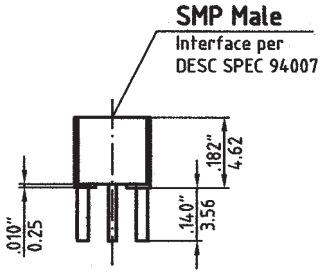

**DC - 18.0 GHz**

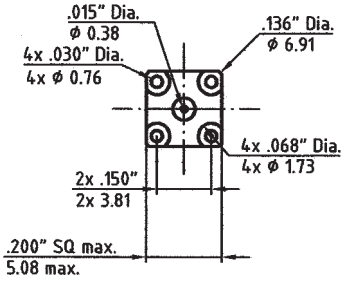
### SMP male hermetic THD in W/O-Ring

| Connector Part No. | Interface |
|---|---|
| 11F9-5405-40 | full detent |
| 11L9-5405-40 | limited detent |
| 11S9-5405-40 | smooth bore |

Connector outer conductor is kovar gold plated.
Center conductor is gold plated.

Dimensions shown are inches over millimeters. Standard units are beryllium copper gold plated (last two digits of the P/N are -04), or stainless steel gold plated (last two digits of the P/N are -00). Interface mating dimensions and specifications, as issued by DESC 94007 and DESC 94008. For details please refer to the beginning of this section.



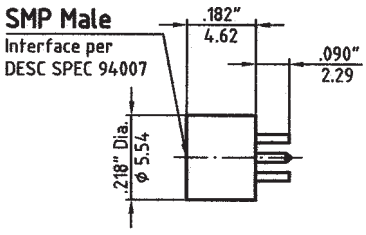



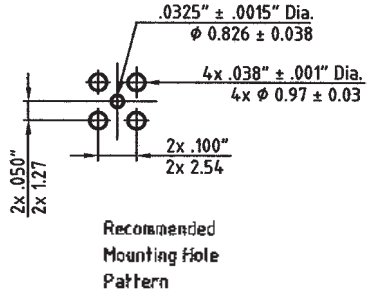

**DC - 18.0 GHz**

## SMP male printed Circuit Board

| Connector Part No. | Interface |
|---|---|
| 11F9-5203-02 | full detent |
| 11L9-5203-02 | limited detent |
| 11S9-5203-02 | smooth detent |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.



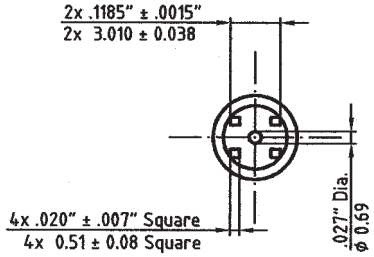




**DC - 18.0 GHz**

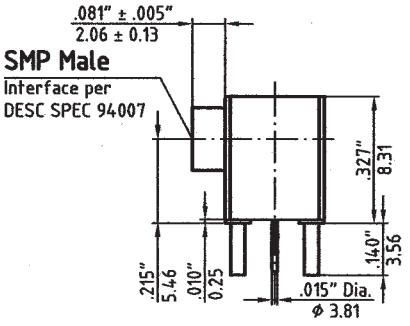
## SMP male straight to P.C. Board Connector

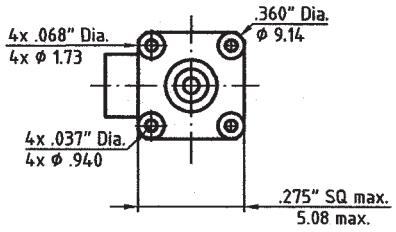
| Connector Part No. | Interface |
|---|---|
| 11F9-5204-02 | limited detent |
| 11L9-5204-02 | full detent |
| 11S9-5204-02 | smooth bore |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.




Dimensions shown are inches over millimeters. Standard units are beryllium copper gold plated (last two digits of the P/N are -04), or stainless steel gold plated (last two digits of the P/N are -00). Interface mating dimensions and specifications, as issued by DESC 94007 and DESC 94008. For details please refer to the beginning of this section.



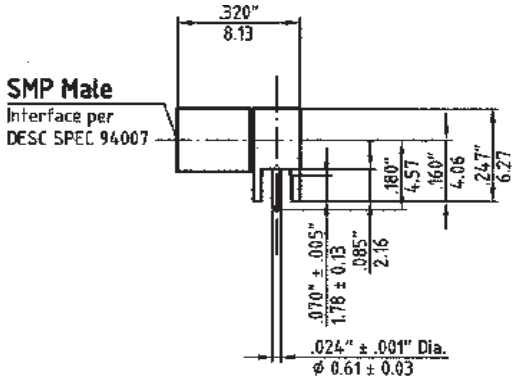



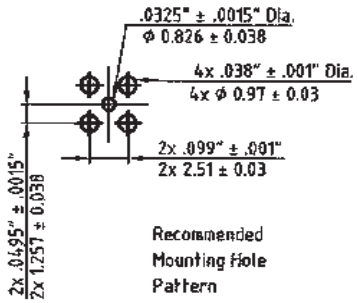

**DC - 18.0 GHz**

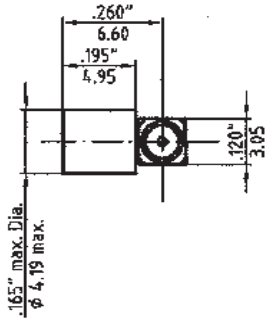
## SMP male right angle printed Circuit Board Connector

| Connector Part No. | Interface |
|---|---|
| 11F9-5202-02 | full detent |
| 11L9-5202-02 | limited detent |
| 11S9-5202-02 | smooth bore |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.




**DC - 18.0 GHz**

## SMP male right angle to P.C. Board

| Connector Part No. | Interface |
|---|---|
| 11F9-5201-02 | full detent |
| 11L9-5201-02 | limited detent |
| 11S9-5201-02 | smooth bore |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.

Dimensions shown are inches over millimeters. Standard units are beryllium copper gold plated (last two digits of the P/N are -04), or stainless steel gold plated (last two digits of the P/N are -00). Interface mating dimensions and specifications, as issued by DESC 94007 and DESC 94008. For details please refer to the beginning of this section.

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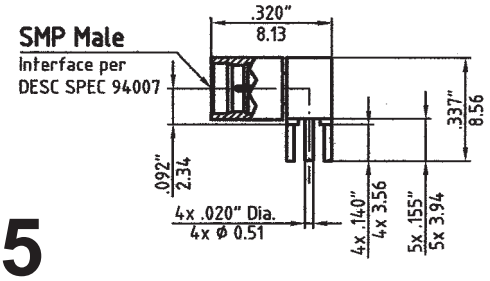
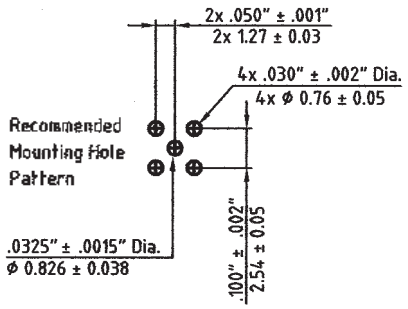
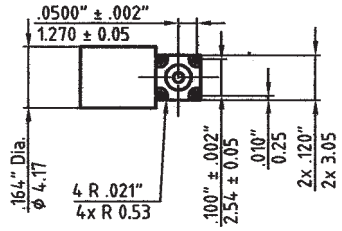



**5**



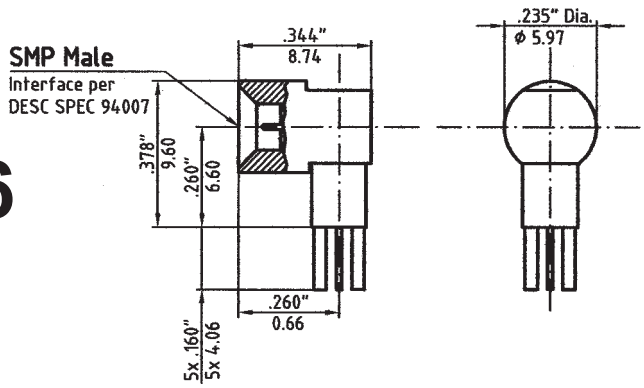




DC - 18.0 GHz

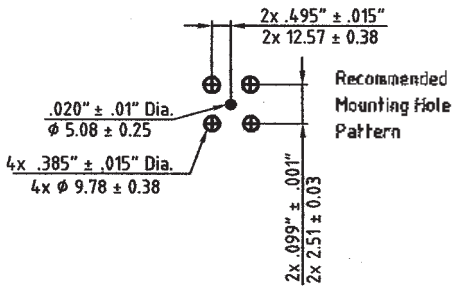
## SMP male right angle P.C. Board

| Connector Part No. | Interface |
|---|---|
| **1199-5201-00** | **full detent** |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.




**6**

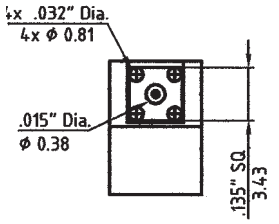



DC - 18.0 GHz

## SMP male right angle PCB mount

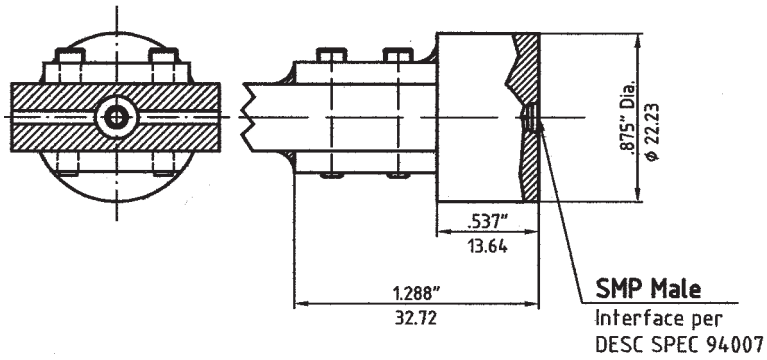
| Connector Part No. | Interface |
|---|---|
| **11S9-5205-00** | **smooth bore** |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.




Dimensions shown are inches over millimeters. Standard units are beryllium copper gold plated (last two digits of the P/N are -04), or stainless steel gold plated (last two digits of the P/N are -00). Interface mating dimensions and specifications, as issued by DESC 94007 and DESC 94008. For details please refer to the beginning of this section.

c:\quick\98\smp2.pm6

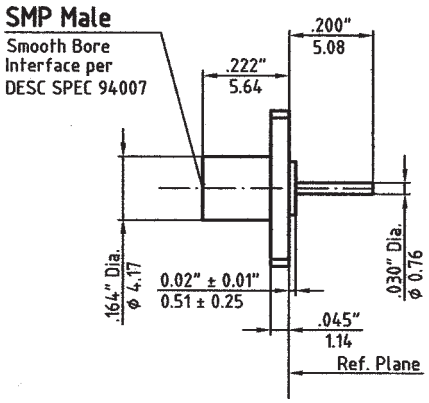


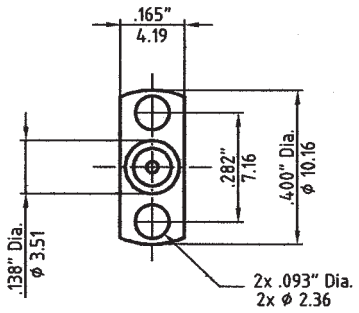

**DC - 18.0 GHz**

## SMP male edge launched connector

| Connector Part No. | Interface |
|---|---|
| 11S9-5207-00 | smooth bore |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.



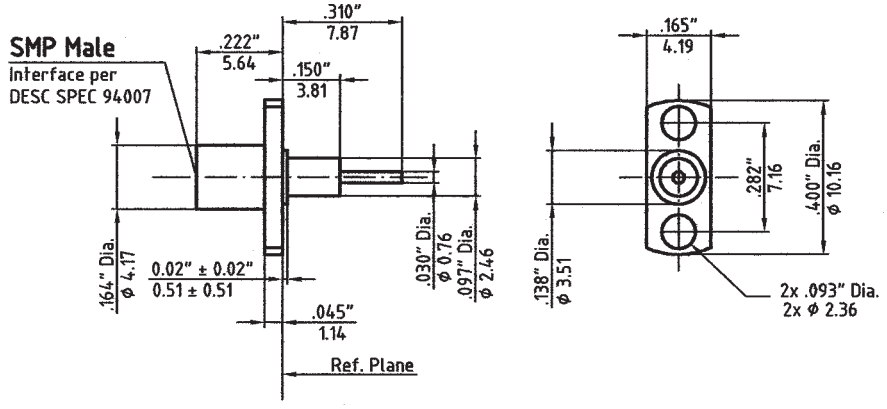

**DC - 18.0 GHz**

## SMP male flange mount

| Connector Part No. | Interface |
|---|---|
| 11S9-6306-02 | smooth bore |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.

Dimensions shown are inches over millimeters. Standard units are beryllium copper gold plated (last two digits of the P/N are -04), or stainless steel gold plated (last two digits of the P/N are -00). Interface mating dimensions and specifications, as issued by DESC 94007 and DESC 94008. For details please refer to the beginning of this section.

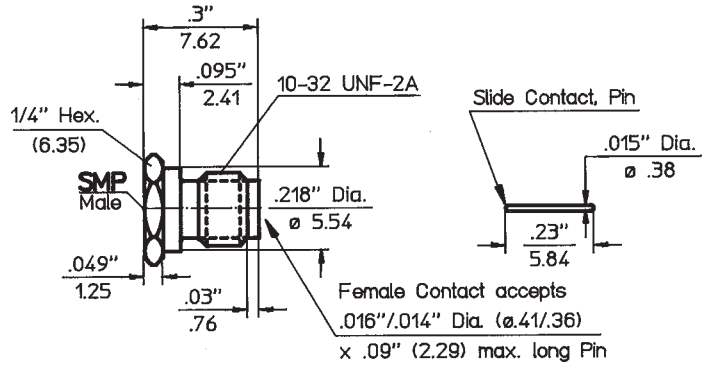



DC - 18.0 GHz

## SMP male flange mount

| Connector Part No. | Interface |
|---|---|
| 11F9-6305-02 | full detent |
| 11L9-6305-02 | limited detent |
| 11S9-6305-02 | smooth bore |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.



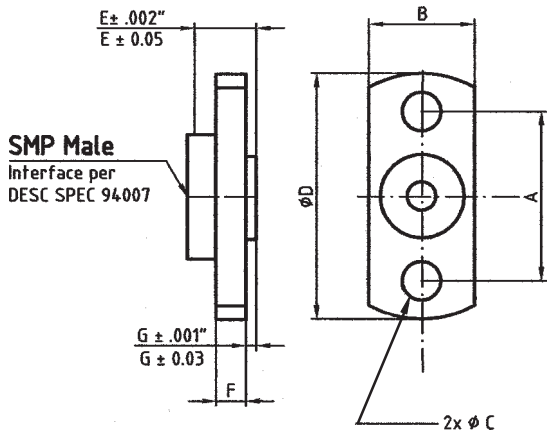

DC - 18.0 GHz

## SMP male bulkhead

| Connector Part No. | Interface |
|---|---|
| 11S3-6411-00 | smooth bore |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.

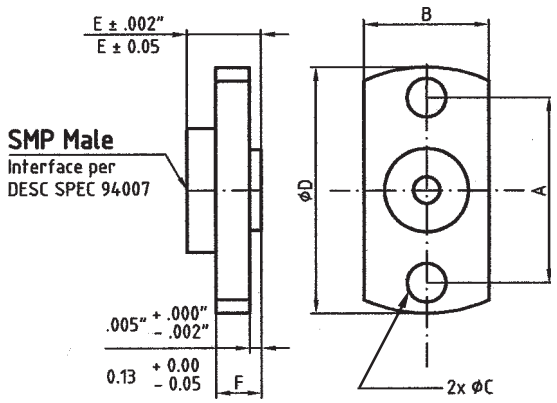
Dimensions shown are inches over millimeters. Standard units are beryllium copper gold plated (last two digits of the P/N are -04), or stainless steel gold plated (last two digits of the P/N are -00). Interface mating dimensions and specifications, as issued by DESC 94007 and DESC 94008. For details please refer to the beginning of this section.




### SMP male full detent shroud

| Connector Part No. | A | B | ØC | ØD | E | F | G |
|---|---|---|---|---|---|---|---|
| 11F9-6301-02 | .328" | .187" | .098" | .480" | .120" | .045" | .004" |
| | 8.33 | 4.75 | 2.49 | 12.19 | 3.05 | 1.14 | .10 |
| 11F9-6302-02 | .481" | .223" | .102" | .625" | .120" | .045" | .002" |
| | 12.22 | 5.66 | 2.59 | 15.88 | 3.05 | 1.14 | .05 |
| 11F9-6303-02 | .282" | .165" | .073" | .400" | .120" | .045" | .002" |
| | 7.16 | 4.19 | 1.85 | 10.16 | 3.05 | 1.14 | .05 |
| 11F9-6304-02 | .400" | .186" | .103" | .550" | .120" | .045" | .004" |
| | 10.16 | 4.72 | 2.62 | 13.97 | 3.05 | 1.14 | .10 |

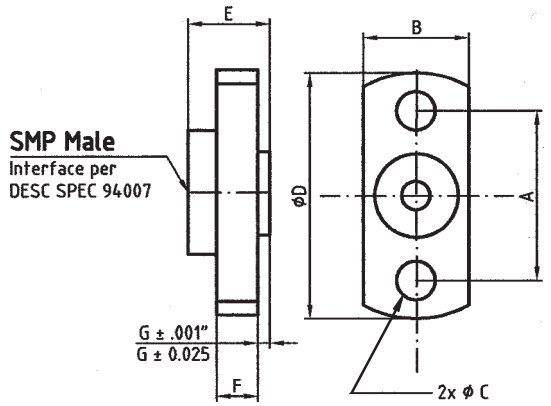
Connector outer conductor is passivated stainless steel.
Dimensions shown are inches over millimeters.




### SMP male shroud non-detent

| Connector Part No. | A | B | ØC | ØD | E | F |
|---|---|---|---|---|---|---|
| 11N9-6301-02 | .352" | .235" | .073" | .470" | .120" | .045" |
| | 8.94 | 5.97 | 1.85 | 11.94 | 3.05 | 1.14 |
| 11N9-6302-02 | .481" | .235" | .102" | .625" | .120" | .045" |
| | 12.22 | 5.97 | 2.59 | 15.88 | 3.05 | 1.14 |
| 11N9-6303-02 | .400" | .235" | .073" | .550" | .120" | .045" |
| | 10.16 | 5.97 | 1.85 | 13.97 | 3.05 | 1.14 |

Connector outer conductor is passivated stainless steel.
Dimensions shown are inches over millimeters.




### SMP male shroud limited detent

| Connector Part No. | A | B | ØC | ØD | E | F | G |
|---|---|---|---|---|---|---|---|
| 11L9-6301-02 | .328" | .187" | .098" | .480" | .120" | .045" | .004" |
| | 8.33 | 4.75 | 2.49 | 12.19 | 3.05 | 1.14 | .10 |
| 11L9-6302-02 | .481" | .223" | .102" | .625" | .120" | .045" | .002" |
| | 12.22 | 5.66 | 2.59 | 15.88 | 3.05 | 1.14 | .05 |
| 11L9-6303-02 | .282" | .165" | .073" | .400" | .120" | .045" | .002" |
| | 7.16 | 4.19 | 1.85 | 10.16 | 3.05 | 1.14 | .05 |

Connector outer conductor is passivated stainless steel.
Dimensions shown are inches over millimeters.

Dimensions shown are inches over millimeters. Standard units are beryllium copper gold plated (last two digits of the P/N are -04), or stainless steel gold plated (last two digits of the P/N are -00). Interface mating dimensions and specifications, as issued by DESC 94007 and DESC 94008. For details please refer to the beginning of this section.

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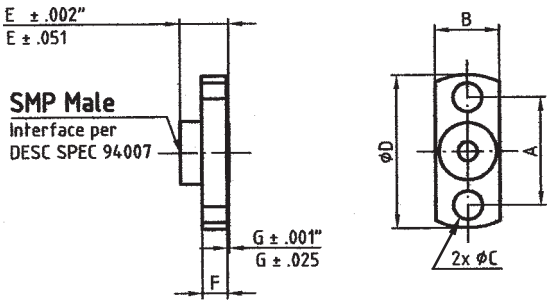
### SMP male shroud smooth bore

| Connector Part No. | A | B | ØC | ØD | E | F | G |
|---|---|---|---|---|---|---|---|
| 11S9-6301-02 | .328" | .187" | .098" | .480" | .120" | .045" | .004" |
| | 8.33 | 4.75 | 2.49 | 12.19 | 3.05 | 1.14 | .10 |
| 11S9-6302-02 | .481" | .223" | .102" | .625" | .120" | .045" | .002" |
| | 12.22 | 5.66 | 2.59 | 15.88 | 3.05 | 1.14 | .05 |
| 11S9-6303-02 | .282" | .165" | .073" | .400" | .120" | .045" | .002" |
| | 7.16 | 4.19 | 1.85 | 10.16 | 3.05 | 1.14 | .05 |

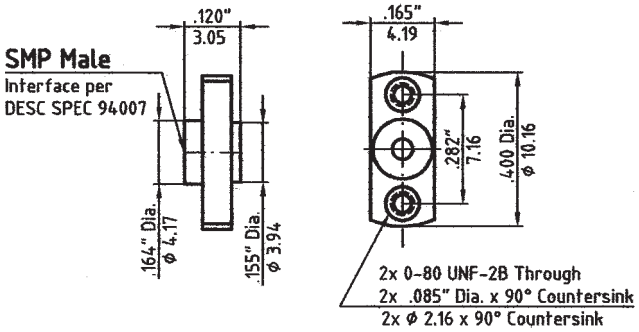
Connector outer conductor is passivated stainless steel.
Dimensions shown are inches over millimeters.




### SMP male detent shroud

| Connector Part No. | Interface |
|---|---|
| 11N9-6304-02 | non detent |

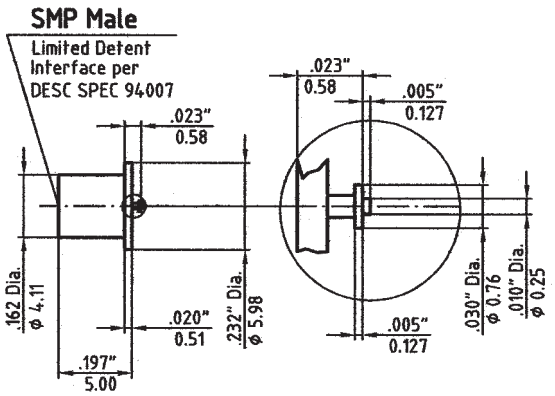
Connector outer conductor is passivated stainless steel.



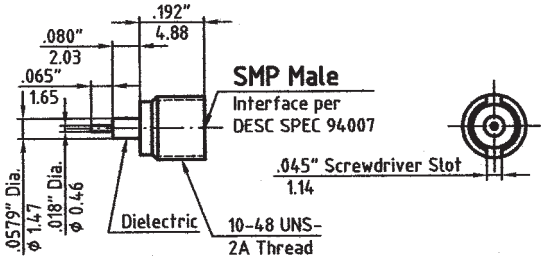

### SMP male surface mount round flange

| Connector Part No. | Interface |
|---|---|
| 11L9-6304-02 | limited detent |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.



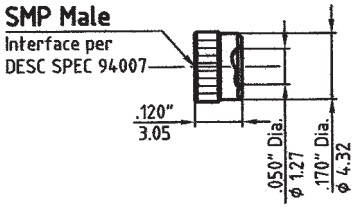

Dimensions shown are inches over millimeters. Standard units are beryllium copper gold plated (last two digits of the P/N are -04), or stainless steel gold plated (last two digits of the P/N are -00). Interface mating dimensions and specifications, as issued by DESC 94007 and DESC 94008. For details please refer to the beginning of this section.




**SMP male thread in**

| Connector Part No. | Interface |
|---|---|
| 11F9-1101-02 | full detent |
| 11L9-1101-02 | limited detent |
| 11S9-1101-02 | smooth bore |

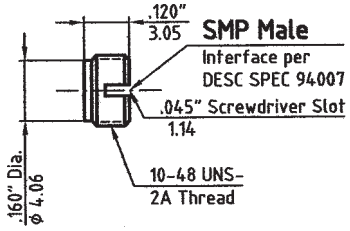
Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.




**SMP male press in shroud**

| Connector Part No. | Interface |
|---|---|
| 11F9-1102-02 | full detent |
| 11L9-1102-02 | limited detent |
| 11S9-1102-02 | smooth bore |

Connector outer conductor is passivated stainless steel.




**SMP Shroud, thread in style**

| Connector Part No. | Interface |
|---|---|
| 11F9-1103-02 | full detent |
| 11L9-1103-02 | limited detent |
| 11S9-1103-02 | smooth bore |

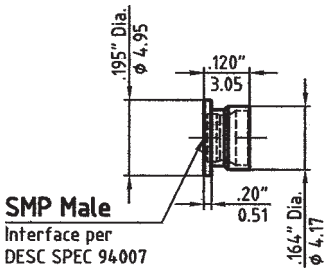
Connector outer conductor is passivated stainless steel.

Dimensions shown are inches over millimeters. Standard units are beryllium copper gold plated (last two digits of the P/N are -04), or stainless steel gold plated (last two digits of the P/N are -00). Interface mating dimensions and specifications, as issued by DESC 94007 and DESC 94008. For details please refer to the beginning of this section.

### SMP Shroud solder in

| Connector Part No. | Interface |
|---|---|
| 11F9-1104-02 | full detent |
| 11L9-1104-02 | limited detent |
| 11S9-1104-02 | smooth bore |

Connector outer conductor is passivated stainless steel.




Dimensions shown are inches over millimeters. Standard units are beryllium copper gold plated (last two digits of the P/N are -04), or stainless steel gold plated (last two digits of the P/N are -00). Interface mating dimensions and specifications, as issued by DESC 94007 and DESC 94008. For details please refer to the beginning of this section.

# SMP









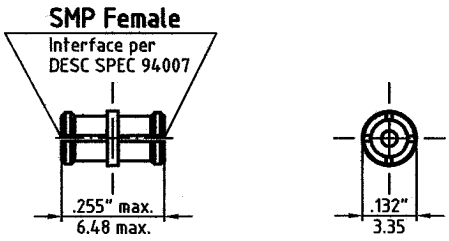
* 'K' Connector is a trademark of Wiltron Company.

# SMP In-Series Adapters

Spectrum Elektrotechnik GmbH

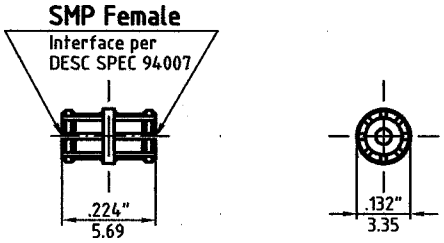
| Adapter Part No. | 8001-MPMP-04 |
|---|---|
| Connector Config. | SMP-f to SMP-f |
| Frequency Range | DC to 40.0 GHz |
| VSWR | 1.5 : 1 to 40.0 GHz |

Connector outer conductor and center contact are berrylium copper gold plated.



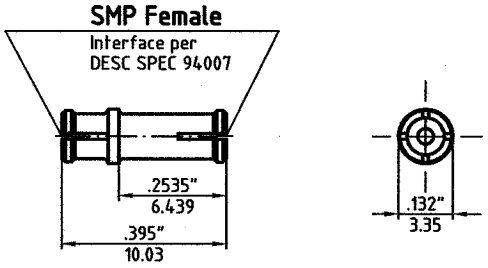

| Adapter Part No. | 8003-MPMP-04 |
|---|---|
| Connector Config. | SMP-f to SMP-f |
| Frequency Range | DC to 40.0 GHz |
| VSWR | 1.70 : 1 max to 40.0 GHz |

Connector outer conductor and center contact are berrylium copper gold plated.



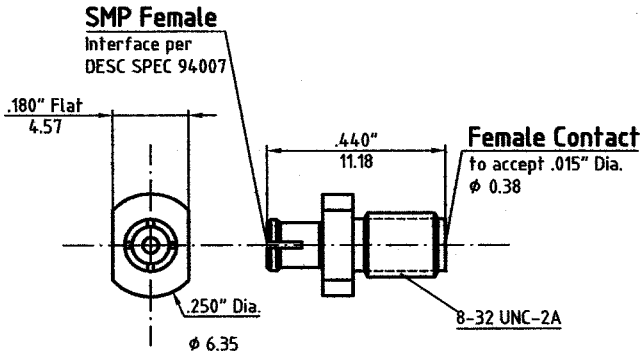

| Adapter Part No. | 8004-MPMP-04 |
|---|---|
| Connector Config. | SMP-f to SMP-f |
| Frequency Range | DC to 40.0 GHz |
| VSWR | 1.70 : 1 max to 40.0 GHz |

Connector outer conductor and center contact are berrylium copper gold plated.




| Adapter Part No. | 8005-MPMP-04 |
|---|---|
| Connector Config. | SMP-f to SMP-f |
| Frequency Range | DC to 18.0 GHz |
| VSWR | 1.25 : 1 max to 18.0 GHz |

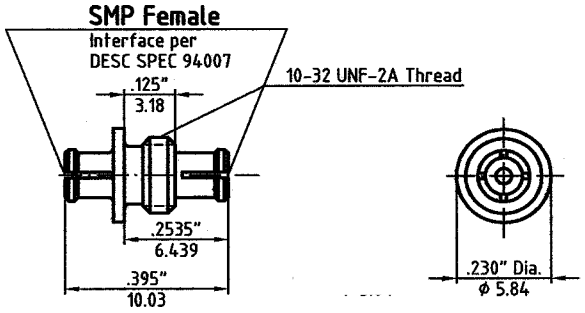
Connector outer conductor and center contact are berrylium copper gold plated.




Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per DESC 94007 and DESC 94008. For details please refer to the beginning of this section.

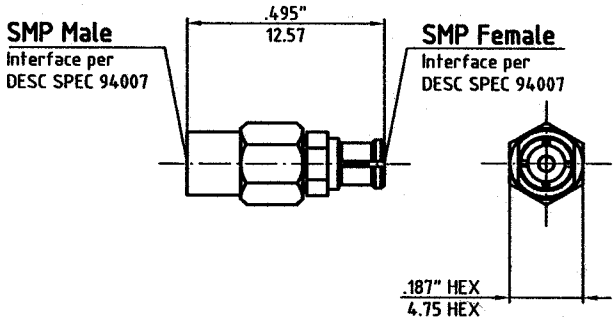
c:/quick98/smp3.pm6

# In-Series Adapters, Type SMP



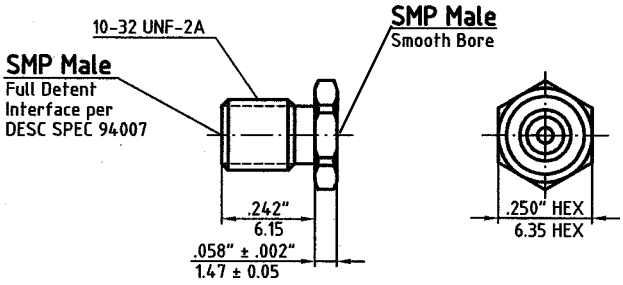

| Adapter Part No. | 8006-MPMP-04 |
|---|---|
| Connector Config. | SMP-f to SMP-f |
| Frequency Range | DC to 40.0 GHz |
| VSWR | 1.7 : 1 max to 40.0 GHz |

Connector outer conductor and center contact are berrylium copper gold plated.



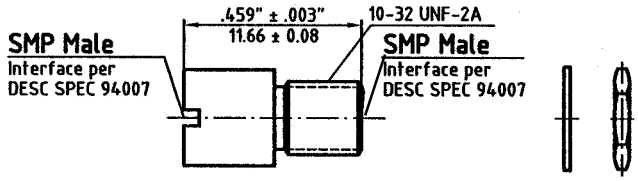

| Adapter Part No. | 8002-MJMP-04 |
|---|---|
| Connector Config. | SMP-f to SMP-m |
| Frequency Range | DC to 40.0 GHz |
| VSWR | 1.5 : 1 max to 40.0 GHz |

Connector outer conductor and center contact are berrylium copper gold plated.




| Adapter Part No. | 8002-MJMJ-02 |
|---|---|
| Connector Config. | SMP-m to SMP-m |
| Frequency Range | DC to 40.0 GHz |
| VSWR | 1.3 : 1 max to 40.0 GHz |

Connector outer conductor is passivated stainless steel. Center conductor is beryllium copper gold plated.

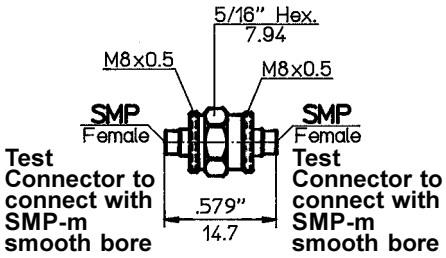



| Adapter Part No. | 8003-MJMJ-02 |
|---|---|
| Connector Config. | SMP-m to SMP-m |
| Frequency Range | DC to 40.0 GHz |
| VSWR | 1.3 : 1 max to 40.0 GHz |

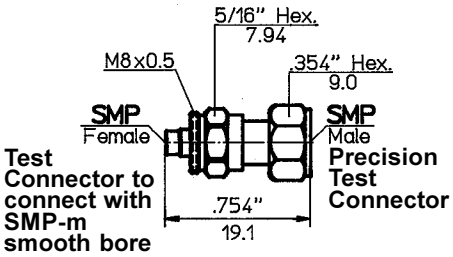
Connector outer conductor is passivated stainless steel. Center conductor is beryllium copper gold plated.

Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per DESC 94007 and DESC 94008. For details please refer to the beginning of this section.

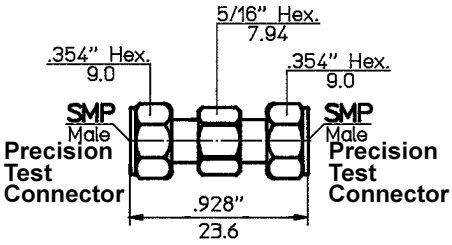
| SMP-F to SMP-F | | |
|---|---|---|
| **Part No.** | **Frequency** | **VSWR** |
| **8801-TPTP-02** | DC - 18.0 | 1.15 : 1 |
| **8802-TPTP-02** | DC - 40.0 | 1.2 : 1 |



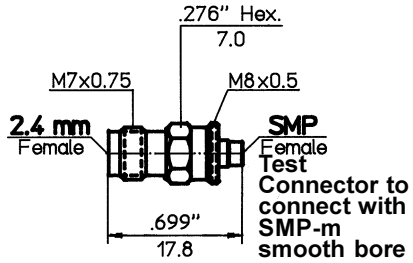

| SMP-F to SMP-M | | |
|---|---|---|
| **Part No.** | **Frequency** | **VSWR** |
| **8801-TJTP-02** | DC - 18.0 | 1.15 : 1 |
| **8802-TJTP-02** | DC - 40.0 | 1.2 : 1 |



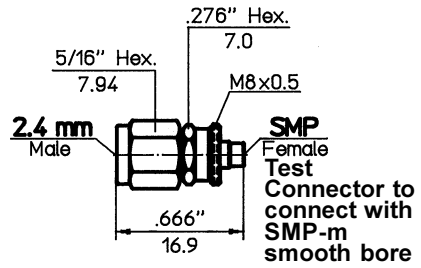

| SMP-M to SMP-M | | |
|---|---|---|
| **Part No.** | **Frequency** | **VSWR** |
| **8801-TJTJ-02** | DC - 18.0 | 1.15 : 1 |
| **8802-TJTJ-02** | DC - 40.0 | 1.2 : 1 |



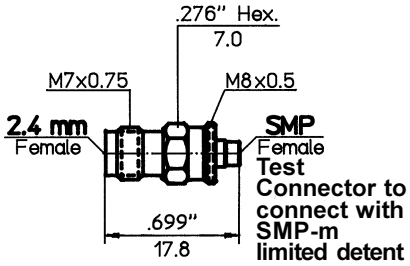

Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per Spectrum Elektrotechnik GmbH Specifications. For details please refer to the beginning of this section.




| Part - No. | 8801-HFTP-02 |
|---|---|
| Connectors | SMP-F to 2.4mm -F |
| Frequency | DC - 18.0 GHz |
| VSWR max. | 1.10 : 1 |

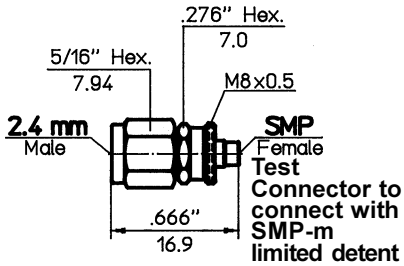



| Part - No. | 8801-HMTP-02 |
|---|---|
| Connectors | SMP-F to 2.4mm -M |
| Frequency | DC - 18.0 GHz |
| VSWR max. | 1.10 : 1 |




SMP-f connect with SMP male limited detent.

| Part - No. | 8801-HFTL-02 |
|---|---|
| Connectors | SMP-F to 2.4mm -F |
| Frequency | DC - 18.0 GHz |
| VSWR max. | 1.10 : 1 |



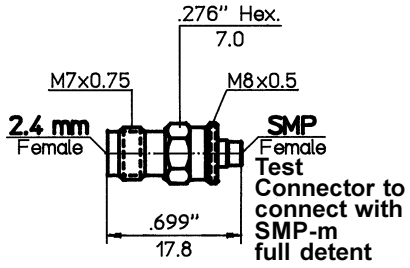

SMP-f connect with SMP male limited detent.

| Part - No. | 8801-HMTL-02 |
|---|---|
| Connectors | SMP-F to 2.4mm -M |
| Frequency | DC - 18.0 GHz |
| VSWR max. | 1.10 : 1 |

Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per MIL-C 39012, MIL-C-87104/2, MIL-C-3643, MIL-STD-348, IEC-169-7, IEC-457-2, DIN 47 223, DIN 47 226, DIN 47 298, Spectrum Elektrotechnik GmbH Specifications, as applicable. For details please refer to the beginning of this section.

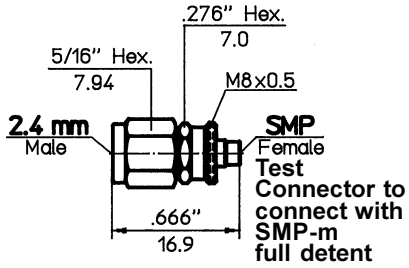
Spectrum Elektrotechnik GmbH

| Part - No. | 8801-HFTF-02 |
|---|---|
| Connectors | SMP-F to 2.4mm -F |
| Frequency | DC - 18.0 GHz |
| VSWR max. | 1.10 : 1 |



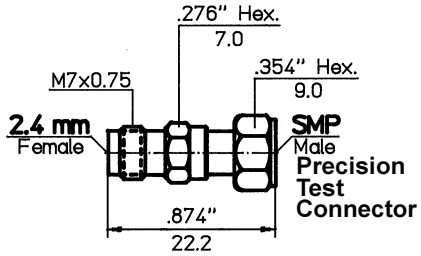

SMP-f connect with SMP male full detent.

| Part - No. | 8801-HMTF-02 |
|---|---|
| Connectors | SMP-F to 2.4mm -M |
| Frequency | DC - 18.0 GHz |
| VSWR max. | 1.10 : 1 |

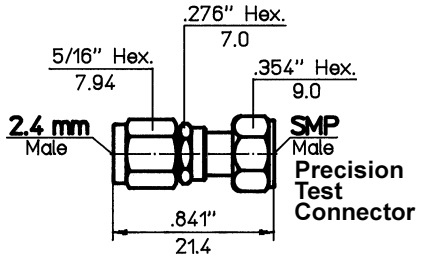



SMP-f connect with SMP male full detent.

| Part - No. | 8801- HFTJ - 02 |
|---|---|
| Connectors | SMP-M to 2.4mm -F |
| Frequency | DC - 18.0 GHz |
| VSWR max. | 1.10 : 1 |




| Part - No. | 8801-HMTJ-02 |
|---|---|
| Connectors | SMP-M to 2.4mm -M |
| Frequency | DC - 18.0 GHz |
| VSWR max. | 1.10 : 1 |




Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per MIL-C 39012, MIL-C-87104/2, MIL-C-3643, MIL-STD-348, IEC-169-7, IEC-457-2, DIN 47 223, DIN 47 226, DIN 47 298, Spectrum Elektrotechnik GmbH Specifications, as applicable. For details please refer to the beginning of this section.

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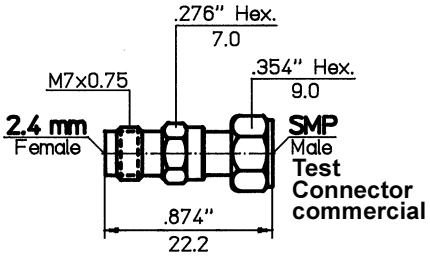
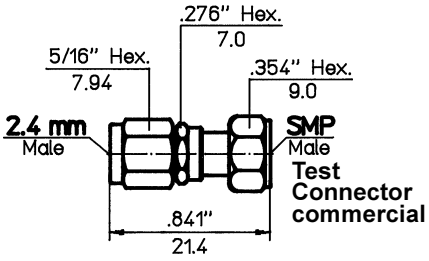


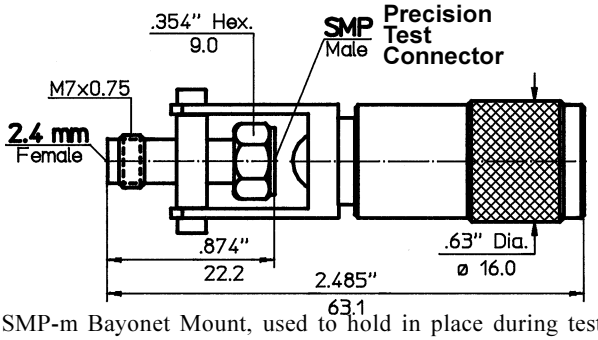

SMP-m commercial

| Part - No. | 8801-HFTC-02 |
|---|---|
| Connectors | SMP-M to 2.4mm -F |
| Frequency | DC - 18.0 GHz |
| VSWR max. | 1.10 : 1 |



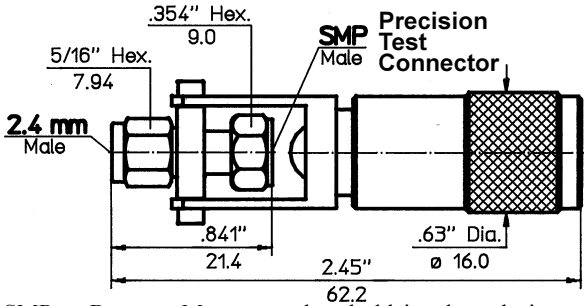

SMP-m commercial

| Part - No. | 8801-HMTC-02 |
|---|---|
| Connectors | SMP-M to 2.4mm -M |
| Frequency | DC - 18.0 GHz |
| VSWR max. | 1.10 : 1 |




SMP-m Bayonet Mount, used to hold in place during testing the SMP right angle.

| Part - No. | 8801-HFTB- 02 |
|---|---|
| Connectors | SMP-M to 2.4mm -F |
| Frequency | DC - 18.0 GHz |
| VSWR max. | 1.10 : 1 |




SMP-m Bayonet Mount, used to hold in place during testing the SMP right angle.

| Part - No. | 8801-HMTB- 02 |
|---|---|
| Connectors | SMP-M to 2.4mm -M |
| Frequency | DC - 18.0 GHz |
| VSWR max. | 1.10 : 1 |

Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per MIL-C 39012, MIL-C-87104/2, MIL-C-3643, MIL-STD-348, IEC-169-7, IEC-457-2, DIN 47 223, DIN 47 226, DIN 47 298, Spectrum Elektrotechnik GmbH Specifications, as applicable. For details please refer to the beginning of this section.

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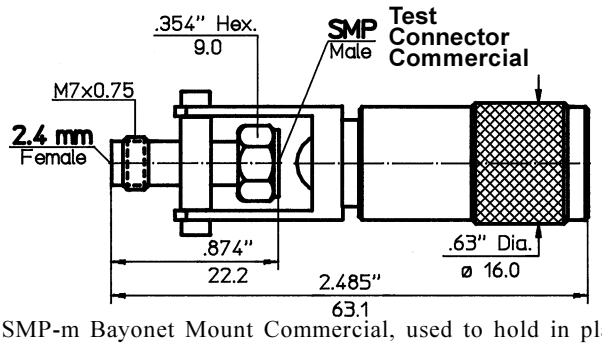
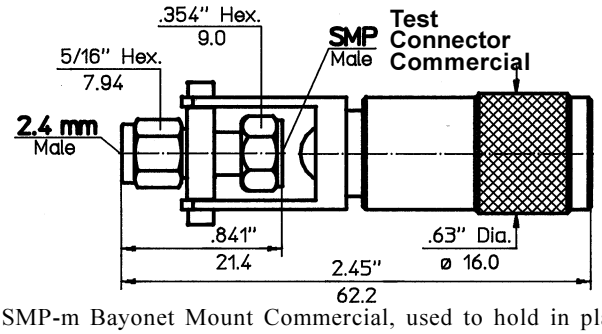
# SMP Between Series Test Adapters

| Part - No. | 8801-HFTD-02 |
|---|---|
| Connectors | SMP-M to 2.4mm -F |
| Frequency | DC - 18.0 GHz |
| VSWR max. | 1.10 : 1 |



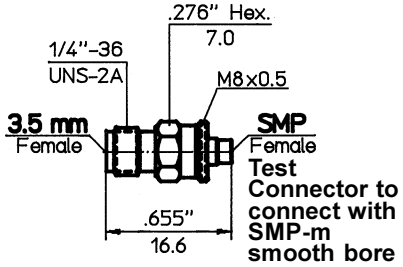

SMP-m Bayonet Mount Commercial, used to hold in place during testing the SMP right angle.

| Part - No. | 8801-HMTD-02 |
|---|---|
| Connectors | SMP-M to 2.4mm -M |
| Frequency | DC - 18.0 GHz |
| VSWR max. | 1.10 : 1 |

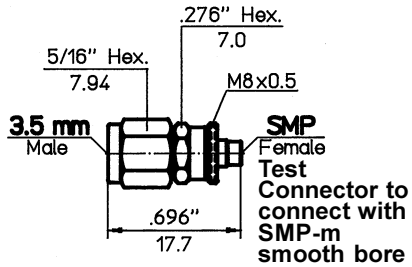



SMP-m Bayonet Mount Commercial, used to hold in place during testing the SMP right angle.

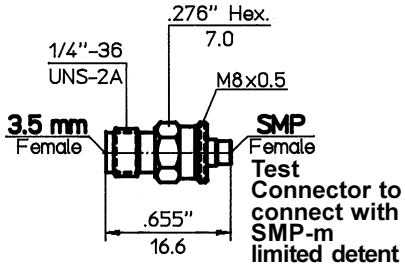
Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per MIL-C 39012, MIL-C-87104/2, MIL-C-3643, MIL-STD-348, IEC-169-7, IEC-457-2, DIN 47 223, DIN 47 226, DIN 47 298, Spectrum Elektrotechnik GmbH Specifications, as applicable. For details please refer to the beginning of this section.




| Part - No. | 8801-TP92-02 |
|---|---|
| Connectors | SMP-F to 3.5mm -F |
| Frequency | DC - 18.0 GHz |
| VSWR max. | 1.10 : 1 |

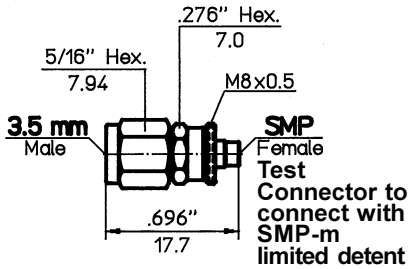



| Part - No. | 8801-TP91-02 |
|---|---|
| Connectors | SMP-F to 3.5mm -M |
| Frequency | DC - 18.0 GHz |
| VSWR max. | 1.10 : 1 |




SMP-f connect with SMP male limited detent.

| Part - No. | 8801-TL92-02 |
|---|---|
| Connectors | SMP-F to 3.5mm -F |
| Frequency | DC - 18.0 GHz |
| VSWR max. | 1.10 : 1 |



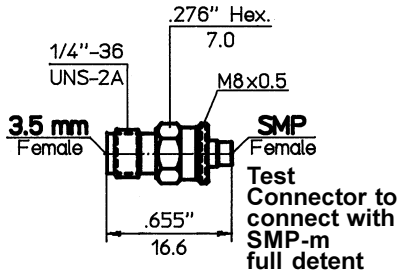

SMP-f connect with SMP male limited detent.

| Part - No. | 8801-TL91-02 |
|---|---|
| Connectors | SMP-F to 3.5mm -M |
| Frequency | DC - 18.0 GHz |
| VSWR max. | 1.10 : 1 |

Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per MIL-C 39012, MIL-C-87104/2, MIL-C-3643, MIL-STD-348, IEC-169-7, IEC-457-2, DIN 47 223, DIN 47 226, DIN 47 298, Spectrum Elektrotechnik GmbH Specifications, as applicable. For details please refer to the beginning of this section.

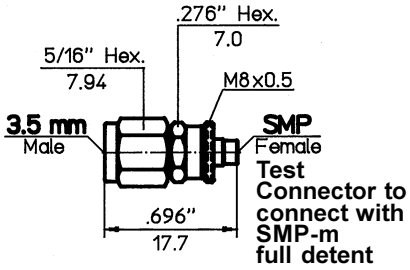
Spectrum Elektrotechnik GmbH

| Part - No. | 8801-TF92-02 |
|---|---|
| Connectors | SMP-F to 3.5mm -F |
| Frequency | DC - 18.0 GHz |
| VSWR max. | 1.10 : 1 |



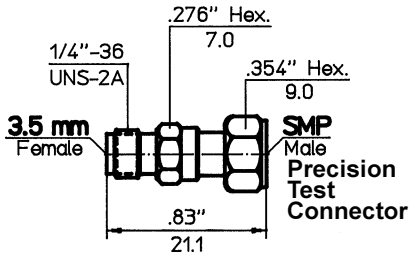

SMP-f connect with SMP male full detent.

| Part - No. | 8801-TF91-02 |
|---|---|
| Connectors | SMP-F to 3.5mm -M |
| Frequency | DC - 18.0 GHz |
| VSWR max. | 1.10 : 1 |

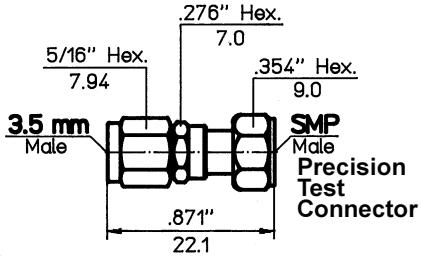



SMP-f connect with SMP male full detent.

| Part - No. | 8801- TJ92 - 02 |
|---|---|
| Connectors | SMP-M to 3.5mm -F |
| Frequency | DC - 18.0 GHz |
| VSWR max. | 1.10 : 1 |




| Part - No. | 8801-TJ91-02 |
|---|---|
| Connectors | SMP-M to 3.5mm-M |
| Frequency | DC - 18.0 GHz |
| VSWR max. | 1.10 : 1 |




Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per MIL-C 39012, MIL-C-87104/2, MIL-C-3643, MIL-STD-348, IEC-169-7, IEC-457-2, DIN 47 223, DIN 47 226, DIN 47 298, Spectrum Elektrotechnik GmbH Specifications, as applicable. For details please refer to the beginning of this section.

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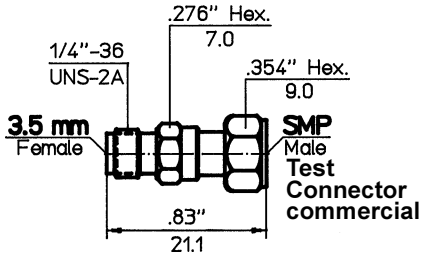
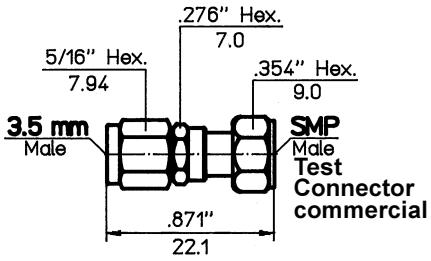


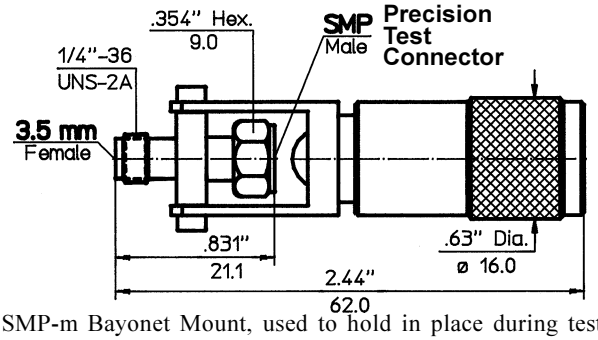

SMP-m commercial

| Part - No. | 8801-TC92-02 |
|---|---|
| Connectors | SMP-M to 3.5mm-F |
| Frequency | DC - 18.0 GHz |
| VSWR max. | 1.10 : 1 |



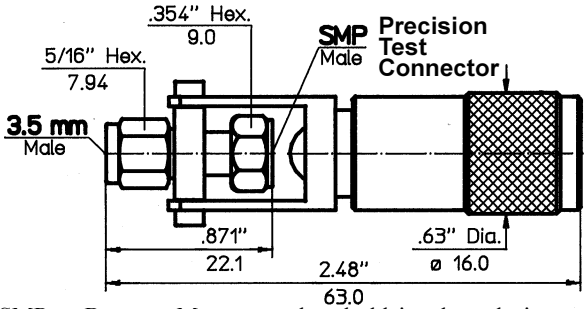

SMP-m commercial

| Part - No. | 8801-TC91-02 |
|---|---|
| Connectors | SMP-M to 3.5mm-M |
| Frequency | DC - 18.0 GHz |
| VSWR max. | 1.10 : 1 |




SMP-m Bayonet Mount, used to hold in place during testing the SMP right angle.

| Part - No. | 8801-TB92- 02 |
|---|---|
| Connectors | SMP-M to 3.5mm-F |
| Frequency | DC - 18.0 GHz |
| VSWR max. | 1.10 : 1 |




SMP-m Bayonet Mount, used to hold in place during testing the SMP right angle.

| Part - No. | 8801-TB91- 02 |
|---|---|
| Connectors | SMP-M to 3.5mm-M |
| Frequency | DC - 18.0 GHz |
| VSWR max. | 1.10 : 1 |

Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per MIL-C 39012, MIL-C-87104/2, MIL-C-3643, MIL-STD-348, IEC-169-7, IEC-457-2, DIN 47 223, DIN 47 226, DIN 47 298, Spectrum Elektrotechnik GmbH Specifications, as applicable. For details please refer to the beginning of this section.

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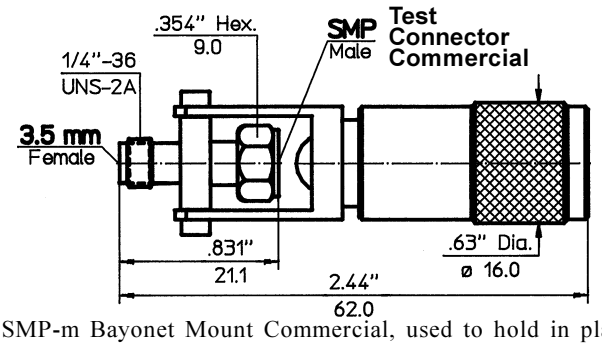
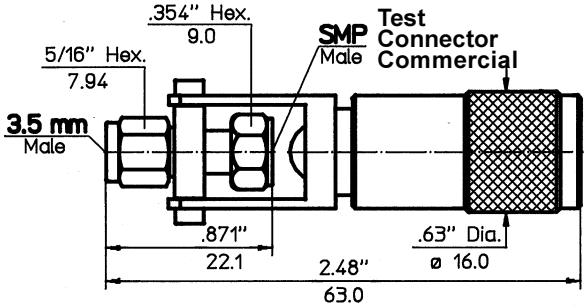
# SMP Between Series Test Adapters

| Part - No. | 8801-TD92-02 |
|---|---|
| Connectors | SMP-M to 3.5mm-F |
| Frequency | DC - 18.0 GHz |
| VSWR max. | 1.10 : 1 |




SMP-m Bayonet Mount Commercial, used to hold in place during testing the SMP right angle.

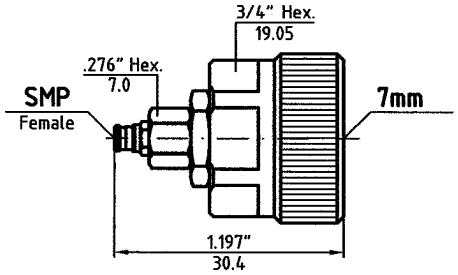
| Part - No. | 8801-TD91-02 |
|---|---|
| Connectors | SMP-M to 3.5mm-M |
| Frequency | DC - 18.0 GHz |
| VSWR max. | 1.10 : 1 |




SMP-m Bayonet Mount Commercial, used to hold in place during testing the SMP right angle.

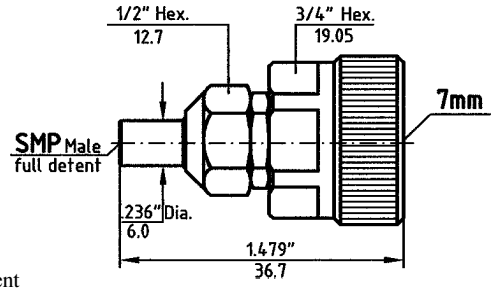
Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per MIL-C 39012, MIL-C-87104/2, MIL-C-3643, MIL-STD-348, IEC-169-7, IEC-457-2, DIN 47 223, DIN 47 226, DIN 47 298, Spectrum Elektrotechnik GmbH Specifications, as applicable. For details please refer to the beginning of this section.

# Between-Series Adapters, TypeSMP




| Adapter Part No. | 8001-MP90-02 |
|---|---|
| Connector Config. | SMP-f to 7mm |
| Frequency Range | DC to 18.0 GHz |
| VSWR | 1.10 : 1 max. |

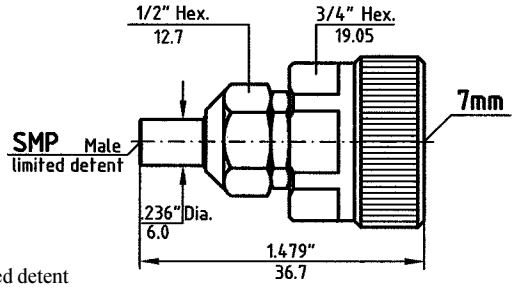
Connector outer conductor is passivated stainless steel. Center conductor is gold plated. If you require 6 slots at the 7mm Center Conductor, code changes to **8001-MP96-02.**




full detent

| Adapter Part No. | 8001-MJ90-02 |
|---|---|
| Connector Config. | SMP-m to 7mm |
| Frequency Range | DC to 18.0 GHz |
| VSWR | 1.10 : 1 max. |

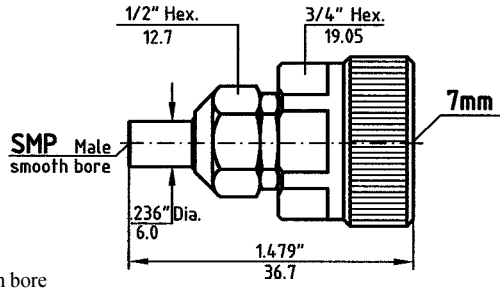
Connector outer conductor is passivated stainless steel. Center conductor is gold plated. If you require 6 slots at the 7mm Center Conductor, code changes to **8001-MJ96-02.**




limited detent

| Adapter Part No. | 8002-MJ90-02 |
|---|---|
| Connector Config. | SMP-m to 7mm |
| Frequency Range | DC to 18.0 GHz |
| VSWR | 1.10 : 1 max. |

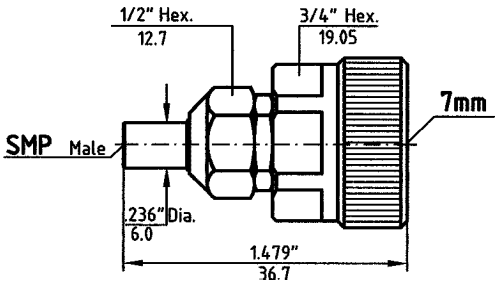
Connector outer conductor is passivated stainless steel. Center conductor is gold plated. If you require 6 slots at the 7mm Center Conductor, code changes to **8002-MJ96-02.**




smooth bore

| Adapter Part No. | 8003-MJ90-02 |
|---|---|
| Connector Config. | SMP-m to 7mm |
| Frequency Range | DC to 18.0 GHz |
| VSWR | 1.10 : 1 max. |

Connector outer conductor is passivated stainless steel. Center conductor is gold plated. If you require 6 slots at the 7mm Center Conductor, code changes to **8003-MJ96-02.**



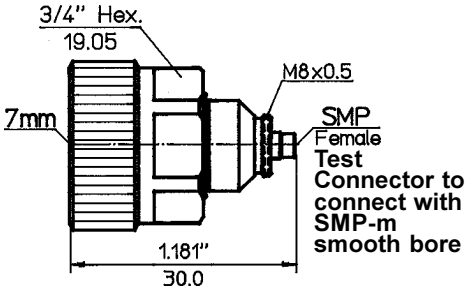

| Adapter Part No. | 8004-MJ90-02 |
|---|---|
| Connector Config. | SMP-m to 7mm |
| Frequency Range | DC to 18.0 GHz |
| VSWR | 1.10 : 1 max. |

Connector outer conductor is passivated stainless steel. Center conductor is gold plated. If you require 6 slots at the 7mm Center Conductor, code changes to **8004-MJ96-02.**

Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per MIL-C 39012, MIL-C-87104/2, MIL-C-3643, MIL-STD-348, IEC-169-7, IEC-457-2, DIN 47 223, DIN 47 226, DIN 47 298, DESC 94007 and DESC 94008, where applicable. For details please refer to the beginning of this section.

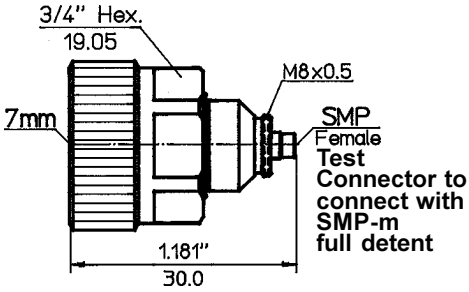
The Center Conductor of the 7 mm Connector is supplied with 4 slots. If you require 6 slots, Connector Code changes from **90** to **96**.

| Part - No. | 8801-TP90-02 |
|---|---|
| Connectors | SMP-F to 7mm |
| Frequency | DC - 18.0 GHz |
| VSWR max. | 1.10 : 1 |




The Center Conductor of the 7 mm Connector is supplied with 4 slots. If you require 6 slots, Connector Code changes from **90** to **96**.

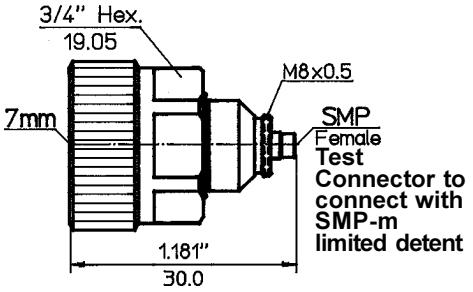
| Part - No. | 8801-TF90-02 |
|---|---|
| Connectors | SMP-F to 7mm |
| Frequency | DC - 18.0 GHz |
| VSWR max. | 1.10 : 1 |




SMP-f connect with SMP male full detent.

The Center Conductor of the 7 mm Connector is supplied with 4 slots. If you require 6 slots, Connector Code changes from **90** to **96**.

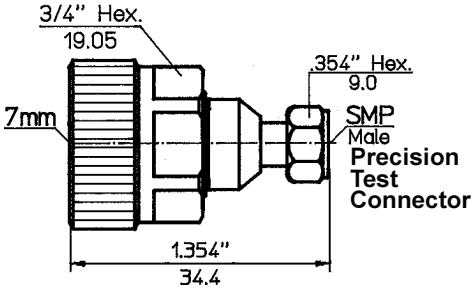
| Part - No. | 8801-TL90-02 |
|---|---|
| Connectors | SMP-F to 7mm |
| Frequency | DC - 18.0 GHz |
| VSWR max. | 1.10 : 1 |




SMP-f connect with SMP male limited detent.

The Center Conductor of the 7 mm Connector is supplied with 4 slots. If you require 6 slots, Connector Code changes from **90** to **96**.

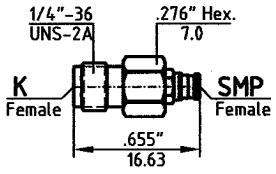
| Part - No. | 8801-TJ90-02 |
|---|---|
| Connectors | SMP-M to 7mm |
| Frequency | DC - 18.0 GHz |
| VSWR max. | 1.10 : 1 |




Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per MIL-C 39012, MIL-C-87104/2, MIL-C-3643, MIL-STD-348, IEC-169-7, IEC-457-2, DIN 47 223, DIN 47 226, DIN 47 298, Spectrum Elektrotechnik GmbH Specifications, as applicable. For details please refer to the beginning of this section.

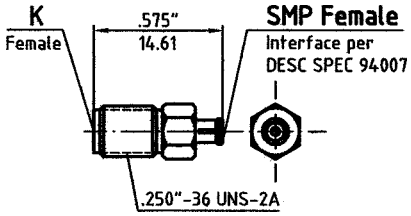
c:/quick98/smp5.pm6

# Between-Series Adapters, Type SMP



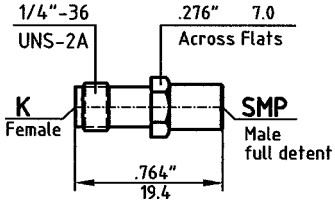

| Adapter Part No. | 8001-KFMP-02 |
|---|---|
| Connector Config. | SMP-f to K*-f |
| Frequency Range | DC to 40.0 GHz |
| VSWR | 1.20 : 1 max. |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.




| Adapter Part No. | 8002-KFMP-02 |
|---|---|
| Connector Config. | SMP-f to K*-f |
| Frequency Range | DC to 40.0 GHz |
| VSWR | 1.5 : 1 max to 40.0 GHz |

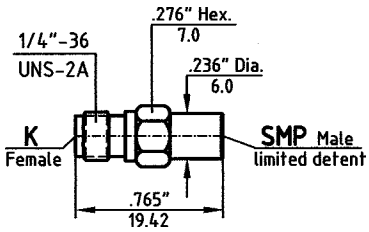
Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.




full detent

| Adapter Part No. | 8001-KFMJ-02 |
|---|---|
| Connector Config. | SMP-m to K*-f |
| Frequency Range | DC to 40.0 GHz |
| VSWR | 1.20 : 1 max. |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.




limited detent

| Adapter Part No. | 8002-KFMJ-02 |
|---|---|
| Connector Config. | SMP-m to K*-f |
| Frequency Range | DC to 40.0 GHz |
| VSWR | 1.20 : 1 max. |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.

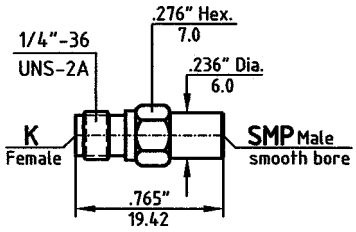
Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per MIL-C 39012, MIL-C-87104/2, MIL-C-3643, MIL-STD-348, IEC-169-7, IEC-457-2, DIN 47 223, DIN 47 226, DIN 47 298, DESC 94007 and DESC 94008, where applicable. For details please refer to the beginning of this section.

# SMP Between-Series Adapters

smooth bore

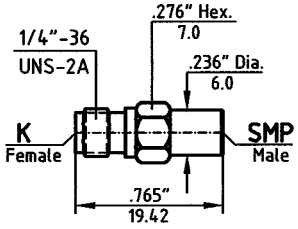
| Adapter Part No. | 8003-KFMJ-02 |
|---|---|
| Connector Config. | SMP-m to K*-f |
| Frequency Range | DC to 40.0 GHz |
| VSWR | 1.20 : 1 max. |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.




| Adapter Part No. | 8004-KFMJ-02 |
|---|---|
| Connector Config. | SMP-m to K*-f |
| Frequency Range | DC to 40.0 GHz |
| VSWR | 1.20 : 1 max. |

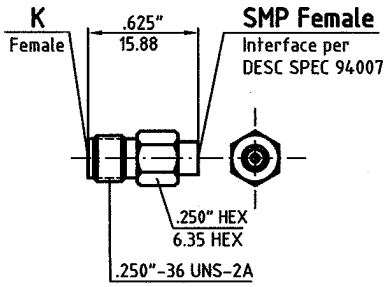
Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.




limited detent

| Adapter Part No. | 8002-KFMJ-02 |
|---|---|
| Connector Config. | SMP-m to K*-f |
| Frequency Range | DC to 40.0 GHz |
| VSWR | 1.5 : 1 max to 40.0 GHz |

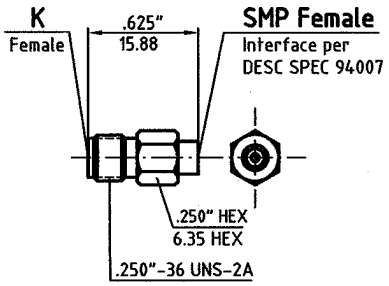
Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.




smooth bore

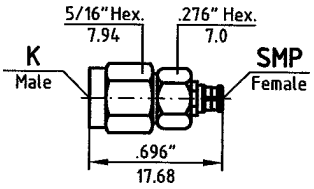
| Adapter Part No. | 8003-KFMJ-02 |
|---|---|
| Connector Config. | SMP-m to K*-f |
| Frequency Range | DC to 40.0 GHz |
| VSWR | 1.5 : 1 max to 40.0 GHz |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.



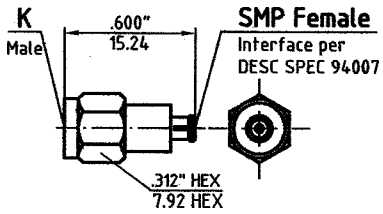

Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per MIL-C 39012, MIL-C-87104/2, MIL-C-3643, MIL-STD-348, IEC-169-7, IEC-457-2, DIN 47 223, DIN 47 226, DIN 47 298, DESC 94007 and DESC 94008, where applicable. For details please refer to the beginning of this section.

# Between-Series Adapters, Type SMP



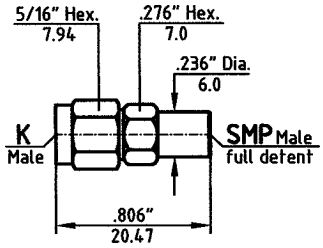

| Adapter Part No. | 8001-KMMP-02 |
|---|---|
| Connector Config. | SMP-f to K*-m |
| Frequency Range | DC to 40.0 GHz |
| VSWR | 1.20 : 1 max. |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.




| Adapter Part No. | 8002-KMMP-02 |
|---|---|
| Connector Config. | SMP-f to K*-m |
| Frequency Range | DC to 40.0 GHz |
| VSWR | 1.5 : 1 max to 40.0 GHz |

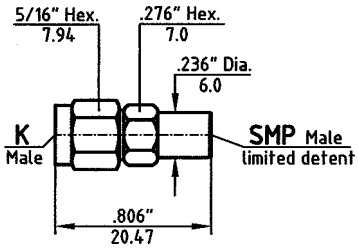
Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.




full detent

| Adapter Part No. | 8001-KMMJ-02 |
|---|---|
| Connector Config. | SMP-m to K*-m |
| Frequency Range | DC to 40.0 GHz |
| VSWR | 1.20 : 1 max. |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.




limited detent

| Adapter Part No. | 8002-KMMJ-02 |
|---|---|
| Connector Config. | SMP-m to K*-m |
| Frequency Range | DC to 40.0 GHz |
| VSWR | 1.20 : 1 max. |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.

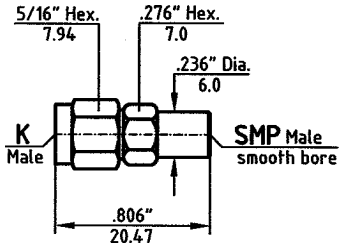
Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per MIL-C 39012, MIL-C-87104/2, MIL-C-3643, MIL-STD-348, IEC-169-7, IEC-457-2, DIN 47 223, DIN 47 226, DIN 47 298, DESC 94007 and DESC 94008, where applicable. For details please refer to the beginning of this section.

# SMP Between-Series Adapters

smooth bore

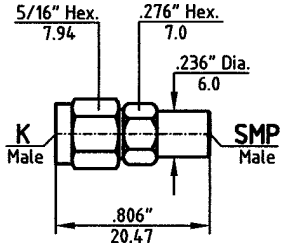
| Adapter Part No. | 8003-KMMJ-02 |
|---|---|
| Connector Config. | SMP-m to K*-m |
| Frequency Range | DC to 40.0 GHz |
| VSWR | 1.20 : 1 max. |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.



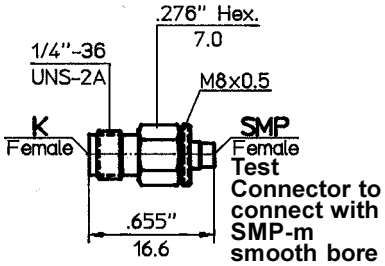

| Adapter Part No. | 8004-KMMJ-02 |
|---|---|
| Connector Config. | SMP-m to K*-m |
| Frequency Range | DC to 40.0 GHz |
| VSWR | 1.20 : 1 max. |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.

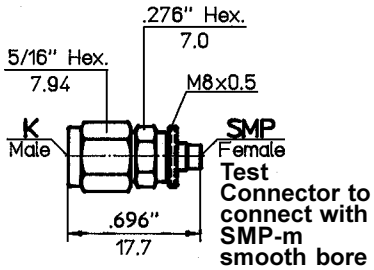



Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per MIL-C 39012, MIL-C-87104/2, MIL-C-3643, MIL-STD-348, IEC-169-7, IEC-457-2, DIN 47 223, DIN 47 226, DIN 47 298, DESC 94007 and DESC 94008, where applicable. For details please refer to the beginning of this section.

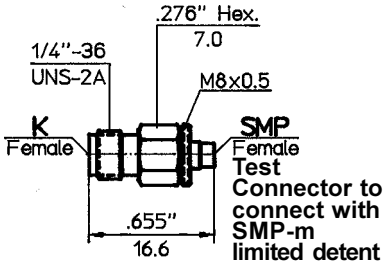
c:/quick98/smp5.pm6




| Part - No. | 8801-KFTP-02 |
|---|---|
| Connectors | SMP-F to K*-F |
| Frequency | DC - 18.0 GHz |
| VSWR max. | 1.10 : 1 |

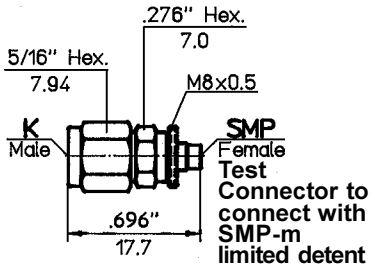



| Part - No. | 8801-KMTP-02 |
|---|---|
| Connectors | SMP-F to K*-M |
| Frequency | DC - 18.0 GHz |
| VSWR max. | 1.10 : 1 |




SMP-f connect with SMP male limited detent.

| Part - No. | 8801-KFTL-02 |
|---|---|
| Connectors | SMP-F to K*-F |
| Frequency | DC - 18.0 GHz |
| VSWR max. | 1.10 : 1 |

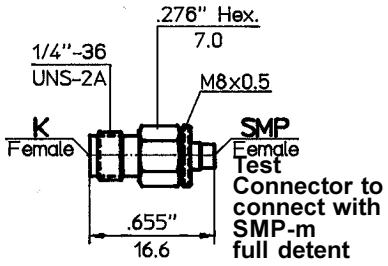



SMP-f connect with SMP male limited detent.

| Part - No. | 8801-KMTL-02 |
|---|---|
| Connectors | SMP-F to K*-M |
| Frequency | DC - 18.0 GHz |
| VSWR max. | 1.10 : 1 |

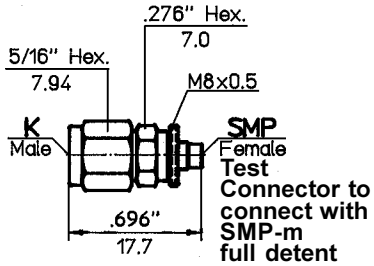
Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per MIL-C 39012, MIL-C-87104/2, MIL-C-3643, MIL-STD-348, IEC-169-7, IEC-457-2, DIN 47 223, DIN 47 226, DIN 47 298, Spectrum Elektrotechnik GmbH Specifications, as applicable. For details please refer to the beginning of this section.

| Part - No. | 8801-KFTF-02 |
|---|---|
| Connectors | SMP-F to K*-F |
| Frequency | DC - 18.0 GHz |
| VSWR max. | 1.10 : 1 |



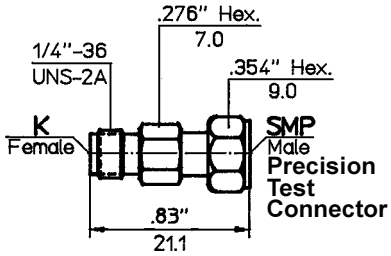

SMP-f connect with SMP male full detent.

| Part - No. | 8801-KMTF-02 |
|---|---|
| Connectors | SMP-F to K*-M |
| Frequency | DC - 18.0 GHz |
| VSWR max. | 1.10 : 1 |

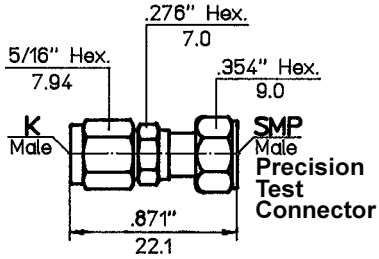



SMP-f connect with SMP male full detent.

| Part - No. | 8801- KFTJ - 02 |
|---|---|
| Connectors | SMP-M to K*-F |
| Frequency | DC - 18.0 GHz |
| VSWR max. | 1.10 : 1 |




| Part - No. | 8801-KMTJ-02 |
|---|---|
| Connectors | SMP-M to K*-M |
| Frequency | DC - 18.0 GHz |
| VSWR max. | 1.10 : 1 |




Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per MIL-C 39012, MIL-C-87104/2, MIL-C-3643, MIL-STD-348, IEC-169-7, IEC-457-2, DIN 47 223, DIN 47 226, DIN 47 298, Spectrum Elektrotechnik GmbH Specifications, as applicable. For details please refer to the beginning of this section.

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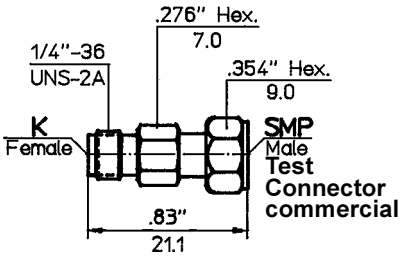
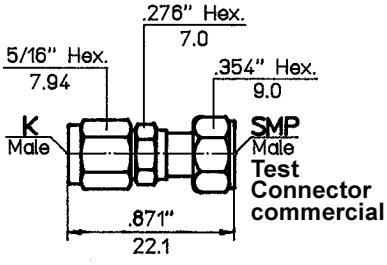


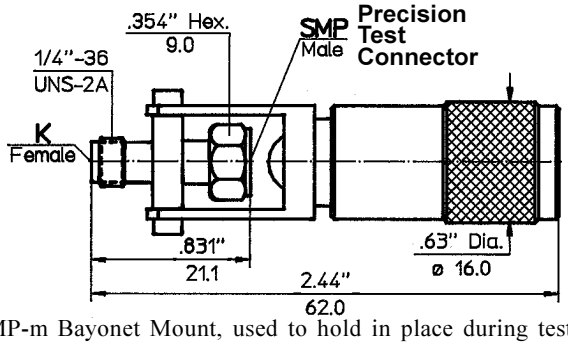

SMP-m commercial

| Part - No. | 8801-KFTC-02 |
|---|---|
| Connectors | SMP-M to K*-F |
| Frequency | DC - 18.0 GHz |
| VSWR max. | 1.10 : 1 |



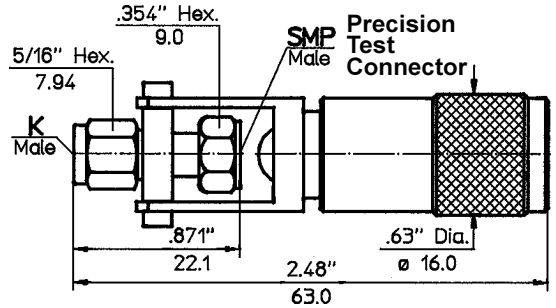

SMP-m commercial

| Part - No. | 8801-KMTC-02 |
|---|---|
| Connectors | SMP-M to K*-M |
| Frequency | DC - 18.0 GHz |
| VSWR max. | 1.10 : 1 |




SMP-m Bayonet Mount, used to hold in place during testing the SMP right angle.

| Part - No. | 8801-KFTB- 02 |
|---|---|
| Connectors | SMP-M to K*-F |
| Frequency | DC - 18.0 GHz |
| VSWR max. | 1.10 : 1 |




SMP-m Bayonet Mount, used to hold in place during testing the SMP right angle.

| Part - No. | 8801-KMTB- 02 |
|---|---|
| Connectors | SMP-M to K*-M |
| Frequency | DC - 18.0 GHz |
| VSWR max. | 1.10 : 1 |

Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per MIL-C 39012, MIL-C-87104/2, MIL-C-3643, MIL-STD-348, IEC-169-7, IEC-457-2, DIN 47 223, DIN 47 226, DIN 47 298, Spectrum Elektrotechnik GmbH Specifications, as applicable. For details please refer to the beginning of this section.

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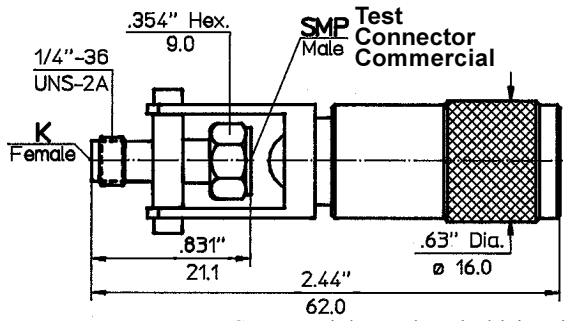
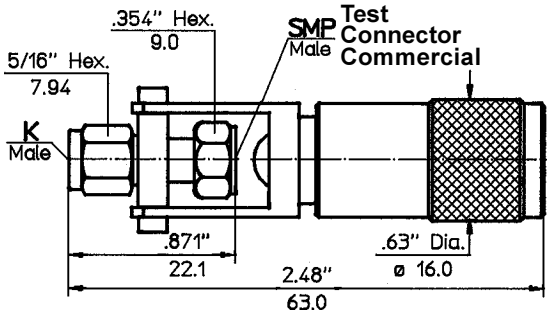
Spectrum Elektrotechnik GmbH

| Part - No. | 8801-KFTD-02 |
|---|---|
| Connectors | SMP-M to K*-F |
| Frequency | DC - 18.0 GHz |
| VSWR max. | 1.10 : 1 |




SMP-m Bayonet Mount Commercial, used to hold in place during testing the SMP right angle.

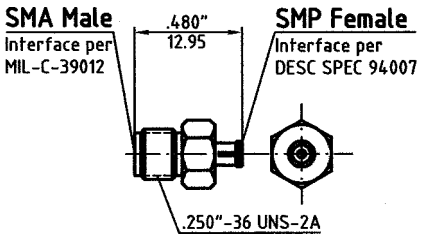
| Part - No. | 8801-KMTD-02 |
|---|---|
| Connectors | SMP-M to K*-M |
| Frequency | DC - 18.0 GHz |
| VSWR max. | 1.10 : 1 |




SMP-m Bayonet Mount Commercial, used to hold in place during testing the SMP right angle.

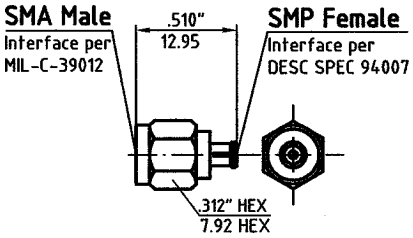
Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per MIL-C 39012, MIL-C-87104/2, MIL-C-3643, MIL-STD-348, IEC-169-7, IEC-457-2, DIN 47 223, DIN 47 226, DIN 47 298, Spectrum Elektrotechnik GmbH Specifications, as applicable. For details please refer to the beginning of this section.

# Between-Series Adapters, Type SMP



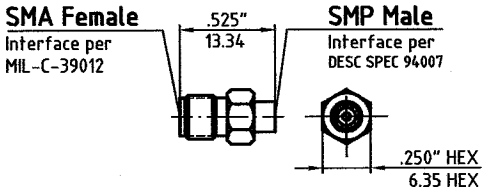

| Adapter Part No. | 8001-MP21-04 |
|---|---|
| Connector Config. | SMP-f to SMA-f |
| Frequency Range | DC to 12.0 GHz |
| VSWR | 1.03 + 0.01 x f (GHz) |

Connector outer conductor is passivated stainless steel. Center conductor is berrylium copper gold plated.




| Adapter Part No. | 8001-MP11-04 |
|---|---|
| Connector Config. | SMP-f to SMA-m |
| Frequency Range | DC to 18.0 GHz |
| VSWR | 1.25 : 1 max to 18.0 GHz |

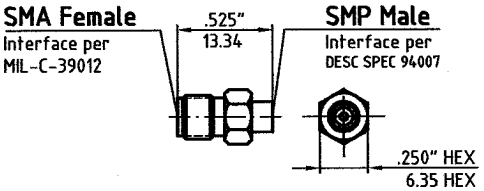
Connector outer conductor is passivated stainless steel. Center conductor is berrylium copper gold plated.




limited detent

| Adapter Part No. | 8001-MJ21-02 |
|---|---|
| Connector Config. | SMP-m to SMA-f |
| Frequency Range | DC to 18.0 GHz |
| VSWR | 1.25 : 1 max to 18.0 GHz |

Connector outer conductor is passivated stainless steel. Center conductor is gold plated.




smooth bore

| Adapter Part No. | 8002-MJ21-02 |
|---|---|
| Connector Config. | SMP-m to SMA-f |
| Frequency Range | DC to 18.0 GHz |
| VSWR | 1.25 : 1 max to 18.0 GHz |

Connector outer conductor is passivated stainless steel. Center conductor is gold plated.

Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per MIL-C 39012, MIL-C-87104/2, MIL-C-3643, MIL-STD-348, IEC-169-7, IEC-457-2, DIN 47 223, DIN 47 226, DIN 47 298, DESC 94007 and DESC 94008, where applicable. For details please refer to the beginning of this section.

# SMP Between-Series Adapters

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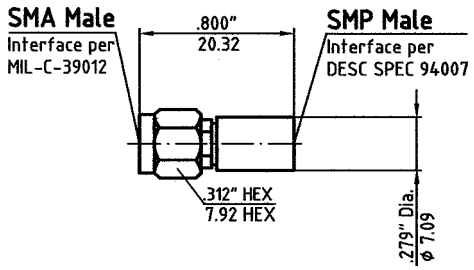
| Adapter Part No. | 8003-MJ11-02 |
|---|---|
| Connector Config. | SMP-m to SMA-m |
| Frequency Range | DC to 18.0 GHz |
| VSWR | 1.25 : 1 max to 18.0 GHz |

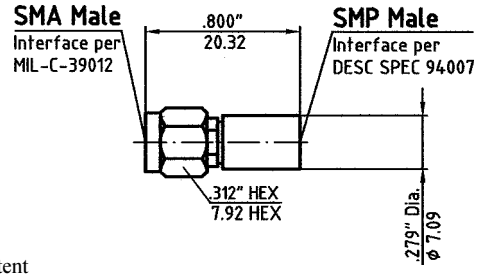
Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.




full detent

| Adapter Part No. | 8004-MJ11-02 |
|---|---|
| Connector Config. | SMP-m to SMA-m |
| Frequency Range | DC to 18.0 GHz |
| VSWR | 1.25 : 1 max to 18.0 GHz |

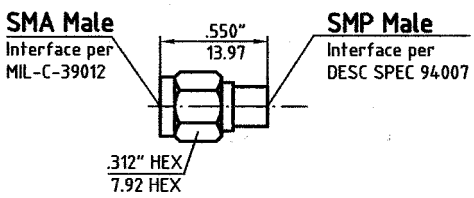
Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.




limited detent

| Adapter Part No. | 8001-MJ11-02 |
|---|---|
| Connector Config. | SMP-m to SMA-m |
| Frequency Range | DC to 18.0 GHz |
| VSWR | 1.25 : 1 max to 18.0 GHz |

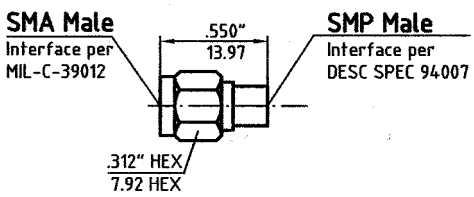
Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.




limited detent

| Adapter Part No. | 8002-MJ11-02 |
|---|---|
| Connector Config. | SMP-m to SMA-m |
| Frequency Range | DC to 18.0 GHz |
| VSWR | 1.25 : 1 max to 18.0 GHz |

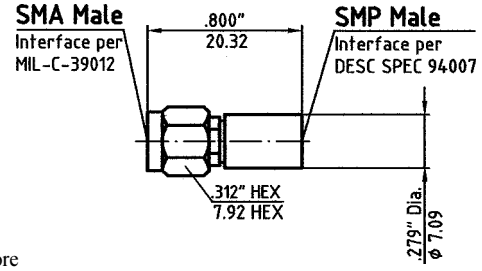
Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.




smooth bore

| Adapter Part No. | 8005-MJ11-02 |
|---|---|
| Connector Config. | SMP-m to SMA-m |
| Frequency Range | DC to 18.0 GHz |
| VSWR | 1.25 : 1 max to 18.0 GHz |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.




smooth bore

Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per MIL-C 39012, MIL-C-87104/2, MIL-C-3643, MIL-STD-348, IEC-169-7, IEC-457-2, DIN 47 223, DIN 47 226, DIN 47 298, DESC 94007 and DESC 94008, where applicable. For details please refer to the beginning of this section.

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# TNC

# PUSH-ON

# **TNC** Interface Mating Dimensions (Per MIL-C-87104/2)

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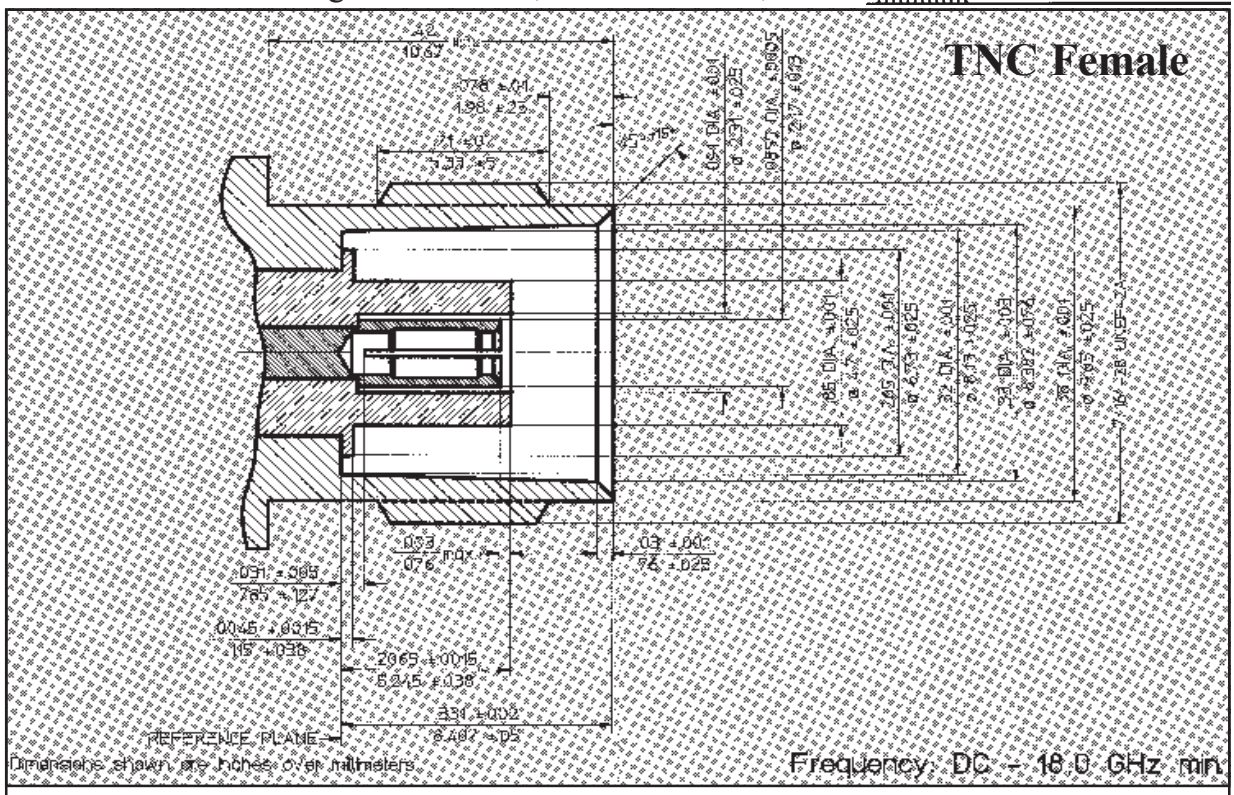


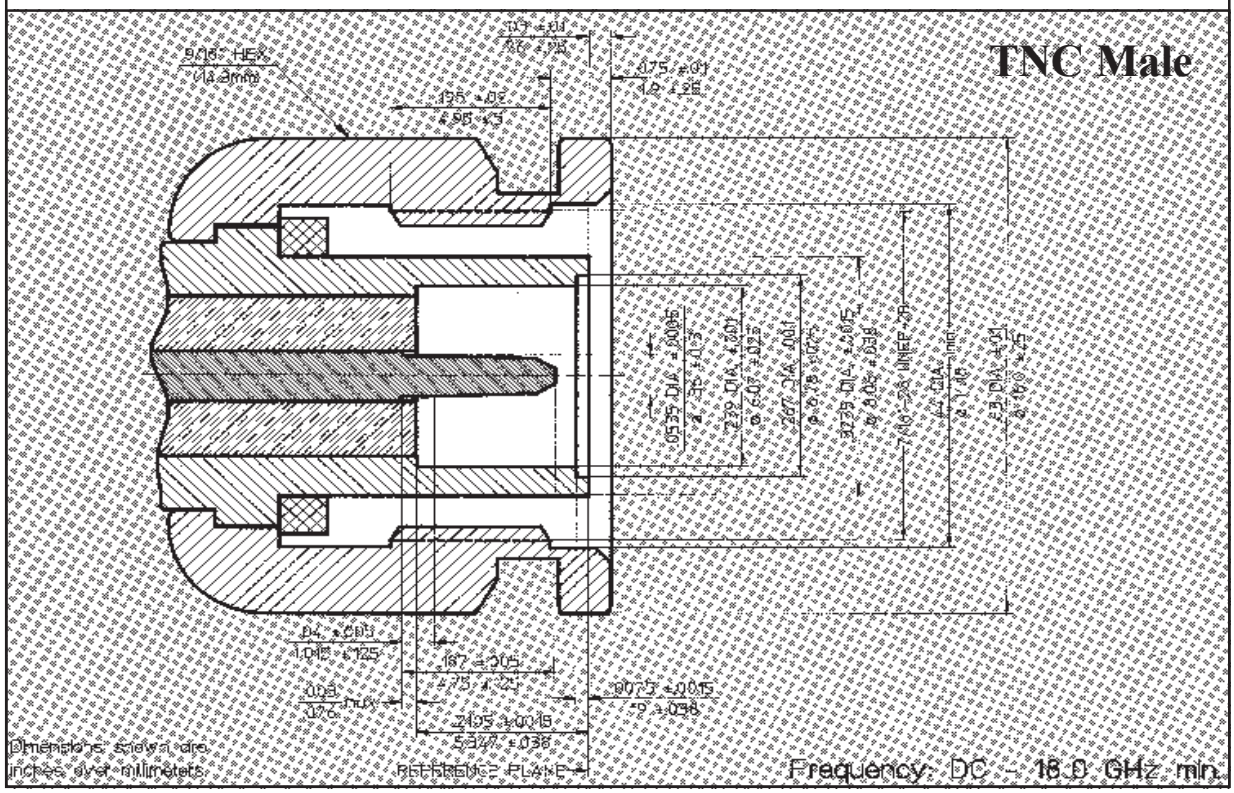


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# Spectrum Elektrotechnik GmbH (to MIL-C-87104/2) TNC PUSH-ON Specifications

The specifications below are general specifications for all TNC PUSH-ON connectors. Specifications in the following table are recommended for any procurement documents or drawings. In the event of any conflict, these specifications shall govern.The PUSH-ON Connectors were developed to eliminate the time consuming lightening, torquing and loosening of connectors during test. The connector slides directly onto any Female of the same connector style, allowing quick connecting and disconnecting. Its mechanism locks safely onto the standard thread of the Female connector.

| REQUIREMENT | | REQUIREMENT PARAGRAPH | GENERAL SPECIFICATIONS |
|---|---|---|---|
| **GENERAL** | | | |
| Standard Materials | | 3.3 | STEEL corrosion resistant 1.4305 per DIN 17440 (QQ-S-764, class 303 or ASTM-A-582-80).<br>ALUMINUM AlMg4.5Mn per DIN 1725, AlMgSi0.5 per DIN 1725, AlMgSi1 per DIN 1725 (6061-T6 per QQ-A-225/8).<br>BRASS CuZn39Pb3 per DIN 17660 (QQ-B-626, half hard).<br>COPPER BERYLLIUM 33-25 CuBe2Pb H per DIN 17666 (QQ-C-530).<br>TFE Fluorocarbon per DIN 52900 (MIL-P-19468 and L-P403).<br>SILICONE RUBBER per DIN 3771 (MIL-R-5847 and ZZ-R-765, Class II B,) Grade 50 - 75.<br>BORRIUM NITRITE Dielectric for high power applications per inhouse specification. |
| Finish for | COPPER BERYLLIUM | 3.3.1 | Center Contacts shall be gold plated to a minimum thickness of .00005 inch (1.27 µm) in accordance with MIL-G-45204, Type II, Grade C. Outer conductors shall be gold plated to a thickness of .00003 inch (0.8 µm) per MIL-G-45204 , Type II, Grade C, or silver plated to a thickness of .0001 inch (2.5 µm) per QQ-S-365. |
| | STAINLESS STEEL | | Shall be passivated per QQ-P-35 or gold plated to a thickness of .00003 inch (0.8 µm) per MIL-G-45204, Type II, Grade C. |
| | ALUMINUM | | Conductive Parts shall have an iridited finish per MIL-C-5541.<br>Other parts, such as Coupling Nuts and Back-Bodies shall be anodized per MIL-A-8625. |
| | BRASS | | Gold plated to a thickness of .00003 inch (0.8 µm) min. per MIL-45204, Type II, Grade C, or nicle plated to a thickness of .0002 inch (5µm) per QQ-N-290, grade E, or silver plated to a thickness of .0001 inch (2.5 µm) per QQ-S-365. |
| | VARIOUS | | Imoloy .0001 inch (2.5 µm) min. plating, consisting of 55% Copper / 20% Zinc / 25% Tin (on special request). |
| Design | | 3.4 | The design shall be such that the outline dimensions in this catalog are met. In addition, the assembled connector shall meet the interface dimensions. |
| **ELECTRICAL** | | | |
| Frequency Range | | 3.5.1.1 | DC - 18.0 GHz min. |
| Insulation Resistance | | 3.11* | The insulation resistance shall not be less than 5.000 megohms. |
| Voltage Standing Wave Ratio (VSWR) | | 3.5.1.2 | 1.15 : 1 |
| Contact Resistance | | 3.16* | The center contact resistance drop shall not exceed 1.0 milliohms max. |
| Dielectric Withstanding Voltage | | 3.17* | The magnitude of the test voltage shall be 2500 volts rms at 60 Hz. |
| RF High Potential Withstanding Voltage | | 3.23 | The RF high potential withstanding voltage is 1,500 volts rms at 5 MHz. |
| RF Leakage | | 3.5.1.8 | 90 dB max. to 3.0 GHz, -65 dB max. to 18.0 GHz |
| Insertion Loss | | 3.5.1.3 | 0.2 dB max. at 18.0 GHz |
| Impedance | | | 50 Ohms Nominal |
| Corona Level Voltage | | | 375 Volts at 70,000 ft. |
| **MECHANICAL** | | | |
| Connector Durability | | 3.15* | The connector is to be tested and its mating connector shall be subjected to 500 insertion min. Withdrawal cycles / minute are not applicable. The connector shall show no evidence of mechanical failure and the connector shall meet the mating characteristic requirements. |
| Temperature | | | -65°C to +100°C |
| Force to Engage and Disengage | | 3.5.1* | The Force to Engage and Disengage shall not exceed 2-4 inch-pounds (0.452-0.678 Nm). |
| Longitudinal Force max. | | | Longitudinal force is not applicable. |
| **ENVIRONMENTAL** | | | |
| Corrosion (Salt Spray) | | 3.13* | Specification MIL-STD-202, Method 101, Test Condition B. The salt solution shall be 5%. |
| Vibration | | 3.18* | Specification MIL-STD-202, Method 204, Test Condition D. |
| Shock | | 3.19* | Specification MIL-STD-202, Method 213, Test Condition I. |
| Thermal Shock | | 3.20* | Specification MIL-STD-202, Method 107, Test Condition B, except high temperature shall be + 200°C. |
| Moisture Resistance | | 3.21* | Specification MIL-STD-202, Method 106. Step 7b (vibration) shall be omitted. Insulation resistance shall be 200 megohms min. within 5 minutes of removal from humidity. |

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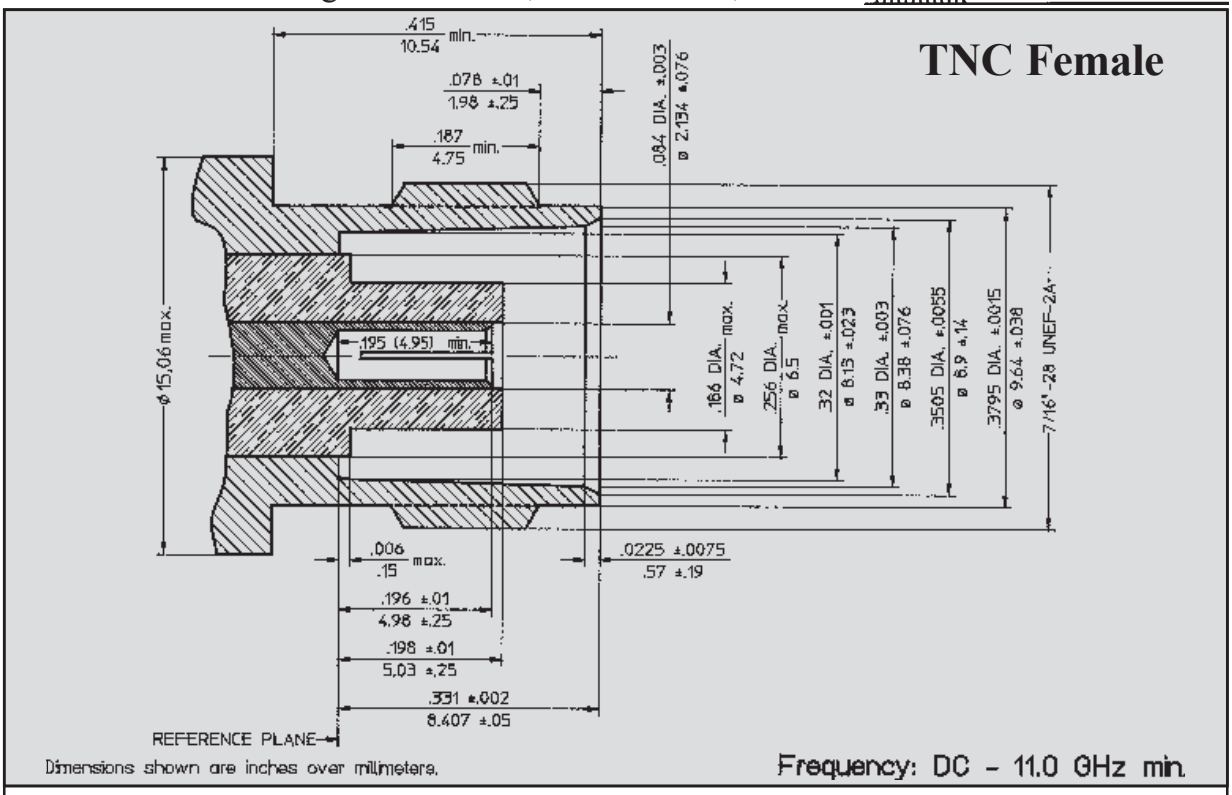
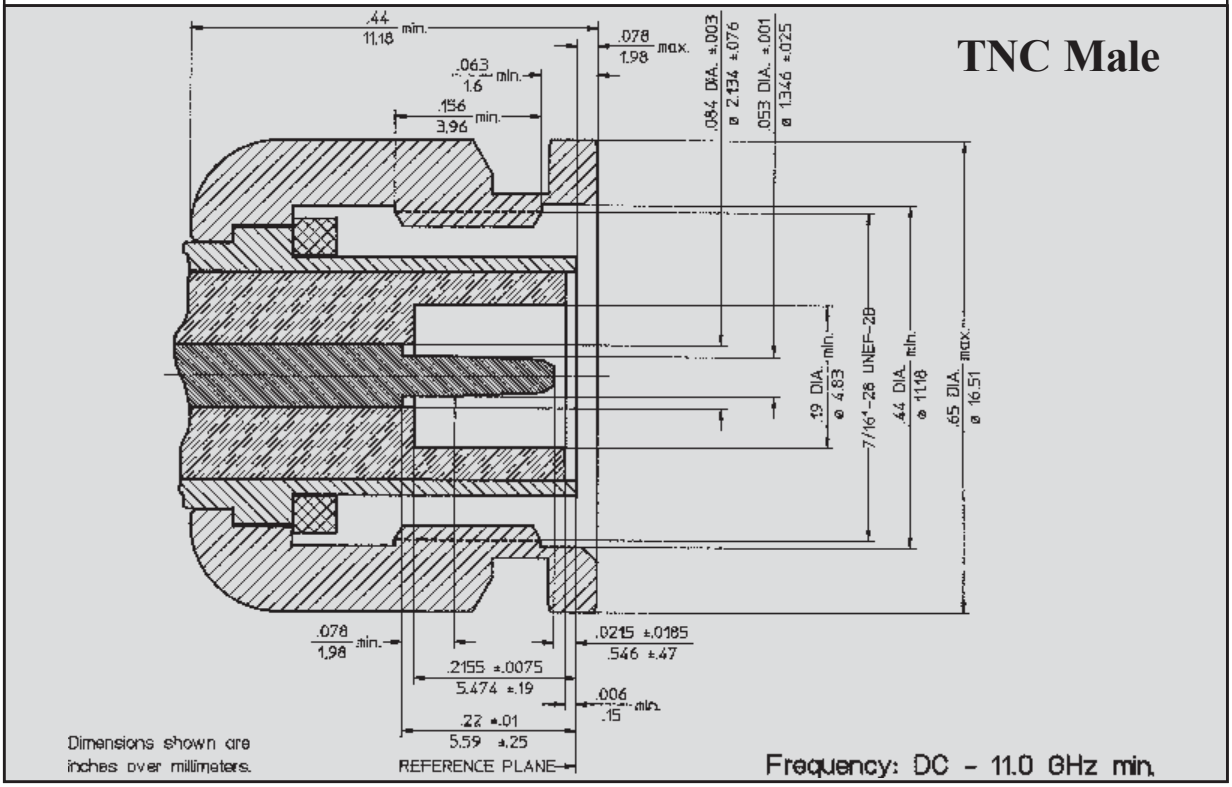
* not specified in MIL-C-87104/2. It is refered here to MIL-C-39012.

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# Spectrum Elektrotechnik GmbH (to MIL-C-39012) TNC PUSH-ON Specifications

The specifications below are general specifications for all TNC PUSH-ON connectors. Specifications in the following table are recommended for any procurement documents or drawings. In the event of any conflict, these specifications shall govern.The PUSH-ON Connectors were developed to eliminate the time consuming lightening, torquing and loosening of connectors during test. The connector slides directly onto any Female of the same connector style, allowing quick connecting and disconnecting. Its mechanism locks safely onto the standard thread of the Female connector.

| REQUIREMENT | | REQUIREMENT PARAGRAPH | GENERAL SPECIFICATIONS |
|---|---|---|---|
| **GENERAL** | | | |
| Standard Materials | | 3.3 | STEEL corrosion resistant 1.4305 per DIN 17440 (QQ-S-764, class 303 or ASTM-A-582-80).<br>ALUMINUM AlMg4.5Mn per DIN 1725, AlMgSi0.5 per DIN 1725, AlMgSi1 per DIN 1725 (6061-T6 per QQ-A-225/8).<br>BRASS CuZn39Pb3 per DIN 17660 (QQ-B-626, half hard).<br>COPPER BERYLLIUM 33-25 CuBe2Pb H per DIN 17666 (QQ-C-530).<br>TFE Fluorocarbon per DIN 52900 (MIL-P-19468 and L-P403).<br>SILICONE RUBBER per DIN 3771 (MIL-R-5847 and ZZ-R-765, Class II B,) Grade 50 - 75.<br>BORRIUM NITRITE Dielectric for high power applications per inhouse specification. |
| Finish for | COPPER BERYLLIUM | 3.3.1 | Center Contacts shall be gold plated to a minimum thickness of .00005 inch (1.27 µm) in accordance with MIL-G-45204, Type II, Grade C. Outer conductors shall be gold plated to a thickness of .00003 inch (0.8 µm) per MIL-G-45204 , Type II, Grade C, or silver plated to a thickness of .0001 inch (2.5 µm) per QQ-S-365. |
| | STAINLESS STEEL | | Shall be passivated per QQ-P-35 or gold plated to a thickness of .00003 inch (0.8 µm) per MIL-G-45204, Type II, Grade C. |
| | ALUMINUM | | Conductive Parts shall have an iridited finish per MIL-C-5541.<br>Other parts, such as Coupling Nuts and Back-Bodies shall be anodized per MIL-A-8625. |
| | BRASS | | Gold plated to a thickness of .00003 inch (0.8 µm) min. per MIL-45204, Type II, Grade C, or nicle plated to a thickness of .0002 inch (5µm) per QQ-N-290, grade E, or silver plated to a thickness of .0001 inch (2.5 µm) per QQ-S-365. |
| | VARIOUS | | Imoloy .0001 inch (2.5 µm) min. plating, consisting of 55% Copper / 20% Zinc / 25% Tin (on special request). |
| Design | | 3.4 | The design shall be such that the outline dimensions in this catalog are met. In addition, the assembled connector shall meet the interface dimensions. |
| **ELECTRICAL** | | | |
| Frequency Range | | | DC - 11.0 GHz min. |
| Insulation Resistance | | 3.11 | The insulation resistance shall not be less than 5,000 megohms. |
| Voltage Standing Wave Ratio (VSWR) | | 3.14 | 1.03 + .005 * f (GHz) |
| Contact Resistance | | 3.16 | The center contact resistance drop shall not exceed 1.5 milliohms and the outer contact resistance drop shall not exceed 2.0 milliohms. |
| Dielectric Withstanding Voltage | | 3.17 | The magnitude of the test voltage shall be 1,500 volts rms at sea level. |
| High Potential Test Voltage | | 3.23 | The high potential test voltage is 1,500 volts rms. Leakage is not applicable. |
| RF Leakage | | 3.26 | - (90 - f (GHz)) dB |
| Insertion Loss | | 3.27 | (.05 SQT(f(GHz))) dB |
| **MECHANICAL** | | | |
| Connector Durability | | 3.15 | The connector is to be tested and its mating connector shall be subjected to 500 insertion and withdrawal cycles at 12 cycles per minute max. The connector shall show no evidence of mechanical failure and the connector shall meet the mating characteristic requirements. |
| Cable Retention Force | | 3.24 | 90 pounds (400 N) min. |
| Coupling Nut Retention Force | | 3.25 | Not applicable for Female connectors. For male connectors, the axial force is 100 lbs (445 N) max.. The torque is 30 inch-pounds (3.4 Nm) max. |
| Force to Engage and Disengage | | 3.5.1 | The torque required to engage and disengage shall not exceed 2-4 inch-pounds (0.452-0.678 Nm). |
| Longitudinal Force max. | | | Longitudinal force is not applicable. |
| Mating Characteristics | | 3.7 | See interface dimensions shown on next page. Applicable to Females only: oversize pin .055 inch (1.4 mm) max. dia.,.080 inch (2.03 mm) deep; insertion force 2 lbs. (8.9 N) max. with .054 inch (1.37 mm) min. dia. pin; withdrawal force 2.00 oz (.556 N) min. with .052 inch (1.32 mm) max. dia. pin. |
| Recommended Mating Torque | | | 12 - 15 inch-pounds (1.4 - 1.7 Nm) |
| **ENVIRONMENTAL** | | | |
| Corrosion (Salt Spray) | | 3.13 | Specification MIL-STD-202, Method 101, Test Condition B. The salt solution shall be 5%. |
| Vibration | | 3.18 | Specification MIL-STD-202, Method 204, Test Condition B. |
| Shock | | 3.19 | Specification MIL-STD-202, Method 213, Test Condition I. |
| Thermal Shock | | 3.20 | Specification MIL-STD-202, Method 107, Test Condition B, except high temperature shall be + 200°C. |
| Moisture Resistance | | 3.21 | Specification MIL-STD-202, Method 106. Step 7b (vibration) shall be omitted. Insulation resistance shall be 200 megohms min. within 5 minutes of removal from humidity. |
| Corona Level | | 3.22 | The connector shall not exhibit breakdown (corona) when the applied voltage is 375 volts rms and the altitude is 70,000 feet. |

# TNC Push-On Connectors & Adapters

**PUSH-ON TNC-TYPE CONNECTORS** eliminate time consuming tightening, torquing and loosening of TNC-male connectors during testing or in applications where limited space requirements make tightening and torquing of a coupling nut difficult, if not impossible.

The TNC push-on slides directly onto any standard TNC-female, allowing prompt connection and loosening. Three types of push-on TNC connectors are available: full-locking, locking with non-locking rear nut, and non-locking.

**Full Locking** push-on TNC-Type connectors are recommended when longer testing is required and the connectors must be firmly locked so that they cannot be disconnected, even by mistake. **Locking with non-locking rear nut** TNC-Type connectors are recommended where safe locking is necessary, but long term testing is not required. **Non-locking** push-on connectors are recommended for short period testing, testing that usually takes only seconds.

Push-On TNC-Type connectors are available for termination with cables RG-142B/U, RG-400/U and RG-214/U. State-of-the-art high performance cables using push-on connectors are available as well, however, these high performance cable assemblies are only available completely terminated; they can be found in the section "Cable Assemblies" on page 242 -243 of this catalog.

**PUSH-ON TNC-TYPE CONNECTOR SAVERS**, or adapters, were developed for attachment to cable assemblies which are terminated with regular connectors. The adapter has a standard connector on one side, and a push-on connector on the other end. The standard connector end of the adapter engages with the standard connector of the opposite sex at the cable assembly. These connnector savers modify cable assemblies in seconds, changing them from a standard product to a state-of-the-art push-on assembly.
Push-on adapters are availabe for a variety of connectors and both male and female sexes within the connector series. TNC-type push-on connectors savers are supplied in **full locking**, **locking with non-locking rear nut** and **non-locking** configuration.

## FEATURES:

**REPEATABLE PERFORMANCE**
**SAFE LOCKING MECHANISM***
**REDUCED TEST TIME**

* on Full Locking and Locking Units

**LOW INSERTION LOSS**
**HIGH RETURN LOSS**
**DC- 18.0 GHz per MIL-C-87104/2**
**DC- 11.0 GHz per MIL-C-39012**
**LONG LIFE**

c:/quick98/tnc-push.pm6

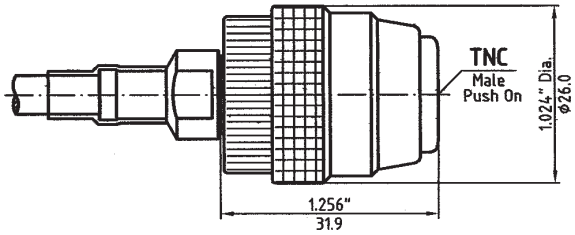
# TNC

# PUSH-ON

## Full Locking DC-18.0 GHz, MIL-C-87104/2

| Connector Part No. | Flexible Cable Type | Cable Code | Connector Code |
|---|---|---|---|
| 4015-TS01-02 | RG-142B/U | 42 | TS |
| 4015-TS02-02 | RG-400/U | 40 | |
| 4017-TS01-02 | RG-214/U | 21 | |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.

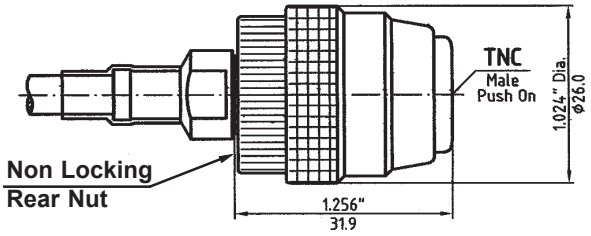



DC-18.0 GHz, MIL-C-87104/2

## Locking with Non-locking Rear Nut

| Connector Part No. | Flexible Cable Type | Cable Code | Connector Code |
|---|---|---|---|
| 4015-TR01-02 | RG-142B/U | 42 | TR |
| 4015-TR02-02 | RG-400/U | 40 | |
| 4017-TR01-02 | RG-214/U | 21 | |

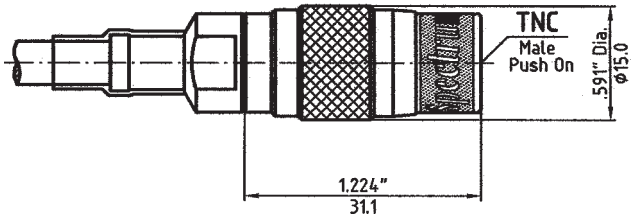
Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.



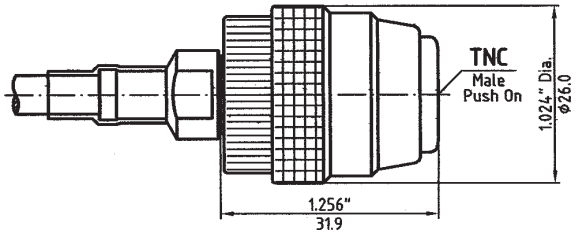

## NON Locking DC-18.0 GHz, MIL-C-87104/2

| Connector Part No. | Flexible Cable Type | Cable Code | Connector Code |
|---|---|---|---|
| 4015-TN01-02 | RG-142B/U | 42 | TN |
| 4015-TN02-02 | RG-400/U | 40 | |
| 4017-TN01-02 | RG-214/U | 21 | |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.




Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per MIL-C-87104/2. For details please refer to the beginning of this section.

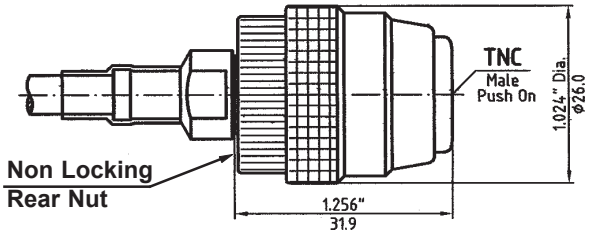



DC-11.0 GHz, MIL-C-39012

## Full Locking

| Connector Part No. | Flexible Cable Type | Cable Code | Connector Code |
|---|---|---|---|
| 4215-TS01-02 | RG-142B/U | 42 | TS3 |
| 4215-TS02-02 | RG-400/U | 40 | |
| 4217-TS01-02 | RG-214/U | 21 | |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.

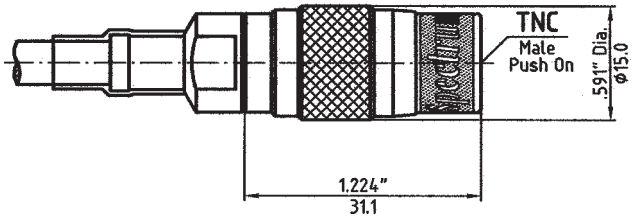



DC-11.0 GHz, MIL-C-39012

## Locking with Non-locking Rear Nut

| Connector Part No. | Flexible Cable Type | Cable Code | Connector Code |
|---|---|---|---|
| 4215-TR01-02 | RG-142B/U | 42 | TR3 |
| 4215-TR02-02 | RG-400/U | 40 | |
| 4217-TR01-02 | RG-214/U | 21 | |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.



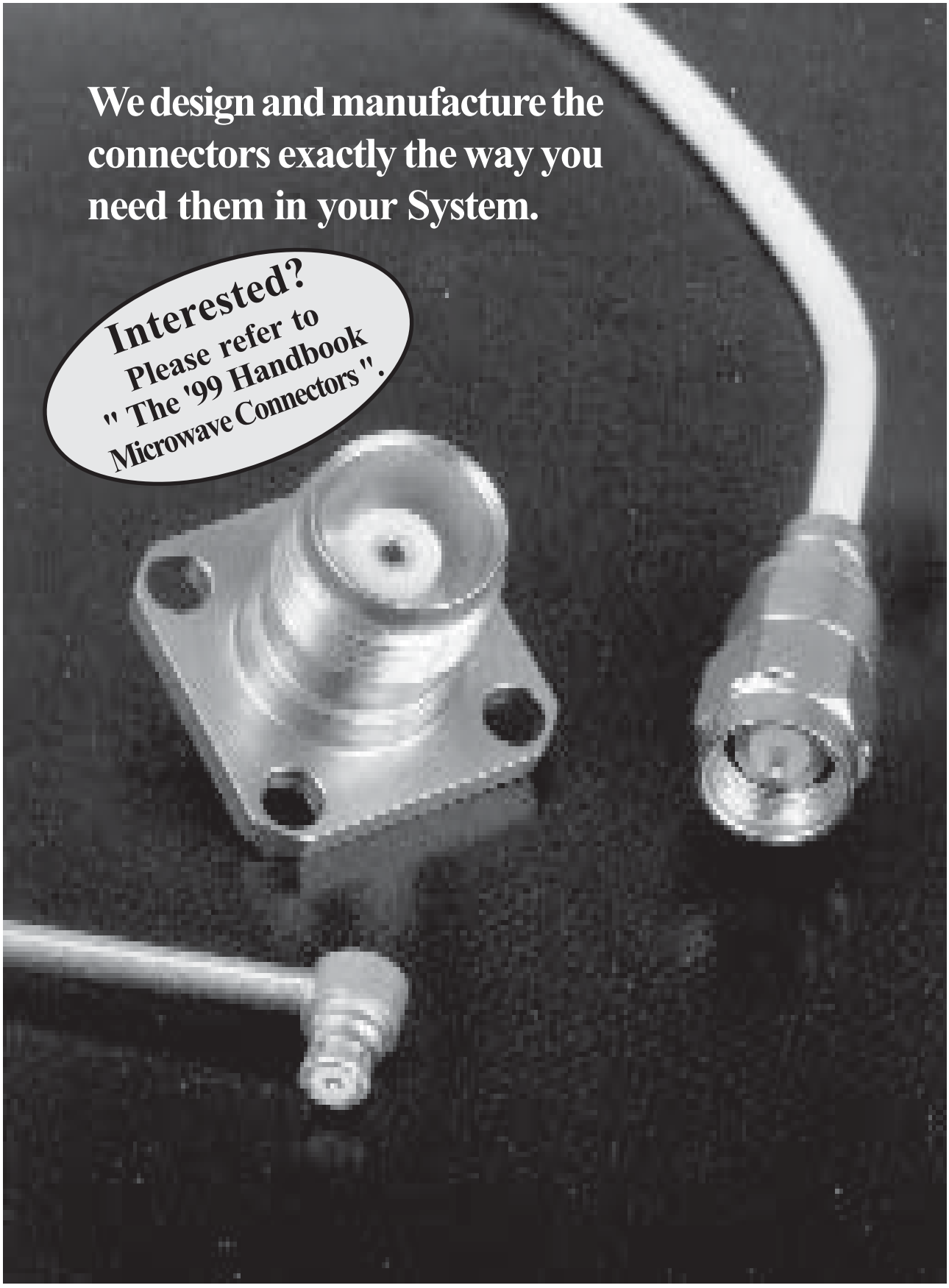

DC-11.0 GHz, MIL-C-39012

## NON Locking

| Connector Part No. | Flexible Cable Type | Cable Code | Connector Code |
|---|---|---|---|
| 4215-TN01-02 | RG-142B/U | 42 | TN3 |
| 4215-TN02-02 | RG-400/U | 40 | |
| 4217-TN01-02 | RG-214/U | 21 | |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.

Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per MIL-C-39012.
For details please refer to the beginning of this section.


We design and manufacture the connectors exactly the way you need them in your System.
Interested?
Please refer to
" The '99 Handbook
Microwave Connectors ".

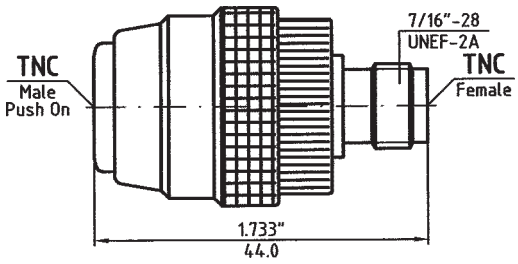
# TNC

# PUSH-ON

## Full Locking DC-18.0 GHz, MIL-C-87104/2

| Adapter Part No. | 8001-TS41-02 |
|---|---|
| Connector Config. | TNC Push-On to TNC-f |
| Frequency Range | DC to 18.0 GHz |
| VSWR | 1.06 + 0.005 x f (GHz) |

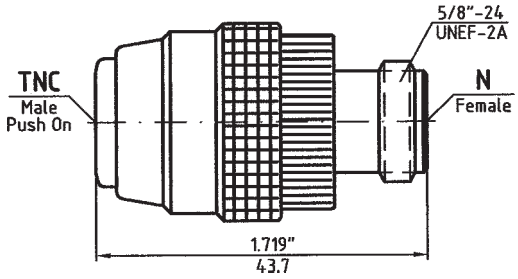
Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.




## Full Locking DC-18.0 GHz, MIL-C-87104/2

| Adapter Part No. | 8001-TS61-02 |
|---|---|
| Connector Config. | TNC Push-On to N-f |
| Frequency Range | DC to 18.0 GHz |
| VSWR | 1.06 + 0.005 x f (GHz) |

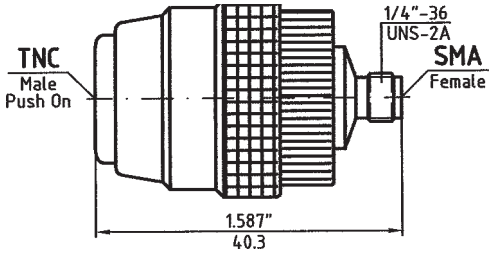
Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.



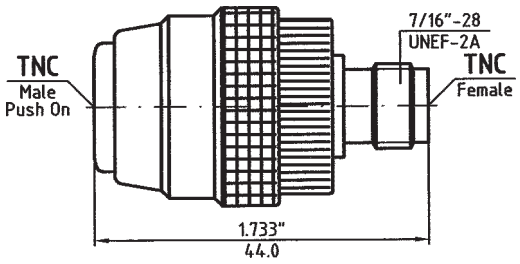

## Full Locking DC-18.0 GHz, MIL-C-87104/2

| Adapter Part No. | 8001-TS21-02 |
|---|---|
| Connector Config. | TNC Push-On to SMA-f |
| Frequency Range | DC to 18.0 GHz |
| VSWR | 1.06 + 0.005 x f (GHz) |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.



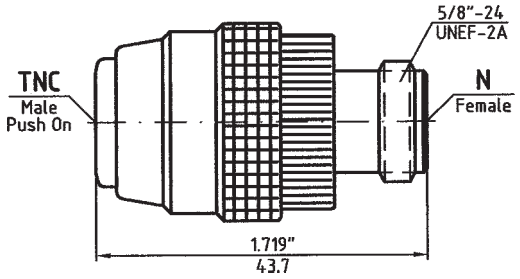

Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per MIL-C 39012, MIL-C-87104/2, MIL-C-3643, MIL-STD-348, IEC-169-7, IEC-457-2, DIN 47 223, DIN 47 226, DIN 47 298, where applicable. For details please refer to the beginning of this section.




DC-11.0 GHz, MIL-C-39012 **Full Locking**

| Adapter Part No. | 8901-TS41-02 |
|---|---|
| Connector Config. | TNC Push-On to TNC-f |
| Frequency Range | DC to 11.0 GHz |
| VSWR | 1.15 : 1 |

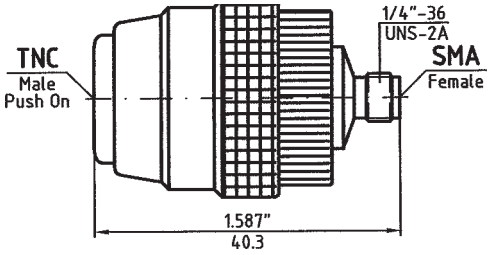
Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.




DC-11.0 GHz, MIL-C-39012 **Full Locking**

| Adapter Part No. | 8901-TS61-02 |
|---|---|
| Connector Config. | TNC Push-On to N-f |
| Frequency Range | DC to 11.0 GHz |
| VSWR | 1.15 : 1 |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.




DC-11.0 GHz, MIL-C-39012 **Full Locking**

| Adapter Part No. | 8901-TS21-02 |
|---|---|
| Connector Config. | TNC Push-On to SMA-f |
| Frequency Range | DC to 11.0 GHz |
| VSWR | 1.15 : 1 |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.

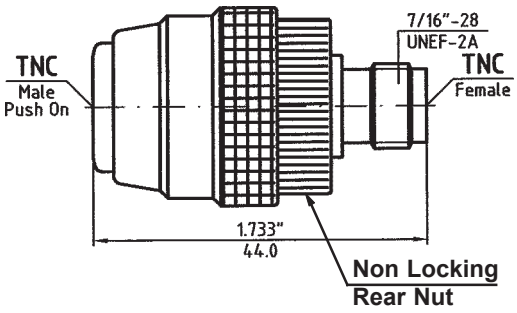
Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per MIL-C 39012, MIL-C-87104/2, MIL-C-3643, MIL-STD-348, IEC-169-7, IEC-457-2, DIN 47 223, DIN 47 226, DIN 47 298, where applicable. For details please refer to the beginning of this section.

DC-18.0 GHz, MIL-C-87104/2

## Locking with Non-locking Rear Nut

| Adapter Part No. | 8001-TL41-02 |
|---|---|
| Connector Config. | TNC Push-On to TNC-f |
| Frequency Range | DC to 18.0 GHz |
| VSWR | 1.06 + 0.005 x f (GHz) |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.

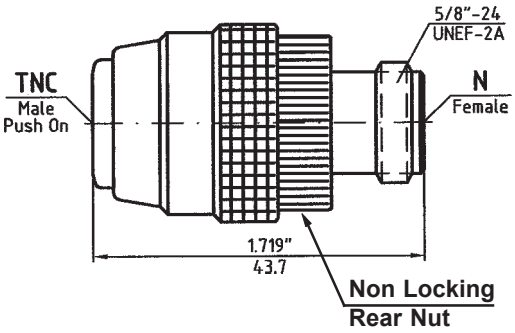



DC-18.0 GHz, MIL-C-87104/2

## Locking with Non-locking Rear Nut

| Adapter Part No. | 8001-TL61-02 |
|---|---|
| Connector Config. | TNC Push-On to N-f |
| Frequency Range | DC to 18.0 GHz |
| VSWR | 1.06 + 0.005 x f (GHz) |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.

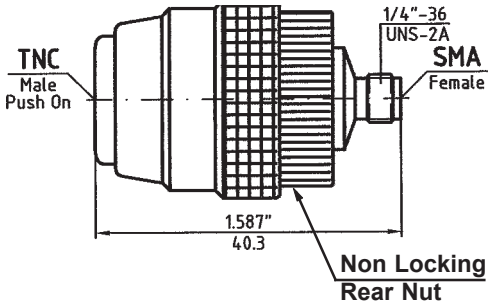



DC-18.0 GHz, MIL-C-87104/2

## Locking with Non-locking Rear Nut

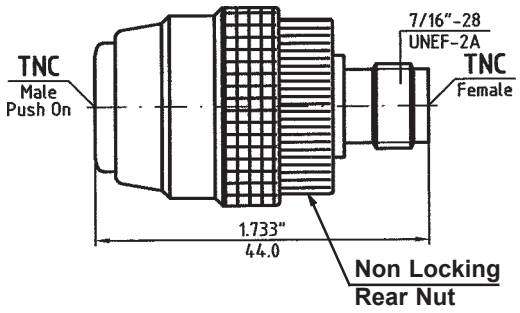
| Adapter Part No. | 8001-TL21-02 |
|---|---|
| Connector Config. | TNC Push-On to SMA-f |
| Frequency Range | DC to 18.0 GHz |
| VSWR | 1.06 + 0.005 x f (GHz) |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.




Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per MIL-C 39012, MIL-C-87104/2, MIL-C-3643, MIL-STD-348, IEC-169-7, IEC-457-2, DIN 47 223, DIN 47 226, DIN 47 298, where applicable. For details please refer to the beginning of this section.

# PUSH-ON Adapters, Type TNC

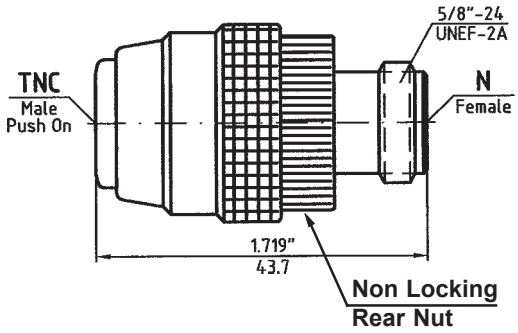



DC-11.0 GHz, MIL-C-39012

## Locking with Non-locking Rear Nut

| Adapter Part No. | 8901-TL41-02 |
|---|---|
| Connector Config. | TNC Push-On to TNC-f |
| Frequency Range | DC to 11.0 GHz |
| VSWR | 1.15 : 1 |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.

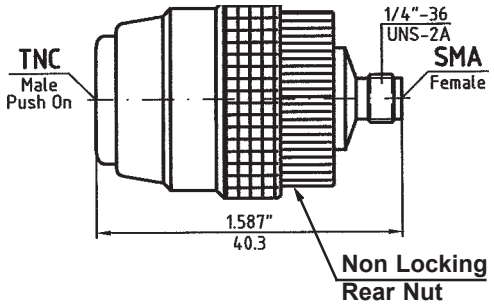



DC-11.0 GHz, MIL-C-39012

## Locking with Non-locking Rear Nut

| Adapter Part No. | 8901-TL61-02 |
|---|---|
| Connector Config. | TNC Push-On to N-f |
| Frequency Range | DC to 11.0 GHz |
| VSWR | 1.15 : 1 |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.




DC-11.0 GHz, MIL-C-39012

## Locking with Non-locking Rear Nut

| Adapter Part No. | 8901-TL21-02 |
|---|---|
| Connector Config. | TNC Push-On to SMA-f |
| Frequency Range | DC to 11.0 GHz |
| VSWR | 1.15 : 1 |

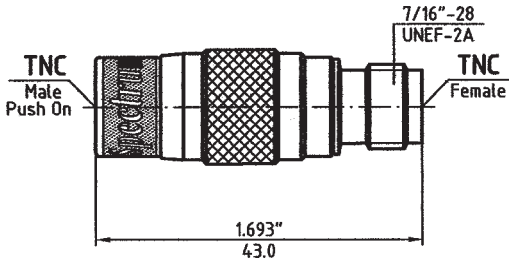
Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.

Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per MIL-C 39012, MIL-C-87104/2, MIL-C-3643, MIL-STD-348, IEC-169-7, IEC-457-2, DIN 47 223, DIN 47 226, DIN 47 298, where applicable. For details please refer to the beginning of this section.

## NON Locking DC-18.0 GHz, MIL-C-87104/2

| Adapter Part No. | 8001-TN41-02 |
|---|---|
| Connector Config. | TNC Push-On to TNC-f |
| Frequency Range | DC to 18.0 GHz |
| VSWR | 1.06 + 0.005 x f (GHz) |

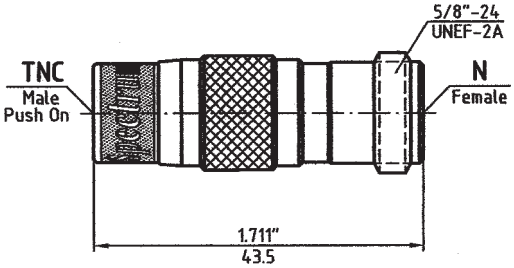
Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.




## NON Locking DC-18.0 GHz, MIL-C-87104/2

| Adapter Part No. | 8001-TN61-02 |
|---|---|
| Connector Config. | TNC Push-On to N-f |
| Frequency Range | DC to 18.0 GHz |
| VSWR | 1.06 + 0.005 x f (GHz) |

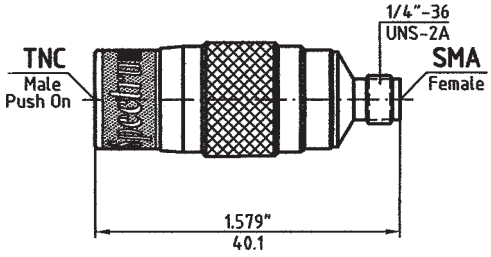
Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.




## NON Locking DC-18.0 GHz, MIL-C-87104/2

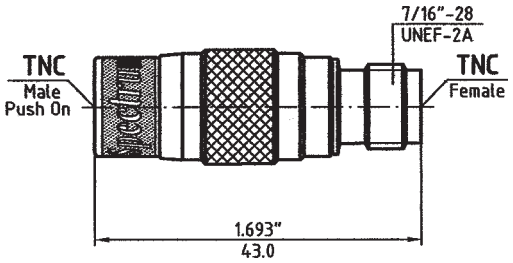
| Adapter Part No. | 8001-TN21-02 |
|---|---|
| Connector Config. | TNC Push-On to SMA-f |
| Frequency Range | DC to 18.0 GHz |
| VSWR | 1.06 + 0.005 x f (GHz) |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.




Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per MIL-C 39012, MIL-C-87104/2, MIL-C-3643, MIL-STD-348, IEC-169-7, IEC-457-2, DIN 47 223, DIN 47 226, DIN 47 298, where applicable. For details please refer to the beginning of this section.

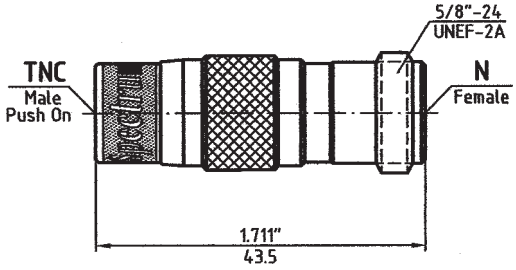
# PUSH-ON Adapters, Type TNC




## DC-11.0 GHz, MIL-C-39012 NON Locking

| Adapter Part No. | 8901-TN41-02 |
|---|---|
| Connector Config. | TNC Push-On to TNC-f |
| Frequency Range | DC to 11.0 GHz |
| VSWR | 1.15 : 1 |

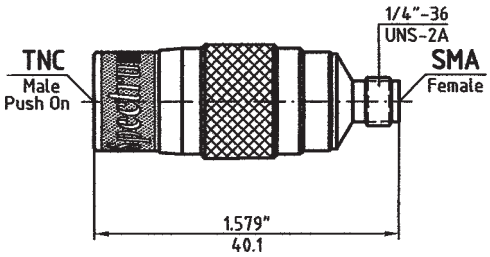
Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.




## DC-11.0 GHz, MIL-C-39012 NON Locking

| Adapter Part No. | 8901-TN61-02 |
|---|---|
| Connector Config. | TNC Push-On to N-f |
| Frequency Range | DC to 11.0 GHz |
| VSWR | 1.15 : 1 |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.




## DC-11.0 GHz, MIL-C-39012 NON Locking

| Adapter Part No. | 8901-TN21-02 |
|---|---|
| Connector Config. | TNC Push-On to SMA-f |
| Frequency Range | DC to 11.0 GHz |
| VSWR | 1.15 : 1 |

Connector outer conductor is passivated stainless steel.
Center conductor is gold plated.

Dimensions shown are inches over millimeters. Standard units have stainless steel finish (last two digits of the P/N are -02). Interfaces are per MIL-C 39012, MIL-C-87104/2, MIL-C-3643, MIL-STD-348, IEC-169-7, IEC-457-2, DIN 47 223, DIN 47 226, DIN 47 298, where applicable. For details please refer to the beginning of this section.

Spectrum Elektrotechnik GmbH

# Cable Assemblies

# Cable Assemblies

**Introduction:** Cable Assemblies are necessary to interconnect components subsystems and systems.

**Regular Cable Assemblies:** Many cables are available, terminated with a variety of connectors and connector styles. Spectrums "´97 Handbook Cable Assemblies" shows on 176 pages a large number of cables and connectors, satisfying the individual needs.

**Cable assemblies with interchangeable connectors:** The answer to the problem at test stations where test cables are calibrated with the system, and different connector configurations are needed during testing, and a new calibration of the system is not desired, as it would be too time consuming. Cable Assemblies with Interchangeable Connectors consist of Primary Connector Units, fitted to the cable, accepting those Interchangeable Connector Heads. As the Interchangeable Connector Heads have almost identical electrical performance and are of same electrical length, they can be exchanged during testing. If the performance of a Connector Head becomes worn out, it can be replaced in no time, testing can be continued, as the electrical performance remains the same. Basic Connector Units have been developed for the phase stable ANA test cables of types 18 and 22, and as well as for a variety of other test cables Spectrum Elektrotechnik GmbH is offering, such as the high performance cables of types 10, 14, 17, 100 and 140. The Interchangeable Connector Heads are available in most popular connector series, such as 7mm, N, SMA and TNC. All these connector heads are of the same electrical length (except for the short Nf).

**Cable assembly kits with interchangeable connectors:** Cable assemblies with Interchangeable Connectors can be supplied in an instrument case, as a Standard Kit, or a Professional Kit. The Kit contains the cable assembly with the basic connector units, Interchangeable Connector Heads, and torque wrenches.

**Cable assemblies with Push-On Connectors:** In various applications repetitive testing needs to take place. Hundreds, or sometimes even thousands of identical components have to be tested. Using regular connectors means threading on the connector, tightening and torquing, then loosening and disconnecting. This is a very time consuming process, which in some cases may even be longer than the electrical test cycle. Push-On Connectors and Connector Savers were developed to eliminate all the time consuming tightening, torquing and loosening of the connectors during test. The Push-On connector slides directly onto any standard female connector of the same series, allowing quick and easy connection and disconnection. Push-On Connectors are available as locking, locking with non-locking rear nut and non-locking. 50 Ohms Push-On Connectors are available in series 7/16, N, SMA and TNC. For 75 Ohms the Push-Ons were designed in series N and F. Cable assemblies can be terminated directly with Push-On Connectors. Standard cable assemblies can be turned into assemblies with Push-On Connectors by using Push-On Adapters.

**Custom products:** Spectrum Elektrotechnik GmbH is a very innovative company. Our engineers are constantly designing new products, or modifying existing products to customer's requests. Therefore, catalogs will never be complete. If you do not find in our catalogs exactly what you need, please contact our sales or engineering department, or your nearest representative.

Spectrum Elektrotechnik GmbH

# Cable Assemblies





c:/quickc98/cabl-as1.pm6

# Assemblies with Interchangeable Connectors

**INTRODUCTION:** To ensure accurate testing and optimum system performance, the cable assemblies of test stations are always calibrated with the system. One certain cable set will be used, fitted with certain connectors.
It happens then eventually, that a component would need to be included into the test, showing a different connector configuration. Adding a between-series adapter might be an alternative, but would change the electrical length of the setup. Consequence is then usually to change to different test cables, employing the connectors needed, and calibrating the system again.
Or it occurs that a certain test result is doubted, as it is too bad, or too good. Recalibrating the system and retesting is usually the only alternative.

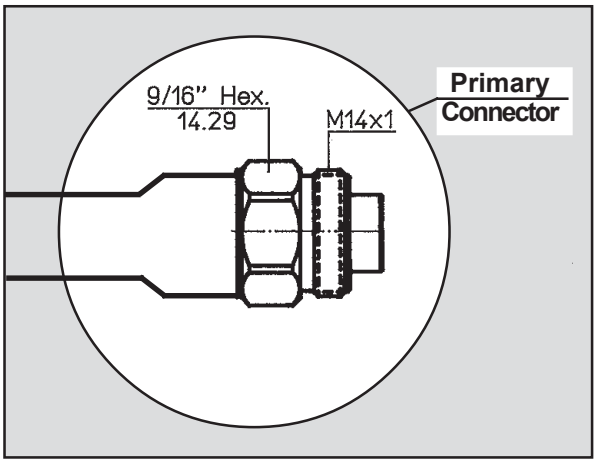
**THE SOLUTION:** The answer is the Cable Assembly using Interchangeable Connectors. A Primary Connector Unit is fitted to the cable, accepting those Interchangeable Connector Series. As the Interchangeable Connector Heads have similar electrical performance and are of same electrical length, they can be changed during testing. If the performance of a Connector Head is questionable, it can be exchanged in no time, and the test results can be compared. A cable assembly can be supplied with the Primary Connector Unit, on one, or both ends. In no time the Interchangeable Connectors can be put on, as needed for the application. Basic Connector Units have been developed for the Phase Stable ANA Test Cables of Types 18 and 22, and as well as for a variety of other Test Cables Spectrum Elektrotechnik GmbH is offering, such as the cables of Types 10, 14, 17, 100 and 140.
The Interchangeable Connector Heads are available in most popular connector series, such as 7mm, N, SMA and TNC. All these connector heads of the different connector series are of the same electrical length (except the short Nf).

**SPECIFYING THE CABLE ASSEMBLY:** For your Cable Assembly you need to specify the Type of cable, as listed on page 231 f.f.. You have to decide then about the connector configuration. You may choose to have the Primary Connector Unit terminated on both ends, or you may decide to have the Primary Connector Unit for the Interchangeable Connectors only on one end and a regular connector on the other side. The codes for regular connectors are listed in The '97 Handbook "Cable Assemblies" on page 174.
General ordering information is shown on page 204.

**THE CABLE ASSEMBLY KIT:** Normally the Cable assembly with Interchangeable Connectors is supplied in an instrument case, as a Standard Kit, or the Professional Kit. It contains also a number of Interchangeable Connectors and a torque wrench. Additional empty spots can be filled with connector heads on separate order, as needed in the individual application.

**CUSTOM PRODUCTS:** Spectrum Elektrotechnik GmbH is a very innovative company. Our engineers are constantly designing new products, or modifying existing products to customer's requests. Therefore, catalogs will never be complete. If you do not find exactly what you need in our catalogs, please contact our sales or engineering department.

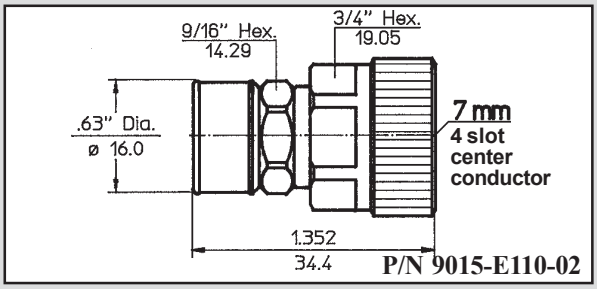
# Assemblies with Interchangeable Connectors



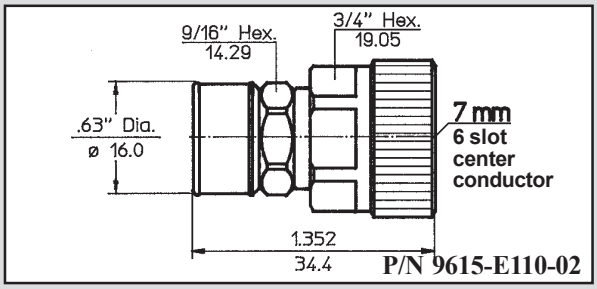

**Primary Connector Unit for Interchangeable Connector Series as supplied with the cable assembly.**

| Type | Sex | Description | Remarks | Connector of equal Electrical Length | Code | Part Number | Finish |
|---|---|---|---|---|---|---|---|
| **7mm** | -- | straight | 4 equally spaced Contact slots | **YES** | **E90** | **9015-E110-02** | passivated Stainless Steel |
| | | | 6 equally spaced Contact slots | **YES** | **E96** | **9615-E110-02** | |
| **N** | Male | straight | | **YES** | **E51** | **3015-E110-02** | passivated Stainless Steel |
| | Female | | | **YES** | **E61** | **3015-E210-02** | |
| | | | Short version | **NO** | **E62** | **3015-E211-02** | |
| **SMA** | Male | straight | Maxi-Nut | **YES** | **E11** | **2015-E110-02** | passivated Stainless Steel |
| | Female | | | **YES** | **E21** | **2015-E210-02** | |
| **TNC** | Male | straight | | **YES** | **E31** | **4015-E110-02** | passivated Stainless Steel |
| | Female | | | **YES** | **E41** | **4015-E210-02** | |

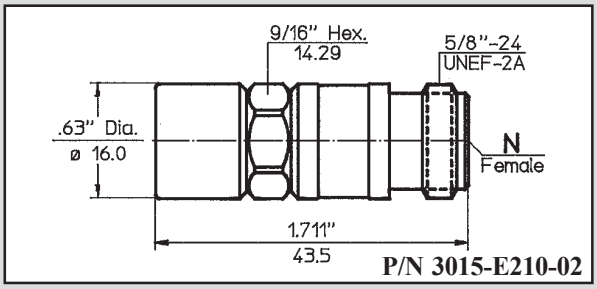
## Interchangeable Connectors of Identical Electrical Lengths



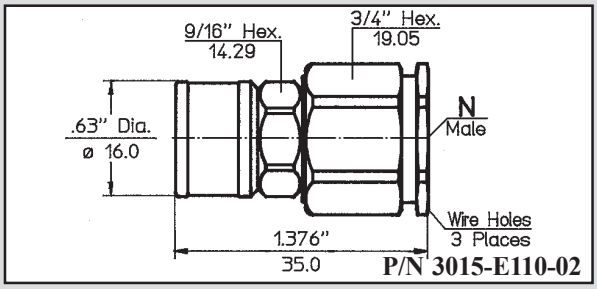

P/N 9015-E110-02




P/N 9615-E110-02




P/N 3015-E210-02

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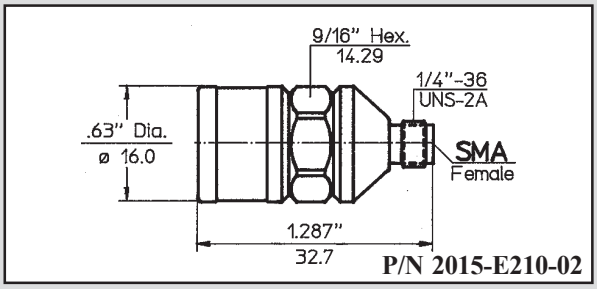
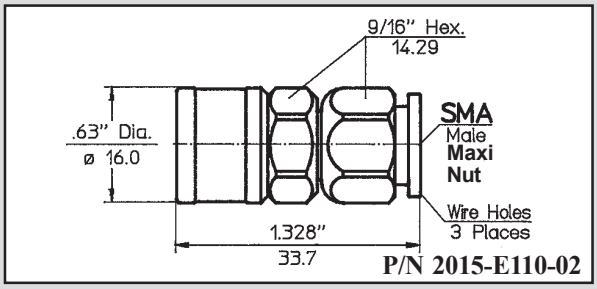
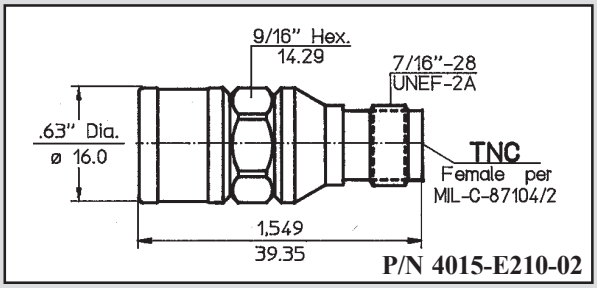


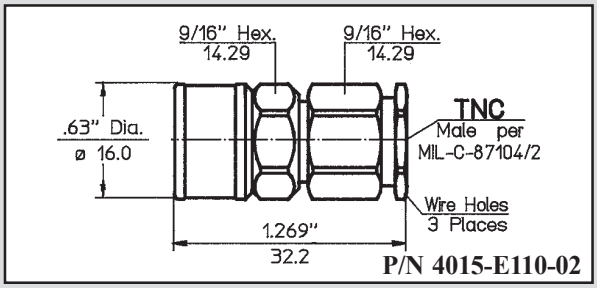

P/N 2015-E210-02



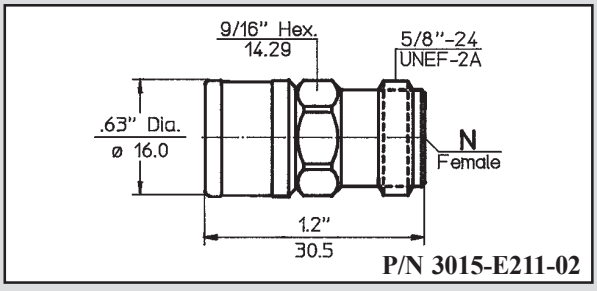

P/N 2015-E110-02




P/N 4015-E210-02




P/N 4015-E110-02




P/N 3015-E211-02

**N female straight**
**Short Version**

**INFORMATION ON HOW TO ORDER INTERCHANGEABLE CONNECTOR ASSEMBLIES:** The customer may order only an assembly, instead of ordering the whole Kit with interchangeable connectors. The table below explains the system and describes the possible alternatives for composing the part number of the cable assembly.

**THE CABLE:** The three letters **ABC** are used to identify the cable by its code. The cable code does not necessarily have to be of three digits, it also can be two digits only.

**THE ARMORING:** For strenuous applications or harsh environment, armoring of the cable may be needed. A variety of armors are available as standard, as outlined in "The ´97 Handbook Cable Assemblies". The Customer may replace the **D** in the part number with the code for the armour requested, or he may rely on Spectrum's suggestions by replacing the ´**D**´ with a temporary code ´**A**´. Spectrum will then change that temporary code ´**A**´ with the appropriate code, describing the armor recommended. For no armor, a ´**Blank**´ will be used.

**THE LENGTH:** The letters **EFGH** are describing the length of the cable in millimeters, from reference plane to reference plane of the connectors. For lengths longer than 9999mm (10m), three digits with a leading ´**d**´ are used to identify the length in decimeters (dm).

Example: For a cable length of 30 meters the length code will be ´d300´.

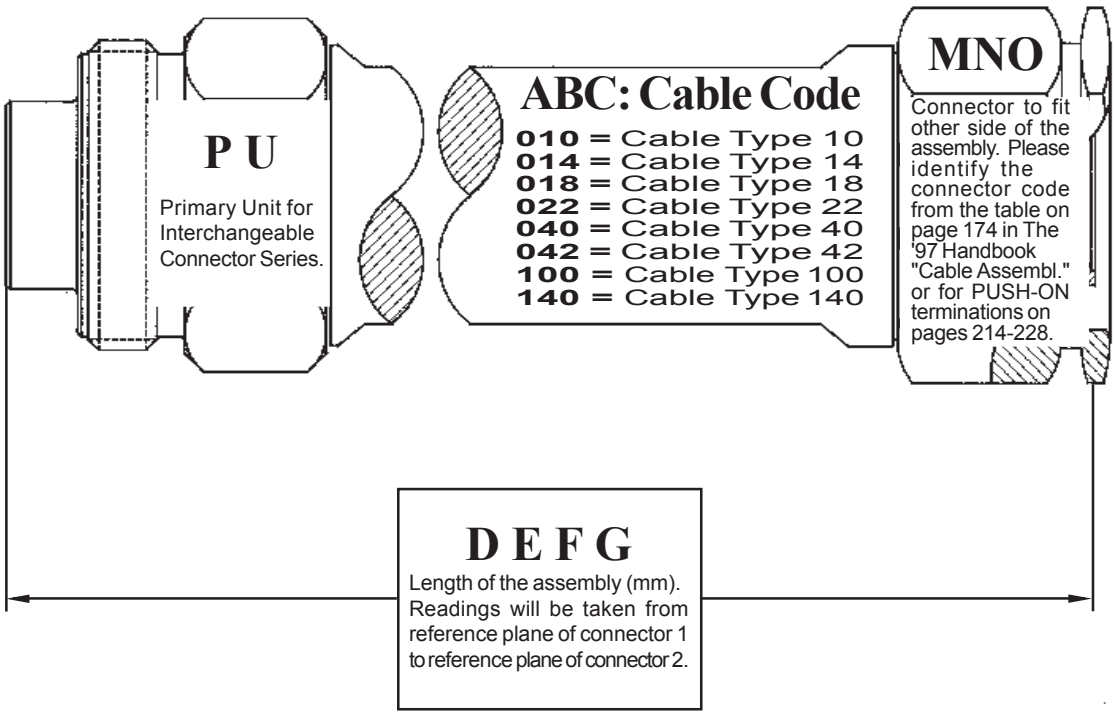
**THE CONNECTORS**: The letters **PU** stand for ´Primary Unit´. They identify that one end of the cable assembly is terminated with the Primary Connector Unit, as necessary to connect with the Interchangeable Connector Heads. The letters **MNO** are to be replaced with the two or three digit code, identifying the connector configuration at the other end of the cable assembly. This end may be terminated with a standard connector. For that connector code, please refer to The '97 Handbook "Cable Assemblies" page 174. If this end of the cable assembly is supposed to be supplied with a Push- On Connector, locking or non-locking, please refer to pages 214 f.f. If a Primary Unit for Interchangeable connectors is required, then replace MNO simply by PU.

| A B C | D | - | E F G H | - | P U | - | M N O |
|---|---|---|---|---|---|---|---|
| **ABC:** to be replaced with the following two or three digit numbers respectively, for the Cable required.<br>**Cable Code**<br>**10 =** Cable Type 10<br>**14 =** Cable Type 14<br>**18 =** Cable Type 18<br>**22 =** Cable Type 22<br>**40 =** Cable Type 40<br>**42 =** Cable Type 42<br>**100 =** Cable Type 100<br>**140 =** Cable Type 140<br>For details on the cables, please refer to pages 231 - 246. | **D:** to be replaced in the part number with the code for the armor requested, or rely on Spectrums' suggestions by replacing the 'D' with an ' A ' . Spectrum will then change the temporary code 'A' with the appropriate code. | | **EFGH:** to be replaced with the length of the cable. Measurements are taken from the reference plane of one connector to the opposite one. | | **PU:** Primary Unit for Interchangeable Connector Series. | | **MNO:** for the standard Connector configuration, please fill in the two or three number/letter Code, describing the Connector. Please refer to The '97 Handbook "Cable Assemblies" page 174.<br>If Push-On Connector is required here as well, please use Codes on pages 214-228. |

# Ordering Details:

**The Part Number Sequence is:**

## ABCD-EFGH-PU-MNO



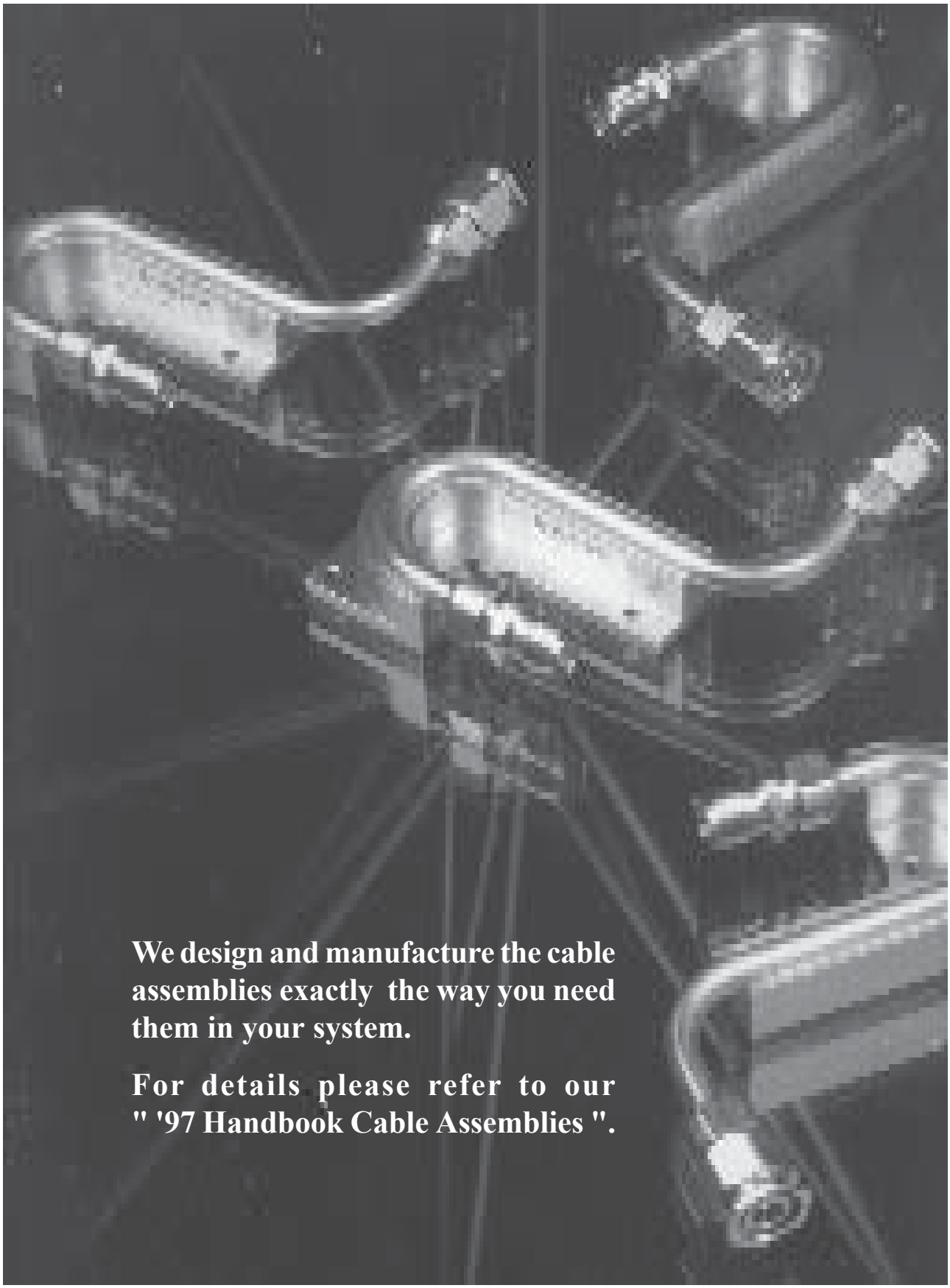

Please refer to page 204 for further explanations on the part number sequence.

For cable assemblies, made to customer specification, or complying to special requirements, the company will issue a special part number.

**Ordering Example:** The cable assembly of Type '22' shall have the length of 75 cm (length is measured from interface to interface). It shall be terminated with a Primary Unit and an N male connector (code from The '97 Handbook "Cable Assemblies" page 174).

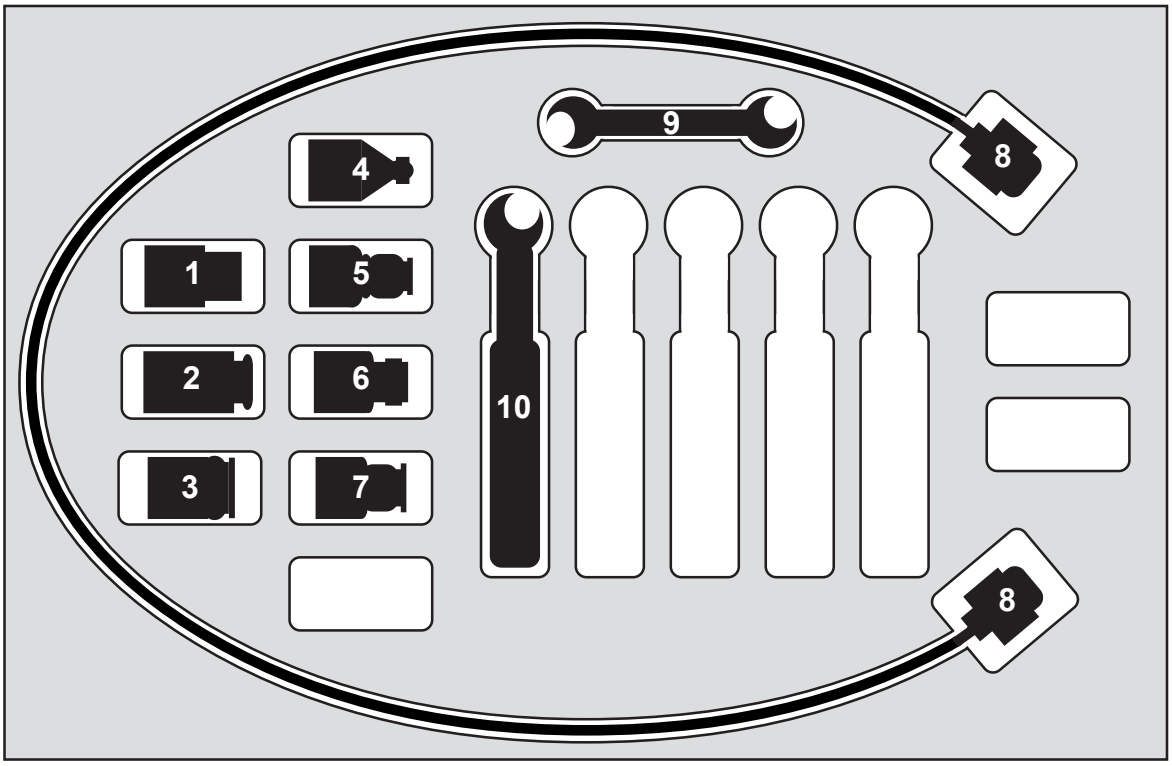
ABC = cable code = 22 - DEFG = length in mm = 0750 - PU and LMN are the connectors = PU and 51.

**Part Number for the cable assembly in this example: 22 - 0750 - PU - 51.**


We design and manufacture the cable assemblies exactly the way you need them in your system.
For details please refer to our " '97 Handbook Cable Assemblies ".

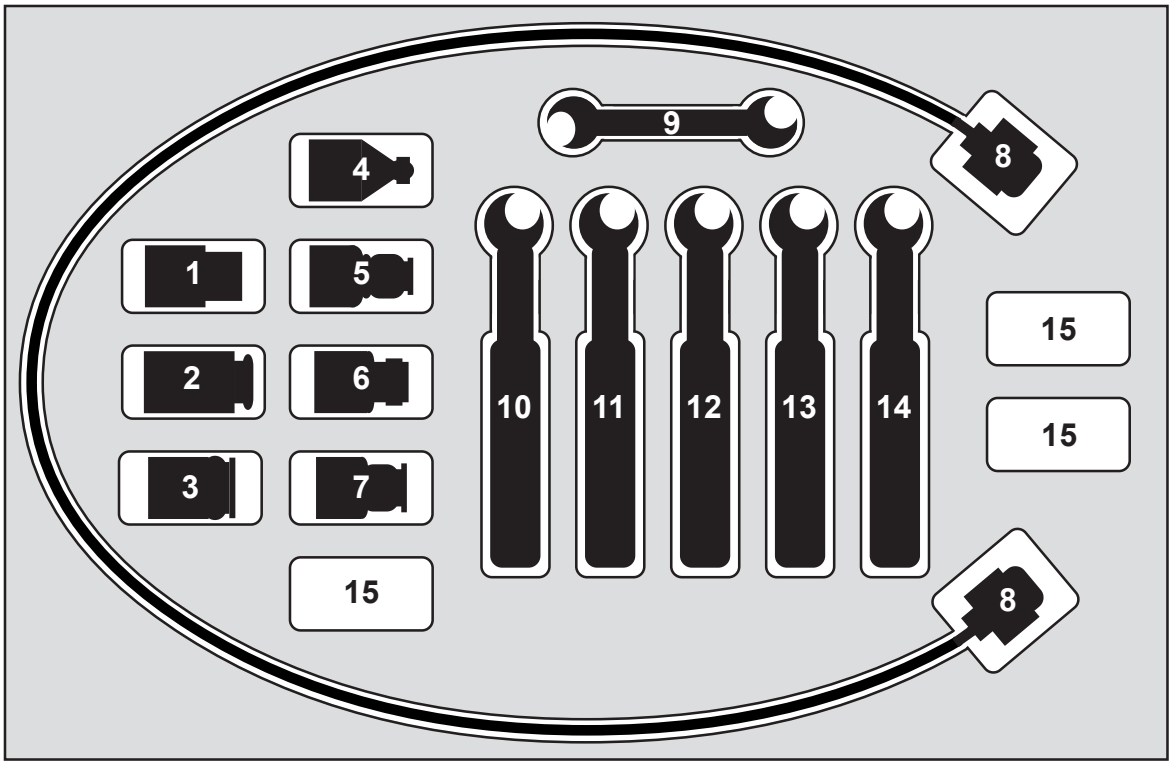
# Cable Assemblies

## Cable Assemblies




# Cable Assembly Kit using Interchangeable Connectors.

| Description of Equipment Provided | | Standard Kit |
|---|---|---|
| 1: | Interchangeable Connector 7mm P/N 9015-E110-02 | |
| 2: | Interchangeable Connector N f P/N 3015-E210-02 | |
| 3: | Interchangeable Connector N m P/N 3015-E110-02 | |
| 4: | Interchangeable Connector SMA f P/N 2015-E210-02 | |
| 5: | Interchangeable Connector SMA m Maxi Nut P/N 2015-E110-02 | |
| 6: | Interchangeable Connector TNC f P/N 4015-E210-02 | |
| 7: | Interchangeable Connector TNC m P/N 4015-E110-02 | |
| 8: | 2 Pcs. Primary Connector supplied with the Cable Assembly | |
| 9: | Double Ended Wrench | |
| 10: | Torque Wrench for Interchangeable Connectors Size: 9/16", P/N: WE - DE01 | |
| | Instrument case | |




# Cable Assembly Kit using Interchangeable Connectors.

## Description of Equipment Provided — Professional Kit

| | | | |
|---|---|---|---|
| 1: | Interchangeable Connector 7mm P/N 9015-E110-02 | 10: | Torque Wrench for Interchangeable Connectors Size: 9/16", P/N: WE - DE01 |
| 2: | Interchangeable Connector N f P/N 3015-E210-02 | | |
| 3: | Interchangeable Connector N m P/N 3015-E110-02 | 11: | Torque Wrench for 7mm Size: 3/4", P/N: WE - D107 |
| 4: | Interchangeable Connector SMA f P/N 2015-E210-02 | 12: | Torque Wrench for N Size: 3/4", P/N: WE - D105 |
| 5: | Interchangeable Connector SMA m Maxi Nut P/N 2015-E110-02 | 13: | Torque Wrench for SMA w/Maxi Nut Size: 9/16", P/N: WE - D103 |
| | | 14: | Torque Wrench for TNC Size: 9/16", P/N: WE - D102 |
| 6: | Interchangeable Connector TNC f P/N 4015-E210-02 | | |
| 7: | Interchangeable Connector TNC m P/N 4015-E110-02 | 15: | Optional Additional Interchangeable Connectors |
| 8: | 2 Pcs. Primary Connector supplied with the Cable Assembly | | Instrument case |
| 9: | Double Ended Wrench | | |

**INFORMATION ON HOW TO ORDER AN INTERCHANGEABLE CONNECTOR ASSEMBLY KIT:**
Spectrum Elektrotechnik GmbH has set up an easy to use part number system. The customer can compose his part number, describing completely the kit he is ordering. The table below explains the system and describes the possible alternatives.

**THE KIT:** Normally the Cable assembly with Interchangeable Connectors is supplied in an instrument case, as a Standard Kit, or the Professional Kit. It contains also a number of Interchangeable Connectors, and a torque wrench. Additional empty spots can be filled with connector heads on separate order, as needed in the individual application.The letter **T** identifies the type of Kit being ordered. Replacing **T** by **S** means ordering the Standard Kit, **P** stands for the Professional Kit, **C** is used when a custom compiled Kit is ordered.

**THE CABLE:** The three letters **ABC** are used to identify the cable by its code. The cable code does not necessarily have to be of three digits, it also can be two digits only.

**THE ARMORING:** For strenuous applications or harsh environment, armoring of the cable may be needed. A variety of armors are available as standard, as outlined in "The ´97 Handbook Cable Assemblies". The Customer may replace the **D** in the part number with the code for the armour requested, or he may rely on Spectrums suggestions by replacing the ´**D**´ with a temporary code ´**A**´. Spectrum will then change that temporary code ´**A**´ with the appropriate code, describing the armor recommended. For no armour, a ´**Blank**´ will be used.

**THE LENGTH:** The letters **EFGH** are describing the length of the cable in millimeters, from reference plane to reference plane of the connectors. For lengths longer than 9999mm (10m), three digits with a leading ´**d**´ are used to identify the length in decimeters (dm).
Example: for a cable length of 30 meters the length code will be ´d300´.

**THE CONNECTORS**: Both ends of the assembly will be terminated with the Primary Unit, as necessary to connect with the Interchangeable Connector Heads. The Interchangeable Connector Heads are available in most popular connector series, such as 7mm, N, SMA and TNC. All these connector heads of the different connector series are of the same electrical length (exception: the short Nf).

| R | T | - | A | B | C | D | - | E | F | G | H |
|---|---|---|---|---|---|---|---|---|---|---|---|

**T:** to be replaced with one of the following letters for the option required.

**S =** Standard Kit
**P =** Professional Kit
**C =** Custom Kit

**ABC:**to be replaced with the following two or three digit numbers respec- tively, for the Cable required.

**Cable Code**
**10 =** Cable Type 10
**14 =** Cable Type 14
**18 =** Cable Type 18
**22 =** Cable Type 22
**40 =** Cable Type 40
**42 =** Cable Type 42
**100 =** Cable Type 100
**140 =** Cable Type 140

For details on the cables, please refer to pages 231 - 246.

**D:** to be replaced in the part number with the code for the armor requested, or rely on Spectrums' suggestions by replacing the 'D' with an 'A'. Spectrum will then change the temporary code 'A' with the appropriate code.

**EFGH:** to be replaced with the length of the cable. Measurements are taken from the reference plane of one connector to the opposite one.

Spectrum Elektrotechnik GmbH

# Cable Assemblies

## Cable Assemblies





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# Assemblies with Push-On Connectors

**INTRODUCTION:** In various applications, especially with test stations, repetitive testing needs to take place. Hundreds, or sometimes even thousands of components have to be tested. Using regular connectors, this means threading on the connector, tightening and torquing, then loosening and disconnecting. This is a very time consuming process, which in most cases is even longer than the electrical test cycle. In applications where only a simple “go/no go” test has to be performed, the time needed for connecting and disconnecting may be ten times longer than the actual test time.

**THE SOLUTION:** The Push-On Connectors and Connector Savers were developed to eliminate all the time consuming tightening, torquing and loosening of the connectors during test. The Push-On connector slides directly onto any standard female connector of the same series, allowing quick and easy connection and disconnection.

**THE LOCKING PUSH-ON:** The Push-On connector is a male connector, and looks almost like a regular male connector, but does not employ thread in the coupling nut, and the coupling nut does not turn. To connect, the lock nut is only to be pushed forward. When released, three bolts are locking the connector safely onto the female thread. To disconnect the lock nut has to be pushed forward again, and kept in that position.

**THE NON-LOCKING PUSH-ON:** The connector does not contain any locking mechanism. A spring finger outer conductor is holding the connector in place. The forces needed for pushing on / pulling off the connector from its mating connector correspond directly to the insertion force / withdrawal force of the spring finger outer conductor. The non-locking Push-On is liked at test stations, where short tests are performed, where data are taken while the hand is still on the connector.

**CONNECTORS AVAILABLE:** 50 Ohms Push-On Connectors are available in series 7/16, N, SMA and TNC. For 75 Ohms the Push-Ons were designed in series N and F. Some of the connectors are available in different versions, such as lockable and non lockable, or for the N-"Double D" connectors, as being used on test equipment, having flats on two sides in parallel and along the thread.

**CABLE ASSEMBLIES:** Cable assemblies can be terminated directly with Push-On Connectors. For certain RG-Cables the customer may purchase the Push-On Connectors and he can then terminate the assemblies himself using standard tools. Assemblies, using Spectrum's special cable, are only available completely terminated, as special tooling is required. On pages **231 - 246** all the cables are listed that can currently be fitted with Push-On connectors. But please always keep in mind that Spectrum Elektrotechnik GmbH is a very innovative company. Our engineers are constantly designing new products, or modifying existing products to customers' requests. Therefore, the catalogs never will be complete.

**CABLE ASSEMBLY PROCEDURES:** For those RG-Cables the customer may purchase the Push-On Connectors for making his own assembly. Cable assembly procedures are listed in "The '98 Handbook Quick Connections", or "The '98 Handbook Microwave Connectors".

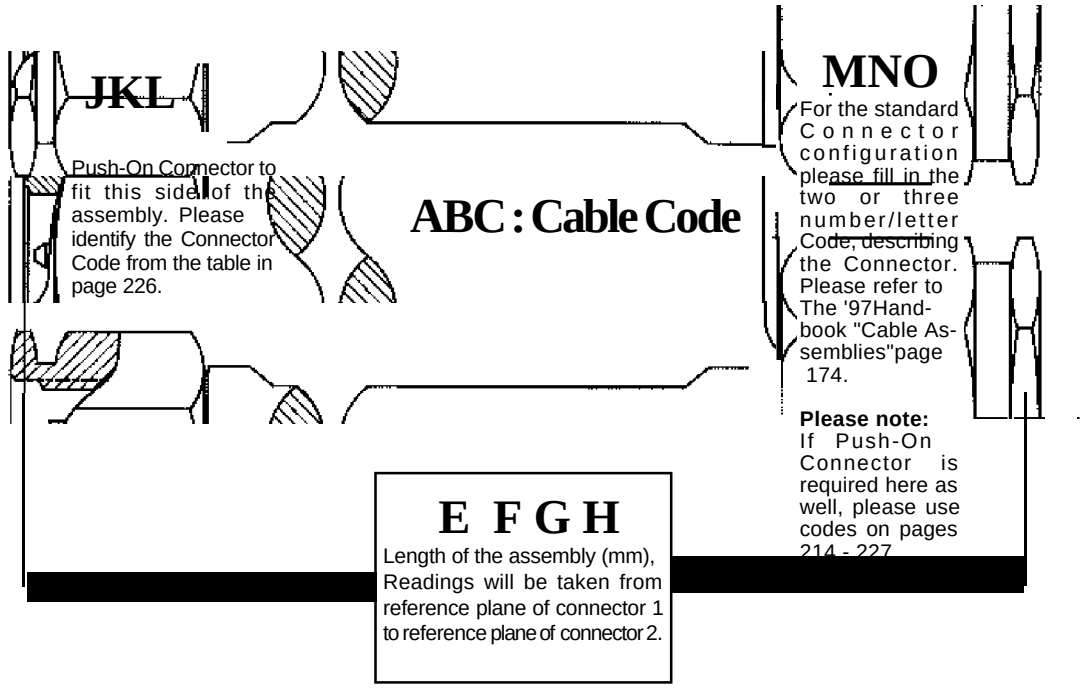
**PUSH-ON ADAPTERS:** If you want to use your existing standard cable assemblies, you can turn them into Assemblies with Push-On Connectors, by using Push-On Adapters. The standard female of the Push-On Adapter threads into the male connector of your assembly.

# Purchasing Information on Quick Connecting Assemblies

## Ordering Details:

**The Part Number Sequence is:**

**ABCD-EFGH-JKL-MNO**




For cable assemblies, made to customer specification, or complying to special requirements, the company will issue a special part number.

**Ordering Example:** The cable assembly of Type '18' shall have the length of 80 cm. It shall be terminated with 'TNC PUSH-ON locking' (Code from page 226) and 'SMA female' - (Code from Page 174 in The '97 Handbook "Cable Assemblies"). Length is from interface to interface.

ABC = cable code = 18 / EFGH = length in mm = 0800 / JKL and MNO are the connectors = TS and 21.

**Part Number for the cable assembly in this example: 18 - 0800 - TS - 21.**

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# Assemblies with Push-On Connectors

## Cable Selection Chart

| Frequency in (GHz) → | 1 | 2 | 3 | 4 | 8 | 12.4 | 15 | 18 | 26.5 | 30 | 40 | 50 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Band** | L | | S | | C | X | KU | | K | KA | | |
| **Cable Type** | Operational Range → | | | | | | | | | | | |
| **14** | (Dia. 7.4mm). | | | | | | | | | 20.0 GHz | | |
| **140** | (Dia. 7.4mm). | | | | | | | | | 20.0 GHz | | |
| **10** | (Dia. 7.0mm). | | | | | | | | | 26.5 GHz | | |
| **100** | (Dia. 5.2mm). | | | | | | | | | 26.5 GHz | | |
| **18** | ANA-Cable (Dia. 6.0mm). | | | | | | | | | 26.5 GHz | | |
| **22** | ANA-Cable (Dia. 9.2mm). | | | | | | | | | 26.5 GHz | | |
| **43** | (Dia. 4.3mm). | | | | | | | | | 26.5 GHz | | |
| **21** | RG-214/U (Dia. 10.8mm). | | | | | 10.0 GHz | | | | | | |
| **42** | RG-142B/U (Dia. 4.95mm). | | | | | | 12.4 GHz | | | | | |
| **40** | RG-400/U (Dia. 4.95mm). | | | | | | 12.4 GHz | | | | | |
| **700** | (Dia. 2.5mm). | | | | | | | | 18.0 GHz | | | |
| **677** | (Dia. 2.3mm). | | | | | | | | 18.0 GHz | | | |
| **17** | (Dia. 2.7mm). | | | | | | | | 18.0 GHz | | | |
| **32** | RD-316/U (Dia. 3.1mm). | | 3.0 GHz | | | | | | | | | |
| **31** | RG-316/U (Dia. 2.5mm). | | 3.0 GHz | | | | | | | | | |
| **78D** | RD-178B/U (Dia. 2.3mm). | | 3.0 GHz | | | | | | | | | |
| **78** | RG-178B/U (Dia. 1.8mm). | | 3.0 GHz | | | | | | | | | |

Increasing Insertion Loss ↓

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Spectrum Elektrotechnik GmbH P.O. Box 45 05 33, 80905 Munich, Germany **Tel. (89) 354 804-0, Fax (89) 354 804-90** (Country Code: 49)

# Ordering Information Assemblies with Push-On Connectors

**GENERAL INFORMATION ON HOW TO ORDER THE PUSH ON ASSEMBLIES:**
Spectrum Elektrotechnik GmbH has set up an easy to use part number system. The customer can compose his part number, describing completely the component he is ordering. The table below explains the system and describes the possible alternatives.

**THE CABLE:** The three letters **ABC** are used to identify the cable by its code. The cable code does not necessarily have to be of three digits, it also can be two digits only.

**THE ARMORING:** For strenuous applications or harsh environment, armoring of the cable may be needed,. A variety of armors are available as standard, as outlined in "The ´97 Handbook Cable Assemblies". The Customer may replace the **D** in the part number with the code for the armor requested, or he may rely on Spectrums' suggestions by replacing the ´**D**´ with a temporary code ´**A**´. Spectrum will then change that temporary code ´**A**´ with the appropriate code, describing the armor recommended.

**THE LENGTH:** The letters **EFGH** are describing the length of the cable in millimeters, from reference plane to reference plane of the connectors.

**THE CONNECTORS**: The letters **JKL** and **MNO** are to be replaced with the two or three digit codes identifying the connector configuration. One end of the cable assembly is usually supplied with a Push-On Connector, either in locking, or non locking configuration. The locking mechanism is preferred where the cable assembly is connected to the device under test and has to remain there safely for some time. For short term testing, when the assembly is only connected for seconds, the non-locking Push-On Connector may be chosen. The other end of the assembly is normally supplied with a regular connector. For the code please refer to The '97 handbook "Cable Assemblies" page 174. The assembly also can be fitted with a second Push-On Connector, if needed.

| A | B | C | D | - | E | F | G | H | - | J | K | L | - | M | N | O |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

**ABC:** to be replaced with the following two or three digit numbers respectively, for the Cable required.

**Cable Code**
**10 =** Cable Type 10
**14 =** Cable Type 14
**18 =** Cable Type 18
**22 =** Cable Type 22
**40 =** Cable Type 40
**42 =** Cable Type 42
**100 =** Cable Type 100
**140 =** Cable Type 140

For details on the cables, please refer to pages 231 - 246.

**D:** to be replaced in the part number with the code for the armor requested, or rely on Spectrums' suggestions by replacing the 'D' with an 'A'. Spectrum will then change the temporary code 'A' with the appropriate code.

**EFGH:** to be replaced with the length of the cable. Measurements are taken from the reference plane of one connector to the opposite one.

**JKL:** to be replaced with the following two or three digit number/letter Code, describing the Push-On Connectors.

**MNO:** for the standdard Connector configuration, please fill in the two or three number/letter Code, describing the Connector. Please refer to The '97 Handbook "Cable Assemblies" page 174.

If Push-On Connector is required here as well, please use Codes on pages 230-243.

**For the connector codes, please refer to pages 230 to 243.**

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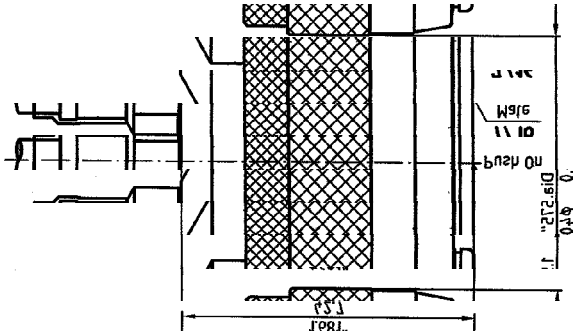
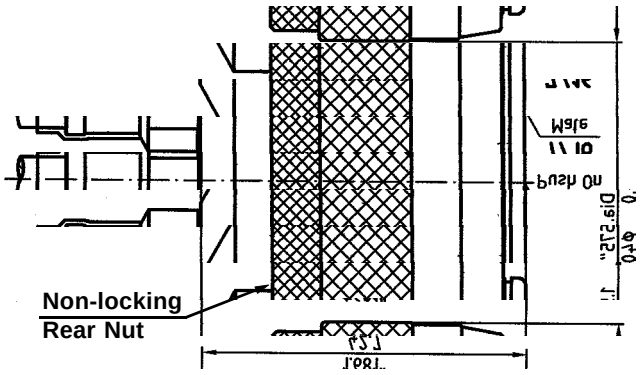
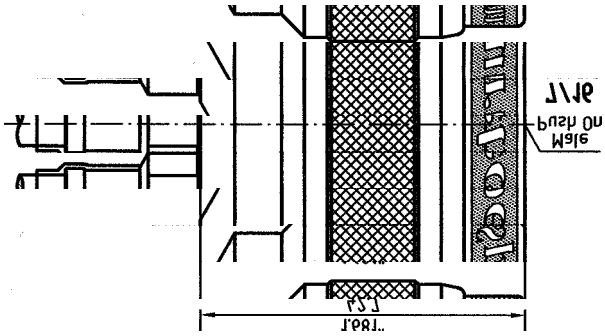
# Cable Assemblies with PUSH-ON Connectors

| Description | Connector Body Material | Connector Code | Outline |
|---|---|---|---|
| **7/16 Push-On Full Locking** | passivated Stainless Steel | **7S** |  |
| | Brass, Silver Plated for lower Intermodulation Products | **7SB** | |
| **7/16 Push-On Locking with Non-locking Rear Nut** | passivated Stainless Steel | **7R** |  |
| | Brass, Silver Plated for lower Intermodulation Products | **7RB** | |
| **7/16 Push-On Non-locking** | passivated Stainless Steel | **7N** |  |
| | Brass, Silver Plated for lower Intermodulation Products | **7NB** | |

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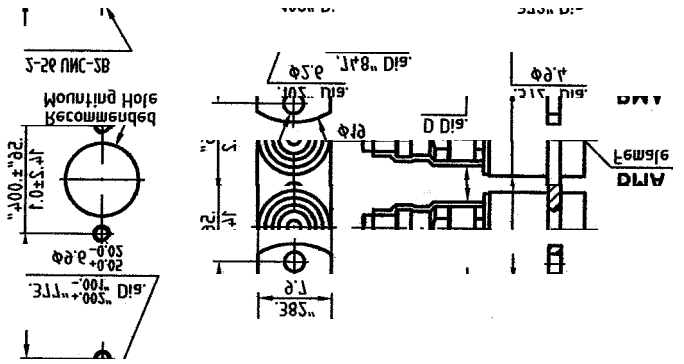
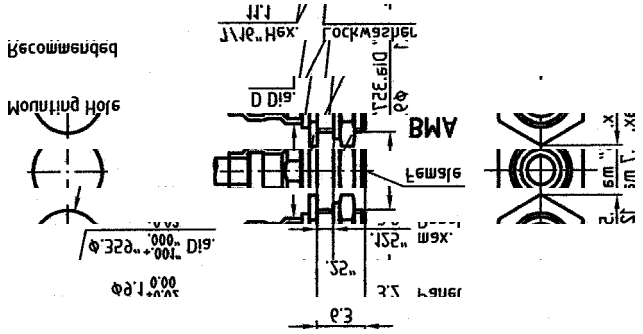
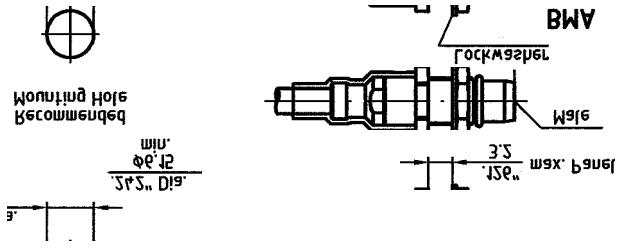
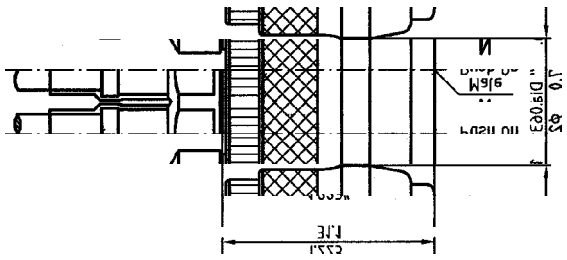
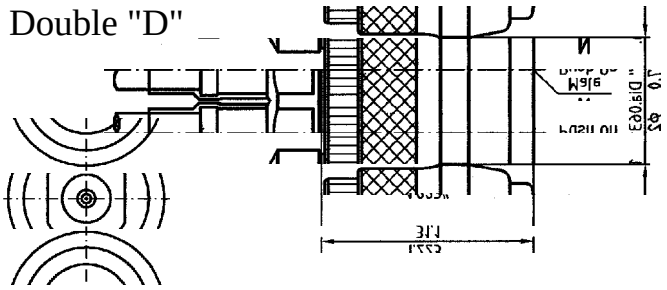
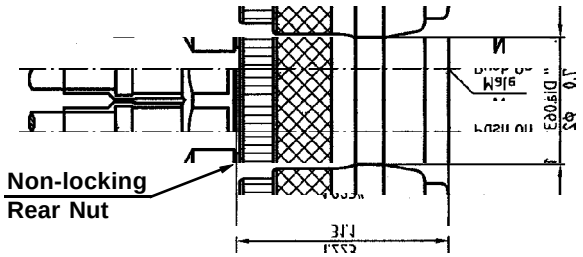
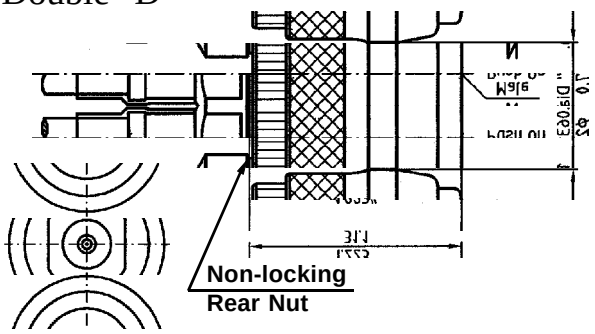
# Cable Assemblies with PUSH-ON Connectors

| Outline | Connector Code | Connector Body Material | Description |
|---|---|---|---|
|  | **BF** | passivated Stainless Steel | **BMA Female Floating Rear Mount** |
|  | **BB** | passivated Stainless Steel | **BMA Female Bulkhead Feedthrough** |
|  | **BM** | passivated Stainless Steel | **BMA Male** |
|  | **NS** | passivated Stainless Steel | **N Push-On Full Locking** |
| | **NSB** | Brass, Silver Plated for lower Intermodulation Products | |

# Cable Assemblies with PUSH-ON Connectors

Spectrum Elektrotechnik GmbH

| Description | Connector Body Material | Connector Code | Outline |
|---|---|---|---|
| **N Push-On Full Locking** | passivated Stainless Steel | **NDS** | Double "D"  |
| | Brass, Silver Plated for lower Intermodulation Products | **NDB** | |
| **N Push-On Locking with Non-locking Rear Nut** | passivated Stainless Steel | **NL** |   |
| | Brass, Silver Plated for lower Intermodulation Products | **NLB** | |
| | passivated Stainless Steel | **NDL** | Double "D"   |
| | Brass, Silver Plated for lower Intermodulation Products | **NDC** | |

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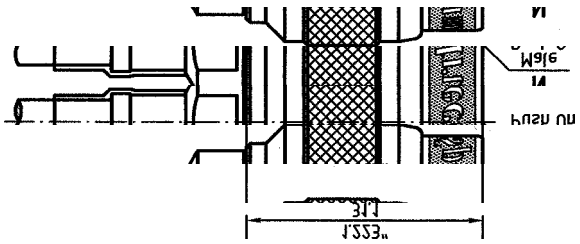
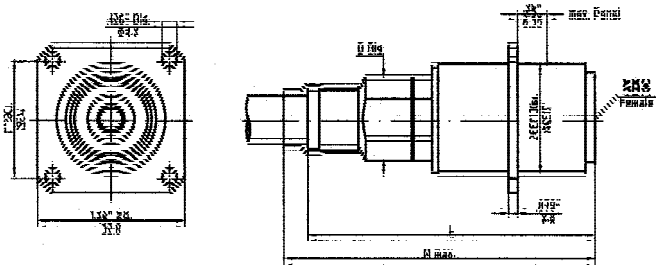
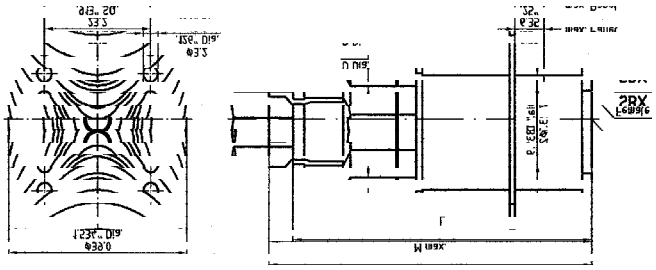
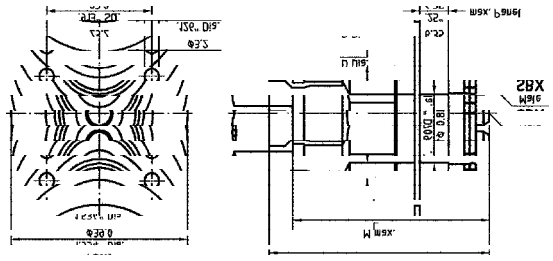
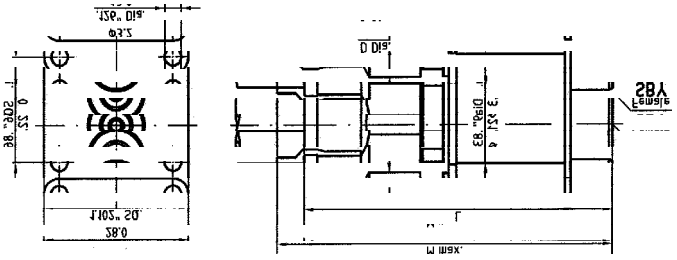
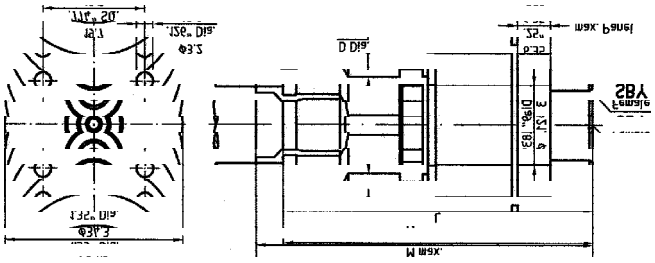
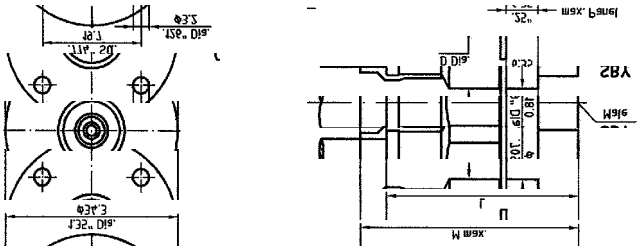
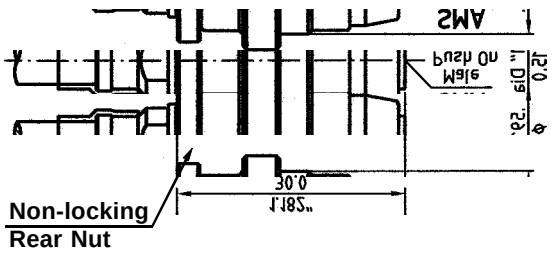
# Cable Assemblies with PUSH-ON Connectors

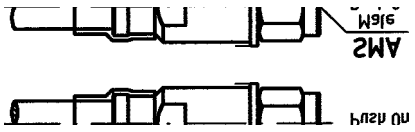
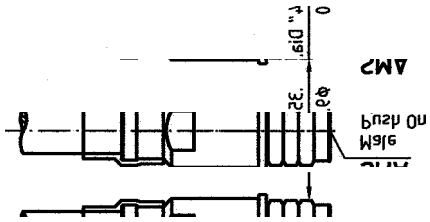
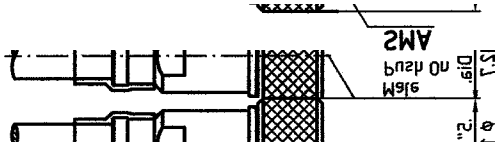
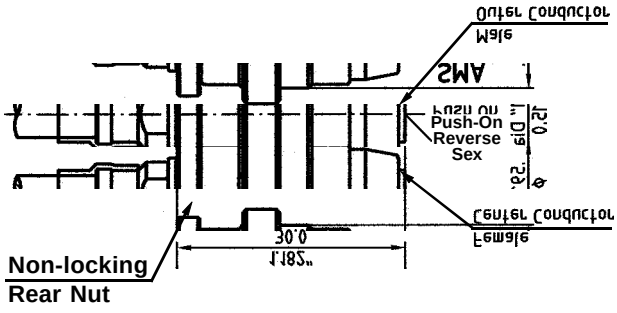
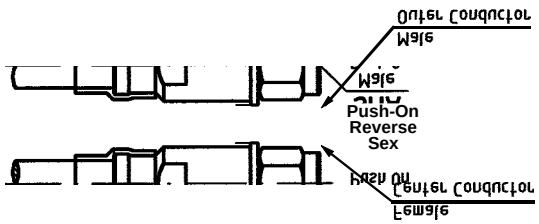
| Outline | Connector Code | Connector Body Material | Description |
|---|---|---|---|
|  | **NN** | passivated Stainless Steel | **N Push-On Non-locking** |
| | **NNB** | Brass, Silver Plated for lower Intermodulation Products | |
|  | **XF4** | passivated Stainless Steel | **SBX Female Float Mount** |
|  | **XFR** | passivated Stainless Steel | |
|  | **XM** | passivated Stainless Steel | **SBX Male** |

# Cable Assemblies with PUSH-ON Connectors

Spectrum Elektrotechnik GmbH

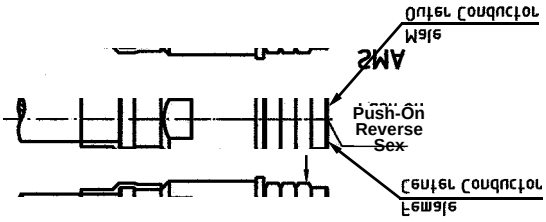
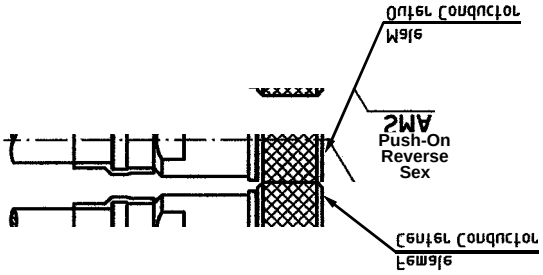
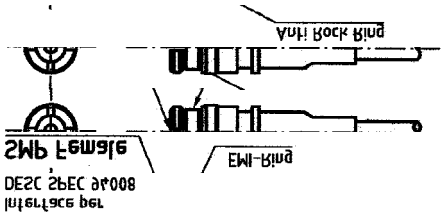
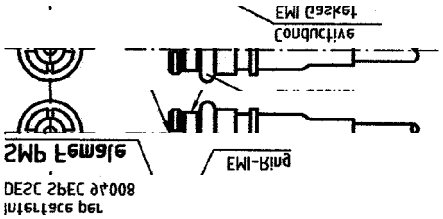
| Description | Connector Body Material | Connector Code | Outline |
|---|---|---|---|
| **SBY Female Float Mount** | passivated Stainless Steel | **YF4** |  |
| | passivated Stainless Steel | **YFR** |  |
| **SBY Male** | passivated Stainless Steel | **YM** |  |
| **SMA Push-On Locking with Non-locking Rear Nut** | passivated Stainless Steel | **SML** |   |

# Cable Assemblies with PUSH-ON Connectors

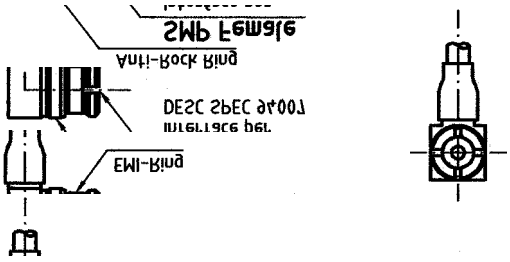
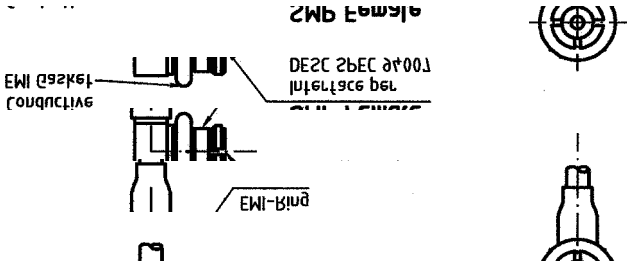
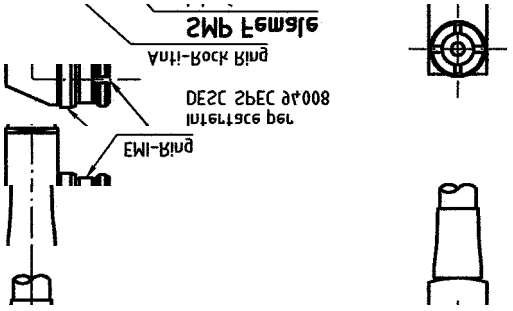
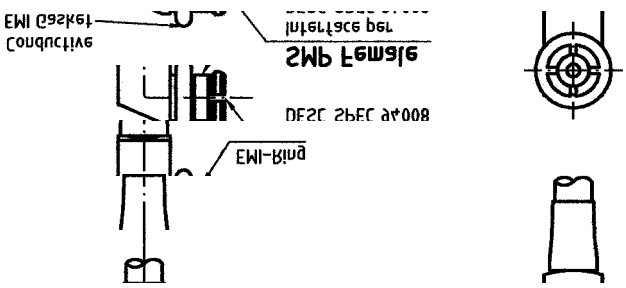
| Outline | Connector Code | Connector Body Material | Description |
|---|---|---|---|
|  | **SM** | passivated Stainless Steel | **SMA Push-On NON-Locking** |
|  | **SMR** | passivated Stainless Steel | |
|  | **SMM** | passivated Stainless Steel | |
|  | **RML** | passivated Stainless Steel | **SMA Reverse Sex Push-On Locking with Non-Locking Rear Nut** |
|  | **RM** | passivated Stainless Steel | **SMA Reverse Sex Push-On Non-locking** |

# Cable Assemblies with PUSH-ON Connectors

Spectrum Elektrotechnik GmbH

| Description | Connector Body Material | Connector Code | Outline |
|---|---|---|---|
| **SMA Reverse Sex Push-On Non-locking** | passivated Stainless Steel | **RMR** |  |
| | passivated Stainless Steel | **RMM** |  |
| **SMP Female DC-26.5 GHz** | Berrylium copper gold plated | **SPE** |  |
| **SMP Female DC-18.0 GHz** | | **SPF** | |
| **SMP Female** | Berrylium copper gold plated | **SPG** |  |

# Cable Assemblies with PUSH-ON Connectors

| Outline | Connector Code | Connector Body Material | Description |
|---|---|---|---|
|  | **SPQ** | Beryllium copper gold plated | **SMP Female Right Angle** |
|  | **SPD** | Beryllium copper gold plated | |
|  | **SPR** | Beryllium copper gold plated | |
|  | **SPC** | Beryllium copper gold plated | |

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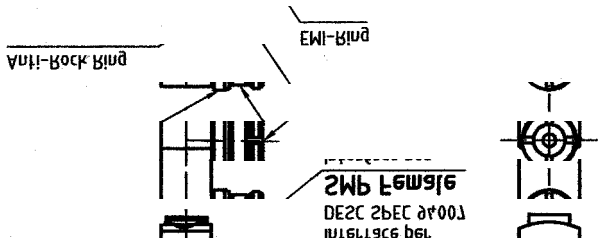
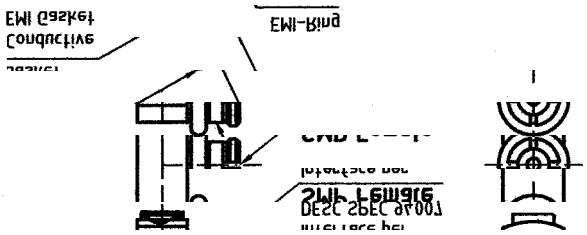
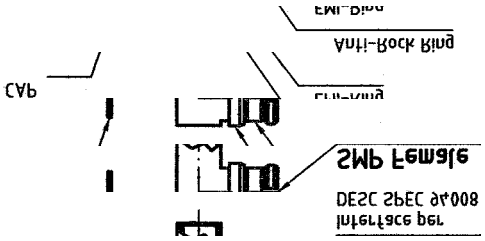
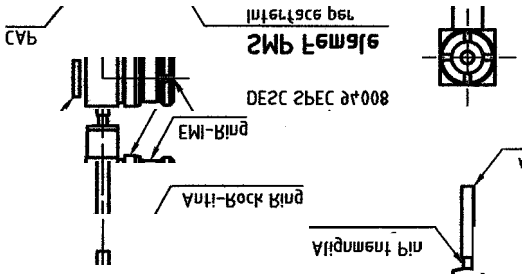
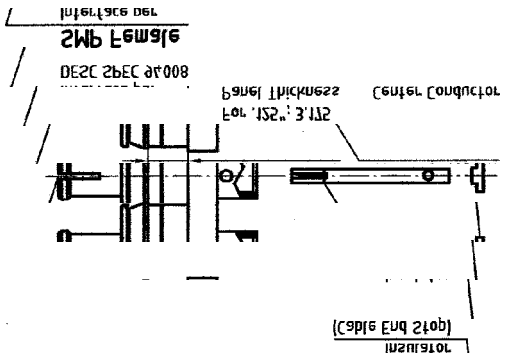
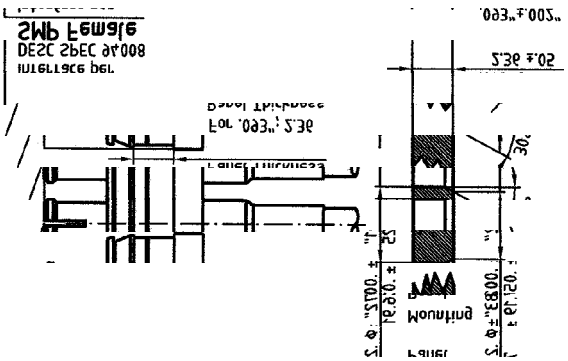
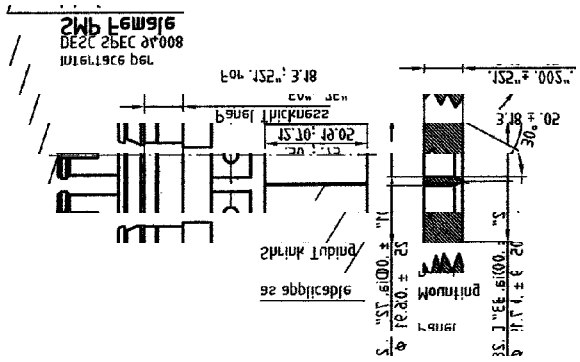
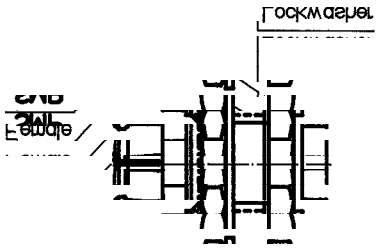
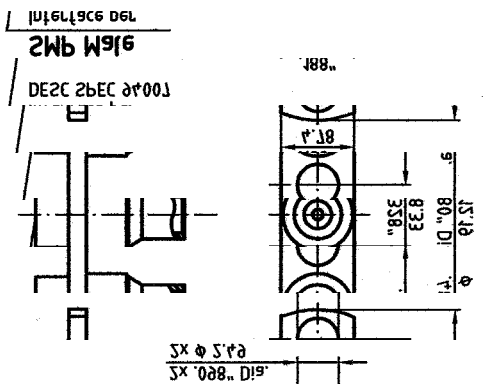
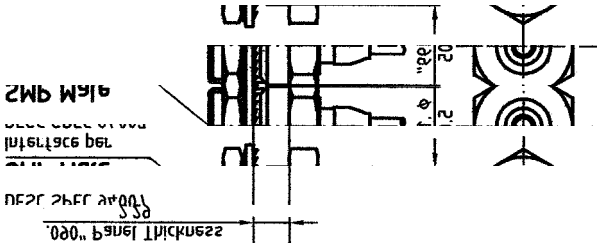
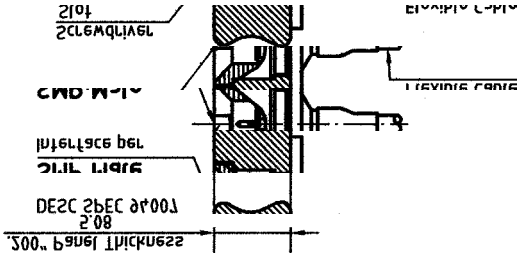
| Description | Connector Body Material | Connector Code | Outline |
|---|---|---|---|
| **SMP Female Right Angle** | Beryllium copper gold plated | **SPA** |  |
| | Beryllium copper gold plated | **SPB** |  |
| | Beryllium copper gold plated | **SPH** |  |
| | Beryllium copper gold plated | **SPJ** |  |

# Cable Assemblies with PUSH-ON Connectors

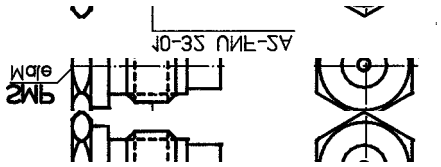
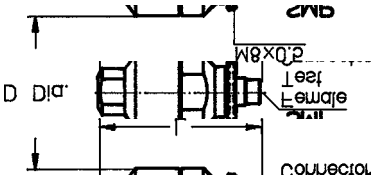
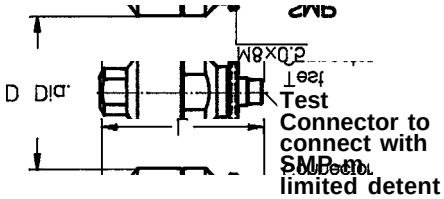
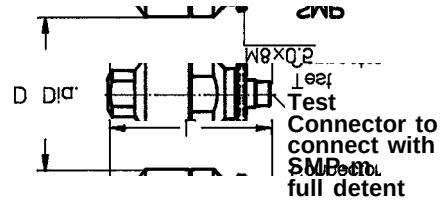
| Outline | Connector Code | Connector Body Material | Description |
|---|---|---|---|
|  | **SPN** | Beryllium copper gold plated | **SMP Female Float Mount** |
|  | **SPP** | Beryllium copper gold plated | |
|  | **SPT** | Beryllium copper gold plated | |
|  | **SPU** | Passivated stainless steel | **SMP Female Float Mount Bulkhead** |

# Cable Assemblies with PUSH-ON Connectors

Spectrum Elektrotechnik GmbH

| Description | Connector Body Material | Connector Code | Outline |
|---|---|---|---|
| **SMP Male Full detent** | Stainless Steel gold plated | **SRF** |  |
| **SMP Male Limited detent** | | **SRL** | |
| **SMP Male Smooth bore** | | **SRS** | |
| **SMP Male Bulkhead Full detent** | Beryllium copper gold plated | **STF** |  |
| **SMP Male Bulkhead Limited detent** | | **STL** | |
| **SMP Male Bulkhead Smooth bore** | | **STS** | |
| **SMP Male Panel Mount** | Beryllium copper gold plated | **SPS** |  |

# Cable Assemblies with PUSH-ON Connectors

| Outline | Connector Code | Connector Body Material | Description |
|---|---|---|---|
|  | **SPW** | Stainless Steel gold plated | **SMP Male Bulkhead** |
|  | **TJ** | passivated Stainless Steel | **SMP Female Test Connector** |
|  | **TJL** | passivated Stainless Steel | **SMP Female Test Connector to connect with SMP-m limited detent** |
|  | **TJF** | passivated Stainless Steel | **SMP Female Test Connector to connect with SMP-m full detent** |

# Cable Assemblies with PUSH-ON Connectors

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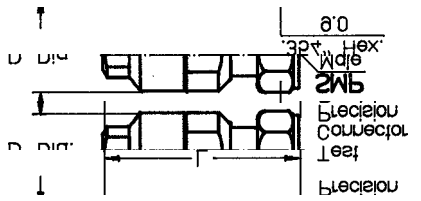
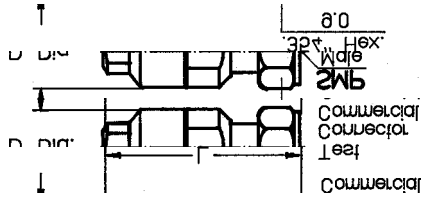
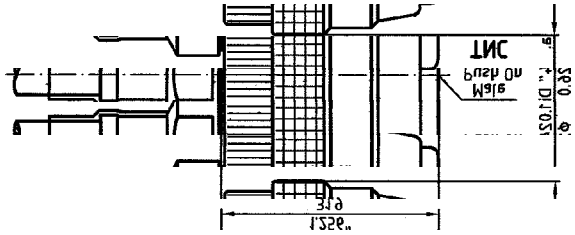
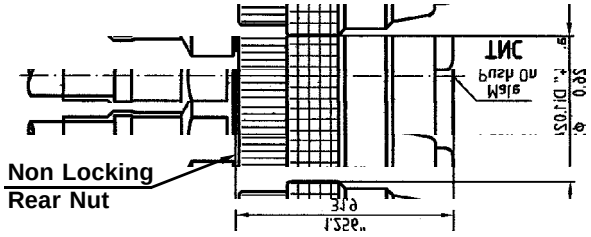
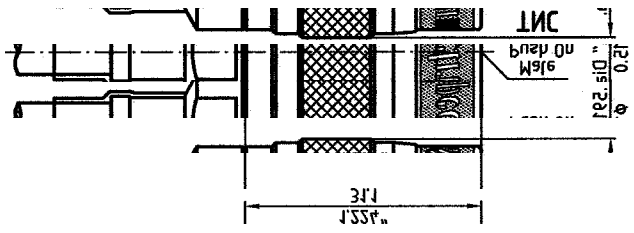
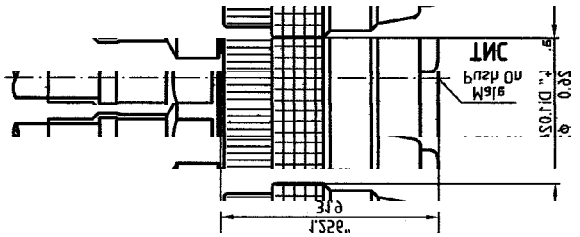
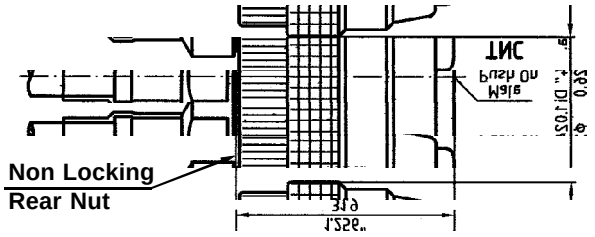
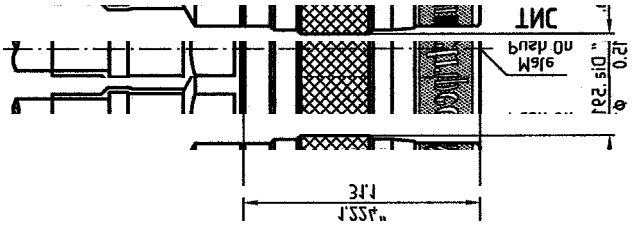
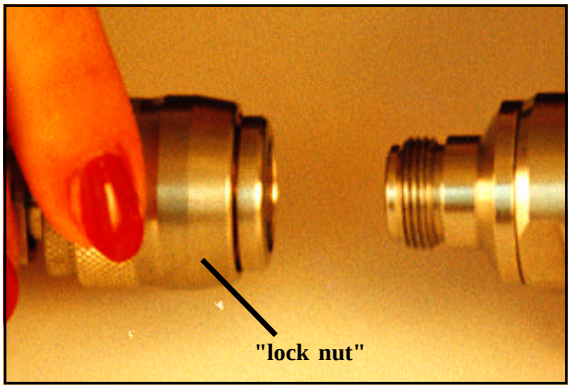
| Description | Connector Body Material | Connector Code | Outline |
|---|---|---|---|
| **SMP Test Connector** | passivated Stainless Steel | **TP** |  |
| | passivated Stainless Steel | **TPC** |  |
| **TNC Push-On Full Locking (18.0 GHz)** | passivated Stainless Steel | **TS** |  |
| **TNC Push-On Locking with Non-locking Rear Nut (18.0 GHz)** | passivated Stainless Steel | **TR** |  |
| **TNC Push-On Non-locking (18.0 GHz)** | passivated Stainless Steel | **TN** |  |

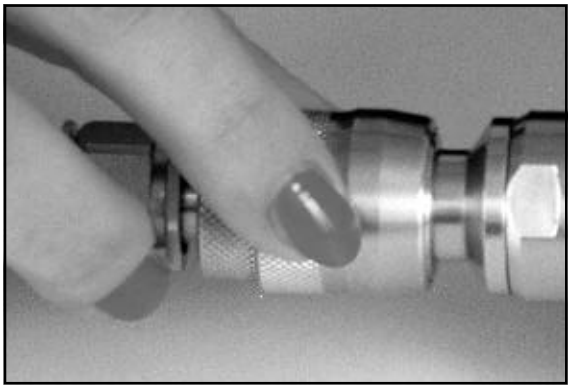
# Cable Assemblies with PUSH-ON Connectors

| Outline | Connector Code | Connector Body Material | Description |
|---|---|---|---|
|  | **TS3** | passivated Stainless Steel | **TNC Push-On Full Locking (11.0 GHz)** |
|   | **TR3** | passivated Stainless Steel | **TNC Push-On Locking with Non-locking Rear Nut (11.0 GHz)** |
|  | **TN3** | passivated Stainless Steel | **TNC Push-On Non-locking (11.0 GHz)** |

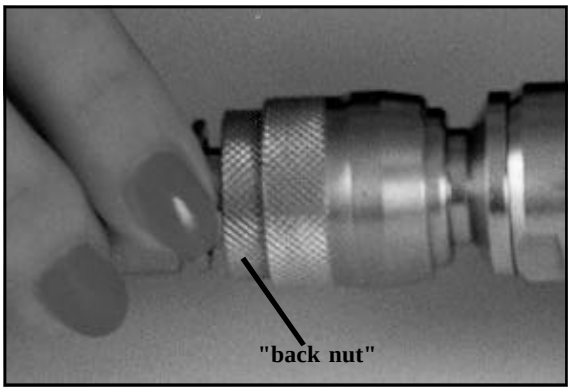
# Lockable PUSH-ONs, Handling Information



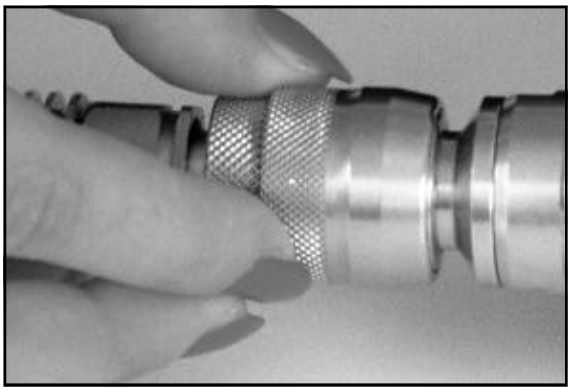

**1.** Place your fingers at the knurls of the "lock nut".



**2.** Push"lock nut" forward and engage the Push-On end of the adapter with the mating standard female. Ensure that back nut is released.




**3.** For operation in an ensured locking mode, push "back nut" onto "lock nut" and tighten.



**4.** To unlock: When "back nut" is in an unlocked mode, push "lock nut" forward and stop reverse movement by setting your fingers down onto the "back nut".

**5.** Pull the Push-On off.

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# Cable Assemblies

## Cable Assemblies

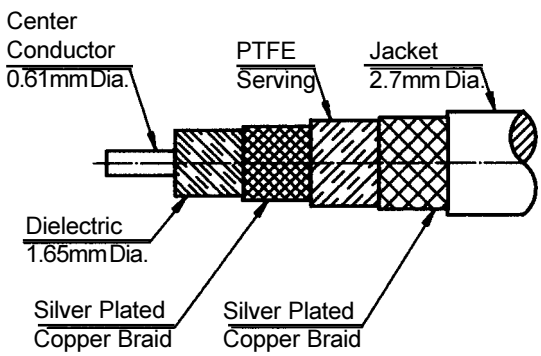
# Cable - Type 17

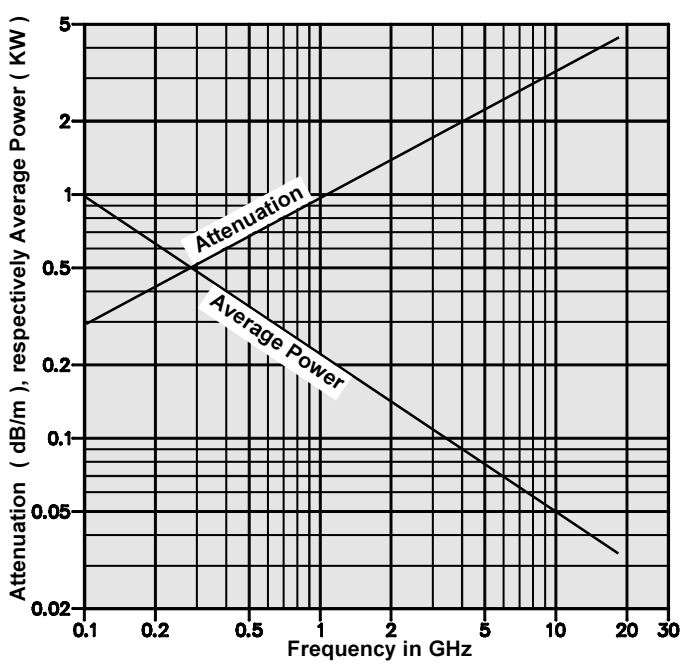
## Flexible as Woolen Yarn
## DC - 18.0 GHz

**Characteristics:**

- Performance to 18.0 GHz.
- Small Diameter.
- Almost no Spring Back; the cable is like Woolen Yarn.
- Better System Performance because of nearly no mechanical interference.
- Procurement for completely terminated assemblies, fully tested. The test documentation for VSWR and Insertion Loss will be supplied with the cable assembly.
- Available connectors: 1.4/4.4, 3.5mm, BMA, K*, N, SMA and TNC.
- For Push - On Connector Code details please refer to page 214 f.f.
- Standard Connector Code details and additional useful information can be derived from: "The '97 Handbook Cable Assemblies".

| SPECIFICATION | | Type 17 |
|---|---|---|
| **Cable Code** | | **17** |
| Frequency Range | | DC 18.0 GHz |
| Outer Diameter in mm | | 2.7 |
| Impedance in Ohms at Sea Level and +25°C | | 50 ± 2 |
| Velocity in %, ± 2% | | 76 |
| Capacitance in pF/m | | 85 |
| Dielectric Strength (60 Hz) in KV rms | | 2.0 |
| Max. Operating Voltage at Sea Level, in KV rms, 60 Hz | | 0.6 |
| Nominal Insertion Loss in dB/m vs. Frequency | 0.5 GHz | 0.64 |
| | 2.0 GHz | 1.30 |
| | 4.0 GHz | 1.90 |
| | 8.0 GHz | 2.67 |
| | 12.4 GHz | 3.40 |
| | 18.0 GHz | 4.20 |
| Nominal CW-Power in Watts, vs. Frequency, at Sea Level and + 20°C | 0.5 GHz | 320 |
| | 2.0 GHz | 140 |
| | 4.0 GHz | 90 |
| | 8.0 GHz | 58 |
| | 12.4 GHz | 46 |
| | 18.0 GHz | 36 |
| RF - Leakage at 18.0 GHz | | -90 dBC |
| Operating Temperature Range | | -54°C to +90°C |
| Outer Conductor Construction | | 2x Silver Plated Copper Braid |
| Outer Jacket | | PTFE |
| Dielectric Diameter in mm | | 1.65 |
| Dielectric Material | | Low Density PTFE |
| Dielectric Constant | | 1.7 |
| Center Conductor Material | | Copper, Silver Plated |
| Center Conductor Dia. in mm | | 0.61 |
| Weight in Gramms (Meter) | | 20 |
| Minimum Bend Radius, Inside, Static (mm) | | 6.0 |
| Minimum Bend Radius, Inside, Dynamic (mm) | | 35.0 |



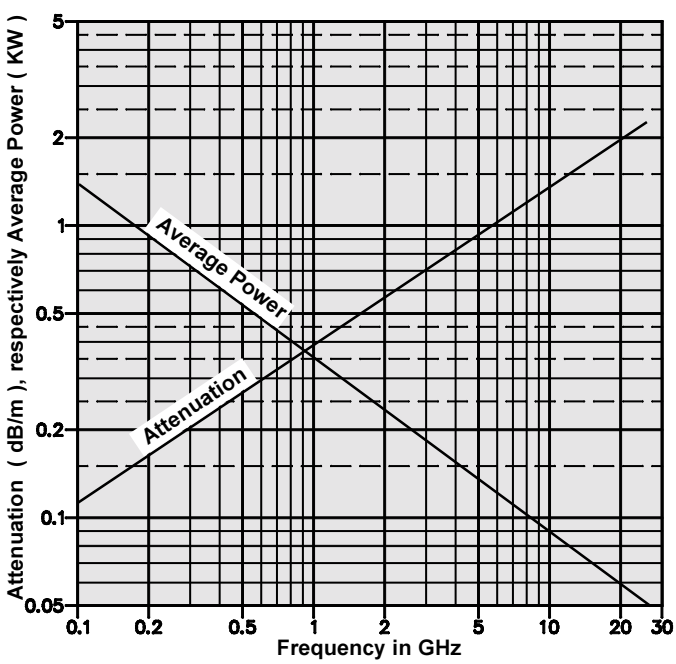



# Cable - Type 18
# ANA - Cable
## DC - 26.5 GHz

**Characteristics:**

- Performance to 26.5 GHz with 2.4mm. Also when terminated with K* or 3.5 mm connectors (mating with SMA).
- Rugged Construction.
- Short delivery; certain lengths with preferred connector styles may be in stock.
- Procurement for completely terminated assemblies, fully tested. The test documentation for VSWR and Insertion Loss will be supplied with the cable assembly.
- Available connectors: 2.4mm, 3.5mm, 7mm, K*, N, SMA, SMP and TNC.
- For Connector Code details please refer to page 203 f.f.
- Additional useful information can be derived from: "The '97 Handbook Cable Assemblies".

The Cable of Type 18 is phase stable, designed for electrical testing at the Vector Network Analyzers of HP and Wiltron. It operates to 26.5 GHz when supplied with connectors of styles 2.4 mm, 2.9mm, or 3.5mm.
One end of the Assembly is usually terminated with a "special" 2.4mm, 2.9mm, or 3.5mm, NMD connector. These connectors are designed with a larger than standard coupling nut for greater stability, mating directly with the RF ports of the Network Analyzers.
The other end of the ANA - Assembly may be terminated with any of the connectors available and needed in the customers test application, mating in direct connection with the device under test. By eliminating expensive adapters the test setup becomes simple and trustworthy.




| SPECIFICATION | | Type 18 |
|---|---|---|
| **Cable Code** | | **18** |
| Frequency Range | | DC - 26.5 GHz |
| Outer Diameter in mm | | 6.0 |
| Impedance in Ohms at Sea Level and +25°C | | 50 ± 2 |
| Velocity in %, ± 2% | | 72 |
| Capacitance in pF/m (nominal) | | 92.5 |
| Dielectric Strength (60 Hz) in KV rms | | 6.0 |
| Max. Operating Voltage at Sea Level, in KV rms, 60 Hz | | 3.0 |
| Nominal Insertion Loss in dB/m vs. Frequency | 1.0 GHz | 0.40 |
| | 10.0 GHz | 1.34 |
| | 18.0 GHz | 1.80 |
| | 26.5 GHz | 2.20 |
| Nominal CW-Power in Watts, vs. Frequency, at Sea Level and + 20°C | 1.0 GHz | 350 |
| | 10.0 GHz | 85 |
| | 18.0 GHz | 60 |
| | 26.5 GHz | 50 |
| RF - Leakage at 1.0 GHz | | -90 dBC |
| Operating Temperature Range | | -55°C +125°C |
| Outer Jacket | | PTFE |
| Dielectric Material | | Low Density PTFE |
| Dielectric Constant | | 1.9 |
| Center Conductor Material | | Silver Plated Copper Clad Steel |
| Weight in Gramms/Meter | | 66 |
| Minimum Bend Radius, Inside, Static (mm) | | 51 |
| Minimum Bend Radius, Inside, | | |

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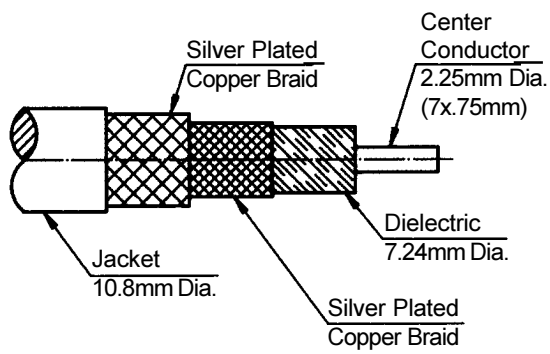
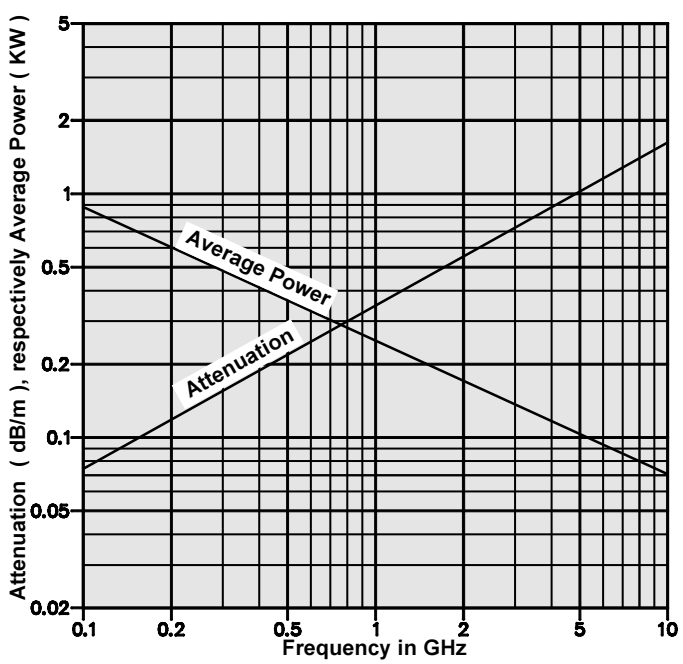
# Cable - Type 21
# RG - 214/U
## DC - 10.0 GHz

**Characteristics:**

- Performance to 10.0 GHz.
- Commercial applications or Test Centers where Insertion Loss and price are of importance.
- Procurement for the raw cable only, or completely terminated assemblies, 100% tested in VSWR and Insertion Loss.
- Available connectors: 7mm, 7/16, HN, N, SBX, SBY, SC, SMA and TNC. For Connector Outline Drawings please refer to Page 131 f.f.
- For Push - On Connector Code details please refer to page 214 f.f.
- Standard Connector Code details and additional useful information can be derived from: "The '97 Handbook Cable Assemblies".

| SPECIFICATION | | Type 21 |
|---|---|---|
| **Cable Code** | | 21 |
| Frequency Range | | DC 10.0 GHz |
| Outer Diameter in mm | Standard | 10.8 |
| | Armored | See Pages 18 - 19 |
| Impedance in Ohms at Sea Level and +25°C | | 50 ± 2 |
| Velocity in %, ± 2% | | 65.9 |
| Capacitance in pF/m | | 106 |
| Dielectric Strength (60 Hz) in KV rms | | 10.0 |
| Max. Operating Voltage at Sea Level, in KV rms, 60 Hz | | 3.7 |
| Nominal Insertion Loss in dB/m vs. Frequency | 0.5 GHz | 0.22 |
| | 2.0 GHz | 0.55 |
| | 4.0 GHz | 0.86 |
| | 8.0 GHz | 1.39 |
| | 10.0 GHz | 1.60 |
| Nominal CW-Power in Watts, vs. Frequency, at Sea Level and + 20°C | 0.5 GHz | 370 |
| | 2.0 GHz | 180 |
| | 4.0 GHz | 120 |
| | 8.0 GHz | 80 |
| | 10.0 GHz | 70 |
| RF - Leakage at 10.0 GHz | | -90 dBC |
| Operating Temperature Range | | -40°C to +85°C |
| Outer Conductor Construction | | 2x Silver Plated Copper Braid |
| Outer Jacket | | PVC |
| Dielectric Diameter in mm | | 7.24 |
| Dielectric Material | | PE |
| Dielectric Constant | | 2.3 |
| Center Conductor Material | | Silver Plated stranded copper |
| Center Conductor Dia. in mm | | 2.25 |
| Weight in Gramms/Meter | | 209 |
| Minimum Bend Radius, Inside, Static (mm) | | 55 |
| Minimum Bend Radius, Inside, Dynamic (mm) | | 165 |

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# Cable - Type 22
# ANA - Cable
## DC - 26.5 GHz

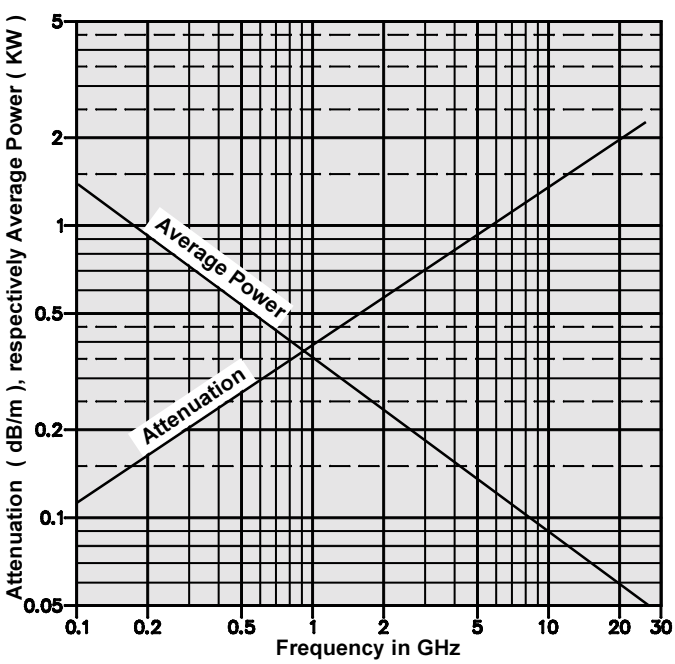
**Characteristics:**

- Performance to 26.5 GHz with 2.4mm. Also when terminated with K* or 3.5 mm connectors (mating with SMA).
- Rugged Construction.
- Procurement for completely terminated assemblies, fully tested. The test documentation for VSWR and
- Insertion Loss will be supplied with the cable assembly.
- Available connectors: 2.4mm, 3.5mm, 7mm, K*, N, SMA, SMP and TNC.
- For Push - On Connector Code details please refer to page 214 f.f.
- Standard Connector Code details and additional useful information can be derived from: "The '97 Handbook Cable Assemblies".

The Cable of Type 22 is phase stable, designed for electrical testing at the Vector Network Analyzers of HP and Wiltron. It is similar to the cable of type 18, but armoured for harsh environment. It operates to 26.5 GHz when supplied with connectors of styles 2.4 mm, 2.9mm, or 3.5mm.

One end of the Assembly is usually terminated with a "special" 2.4mm, 2.9mm, or 3.5mm, NMD connector. These connectors are designed with a larger than standard coupling nut for greater stability, mating directly with the RF ports of the Network Analyzers.

The other end of the ANA - Assembly may be terminated with any of the connectors available and needed in the customers test application, mating in direct connection with the device under test. By eliminating expensive adapters the test setup becomes simple and trustworthy.




| SPECIFICATION | | Type 22 |
|---|---|---|
| **Cable Code** | | **22** |
| Frequency Range | | DC - 26.5 GHz |
| Outer Diameter in mm | | 9.2 |
| Impedance in Ohms at Sea Level and +25°C | | 50 ± 2 |
| Velocity in %, ± 2% | | 72 |
| Capacitance in pF/m (nominal) | | 92.5 |
| Dielectric Strength (60 Hz) in KV rms | | 6.0 |
| Max. Operating Voltage at Sea Level, in KV rms, 60 Hz | | 3.0 |
| Nominal Insertion Loss in dB/m vs. Frequency | 1.0 GHz | 0.40 |
| | 10.0 GHz | 1.34 |
| | 18.0 GHz | 1.80 |
| | 26.5 GHz | 2.20 |
| Nominal CW-Power in Watts, vs. Frequency, at Sea Level and + 20°C | 1.0 GHz | 350 |
| | 10.0 GHz | 85 |
| | 18.0 GHz | 60 |
| | 26.5 GHz | 50 |
| RF - Leakage at 1.0 GHz | | -90 dBC |
| Operating Temperature Range | | -55°C +125°C |
| Outer Jacket | | Stainless Steel Armor Silicone Jacketed |
| Dielectric Material | | Low Density PTFE |
| Dielectric Constant | | 1.9 |
| Center Conductor Material | | Silver Plated Copper Clad Steel |
| Weight in Gramms/Meter | | 174 |
| Minimum Bend Radius, Inside, Static (mm) | | 51 |
| Minimum Bend Radius, Inside, | | |

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* 'K' Connector is a trademark of Wiltron

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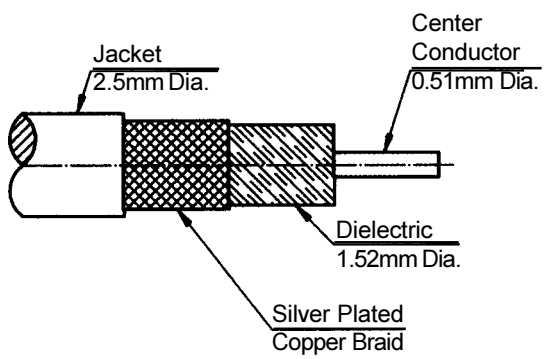
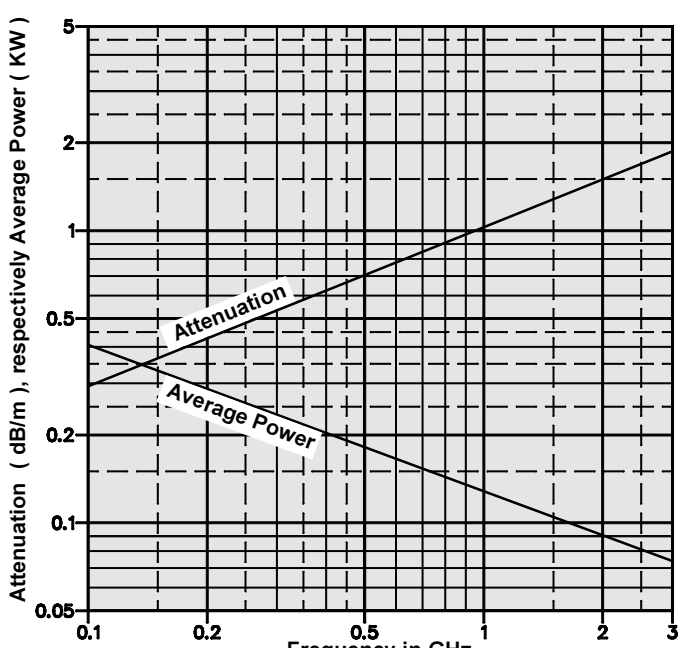
# Cable - Type 31
# RG - 316/U
## DC - 3.0 GHz

**Characteristics:**

- Performance to 3.0 GHz
- Usage in Commercial Systems for low frequency applications.
- Low Price.
- Procurement for the raw cable only, or completely terminated assemblies, 100% tested in VSWR and Insertion Loss.
- Available connectors: 1.8/5.6, SMA, SMP, N and TNC.
- For Push - On Connector Code details please refer to page 214 f.f.
- Standard Connector Code details and additional useful information can be derived from: "The '97 Handbook Cable Assemblies".

| SPECIFICATION | | Type 31 |
|---|---|---|
| **Cable Code** | Standard | **31** |
| Frequency Range | | DC 3.0 GHz |
| Outer Diameter in mm | Standard | 2.5 |
| Impedance in Ohms at Sea Level and +25°C | | 50 ± 2 |
| Velocity in %, ± 2% | | 69.5 |
| Capacitance in pF/m | | 105 |
| Dielectric Strength (60 Hz) in KV rms | | 2.0 |
| Max. Operating Voltage at Sea Level, in KV rms, 60 Hz | | 0.9 |
| Nominal Insertion Loss in dB/m vs. Frequency | 0.5 GHz | 0.70 |
| | 1.0 GHz | 1.10 |
| | 2.0 GHz | 1.57 |
| | 3.0 GHz | 1.89 |
| Nominal CW-Power in Watts, vs. Frequency, at Sea Level and + 20°C | 0.5 GHz | 170 |
| | 1.0 GHz | 130 |
| | 2.0 GHz | 91 |
| | 3.0 GHz | 75 |
| RF - Leakage at 3.0 GHz | | -80 dBC |
| Operating Temperature Range | | -54°C to +110°C |
| Outer Conductor Construction | | 1x Silver Plated Copper Braid |
| Outer Jacket | | PTFE |
| Dielectric Diameter in mm | | 1.52 |
| Dielectric Material | | PTFE |
| Dielectric Constant | | 2.0 |
| Center Conductor Material | | Stranded Silver Plated Copperweld Steel |
| Center Conductor Construction | | 7x.17 mm |
| Center Conductor Dia. in mm | | 0.51 |
| Weight in Gramms/Meter | | 17 |
| Minimum Bend Radius, Inside, | | 24 |

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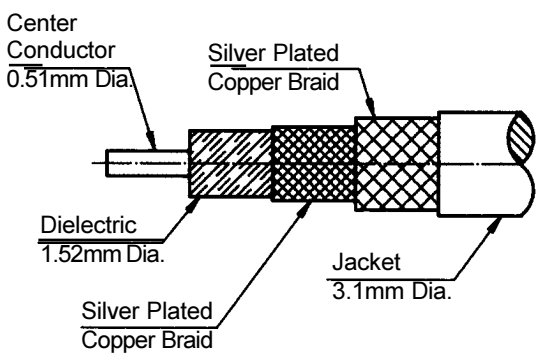
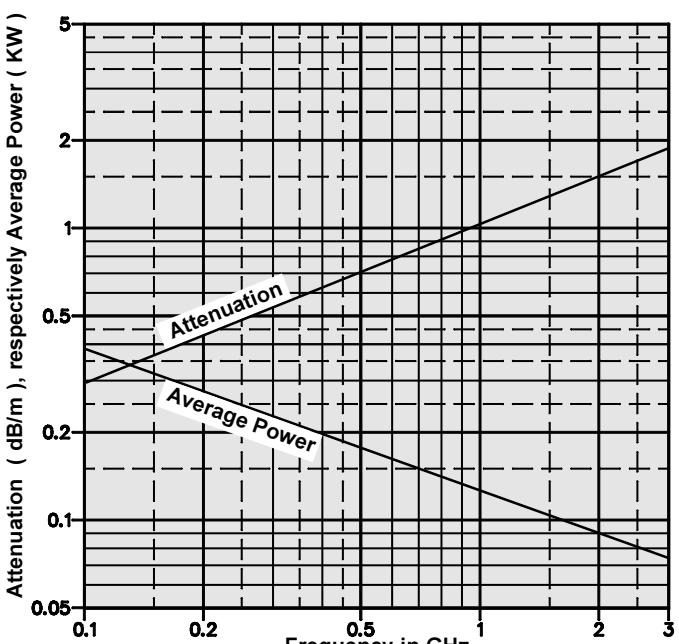
# Cable - Type 32
# RD - 316/U
## DC - 3.0 GHz

**Characteristics:**

- Performance to 3.0 GHz
- This cable is similar to the RG316/U, but it is double shielded for lower leakage.
- Usage in Commercial Systems for low frequency applications.
- Low Price.
- Procurement for the raw cable only, or completely terminated assemblies, 100% tested in VSWR and Insertion Loss.
- Available connectors: 1.8/5.6, SMA, SMP, N and TNC.
- For Push - On Connector Code details please refer to page 214 f.f.
- Standard Connector Code details and additional useful information can be derived from: "The '97 Handbook Cable Assemblies".



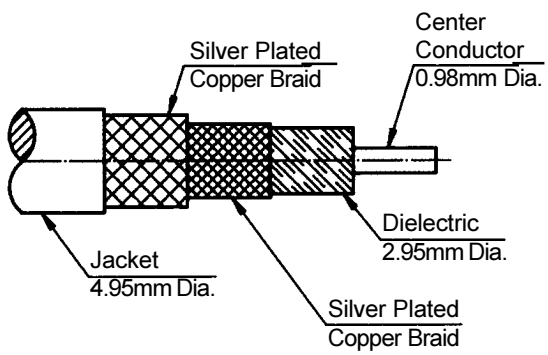

| SPECIFICATION | | Type 32 |
|---|---|---|
| **Cable Code** | Standard | **32** |
| Frequency Range | | DC 3.0 GHz |
| Outer Diameter (mm) | Standard | 3.1 |
| Impedance in Ohms at Sea Level and +25°C | | 50 ± 2 |
| Velocity in %, ± 2% | | 69.5 |
| Capacitance in pF/m | | 105 |
| Dielectric Strength (60 Hz) in KV rms | | 2.0 |
| Max. Operating Voltage at Sea Level, in KV rms, 60 Hz | | 0.9 |
| Nominal Insertion Loss in dB/m vs. Frequency | 0.5 GHz | 0.70 |
| | 1.0 GHz | 1.10 |
| | 2.0 GHz | 1.57 |
| | 3.0 GHz | 1.89 |
| Nominal CW-Power in Watts, vs. Frequency, at Sea Level and + 20°C | 0.5 GHz | 170 |
| | 1.0 GHz | 130 |
| | 2.0 GHz | 91 |
| | 3.0 GHz | 75 |
| RF - Leakage at 3.0 GHz | | -80 dBC |
| Operating Temperature Range | | -54°C to +110°C |
| Outer Conductor Construction | | 2x Silver Plated Copper Braid |
| Outer Jacket | | PTFE |
| Dielectric Diameter in mm | | 1.52 |
| Dielectric Material | | PTFE |
| Dielectric Constant | | 2.0 |
| Center Conductor Material | | Stranded Silver Plated Copperweld Steel |
| Center Conductor Construction | | 7x.17 mm |
| Center Conductor Dia. in mm | | 0.51 |
| Weight in Gramms/Meter | | 24 |
| Minimum Bend Radius, Inside, | | 24 |

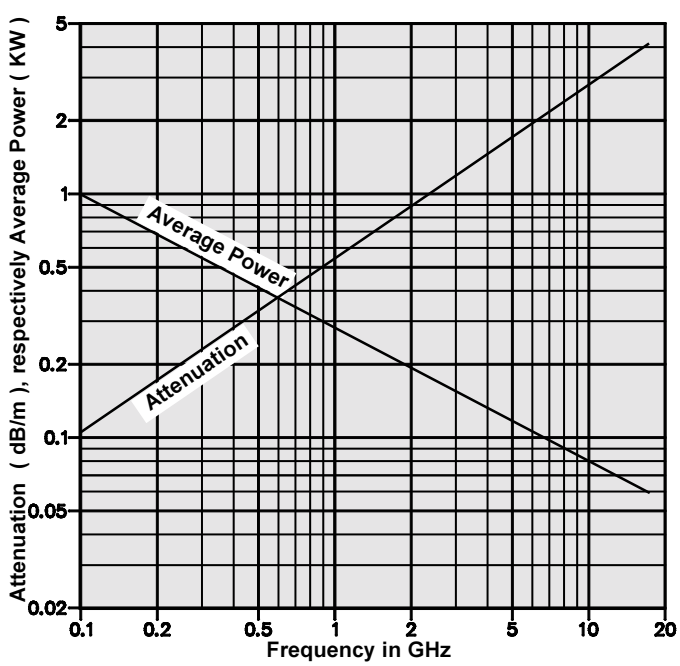
# Cable - Type 40
# RG - 400/U
## DC - 12.4 GHz

**Characteristics:**

- Performance to 12.4 GHz, degraded Performance to 18.0 GHz.
- Almost identical to RG-142/U, with the exception of the center conductor: RG-400/U has a stranded center conductor.
- Usage in Commercial Applications where price is of utmost importance.
- Procurement for the raw cable only, or completely terminated assemblies, 100% tested in VSWR and Insertion Loss.
- Available connectors: 1.8/5.6, BNC, N, SMA and TNC.
- For Push - On Connector Code details please refer to page 214 f.f.
- Standard Connector Code details and additional useful information can be derived from: "The '97 Handbook Cable Assemblies".

| SPECIFICATION | | Type 40 |
|---|---|---|
| **Cable Code** | | **40** |
| Frequency Range | | DC 12.4 GHz |
| Outer Diameter in mm | | 4.95 |
| Impedance in Ohms at Sea Level and +25°C | | 50 ± 2 |
| Velocity in %, ± 2% | | 69.5 |
| Capacitance in pF/m | | 105 |
| Dielectric Strength (60 Hz) in KV rms | | 5.0 |
| Max. Operating Voltage at Sea Level, in KV rms, 60 Hz | | 1.4 |
| Nominal Insertion Loss in dB/m vs. Frequency | 0.5 GHz | 0.34 |
| | 2.0 GHz | 0.87 |
| | 4.0 GHz | 1.40 |
| | 8.0 GHz | 2.24 |
| | 12.4 GHz | 3.00 |
| | 18.0 GHz | 4.00 |
| Nominal CW-Power in Watts, vs. Frequency, at Sea Level and + 20°C | 0.5 GHz | 400 |
| | 2.0 GHz | 192 |
| | 4.0 GHz | 132 |
| | 8.0 GHz | 92 |
| | 12.4 GHz | 75 |
| | 18.0 GHz | 60 |
| RF - Leakage at 18.0 GHz | | -80 dBC |
| Operating Temperature Range | | -54°C to +110°C |
| Outer Conductor Construction | | 2x Silver Plated Copper Braid |
| Outer Jacket | | PTFE |
| Dielectric Diameter in mm | | 2.95 |
| Dielectric Material | | PTFE |
| Dielectric Constant | | 2.0 |
| Center Conductor Material | | Stranded Silver Plated Copper wire |
| Center Conductor Construction | | 19 x 0.20 mm |
| Center Conductor Dia. in mm | | 0.98 |
| Weight in Gramms/Meter | | 74 |
| Minimum Bend Radius, Inside, Static (mm) | | 40 |

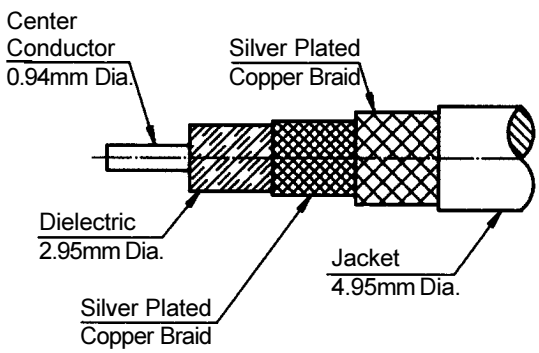


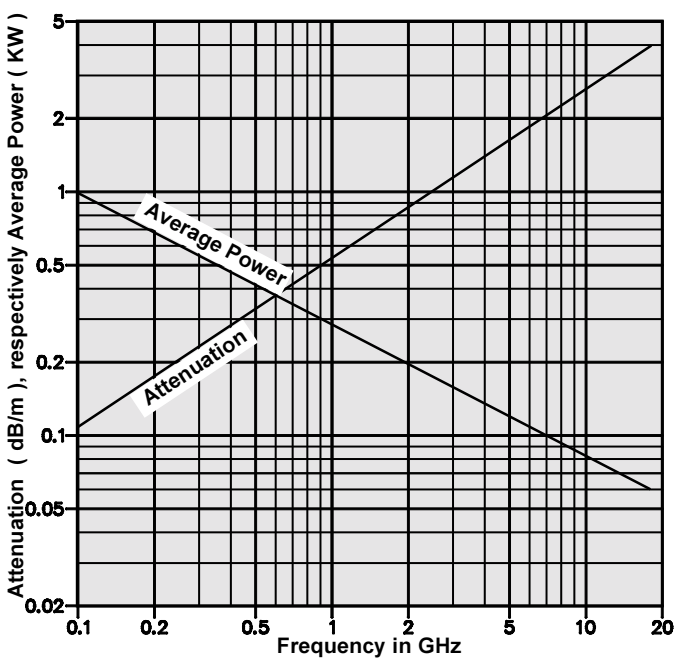



# Cable - Type 42
# RG - 142B/U
## DC - 12.4 GHz

**Characteristics:**

- Performance to 12.4 GHz, degraded Performance to 18.0 GHz.
- Almost identical to RG-400/U, with the exception of the center conductor: RG-142/U has a solid center conductor.
- Usage in Commercial Applications where price is of utmost importance.
- Procurement for the raw cable only, or completely terminated assemblies, 100% tested in VSWR and Insertion Loss.
- Available connectors: 1.8/5.6, BNC, N, SMA and TNC.
- For Push - On Connector Code details please refer to page 214 f.f.
- Standard Connector Code details and additional useful information can be derived from: "The '97 Handbook Cable Assemblies".




| SPECIFICATION | | Type 42 |
|---|---|---|
| **Cable Code** | | **42** |
| Frequency Range | | DC 12.4 GHz |
| Outer Diameter (mm) | | 4.95 |
| Impedance in Ohms at Sea Level and +25°C | | 50 ± 2 |
| Velocity in %, ± 2% | | 69.5 |
| Capacitance in pF/m | | 105 |
| Dielectric Strength (60 Hz) in KV rms | | 5.0 |
| Max. Operating Voltage at Sea Level, in KV rms, 60 Hz | | 1.4 |
| Nominal Insertion Loss in dB/m vs. Frequency | 0.5 GHz | 0.34 |
| | 2.0 GHz | 0.87 |
| | 4.0 GHz | 1.40 |
| | 8.0 GHz | 2.24 |
| | 12.4 GHz | 3.00 |
| | 18.0 GHz | 4.00 |
| Nominal CW-Power in Watts, vs. Frequency, at Sea Level and + 20°C | 0.5 GHz | 400 |
| | 2.0 GHz | 192 |
| | 4.0 GHz | 132 |
| | 8.0 GHz | 92 |
| | 12.4 GHz | 75 |
| | 18.0 GHz | 60 |
| RF - Leakage at 18.0 GHz | | -80 dBC |
| Operating Temperature Range | | -54°C to +110°C |
| Outer Conductor Construction | | 2x Silver Plated Copper Braid |
| Outer Jacket | | PTFE |
| Dielectric Diameter in mm | | 2.95 |
| Dielectric Material | | PTFE |
| Dielectric Constant | | 2.0 |
| Center Conductor Material | | Silver Plated Copperweld Steel |
| Center Conductor Construction | | 1 x 0.94 mm |
| Center Conductor Dia. in mm | | 0.94 |
| Weight in Gramms/Meter | | 69 |
| Minimum Bend Radius, Inside, Static (mm) | | 40 |

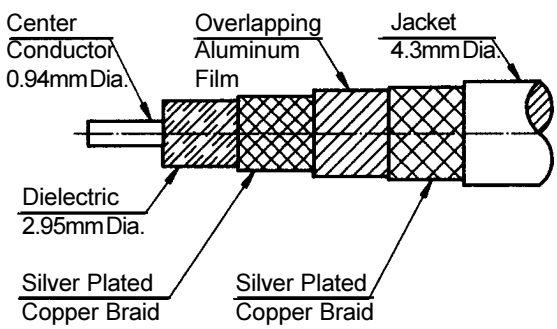
# Cable - Type 43

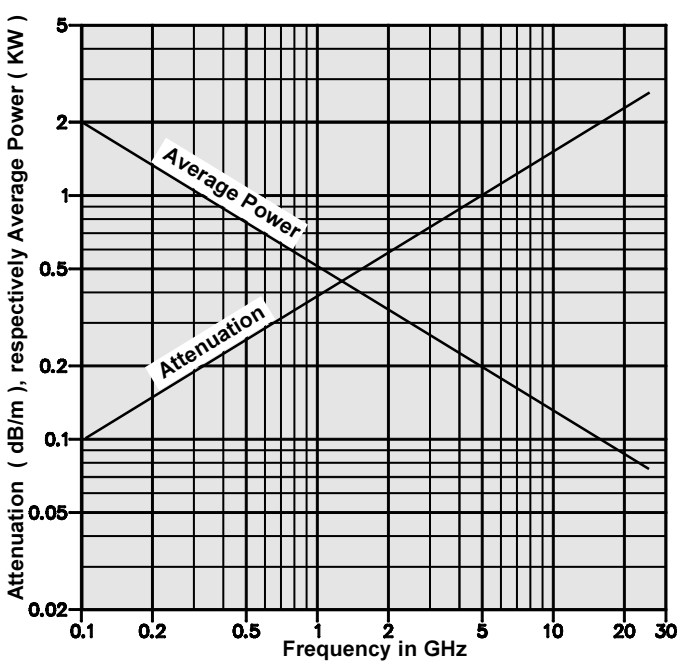
## DC - 26.5 GHz

| SPECIFICATION | | Type 43 |
|---|---|---|
| **Cable Code** | | **43** |
| Frequency Range | | DC 26.5 GHz |
| Outer Diameter in mm | | 4.3 |
| Impedance in Ohms at Sea Level and +25°C | | 50 ± 2 |
| Velocity in %, ± 2% | | 72 |
| Capacitance in pF/m | | 79 |
| Dielectric Strength (60 Hz) in KV rms | | 5.0 |
| Max. Operating Voltage at Sea Level, in KV rms, 60 Hz | | 0.7 |
| Nominal Insertion Loss in dB/m vs. Frequency | 0.5 GHz | 0.28 |
| | 2.0 GHz | 0.61 |
| | 4.0 GHz | 0.85 |
| | 8.0 GHz | 1.28 |
| | 12.4 GHz | 1.70 |
| | 18.0 GHz | 2.10 |
| | 26.5 GHz | 2.70 |
| Nominal CW-Power in Watts, vs. Frequency, at Sea Level and + 20°C | 0.5 GHz | 800 |
| | 2.0 GHz | 340 |
| | 4.0 GHz | 220 |
| | 8.0 GHz | 150 |
| | 12.4 GHz | 120 |
| | 18.0 GHz | 90 |
| | 26.5 GHz | 75 |
| RF - Leakage at 18.0 GHz | | -90 dBC |
| Operating Temperature Range | | -54°C to +110°C |
| Outer Conductor Construction | | Silver Plated Copper, Aluminium Film, Silver Plated Copper |
| Outer Jacket | | PTFE |
| Dielectric Diameter in mm | | 2.95 |
| Dielectric Material | | Low Density PTFE |
| Dielectric Constant | | 1.9 |
| Center Conductor Material | | Copper, Silver Plated |
| Center Conductor Dia. in mm | | 0.94 |
| Weight in Gramms/Meter | | 45 |
| Minimum Bend Radius, Inside, Static (mm) | | 40 |
| Minimum Bend Radius, Inside, | | |

### Characteristics:

- Performance to 26.5 GHz, when terminated with K* or 3.5mm connectors (mating with SMA).
- Procurement for completely terminated assemblies, fully tested. The test documentation for VSWR and Insertion Loss will be supplied with the cable assembly.
- Available connectors: 1.4/4.4, 2.4mm, 3.5mm, 7mm, 7/16, HN, K*, N, SBX, SBY, SC, SQ8, SMA, SPM and TNC.
- For Push - On Connector Code details please refer to page 214 f.f.
- Standard Connector Code details and additional useful information can be derived from: "The '97 Handbook Cable Assemblies".

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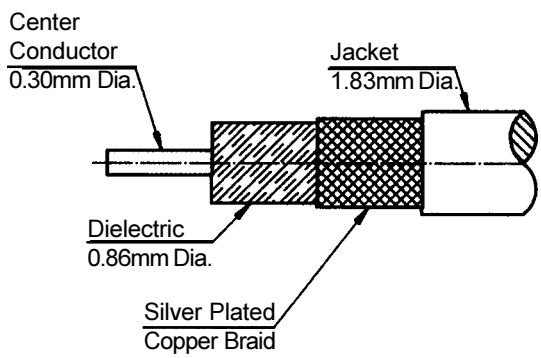
Spectrum Elektrotechnik GmbH P.O. Box 45 05 33, 80905 Munich, Germany **Tel. (89) 354 804-0, Fax (89) 354 804-90** (Country Code: 49)

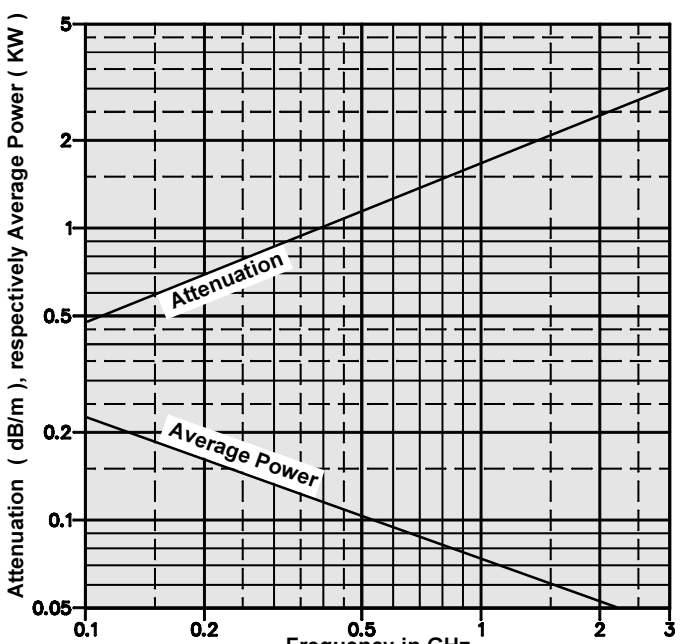
* 'K' Connector is a trademark of Wiltron

# Cable - Type 78
# RG - 178B/U
## DC - 3.0 GHz

**Characteristics:**

- Performance to 3.0 GHz
- Usage in Commercial Systems for low frequency applications.
- Low Price.
- Procurement for the raw cable only, or completely terminated assemblies, 100% tested in VSWR and Insertion Loss.
- Available connectors: 1.8/5.6, SMA, SMP, N and TNC.
- For Push - On Connector Code details please refer to page 214 f.f.
- Standard Connector Code details and additional useful information can be derived from: "The '97 Handbook Cable Assemblies".




| SPECIFICATION | | Type 78 |
|---|---|---|
| **Cable Code** | Standard | **78** |
| Frequency Range | | DC 3.0 GHz |
| Outer Diameter (mm) | Standard | 1.83 |
| Impedance in Ohms at Sea Level and +25°C | | 50 ± 2 |
| Velocity in %, ± 2% | | 69.5 |
| Capacitance in pF/m | | 105 |
| Dielectric Strength (60 Hz) in KV rms | | 2.0 |
| Max. Operating Voltage at Sea Level, in KV rms, 60 Hz | | 1.0 |
| Nominal Insertion Loss in dB/m vs. Frequency | 0.5 GHz | 1.05 |
| | 1.0 GHz | 1.55 |
| | 2.0 GHz | 2.40 |
| | 3.0 GHz | 3.08 |
| Nominal CW-Power in Watts, vs. Frequency, at Sea Level and + 20°C | 0.5 GHz | 110 |
| | 1.0 GHz | 75 |
| | 2.0 GHz | 53 |
| | 3.0 GHz | 40 |
| RF - Leakage at 3.0 GHz | | -80 dBC |
| Operating Temperature Range | | -55°C to +200°C |
| Outer Conductor Construction | | Silver Plated Copper Braid |
| Outer Jacket | | FEP |
| Dielectric Diameter in mm | | 0.86 |
| Dielectric Material | | PTFE |
| Dielectric Constant | | 2.0 |
| Center Conductor Material | | Stranded Silver Plated Copperweld Steel |
| Center Conductor Construction | | 7 x 0.1mm |
| Center Conductor Dia. in mm | | 0.30 |
| Weight in Gramms/Meter | | 8.0 |
| Minimum Bend Radius, Inside, Static (mm) | | 10 |

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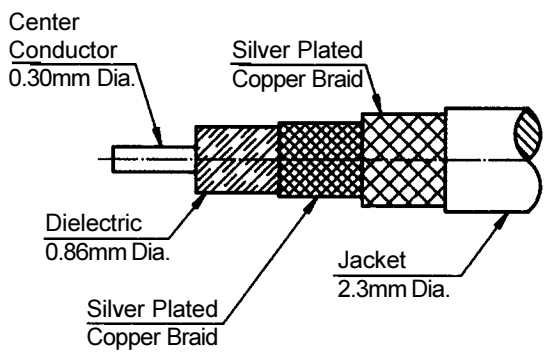
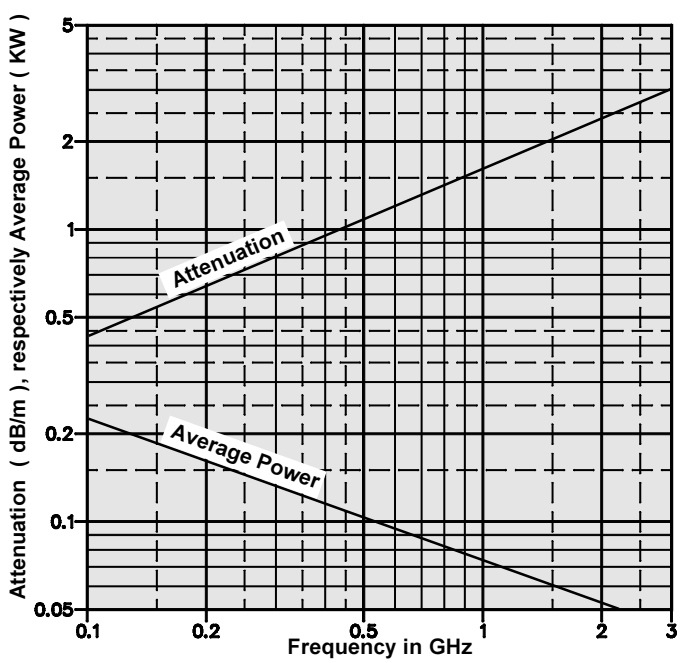
# Cable - Type 78D
# RD - 178B/U
## DC - 3.0 GHz

**Characteristics:**

- Performance to 3.0 GHz
- Usage in Commercial Systems for low frequency applications.
- Low Price.
- Procurement for the raw cable only, or completely terminated assemblies, 100% tested in VSWR and Insertion Loss.
- Available connectors: 1.8/5.6, SMA, SMP, N and TNC.
- For Push - On Connector Code details please refer to page 214 f.f.
- Standard Connector Code details and additional useful information can be derived from: "The '97 Handbook Cable Assemblies".

| SPECIFICATION | | Type 78D |
|---|---|---|
| **Cable Code** | Standard | **78D** |
| Frequency Range | | DC 3.0 GHz |
| Outer Diameter (mm) | Standard | 2.3 |
| Impedance in Ohms at Sea Level and +25°C | | 50 ± 2 |
| Velocity in %, ± 2% | | 69.5 |
| Capacitance in pF/m | | 105 |
| Dielectric Strength (60 Hz) in KV rms | | 2.0 |
| Max. Operating Voltage at Sea Level, in KV rms, 60 Hz | | 1.0 |
| Nominal Insertion Loss in dB/m vs. Frequency | 0.5 GHz | 1.05 |
| | 1.0 GHz | 1.55 |
| | 2.0 GHz | 2.40 |
| | 3.0 GHz | 3.08 |
| Nominal CW-Power in Watts, vs. Frequency, at Sea Level and + 20°C | 0.5 GHz | 110 |
| | 1.0 GHz | 75 |
| | 2.0 GHz | 53 |
| | 3.0 GHz | 40 |
| RF - Leakage at 3.0 GHz | | -80 dBC |
| Operating Temperature Range | | -55°C to +200°C |
| Outer Conductor Construction | | 2x Silver Plated Copper Braid |
| Outer Jacket | | FEP |
| Dielectric Diameter in mm | | 0.86 |
| Dielectric Material | | PTFE |
| Dielectric Constant | | 2.0 |
| Center Conductor Material | | Stranded Silver Plated Copperweld Steel |
| Center Conductor Construction | | 7 x 0.1mm |
| Center Conductor Dia. in mm | | 0.30mm |
| Weight in Gramms/Meter | | 12 |
| Minimum Bend Radius, Inside, Static (mm) | | 12 |

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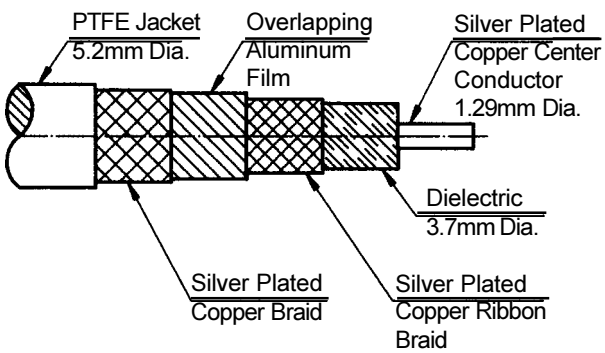
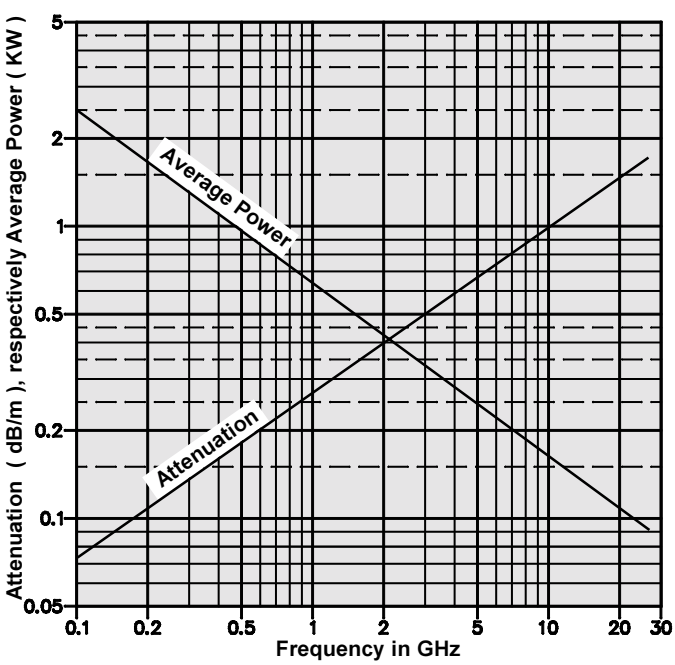
# Cable - Type 100

## Low Loss, Low Cost High Performance DC - 26.5 GHz

**Characteristics:**

- Performance to 26.5 GHz, when terminated with K* or 3.5 mm connectors (mating with SMA).
- Rugged Construction.
- Short delivery; certain lengths with preferred connector styles may be in stock.
- The cable used most; significant price advantage over other similar products.
- Procurement for completely terminated assemblies, fully tested. The test documentation for VSWR and Insertion Loss will be supplied with the cable assembly.
- Available connectors: 1.4/4.4, 2.4mm, 3.5mm, 7mm, 7/16, HN, K*, N, SBX, SBY, SC, SMA, SPM and TNC.
- For Push - On Connector Code details please refer to
- page 214 f.f.
  Standard Connector Code details and additional useful information can be derived from:
  "The '97 Handbook Cable Assemblies".




| SPECIFICATION | | Type 100 |
|---|---|---|
| **Cable Code** | | **100** |
| Frequency Range | | DC 26.5 GHz |
| Outer Diameter in mm | | 5.2 |
| Impedance in Ohms at Sea Level and +25°C | | 50 ± 1 |
| Velocity in %, ± 2% | | 75 |
| Capacitance in pF/m | | 87 |
| Dielectric Strength (60 Hz) in KV rms | | 6.0 |
| Max. Operating Voltage at Sea Level, in KV rms, 60 Hz | | 1.5 |
| Nominal Insertion Loss in dB/m vs. Frequency | 0.5 GHz | 0.18 |
| | 2.0 GHz | 0.40 |
| | 5.0 GHz | 0.63 |
| | 10.0 GHz | 0.97 |
| | 18.0 GHz | 1.35 |
| | 26.5 GHz | 1.70 |
| Nominal CW-Power in Watts, vs. Frequency, at Sea Level and + 20°C | 0.5 GHz | 950 |
| | 2.0 GHz | 421 |
| | 5.0 GHz | 244 |
| | 10.0 GHz | 162 |
| | 18.0 GHz | 114 |
| | 26.5 GHz | 91 |
| Peak-Power, 10% Duty Cycle | | 4 x CW-Power |
| RF - Leakage at 18.0 GHz | | - 100 dBC |
| Operating Temperature Range | | -54°C to +110°C |
| Outer Conductor Construction | | Copper Ribbon Braid, Overlapping Aluminum Film, Silver Plated Copper Braid |
| Outer Jacket | | PTFE |
| Dielectric Diameter in mm | | 3.7 |
| Dielectric Material | | Low Density PTFE |
| Dielectric Constant | | 1.8 |
| Center Conductor Material | | Copper, Silver Plated |
| Center Conductor Dia. in mm | | 1.29 |
| Weight in Gramms/Meter | | 69 |
| Minimum Bend Radius, Inside, Static (mm) | | 26 |
| Minimum Bend Radius, Inside, | | |

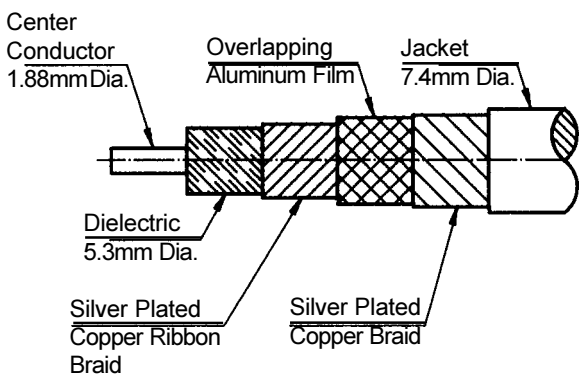
# Cable - Type 140

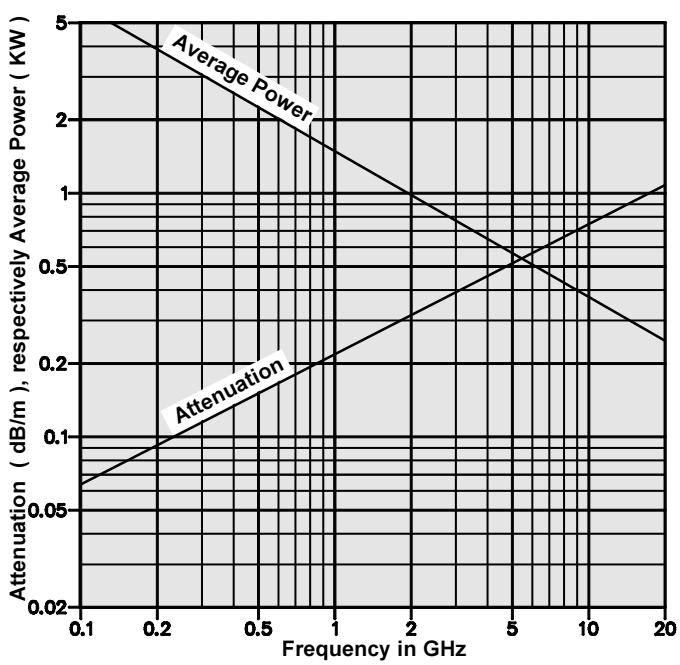
## DC - 20.0 GHz

**Characteristics:**

- Excellent Performance to 20.0 GHz
- Rugged Construction.
- Procurement for completely terminated assemblies, fully tested. The test documentation for VSWR and Insertion Loss will be supplied with the cable assembly.
- Available connectors: 3.5mm, 7mm, 7/16, HN, N, SBX, SBY, SMA, SC, and TNC.
- For Push - On Connector Code details please refer to
- page 214 f.f.
  Standard Connector Code details and additional useful information can be derived from: "The '97 Handbook Cable Assemblies".

| SPECIFICATION | | Type 140 |
|---|---|---|
| **Cable Code** | | **140** |
| Frequency Range | | DC 20.0 GHz |
| Outer Diameter in mm | | 7.4 |
| Impedance in Ohms at Sea Level and +25°C | | 50 ± 1 |
| Velocity in %, ± 2% | | 83 |
| Capacitance in pF/m | | 87 |
| Dielectric Strength (60 Hz) in KV rms | | 6.0 |
| Max. Operating Voltage at Sea Level, in KV rms, 60 Hz | | 1.5 |
| Nominal Insertion Loss in dB/m vs. Frequency | 0.5 GHz | 0.15 |
| | 2.0 GHz | 0.32 |
| | 5.0 GHz | 0.53 |
| | 10.0 GHz | 0.75 |
| | 18.0 GHz | 1.05 |
| | 20.0 GHz | 1.14 |
| Nominal CW-Power in Watts, vs. Frequency, at Sea Level and + 20°C | 0.5 GHz | 2200 |
| | 2.0 GHz | 967 |
| | 5.0 GHz | 561 |
| | 10.0 GHz | 372 |
| | 18.0 GHz | 263 |
| | 20.0 GHz | 245 |
| RF - Leakage at 18.0 GHz | | -100 dBC |
| Operating Temperature Range | | -54°C to +110°C |
| Outer Conductor Construction | | Silver Plated Copper Braid, Overlapping Aluminum Film, Silver Plated Copper Braid |
| Outer Jacket | | PTFE |
| Dielectric Diameter in mm | | 5.3 |
| Dielectric Material | | Low Density PTFE |
| Dielectric Constant | | 1.4 |
| Center Conductor Material | | Copper, Silver Plated |
| Center Conductor Dia. in mm | | 1.88 |
| Weight in Gramms/Meter | | 118 |
| Minimum Bend Radius, Inside, Static (mm) | | 38 |
| Minimum Bend Radius, Inside, | | |

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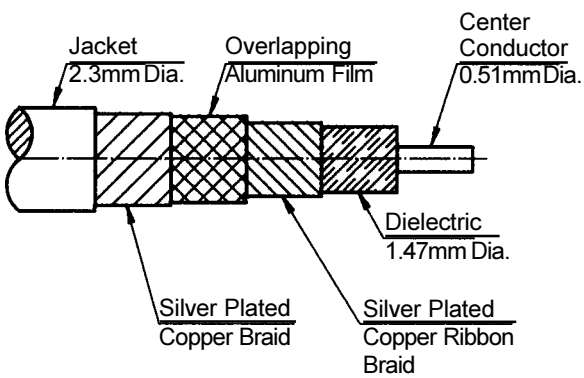
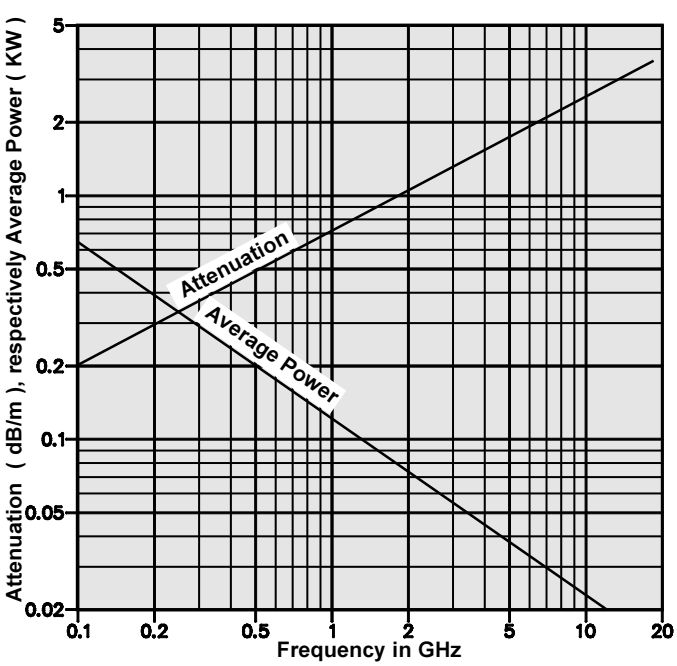
# Cable - Type 677

## DC - 18.0 GHz

**Characteristics:**

- Good Flexibility
- Small Diameter.
- Rugged Construction.
- Procurement for completely terminated assemblies, fully tested. The test documentation for VSWR and Insertion Loss will be supplied with the cable assembly.
- Available connectors: 3.5mm, BMA, K*, SMA, SMP and TNC.
- For Push - On Connector Code details please refer to page 214 f.f.
- Standard Connector Code details and additional useful information can be derived from: "The '97 Handbook Cable Assemblies".




| SPECIFICATION | | Type 677 |
|---|---|---|
| **Cable Code** | | **677** |
| Frequency Range | | DC 18.0 GHz |
| Outer Diameter in mm | | 2.3 |
| Impedance in Ohms at Sea Level and +25°C | | 50 ± 2 |
| Velocity in %, ± 2% | | 78 |
| Capacitance in pF/m | | 87 |
| Dielectric Strength (60 Hz) in KV rms | | 2.0 |
| Max. Operating Voltage at Sea Level, in KV rms, 60 Hz | | 0.6 |
| Nominal Insertion Loss in dB/m vs. Frequency | 0.5 GHz | 0.50 |
| | 2.0 GHz | 1.05 |
| | 4.0 GHz | 1.51 |
| | 8.0 GHz | 2.23 |
| | 12.4 GHz | 2.92 |
| | 18.0 GHz | 3.61 |
| Nominal CW-Power in Watts, vs. Frequency, at Sea Level and + 20°C | 0.5 GHz | 200 |
| | 2.0 GHz | 75 |
| | 4.0 GHz | 45 |
| | 8.0 GHz | 28 |
| | 12.4 GHz | 20 |
| | 18.0 GHz | 10 |
| RF - Leakage at 18.0 GHz | | -90 dBC |
| Operating Temperature Range | | -54°C to +150°C |
| Outer Conductor Construction | | Ribbon Braid Aluminum Foil round Braid |
| Outer Jacket | | PTFE |
| Dielectric Diameter in mm | | 1.47 |
| Dielectric Material | | Low Density PTFE |
| Dielectric Constant | | 1.6 |
| Center Conductor Material | | Silver Plated Copper |
| Center Conductor, Dia. in mm | | .51 |
| Weight in Gramms/Meter | | 13 |
| Minimum Bend Radius, Inside, Static (mm) | | 11.5 |
| Minimum Bend Radius, Inside, | | |

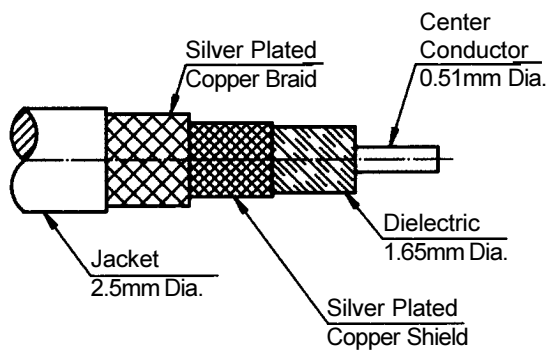
# Cable - Type 700

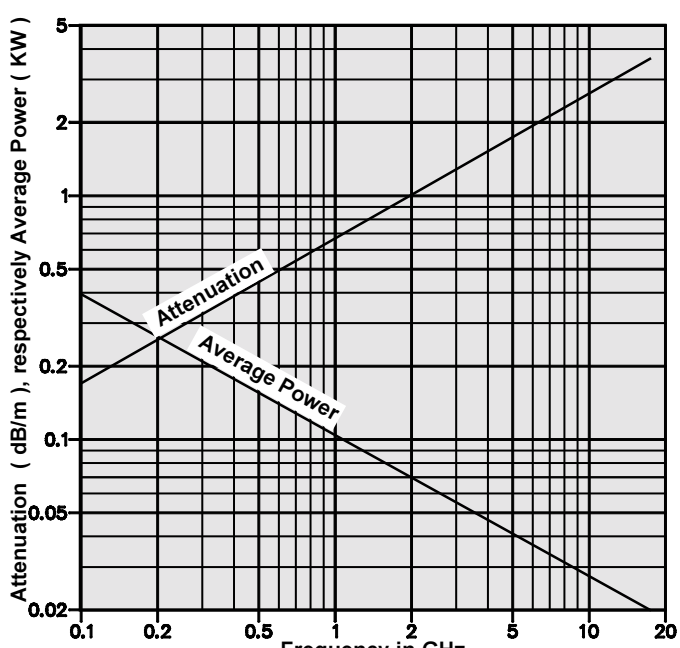
## DC - 18.0 GHz

**Characteristics:**

- Performance to 18.0 GHz.
- Small Diameter.
- Procurement for completely terminated assemblies, fully tested. The test documentation for VSWR and Insertion Loss will be supplied with the cable assembly.
- Available connectors: 3.5mm, BMA, K*, N, SMA and TNC.
- For Push - On Connector Code details please refer to page 214 f.f.
- Standard Connector Code details and additional useful information can be derived from: "The '97 Handbook Cable Assemblies".

| SPECIFICATION | | Type 700 |
|---|---|---|
| **Cable Code** | | **700** |
| Frequency Range | | DC 18.0 GHz |
| Outer Diameter in mm | | 2.5 |
| Impedance in Ohms at Sea Level and +25°C | | 50 ± 2 |
| Velocity in %, ± 2% | | 70.5 |
| Capacitance in pF/m | | 96.5 |
| Dielectric Strength (60 Hz) in KV rms | | 2.5 |
| Max. Operating Voltage at Sea Level, in KV rms, 60 Hz | | 1.5 |
| Nominal Insertion Loss in dB/m vs. Frequency | 0.5 GHz | 0.44 |
| | 2.0 GHz | 1.05 |
| | 4.0 GHz | 1.55 |
| | 8.0 GHz | 2.30 |
| | 12.4 GHz | 2.92 |
| | 18.0 GHz | 3.64 |
| Nominal CW-Power in Watts, vs. Frequency, at Sea Level and + 20°C | 0.5 GHz | 135 |
| | 2.0 GHz | 70 |
| | 4.0 GHz | 45 |
| | 8.0 GHz | 30 |
| | 12.4 GHz | 22 |
| | 18.0 GHz | 20 |
| RF - Leakage at 18.0 GHz | | -100 dBC |
| Operating Temperature Range | | -65°C to +165°C |
| Outer Conductor Construction | | Silver Plated Copper Shield Silver Plated Copper Braid |
| Outer Jacket | | PTFE |
| Dielectric Diameter in mm | | 1.65 |
| Dielectric Material | | PTFE |
| Dielectric Constant | | 2.0 |
| Center Conductor Material | | Silver Plated Copper Clad Steel |
| Center Conductor Dia. in mm | | 0.51 |
| Weight in Gramms (Meter) | | 16 |
| Minimum Bend Radius, Inside, Static (mm) | | 6.1 |
| Minimum Bend Radius, Inside, | | |





Spectrum Elektrotechnik GmbH P.O. Box 45 05 33, 80905 Munich, Germany **Tel. (89) 354 804-0, Fax (89) 354 804-90** (Country Code: 49)
* 'K' Connector is a trademark of Wiltron

# Semi - Rigid Cables with solid Dielectric

Spectrum Elektrotechnik GmbH

## Semi - Rigid Cables with solid PTFE, 50 Ohms

**All cables in this table have a:**

- **Velocity (in % ± 2%) of 69.5**
- **Capacitance ( pF/m) of 95.1**
- **Dielectric Constant of ~2.0**
- **Solid Density PTFE as Dielectric Material**

### Specification

| Cable Model No. | 421-047 | 421-047-1 | 421-047-3 | 421-086 | 421-086-1 | 421-086-3 | 421-086-G | 421-086DS | 421-086SS | 421-087 | 421-087-1 | 421-087-3 | 421-669 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cable Code for Cable Assemblies | 46 | 47 | 48 | 89 | 90 | 91 | 92 | 86D | 94 | 83 | 84 | 85 | 69 |
| Cable MIL-C17-No. | M17/151-00001 | | M17/151-00002 | M17/133-RG405 | | M17/133-00001 | | | | M17/133-00002 | | M17/133-00003 | M17/130-RG402 |
| Cut Off Frequency (GHz) | 109 | 109 | 109 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 33 |
| **Mechanical Requirements** | | | | | | | | | | | | | |
| Outer Conductor Diameter (mm) | 1.19 | 1.19 | 1.19 | 2.18 | 2.18 | 2.18 | 2.18 | 2.18 | 2.18 | 2.18 | 2.18 | 2.18 | 3.58 |
| Semi-Rigid Type (^ Dia in inch) | 0.047" | 0.047" | 0.047" | 0.086" | 0.086" | 0.086" | 0.086" | 0.086" | 0.086" | 0.086" | 0.086" | 0.086" | 0.141" |
| Dielectric Diameter DD in mm | 0.94 | 0.94 | 0.94 | 1.68 | 1.68 | 1.68 | 1.68 | 1.68 | 1.68 | 1.68 | 1.68 | 1.68 | 2.98 |
| Outer Conductor Material | Cu | Cu | Cu | Cu | Cu | Cu | Cu | Cu | Steel | Cu | Cu | Cu | Cu |
| Outer Conductor Finish | - | Silver | Tin | - | Silver | Tin | Gold | - | - | - | Silver | Tin | - |
| Center Conductor, Dia. in mm | 0.29 | 0.29 | 0.29 | 0.51 | 0.51 | 0.51 | 0.51 | 0.51 | 0.51 | 0.51 | 0.51 | 0.51 | 0.91 |
| Center Conductor Material | Steel | Steel | Steel | Steel | Steel | Steel | Steel | Steel | Steel | Cu | Cu | Cu | Steel |
| Center Conductor Finish | Silver | Silver | Silver | Silver | Silver | Silver | Silver | Silver | Silver | Silver | Silver | Silver | Silver |
| Weight in Gramms/ Meter | 6.5 | 6.5 | 6.5 | 21.1 | 22.3 | 22.3 | 22.3 | 20.8 | 21.1 | 20.8 | 21.7 | 21.7 | 47.6 |
| Minimum Bend Radius, Inside, Static (mm) | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 1.3 | 6.4 | 3.2 | 3.2 | 3.2 | 6.4 |
| **Electrical Requirements** | | | | | | | | | | | | | |
| Impedance (Ohms) | 50±2.5 | 50±2.5 | 50±2.5 | 50±1.5 | 50±1.5 | 50±1.5 | 50±1.5 | 50±1.5 | 50±1.5 | 50±1.5 | 50±1.5 | 50±1.5 | 50±1.0 |
| Dielectric Strength (60 Hz) in KV ms | 2.0 | 2.0 | 2.0 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 5.0 |
| Max. Operating Voltage at Sea Level (in KV rms) | 1.0 | 1.0 | 1.0 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.9 |
| Operating Temp. Range (°C) | -54/ +125 | -54/ +125 | -54/ +125 | -54/ +125 | -54/ +125 | -54/ +125 | -54/ +125 | -54/ +125 | -54/ +125 | -54/ +125 | -54/ +125 | -54/ +125 | -54/ +115 |

** Only the most common cables are listed on this page. A number of special cables were developed and manufactured for individual Programs and unique requirements. Please contact us, if you need further assistance.

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# Semi - Rigid Cables with solid Dielectric

## Semi - Rigid Cables with solid PTFE, 50 Ohms

**All cables in this table have a:**

- **Velocity (in % ± 2%) of 69.5**
- **Capacitance ( pF/m) of 95.1**
- **Dielectric Constant of ~2.0**
- **Solid Density PTFE as Dielectric Material**

### Specification

| 421-669-1 | 421-669-3 | 421-669-3 | 421-669DS | 421-669SS | 421-669 SSSS | 421-670 | 421-670-1 | 421-670-3 | 421-250 | 421-252 | 421-252-1 | 421-252-3 | Cable Model No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **70** | **71** | **72** | **69D** | **69S** | **76** | **670** | **671** | **673** | **50** | **52** | **53** | **54** | Cable Code for Cable Assemblies |
| | M17/130-00001 | M17/130-00001 | | | | | | | | M17/129-RG401 | | M17/129-00001 | Cable MIL-C17-No. |
| 33 | 18 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 19 | 19 | 19 | 19 | Cut Off Frequency (GHz) |
| **Mechanical Requirements** | | | | | | | | | | | | | |
| 3.58 | 3.58 | 3.58 | 3.58 | 3.58 | 3.58 | 3.58 | 3.58 | 3.58 | 6.35 | 6.35 | 6.35 | 6.35 | Outer Conductor Diameter (mm) |
| 0.141" | 0.141" | 0.141" | 0.141" | 0.141" | 0.141" | 0.141" | 0.141" | 0.141" | 0.250" | 0.250" | 0.250" | 0.250" | Semi-Rigid Type (^ Dia in inch) |
| 2.98 | 2.98 | 2.98 | 2.98 | 2.98 | 2.98 | 2.98 | 2.98 | 2.98 | 5.31 | 5.31 | 5.31 | 5.31 | Dielectric Diameter DD in mm |
| Cu | Cu | Cu | Cu | Steel | Steel | Cu | Cu | Cu | Alu | Cu | Cu | Cu | Outer Conductor Material |
| Silver | Tin | Tin | - | - | - | - | Silver | Tin | - | - | Silver | Tin | Outer Conductor Finish |
| 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 1.63 | 1.63 | 1.63 | 1.63 | Center Conductor, Dia. in mm |
| Steel | Steel | Steel | Steel | Cu | Steel | Cu | Cu | Cu | Cu | Cu | Cu | Cu | Center Conductor Material |
| Silver | Silver | Silver | Silver | Silver | - | Silver | Silver | Silver | Silver | Silver | Silver | Silver | Center Conductor Finish |
| 47.6 | 47.6 | 47.6 | 47.6 | 47.6 | 47.6 | 47.6 | 47.6 | 47.6 | 103.0 | 148.8 | 150.3 | 150.3 | Weight in Gramms/ Meter |
| 6.4 | 6.4 | 6.4 | 2.5 | 12.7 | 12.7 | 6.4 | 6.4 | 6.4 | 9.5 | 9.5 | 9.5 | 9.5 | Minimum Bend Radius, Inside, Static (mm) |
| **Electrical Requirements** | | | | | | | | | | | | | |
| 50±1.0 | 50±1.0 | 50±1.0 | 50±1.0 | 50±1.0 | 50±1.0 | 50±1.0 | 50±1.0 | 50±1.0 | 50±0.5 | 50±0.5 | 50±0.5 | 50±0.5 | Impedance (Ohms) |
| 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 7.0 | 7.0 | 7.0 | 7.0 | Dielectric Strength (60 Hz) in KV ms |
| 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 3.0 | 3.0 | 3.0 | 3.0 | Max. Operating Voltage at Sea Level (in KV rms) |
| -54/ +115 | -54/ +115 | -54/ +115 | -54/ +115 | -54/ +115 | -54/ +115 | -54/ +115 | -54/ +115 | -54/ +115 | -40/ +90 | -40/ +90 | -40/ +90 | -40/ +90 | Operating Temp. Range (°C) |

** Only the most common cables are listed on this page. A number of special cables were developed and manufactured for individual Programs and unique requirements. Please contact us, if you need further assistance.

Spectrum Elektrotechnik GmbH

## Semi - Rigid Cables with Low Density Dielectric, 50 Ohms

**All cables in this table have a(n):**

- Copper Center Conductor
- Silver Center Conductor Finish
- Low Density PTFE as Dielectric Material
- Operating Temperature of -100 to +250°C
- Impedance (Ohms) of 50±2.0
- Dielectric Constant of ~1.5

### Specification

| Cabel Model No. | 422-100-3 | 421-307 | 421-307-1 | 421-307-3 | 421-298 | 421-298-1 | 421-298-3 |
|---|---|---|---|---|---|---|---|
| Cable Code for Cable Assemblies | 47L | 05 | 06 | 07 | 98 | 97 | 99 |
| Cut Off Frequency (GHz) | 120 | 65 | 65 | 65 | 35 | 35 | 35 |
| **Mechanical Requirements** | | | | | | | |
| Outer Conductor Dia. (mm) | 1.19 | 2.18 | 2.18 | 2.18 | 3.58 | 3.58 | 3.58 |
| Semi-Rigid Type (^ Dia in inch) | .047" | .086" | .086" | .086" | .141" | .141" | .141" |
| Dielectric Diameter DD in mm | 0.97 | 1.47 | 1.47 | 1.47 | 2.95 | 2.95 | 2.95 |
| Outer Conductor Material | Al | Cu | Cu | Cu | Cu | Cu | Cu |
| Outer Conductor Finish | Tin | - | Silver | Tin | - | Silver | Tin |
| Center Conductor, Dia. (mm) | 0.33 | 0.51 | 0.51 | 0.51 | 1.09 | 1.09 | 1.09 |
| Weight in Gramms/m | 5.66 | 22.7 | 23.9 | 23.9 | 40.9 | 42.3 | 42.3 |
| Minimum Bend Radius, Inside, Static (mm) | 1.3 | 6.4 | 6.4 | 6.4 | 11.1 | 11.1 | 11.1 |
| **Electrical Requirements** | | | | | | | |
| Velocity in %, ± 2% | 83 | 80 | 80 | 80 | 80 | 80 | 80 |
| Capacitance in pF/m | 105 | 82.0 | 82.0 | 82.0 | 82.0 | 82.0 | 82.0 |
| Dielectric Strength (60 Hz) in KV ms | 2.0 | 2.0 | 2.0 | 2.0 | 5.0 | 5.0 | 5.0 |
| Max. Operating Voltage at Sea Level (in KV rms) | 0.6 | 0.6 | 0.6 | 0.6 | 1.0 | 1.0 | 1.0 |

** Only the most common cables are listed on this page. A number of special cables were developed and manufactured for individual Programs and unique requirements. Please contact us, if you need further assistance.

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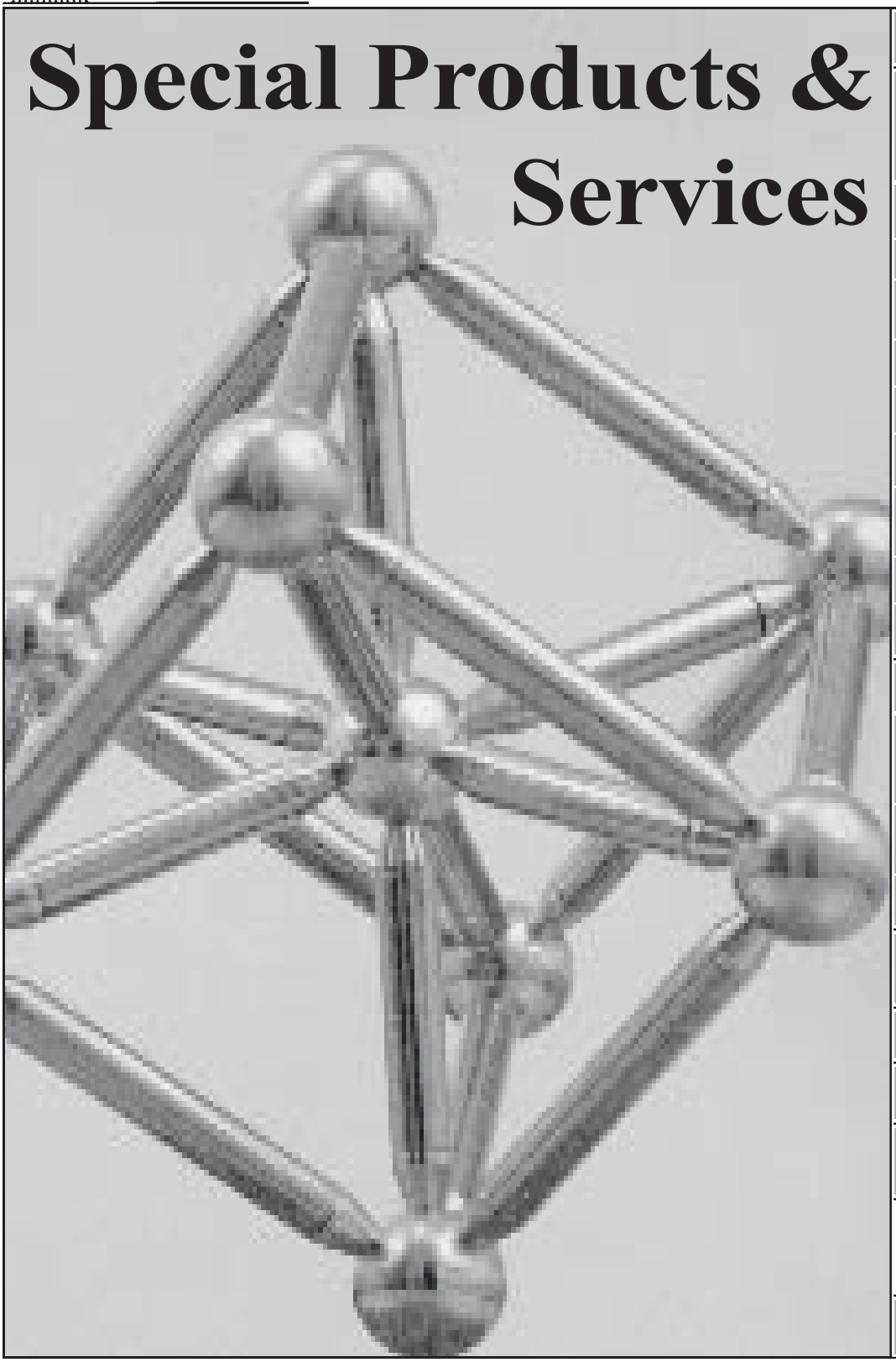
Spectrum Elektrotechnik GmbH

# Special Products & Services





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# Special Products & Services

**Design and Engineering:** Spectrum Elektrotechnik GmbH is a very innovative Company. It employs a strong and successful team of experienced engineers. If your application requires a product that is not available as standard, Spectrum Elektrotechnik GmbH is the Company to contact. Our engineers are ready and willing and capable to listen to your problem and they will try their best to propose something that will fit your needs perfectly. There is also a possibility that we may have solved already a similar problem for somebody else and that we have a solution available, almost off the shelf.
Following a few examples of areas where our engineering staff has proposed and designed and manufactured hardware to the customers requirements, or has developed successfully Products to widen and strengthen our Product Range:

**The Cable Assembly Group:** Designing and manufacturing of Low Loss Cable Assemblies, Extra Light Weight Assemblies, Phase & Amplitude Matched Cable Assemblies, High Velocity and Thermal Stable Dielectrics, Delay Lines, etc.

**The Connector Group:** Designing and manufacturing successfully new Connector Series, e.g. of Types SBX, SBY and SPM, connectors that were not available at all with the physical and electrical performance as needed for specific programs.
Adapters for special applications were designed to fit exactly the customers' needs, mechanically and electrically.
A whole new Product Line was developed and successfully introduced to the market: the PUSH-ON Connectors and Adapters for series 3.5mm, K*, SMA, N and TNC, using 50 Ohms impedance, and for F, N and TNC as well, using 75 Ohms impedance.

**The Component Group:** Besides the Standard Product Lines, Spectrum Elektrotechnik GmbH offers Engineering and Manufacturing Services, to design and manufacture Components exactly to Customer's Specification. Whatever cannot be found in anybody else`s catalog, Spectrum Elektrotechnik GmbH is definitely worthwhile to contact. There is even always a possibility that a similar product has already been designed for somebody else.
The Table to the right shows the areas where Spectrum Elektrotechnik GmbH has successfully designed and manufactured products to customers' specifications. On pages 356 through 399 detailed information will be given on these components.

**Process Engineering:** This Group has been developing tools and machines that are needed in manufacturing but were not available on the market as standard. Currently the design, manufacturing and testing of an Automatic Cable Cutting and Stripping Machine has been completed and the machine has been introduced to the market as CNCA-700.

**Quick Response Manufacturing:** The Quick Response Manufacturing is another good example for the commitment to providing excellent Customer Service. The Quick Response Group was implemented to react immediately to customers' needs. Sometimes Products will be shipped within 24 hours. All Products manufactured in the Quick Response Area will meet the same Quality Standards as all the other products, they are submitted to the same inspection.




Spectrum Elektrotechnik GmbH P.O. Box 45 05 33, 80905 Munich, Germany **Tel. (89) 354 804-0, Fax (89) 354 804-90** (Country Code: 49)
* 'K' Connector is a trademark of Wiltron Company.

# Adapter Sets

Spectrum Elektrotechnik GmbH

Spectrum Elektrotechnik GmbH offers a standard range of precision adapter sets. Each set comprises a commonly used grouping of series and inter-series adapters. Each adapter within any set is 100% tested, and ensures low reflection and optimum phase performance over its full frequency range. To enable the user to maintain these quality adapters in pristine condition, they are supplied in a nicely finished wooden case.

Customers can also specify adapters for their own custom compiled sets. For details please call your Spectrum Representative.

**Between Series Kit 7mm, consisting of the following Precision Adapters:** **SET7-MINI-S1**

| | | |
|---|---|---|
| 1 Adapter straight | 7 mm to 2.4 mm-Female: | P/N 8001-HF90-02 |
| 1 Adapter straight | 7 mm to 2.4 mm-Male: | P/N 8001-HM90-02 |
| 1 Adapter straight | 7 mm to K*-Female: | P/N 8001-KF90-02 |
| 1 Adapter straight | 7 mm to K* -Male: | P/N 8001-KM90-02 |
| 1 Adapter straight | 7 mm to 3.5-Female: | P/N 8001-9092-02 |
| 1 Adapter straight | 7 mm to 3.5-Male: | P/N 8001-9091-02 |
| 1 Adapter straight | 7 mm to SMA-Female: | P/N 8001-2190-02 |
| 1 Adapter straight | 7 mm to SMA-Male: | P/N 8001-1190-02 |

**Between Series Kit 7mm, consisting of the following Precision Adapters:** **SET7-MINI-S2**

| | | |
|---|---|---|
| 2 Adapter straight | 7 mm to 3.5-Female: | P/N 8003-9092-02 |
| 2 Adapter straight | 7 mm to 3.5-Male: | P/N 8003-9091-02 |
| 2 Adapter straight | 7 mm to SMA-Female: | P/N 8001-2190-02 |
| 2 Adapter straight | 7 mm to SMA-Male: | P/N 8001-1190-02 |

**Between Series Kit 7mm, consisting of the following Precision Adapters:** **SET7-TNCN-S1**

| | | |
|---|---|---|
| 2 Adapter straight | 7 mm to TNC-Female: | P/N 8002-4190-02 |
| 2 Adapter straight | 7 mm to TNC-Male: | P/N 8002-3190-02 |
| 2 Adapter straight | 7 mm to N-Female: | P/N 8001-6190-02 |
| 2 Adapter straight | 7 mm to N-Male: | P/N 8001-5190-02 |

**Between Series Kit 7mm, consisting of the following Precision Adapters:** **SET7-UNIV-S1**

| | | |
|---|---|---|
| 1 Adapter straight | 7 mm to 3.5 mm-Female: | P/N 8001-9092-02 |
| 1 Adapter straight | 7 mm to 3.5 mm-Male: | P/N 8001-9091-02 |
| 1 Adapter straight | 7 mm to SMA-Female: | P/N 8001-2190-02 |
| 1 Adapter straight | 7 mm to SMA -Male: | P/N 8001-1190-02 |
| 1 Adapter straight | 7 mm to TNC-Female: | P/N 8002-4190-02 |
| 1 Adapter straight | 7 mm to TNC-Male: | P/N 8002-3190-02 |
| 1 Adapter straight | 7 mm to N-Female: | P/N 8001-6190-02 |
| 1 Adapter straight | 7 mm to N-Male: | P/N 8001-5190-02 |

**Between Series Kit N-TNC, consisting of the following Precision Adapters:** **SETN-TTNC-S1**

| | | |
|---|---|---|
| 2 Adapter straight | N-Female to TNC Fem.: | P/N 8001-4161-02 |
| 2 Adapter straight | N-Female to TNC Male: | P/N 8001-3161-02 |
| 2 Adapter straight | N-Male to TNC Female: | P/N 8001-4151-02 |
| 2 Adapter straight | N-Male to TNC Male: | P/N 8001-3151-02 |

**Between Series Kit TNC-SMA, consisting of the following Precision Adapters:** **SETT-TSMA-S1**

| | | |
|---|---|---|
| 2 Adapter straight | TNC Fem. to SMA-Fem.: | P/N 8001-2141-02 |
| 2 Adapter straight | TNC Fem. to SMA-Male: | P/N 8001-1141-02 |
| 2 Adapter straight | TNC Male to SMA-Fem.: | P/N 8001-2131-02 |
| 2 Adapter straight | TNC Male to SMA-Male: | P/N 8001-1131-02 |

**Between Series Kit Type N, consisting of the following Precision Adapters:** **SETN-MINI-S1**

| | | |
|---|---|---|
| 1 Adapter straight | N-Fem. to 3.5 mm-Fem.: | P/N 8002-6192-02 |
| 1 Adapter straight | N-Fem. to 3.5 mm-Male: | P/N 8002-6191-02 |
| 1 Adapter straight | N-Male to 3.5 mm-Fem.: | P/N 8002-5192-02 |
| 1 Adapter straight | N-Male to 3.5 mm-Male: | P/N 8002-5191-02 |
| 1 Adapter straight | N-Female to SMA-Fem.: | P/N 8001-2161-02 |
| 1 Adapter straight | N-Female to SMA-Male: | P/N 8001-1161-02 |
| 1 Adapter straight | N-Male to SMA-Fem.: | P/N 8002-2151-02 |
| 1 Adapter straight | N-Male to SMA-Male: | P/N 8002-1151-02 |

**Between Series Kit BNC, consisting of the following Precision Adapters:** **SETB-TSMA-S1**

| | | |
|---|---|---|
| 1 Adapter straight | BNC-Fem. to SMA-Fem.: | P/N 8001-2181-02 |
| 1 Adapter straight | BNC-Fem. to SMA-Male: | P/N 8001-1181-02 |
| 1 Adapter straight | BNC-Male to SMA-Fem.: | P/N 8001-2171-02 |
| 1 Adapter straight | BNC-Male to SMA-Male: | P/N 8001-1171-02 |

**In-Series Kit Type SMA, consisting of the following Precision Adapters:** **SETS-TSMA-S1**

| | | |
|---|---|---|
| 1 Adapter straight | SMA-Fem. to SMA-Fem.: | P/N 8001-2121-02 |
| 1 Adapter straight | SMA-Fem. to SMA-Male: | P/N 8001-1121-02 |
| 1 Adapter straight | SMA-Male to SMA-Male: | P/N 8001-1111-02 |
| 1 Adapter radius angle | SMA-Fem. to SMA-Fem.: | P/N 8091-2121-02 |
| 1 Adapter radius angle | SMA-Fem. to SMA-Male: | P/N 8091-1121-02 |
| 1 Adapter radius angle | SMA-Male to SMA-Male: | P/N 8091-1111-02 |

**In-Series Kit, Type N, consisting of the following Precision Adapters:** **SETN-TYPN-S1**

| | | |
|---|---|---|
| 2 Adapter straight | N-Female to N-Female: | P/N 8001-6161-02 |
| 2 Adapter straight | N-Female to N-Male: | P/N 8001-5161-02 |
| 2 Adapter straight | N-Male to N-Male: | P/N 8001-5151-02 |

**In-Series Kit Type TNC, consisting of the following Precision Adapters:** **SETT-TTNC-S1**

| | | |
|---|---|---|
| 2 Adapter straight | TNC-Fem. to TNC Fem.: | P/N 8001-4141-02 |
| 2 Adapter straight | TNC-Fem. to TNC Male: | P/N 8001-3141-02 |
| 2 Adapter straight | TNC-Male to TNC Male: | P/N 8001-3131-02 |

## How to order your Personal Set:

Please use the temporary P/N: SET-PERS, and specify all the Adapters you want to include in your Set. The individual Kit will be showing your name plate, identifying your own compiled Set.

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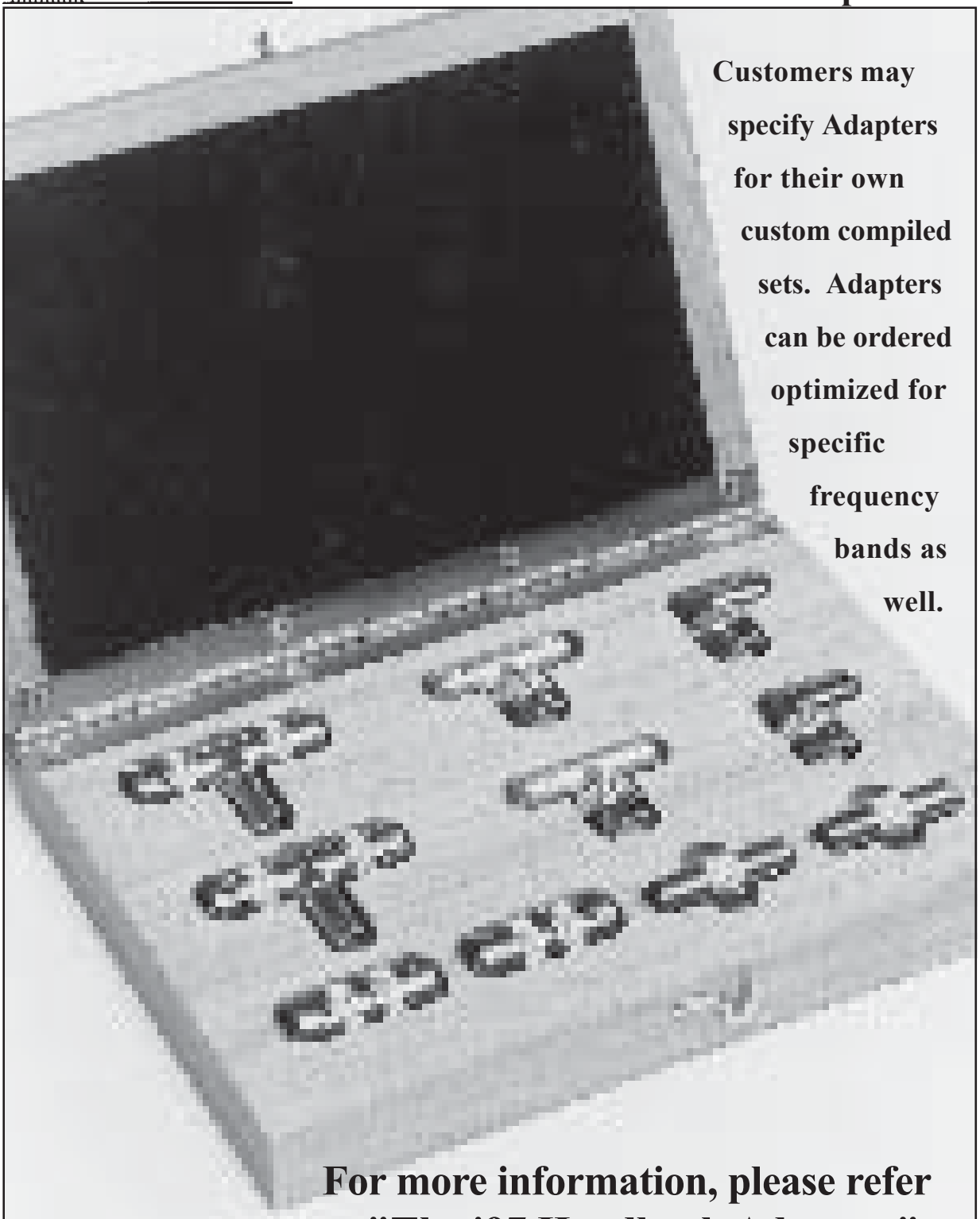


Customers may specify Adapters for their own custom compiled sets. Adapters can be ordered optimized for specific frequency bands as well.

**For more information, please refer to "The '97 Handbook Adapters".**

# Antennas

**INTRODUCTION:** Antennas are employed to couple electromagnetic energy between free space propagation and the energy received or transmitted as a guided wave by a radar system. Antenna dimensions of several wavelengths may be needed to confine an adequate amount of energy.

**Application:** Most antennas are used to serve as both, transmitters and receivers of microwave systems. Most systems require an antenna that tends to concentrate the transmitted energy into a small solid angle, or to receive energy from a specific direction.

**Antenna Gain:** The ability of an antenna to concentrate energy in a particular direction or to be more sensitive to energy incident from a specific direction is described in terms of the antenna gain. Denoted only as the gain, the exact definition would be the power gain of an antenna, which includes losses associated with the antenna, such as ohmic and RF heating.

**Antenna Radiation Pattern:** The spatial distribution of energy when plotted on a relative basis is called the antenna radiation pattern and it is a measure of the power per unit area, also called the power pattern. When measuring the unit per solid angle in a given direction, it is called the radiation intensity pattern.

**Average Power Handling:** This is the maximum allowable power to which the antenna can be subjected to without suffering permanent damage.

**Connectors:** Antennas can be supplied with almost any connector or waveguide configuration, supposing that frequency range and power level are within the connector/waveguide limits.

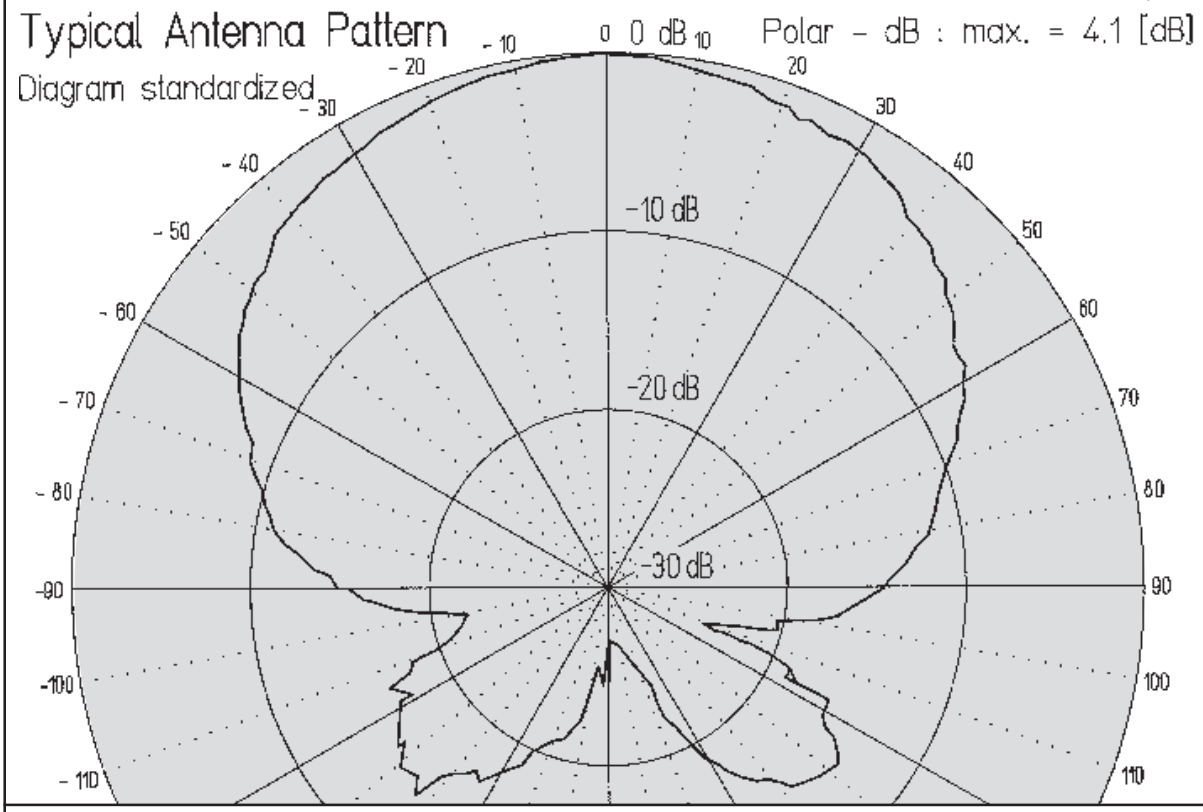
**Custom Designs:** Spectrum Elektrotechnik GmbH has been supplying only antennas that are designed to special requirements. At the time being the company does not compete with standard products that are available from various suppliers.

**Frequency and Bandwidth:** The frequency and bandwidth depend on many parameters, the type and physical structure, dimensions and materials of the antenna, the gain, beam width, polarization, radome, material, shape, etc.

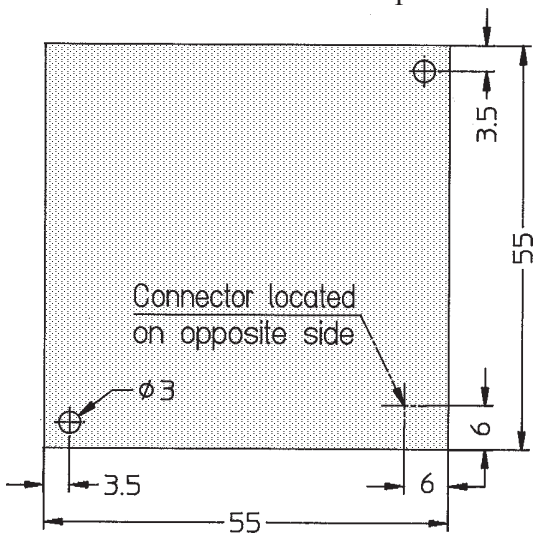
**Operating Temperature Range:** The temperature range is usually very wide, especially for outdoor applications.

**Polarization:** The direction of the polarization is defined as the direction of the electric field vector. The principal planes of the antenna pattern are associated with a linearly polarized component of the electric field and are commonly designated as horizontal or vertical polarizations, so that the antenna patterns are specified as being either horizontal or vertical patterns. For circular polarization the electric field rotates at a frequency equal to the frequency of the propagating wave, e.g. right handed when the direction of rotation of the electric-field vector is clockwise when viewed as a receding wave away from the antenna.

**VSWR:** VSWR is the ratio of the reflected signal and the incident signal, when looking into the antenna from system side. The VSWR for receive and transmit of an antenna may be different.




The Planar Antenna has been designed for OEM - Applications and is operating in the 2.4 GHz Band. The small dimensions and the rugged construction of the device are ideally suited for all applications regarding Wireless Telecommunication such as LAN, PBXs, PCS, PCN, Laptops, etc. The unique design utilizes a board construction that allows lowest cost at high volume. The Antenna can be optimized for any frequency in the ISM band.




| Specification | |
|---|---|
| **Model-No. AN-2424-21** | |
| Frequency Range | 2.45 GHz |
| Antenna Gain | 3.5 dBi |
| Polarization | linear |
| Dimensions | 55mm * 55mm |
| Connector | SMA female |

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# Charged Device Modelling

**INTRODUCTION:** Microelectronic products, semiconductor devices, are used in almost any kind of equipment. These devices may suffer from electronic discharge damage. This can occur, when a device acquires charge through some turboelectric process and then abruptly touches grounded objects. Discharge damage also may occur, when charged personnel is touching grounded devices. To avoid the human body discharge, considerable effort has been made by employing wrist straps, static dissipative flooring, or avoiding human handling completely. But ICs may even already suffer from transportation. Often they are packaged in plastic shipping tubes, made from PVC (Polyvinyl Chloride). Left untreated, the material acts like a charge generator. PVC must be dipped in antistatic solution, but the coating deteriorates with age and wear.

**CDM MODELLING:** In order to find out how safe the semiconductor devices are and what kind of stress, or electronic discharge the semiconductor products can take, test methods were needed to be developed. For simulating controlled discharge at semiconductor devices, a special method, the Charged Device Modelling (CDM) became known.

**THE CDM SIMULATOR:** At a standard charged device modelling simulator the device under test is placed on dielectric, charged by a power supply and discharged through a 1 Ohm resistor that serves to sample the discharge current. The process is then monitored via an oscilloscope, connected to a parallel transmission line. The parasitic inductance, associated with the 1 Ohm resistor, is critical to the proper operation of the circuit.

**THE DISC RESISTOR:** The problem of parasitic inductances can be avoided or at least minimized by its geometrical shape that is most benificial to the circuit. If a disc resistor is used, the current flows radially. By mounting the disc resistor on a coaxial line of same dimensions a CDM (Charged Device Modelling) test can be performed by simply connecting the protruding center conductor of the coaxial line with the device that has been charged.

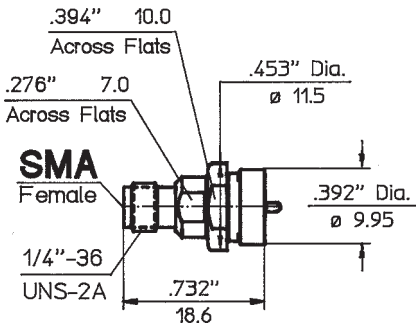
**CALIBRATION:** For calibration purposes the coaxial probe needs a mating receptacle. It must connect to a device that accomodates the protruding center conductor of the probe. The structure of the probe/mating receptacle must maintain a perfect 50 Ohm transmission line, with the only exception of the small area where the 1 Ohm resistor is placed.

**THE HARDWARE:** Spectrum Elektrotechnk GmbH has designed and manufactured a probe that has a standard SMA female connector at one end, and therefore can easily connect to standard transmission lines with SMA connectors. The other side of the unit is equipped with a replaceable center conductor and has a narrow cylindrical area for the 1 Ohm resistor. The replaceable center conductor is of utmost importance, as damages at the center conductor, resulting from arcing when discharging devices, are unavoidable.

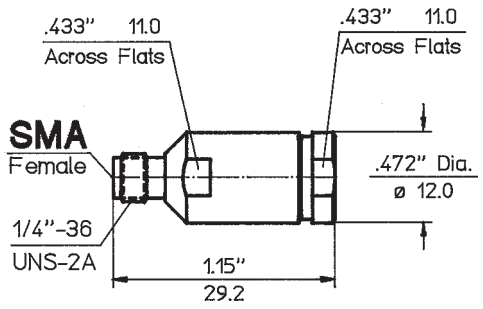
The mating device for calibration purposes accomodates the protruding center conductor of the probe and maintains a perfect 50 Ohm line, with the exception of the area where the one Ohm resistor has been placed. The SMA connector at the other end allows again for connection with standard 50 Ohm transmission lines.

The mounting plate is necessary to accomodate the probe savely in order to mount it on a positioner for accurate placement in relation to the device to be discharged.

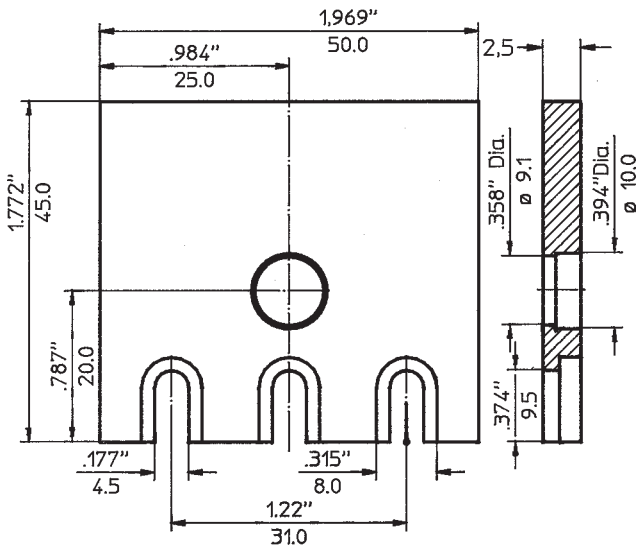
**CUSTOM PRODUCTS:** The CDM Components are custom products, developed to one customers' needs. Spectrum Elektrotechnk GmbH is a very innovative company. Our engineers are constantly designing new products, or modifying existing products to customers' requests. Therefore, our catalogs will never be complete. If you do not find exactly what you need in our catalogs, or other catalogs, please contact our sales or engineering department.




**CDM* - Probe**
**P/N 8001-S001-02**




**CDM* - Probe Test Adapter**
**P/N 8001-S002-02**




**Mounting Plate for CDM* Probe**
**P/N 8001-S003-00**

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* CDM = Charged Device Model

# Custom Connectors/Adapters

**INTRODUCTION:** Spectrum Elektrotechnik GmbH offers a large variety of standard Connectors and Adapters, as shown in "The ´97 Handbook Adapters " and " The ´98 Handbook Microwave Connectors ".
In many applications a standard component will not fit perfectly, or maybe it cannot be used at all. It would be needed a little bit shorter or longer, or narrower, or wider, or would have to meet special electrical requirements, such as higher power or better return loss, or ....etc,.

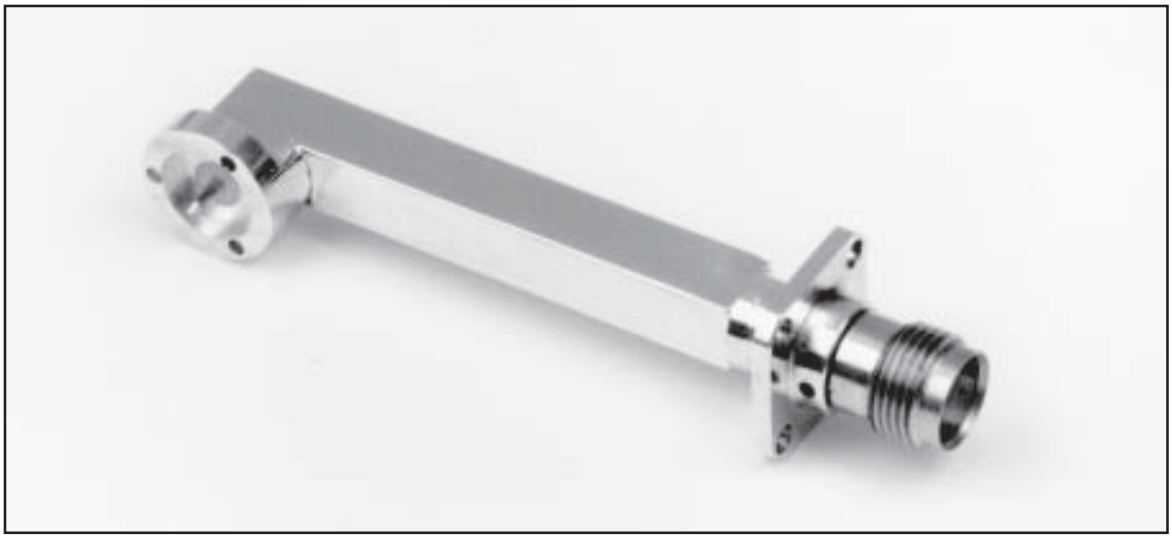
**Applications:** Special Connectors and Adapters are needed in state-of-the-art systems. These systems are following design criteria that are quite different to the standard scheme.
Mechanically they may be more compact, and of lighter weight, therefore cannot use some existing designs. Electrically these systems are to be of superior performance, therefore they have to meet specifications that are almost impossible, needing components to be engineered to excellence, and in detail.

**Frequency:** The frequency for custom designed connectors and adapters ranges is from DC to 50.0 GHz. For this frequency range complete test equipment is available.

**Connector Types:** Besides the connectors, meeting the standard interface specifications, such as MIL-Standards, DIN- or IEC- Specifications, Spectrum Elektrotechnik GmbH has been designing, manufacturing and introducing to the market successfully new Connector Series of Types **SBX**, **SBY** and **SPM**, connectors that were not available at all with the physical and electrical performance, as needed for applications in certain programs.
Additionally, a whole new Product Line was designed: the **PUSH-ON** Connectors and Adapters, being available in **50 Ohms** impedance for Series **7/16, SMA**, **N and TNC**. In **75 Ohms** impedance **PUSH-ON** Connectors of styles **F** and **N** were developed.
Spectrum Elektrotechnik GmbH is open for almost any engineering task. If none of the existing designs can be used, experienced engineering staff is available to develop the component that will meet exactly the requirements.

**Operating Temperature Range:** The normal operating temperature ranges from -54°C to +115°C. For certain programs however, connectors and adapters were designed, allowing a much wider environmental temperature range.
Successful performance has been achieved at lowest temperatures of 20 K, in programs where the components in receivers, used for exploring the universe, are being cooled down to those temperatures because of noise level reasons.
In other programs the opposite was needed, environmental temperatures above 200° C. Using special design techniques and dielectrics, also these requirements were met.

**VSWR:** VSWR is the ratio of the reflected signal and the incident signal.
Spectrum Elektrotechnik GmbH has designed for several programs connectors and adapters showing lowest VSWR. Especially with high power components, reflections are unwanted, as the reflected power will be transformed into heat, causing even higher temperatures and consequently limiting the performance, especially when already operating at higher environmental temperatures.



These special adapters were designed to replace a semi rigid cable of 0.250" diameter. There was a major problem with the cable assembly: it could not be manufactured with repeatable performance, as the cable is quite big in diameter for its short length, therefore difficult to bend. Soldering connectors to such a short assembly is extremely difficult in addition. Using newest complex CNC machinery the outer conductor of the replacing mitre angled adapter was machined in one piece. Designing and developing components using state-of-the-art manufacturing features, results in outstanding mechanical designs with superior electrical performance at higher frequencies.

The special connector above was developed to hook up directly to an aerial, a long whip antenna, as used on radio equipment of vehicles. For achieving superior electrical performance, it incorporates a matching circuit in the connector body. A special quick connection/ disconnection mechanism was developed for this special unit.

Spectrum Elektrotechnik GmbH

# RF Multipin Connector SQ-8



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# RF Multipin Connector SQ-8

**INTRODUCTION:** In various applications it is necessary to connect and disconnect several microwave links. This may happen when testing high frequency systems: four,.... eight, or even more microwave cables need to be connected.
But not only test stations need the connection of several coaxial high frequency cable assemblies. Helicopters and other aircrafts are equipped with equipment that is needed during flight and normally then taken out again after the completed mission.
Using cable assemblies that are terminated with regular connectors, this means threading on the connectors, tightening and torquing, then later loosening and disconnecting again. This is a very time consuming process, which in some cases may even be longer than the test cycle. In any case valuable time is waisted by making connections and disconnections.

**THE SOLUTION:** Spectrum's new 'SQ-8' Multipin connector incorporates EIGHT NEW GENERATION precision microwave connectors. The advantage of being able to connect and disconnect eight microwave links simultaneously is one of its major benefits. The 'SQ-8' is blind mating and automatically locks the individual links into place by using a standard housing per MIL-C-38999, series III, shell size 21. The need for a torque wrench, and the difficulties sometimes experienced with mating miniature connectors in confined space, is eliminated.

**FIELD REPLACEABLE ASSEMBLIES:** Although designed and constructued with reliability and performance foremost in mind, every individual microwave assembly within the component is field replaceable. Everyone of these cable assemblies can be exchanged or replaced in minimum time, by the simple task of engaging or disengaging a bayonet catch. Should one of the assemblies used in the ´SQ-8´ get physically damaged, it can be replaced in no time.
When using the 'SQ-8' Multipin Connector, the design, manufacture, and servicing of RF and microwave systems and test equipments is made infinitely easier. Electrically, the individual RF connector inserts offer an excellent performance, and are comparable, and in some cases better than those exhibited by standard microwave connectors.

**THE CABLES:** The 'SQ-8' Multipin Connector is available for Spectrum´s Type 43 cable with normal deliveries. Additional designs have been completed to accommodate a variety of other cable types. These include cable diameters from 3mm to 5mm, from ultra flexible to extremely rugged, electrically phase stable and very low loss. ´SQ-8´ Connectors for those cables will become available upon demand. Spectrum Elektrotechnik GmbH is a very innovative company, engineering products exactly to the customers' needs.

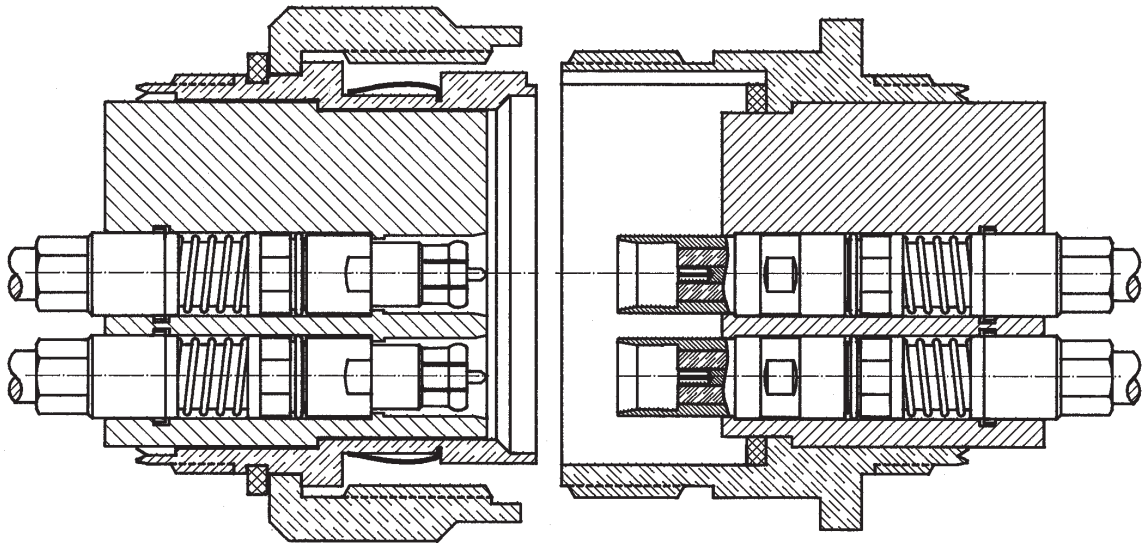
**FUTURE DESIGNS:** The 'SQ-8' may be the fore runner of a series of NEW MULTIPIN CONNECTOR developments. Other choices of outer body shell styling with different number of microwave inserts may become of interest in certain applications. Frequencies up to 50.0 GHz, and above, with combinations of RF-Inserts and regular pins will be engineered and made available, as they become necessary. Shell sizes, other than offered currently may be needed, or shells to newer configurations can be designed and engineered exactly to the customers' requirements.

# RF Multipin Connector SQ-8

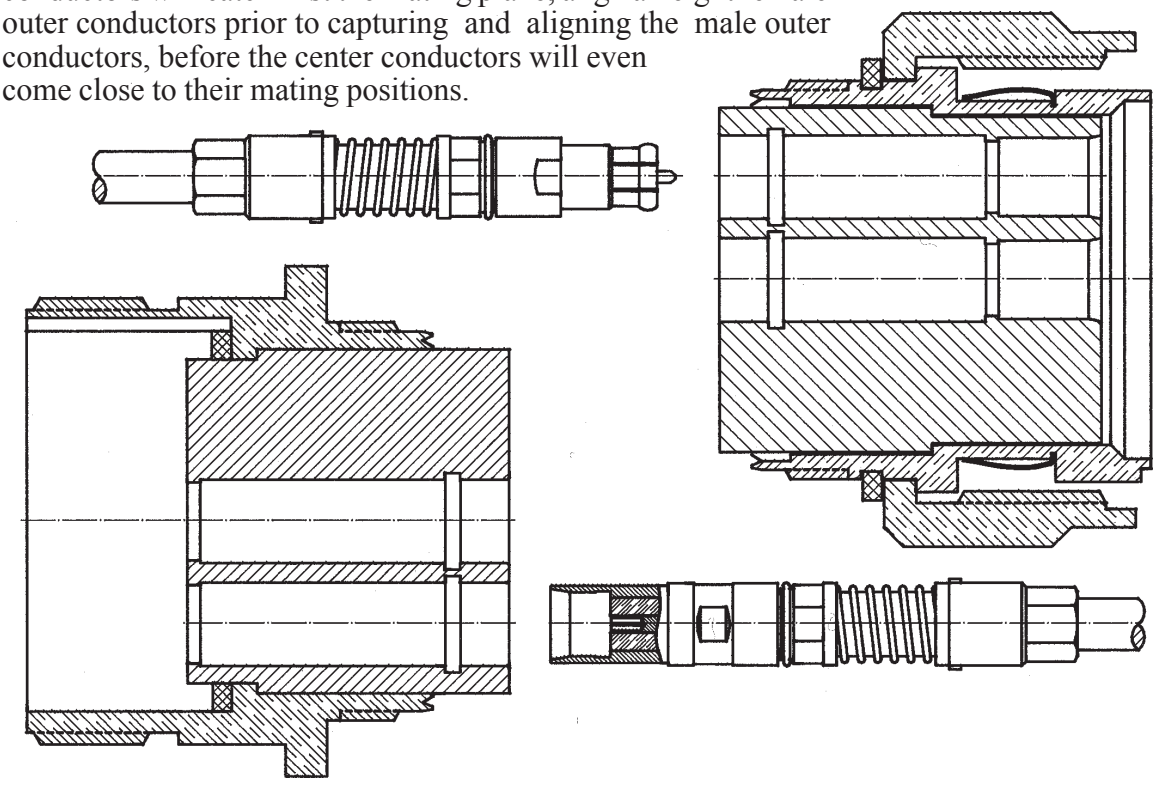
**THE INTERFACES:** When you have eight microwave connections per interface, it has to be ensured that all the connectors are self aligning easily. This guarantees that the connection is made successfully, each time, without the need for additional force during mating. The male inserts at the SQ-8 are designed to be recessed below the reference plane of the SQ-8. Thus the center pins of the inserts are well protected. The outer conductor of the female insert does protrude above the reference plane of the SQ-8. During the mating process the female outer conductor will catch first the mating plane, align automatically all eight female outer conductors prior to capturing the male outer conductors, aligning them, before the center conductors will meet.

**THE INSERTS:** All the inserts, used in the SQ-8, are spring loaded for blind mating/self alignment purposes, and they are equipped with a bayonet catch. Therefore every cable assembly can be replaced in minimum time by simply engaging/disengaging the bayonet catch.

# RF Multipin Connector SQ-8



The cross section view demonstrates the perfect engineering that has been leading to the success of the SQ-8: Every cable assembly terminated with an SQ-8 Insert can be replaced in minimum time by simply engaging/disengaging a bayonet catch. The inserts are spring loaded for blind mating / self alignment purposes. The outer conductor of the female insert does protrude above the reference plane of the SQ-8. During the mating process the female outer conductors will catch first the mating plane, align all eight female outer conductors prior to capturing and aligning the male outer conductors, before the center conductors will even come close to their mating positions.



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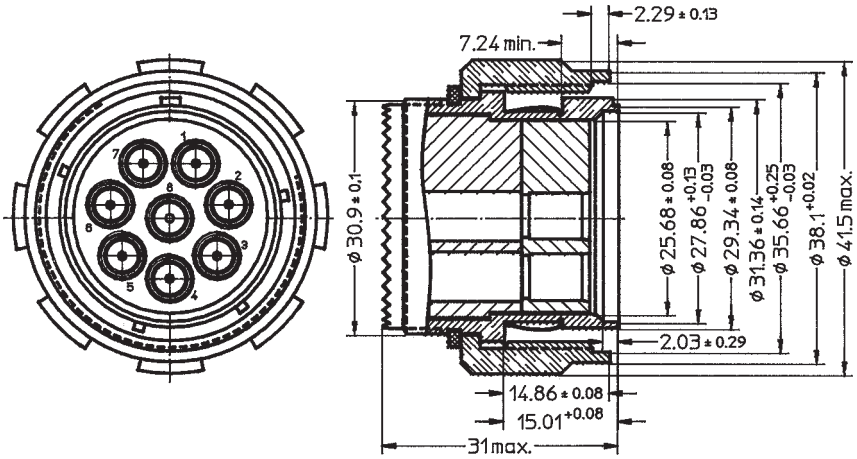
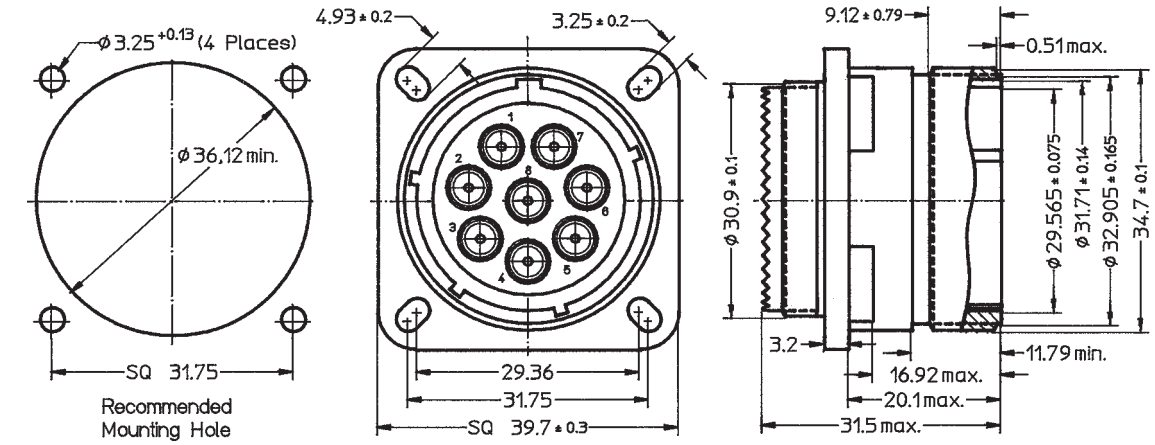
## Interface Mating Dimensions (Per MIL-C-38999, Series III, Shell Size 21)

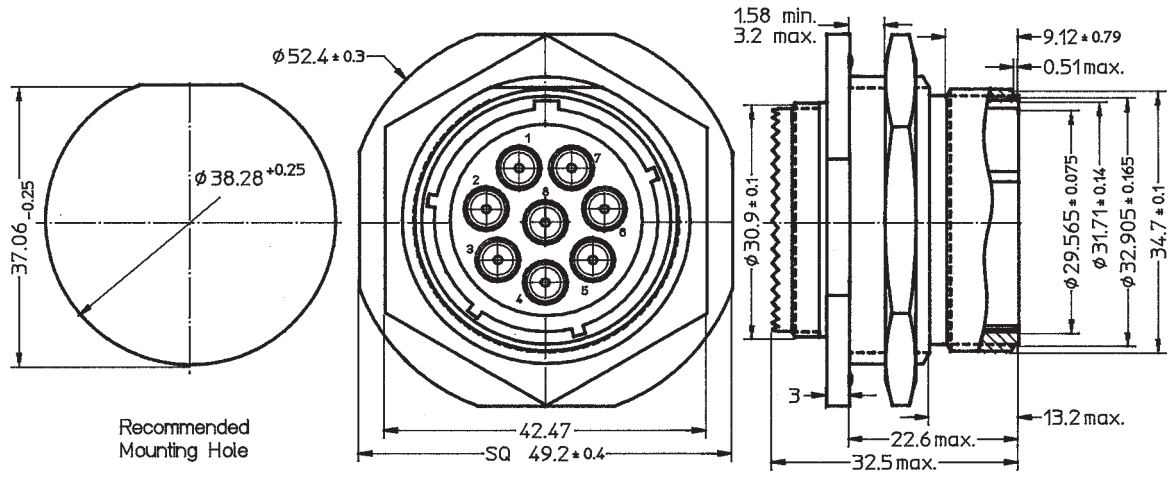



# RF Multipin Connector SQ-8

**SQ-8 MALE Cable Connector** **P/N: SQ-8MLE**




**SQ-8 4 - Hole Flange Mount Jack** **P/N: SQ-8FMJ**




**SQ-8 Bulkhead Feedthrough Jack** **P/N: SQ-8BFJ**

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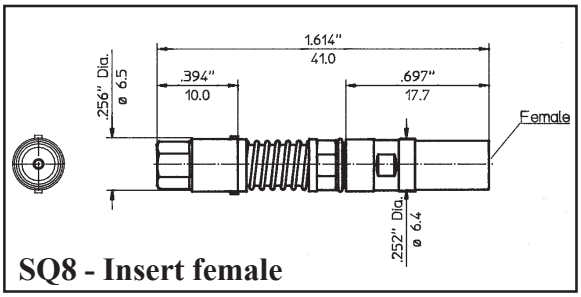
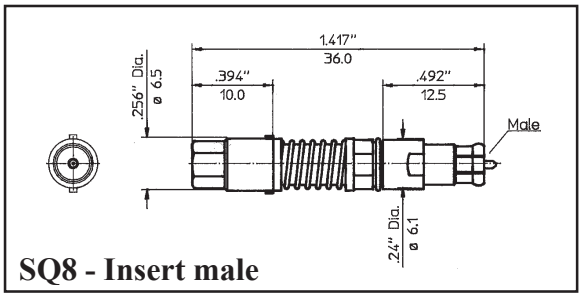
# RF Multipin Connector SQ-8




**SQ8 - Insert female**




**SQ8 - Insert male**

**SPECIFICATIONS OF THE SQ - 8 INSERTS**

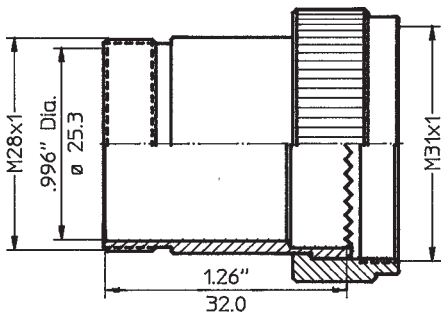
**ELECTRICAL**

| | |
|---|---|
| Frequency Range | DC - 24.0 GHz min., DC - 40.0 GHz optional. |
| Insulation Resistance | The insulation resistance shall not be less than 5,000 megohms. |
| Voltage Standing Wave Ratio (VSWR) | 1.02 + .005 * f (GHz) |
| Contact Resistance | The center contact resistance drop shall not exceed 3.0 milliohms and the outer contact resistance drop shall not exceed 2.0 milliohms. |
| Dielectric Withstanding Voltage | The magnitude of the test voltage shall be 1,000 volts rms at sea level. |
| RF High Potential Withstanding Voltage | The RF high potential withstanding Jvoltage is 670 volts rms at 5 MHz. Leakage is not applicable. |
| RF Leakage | - (100 - f (GHz)) dB |
| Insertion Loss | (.03 SQT(f(GHz))) dB |

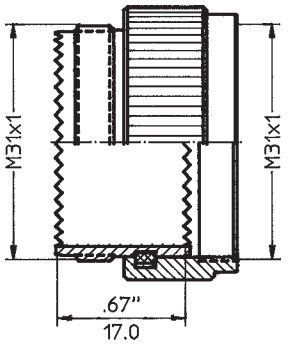
**MECHANICAL**

| | |
|---|---|
| Connector Durability | The connector is to be tested and its mating connector shall be subjected to 500 insertions and withdrawal cycles at 12 cycles per minute max. The connector shall show no evidence of mechanical failure and the connector shall meet the mating characteristic requirements. |
| Cable Retention Force | 60 pounds (267 N) min., without stress relief. |
| Coupling Nut Retention Force | Not applicable. |
| Force to Engage and Disengage | Not applicable. |
| Longitudinal Force max. | Longitudinal force is not applicable. |
| Mating Characteristics | Applicable to Females only: oversize pin .0372 inch (.945 mm) max. dia.,.045 inch (1.14 mm) deep; insertion force 3 lbs. (13.34 N) max. with .037 inch (.94 mm) min. dia. pin; withdrawal force 1.00 oz (.278 N) min. with .0355 inch (.90 mm) max. dia. pin. |
| Recommended Mating Torque | Not applicable. |

**BACK BODIES**




**SQ-8 Standard Back Body**




**SQ-8 Adapter Back Body**

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# TOOLS

**INTRODUCTION:** To manufacture superior products, well educated and trained personnel, state-of-the-art machines and proper and well engineered tooling are necessities. This ensures quality products and competitive pricing. Therefore most of the products are built in companies, specializing in the different product categories.
Cable assemblies are necessary for signal routing between components within a system. Not all of these cable assemblies can be manufactured and then installed in the systems. In some applications the connector is too big in diameter to fit through the slots, the cable has to be pulled through. In those cases the cable has to be terminated with the connector after the cable is put in place. Other examples are laboratories where certain cable assemblies are to be replaced or repaired immediately, etc. For those applications Spectrum Elektrotechnik GmbH is offering a number of tools. But it cannot be expected that these manually used tools are as good as the machines used for the manufacturing of superior cable assemblies at the Cable Assembly Division of Spectrum Elektrotechnik GmbH.
Besides the adequate manufacturing tools, also a number of important test tools are needed, to ensure proper manufacturing and repeatable testing.

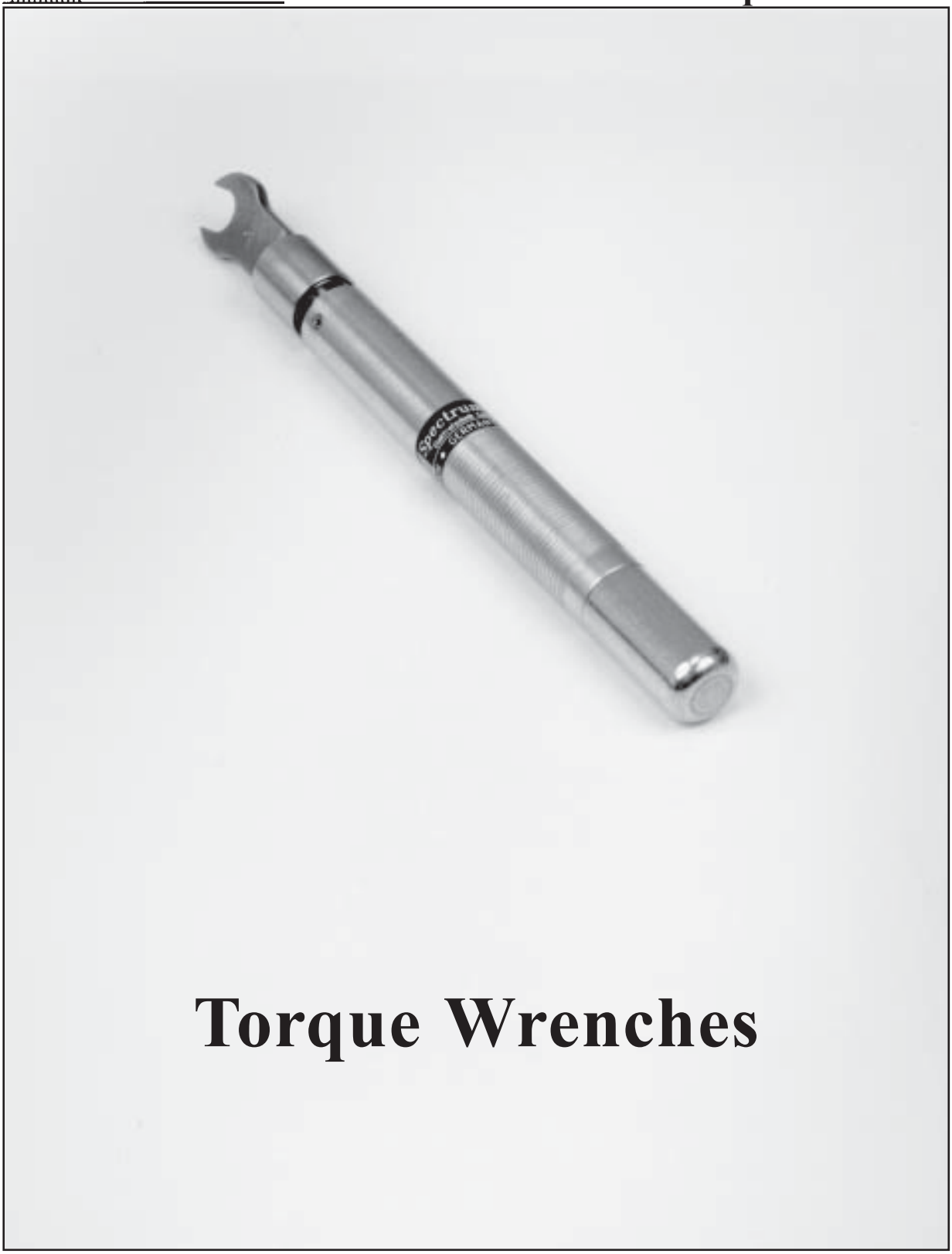
**CABLE TRIMMING TOOLS:** They are used to cut interfaces at semi rigid cables. Others are engineered to cut interfaces at the flexible cable assemblies.

**CRIMPING TOOLS:** Instead of soldering, center contacts and outer conductors can be crimped. The pliers for crimping the center contacts and the pliers used for the outer conductors are different, as much higher pressure is needed for the outer conductors. A variety of inserts can be supplied, as needed for the different cables.

**CONNECTOR INTERFACE GAUGES:** Connector gauges are needed for measuring the critical interface dimensions of coaxial connectors. These connector gauges consist of an especially adapted dial indicator with appropriate bushings and pins that are designed to mate with the specific connector under test. The indicator of each gauge is zero set by a specific master gauge.When engaged to a connector, it measures the specific interface dimension from a specific reference plane. For every dimension of interest, a special gauge is offered. This gives the most accurate results, allows easy calibration, fast and comfortable testing and it helps to avoid mistakes.

**TORQUE WRENCHES:** For proper test results and long life of the connectors the rules need to be obeyed. For each individual connector series a torque has been specified, a torque that ensures proper mating conditions, repeatable electrical performance and guarantees mechanically a long life of the connectors. Using a Torque Wrench guarantees that the connection is not too loose, it also ensures that the connection is not too tight, preventing possible connector damage and impaired electrical performance. Using the Torque Wrench also assures that all connections are equally tight, each time.

**THREAD LIMIT GAUGES:** It is almost a necessity to check the thread of connectors and adapters. Out of limits thread can create serious problems and may damage the connectors of mating components or ruin the connectors at test equipment. Spectrum Elektrotechnik GmbH offers a comprehensive line of thread limit gauges to check the thread on a "GO" / "NO GO" basis.



# Torque Wrenches

# Torque Wrenches

**INTRODUCTION:** Connectors have to be mated and need to be tightened. Some people do it by hand, some use a regular wrench, some use a Torque Wrench.

**TIGHTENING BY HAND:** People who are using nothing but their fingers for tightening, usually undertorque. The electrical performance will vary from tightening to tightening, depending how tired the fingers are. In addition: If the same component is tested several times and by different people using only their fingers for tightening, the electrical performance will even vary more, as different torque will be applied, equivalent to the strength of the individual. But strength does not only depend on the physical ability of the individual, but also one's perception of what constitutes proper torque. Tightening connectors by hand will result from very loose fits to almost correct fits, but usually always incorrect fits. Tightening connectors by hand is obviously inadequate and not recommendable.

**USING A REGULAR WRENCH:** The ones who are using a regular wrench, usually overtorque. Short wrenches may lead to torsional forces that are only a little high, the use of longer wrenches however usually results into applying very high torsion. Overtorquing of up to three times has been seen. This will deform the interface of the connectors, proper test results from then on cannot be obtained anymore.

**USING THE TORQUE WRENCH:** For proper test results and long life of the connectors the rules need to be obeyed. For each individual connector series a torque has been specified, a torque that ensures proper mating conditions, repeatable electrical performance and guarantees mechanically a long life of the connectors. Using the Torque Wrench guarantees that the connection is not too loose, it also ensures that the connection is not too tight, preventing possible connector damage and impaired electrical performance. Using the Torque Wrench also assures that all connections are equally tight, each time.

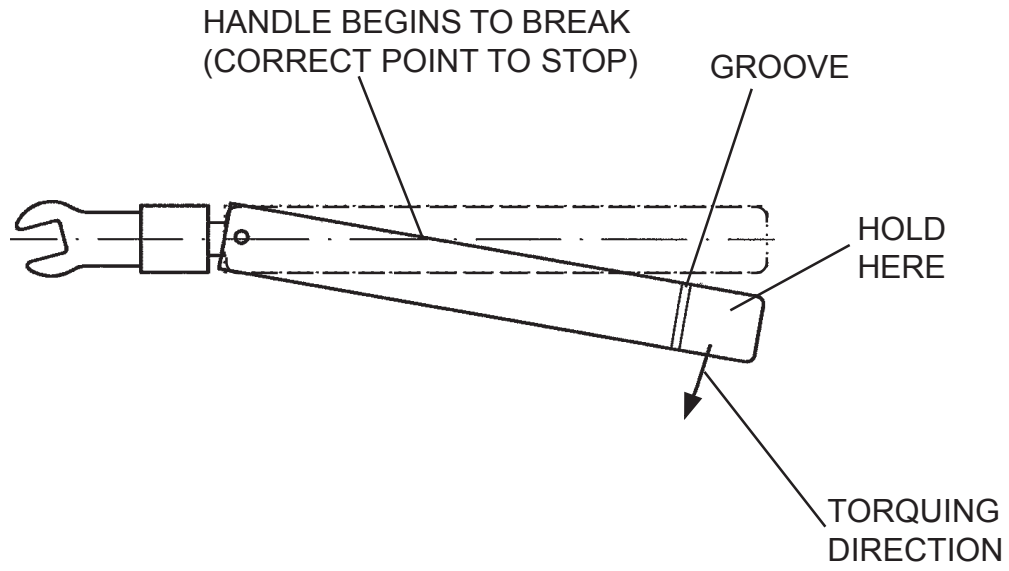
**OPERATING THE TORQUE WRENCH:** Hold the Torque Wrench always at the same point near the end of the handle. Apply force perpendicular to the Wrench, in a plane parallel to the outer conductor mating planes of the connectors. Rotate the connector nut only when tightening the connector. Use an open-end wrench to keep the body of the mating connector from turning, if it is not a fixed test port connector. Position the wrenches within 90° of each other before applying force.

Avoid pivoting the Wrench on your thumb or other fingers, and do not twist the Wrench relative to the outer conductors mating plane of the connectors. This would result into applying an additional and unknown amount of torque to the connection.

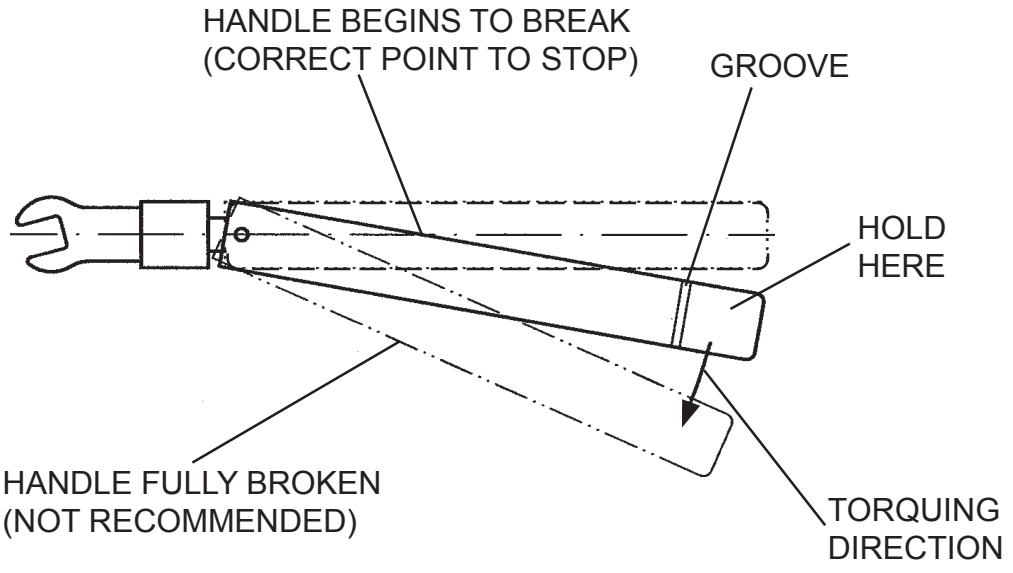
**DIFFERENT TORQUE WRENCHES:** Spectrum Electrotechnik GmbH manufactures two different types of Torque Wrenches for most of the connector series:

**The Wrench with only the Break Point:** The Wrench is employing a "Break Point", when the specific torque has been reached. But having heard and felt the Break, a further torquing would be possible. This Wrench has been designed for people that are sensitive and very conscientious (Torque Wrenches are Series: WE-D.....).

**The Torque Wrench that breaks completely:** For the smaller connector series that can suffer most from overtorquing, this Wrench has been designed that "Fully Breaks". After the Break Point has been reached, it almost moves freely in an angle of 90° (Series WE-B.....).




**Torque Wrenches, Model Nos. WE-D..... employing only the "Break Point".**




**Torque Wrenches, Model Nos. WE-B..... These Wrenches break completely.**

# Torque Wrenches

| Connector Type | Remarks | Torque Wrench "Break Point" Model No. | Torque Wrench "Fully Breaks" Model No. | Wrench Size (inches) | Wrench Size (mm) | Preset Torque (in./lbs.) | Preset Torque (Ncm) |
|---|---|---|---|---|---|---|---|
| **2.4mm** | | **WE - D108** | **WE - B108** | 5/16" | 7.94 | 9.0 | 100 |
| **2.4mm** | **Maxi Nut** | **WE - D117** | **WE - B117** | 9/16" | 14.29 | 9.0 | 100 |
| **3.5mm** | | **WE - D100** | **WE - B100** | 5/16" | 7.94 | 8.0 | 90 |
| **3.5mm** | **Maxi Nut** | **WE - D103** | **WE - B103** | 9/16" | 14.29 | 8.0 | 90 |
| **7mm** | | **WE - D107** | **WE - B107** | 3/4" | 19.05 | 16.0 | 180 |
| **HN** | | **WE - D116** | **WE - B116** | 7/8" | 22.2 | 16.0 | 180 |
| **K* (2.9mm)** | | **WE - D100** | **WE - B100** | 5/16" | 7.94 | 8.0 | 90 |
| **K* (2.9mm)** | **Maxi Nut** | **WE - D103** | **WE - B103** | 9/16" | 14.29 | 8.0 | 90 |
| **N** | | **WE - D101** | **WE - B101** | 11/16" | 17.46 | 13.0 | 150 |
| **N** | | **WE - D105** | **WE - B105** | 3/4" | 19.05 | 13.0 | 150 |
| **NMD 2.4** | | **WE - D115** | **WE - B115** | 3/4" | 19.05 | 9.0 | 100 |
| **NMD 2.9** | | **WE - D114** | **WE - B114** | 3/4" | 19.05 | 8.0 | 90 |
| **NMD 3.5** | | **WE - D114** | **WE - B114** | 3/4" | 19.05 | 8.0 | 90 |
| **SC** | | **WE - D111** | **WE - B111** | 13/16" | 20.60 | 13.0 | 150 |
| **SMA** | | **WE - D100** | **WE - B100** | 5/16" | 7.94 | 8.0 | 90 |
| **SMA** | **Maxi Nut** | **WE - D103** | **WE - B103** | 9/16" | 14.29 | 8.0 | 90 |
| **SSMA** | | **WE - D106** | **WE - B106** | 1/4" | 6.35 | 5.0 | 55 |
| **SMP** | **Calibration Components** | **WE - D109** | **WE - B109** | .354" | 9.0 | 6.2 | 70 |
| **SPM** | | **WE - D113** | **WE - B113** | 5/16" | 7.94 | 8.0 | 90 |
| **TNC** | | **WE - D102** | **WE - B102** | 9/16" | 14.29 | 13.0 | 150 |
| **TNX** | | **WE - D112** | **WE - B112** | 9/16" | 14.29 | 23.0 | 260 |
| **Spectrum's Interchangeable Connector** | | **WE - DE01** | **WE - BE01** | 9/16" | 14.29 | 35.4 | 400 |

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* 'K' Connector is a trademark of Wiltron Company.


# Connector Interface Gauges

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# Connector Interface Gauges

**INTRODUCTION:** Testing the interfaces of connectors and adapters upon incoming inspection is not only highly recommended, it is definitely a necessity. Interfaces not meeting specification will not only lead to degraded specification of the components, furthermore, these out of specification interfaces may damage the connectors of mating components or ruin the connectors of test equipment.

**CHECKING THE INTERFACE:** Spectrum Elektrotechnik GmbH manufactures a comprehensive line of connector gauges for measuring the critical interface dimensions of coaxial connectors. These connector gauges consist of an especially adapted dial indicator with appropriate bushings and pins that are designed to mate with the specific connector under test. The indicator of each gauge is zero set by a specific master gauge. When engaged to a connector, it measures the specific interface dimension from a specific reference plane. For every dimension of interest, a special gauge will be offered. This gives the most accurate results, allows easy calibration, fast testing and helps to avoid mistakes.

**RESOLUTION:** A number of gauges are available. The models are shown to the right. The main difference between these four types of gauges is the different resolution as well as the units of measurement: inches or metric. Only the digital gauges can be switched from metric to inch and vice versa.

**"HAND-HELD" VERSUS "THREAD-ON":** Most Gauges shown are available as "Hand-Held" or "Thread-On". The faster testing is possible by using the "Hand-Held" gauges, the more accurate readings will be achieved from the "Thread-On" gauges, as threading on the gauges will perfectly align them with the connector. Hand-Held means aligning gauge and connector freely, which may allow for mistakes.

**INTERFACE DIMENSIONS:** Complete interface dimensions are shown in section VII.4. of the " '98 Handbook Test Necessities & Accessories ". The important measurements are marked clearly for every connector series:Dimensions, highlighted in an oval shape, are recommended for verification as a minimum. The connector gauges mea suring these dimensions are included in the Expanded Calibration Kit and the Professional Kit as well.

Dimensions, highlighted in a rectangular block are recommended for verification in addition to the dimensions highlighted in an oval shape. Checking all these dimensions will guarantee optimum performance of the connectors. The necessary connector gauges to measure all those dimensions are included in the Professional Calibration Kit only.

**USING CONNECTOR GAUGES:** Select the correct gauge for the connector under test. Inspect the gauge and the appropriate calibration block (master) and make sure that both are in good condition and clean. (Dirt on the gauge or the master will lead to inaccurate measurements and can transfer dirt to the connectors and damage them during gauging). Attach the calibration block carefully to the gauge. Zero the gauge by moving the dial until the gauge pointer reads zero. To verify that the setting is correct and repeatable, remove the calibration block and then attach it a second time.
When testing the connectors, make sure that they are not damaged and clean. When using the "Thread-On" gauges, tighten the connection with the appropriate Torque Wrench only.

# Connector Interface Gauges


**Type H: This gauge is available with a resolution of 0.005mm, or 0.0001 inches.**


**Type K: This gauge is available with a resolution of 0.01mm, or 0.001 inches.**


**Type D: This gauge employs a digital readout and can be switched from a resolution of 0.01mm to 0.0005 inches.**


**Type T: This gauge uses a resolution of 0.001 mm and it is available in metric only.**

# Ordering Information, Connector Gauges Kits

**INFORMATION ON HOW TO ORDER CONNECTOR GAUGES:** Spectrum Elektrotechnik GmbH has set up an easy to use part number system. The customer can compose his part number, describing completely the Connector Interface Gauge Kit, he is ordering. The table below explains the system and describes the possible alternatives.

**THE MEASUREMENT:** The Letter **B** identifies the units of the dial readings, which either can be in millimeters or inches.

**THE CONNECTOR SERIES:** The four letters **CDEF** are used to recognize the connector series, the Kit is needed for. Please replace these four letters by the code used for identifying the connector series, as listed below.

**THE KIT:** The letter **H** is to be replaced by the letter **S** when a Standard Kit is ordered, and by the letter **P**, when the Professional Kit is specified.

**THE TYPE OF GAUGES:** The Gauges are usually available as "Hand Held" or "Thread On". The faster testing is possible by using the "Hand Held" gauges, the more accurate readings will be achieved from the "Thread On" gauges, as threading on the gauges will perfectly align them with the connector. Hand Held means aligning gauge and connector freely, which may allow for mistakes. The letters **JK** are to be replaced by **HH**, when Hand Held Gauges are specified, and with **MG**, when Thread On Gauges are needed.

**THE RESOLUTION:** The letter **L** has to be replaced by the code that is used to identify the resolution. Resolutions of 0.01mm to 0.001mm, and 0.001 inches to 0.0001 inches are available. For the appropriate letter coding please refer to the table below.

**FOR MORE INFORMATION:** Please refer to the" '99 Handbook Test Necessities & Accessories ".

# GB - CDEF - HJKL

**B:** to be replaced with the letter **I** or **M** according to the units of measurement of the gauge required.

**I** = Inch
**M** = Metric

**CDEF:** to be replaced with one of the following digit number/letter Code, describing Connectors as listed below.

| | | | |
|---|---|---|---|
| **2400** | = 2.4mm | **SBY0** | = SBY |
| **3500** | = 3.5mm | **SC00** | = SC |
| **7000** | = 7mm | **SMA0** | = SMA |
| **7160** | = 7/16 | **SSMA** | = SSMA |
| **BMA0** | = BMA | **SMP0** | = SMP |
| **BNC0** | = BNC | **SMPT** | = SMP Test Connector |
| **C000** | = C | **SPM0** | = SPM |
| **HN00** | = HN | **TNC3** | = TNC per MIL-C-39012 |
| **2920** | = K* | | |
| **N000** | = N | **TNC8** | = TNC per MIL-C-87104/2 |
| **N750** | = N 75Ω | | |
| **SBX0** | = SBX | **TNX0** | = TNX |

**H:** to be replaced with one of the following letters for the option required.

**S** = Standard Kit
**P** = Professional Kit

**JK:** to be replaced with the letters **HH** or **MG** according to the type of gauge required.

**HH** = Hand Held
**MG** = "Thread-On"

**L = Resolution**

| | mm | inches |
|---|---|---|
| **H =** | 0.005 | 0.0001 |
| **K =** | 0.01 | 0.001 |
| **T =** | 0.001 | - |
| **D =** | Digital Gauge 0.01mm/ 0.0005" | |

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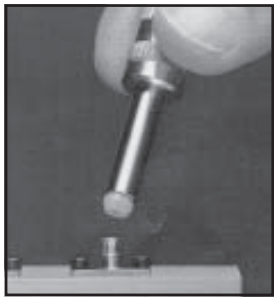
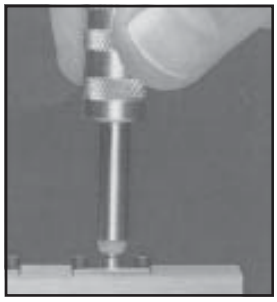
# TOOLS

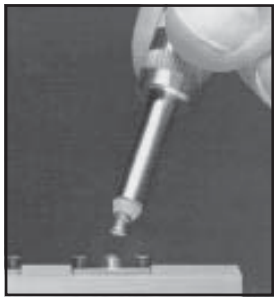
# SMP "Bullet" Removal/Installation Tool



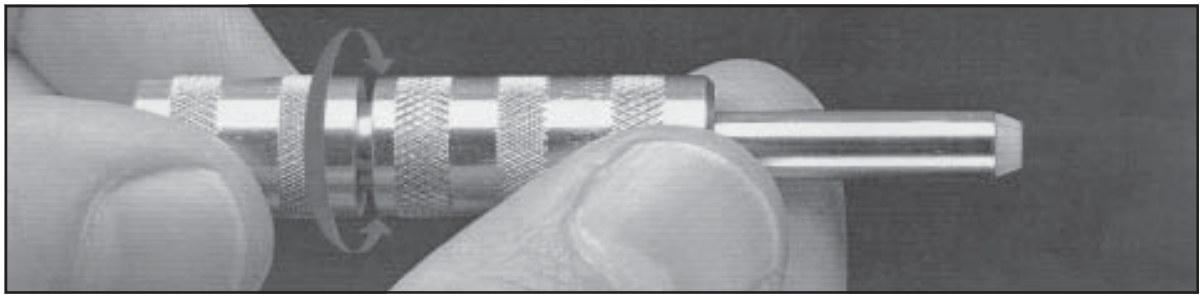
Spectrum Elektrotechnik GmbH has introduced the WE - 6313, an all new tool for removing or installing the "bullets" used in its subminiature push-on SMP series of connectors.

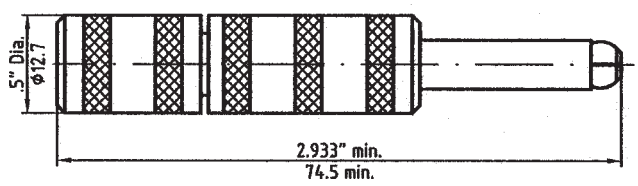


Because of their small size, SMP bullets can be particularly difficult to remove once they are mated with other SMP family components.



However, the WE - 6313 can grasp the part securely in its slotted Delrin jaws so it can be removed without damage.






By rotating the stainless steel tool's handle clockwise its jaws can be opened to accept or release the part. Rotate the handle counterclockwise and jaws close to grasp the bullet.

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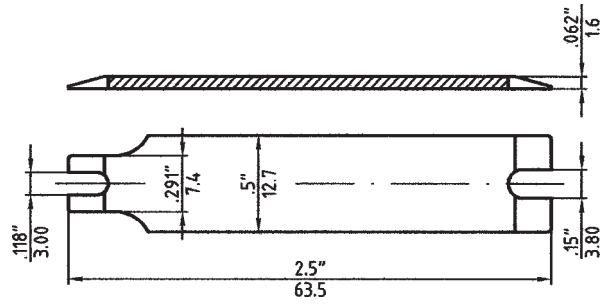
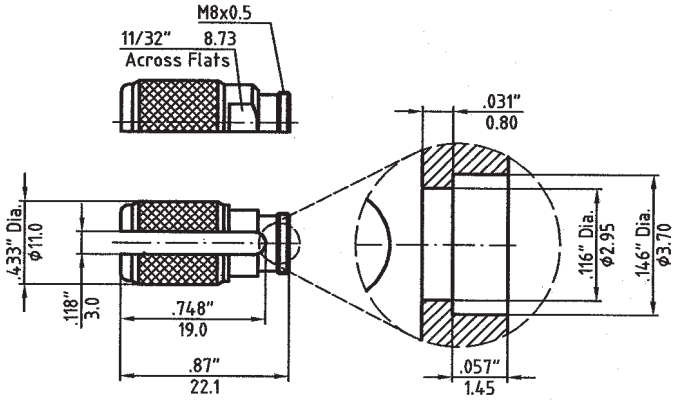
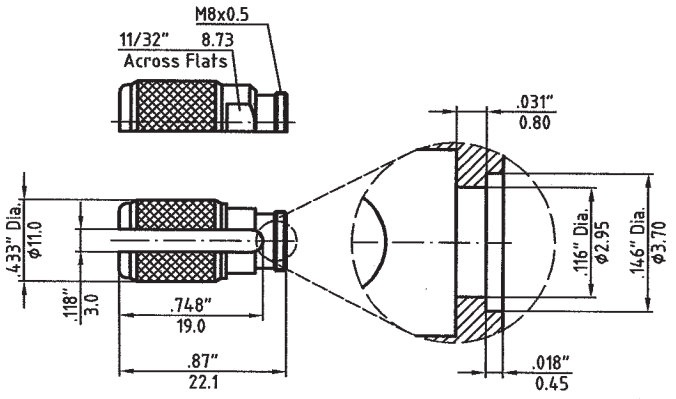


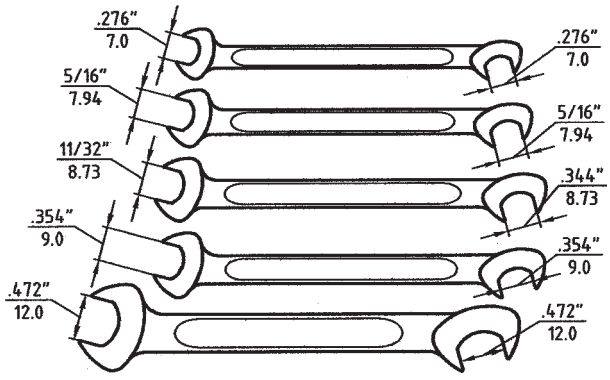

**SMP Withdrawal Tool for female connectors, Part Number: T - 6298**




**Insert/Holding/Withdrawal Tool for straight SMP female connectors, Part Number: WE - SMPL**

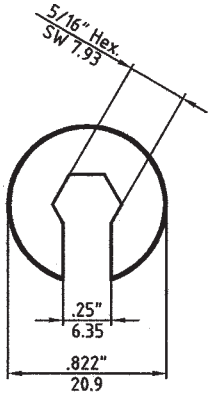



**Insert/Holding/Withdrawal Tool for straight SMP female connectors, Part Number: WE - SMPS**

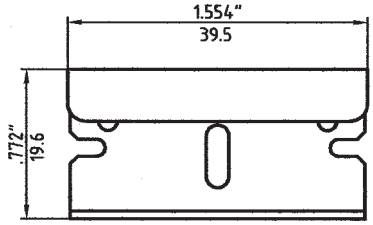



**Set of Double ended wrenches, Part Number: WE - WSET**

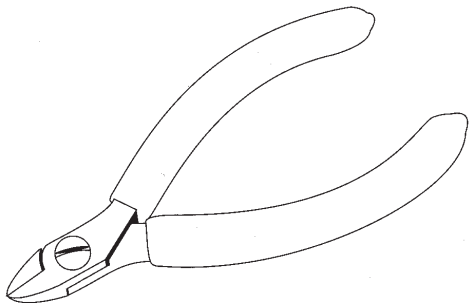
**The "fingersaver" is an effective gadget for tightening and loosening SMA male connectors.**
**Part Number: WE - F100**




**Single edged razor blades.**
**(5 pieces)**
**Part Number: WE - K005**

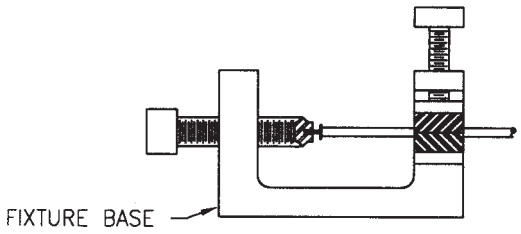



**Side cutting pliers.**
**Part Number: WE - A140**

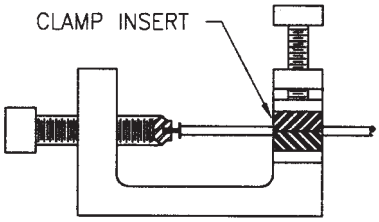


**Pin wrench.**
**Part Number:**
**WE - P019**
**WE - P026**
**WE - P040**

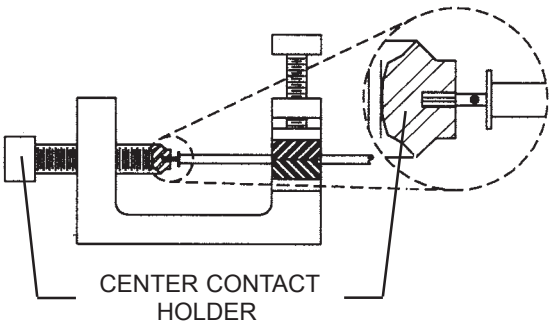
**Fixture base.**
**Part Number: WE - 6053**



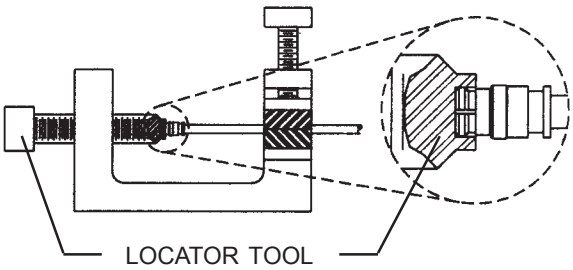

**Clamp insert.**
**Part Number:**
**WE - 6055-2 for S/R .085"**
**WE - 6055-3 for S/R .047"**



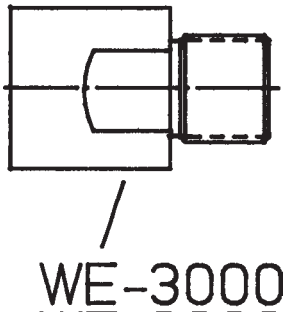

**Center contact holder.**
**Part Number:**
**WE - 6057**
**WE - 6307**



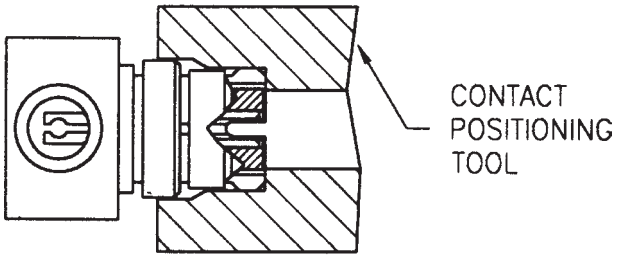

**Locator tool**
**Part Number:**
**WE - 6292**
**WE - 6295**
**WE - 6296-1**
**WE - 6296-2**
**WE - 6296-3**
**WE - 6308**



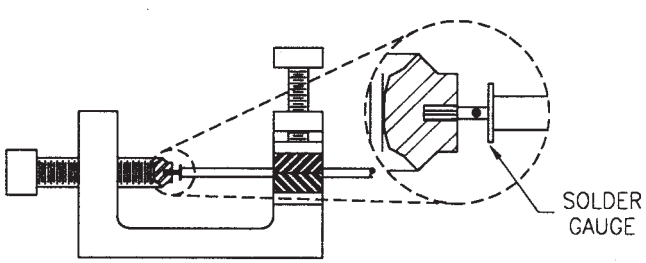
**Clamping Tool.**
**Part Number: WE - 3000**



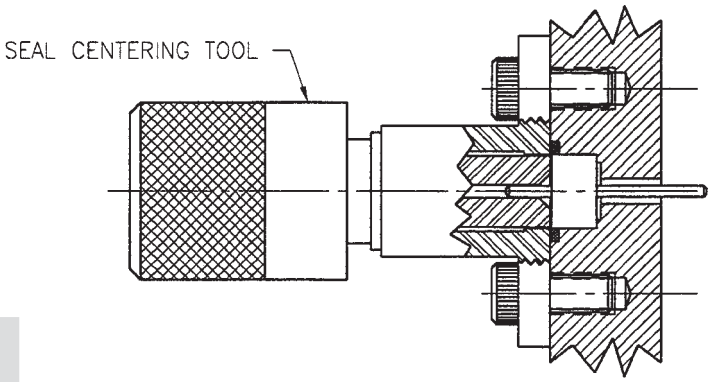

**Contact positioning tool.**
**Part Number:**
**WE - 6290**




**Soldering gauge.**
**Part Number: WE - 6294**




**Seal centering tool.**
**Part Number: WE - 6304**

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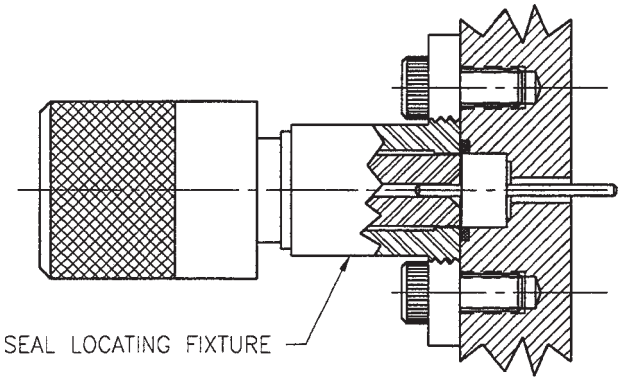
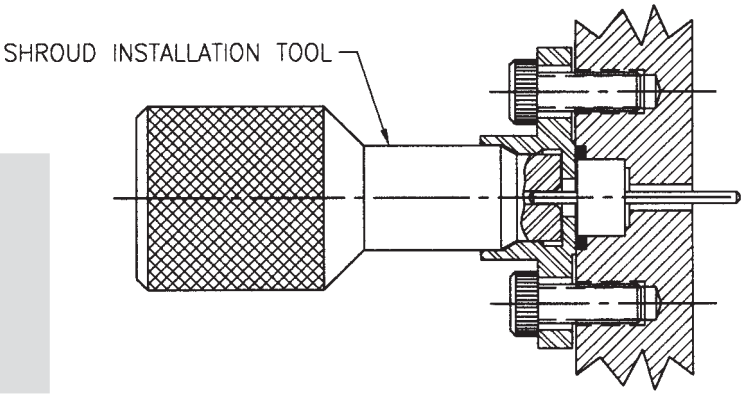
**Seal locating fixture.**
**Part Number:**
**WE - 6305-1**
**WE - 6305-2**
**WE - 6305-3**




**Shroud installation tool.**
**Part Number:**
**WE - 6301-1**
**WE - 6301-2**
**WE - 6301-3**
**WE - 6301-4**



Calibration Kits are designed and manufactured to the highest standards.
A Calibration Kit should not only include the standards needed for the calibration. It is furthermore very helpful to have handy the necessary adapters, gauges and wrenches as well.
Every Calibration Kit is supplied with a parts list, identifying the individual components and their part numbers.
A certificate guarantees that the calibration Kit meets the appropriate standards and requirements.

Spectrum Elektrotechnik GmbH

## 18.0 GHz SMP Calibration Kit

### MODEL NO.:CSMP-WILT-18

### Parts List S/N: 011

**MODEL NO.:CSMP-WILT-18**
**Precision 18.0 GHz Calibration Kit supplied for Wiltron 360, using K*connectors.**
**The Calibration Kit consists of the following:**

| | |
|---|---|
| 1 pce Precision Standard SMP Short female | 1130-2101-02 S/N |
| 1 pce Precision Standard SMP Short male | 1130-1101-02 S/N |
| 1 pce Precision Standard SMP Open female | 1140-2102-02 S/N |
| 1 pce Precision Standard SMP Open male | 1140-1102-02 S/N |
| 2 pcs Precis.Stand.Terminations SMP female | TE-0018-MP01 |
| 2 pcs Precis.Stand.Terminations SMP male | TE-0018-MJ01 |
| 1 pce Throughline SMP female/SMP female | 8002-MPMP-02 |
| 1 pce Throughline SMP female/SMP male | 8001-MJMP-02 |
| 1 pce Throughline SMP male/SMP male | 8001-MJMJ-02 |
| 1 pce Interface Gauge SMP female, CC | IG-SMPF-CC01 S/N |
| 1 pce Interface Gauge SMP female, Diel. | IG-SMPF-D001 S/N |
| 1 pce Interface Gauge SMP male, CC | IG-SMPM-CC01 S/N |
| 1 pce Interface Gauge SMP male, Diel. | IG-SMPM-D001 S/N |
| 1 pce Master female | IG-SMPF-M001 S/N |
| 1 pce Master male | IG-SMPM-M001 S/N |
| 1 pce Torque Wrench, 0.6 Nm for SMP | WE-D109 |
| 5 pcs Regular Wrenches | 7mm, 9mm, 12mm, 5/16", 11/32" |
| 1 pce SMP Withdrawal Tool | T-6298 |
| 2 pcs I.H.W. Tool for straight connectors | 2x WE-SMPL |
| 2 pcs I.H.W. Tool for straight connectors | 2x WE-SMPS |
| 1 pce Prec. Adapter/B.M. SMPm. to K*male | 8009-KMMJ-02 |
| 1 pce Prec. Adapter/B.M. SMPm. to K*fem. | 8005-KFMJ-02 |
| 1 pce Comm. Adapter/B.M. SMPm. to K*m. | 8010-KMMJ-02 |
| 1 pce Comm. Adapter/B.M. SMPm. to K*fem. | 8010-KFMJ-02 |
| 1 pce Precision Adapter SMP fem. to K*male | 8003-KMMP-02 |
| 1 pce Precision Adapter SMP fem. to K*fem. | 8003-KFMP-02 |
| 1 pce Disc containing Calibration Properties | |

**ABBREVIATIONS:**
**B.M.:** Bayonet Mount, used to hold in place during testing the SMP right angle.
**CC:** Center Contact
**Diel.:** Dielectric
**I.H.W.:** Insertion/Holding/Withdrawal

* 'K' Connector is a trademark of Wiltron Company.

Spectrum Elektrotechnik GmbH P.O. Box 45 05 33, 80905 Munich, Germany **Tel. (89) 354 804-0, Fax (89) 354 804-90** (Country Code: 49)

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Spectrum Elektrotechnik GmbH

# Assembly Instructions

# Assembly Instructions Index

| Connector Part No. | Assembly Instruction | Special Information |
|---|---|---|
| 11F2-6301-00 | SMP 315 | WE-6053, WE-6055-2, WE-6307, WE-6308 |
| 11F2-6302-00 | SMP 315 | WE-6053, WE-6055-2, WE-6307, WE-6308 |
| 11F2-6401-00 | SMP 309 | WE-6053, WE-6055-2, WE-6294, WE-6295 |
| 11F2-6402-00 | SMP 309 | WE-6053, WE-6055-2, WE-6294, WE-6295 |
| 11F3-21J1-02 | SMPT 200 | A=3.00 (.118") |
| 11F3-21J2-02 | SMPT 200 | A=3.00 (.118") |
| 11F3-6301-00 | SMP 315 | WE-6053, WE-6055-2, WE-6307, WE-6308 |
| 11F3-6302-00 | SMP 315 | WE-6053, WE-6055-2, WE-6307, WE-6308 |
| 11F3-6401-00 | SMP 309 | WE-6053, WE-6055-2, WE-6294, WE-6295 |
| 11F3-6402-00 | SMP 309 | WE-6053, WE-6055-2, WE-6294, WE-6295 |
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| 11F3-6404-00 | - | T.B.A. |
| 11F3-6405-00 | - | T.B.A. |
| 11F3-6406-00 | - | T.B.A. |
| 11F9-1101-02 | - | T.B.A. |
| 11F9-1102-02 | - | T.B.A. |
| 11F9-1103-02 | SMP 306 | WE-6306, WE-6307-1 |
| 11F9-1104-02 | - | T.B.A. |
| 11F9-5401-40 | SMP 293 | A=4.55/4.60 (.179"/.181"), B=4.04/4.09 (.159".161"), C=3.15/3.20 (.124"/.126"); WE-6296-1 |
| 11F9-5402-40 | SMP 293 | A=4.72/4.78 (.186"/.188"), B=4.22/4.27 (.166".168"), C=3.25/3.30 (.128"/.130"); WE-6296-1 |
| 11F9-5403-40 | SMP 293 | A=5.23/5.28 (.206"/.208"), B=4.72/4.78 (.186".188"), C=3.25/3.30 (.128"/.130"); WE-6296-1 |
| 11F9-5405-40 | - | T.B.A. |
| 11F9-6301-02 | SMP 305 | WE-6301-1 |
| 11F9-6302-02 | SMP 305 | WE-6301-1 |
| 11F9-6303-02 | SMP 305 | WE-6301-1 |
| 11F9-6304-02 | SMP 305 | WE-6301-1 |
| 11L2-6301-00 | SMP 315 | WE-6053, WE-6055-2, WE-6307, WE-6308 |
| 11L2-6302-00 | SMP 315 | WE-6053, WE-6055-2, WE-6307, WE-6308 |
| 11L2-6401-00 | SMP 309 | WE-6053, WE-6055-2, WE-6294, WE-6295 |
| 11L2-6402-00 | SMP 309 | WE-6053, WE-6055-2, WE-6294, WE-6295 |
| 11L3-21J1-02 | SMPT 200 | A=3.00 (.118") |
| 11L3-21J2-02 | SMPT 200 | A=3.00 (.118") |
| 11L3-6301-00 | SMP 315 | WE-6053, WE-6055-2, WE-6307, WE-6308 |
| 11L3-6302-00 | SMP 315 | WE-6053, WE-6055-2, WE-6307, WE-6308 |
| 11L3-6401-00 | SMP 309 | WE-6053, WE-6055-2, WE-6294, WE-6295 |
| 11L3-6402-00 | SMP 309 | WE-6053, WE-6055-2, WE-6294, WE-6295 |
| 11L3-6403-00 | - | T.B.A. |
| 11L3-6404-00 | - | T.B.A. |
| 11L3-6405-00 | - | T.B.A. |

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| Connector Part No. | Assembly Instruction | Special Information |
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| 11L3-6406-00 | - | T.B.A. |
| 11L9-1101-02 | - | T.B.A. |
| 11L9-1102-02 | - | T.B.A. |
| 11L9-1103-02 | SMP 306 | WE-6306, WE-6307-2 |
| 11L9-1104-02 | - | T.B.A. |
| 11L9-5401-40 | SMP 293 | A=4.55/4.60 (.179"/.181"), B=4.04/4.09 (.159".161"), C=3.15/3.20 (.124"/.126"); WE-6296-2 |
| 11L9-5402-40 | SMP 293 | A=4.72/4.78 (.186"/.188"), B=4.22/4.27 (.166".168"), C=3.25/3.30 (.128"/.130"); WE-6296-2 |
| 11L9-5403-40 | SMP 293 | A=5.23/5.28 (.206"/.208"), B=4.72/4.78 (.186".188"), C=3.25/3.30 (.128"/.130"); WE-6296-2 |
| 11L9-5404-40 | - | T.B.A. |
| 11L9-5405-40 | - | T.B.A. |
| 11L9-6301-02 | SMP 305 | WE-6301-3 |
| 11L9-6302-02 | SMP 305 | WE-6301-3 |
| 11L9-6303-02 | SMP 305 | WE-6301-3 |
| 11L9-6304-02 | - | T.B.A. |
| 11N9-6301-02 | SMP 305 | WE-6301-2 |
| 11N9-6302-02 | SMP 305 | WE-6301-2 |
| 11N9-6303-02 | SMP 305 | WE-6301-2 |
| 11N9-6304-02 | - | T.B.A. |
| 11S2-6301-00 | SMP 315 | WE-6053, WE-6055-2, WE-6307, WE-6308 |
| 11S2-6302-00 | SMP 315 | WE-6053, WE-6055-2, WE-6307, WE-6308 |
| 11S2-6401-00 | SMP 309 | WE-6053, WE-6055-2, WE-6294, WE-6295 |
| 11S2-6402-00 | SMP 309 | WE-6053, WE-6055-2, WE-6294, WE-6295 |
| 11S3-21C1-02 | SMPT 100 | A=3.00 (.118") |
| 11S3-21C2-02 | SMPT 100 | A=3.00 (.118") |
| 11S3-21J1-02 | SMPT 200 | A=3.00 (.118") |
| 11S3-21J2-02 | SMPT 200 | A=3.00 (.118") |
| 11S3-21P1-02 | SMPT 100 | A=3.00 (.118") |
| 11S3-21P2-02 | SMPT 100 | A=3.00 (.118") |
| 11S3-6301-00 | SMP 315 | WE-6053, WE-6055-2, WE-6307, WE-6308 |
| 11S3-6302-00 | SMP 315 | WE-6053, WE-6055-2, WE-6307, WE-6308 |
| 11S3-6401-00 | SMP 309 | WE-6053, WE-6055-2, WE-6294, WE-6295 |
| 11S3-6402-00 | SMP 309 | WE-6053, WE-6055-2, WE-6294, WE-6295 |
| 11S3-6403-00 | - | T.B.A. |
| 11S3-6404-00 | - | T.B.A. |
| 11S3-6405-00 | - | T.B.A. |
| 11S3-6406-00 | - | T.B.A. |
| 11S3-6407-00 | SMP 401 | A=1.40 (.055") |
| 11S3-6408-00 | SMP 401 | A=1.40 (.055") |
| 11S3-6409-00 | SMP 401 | A=1.40 (.055") |

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| Connector Part No. | Assembly Instruction | Special Information |
|---|---|---|
| 11S3-6410-00 | SMP 401 | A=1.40 (.055") |
| 11S9-1101-02 | - | T.B.A. |
| 11S9-1102-02 | - | T.B.A. |
| 11S9-1103-02 | SMP 306 | WE-6306, WE-6307-3 |
| 11S9-1104-02 | - | T.B.A. |
| 11S9-5401-40 | SMP 293 | A=4.55/4.60 (.179"/.181"), B=4.04/4.09 (.159".161"), C=3.15/3.20 (.124"/.126"); WE-6296-3 |
| 11S9-5402-40 | SMP 293 | A=4.72/4.78 (.186"/.188"), B=4.22/4.27 (.166".168"), C=3.25/3.30 (.128"/.130"); WE-6296-3 |
| 11S9-5403-40 | SMP 293 | A=5.23/5.28 (.206"/.208"), B=4.72/4.78 (.186".188"), C=3.25/3.30 (.128"/.130"); WE-6296-3 |
| 11S9-5405-40 | - | T.B.A. |
| 11S9-6301-02 | SMP 305 | WE-6301-4 |
| 11S9-6302-02 | SMP 305 | WE-6301-4 |
| 11S9-6303-02 | SMP 305 | WE-6301-4 |
| 1102-2101-04 | SMP 292 | WE-6053, WE-6055-3, WE-6057, WE-6294, WE-6295 |
| 1102-2102-04 | SMP 292 | WE-6053, WE-6055-3, WE-6057, WE-6294, WE-6295 |
| 1102-2103-04 | SMP 292 | WE-6053, WE-6055-3, WE-6057, WE-6294, WE-6295 |
| 1102-2104-04 | SMP 292 | WE-6053, WE-6055-3, WE-6057, WE-6294, WE-6295 |
| 1102-3401-04 | SMP 291 | WE-6053, WE-6055-3, WE-6292 , WE-6294 |
| 1102-3402-04 | SMP 291 | WE-6053, WE-6055-3, WE-6292 , WE-6294 |
| 1102-3403-04 | SMP 291 | WE-6053, WE-6055-3, WE-6292 , WE-6294 |
| 1102-3404-04 | SMP 291 | WE-6053, WE-6055-3, WE-6292 , WE-6294 |
| 1102-3405-04 | - | T.B.A. |
| 1102-3406-04 | - | T.B.A. |
| 1102-3407-04 | - | T.B.A. |
| 1102-3408-04 | - | T.B.A. |
| 1102-3409-04 | SMP 311 | WE-6053, WE-6055-2, WE-6295 |
| 1102-3410-04 | SMP 311 | WE-6053, WE-6055-2, WE-6295 |
| 1102-3411-04 | SMP 311 | WE-6053, WE-6055-2, WE-6295 |
| 1102-3412-04 | SMP 311 | WE-6053, WE-6055-2, WE-6295 |
| 1102-3413-04 | SMP 291 | WE-6053, WE-6055-3, WE-6292 , WE-6294 |
| 1102-3414-04 | SMP 291 | WE-6053, WE-6055-3, WE-6292 , WE-6294 |
| 1102-3415-04 | SMP 291 | WE-6053, WE-6055-3, WE-6292 , WE-6294 |
| 1102-3416-04 | SMP 291 | WE-6053, WE-6055-3, WE-6292 , WE-6294 |
| 1102-3417-04 | - | T.B.A. |
| 1102-3418-04 | - | T.B.A. |
| 1102-6501-04 | - | T.B.A. |
| 1102-6502-04 | - | T.B.A. |
| 1102-6505-04 | SMP 330 | |
| 1102-6601-00 | SMP 313 | WE-6053, WE-6055-2, WE-6307, WE-6308 |
| 1103-2102-04 | SMP 292 | WE-6053, WE-6055-2, WE-6057, WE-6294, WE-6295 |

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| Connector Part No. | Assembly Instruction | Special Information |
|---|---|---|
| 1103-2103-04 | SMP 292 | WE-6053, WE-6055-2, WE-6057, WE-6294, WE-6295 |
| 1103-2104-04 | SMP 292 | WE-6053, WE-6055-2, WE-6057, WE-6294, WE-6295 |
| 1103-2105-04 | SMP 292 | WE-6053, WE-6055-2, WE-6057, WE-6294, WE-6295 |
| 1103-2106-04 | SMP 292 | WE-6053, WE-6055-2, WE-6057, WE-6294, WE-6295 |
| 1103-2107-04 | SMP 292 | WE-6053, WE-6055-2, WE-6057, WE-6294, WE-6295 |
| 1103-2108-04 | - | T.B.A. |
| 1103-3401-04 | SMP 291 | WE-6053, WE-6055-2, WE-6292 , WE-6294 |
| 1103-3402-04 | SMP 291 | WE-6053, WE-6055-2, WE-6292 , WE-6294 |
| 1103-3403-04 | SMP 291 | WE-6053, WE-6055-2, WE-6292 , WE-6294 |
| 1103-3404-04 | SMP 291 | WE-6053, WE-6055-2, WE-6292 , WE-6294 |
| 1103-3405-04 | - | T.B.A. |
| 1103-3406-04 | - | T.B.A. |
| 1103-3407-04 | - | T.B.A. |
| 1103-3408-04 | - | T.B.A. |
| 1103-3409-04 | SMP 311 | WE-6053, WE-6055-2, WE-6295 |
| 1103-3410-04 | SMP 311 | WE-6053, WE-6055-2, WE-6295 |
| 1103-3411-04 | SMP 311 | WE-6053, WE-6055-2, WE-6295 |
| 1103-3412-04 | SMP 311 | WE-6053, WE-6055-2, WE-6295 |
| 1103-3413-04 | SMP 291 | WE-6053, WE-6055-2, WE-6292 , WE-6294 |
| 1103-3414-04 | SMP 291 | WE-6053, WE-6055-2, WE-6292 , WE-6294 |
| 1103-3415-04 | SMP 291 | WE-6053, WE-6055-2, WE-6292 , WE-6294 |
| 1103-3416-04 | SMP 291 | WE-6053, WE-6055-2, WE-6292 , WE-6294 |
| 1103-3417-04 | SMP 291 | WE-6053, WE-6055-2, WE-6292 , WE-6294 |
| 1103-3418-04 | SMP 291 | WE-6053, WE-6055-2, WE-6292 , WE-6294 |
| 1103-3419-04 | - | T.B.A. |
| 1103-3420-04 | - | T.B.A. |
| 1103-6501-04 | - | T.B.A. |
| 1103-6502-04 | - | T.B.A. |
| 1103-6601-00 | SMP 313 | WE-6053, WE-6055-2, WE-6307, WE-6308 |
| 1113-2101-04 | - | T.B.A. |
| 1113-2102-04 | - | T.B.A. |
| 1113-2103-04 | - | T.B.A. |
| 1113-2104-04 | - | T.B.A. |
| 1113-2105-04 | - | T.B.A. |
| 1113-2106-04 | - | T.B.A. |
| 1113-2107-04 | - | T.B.A. |
| 1113-2108-04 | - | T.B.A. |
| 1113-3401-04 | - | T.B.A. |
| 1113-3402-04 | - | T.B.A. |

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| Connector Part No. | Assembly Instruction | Special Information |
|---|---|---|
| 1113-3403-04 | - | T.B.A. |
| 1113-3404-04 | - | T.B.A. |
| 1113-3405-04 | - | T.B.A. |
| 1113-3406-04 | - | T.B.A. |
| 1113-3407-04 | - | T.B.A. |
| 1113-3408-04 | - | T.B.A. |
| 1113-3409-04 | - | T.B.A. |
| 1113-3410-04 | - | T.B.A. |
| 1113-3411-04 | - | T.B.A. |
| 1113-3412-04 | - | T.B.A. |
| 1113-3413-04 | - | T.B.A. |
| 1113-3414-04 | - | T.B.A. |
| 1113-3415-04 | - | T.B.A. |
| 1113-3416-04 | - | T.B.A. |
| 1113-6501-04 | - | T.B.A. |
| 1113-6502-04 | - | T.B.A. |
| 1113-6601-00 | - | T.B.A. |
| 1113-6602-00 | - | T.B.A. |
| 1113-6603-00 | - | T.B.A. |
| 1113-6604-00 | - | T.B.A. |
| 2R13-RM01-02 | - | T.B.A. |
| 2R13-RM02-02 | SMA 101 | |
| 2R13-RM03-02 | SMA 101 | |
| 2R13-RM04-02 | SMA 101 | |
| 2R15-RM01-02 | SMA 200 | A=4.80 (.189"), B=8.80 (.346"), C=0, WE-P019 |
| 2R15-RM02-02 | SMA 200 | A=4.80 (.189"), B=8.80 (.346"), C=0, WE-P019 |
| 2R15-RM03-02 | SMA 101 | A=4.80 (.189"), B=8.80 (.346"), C=0 |
| 2R15-RM04-02 | SMA 101 | A=4.80 (.189"), B=8.80 (.346"), C=0 |
| 2R15-RM05-02 | SMA 101 | A=4.80 (.189"), B=8.80 (.346"), C=0 |
| 2R15-RM06-02 | SMA 101 | A=4.80 (.189"), B=8.80 (.346"), C=0 |
| 2R15-RM07-02 | SMA 101 | A=4.80 (.189"), B=8.80 (.346"), C=0 |
| 2R15-RM08-02 | SMA 101 | A=4.80 (.189"), B=8.80 (.346"), C=0 |
| 2013-SM01-02 | - | T.B.A. |
| 2013-SM02-02 | SMA 101 | |
| 2013-SM03-02 | SMA 101 | |
| 2013-SM04-02 | SMA 101 | |
| 2015-SM01-02 | SMA 200 | A=4.80 (.189"), B=8.80 (.346"), C=0, WE-P019 |
| 2015-SM02-02 | SMA 200 | A=4.80 (.189"), B=8.80 (.346"), C=0, WE-P019 |
| 2015-SM03-02 | SMA 101 | A=4.80 (.189"), B=8.80 (.346"), C=0 |

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| 2015-SM04-02 | SMA 101 | A=4.80 (.189"), B=8.80 (.346"), C=0 |
| 2015-SM05-02 | SMA 101 | A=4.80 (.189"), B=8.80 (.346"), C=0 |
| 2015-SM06-02 | SMA 101 | A=4.80 (.189"), B=8.80 (.346"), C=0 |
| 2015-SM07-02 | SMA 101 | A=4.80 (.189"), B=8.80 (.346"), C=0 |
| 2015-SM08-02 | SMA 101 | A=4.80 (.189"), B=8.80 (.346"), C=0 |
| 2302-1101-02 | BMA 50 | A=2.70 (.106") |
| 2302-6101-02 | BMA 70 | A=2.70 (.106") |
| 2302-6201-02 | BMA 70 | A=2.70 (.106") |
| 2303-1101-02 | BMA 51 | A=4.20 (.165") |
| 2303-6101-02 | BMA 71 | A=4.20 (.165") |
| 2303-6201-02 | BMA 71 | A=4.20 (.165") |
| 2312-1102-02 | BMA 100 | A=2.70 (.106"), B=5.50 (.217"), C=0 |
| 2312-6102-02 | BMA 200 | A=2.70 (.106"), B=5.50 (.217"), C=0 |
| 2312-6202-02 | BMA 200 | A=2.70 (.106"), B=5.50 (.217"), C=0 |
| 2313-1101-02 | BMA 100 | A=2.70 (.106"), B=5.50 (.217"), C=0 |
| 2313-1102-02 | BMA 100 | A=2.70 (.106"), B=5.50 (.217"), C=0 |
| 2313-6101-02 | BMA 200 | A=2.70 (.106"), B=5.50 (.217"), C=0 |
| 2313-6102-02 | BMA 200 | A=2.70 (.106"), B=5.50 (.217"), C=0 |
| 2313-6201-02 | BMA 200 | A=2.70 (.106"), B=5.50 (.217"), C=0 |
| 2313-6202-02 | BMA 200 | A=2.70 (.106"), B=5.50 (.217"), C=0 |
| 2315-1102-02 | BMA 101 | A=4.20 (.165"), B=8.80 (.346"), C=0 |
| 2315-1103-02 | BMA 101 | A=4.20 (.165"), B=8.80 (.346"), C=0 |
| 2315-1104-02 | BMA 101 | A=4.20 (.165"), B=8.80 (.346"), C=0 |
| 2315-6101-02 | BMA 201 | A=4.20 (.165"), B=8.80 (.346"), C=0 |
| 2315-6102-02 | BMA 201 | A=4.20 (.165"), B=8.80 (.346"), C=0 |
| 2315-6103-02 | BMA 201 | A=4.20 (.165"), B=8.80 (.346"), C=0 |
| 2315-6202-02 | BMA 201 | A=4.20 (.165"), B=8.80 (.346"), C=0 |
| 2315-6203-02 | BMA 201 | A=4.20 (.165"), B=8.80 (.346"), C=0 |
| 2315-6204-02 | BMA 201 | A=4.20 (.165"), B=8.80 (.346"), C=0 |
| 3015-NDB1-13 | N 710 | A=4.70 (.185"), B=8.80 (.346"), C=0, E=0.35 (.014"), WE-P026 |
| 3015-NDB2-13 | N 710 | A=4.70 (.185"), B=8.80 (.346"), C=0, E=0.35 (.014"), WE-P026 |
| 3015-NDC1-13 | N 710 | A=4.70 (.185"), B=8.80 (.346"), C=0, E=0.35 (.014"), WE-P026 |
| 3015-NDC2-13 | N 710 | A=4.70 (.185"), B=8.80 (.346"), C=0, E=0.35 (.014"), WE-P026 |
| 3015-NDL1-02 | N 710 | A=4.70 (.185"), B=8.80 (.346"), C=0, E=0.35 (.014"), WE-P026 |
| 3015-NDL2-02 | N 710 | A=4.70 (.185"), B=8.80 (.346"), C=0, E=0.35 (.014"), WE-P026 |
| 3015-NDS1-02 | N 710 | A=4.70 (.185"), B=8.80 (.346"), C=0, E=0.35 (.014"), WE-P026 |
| 3015-NDS2-02 | N 710 | A=4.70 (.185"), B=8.80 (.346"), C=0, E=0.35 (.014"), WE-P026 |
| 3015-NLB1-13 | N 710 | A=4.70 (.185"), B=8.80 (.346"), C=0, E=0.35 (.014"), WE-P026 |
| 3015-NLB2-13 | N 710 | A=4.70 (.185"), B=8.80 (.346"), C=0, E=0.35 (.014"), WE-P026 |

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| Connector Part No. | Assembly Instruction | Special Information |
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| 3015-NL01-02 | N 710 | A=4.70 (.185"), B=8.80 (.346"), C=0, E=0.35 (.014"), WE-P026 |
| 3015-NL02-02 | N 710 | A=4.70 (.185"), B=8.80 (.346"), C=0, E=0.35 (.014"), WE-P026 |
| 3015-NNB1-13 | N 710 | A=4.70 (.185"), B=8.80 (.346"), C=0, E=0.35 (.014"), WE-P026 |
| 3015-NNB2-13 | N 710 | A=4.70 (.185"), B=8.80 (.346"), C=0, E=0.35 (.014"), WE-P026 |
| 3015-NN01-02 | N 710 | A=4.70 (.185"), B=8.80 (.346"), C=0, E=0.35 (.014"), WE-P026 |
| 3015-NN02-02 | N 710 | A=4.70 (.185"), B=8.80 (.346"), C=0, E=0.35 (.014"), WE-P026 |
| 3015-NS05-02 | N 710 | A=4.70 (.185"), B=8.80 (.346"), C=0, E=0.35 (.014"), WE-P026 |
| 3015-NS06-02 | N 710 | A=4.70 (.185"), B=8.80 (.346"), C=0, E=0.35 (.014"), WE-P026 |
| 3015-NSB1-13 | N 710 | A=4.70 (.185"), B=8.80 (.346"), C=0, E=0.35 (.014"), WE-P026 |
| 3015-NSB2-13 | N 710 | A=4.70 (.185"), B=8.80 (.346"), C=0, E=0.35 (.014"), WE-P026 |
| 3017-NDB1-13 | N 720 | A=4.00 (.157"), B=12.50 (.492"), E=4.70 (.185"), F=0.60 (.024"), WE-P026 |
| 3017-NDC1-13 | N 720 | A=4.00 (.157"), B=12.50 (.492"), E=4.70 (.185"), F=0.60 (.024"), WE-P026 |
| 3017-NDL1-02 | N 720 | A=4.00 (.157"), B=12.50 (.492"), E=4.70 (.185"), F=0.60 (.024"), WE-P026 |
| 3017-NDS1-02 | N 720 | A=4.00 (.157"), B=12.50 (.492"), E=4.70 (.185"), F=0.60 (.024"), WE-P026 |
| 3017-NLB1-13 | N 720 | A=4.00 (.157"), B=12.50 (.492"), E=4.70 (.185"), F=0.60 (.024"), WE-P026 |
| 3017-NL01-02 | N 720 | A=4.00 (.157"), B=12.50 (.492"), E=4.70 (.185"), F=0.60 (.024"), WE-P026 |
| 3017-NNB1-13 | N 720 | A=4.00 (.157"), B=12.50 (.492"), E=4.70 (.185"), F=0.60 (.024"), WE-P026 |
| 3017-NN01-02 | N 720 | A=4.00 (.157"), B=12.50 (.492"), E=4.70 (.185"), F=0.60 (.024"), WE-P026 |
| 3017-NS04-02 | N 720 | A=4.00 (.157"), B=12.50 (.492"), E=4.70 (.185"), F=0.60 (.024"), WE-P026 |
| 3017-NSB1-13 | N 720 | A=4.00 (.157"), B=12.50 (.492"), E=4.70 (.185"), F=0.60 (.024"), WE-P026 |
| 4015-TN01-02 | TNC 710 | A=4.70 (.185"), B=8.80 (.346"), C=0, E=0.35 (.014"), WE-P026 |
| 4015-TN02-02 | TNC 710 | A=4.70 (.185"), B=8.80 (.346"), C=0, E=0.35 (.014"), WE-P026 |
| 4015-TR01-02 | TNC 710 | A=4.70 (.185"), B=8.80 (.346"), C=0, E=0.35 (.014"), WE-P026 |
| 4015-TR02-02 | TNC 710 | A=4.70 (.185"), B=8.80 (.346"), C=0, E=0.35 (.014"), WE-P026 |
| 4015-TS01-02 | TNC 710 | A=4.70 (.185"), B=8.80 (.346"), C=0, E=0.35 (.014"), WE-P026 |
| 4015-TS02-02 | TNC 710 | A=4.70 (.185"), B=8.80 (.346"), C=0, E=0.35 (.014"), WE-P026 |
| 4017-TN01-02 | TNC 720 | A=4.00 (.157"), B=12.50 (.492"), E=4.70 (.185"), F=0.60 (.024"), WE-P026 |
| 4017-TR01-02 | TNC 720 | A=4.00 (.157"), B=12.50 (.492"), E=4.70 (.185"), F=0.60 (.024"), WE-P026 |
| 4017-TS01-02 | TNC 720 | A=4.00 (.157"), B=12.50 (.492"), E=4.70 (.185"), F=0.60 (.024"), WE-P026 |
| 4215-TN01-02 | TNC 710 | A=4.70 (.185"), B=8.80 (.346"), C=0, E=0.35 (.014"), WE-P026 |
| 4215-TN02-02 | TNC 710 | A=4.70 (.185"), B=8.80 (.346"), C=0, E=0.35 (.014"), WE-P026 |
| 4215-TR01-02 | TNC 710 | A=4.70 (.185"), B=8.80 (.346"), C=0, E=0.35 (.014"), WE-P026 |
| 4215-TR02-02 | TNC 710 | A=4.70 (.185"), B=8.80 (.346"), C=0, E=0.35 (.014"), WE-P026 |
| 4215-TS01-02 | TNC 710 | A=4.70 (.185"), B=8.80 (.346"), C=0, E=0.35 (.014"), WE-P026 |
| 4215-TS02-02 | TNC 710 | A=4.70 (.185"), B=8.80 (.346"), C=0, E=0.35 (.014"), WE-P026 |
| 4217-TN01-02 | TNC 720 | A=4.00 (.157"), B=12.50 (.492"), E=4.70 (.185"), F=0.60 (.024"), WE-P026 |
| 4217-TR01-02 | TNC 720 | A=4.00 (.157"), B=12.50 (.492"), E=4.70 (.185"), F=0.60 (.024"), WE-P026 |
| 4217-TS01-02 | TNC 720 | A=4.00 (.157"), B=12.50 (.492"), E=4.70 (.185"), F=0.60 (.024"), WE-P026 |
| 7515-7NB1-13 | - | in development |

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| Connector Part No. | Assembly Instruction | Special Information |
|---|---|---|
| 7515-7NB2-13 | - | in development |
| 7515-7N01-02 | - | in development |
| 7515-7N02-02 | - | in development |
| 7515-7RB1-13 | - | in development |
| 7515-7RB2-13 | - | in development |
| 7515-7R01-02 | - | in development |
| 7515-7R02-02 | - | in development |
| 7515-7SB1-13 | - | in development |
| 7515-7SB2-13 | - | in development |
| 7515-7S01-02 | - | in development |
| 7515-7S02-02 | - | in development |
| 7517-7NB2-13 | 7/16 720 | A=4.00 (.157"), B=12.50 (.492"), E=4.70 (.185"), WE-3000, WE-P040 |
| 7517-7N01-02 | 7/16 720 | A=4.00 (.157"), B=12.50 (.492"), E=4.70 (.185"), WE-3000, WE-P040 |
| 7517-7SB1-13 | 7/16 720 | A=4.00 (.157"), B=12.50 (.492"), E=4.70 (.185"), WE-3000, WE-P040 |
| 7517-7R01-02 | 7/16 720 | A=4.00 (.157"), B=12.50 (.492"), E=4.70 (.185"), WE-3000, WE-P040 |
| 7517-7RB1-13 | 7/16 720 | A=4.00 (.157"), B=12.50 (.492"), E=4.70 (.185"), WE-3000, WE-P040 |
| 7517-7S01-02 | 7/16 720 | A=4.00 (.157"), B=12.50 (.492"), E=4.70 (.185"), WE-3000, WE-P040 |
| 7803-6001-02 | - | in development |
| 7803-6002-02 | - | in development |
| 7803-7001-02 | - | in development |
| 7803-7002-02 | - | in development |
| 7806-6001-02 | SBX 101 | A=4.60 (.181"), E=0.40 (.016") |
| 7806-6002-02 | SBX 101 | A=4.60 (.181"), E=0.40 (.016") |
| 7806-6003-02 | SBX 101 | A=4.60 (.181"), E=0.40 (.016") |
| 7806-6004-02 | SBX 101 | A=4.60 (.181"), E=0.40 (.016") |
| 7806-7001-02 | SBX 100 | A=4.60 (.181"), E=0.40 (.016") |
| 7806-7002-02 | SBX 100 | A=4.60 (.181"), E=0.40 (.016") |
| 7806-7003-02 | SBX 100 | A=4.60 (.181"), E=0.40 (.016") |
| 7806-7004-02 | SBX 100 | A=4.60 (.181"), E=0.40 (.016") |
| 7815-6001-02 | - | in development |
| 7815-6002-02 | - | in development |
| 7815-6003-02 | - | in development |
| 7815-6004-02 | - | in development |
| 7815-7001-02 | - | in development |
| 7815-7002-02 | - | in development |
| 7815-7003-02 | - | in development |
| 7815-7004-02 | - | in development |
| 7817-6001-02 | SBX 203 | A=4.00 (.157"), B=12.50 (.492"), E=4.70 (.185"), F=0.60 (.024") |
| 7817-6002-02 | SBX 203 | A=4.00 (.157"), B=12.50 (.492"), E=4.70 (.185"), F=0.60 (.024") |

# Assembly Instructions Index

| Connector Part No. | Assembly Instruction | Special Information |
|---|---|---|
| 7817-7001-02 | SBX 201 | A=4.00 (.157"), B=12.50 (.492"), E=4.70 (.185"), F=0.60 (.024") |
| 7817-7002-02 | SBX 201 | A=4.00 (.157"), B=12.50 (.492"), E=4.70 (.185"), F=0.60 (.024") |
| 7903-6001-02 | - | in development |
| 7903-7001-02 | - | in development |
| 7903-6002-02 | - | in development |
| 7906-6001-02 | SBY 101 | A=4.00 (.157"), B=12.50 (.492"), E=4.70 (.185"), F=0.60 (.024") |
| 7906-6002-02 | SBY 101 | A=4.00 (.157"), B=12.50 (.492"), E=4.70 (.185"), F=0.60 (.024") |
| 7906-6003-02 | SBY 101 | A=4.00 (.157"), B=12.50 (.492"), E=4.70 (.185"), F=0.60 (.024") |
| 7906-6004-02 | SBY 101 | A=4.00 (.157"), B=12.50 (.492"), E=4.70 (.185"), F=0.60 (.024") |
| 7906-7001-02 | SBY 100 | A=4.00 (.157"), B=12.50 (.492"), E=4.70 (.185"), F=0.60 (.024") |
| 7906-7002-02 | SBY 100 | A=4.00 (.157"), B=12.50 (.492"), E=4.70 (.185"), F=0.60 (.024") |
| 7915-6001-02 | - | in development |
| 7915-6002-02 | - | in development |
| 7915-6003-02 | - | in development |
| 7915-6004-02 | - | in development |
| 7915-7001-02 | - | in development |
| 7915-7002-02 | - | in development |
| 7917-6001-02 | SBY 203 | A=4.00 (.157"), B=12.50 (.492"), E=4.70 (.185"), F=0.60 (.024") |
| 7917-6002-02 | SBY 203 | A=4.00 (.157"), B=12.50 (.492"), E=4.70 (.185"), F=0.60 (.024") |
| 7917-7001-02 | SBY 201 | A=4.00 (.157"), B=12.50 (.492"), E=4.70 (.185"), F=0.60 (.024") |
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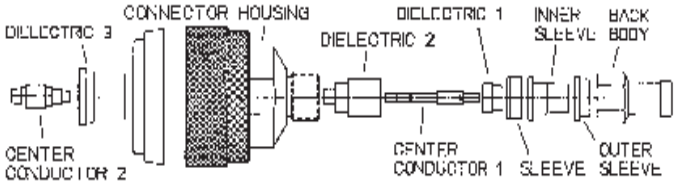
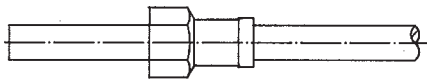
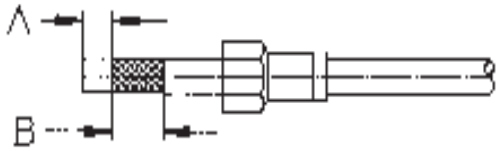
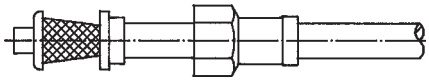
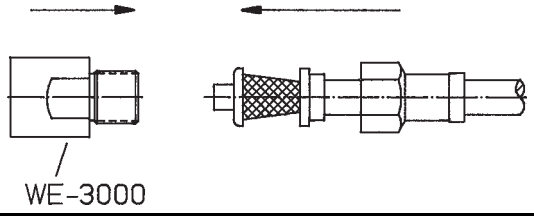
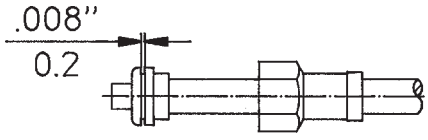
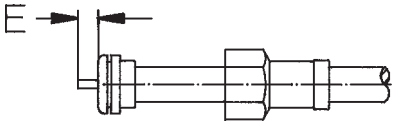
# Assembly Instructions 7/16-720 (Page 1/2)

| Connector Type | Cable Type | Connector Components | Tools Required |
|---|---|---|---|
| 7/16 PUSH - ON | RG-214/U |   | WE-3000 |

| | | |
|---|---|---|
| **Procedure 1** | Slide back body over cable. |  |
| **Procedure 2** | Trim outer conductor and dielectric to dimensions shown. |   |
| **Procedure 3** | Slide outer sleeve over outer conductor of cable. Assemble inner sleeve over cable dielectric and under the braid. |  |
| **Procedure 4** | Insert cable assembly into tool WE - 3000. Screw tool into back body and tighten. |   |
| **Procedure 5** | Unscrew tool WE - 3000. |   |
| **Procedure 6** | Trim dielectric. It should be flush with the sleeve. |   |

# Assembly Instructions 7/16-720 (Page 2/2)

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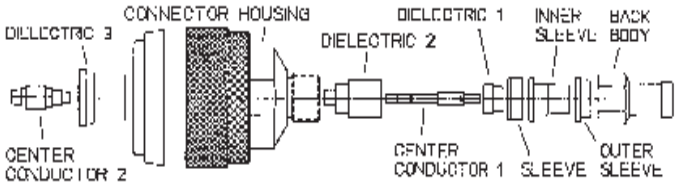
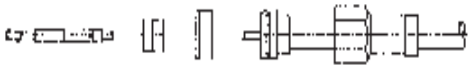
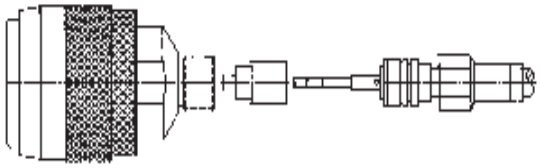
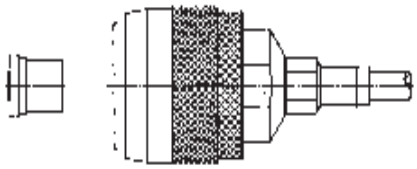
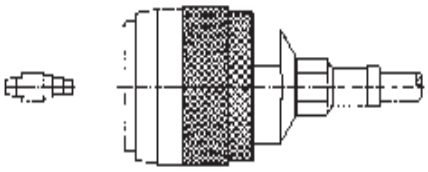
| Connector Type | Cable Type | Connector Components | Tools Required |
|---|---|---|---|
| 7/16 PUSH - ON | RG-214/U |   | WE-3000 |

| | | |
|---|---|---|
| **Procedure 7** | Slide sleeve over dielectric 1. Insert center conductor 1 into dielectric 1. Slide center conductor 1 over center conductor of cable, seat firmly and solder. |  |
| **Procedure 8** | Slide dielectric 2 over center conductor 1. Insert cable assembly into connector housing. Engage threads of back body and connector housing and torque to 50 inch pounds (5.6 Nm). The usage of Loctite is recommended. |  |
| **Procedure 9** | Insert dielectric 3 into connector housing. |  |
| **Procedure 10** | Tread center conductor 2 over center conductor1 until it is finger tight.<br>The use of Silver Epoxy at only the threads and heatthreads is recommended. |  |

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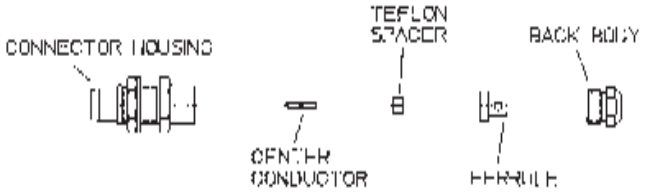
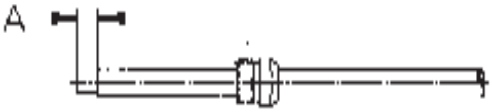
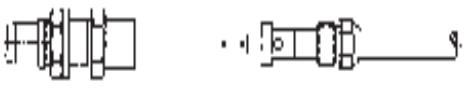
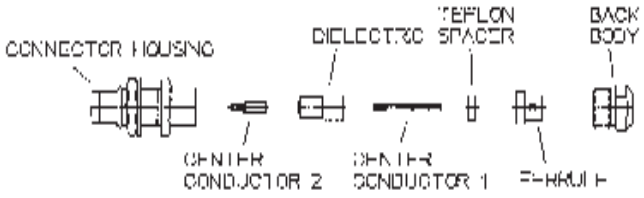
# Assembly Instructions BMA-050

| Connector Type | Cable Type | Connector Components | Tools Required |
|---|---|---|---|
| BMA Male | S/R .085" |   | |

| | | |
|---|---|---|
| **Procedure 1** | Slide back body over cable. |  |
| **Procedure 2** | Trim outer conductor and dielectric to dimensions shown. |   |
| **Procedure 3** | Slide ferrule over outer conductor, seat firmly and solder. |  |
| **Procedure 4** | Trim dielectric. It should be flush with the ferrule. |  |
| **Procedure 5** | Slide teflon spacer and center conductor of connector over center conductor of cable, seat firmly and solder. |  |
| **Procedure 6** | Insert cable assembly into connector housing. Engage threads of back body and connector housing and torque to 27 inch pounds (3 Nm). |  |

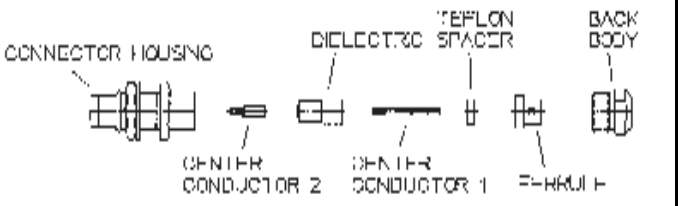
# Assembly Instructions BMA-051 (Page 1/2)

Spectrum Elektrotechnik GmbH

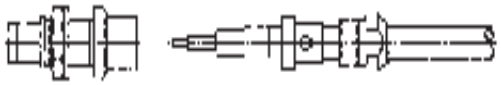
| Connector Type | Cable Type | Connector Components | Tools Required |
|---|---|---|---|
| BMA Male | S/R .141" |   | |

| | | |
|---|---|---|
| **Procedure 1** | Slide back body over cable. |  |
| **Procedure 2** | Trim outer conductor and dielectric to dimensions shown. |   |
| **Procedure 3** | Slide ferrule over outer conductor, seat firmly and solder. |  |
| **Procedure 4** | Trim dielectric. It should be flush with the ferrule. |  |
| **Procedure 5** | Slide teflon spacer and center conductor 1 over center conductor of cable, seat firmly and solder. |  |
| **Procedure 6** | Slide dielectric over center conductor 1. |  |

# Assembly Instructions BMA-051 (Page 2/2)

| Connector Type | Cable Type | Connector Components | Tools Required |
|---|---|---|---|
| BMA Male | S/R .141" |  | |



| | | |
|---|---|---|
| **Procedure 7** | Thread center conductor 2 over center conductor 1 until it is finger tight.<br>The use of Silver Epoxy at only the threads and heattreat is recommended. |  |
| **Procedure 8** | Insert cable assembly into connector housing. Engage threads of back body and connector housing and torque to 27 inch pounds (3 Nm). |  |

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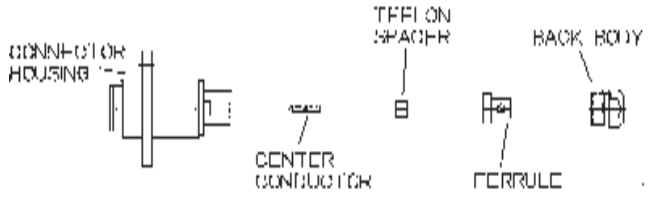
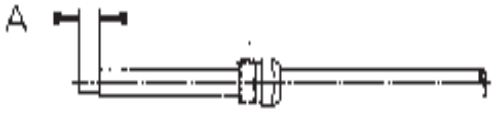
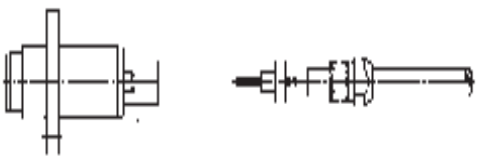
# Assembly Instructions BMA-070

Spectrum Elektrotechnik GmbH

| Connector Type | Cable Type | Connector Components | Tools Required |
|---|---|---|---|
| BMA Female | S/R .085" |   | |

| | | |
|---|---|---|
| **Procedure 1** | Slide back body over cable. |  |
| **Procedure 2** | Trim outer conductor and dielectric to dimensions shown. |   |
| **Procedure 3** | Slide ferrule over outer conductor, seat firmly and solder. |  |
| **Procedure 4** | Trim dielectric. It should be flush with the ferrule. |  |
| **Procedure 5** | Slide teflon spacer and center conductor of connector over center conductor of cable, seat firmly and solder. |  |
| **Procedure 6** | Insert cable assembly into connector housing. Engage threads of back body and connector housing and torque to 27 inch pounds (3 Nm). |  |

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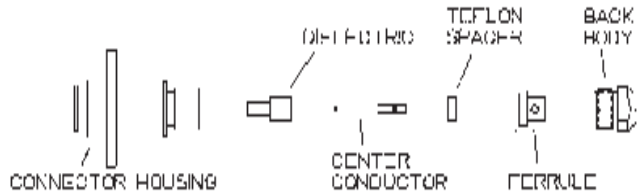
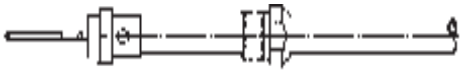
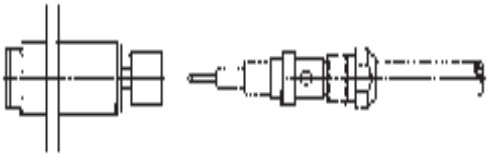
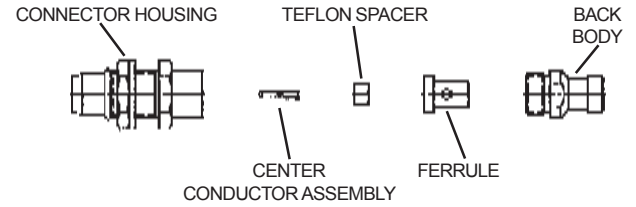
# Assembly Instructions BMA-071

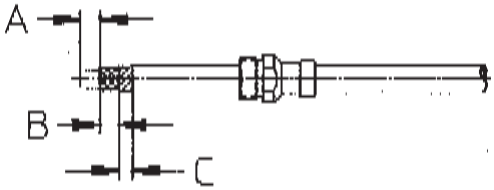
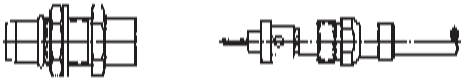
| Connector Type | Cable Type | Connector Components | Tools Required |
|---|---|---|---|
| BMA Female | S/R .141" |   | |

| | | |
|---|---|---|
| **Procedure 1** | Slide back body over cable. |  |
| **Procedure 2** | Trim outer conductor and dielectric to dimensions shown. |   |
| **Procedure 3** | Slide ferrule over outer conductor, seat firmly and solder. |  |
| **Procedure 4** | Trim dielectric. It should be flush with the ferrule. |  |
| **Procedure 5** | Slide teflon spacer and center conductor of connector over center conductor of cable, seat firmly and solder. |  |
| **Procedure 6** | Slide dielectric over center conductor. Insert cable assembly into connector housing. Engage threads of back body and connector housing and torque to 27 inch pounds (3 Nm). |  |

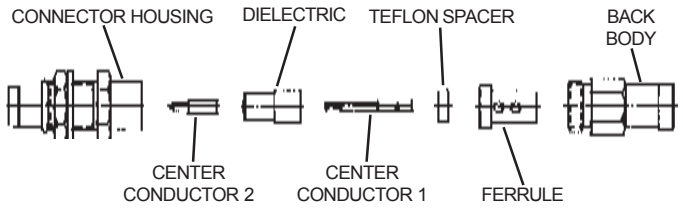
# Assembly Instructions BMA-100

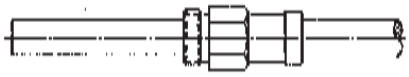
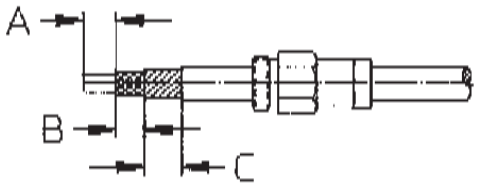
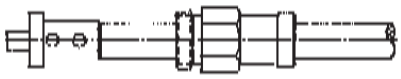
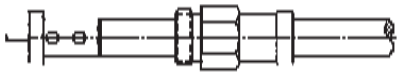
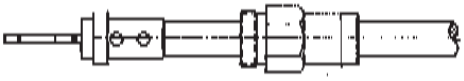
Spectrum Elektrotechnik GmbH

| Connector Type | Cable Type | Connector Components | Tools Required |
|---|---|---|---|
| **BMA Male** | **RD-316/U<br>RG-316/U<br>RG-178B/U** |  | |

| | | |
|---|---|---|
| **Procedure 1** | Slide back body over cable. |  |
| **Procedure 2** | Trim outer conductor and dielectric to dimensions shown. |  |
| **Procedure 3** | Slide ferrule over outer conductor, seat firmly and solder. |  |
| **Procedure 4** | Trim dielectric. It should be flush with the ferrule. |  |
| **Procedure 5** | Slide teflon spacer and center conductor of connector over center conductor of cable, seat firmly and solder. |  |
| **Procedure 6** | Insert cable assembly into connector housing. Engage threads of back body and connector housing and torque to 27 inch pounds (3 Nm). |  |

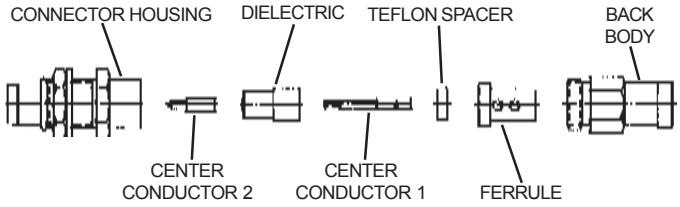
# Assembly Instructions BMA-101 (Page 1/2)

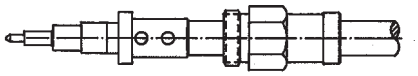
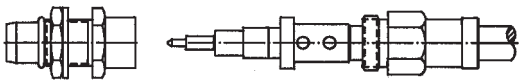
| Connector Type | Cable Type | Connector Components | Tools Required |
|---|---|---|---|
| BMA Male | RG-142B/U<br>RG-223/U<br>RG-400/U |  | |

| | | |
|---|---|---|
| **Procedure 1** | Slide back body over cable. |  |
| **Procedure 2** | Trim outer conductor and dielectric to dimensions shown. |  |
| **Procedure 3** | Slide ferrule over outer conductor, seat firmly and solder. |  |
| **Procedure 4** | Trim dielectric. It should be flush with the ferrule. |  |
| **Procedure 5** | Slide teflon spacer and center conductor 1 over center conductor of cable, seat firmly and solder. |  |

# Assembly Instructions BMA-101 (Page 2/2)

Spectrum Elektrotechnik GmbH

| Connector Type | Cable Type | Connector Components | Tools Required |
|---|---|---|---|
| **BMA Male** | **RG-142B/U<br>RG-223/U<br>RG-400/U** |  | |

| | | |
|---|---|---|
| **Procedure 6** | Slide dielectric over center conductor 1. |  |
| **Procedure 7** | Thread center conductor 2 over center conductor 1 until it is finger tight.<br>The use of Silver Epoxy at only the threads and heattreat is recommended. |  |
| **Procedure 8** | Insert cable assembly into connector housing. Engage threads of back body and connector housing and torque to 27 inch pounds (3 Nm). |  |

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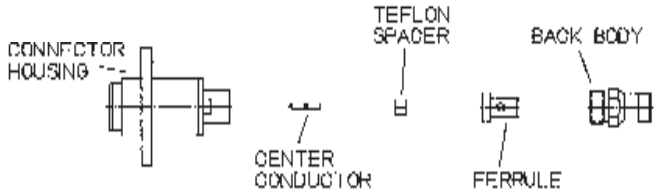
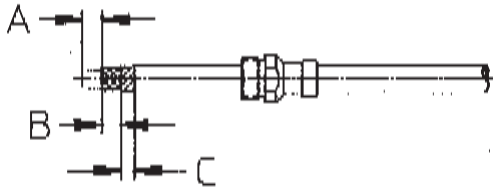
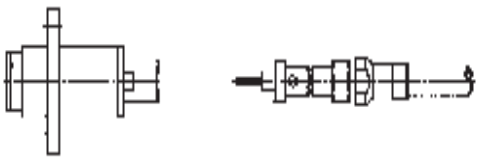
Spectrum Elektrotechnik GmbH P.O. Box 45 05 33, 80905 Munich, Germany **Tel. (89) 354 804-0, Fax (89) 354 804-90** (Country Code: 49)

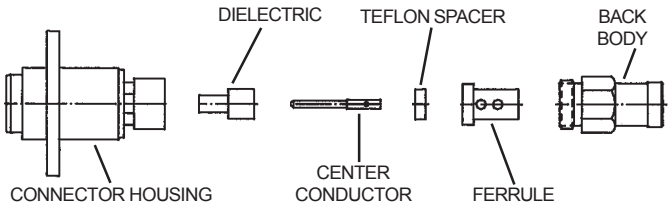
# Assembly Instructions BMA-200

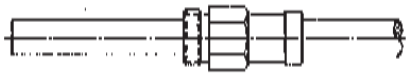
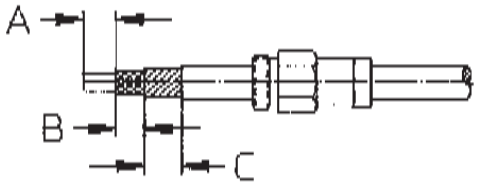
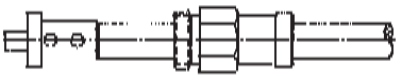
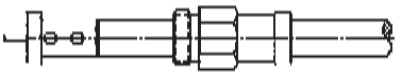
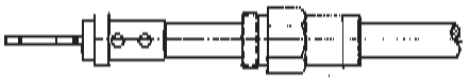
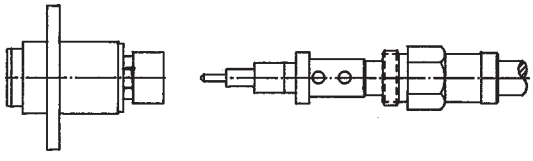
| Connector Type | Cable Type | Connector Components | Tools Required |
|---|---|---|---|
| **BMA Female** | **RD-316/U<br>RG-316/U<br>RG-178B/U** |  | |

| | | |
|---|---|---|
| **Procedure 1** | Slide back body over cable. |  |
| **Procedure 2** | Trim outer conductor and dielectric to dimensions shown. |  |
| **Procedure 3** | Slide ferrule over outer conductor, seat firmly and solder. |  |
| **Procedure 4** | Trim dielectric. It should be flush with the ferrule. |  |
| **Procedure 5** | Slide teflon spacer and center conductor of connector over center conductor of cable, seat firmly and solder. |  |
| **Procedure 6** | Insert cable assembly into connector housing. Engage threads of back body and connector housing and torque to 27 inch pounds (3 Nm). |  |

# Assembly Instructions BMA-201

Spectrum Elektrotechnik GmbH

| Connector Type | Cable Type | Connector Components | Tools Required |
|---|---|---|---|
| **BMA Female** | **RG-142B/U<br>RG-223/U<br>RG-400/U** |  | |

| | | |
|---|---|---|
| **Procedure 1** | Slide back body over cable. |  |
| **Procedure 2** | Trim outer conductor and dielectric to dimensions shown. |  |
| **Procedure 3** | Slide ferrule over outer conductor, seat firmly and solder. |  |
| **Procedure 4** | Trim dielectric. It should be flush with the ferrule. |  |
| **Procedure 5** | Slide teflon spacer and center conductor 1 over center conductor of cable, seat firmly and solder. |  |
| **Procedure 6** | Slide dielectric over center conductor.Insert cable assembly into connector housing. Engage threads of back body and connector housing and torque to 27 inch pounds (3 Nm). |  |

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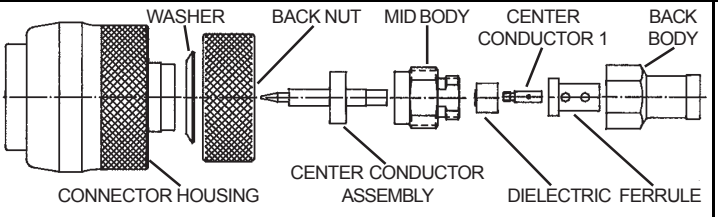
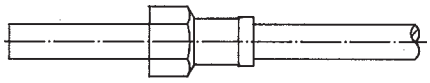
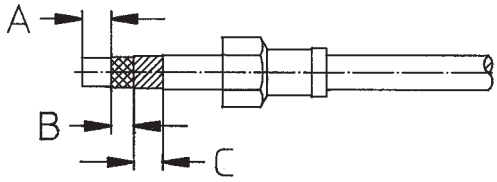
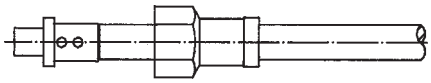
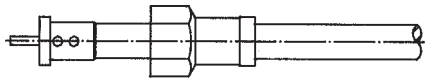
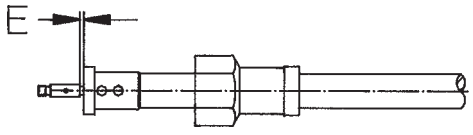
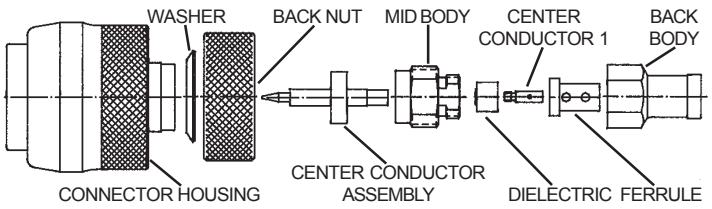
# Assembly Instructions N-710 (Page 1/2)

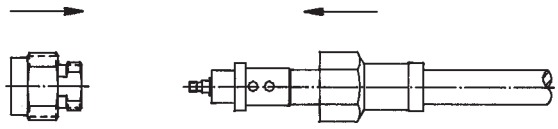
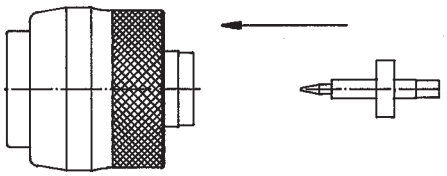
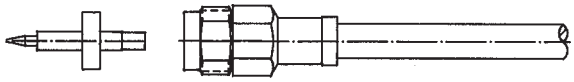
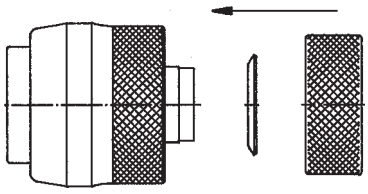
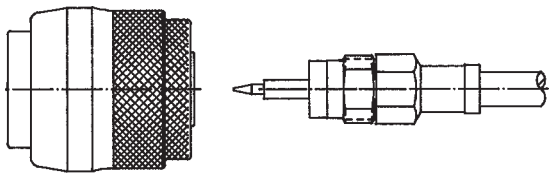
| Connector Type | Cable Type | Connector Components | Tools Required |
|---|---|---|---|
| **N PUSH - ON** | **RG-142B/U RG-400/U** |   | **Pin Wrench WE-P026** |

| | | |
|---|---|---|
| **Procedure 1** | Slide back body over cable. |  |
| **Procedure 2** | Trim outer conductor and dielectric to dimensions shown. |   |
| **Procedure 3** | Slide ferrule over outer conductor, seat firmly and solder. |  |
| **Procedure 4** | Trim dielectric. It should be flush with the ferrule. |  |
| **Procedure 5** | Slide center conductor 1 over center conductor of cable, seat firmly against soldering gauge and solder. |   |

# Assembly Instructions N-710 (Page 2/2)

Spectrum Elektrotechnik GmbH

| Connector Type | Cable Type | Connector Components | Tools Required |
|---|---|---|---|
| N<br>PUSH - ON | RG-142B/U<br>RG-400/U |  | Pin Wrench<br>WE-P026 |

| | | |
|---|---|---|
| **Procedure 6** | Slide dielectric over center conductor 1 and insert mid body into back body. Engage threads of back body and mid body and torque to 50 inch pounds (5.6Nm). The usage of Loctite is recommended. |  |
| **Procedure 7** | Make sure that center conductor assembly slides easily into connector housing. |  |
| **Procedure 8** | Thread center conductor assembly into center conductor 1 until it is finger tight.<br>The use of Silver Epoxy at only the threads and heattreat is recommended. |  |
| **Procedure 9** | Place washer and back nut onto connector housing. |  |
| **Procedure 10** | Insert cable assembly into connector housing. Engage threads of back body and connector housing and torque to 45 inch pounds (5.1Nm). Use a Pin Wrench to hold the coupling nut. |  |

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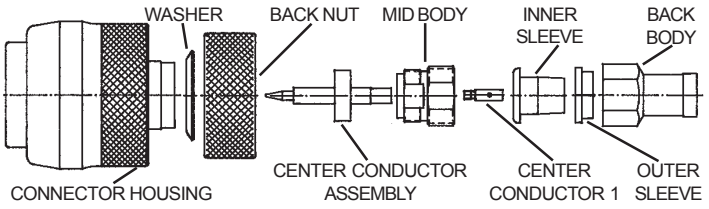
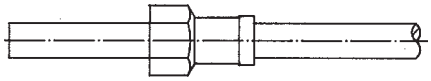
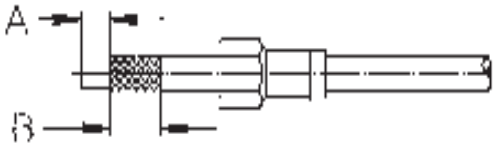
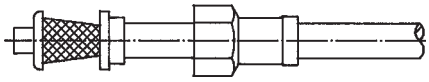
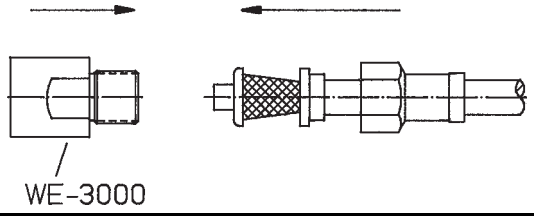
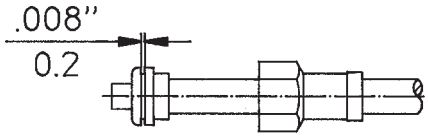
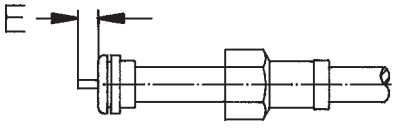
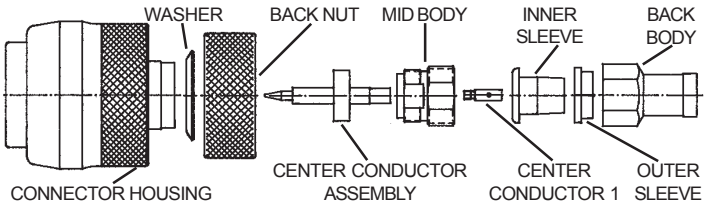
# Assembly Instructions N-720 (Page 1/2)

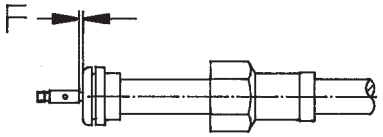
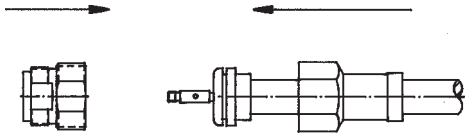
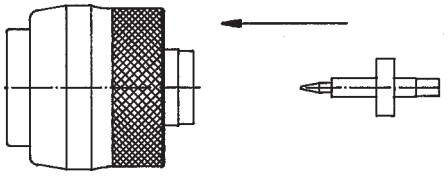
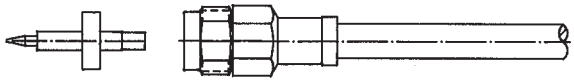
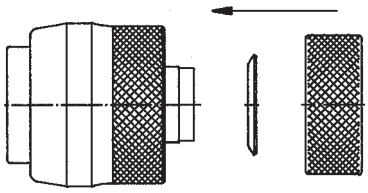
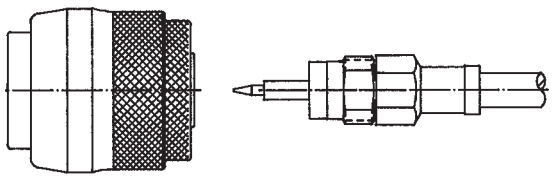
| Connector Type | Cable Type | Connector Components | Tools Required |
|---|---|---|---|
| N<br>PUSH - ON | RG-214/U |  | WE-3000<br>Pin Wrench<br>WE-P026 |

| | | |
|---|---|---|
| **Procedure 1** | Slide back body over cable. |  |
| **Procedure 2** | Trim outer conductor and dielectric to dimensions shown. |  |
| **Procedure 3** | Slide outer sleeve over outer conductor of cable. Assemble inner sleeve over cable dielectric and under the braid. |  |
| **Procedure 4** | Insert cable assembly into tool WE - 3000. Screw tool into back body and tighten. |  |
| **Procedure 5** | Unscrew tool WE - 3000. |  |
| **Procedure 6** | Trim dielectric. It should be flush with the sleeve. |  |

# Assembly Instructions N-720 (Page 2/2)

Spectrum Elektrotechnik GmbH

| Connector Type | Cable Type | Connector Components | Tools Required |
|---|---|---|---|
| N<br>PUSH - ON | RG-214/U |  | WE-3000<br>Pin Wrench<br>WE-P026 |

| | | |
|---|---|---|
| **Procedure 7** | Slide center conductor 1 over center conductor of cable, seat firmly against soldering gauge and solder. |  |
| **Procedure 8** | Insert mid body into back body. Engage threads of back body and mid body and torque to 50 inch pounds (5.6 Nm). The usage of Loctite is recommended. |  |
| **Procedure 9** | Make sure that center conductor assembly slides easily into connector housing. |  |
| **Procedure 10** | Thread center conductor assembly into center conductor 1 until it is finger tight.<br>The use of Silver Epoxy at only the threads and heattreat is recommended. |  |
| **Procedure 11** | Place washer and back nut onto connector housing. |  |
| **Procedure 12** | Insert cable assembly into connector housing. Engage threads of back body and connector housing and torque to 45 inch pounds (5.1Nm). Use a Pin Wrench to hold the coupling nut. |  |

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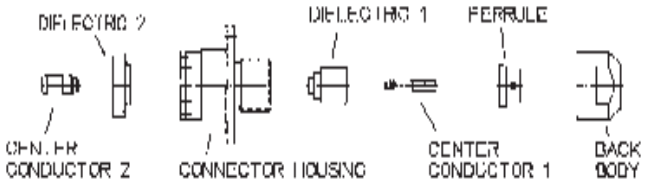
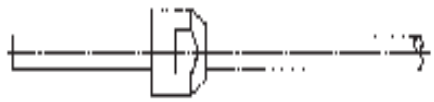
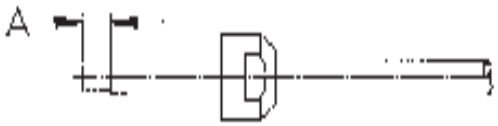
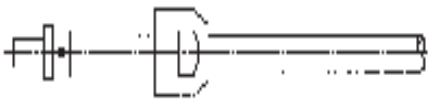
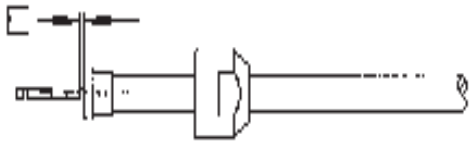
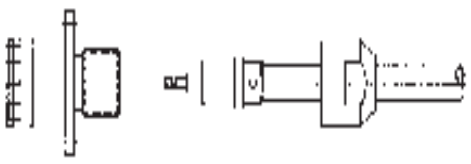
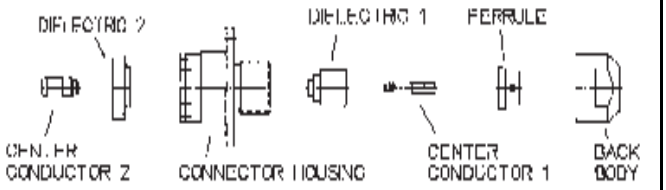
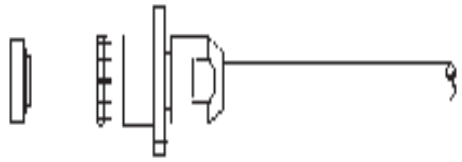
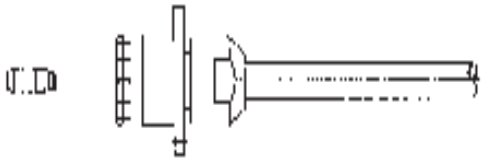
# Assembly Instructions SBX-100 (Page 1/2)

| Connector Type | Cable Type | Connector Components | Tools Required |
|---|---|---|---|
| SBX Male | S/R .250" S/R .250" LL |   | |

| | | |
|---|---|---|
| **Procedure 1** | Slide back body over cable. |  |
| **Procedure 2** | Trim outer conductor and dielectric to dimensions shown. |   |
| **Procedure 3** | Slide ferrule over outer conductor, seat firmly and solder. |  |
| **Procedure 4** | Trim dielectric. It should be flush with the ferrule. |  |
| **Procedure 5** | Slide center conductor 1 over center conductor of cable, seat firmly against soldering gauge and solder. |  |
| **Procedure 6** | Slide dielectric 1 over center conductor 1. Insert cable assembly into connector housing. Engage threads of back body and connector housing and torque to 45 inch pounds (5.1 Nm). |  |

# Assembly Instructions SBX-100 (Page 2/2)

| Connector Type | Cable Type | Connector Components | Tools Required |
|---|---|---|---|
| **SBX Male** | **S/R .250" S/R .250" LL** |   | |

| | | |
|---|---|---|
| **Procedure 7** | Insert dielectric 2 into connector housing. |  |
| **Procedure 8** | Thread center conductor 2 into center conductor 1 until it is finger tight.<br>The use of Silver Epoxy at only the threads and heattreat is recommended. |  |

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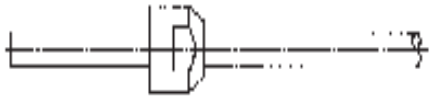
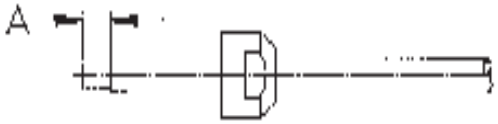
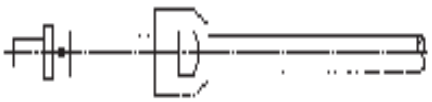
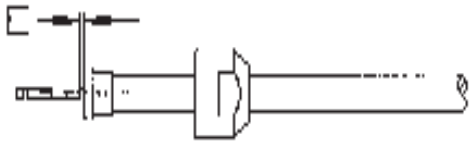
# Assembly Instructions SBX-101 (Page 1/2)

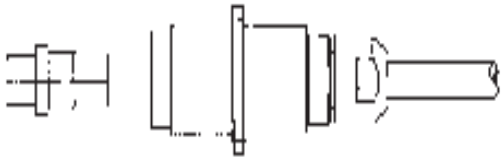
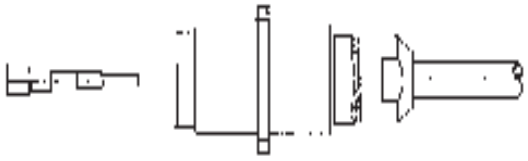
| Connector Type | Cable Type | Connector Components | Tools Required |
|---|---|---|---|
| SBX Female | S/R .250" S/R .250" LL |   | |

| | | |
|---|---|---|
| **Procedure 1** | Slide back body over cable. |  |
| **Procedure 2** | Trim outer conductor and dielectric to dimensions shown. |   |
| **Procedure 3** | Slide ferrule over outer conductor, seat firmly and solder. |  |
| **Procedure 4** | Trim dielectric. It should be flush with the ferrule. |  |
| **Procedure 5** | Slide center conductor 1 over center conductor of cable, seat firmly against soldering gauge and solder. |  |
| **Procedure 6** | Slide dielectric 1 over center conductor 1. Insert cable assembly into connector housing. Engage threads of back body and connector housing and torque to 45 inch pounds (5.1 Nm). |  |

# Assembly Instructions SBX-101 (Page 2/2)

| Connector Type | Cable Type | Connector Components | Tools Required |
|---|---|---|---|
| **SBX Female** | **S/R .250" S/R .250" LL** |  | |



| | | |
|---|---|---|
| **Procedure 7** | Insert dielectric 2 into connector housing. |  |
| **Procedure 8** | Thread center conductor 2 into center conductor 1 until it is finger tight.<br>The use of Silver Epoxy at only the threads and heattreat is recommended. |  |

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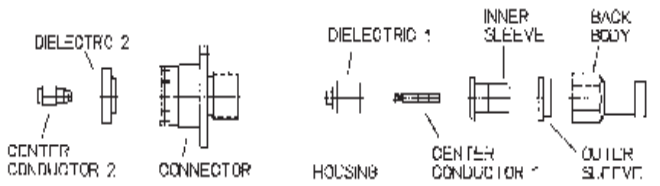
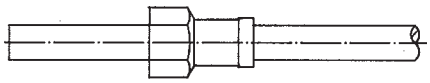
# Assembly Instructions SBX-201 (Page 1/2)

| Connector Type | Cable Type | Connector Components | Tools Required |
|---|---|---|---|
| SBX Male | RG-214/U |   | WE-3000 |

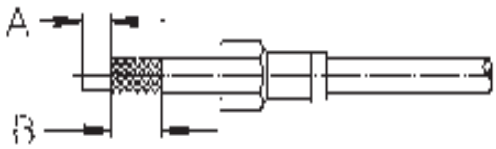
**Procedure 1**

Slide back body over cable.



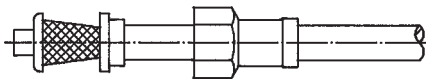
**Procedure 2**

Trim outer conductor and dielectric to dimensions shown.



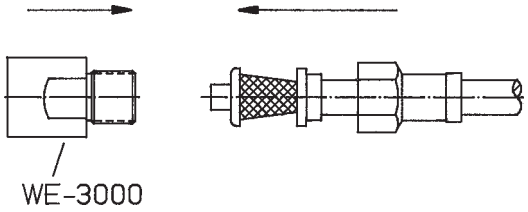

**Procedure 3**

Slide outer sleeve over outer conductor of cable. Assemble inner sleeve over cable dielectric and under the braid.



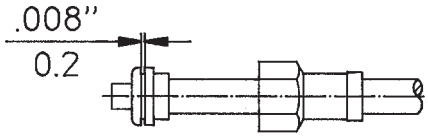
**Procedure 4**

Insert cable assembly into tool WE - 3000. Screw tool into back body and tighten.



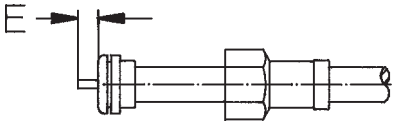

**Procedure 5**

Unscrew tool WE - 3000.




**Procedure 6**

Trim dielectric. It should be flush with the sleeve.

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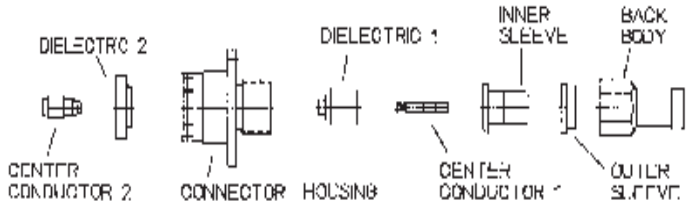
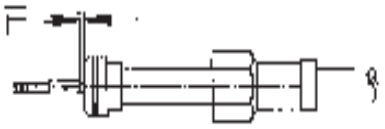
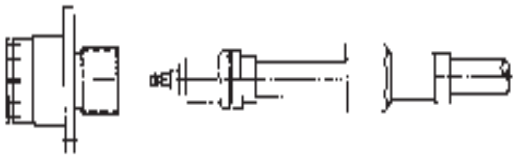
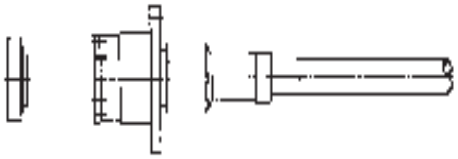
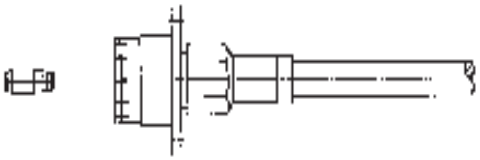
# Assembly Instructions SBX-201 (Page 2/2)

Spectrum Elektrotechnik GmbH

| Connector Type | Cable Type | Connector Components | Tools Required |
|---|---|---|---|
| SBX Male | RG-214/U |   | WE-3000 |

| | | |
|---|---|---|
| Procedure 7 | Slide center conductor 1 over center conductor of cable, seat firmly against soldering gauge and solder. |  |
| Procedure 8 | Insert cable assembly into connector housing. Engage threads of back body and connector housing and torque to 45 inch pounds (5.1Nm). |  |
| Procedure 9 | Insert dielectric 2 into connector housing. |  |
| Procedure 10 | Thread center conductor 2 into center conductor 1 until it is finger tight. The use of Silver Epoxy at only the threads and heattreat is recommended. |  |

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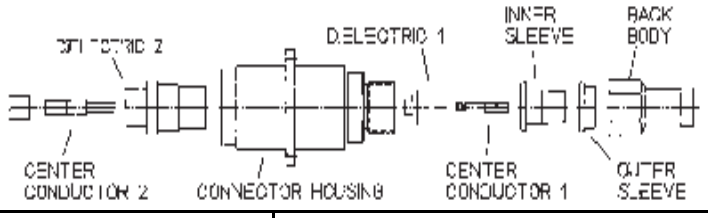
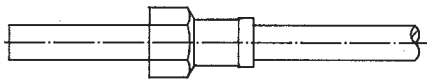
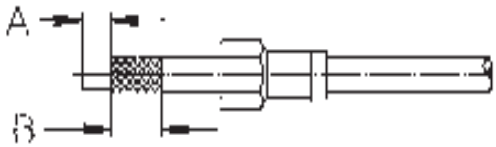
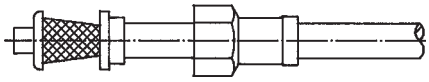
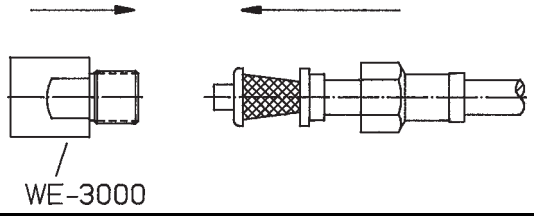
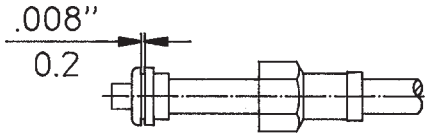
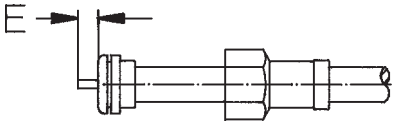
# Assembly Instructions SBX-203 (Page 1/2)

| Connector Type | Cable Type | Connector Components | Tools Required |
|---|---|---|---|
| SBX Female | RG-214/U |  | WE-3000 |

| | | |
|---|---|---|
| **Procedure 1** | Slide back body over cable. |  |
| **Procedure 2** | Trim outer conductor and dielectric to dimensions shown. |  |
| **Procedure 3** | Slide outer sleeve over outer conductor of cable. Assemble inner sleeve over cable dielectric and under the braid. |  |
| **Procedure 4** | Insert cable assembly into tool WE - 3000. Screw tool into back body and tighten. |  |
| **Procedure 5** | Unscrew tool WE - 3000. |  |
| **Procedure 6** | Trim dielectric. It should be flush with the sleeve. |  |

# Assembly Instructions SBX-203 (Page 2/2)

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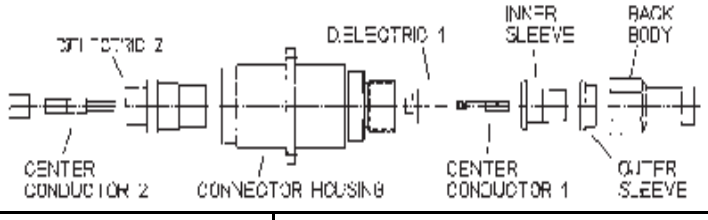
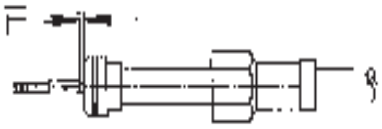
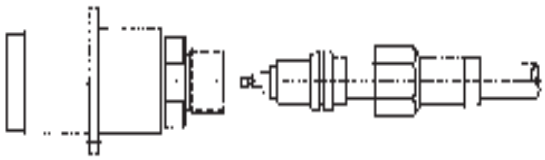
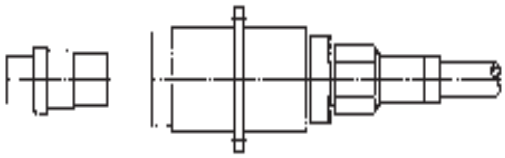
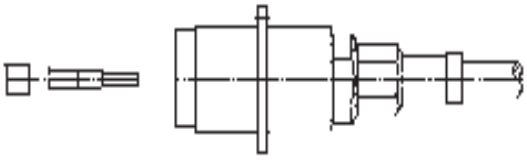
| Connector Type | Cable Type | Connector Components | Tools Required |
|---|---|---|---|
| SBX Female | RG-214/U |   | WE-3000 |

| | | |
|---|---|---|
| Procedure 7 | Slide center conductor 1 over center conductor of cable, seat firmly against soldering gauge and solder. |  |
| Procedure 8 | Insert cable assembly into connector housing. Engage threads of back body and connector housing and torque to 45 inch pounds (5.1Nm). |  |
| Procedure 9 | Insert dielectric into connector housing. |  |
| Procedure 10 | Thred center conductor 2 into center conductor 1 until it is finger tight. The use of Silver Epoxy at only the threads and heattreat is recommended. |  |

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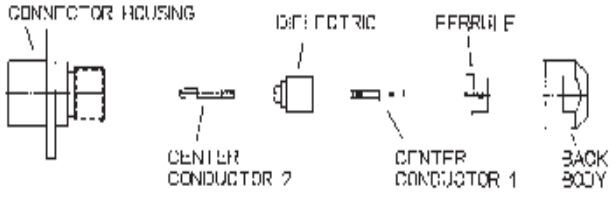
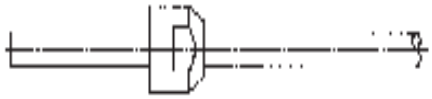
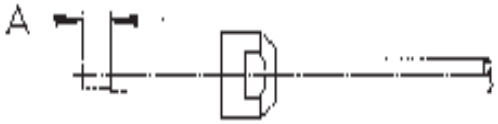
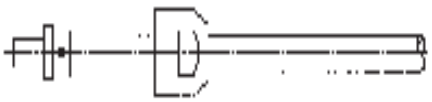
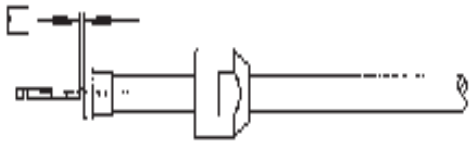
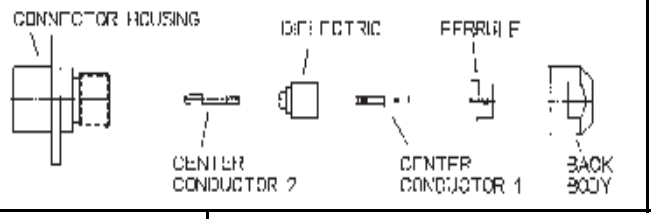
# Assembly Instructions SBY-100 (Page 1/2)

| Connector Type | Cable Type | Connector Components | Tools Required |
|---|---|---|---|
| SBY Male | S/R .250" S/R .250" LL |   | |

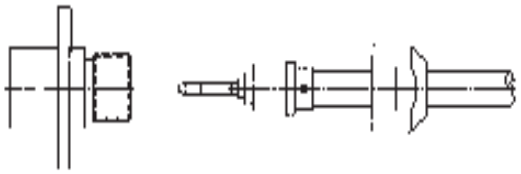
| | | |
|---|---|---|
| **Procedure 1** | Slide back body over cable. |  |
| **Procedure 2** | Trim outer conductor and dielectric to dimensions shown. |   |
| **Procedure 3** | Slide ferrule over outer conductor, seat firmly and solder. |  |
| **Procedure 4** | Trim dielectric. It should be flush with the ferrule. |  |
| **Procedure 5** | Slide center conductor 1 over center conductor of cable, seat firmly against soldering gauge and solder. |  |
| **Procedure 6** | Thred center conductor 2 into center conductor 1 until it is finger tight. The use of Silver Epoxy at only the threads and heattreat is recommended. |  |

# Assembly Instructions SBY-100 (Page 2/2)

| Connector Type | Cable Type | Connector Components | Tools Required |
|---|---|---|---|
| **SBY Male** | **S/R .250" S/R .250" LL** |   | |

**Procedure 7**

Insert cable assembly into connector housing. Engage threads of back body and connector housing and torque to 45 inch pounds (5.1Nm).



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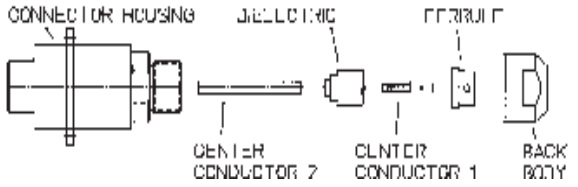
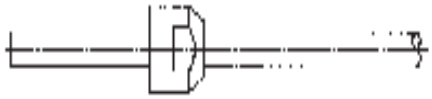
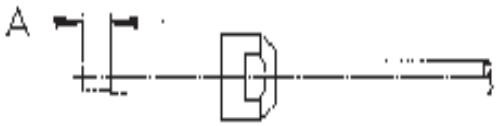
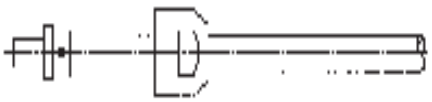
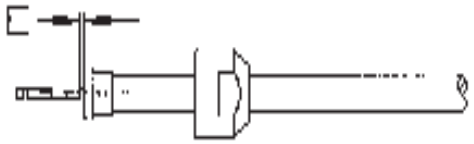
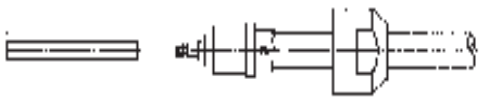
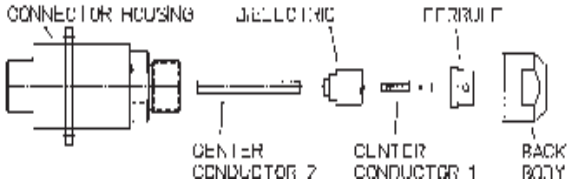
# Assembly Instructions SBY-101 (Page 1/2)

| Connector Type | Cable Type | Connector Components | Tools Required |
|---|---|---|---|
| SBY Female | S/R .250" S/R .250" LL |   | |

| | | |
|---|---|---|
| **Procedure 1** | Slide back body over cable. |  |
| **Procedure 2** | Trim outer conductor and dielectric to dimensions shown. |   |
| **Procedure 3** | Slide ferrule over outer conductor, seat firmly and solder. |  |
| **Procedure 4** | Trim dielectric. It should be flush with the ferrule. |  |
| **Procedure 5** | Slide center conductor 1 over center conductor of cable, seat firmly against soldering gauge and solder. |  |
| **Procedure 6** | Slide dielectric over center conductor 1.Thread center conductor 2 into center conductor 1 until it is finger tight.<br>The use of Silver Epoxy at only the threads and heattreat is recommended. |  |

# Assembly Instructions SBY-101 (Page 2/2)

| Connector Type | Cable Type | Connector Components | Tools Required |
|---|---|---|---|
| **SBY Female** | **S/R .250" S/R .250" LL** |   | |

**Procedure 7**

Insert cable assembly into connector housing. Engage threads of back body and connector housing and torque to 45 inch pounds (5.1Nm).

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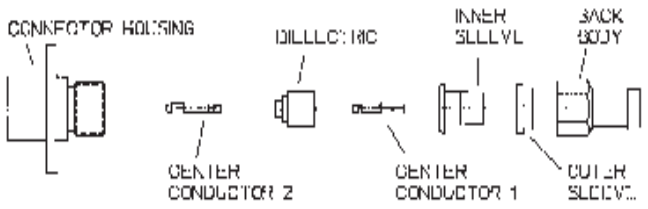
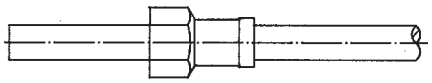
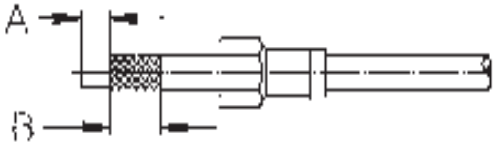
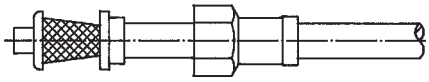
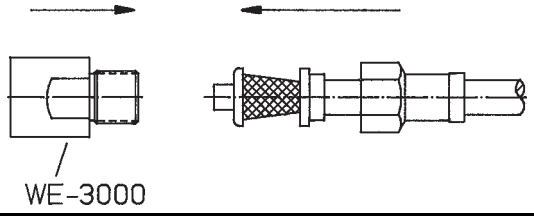
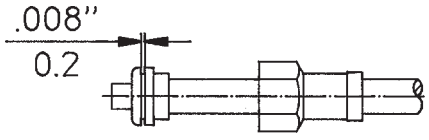
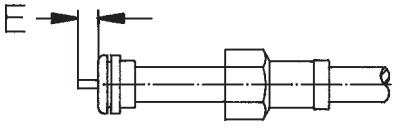
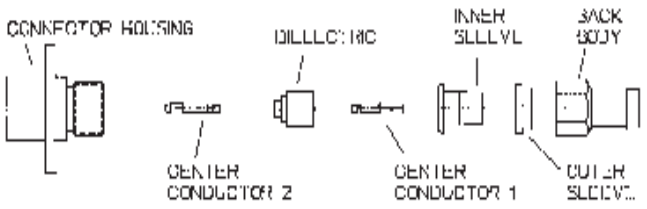
# Assembly Instructions SBY-201 (Page 1/2)

| Connector Type | Cable Type | Connector Components | Tools Required |
|---|---|---|---|
| SBY Male | RG-214/U |  | WE-3000 |

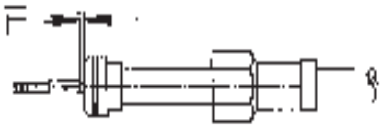
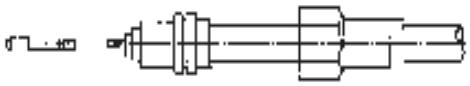
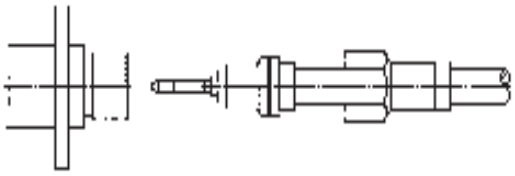


| | | |
|---|---|---|
| **Procedure 1** | Slide back body over cable. |  |
| **Procedure 2** | Trim outer conductor and dielectric to dimensions shown. |   |
| **Procedure 3** | Slide outer sleeve over outer conductor of cable. Assemble inner sleeve over cable dielectric and under the braid. |  |
| **Procedure 4** | Insert cable assembly into tool WE - 3000. Screw tool into back body and tighten. |   |
| **Procedure 5** | Unscrew tool WE - 3000. |   |
| **Procedure 6** | Trim dielectric. It should be flush with the sleeve. |   |

# Assembly Instructions SBY-201 (Page 2/2)

| Connector Type | Cable Type | Connector Components | Tools Required |
|---|---|---|---|
| **SBX Male** | **RG-214/U** |  | **WE-3000** |



| | | |
|---|---|---|
| **Procedure 7** | Slide center conductor 1 over center conductor of cable, seat firmly against soldering gauge and solder. |  |
| **Procedure 8** | Slide dielectric over center conductor 1. Insert cable assembly into connector housing. Engage threads of back body and connector housing and torque to 45 inch pounds (5.1 Nm). |  |
| **Procedure 9** | Insert cable assembly into connector housing. Engage threads of back body and connector housing and torque to 45 inch pounds (5.1Nm). |  |

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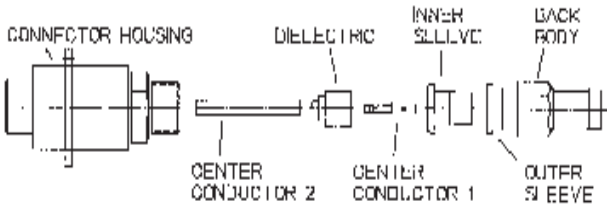
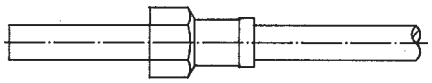
# Assembly Instructions SBY-203 (Page 1/2)

| Connector Type | Cable Type | Connector Components | Tools Required |
|---|---|---|---|
| SBY Female | RG-214/U |   | WE-3000 |

**Procedure 1**

Slide back body over cable.

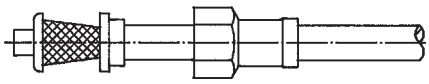


**Procedure 2**

Trim outer conductor and dielectric to dimensions shown.

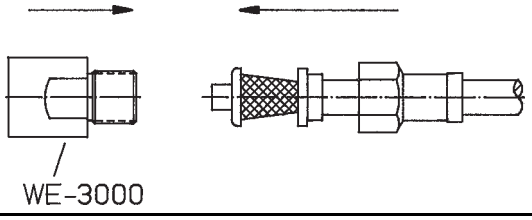

**Procedure 3**

Slide outer sleeve over outer conductor of cable. Assemble inner sleeve over cable dielectric and under the braid.



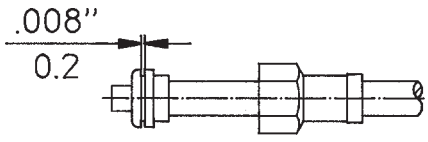
**Procedure 4**

Insert cable assembly into tool WE - 3000. Screw tool into back body and tighten.



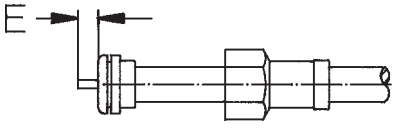

**Procedure 5**

Unscrew tool WE - 3000.




**Procedure 6**

Trim dielectric. It should be flush with the sleeve.

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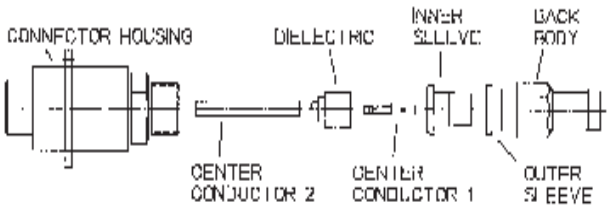
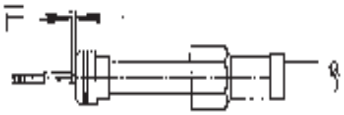
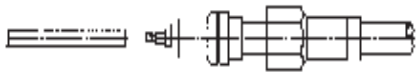
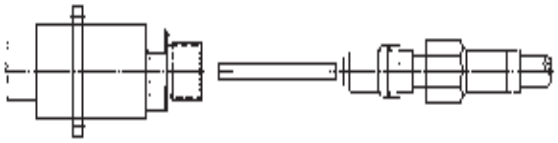
# Assembly Instructions SBY-203 (Page 2/2)

| Connector Type | Cable Type | Connector Components | Tools Required |
|---|---|---|---|
| SBY Female | RG-214/U |   | WE-3000 |

| | | |
|---|---|---|
| **Procedure 7** | Slide center conductor 1 over center conductor of cable, seat firmly against soldering gauge and solder. |  |
| **Procedure 8** | Slide dielectric over center conductor 1.Thread center conductor 2 into center conductor 1 until it is finger tight.<br>The use of Silver Epoxy at only the threads and heattreat is recommended. |  |
| **Procedure 9** | Insert cable assembly into connector housing. Engage threads of back body and connector housing and torque to 45 inch pounds (5.1Nm). |  |

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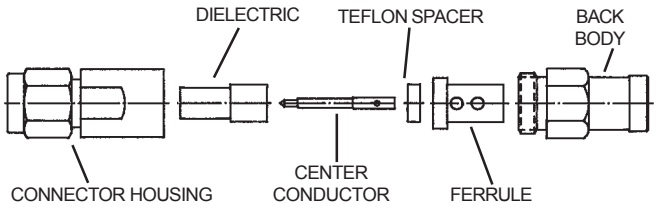
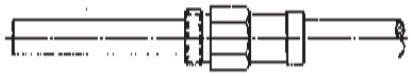
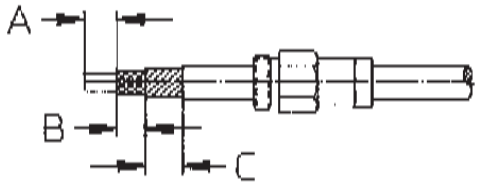
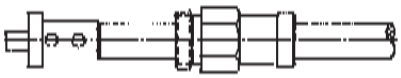
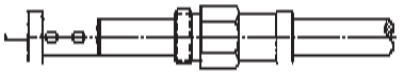
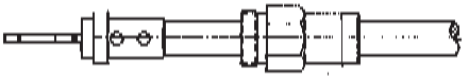
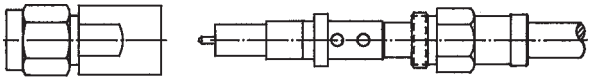
# Assembly Instructions SMA-101

| Connector Type | Cable Type | Connector Components | Tools Required |
|---|---|---|---|
| SMA Male | RG-142B/U RG-400/U |  | |



| | | |
|---|---|---|
| **Procedure 1** | Slide back body over cable. |  |
| **Procedure 2** | Trim outer conductor and dielectric to dimensions shown. |   |
| **Procedure 3** | Slide ferrule over outer conductor, seat firmly and solder. |  |
| **Procedure 4** | Trim dielectric. It should be flush with the ferrule. |  |
| **Procedure 5** | Slide teflon spacer and center conductor 1 over center conductor of cable, seat firmly and solder. |  |
| **Procedure 6** | Slide dielectric over center conductor. Insert cable assembly into connector housing. Engage threads of back body and connector housing and torque to 35 inch pounds (4 Nm). |  |

# Assembly Instructions SMA-200

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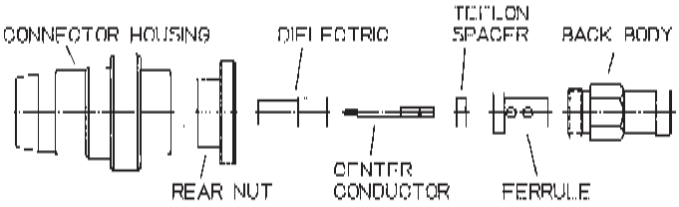
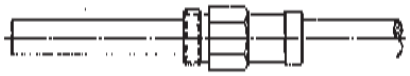
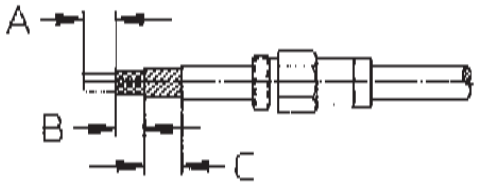
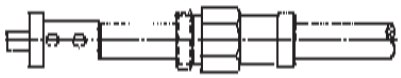
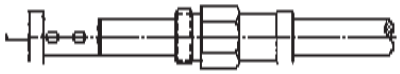
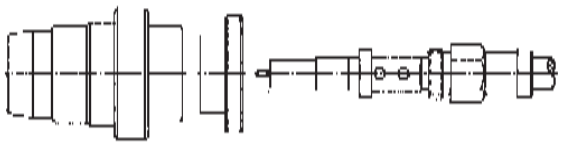
| Connector Type | Cable Type | Connector Components | Tools Required |
|---|---|---|---|
| **SMA Male Push-On** | **RG-142B/U RG-400/U** |   | **Pin Wrench WE-P019** |

| | | |
|---|---|---|
| **Procedure 1** | Slide back body over cable. |  |
| **Procedure 2** | Trim outer conductor and dielectric to dimensions shown. |   |
| **Procedure 3** | Slide ferrule over outer conductor, seat firmly and solder. |  |
| **Procedure 4** | Trim dielectric. It should be flush with the ferrule. |  |
| **Procedure 5** | Slide teflon spacer and center conductor of connector over center conductor of cable, seat firmly and solder. |  |
| **Procedure 6** | Slide dielectric over center conductor. Insert cable assembly into connector housing. Engage threads of back body and connector housing and torque to 35 inch pounds (4 Nm). Use a Pin Wrench to hold the coupling nut. |  |

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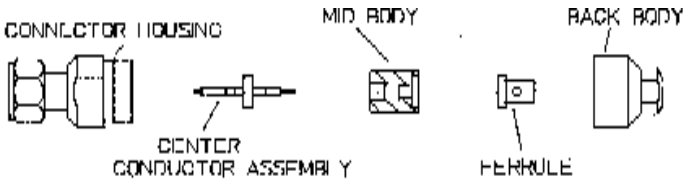
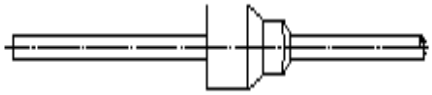
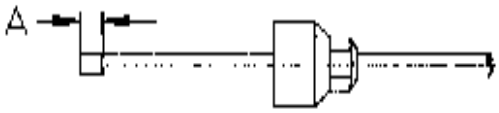
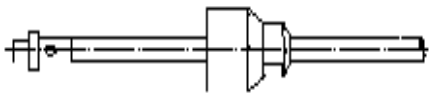
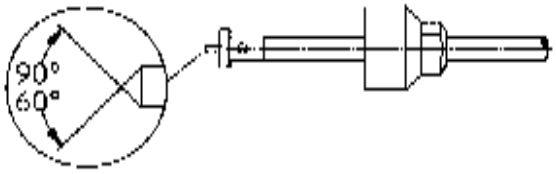
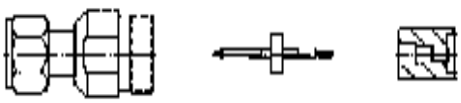
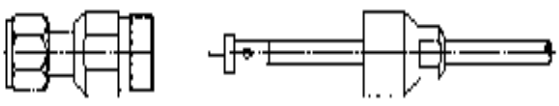
# Assembly Instructions SMPT-100

| Connector Type | Cable Type | Connector Components | Tools Required |
|---|---|---|---|
| SMP Male Test Connector | S/R .085" S/R .085"LL (Low Loss) |   | |

| | | |
|---|---|---|
| **Procedure 1** | Slide back body over cable. |  |
| **Procedure 2** | Trim outer conductor and dielectric to dimensions shown. |   |
| **Procedure 3** | Slide ferrule over outer conductor, seat firmly and solder. |  |
| **Procedure 4** | Trim dielectric. It should be flush with the ferrule. Point center conductor as shown. |   |
| **Procedure 5** | Insert center conductor assembly and mid body into connector housing. |  |
| **Procedure 6** | Insert center conductor of cable into center conductor of connector. Engage threads of back body and connector housing and torque to 35 inch pounds (4 Nm). |  |

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# Assembly Instructions SMPT-200

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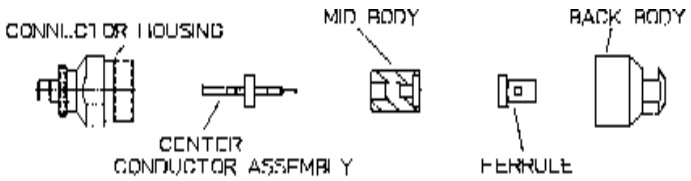
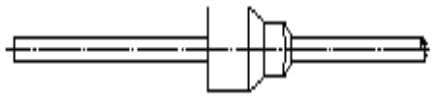
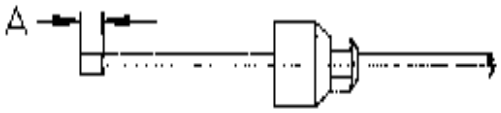
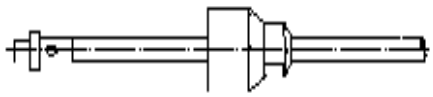
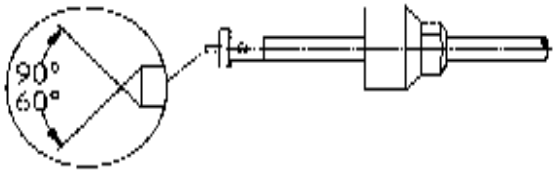
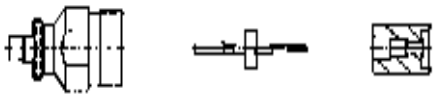
| Connector Type | Cable Type | Connector Components | Tools Required |
|---|---|---|---|
| SMP Female Test Connector | S/R .085" S/R .085"LL (Low Loss) |   | |

| | | |
|---|---|---|
| **Procedure 1** | Slide back body over cable. |  |
| **Procedure 2** | Trim outer conductor and dielectric to dimensions shown. |   |
| **Procedure 3** | Slide ferrule over outer conductor, seat firmly and solder. |  |
| **Procedure 4** | Trim dielectric. It should be flush with the ferrule. Point center conductor as shown. |   |
| **Procedure 5** | Insert center conductor assembly and mid body into connector housing. |  |
| **Procedure 6** | Insert center conductor of cable into center conductor of connector. Engage threads of back body and connector housing and torque to 45 inch pounds. |  |

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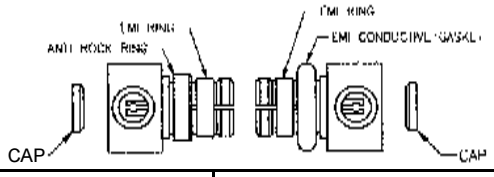
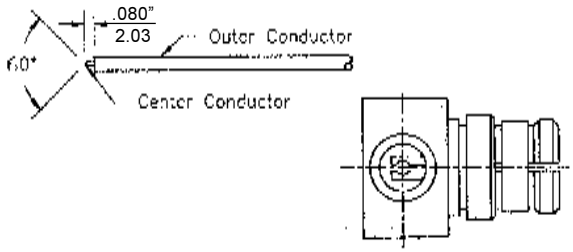
Spectrum Elektrotechnik GmbH

# Assembly Instructions SMP-291

| Connector Type | Cable Type | Connector Components | Tools Required |
|---|---|---|---|
| SMP female right angle captivated contact solder attachment | -S/R .047”<br>-S/R .086”<br>-S/R .086” LL (Low Loss) |  | Soldering gauge WE-6294<br>Fixture base WE-6053<br>Contact pos. tool WE-6290<br>Locator tool WE-6292<br>Clamp insert<br>WE-6055-3 for S/R .047”<br>WE-6055-2 for S/R .085” |

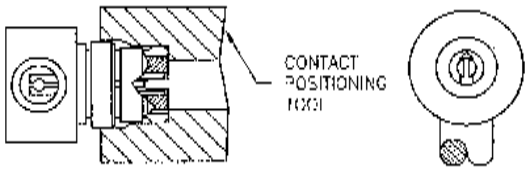
## Procedure 1

**Preparation of Components**
1. Trim outer conductor and dielectric to dimensions shown.
2. Align cross hole in center contact with hole in connector by rotating contact from interface end.



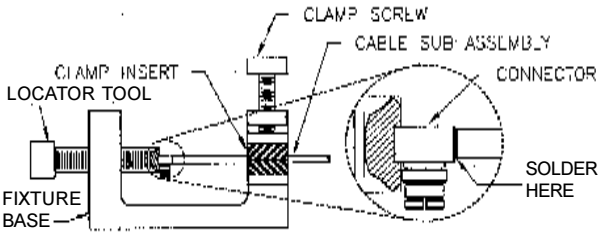

## Procedure 2

**Attach Cable to Center Conductor**
1. Install contact positioning tool to interface of connector.
2. Insert cable into connector body. Cable center conductor must engage center contact of connector as shown.



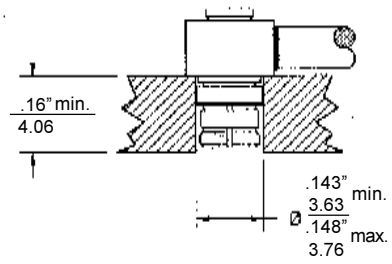

## Procedure 3

**Attach Cable to Connector**
1. Fixture as shown.
2. Solder as shown. Temperature must not exceed 550°F (290°C).
3. Allow to cool. Clean solder joint and remove excess flux.



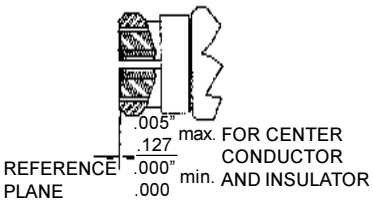

## Procedure 4

**Install Cap**
1. Insert cap with countersink going into connector body.
2. Using fixture as shown. Press cap until seated. Cap should not protude more than .001” (0.03mm).




## Procedure 5

**Shrink Sheath to Cable**
1. Position sheath over outer sleeve as shown.
2. Apply indirect heat with thermo gun to shrink sheath.
3. Remove locator tool.

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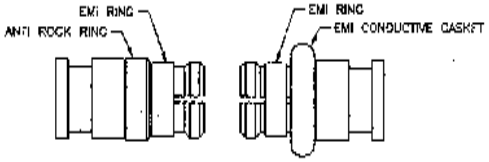
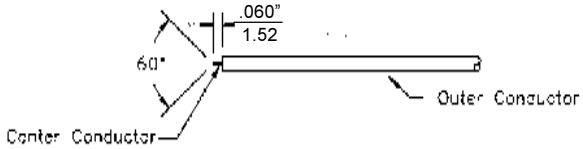
# Assembly Instructions SMP-292

Spectrum Elektrotechnik GmbH

| Connector Type | Cable Type | Connector Components | Tools Required |
|---|---|---|---|
| SMP female straight solder on contact solder attachment | -S/R .047<br>-S/R .086<br>-S/R .086 LL (Low Loss) |  | Soldering gauge WE-6294<br>Fixture base WE-6053<br>Center cont. holder WE-6057<br>Locator tool WE-6295<br>Clamp insert<br>WE-6055-3 for S/R .047"<br>WE-6055-2 for S/R .085" |

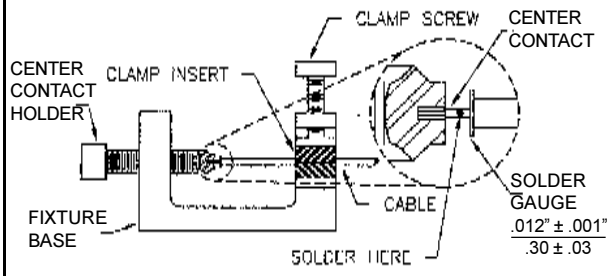
**Procedure 1**

**Preparation of Cable**
1. Trim outer conductor and dielectric to dimension shown.



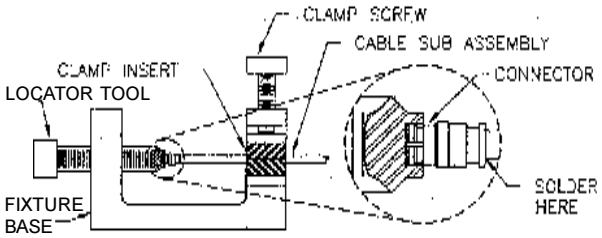

**Procedure 2**

**Attach Center Conductor to Cable**
1. Slide center conductor over cable inner conductor and seat firmly against soldering gauge.
2. Locate contact as shown and solder contact. Temperature should not exceed 550°F (290°C).
3. Allow to cool. Remove excess solder.



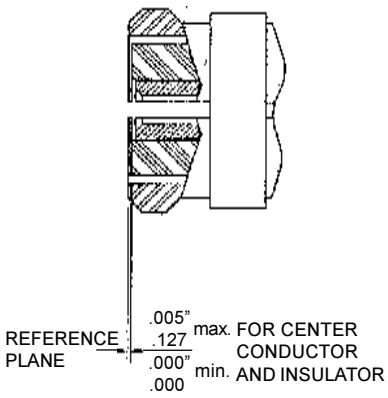

**Procedure 3**

**Attach Cable to Connector**
1. Install connector subassembly in locator tool.
2. Locate on end of cable. Tighten locator tool gently to secure joint.
3. Solder connector to cable. Do not overheat. Temperature must not exceed 550°F (290°C).
4. Clean solder joint and remove excess flux.




**Procedure 4**

**Inspection of completed connector assembly**
1. Adherence to the above steps will yield tolerances shown.

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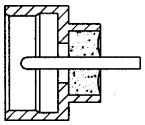
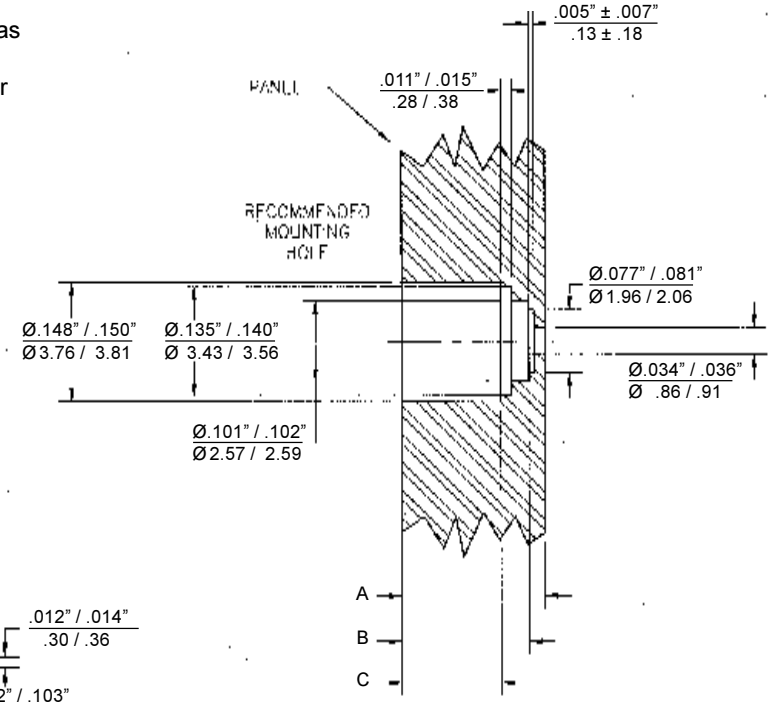
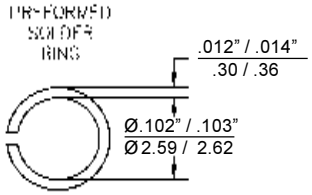
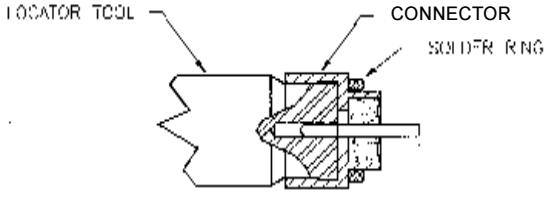
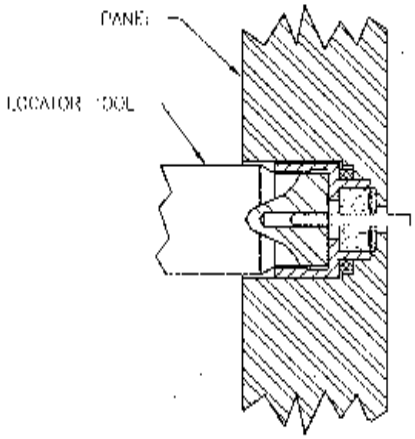
| Connector Type | Cable Type | Connector Components | Tools Required |
|---|---|---|---|
| SMP male hermetic solder attachment | |  | Locator tools<br>WE-6296-1 for full detent<br>WE-6296-2 for limited detent<br>WE-6296-3 for smooth bore |

1. Mount connector on locator tool as shown.
2. Install solder ring on connector as shown.
3. Insert locator tool with connector and solder ring into panel as shown.
4. Solder into place.

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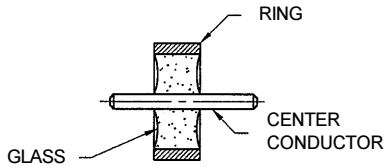
# Assembly Instructions SMP-304

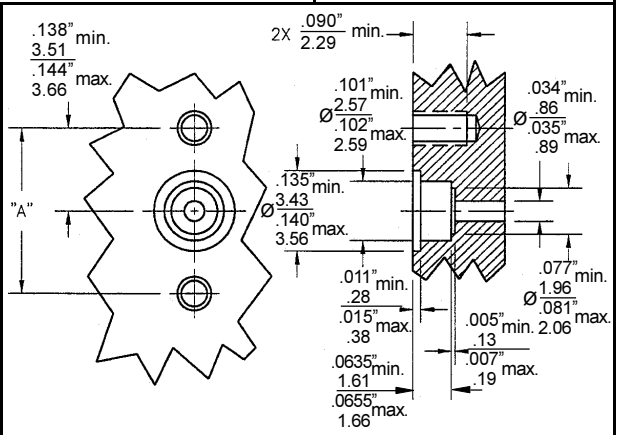
Spectrum Elektrotechnik GmbH

| Connector Type | Cable Type | Connector Components | Tools Required |
|---|---|---|---|
| **4004-9 Hermetic Subassembly solder attachment** | |   | **Seal centering tool WE-6304**<br>**Seal locating fixture WE-6305** |

## Procedure 1

**Mounting Hole Configuration**

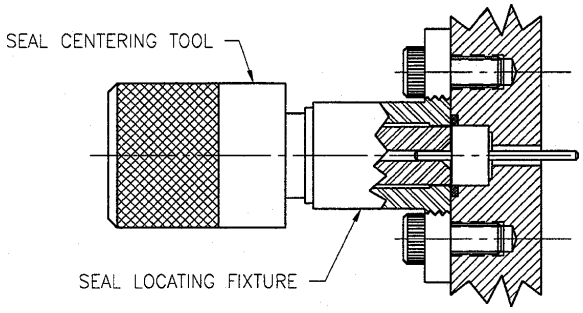
| "A" | Tools Required |
|---|---|
| .328 | WE-6305-1, WE-6304 |
| .487 | WE-6305-2, WE-6304 |
| .282 | WE-6305-3, WE-6304 |




## Procedure 2

**Seal Installation**

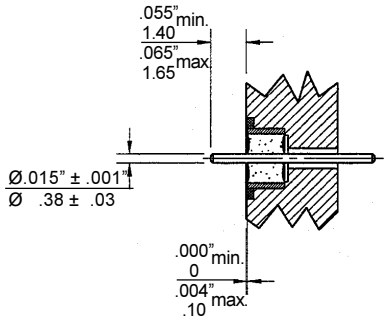
1. Use Spectrum's seal centering tool WE-6304 and seal locating fixture WE-6305 to solder seal in place as illustrated.




## Procedure 3

**Inspection of Completed Seal**

1. Adherence to the above steps will yield tolerance as shown.

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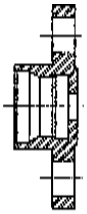
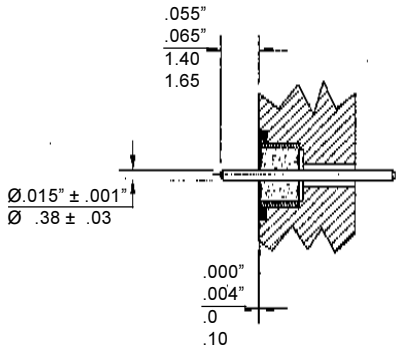
| Connector Type | Cable Type | Connector Components | Tools Required |
|---|---|---|---|
| Shroud Installation solder attachment | |  | Shroud installation tools<br>WE-6301-1 for full detent<br>WE-6301-2 for non detent<br>WE-6301-3 for limited detent<br>WE-6301-4 for smooth bore |

**Procedure 1**

**Installation of 50 Ohm seal**

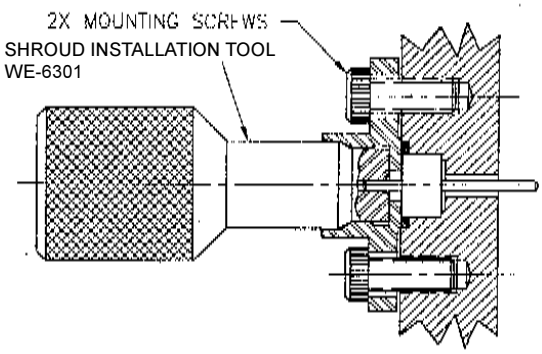
1. Install (50 Ohm seal) into panel as per Assembly Instruction SMP-304.




**Procedure 2**

**Installation of Shroud**

1. Install shroud onto seal using the installation tool as illustrated.

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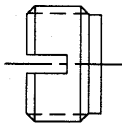
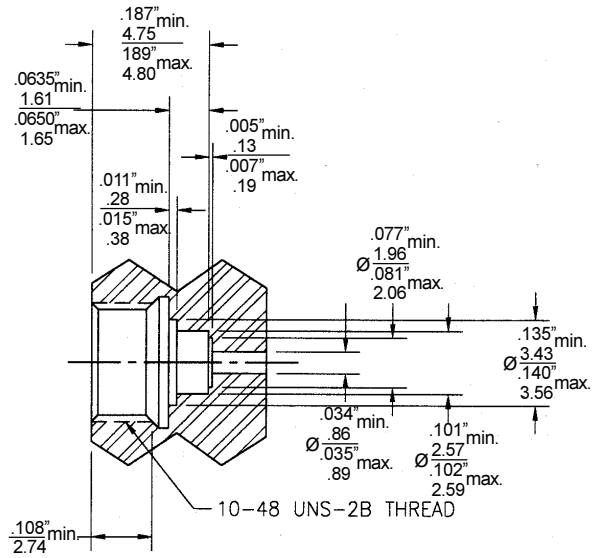
# Assembly Instructions SMP-306

Spectrum Elektrotechnik GmbH

| Connector Type | Cable Type | Connector Components | Tools Required |
|---|---|---|---|
| **Shroud Thread in Attachment** | |  | **WE-6306**<br>**WE-6307** |

**Procedure 1**

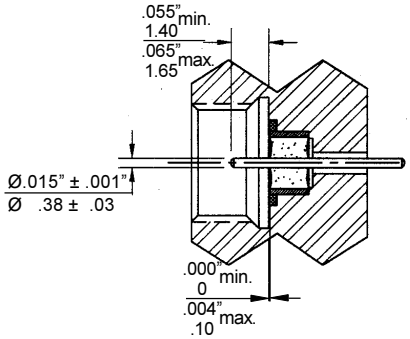
**Mounting Hole Configuration**




**Procedure 2**

**Seal Installation**

1. Install seal per AI-304 using Spectrum's tool P/N WE-6306.

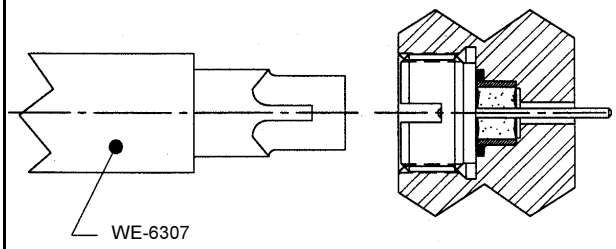



**Procedure 3**

**Shroud Installation**

1. Install shroud by threading into housing.
2. Use WE-6307 to torque to 8-10 inch pounds (0.68 - 0.90 Nm).

| Part Number | Tool |
|---|---|
| **11F9-1103-02** | WE-6307-1 |
| **11L9-1103-02** | WE-6307-2 |
| **11S9-1103-02** | WE-6307-3 |

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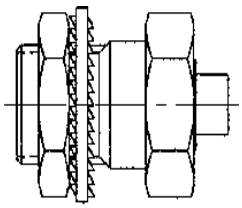
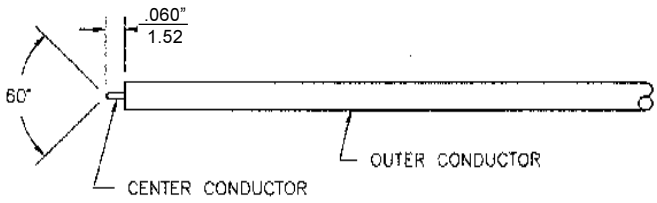
# Assembly Instructions SMP-309

| Connector Type | Cable Type | Connector Components | Tools Required |
|---|---|---|---|
| SMP male straight captivated contact solder attachment | -S/R .086<br>-S/R .086 LL (Low Loss) |  | Soldering gauge WE-6294<br>Fixture base WE-6053<br>Locator tool WE-6295<br>Clamp insert WE-6055-2 |

**Procedure 1**

**Preparation of Cable**

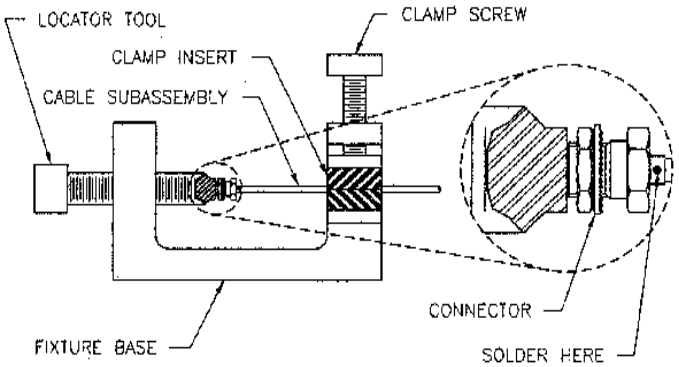
1. Trim outer conductor and dielectric to dimension shown.




**Procedure 2**

**Attach Cable to Connector**

1. Install connector subassembly in locator tool.
2. Locate on end of cable. Tighten locator tool gently to secure joint.
3. Solder connect to cable. Do not overheat. Temperature must not exceed 550°F (290°C).
4. Clean solder joint and remove excess flux.

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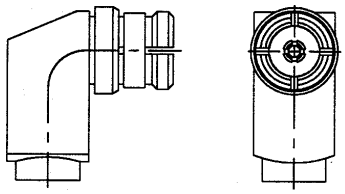
# Assembly Instructions SMP-311

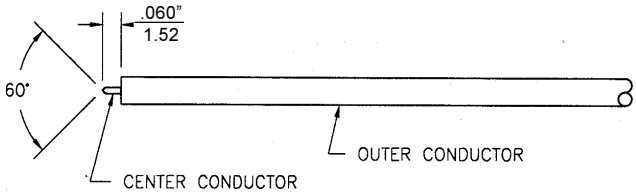
Spectrum Elektrotechnik GmbH

| Connector Type | Cable Type | Connector Components | Tools Required |
|---|---|---|---|
| SMP male right angle captivated contact solder attachment | -S/R .086<br>-S/R .086 LL (Low Loss) |  | Fixture base WE-6053<br>Locator tool WE-6295<br>Clamp insert WE-6055-2 |

**Procedure 1**

**Preparation of Cable**

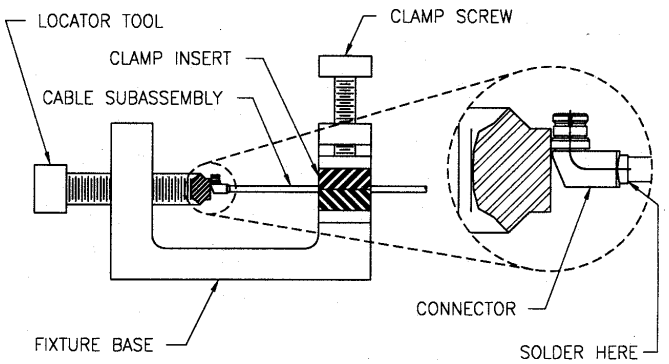
1. Trim outer conductor and dielectric to dimension shown.




**Procedure 2**

**Attach Cable to Connector**

1. Install connector subassembly in locator tool.
2. Locate on end of cable. Tighten locator tool gently to secure joint.
3. Solder connector to cable. Do not overheat. Temperature must not exceed 550°F. (290°C).
4. Clean solder joint and remove excess flux.

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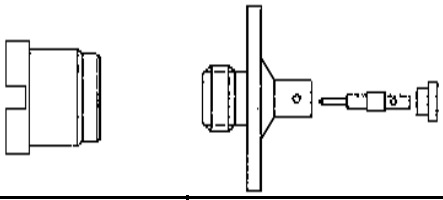
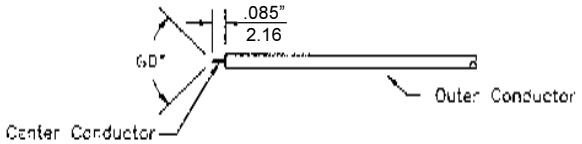
# Spectrum Elektrotechnik GmbH

# Assembly Instructions SMP-313 (Page 1 of 2)

| Connector Type | Cable Type | Connector Components | Tools Required |
|---|---|---|---|
| SMP male straight solder on contact solder attachment | -S/R .086<br>-S/R .086 LL (Low Loss) |  | Fixture base WE-6053<br>Center cont. holder WE-6307<br>Locator tool WE-6308<br>Clamp insert WE-6055-2 |

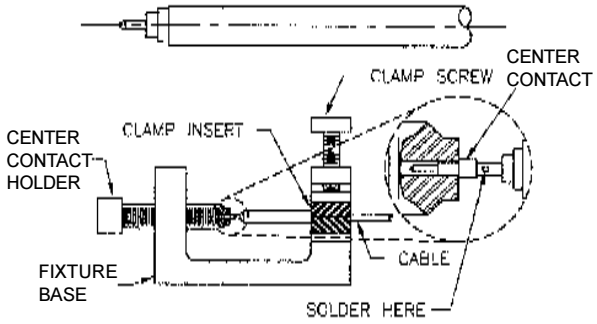
**Procedure 1**

**Preparation of Cable**
1. Trim outer conductor and dielectric to dimension shown.



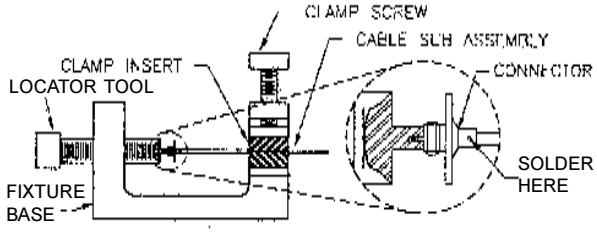

**Procedure 2**

**Attach Center Conductor to Cable**
1. Install dielectric end stop over cable center conductor in the orientation shown.
2. Place center contact over in center conductor of cable push flush to end stop. Solder in place as shown. Temperature should not exceed 550°F (290°C).
3. Allow to cool. Remove excess solder.



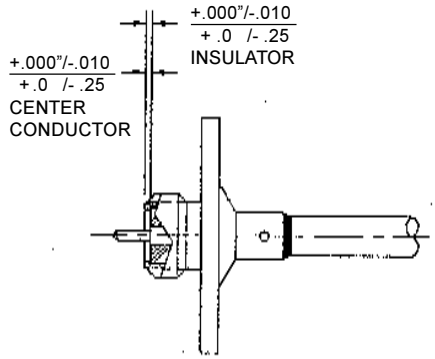

**Procedure 3**

**Attach Cable to Connector**
1. Install connector subassembly in locator tool.
2. Locate on end of cable. Tighten locator tool gently to secure joint.
3. Solder connector to cable. Do not overheat. Temperature must not exceed 550°F (290°C).
4. Clean solder joint and remove excess flux.




**Procedure 4**

**Inspection of completed connector assembly**
1. Adherence to the above steps will yield tolerances shown.

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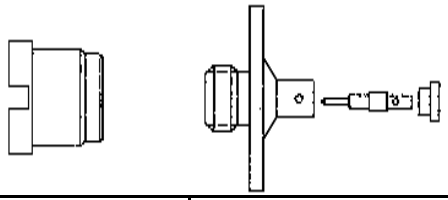
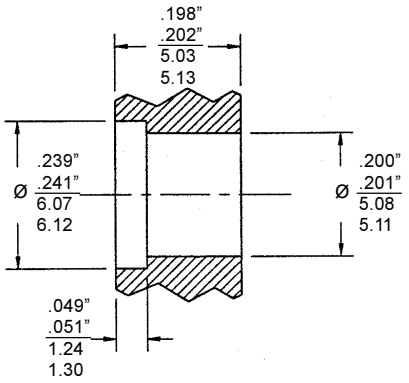
# Assembly Instructions SMP-313 (Page 2 of 2)

| Connector Type | Cable Type | Connector Components | Tools Required |
|---|---|---|---|
| SMP male straight solder on contact solder attachment | -S/R .086<br>-S/R .086 LL (Low Loss) |  | Fixture base WE-6053<br>Center cont. holder WE-6307<br>Locator tool WE-6308<br>Clamp insert WE-6055-2 |

**Procedure 5**

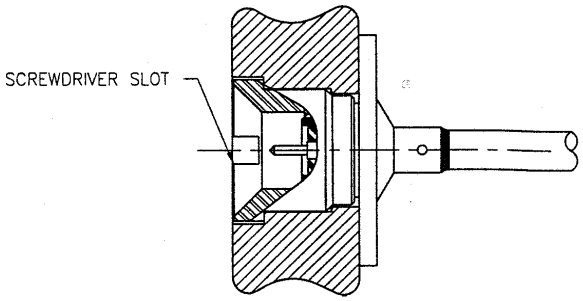
**Mounting Hole Dimensions**




**Procedure 6**

**Installed configuration**

1. Install bulkhead mount as illustrated. Torque 6 - 8 inch pounds (0.68 - 0.90 Nm).

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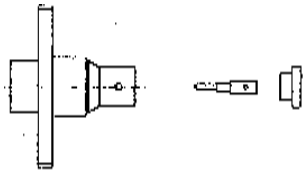
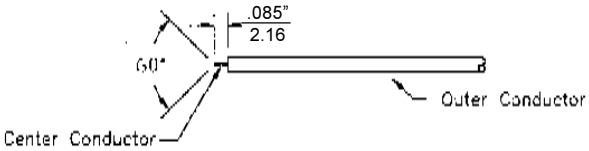
# Assembly Instructions SMP-315

| Connector Type | Cable Type | Connector Components | Tools Required |
|---|---|---|---|
| SMP male straight solder on contact solder attachment | -S/R .086<br>-S/R .086 LL (Low Loss) |  | Fixture base WE-6053<br>Center cont. holder WE-6307<br>Locator tool WE-6308<br>Clamp insert WE-6055-2 |

## Procedure 1

**Preparation of Cable**

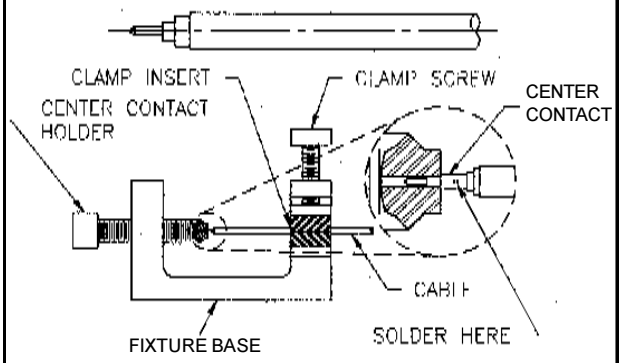
1. Trim outer conductor and dielectric to dimension shown.




## Procedure 2

**Attach Center Conductor to Cable**

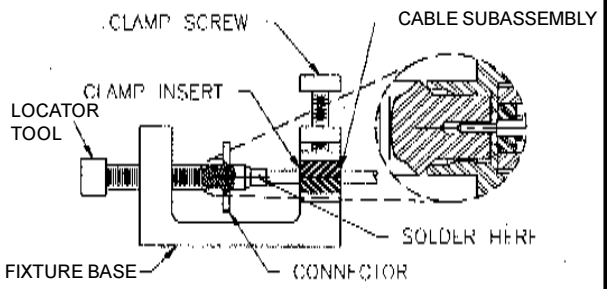
1. Install dielectric end stop over cable center conductor in the orientation shown.
2. Place center contact over in center conductor of cable push flush to end stop. Solder in place as shown. Temperature should not exceed 550°F (290°C).
3. Allow to cool. Remove excess solder.




## Procedure 3

**Attach Cable to Connector**

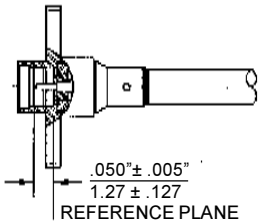
1. Install connector subassembly in locator tool.
2. Locate on end of cable. Tighten locator tool gently to secure joint.
3. Solder connector to cable. Do not overheat. Temperature must not exceed 550°F (290°C).
4. Clean solder joint and remove excess flux.




## Procedure 4

**Inspection of completed connector assembly**

1. Adherence to the above steps will yield tolerances shown.

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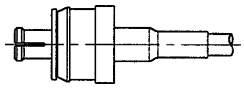
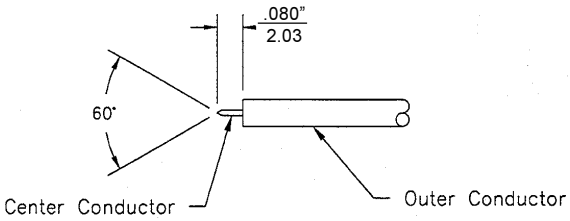
# Assembly Instructions SMP-330

Spectrum Elektrotechnik GmbH

| Connector Type | Cable Type | Connector Components | Tools Required |
|---|---|---|---|
| SMP female straight float for flexible cable solder attachment | S/R .047"<br>S/R .085" |  | No special tools required. |

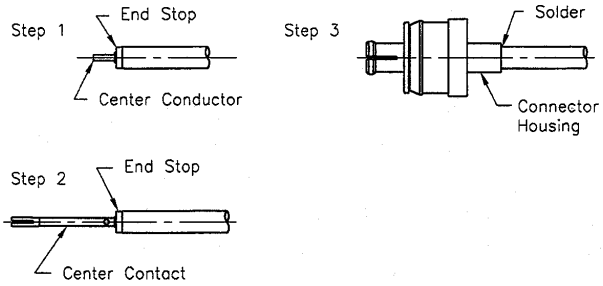
**Procedure 1**

**Preparation of Cable**
1. Trim outer conductor and dielectric to dimension shown.



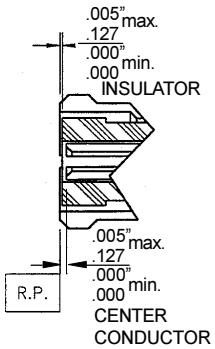

**Procedure 2**

**Attach Cable to Housing**
1. Install dielectric end stop over cable center conductor in the orientation shown.
2. Place center contact over the center conductor of cable. Push flush to end stop. Solder in place.
3. Insert cable into connector housing. Solder in place.




**Procedure 3**

**Inspection of Completed Connector Assembly**
1. Adherence to the above steps will yield tolerances as shown.

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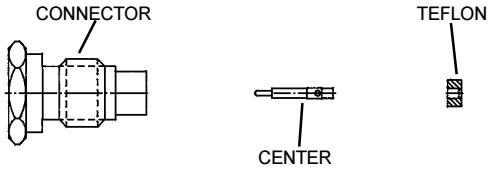
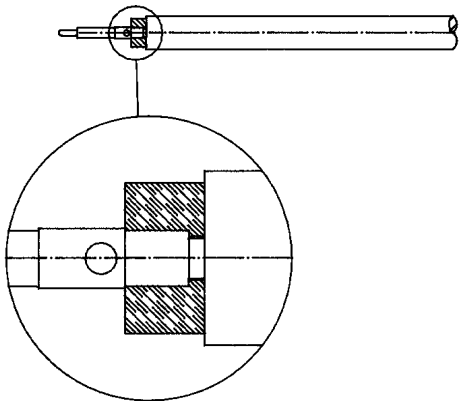
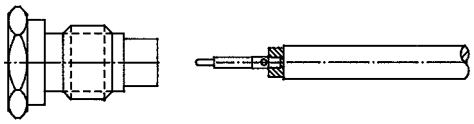
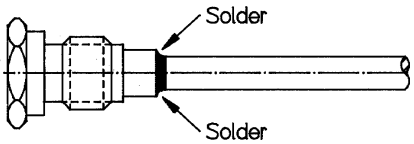
# Assembly Instructions SMP-401

| Connector Type | Cable Type | Connector Components | Tools Required |
|---|---|---|---|
| SMP Male | -S/R .085" |   | |

| | | |
|---|---|---|
| **Procedure 1** | Trim outer conductor and dielectric to dimensions shown. |   |
| **Procedure 2** | Slide teflon spacer and center conductor of connector over center conductor of cable, seat firmly and solder. |  |
| **Procedure 3** | Insert cable assembly into connector housing. Solder in place. |  |
| **Procedure 4** | Solder in place. |   |

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# Assembly Instructions TNC-710 (Page 1/2)

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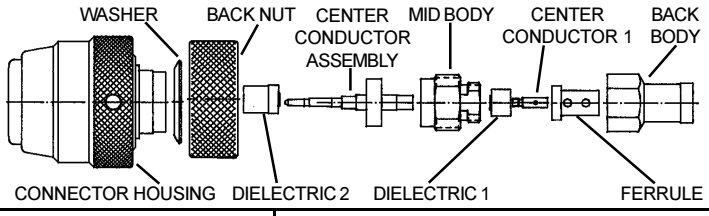
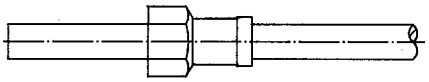
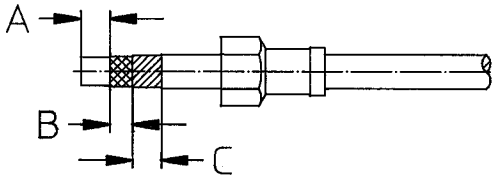
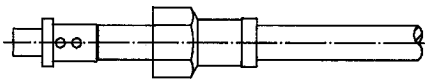
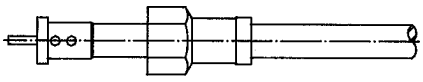
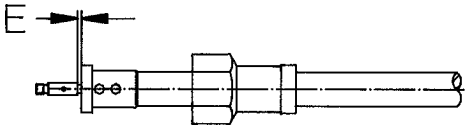
| Connector Type | Cable Type | Connector Components | Tools Required |
|---|---|---|---|
| TNC PUSH - ON | |   | Pin wrench WE-P026 |

| | | |
|---|---|---|
| Procedure 1 | Slide back body over cable. |  |
| Procedure 2 | Trim outer conductor and dielectric to dimensions shown. |   |
| Procedure 3 | Slide ferrule over outer conductor, seat firmly and solder. |  |
| Procedure 4 | Trim dielectric. It should be flush with the ferrule. |  |
| Procedure 5 | Slide center conductor 1 over center conductor of cable, seat firmly against soldering gauge and solder. |   |

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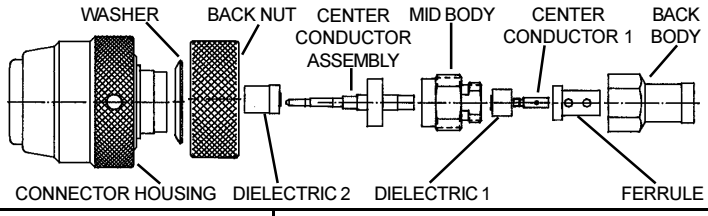
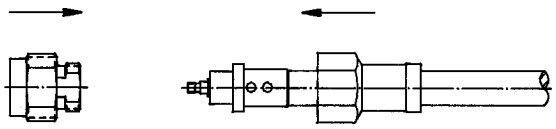
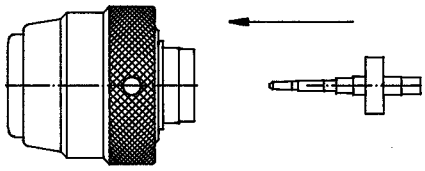
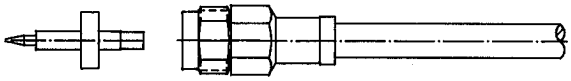
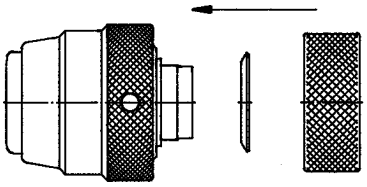
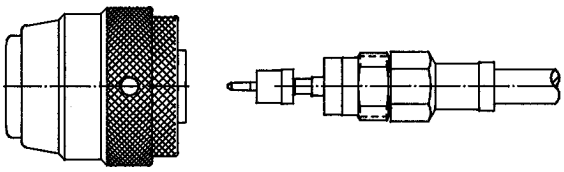
# Assembly Instructions TNC-710 (Page 2/2)

| Connector Type | Cable Type | Connector Components | Tools Required |
|---|---|---|---|
| TNC PUSH - ON | |   | Pin wrench WE-P026 |

| | | |
|---|---|---|
| **Procedure 6** | Slide dielectric 1 over center conductor 1 and insert mid body into back body. Engage threads of back body and mid body and torque to 50 inch pounds (5.6Nm). The usage of Loctite is recommended. |  |
| **Procedure 7** | Make sure that center conductor assembly slides easily into connector housing. |  |
| **Procedure 8** | Thread center conductor assembly into center conductor 1 until it is finger tight. The use of Silver Epoxy at only the threads and heattreat is recommended. |  |
| **Procedure 9** | Place washer and back nut onto connector housing. |  |
| **Procedure 10** | Slide dielectric 2 over center conductor. Insert cable assembly into connector housing. Engage threads of back body and connector housing and torque to 45 inch pounds (5.1Nm). Use a Pin Wrench to hold the coupling nut. |  |

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# Assembly Instructions TNC-720 (Page 1/2)

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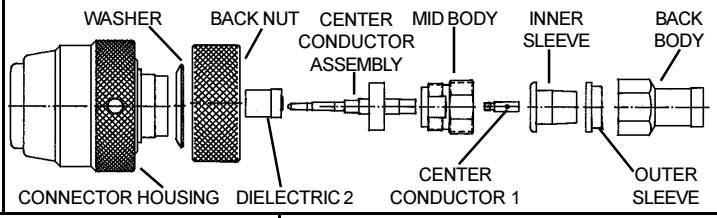
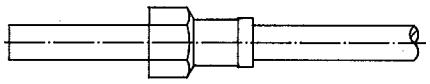
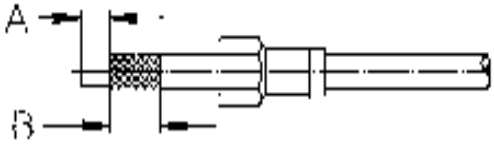
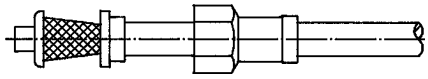
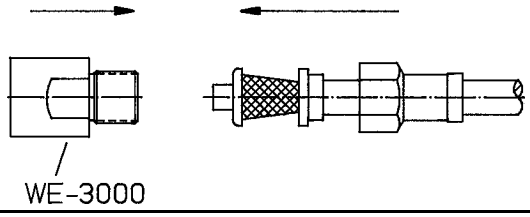
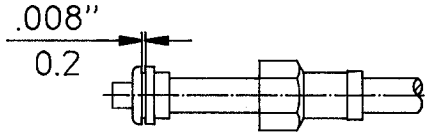
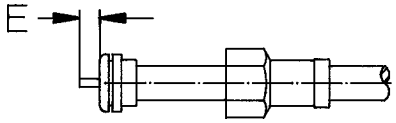
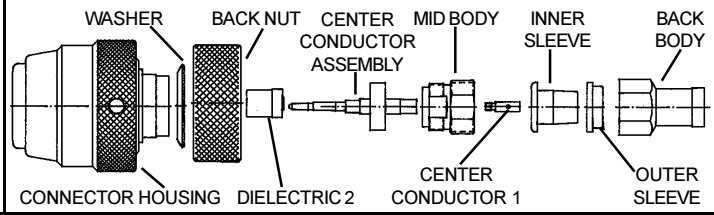
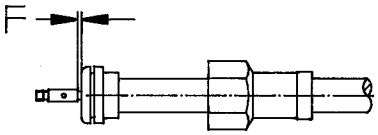
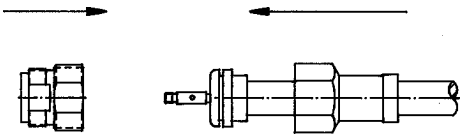
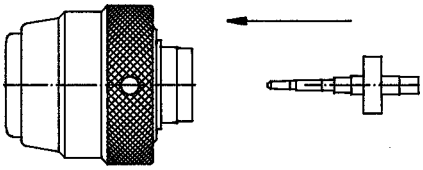
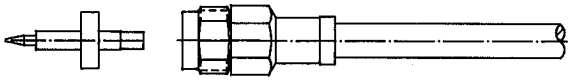
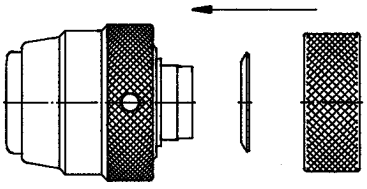
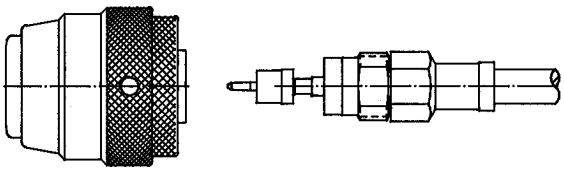
| Connector Type | Cable Type | Connector Components | Tools Required |
|---|---|---|---|
| TNC PUSH - ON | RG-214/U |   | WE-3000 Pin Wrench WE-P026 |

| | | |
|---|---|---|
| **Procedure 1** | Slide back body over cable. |  |
| **Procedure 2** | Trim outer conductor and dielectric to dimensions shown. |   |
| **Procedure 3** | Slide outer sleeve over outer conductor of cable. Assemble inner sleeve over cable dielectric and under the braid. |  |
| **Procedure 4** | Insert cable assembly into tool WE - 3000. Screw tool into back body and tighten. |   |
| **Procedure 5** | Unscrew tool WE - 3000. |   |
| **Procedure 6** | Trim dielectric. It should be flush with the sleeve. |   |

# Assembly Instructions TNC-720 (Page 2/2)

| Connector Type | Cable Type | Connector Components | Tools Required |
|---|---|---|---|
| TNC PUSH - ON | |   | WE-3000 Pin Wrench WE-P026 |

| | | |
|---|---|---|
| **Procedure 7** | Slide center conductor 1 over center conductor of cable, seat firmly against soldering gauge and solder. |   |
| **Procedure 8** | Insert mid body into back body. Engage threads of back body and mid body and torque to 50 inch pounds (5.6Nm). The usage of Loctite is recommended. |  |
| **Procedure 9** | Make sure that center conductor assembly slides easily into connector housing. |  |
| **Procedure 10** | Thread center conductor assembly into center conductor 1 until it is finger tight. <u>The use of Silver Epoxy at only the threads and heattreat is recommended.</u> |  |
| **Procedure 11** | Place washer and back nut onto connector housing. |  |
| **Procedure 12** | Slide dielectric 2 over center conductor. Insert cable assembly into connector housing. Engage threads of back body and connector housing and torque to 45 inch pounds (5.1Nm). Use a Pin Wrench to hold the coupling nut. |  |

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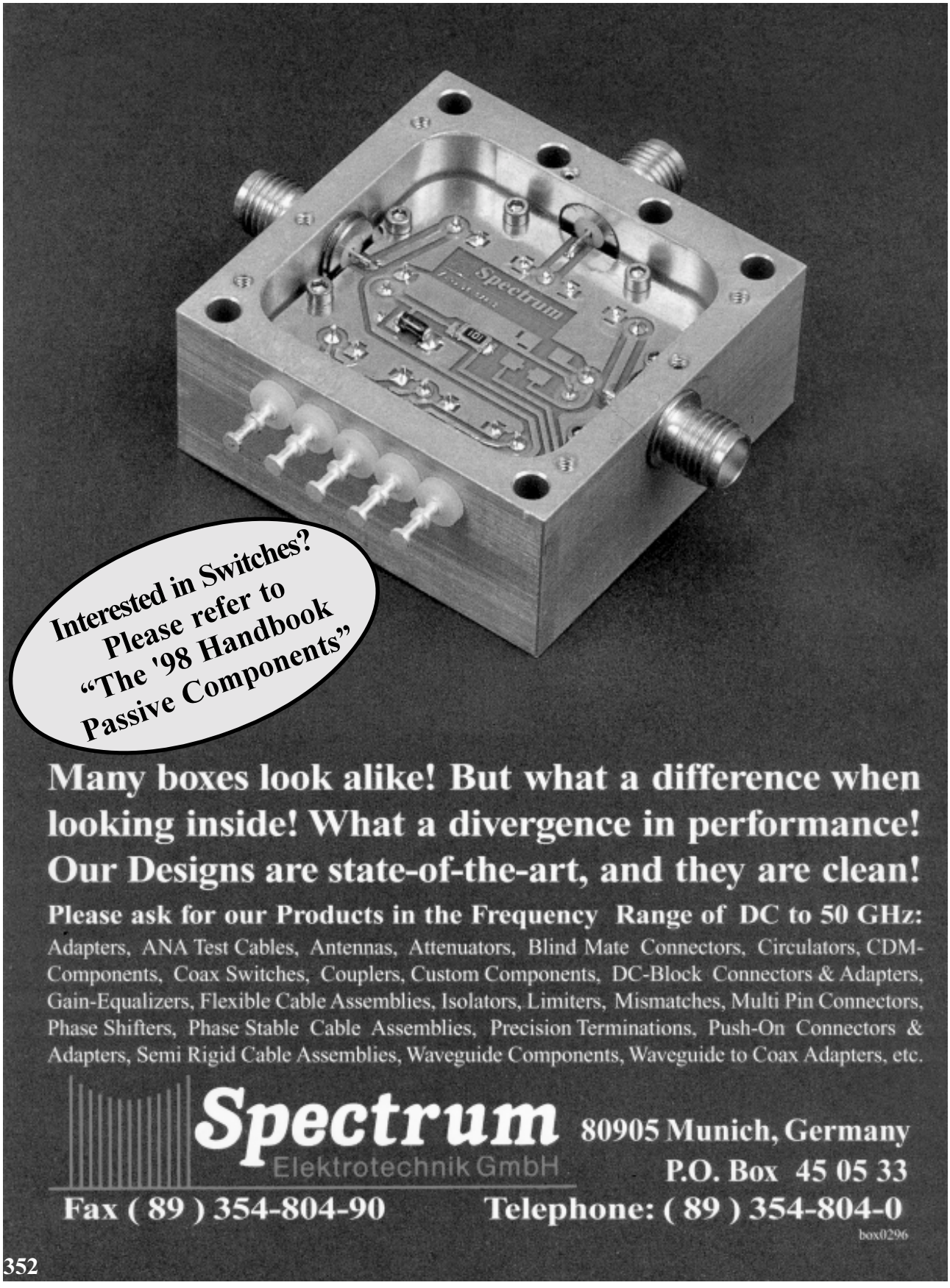

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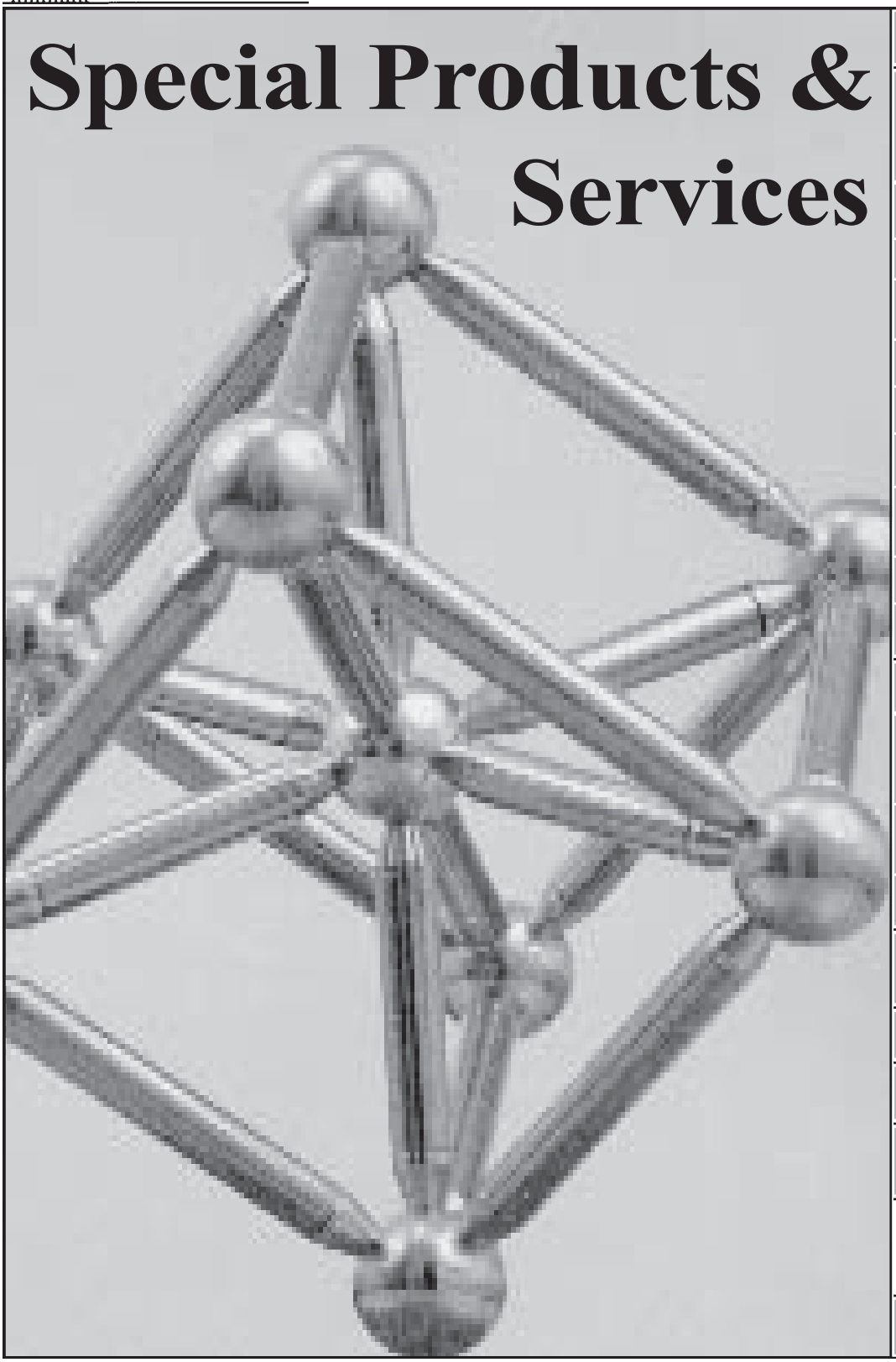
# Special Products & Services





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# Special Products & Services

**Design and Engineering:** Spectrum Elektrotechnik GmbH is a very innovative Company. It employs a strong and successful team of experienced engineers. If your application requires a product that is not available as standard, Spectrum Elektrotechnik GmbH is the Company to contact. Our engineers are ready and willing and capable to listen to your problem and they will try their best to propose something that will fit your needs perfectly. There is also a possibility that we may have solved already a similar problem for somebody else and that we have a solution available, almost off the shelf.
Following a few examples of areas where our engineering staff has proposed and designed and manufactured hardware to the customers requirements, or has developed successfully Products to widen and strengthen our Product Range:

**The Cable Assembly Group:** Designing and manufacturing of Low Loss Cable Assemblies, Extra Light Weight Assemblies, Phase & Amplitude Matched Cable Assemblies, High Velocity and Thermal Stable Dielectrics, Delay Lines, etc.

**The Connector Group:** Designing and manufacturing successfully new Connector Series, e.g. of Types SBX, SBY and SPM, connectors that were not available at all with the physical and electrical performance as needed for specific programs.
Adapters for special applications were designed to fit exactly the customers' needs, mechanically and electrically.
A whole new Product Line was developed and successfully introduced to the market: the PUSH-ON Connectors and Adapters for series 3.5mm, K*, SMA, N and TNC, using 50 Ohms impedance, and for F, N and TNC as well, using 75 Ohms impedance.

**The Component Group:** Besides the Standard Product Lines, Spectrum Elektrotechnik GmbH offers Engineering and Manufacturing Services, to design and manufacture Components exactly to Customer's Specification. Whatever cannot be found in anybody else`s catalog, Spectrum Elektrotechnik GmbH is definitely worthwhile to contact. There is even always a possibility that a similar product has already been designed for somebody else.
The Table to the right shows the areas where Spectrum Elektrotechnik GmbH has successfully designed and manufactured products to customers' specifications. On pages 356 through 399 detailed information will be given on these components.

**Process Engineering:** This Group has been developing tools and machines that are needed in manufacturing but were not available on the market as standard. Currently the design, manufacturing and testing of an Automatic Cable Cutting and Stripping Machine has been completed and the machine has been introduced to the market as CNCA-700.

**Quick Response Manufacturing:** The Quick Response Manufacturing is another good example for the commitment to providing excellent Customer Service. The Quick Response Group was implemented to react immediately to customers' needs. Sometimes Products will be shipped within 24 hours. All Products manufactured in the Quick Response Area will meet the same Quality Standards as all the other products, they are submitted to the same inspection.




Spectrum Elektrotechnik GmbH P.O. Box 45 05 33, 80905 Munich, Germany **Tel. (89) 354 804-0, Fax (89) 354 804-90** (Country Code: 49)
* 'K' Connector is a trademark of Wiltron Company.

# Adapter Sets

Spectrum Elektrotechnik GmbH

Spectrum Elektrotechnik GmbH offers a standard range of precision adapter sets. Each set comprises a commonly used grouping of series and inter-series adapters. Each adapter within any set is 100% tested, and ensures low reflection and optimum phase performance over its full frequency range. To enable the user to maintain these quality adapters in pristine condition, they are supplied in a nicely finished wooden case.

Customers can also specify adapters for their own custom compiled sets. For details please call your Spectrum Representative.

**Between Series Kit 7mm, consisting of the following Precision Adapters:** **SET7-MINI-S1**

| | | |
|---|---|---|
| 1 Adapter straight | 7 mm to 2.4 mm-Female: | P/N 8001-HF90-02 |
| 1 Adapter straight | 7 mm to 2.4 mm-Male: | P/N 8001-HM90-02 |
| 1 Adapter straight | 7 mm to K*-Female: | P/N 8001-KF90-02 |
| 1 Adapter straight | 7 mm to K* -Male: | P/N 8001-KM90-02 |
| 1 Adapter straight | 7 mm to 3.5-Female: | P/N 8001-9092-02 |
| 1 Adapter straight | 7 mm to 3.5-Male: | P/N 8001-9091-02 |
| 1 Adapter straight | 7 mm to SMA-Female: | P/N 8001-2190-02 |
| 1 Adapter straight | 7 mm to SMA-Male: | P/N 8001-1190-02 |

**Between Series Kit 7mm, consisting of the following Precision Adapters:** **SET7-MINI-S2**

| | | |
|---|---|---|
| 2 Adapter straight | 7 mm to 3.5-Female: | P/N 8003-9092-02 |
| 2 Adapter straight | 7 mm to 3.5-Male: | P/N 8003-9091-02 |
| 2 Adapter straight | 7 mm to SMA-Female: | P/N 8001-2190-02 |
| 2 Adapter straight | 7 mm to SMA-Male: | P/N 8001-1190-02 |

**Between Series Kit 7mm, consisting of the following Precision Adapters:** **SET7-TNCN-S1**

| | | |
|---|---|---|
| 2 Adapter straight | 7 mm to TNC-Female: | P/N 8002-4190-02 |
| 2 Adapter straight | 7 mm to TNC-Male: | P/N 8002-3190-02 |
| 2 Adapter straight | 7 mm to N-Female: | P/N 8001-6190-02 |
| 2 Adapter straight | 7 mm to N-Male: | P/N 8001-5190-02 |

**Between Series Kit 7mm, consisting of the following Precision Adapters:** **SET7-UNIV-S1**

| | | |
|---|---|---|
| 1 Adapter straight | 7 mm to 3.5 mm-Female: | P/N 8001-9092-02 |
| 1 Adapter straight | 7 mm to 3.5 mm-Male: | P/N 8001-9091-02 |
| 1 Adapter straight | 7 mm to SMA-Female: | P/N 8001-2190-02 |
| 1 Adapter straight | 7 mm to SMA -Male: | P/N 8001-1190-02 |
| 1 Adapter straight | 7 mm to TNC-Female: | P/N 8002-4190-02 |
| 1 Adapter straight | 7 mm to TNC-Male: | P/N 8002-3190-02 |
| 1 Adapter straight | 7 mm to N-Female: | P/N 8001-6190-02 |
| 1 Adapter straight | 7 mm to N-Male: | P/N 8001-5190-02 |

**Between Series Kit N-TNC, consisting of the following Precision Adapters:** **SETN-TTNC-S1**

| | | |
|---|---|---|
| 2 Adapter straight | N-Female to TNC Fem.: | P/N 8001-4161-02 |
| 2 Adapter straight | N-Female to TNC Male: | P/N 8001-3161-02 |
| 2 Adapter straight | N-Male to TNC Female: | P/N 8001-4151-02 |
| 2 Adapter straight | N-Male to TNC Male: | P/N 8001-3151-02 |

**Between Series Kit TNC-SMA, consisting of the following Precision Adapters:** **SETT-TSMA-S1**

| | | |
|---|---|---|
| 2 Adapter straight | TNC Fem. to SMA-Fem.: | P/N 8001-2141-02 |
| 2 Adapter straight | TNC Fem. to SMA-Male: | P/N 8001-1141-02 |
| 2 Adapter straight | TNC Male to SMA-Fem.: | P/N 8001-2131-02 |
| 2 Adapter straight | TNC Male to SMA-Male: | P/N 8001-1131-02 |

**Between Series Kit Type N, consisting of the following Precision Adapters:** **SETN-MINI-S1**

| | | |
|---|---|---|
| 1 Adapter straight | N-Fem. to 3.5 mm-Fem.: | P/N 8002-6192-02 |
| 1 Adapter straight | N-Fem. to 3.5 mm-Male: | P/N 8002-6191-02 |
| 1 Adapter straight | N-Male to 3.5 mm-Fem.: | P/N 8002-5192-02 |
| 1 Adapter straight | N-Male to 3.5 mm-Male: | P/N 8002-5191-02 |
| 1 Adapter straight | N-Female to SMA-Fem.: | P/N 8001-2161-02 |
| 1 Adapter straight | N-Female to SMA-Male: | P/N 8001-1161-02 |
| 1 Adapter straight | N-Male to SMA-Fem.: | P/N 8002-2151-02 |
| 1 Adapter straight | N-Male to SMA-Male: | P/N 8002-1151-02 |

**Between Series Kit BNC, consisting of the following Precision Adapters:** **SETB-TSMA-S1**

| | | |
|---|---|---|
| 1 Adapter straight | BNC-Fem. to SMA-Fem.: | P/N 8001-2181-02 |
| 1 Adapter straight | BNC-Fem. to SMA-Male: | P/N 8001-1181-02 |
| 1 Adapter straight | BNC-Male to SMA-Fem.: | P/N 8001-2171-02 |
| 1 Adapter straight | BNC-Male to SMA-Male: | P/N 8001-1171-02 |

**In-Series Kit Type SMA, consisting of the following Precision Adapters:** **SETS-TSMA-S1**

| | | |
|---|---|---|
| 1 Adapter straight | SMA-Fem. to SMA-Fem.: | P/N 8001-2121-02 |
| 1 Adapter straight | SMA-Fem. to SMA-Male: | P/N 8001-1121-02 |
| 1 Adapter straight | SMA-Male to SMA-Male: | P/N 8001-1111-02 |
| 1 Adapter radius angle | SMA-Fem. to SMA-Fem.: | P/N 8091-2121-02 |
| 1 Adapter radius angle | SMA-Fem. to SMA-Male: | P/N 8091-1121-02 |
| 1 Adapter radius angle | SMA-Male to SMA-Male: | P/N 8091-1111-02 |

**In-Series Kit, Type N, consisting of the following Precision Adapters:** **SETN-TYPN-S1**

| | | |
|---|---|---|
| 2 Adapter straight | N-Female to N-Female: | P/N 8001-6161-02 |
| 2 Adapter straight | N-Female to N-Male: | P/N 8001-5161-02 |
| 2 Adapter straight | N-Male to N-Male: | P/N 8001-5151-02 |

**In-Series Kit Type TNC, consisting of the following Precision Adapters:** **SETT-TTNC-S1**

| | | |
|---|---|---|
| 2 Adapter straight | TNC-Fem. to TNC Fem.: | P/N 8001-4141-02 |
| 2 Adapter straight | TNC-Fem. to TNC Male: | P/N 8001-3141-02 |
| 2 Adapter straight | TNC-Male to TNC Male: | P/N 8001-3131-02 |

## How to order your Personal Set:

Please use the temporary P/N: SET-PERS, and specify all the Adapters you want to include in your Set. The individual Kit will be showing your name plate, identifying your own compiled Set.

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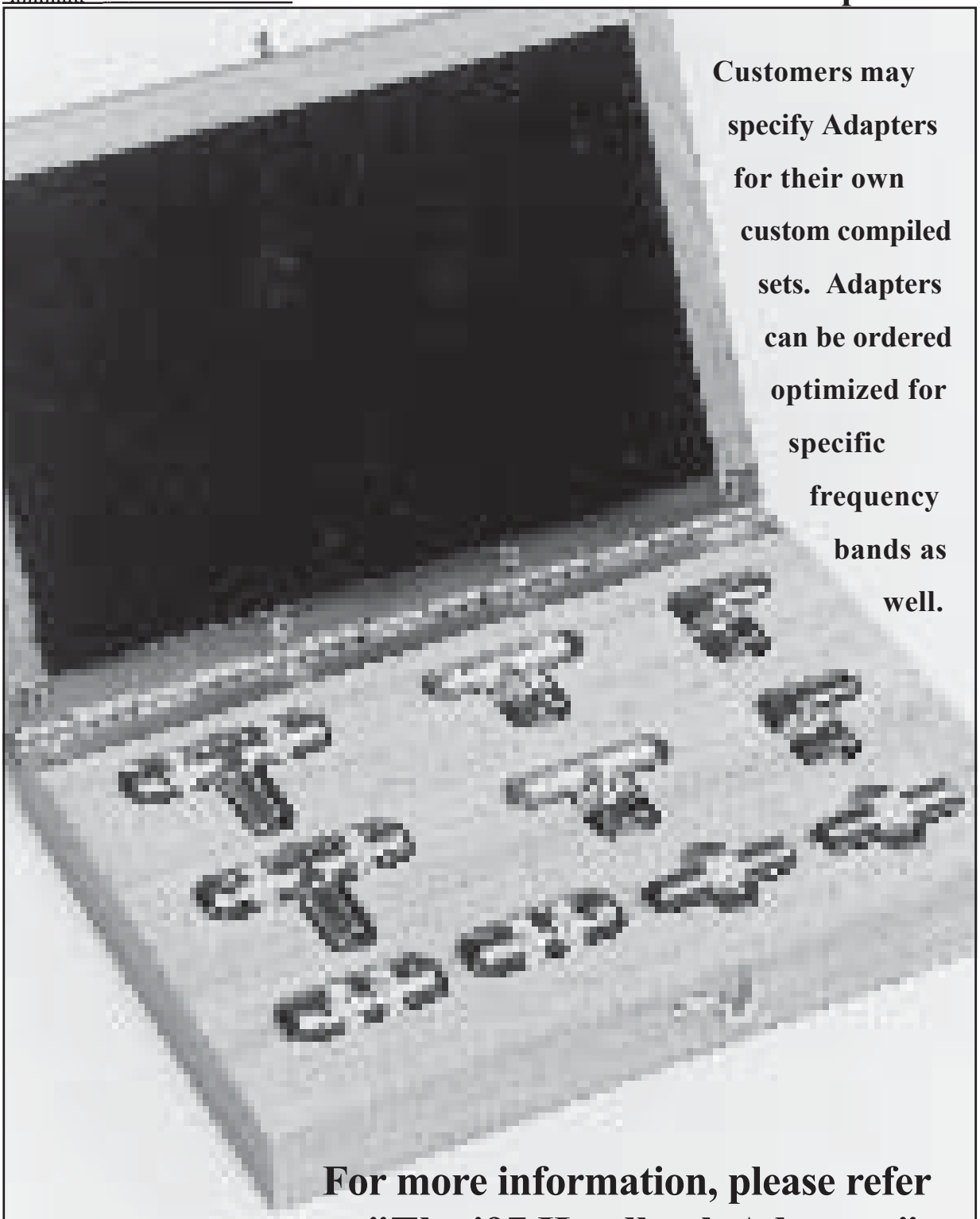


Customers may specify Adapters for their own custom compiled sets. Adapters can be ordered optimized for specific frequency bands as well.

**For more information, please refer to "The '97 Handbook Adapters".**

# Antennas

**INTRODUCTION:** Antennas are employed to couple electromagnetic energy between free space propagation and the energy received or transmitted as a guided wave by a radar system. Antenna dimensions of several wavelengths may be needed to confine an adequate amount of energy.

**Application:** Most antennas are used to serve as both, transmitters and receivers of microwave systems. Most systems require an antenna that tends to concentrate the transmitted energy into a small solid angle, or to receive energy from a specific direction.

**Antenna Gain:** The ability of an antenna to concentrate energy in a particular direction or to be more sensitive to energy incident from a specific direction is described in terms of the antenna gain. Denoted only as the gain, the exact definition would be the power gain of an antenna, which includes losses associated with the antenna, such as ohmic and RF heating.

**Antenna Radiation Pattern:** The spatial distribution of energy when plotted on a relative basis is called the antenna radiation pattern and it is a measure of the power per unit area, also called the power pattern. When measuring the unit per solid angle in a given direction, it is called the radiation intensity pattern.

**Average Power Handling:** This is the maximum allowable power to which the antenna can be subjected to without suffering permanent damage.

**Connectors:** Antennas can be supplied with almost any connector or waveguide configuration, supposing that frequency range and power level are within the connector/waveguide limits.

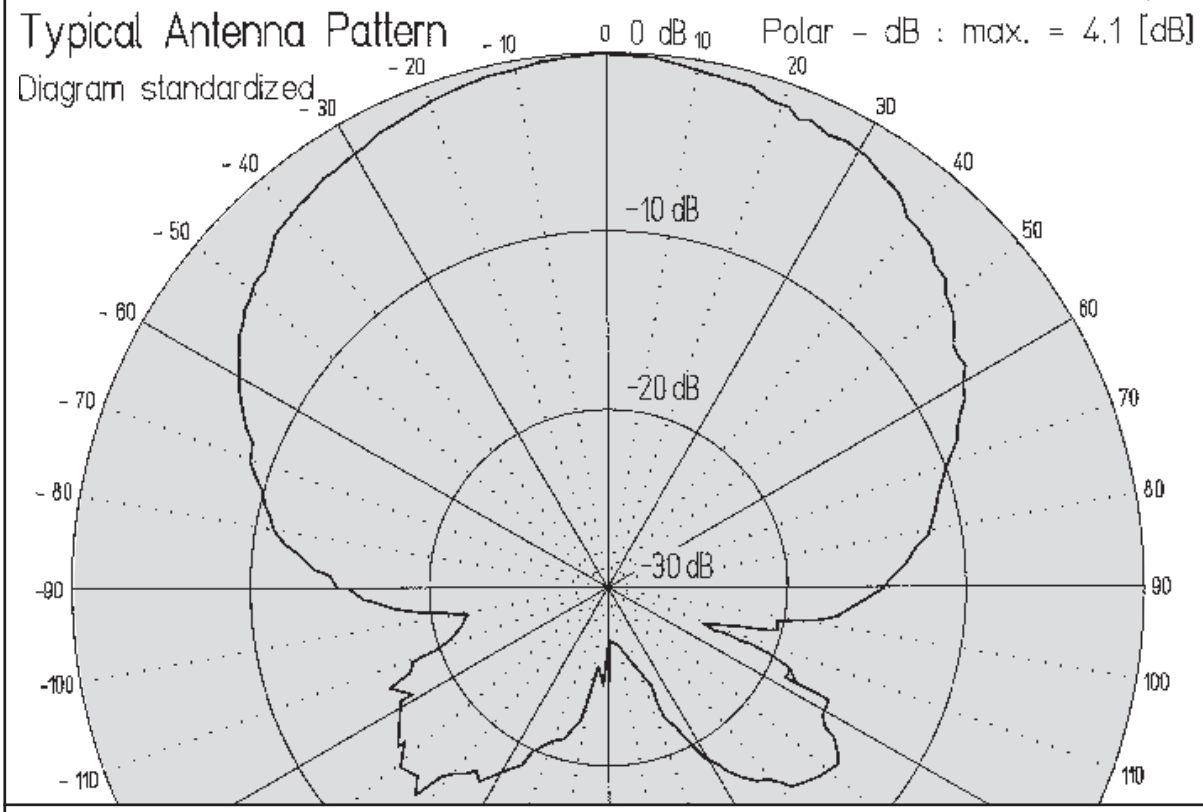
**Custom Designs:** Spectrum Elektrotechnik GmbH has been supplying only antennas that are designed to special requirements. At the time being the company does not compete with standard products that are available from various suppliers.

**Frequency and Bandwidth:** The frequency and bandwidth depend on many parameters, the type and physical structure, dimensions and materials of the antenna, the gain, beam width, polarization, radome, material, shape, etc.

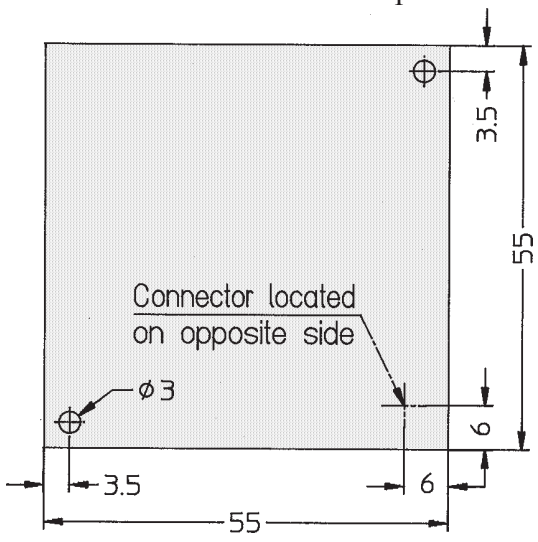
**Operating Temperature Range:** The temperature range is usually very wide, especially for outdoor applications.

**Polarization:** The direction of the polarization is defined as the direction of the electric field vector. The principal planes of the antenna pattern are associated with a linearly polarized component of the electric field and are commonly designated as horizontal or vertical polarizations, so that the antenna patterns are specified as being either horizontal or vertical patterns. For circular polarization the electric field rotates at a frequency equal to the frequency of the propagating wave, e.g. right handed when the direction of rotation of the electric-field vector is clockwise when viewed as a receding wave away from the antenna.

**VSWR:** VSWR is the ratio of the reflected signal and the incident signal, when looking into the antenna from system side. The VSWR for receive and transmit of an antenna may be different.




The Planar Antenna has been designed for OEM - Applications and is operating in the 2.4 GHz Band. The small dimensions and the rugged construction of the device are ideally suited for all applications regarding Wireless Telecommunication such as LAN, PBXs, PCS, PCN, Laptops, etc. The unique design utilizes a board construction that allows lowest cost at high volume. The Antenna can be optimized for any frequency in the ISM band.




| Specification | |
|---|---|
| **Model-No. AN-2424-21** | |
| Frequency Range | 2.45 GHz |
| Antenna Gain | 3.5 dBi |
| Polarization | linear |
| Dimensions | 55mm * 55mm |
| Connector | SMA female |

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# Charged Device Modelling

**INTRODUCTION:** Microelectronic products, semiconductor devices, are used in almost any kind of equipment. These devices may suffer from electronic discharge damage. This can occur, when a device acquires charge through some turboelectric process and then abruptly touches grounded objects. Discharge damage also may occur, when charged personnel is touching grounded devices. To avoid the human body discharge, considerable effort has been made by employing wrist straps, static dissipative flooring, or avoiding human handling completely. But ICs may even already suffer from transportation. Often they are packaged in plastic shipping tubes, made from PVC (Polyvinyl Chloride). Left untreated, the material acts like a charge generator. PVC must be dipped in antistatic solution, but the coating deteriorates with age and wear.

**CDM MODELLING:** In order to find out how safe the semiconductor devices are and what kind of stress, or electronic discharge the semiconductor products can take, test methods were needed to be developed. For simulating controlled discharge at semiconductor devices, a special method, the Charged Device Modelling (CDM) became known.

**THE CDM SIMULATOR:** At a standard charged device modelling simulator the device under test is placed on dielectric, charged by a power supply and discharged through a 1 Ohm resistor that serves to sample the discharge current. The process is then monitored via an oscilloscope, connected to a parallel transmission line. The parasitic inductance, associated with the 1 Ohm resistor, is critical to the proper operation of the circuit.

**THE DISC RESISTOR:** The problem of parasitic inductances can be avoided or at least minimized by its geometrical shape that is most benificial to the circuit. If a disc resistor is used, the current flows radially. By mounting the disc resistor on a coaxial line of same dimensions a CDM (Charged Device Modelling) test can be performed by simply connecting the protruding center conductor of the coaxial line with the device that has been charged.

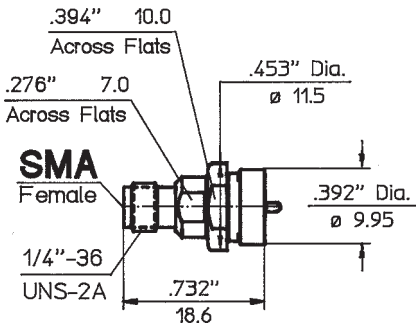
**CALIBRATION:** For calibration purposes the coaxial probe needs a mating receptacle. It must connect to a device that accomodates the protruding center conductor of the probe. The structure of the probe/mating receptacle must maintain a perfect 50 Ohm transmission line, with the only exception of the small area where the 1 Ohm resistor is placed.

**THE HARDWARE:** Spectrum Elektrotechnk GmbH has designed and manufactured a probe that has a standard SMA female connector at one end, and therefore can easily connect to standard transmission lines with SMA connectors. The other side of the unit is equipped with a replaceable center conductor and has a narrow cylindrical area for the 1 Ohm resistor. The replaceable center conductor is of utmost importance, as damages at the center conductor, resulting from arcing when discharging devices, are unavoidable.

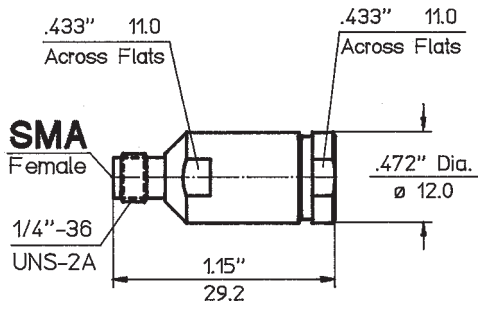
The mating device for calibration purposes accomodates the protruding center conductor of the probe and maintains a perfect 50 Ohm line, with the exception of the area where the one Ohm resistor has been placed. The SMA connector at the other end allows again for connection with standard 50 Ohm transmission lines.

The mounting plate is necessary to accomodate the probe savely in order to mount it on a positioner for accurate placement in relation to the device to be discharged.

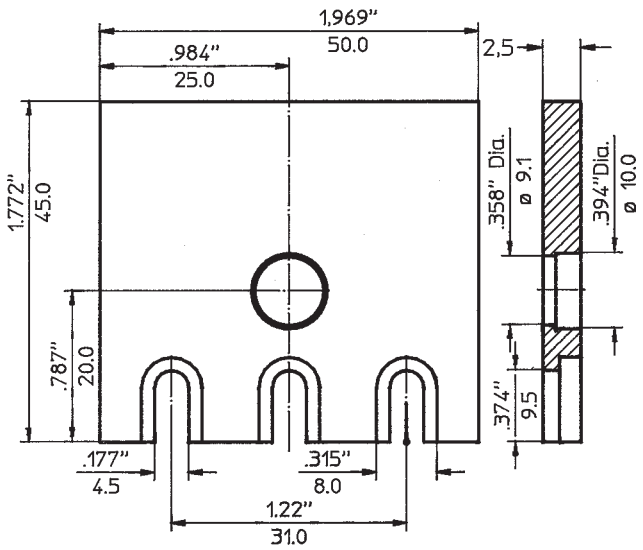
**CUSTOM PRODUCTS:** The CDM Components are custom products, developed to one customers' needs. Spectrum Elektrotechnk GmbH is a very innovative company. Our engineers are constantly designing new products, or modifying existing products to customers' requests. Therefore, our catalogs will never be complete. If you do not find exactly what you need in our catalogs, or other catalogs, please contact our sales or engineering department.




**CDM* - Probe**
**P/N 8001-S001-02**




**CDM* - Probe Test Adapter**
**P/N 8001-S002-02**




**Mounting Plate for CDM* Probe**
**P/N 8001-S003-00**

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* CDM = Charged Device Model

# Custom Connectors/Adapters

**INTRODUCTION:** Spectrum Elektrotechnik GmbH offers a large variety of standard Connectors and Adapters, as shown in "The ´97 Handbook Adapters " and " The ´98 Handbook Microwave Connectors ".
In many applications a standard component will not fit perfectly, or maybe it cannot be used at all. It would be needed a little bit shorter or longer, or narrower, or wider, or would have to meet special electrical requirements, such as higher power or better return loss, or ....etc,.

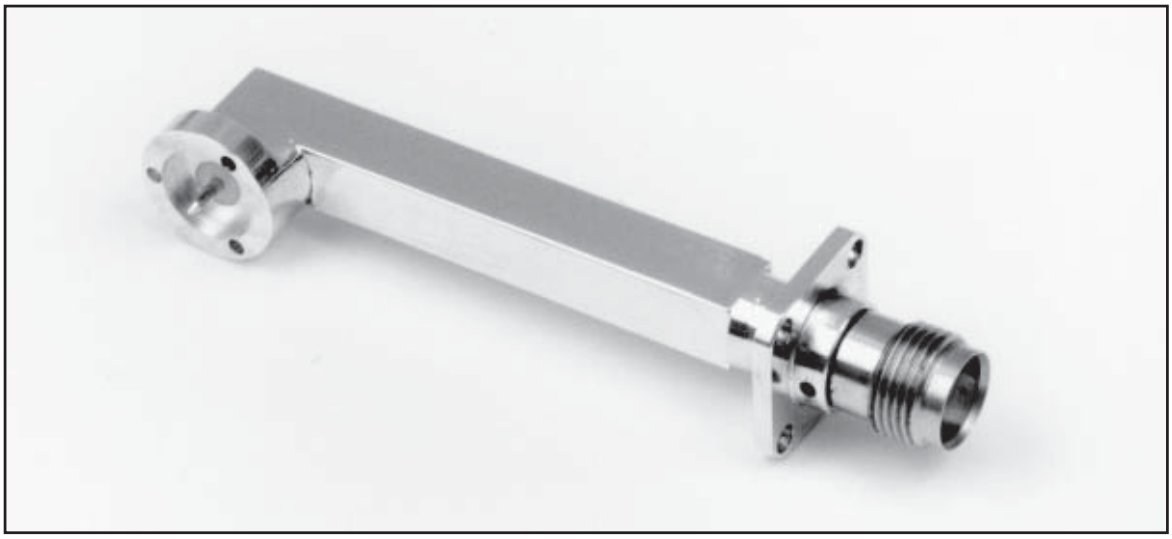
**Applications:** Special Connectors and Adapters are needed in state-of-the-art systems. These systems are following design criteria that are quite different to the standard scheme.
Mechanically they may be more compact, and of lighter weight, therefore cannot use some existing designs. Electrically these systems are to be of superior performance, therefore they have to meet specifications that are almost impossible, needing components to be engineered to excellence, and in detail.

**Frequency:** The frequency for custom designed connectors and adapters ranges is from DC to 50.0 GHz. For this frequency range complete test equipment is available.

**Connector Types:** Besides the connectors, meeting the standard interface specifications, such as MIL-Standards, DIN- or IEC- Specifications, Spectrum Elektrotechnik GmbH has been designing, manufacturing and introducing to the market successfully new Connector Series of Types **SBX**, **SBY** and **SPM**, connectors that were not available at all with the physical and electrical performance, as needed for applications in certain programs.
Additionally, a whole new Product Line was designed: the **PUSH-ON** Connectors and Adapters, being available in **50 Ohms** impedance for Series **7/16, SMA**, **N and TNC**. In **75 Ohms** impedance **PUSH-ON** Connectors of styles **F** and **N** were developed.
Spectrum Elektrotechnik GmbH is open for almost any engineering task. If none of the existing designs can be used, experienced engineering staff is available to develop the component that will meet exactly the requirements.

**Operating Temperature Range:** The normal operating temperature ranges from -54°C to +115°C. For certain programs however, connectors and adapters were designed, allowing a much wider environmental temperature range.
Successful performance has been achieved at lowest temperatures of 20 K, in programs where the components in receivers, used for exploring the universe, are being cooled down to those temperatures because of noise level reasons.
In other programs the opposite was needed, environmental temperatures above 200° C. Using special design techniques and dielectrics, also these requirements were met.

**VSWR:** VSWR is the ratio of the reflected signal and the incident signal.
Spectrum Elektrotechnik GmbH has designed for several programs connectors and adapters showing lowest VSWR. Especially with high power components, reflections are unwanted, as the reflected power will be transformed into heat, causing even higher temperatures and consequently limiting the performance, especially when already operating at higher environmental temperatures.



These special adapters were designed to replace a semi rigid cable of 0.250" diameter. There was a major problem with the cable assembly: it could not be manufactured with repeatable performance, as the cable is quite big in diameter for its short length, therefore difficult to bend. Soldering connectors to such a short assembly is extremely difficult in addition. Using newest complex CNC machinery the outer conductor of the replacing mitre angled adapter was machined in one piece. Designing and developing components using state-of-the-art manufacturing features, results in outstanding mechanical designs with superior electrical performance at higher frequencies.

The special connector above was developed to hook up directly to an aerial, a long whip antenna, as used on radio equipment of vehicles. For achieving superior electrical performance, it incorporates a matching circuit in the connector body. A special quick connection/ disconnection mechanism was developed for this special unit.

Microwave delay devices are designed and manufactured to meet delay requirements in frequency ranges from UHF through KA-Band. Several techniques are used to achieve the delays. It is the responsibility of the design engineer to decide about the best method for delaying the signals in his particular application. The decision depends on the frequency range, the delay needed, the VSWR, the suppression of undesired signals, the size of the device and its form, and last but not least the price of the device will be an important factor.

The coaxial delay line is the classical device. The length of the delay line can easily be calculated from the propagation delay of the signal within the coaxial cable and the delay needed. Other advantages are the good electrical performance of the professional delay line, the usually fast availability and the attractive price. Disadvantages are in some cases the large size and the high insertion loss, especially for longer delays at higher frequencies.

Spectrum Elektrotechnik GmbH offers a wide variety of coaxial delay lines. All the designs use Semi-Rigid Cable, from very small diameters, such as 0.047" up to diameters of 0.250", for certain applications even bigger. The Semi-Rigid Cables are using either Solid Dielectric, or Low Density Dielectric. The advantage of the Low Density Dielectric is lower insertion loss, a wider temperature range and better performance over temperature.

All Delay Lines are made to the customer specifications: a specific delay that is needed in the applications, a minimum attenuation, a maximum return loss, a minimum change over temperature, a certain mechanical configuration and for an environment that often only allows the best.

## Delay Lines Packaging Options

The delay line can be packaged in a number of different ways, such as:

- **An especially designed housing:** It can be made of any kind of material, although mostly used is excavated aluminum.
- **19" Rack Mounting:** This is common for larger delay lines, or for applications in laboratories or test sets.
- **Spool Mounting:** This is an economical way of packaging, using a spool as supporting and mounting fixture.
- **Free Coils:** This is definitely the most inexpensive packaging, winding the delay line in a free coil and then using either tape, plastic or stainless steel ties, or just solder, to hold the delay line together.

The following Table can be used as a quick reference. Comparing the data of the different cables listed in attenuation, diameter, length and weight will allow a fast decision about which cables may be suited best in a specific application.

| Dielectric | Cable P/N | Code | Outer Diameter | Attenuation dB (10 Ghz) | | | Phase Stability | Min. Bend Radius (mm) | Length (Nom.) (m) | | | Weight (grs) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | /10ns | /50ns | /100ns | | | /10ns | /50ns | /100ns | /10ns | /50ns | /100ns |
| Low Density | 421-307 | **05** | 0.085" | 5.00 | 24.9 | 49.8 | | 15.2 | 2.33 | 11.6 | 23.3 | 54 | 272 | 544 |
| | 422-700-3 | **-** | 0.085" | 4.20 | 21.1 | 43.3 | | 15.0 | 2.43 | 12.2 | 24.3 | 50 | 250 | 501 |
| | 421-069 | **-** | 0.116" | 3.10 | 15.5 | 31.0 | Best | 17.80 | 2.35 | 11.7 | 23.5 | 82 | 408 | 816 |
| | 421-298 | **98** | 0.141" | 2.40 | 12.0 | 24.0 | Best | 25.4 | 2.43 | 12.2 | 24.3 | 100 | 499 | 998 |
| | 422-900-3 | **141L** | 0.141" | 2.24 | 11.2 | 22.4 | | 25.4 | 2.43 | 12.2 | 24.3 | 102 | 508 | 1017 |
| | 421-336 | **36** | 0.250" | 1.12 | 5.6 | 11.2 | Best | 50.8 | 2.40 | 12.0 | 24.0 | 327 | 1633 | 3266 |
| | 421-281 | **81** | 0.250" | 1.12 | 5.6 | 11.2 | Best | 50.8 | 2.40 | 12.0 | 24.0 | 181 | 907 | 1814 |
| Solid | RG-405 421-086 | **89** | 0.086" | 5.22 | 26.10 | 52.2 | Note "A"* | 5.1 | 2.12 | 10.6 | 21.2 | 45 | 226 | 454 |
| | RG-402 421-669 | **69** | 0.141" | 2.92 | 14.60 | 29.2 | Note "A"* | 8.9 | 2.12 | 10.6 | 21.2 | 100 | 499 | 998 |
| | RG-401 421-252 | **52** | 0.250" | 1.80 | 9.0 | 18.0 | Note "A"* | 12.7 | 2.12 | 10.6 | 21.2 | 318 | 1588 | 3175 |
| | 421-250 | **50** | 0.250" | 1.80 | 9.0 | 18.0 | | 12.7 | 2.12 | 10.6 | 21.2 | 315 | 1575 | 3150 |

* "A" - At higher temperatures, 21 to 120 degrees C, microporous PTFE dielectric Cable has only slightly better phase response than solid PTFE dielectric cable. However, from 21°C to -50°C microporous cable displays far superior phase response.

## Quick Response Manufacturing

The Quick Response Manufacturing is another good example for the commitment to providing excellent Customer Service. The Quick Response Group was implemented to react immediately to customers' needs. Sometimes Products will be shipped within 24 hours. All Products manufactured in the Quick Response Area will meet the same Quality Standard as all the other products, they are submitted to the same inspection criteria, they are tested with the same procedures as used on standard products.

# Detectors

**INTRODUCTION:** Detectors are needed to monitor power levels of microwave signals or to identify modulation wave shapes, using one of three different semiconductor types: Tunnel Diodes, Biased Schottky Diodes and Zero Bias Schottky Diodes.

**Tunnel Diode Detectors:** Excellent sensitivity at zero bias, good VSWR and flat response over multi-octave bands can be named to describe the semiconductor. Tunnel detectors are preferred for CW and pulse detection at higher pulse repetition rate. They are suitable for narrow and fast pulse processing, have excellent temperature stability and are ideal for DC coupled applications. They are also in used in DLVAs (direct log video amplifiers).

**Schottky Detectors:** These devices have excellent sensitivity at optimum bias, and operate in an extended dynamic range of 20 dBm. They show moderate temperature stability and they are typically used for power monitoring and threshold circuits, as with AC coupled DLVAs as well.

**Zero Bias Schottky Detectors:** They do have good sensitivity at zero bias with an extended dynamic range. Zero Bias Schottky Detectors are very suitable for applications in power monitoring applications and in instrumentation as well.

**Applications:** Detectors are needed during monitoring, test and measurement, they also can be integrated in components and they are used in systems applications as well.

**Connectors:** Detectors are available with a large variety of connectors, meeting the appropriate standard interface specifications, such as MIL-Standards, DIN- or IEC-Specifications, etc.

**Custom Designs:** Spectrum Elektrotechnik GmbH has been designing and supplying special detectors to suit particular requirements in flatness, sensitivity, leakage, lower output capacitance, mechanical outline, mounting, special connector requirements, rough environment, etc., etc.

**Dynamic Range:** It covers the input power range from the minimum power, which is defined by the TSS, and the maximum power, which will cause the diode to burn out.

**Frequency and Bandwidth:** The detectors of Spectrum Elektrotechnik GmbH are designed to operate in frequency ranges of 500 MHz to 26.5 GHz. For certain applications, units may be tuned for certain criteria in narrower bands.

**Flatness:** The logarithmic ratio of the maximum to the minimum output voltage of the detector with constant input power over the whole specified frequency range is called the Flatness.

**Flatness (dB) = 10 Log (Umax/Umin)**

**K Factor:** The min. ratio of output voltage versus the RF input power is specified as the Output Voltage Sensitivity. Measured is the output voltage at an open circuit with a known RF input power.

**Operating Temperature Range:** The temperature range applies from -54°C to +115°C for Schottky Detectors and -54°C to +125°C for Tunnel Detectors. Storage temperature will be -54°C to +125°C for all devices.

**Output Voltage Sensitivity:** The ratio of output voltage versus the RF input power is specified as the Output Voltage Sensitivity. Measured is the output voltage at an open circuit with a known RF input power.

**Peak Power Handling:** This is the maximum allowable Peak power to which the unit can be subjected to without suffering permanent damage, or without changing permanently the specified characteristics of the device. Regular Tunnel detectors can usually withstand a CW power of 17 dBm, Schottky detectors 20 dBm.

**Polarity:** In general detectors can be supplied with positive video output and with negative video output as well.

**Square Law Range:** The range where the video output power remains proportional to the square of the input signal power.

**Survival Power:** This is the maximum allowable peak power at 25°C, 1 microsecond pulse and 0.1% duty to which the unit can be subjected to without suffering permanent damage.

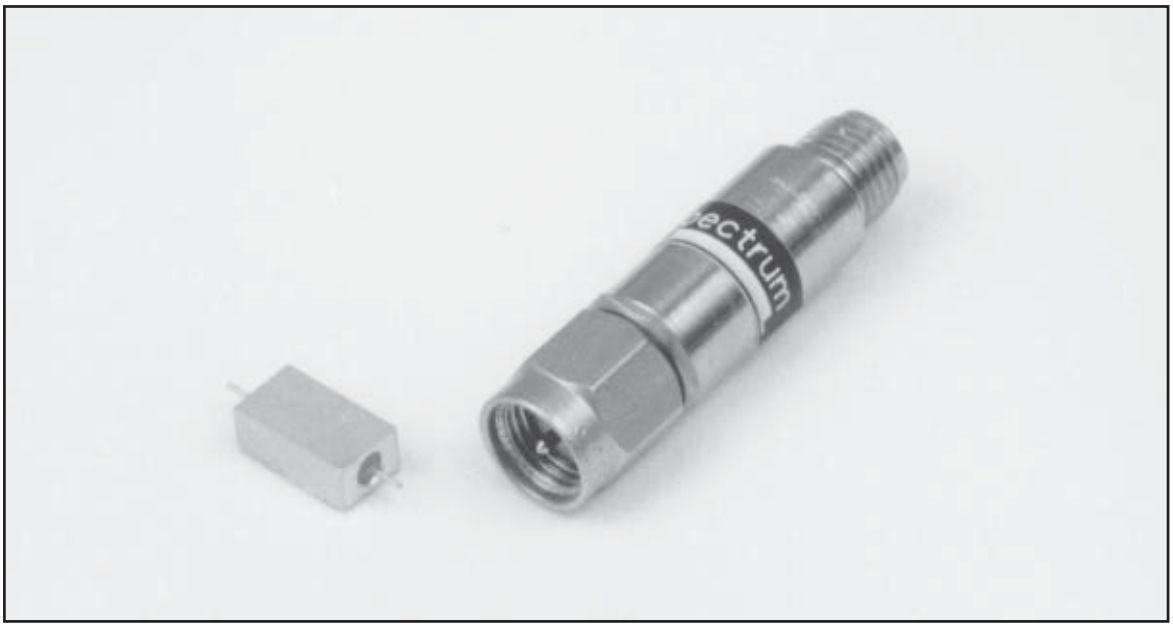
**TSS:** Tangential Signal Sensitivity is the amount of power required to produce an output pulse of an amplitude, which is sufficient to raise the noise fluctuation by an amount equal to the average noise level.

**VSWR:** The Voltage Standing Wave Ratio is measured at the signal input port of the detector.

**Video Bandwidth:** This is the bandwidth of the video modulated signal.

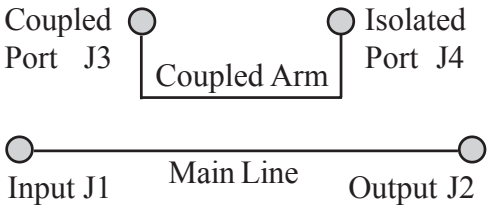
**Video Capacitance:** The capacitance, which can be measured in parallel to the video output of the detector.

**Video Resistance:** The resistance which can be measured at the video output of the detector.



# Directional Couplers

**INTRODUCTION:** Directional Couplers are Four Port devices. The design uses the coupling between two transmission lines. The distance between the main line where the energy is propagating through, and the coupling arm is a function of the energy coupled. All ports of the couplers are matched to 50 Ohms impedance.




Theoretically, the Power transmitted into port J1 is partially coupled into port J3. At port J2 the remaining power will be received. In reality however, the components behave differently: Injected Power into port J1, minus Coupled Power at Port J3, minus Insertion Loss of the Circuit, minus power reflected into port J4, equals the Output Power at port J2. An ideal coupler, would not receive power at port J4.

**Main Line:** The RF-Circuit between the input and output ports is called the Main Line.

**Coupled Line:** The transmission line into which the main signal is coupled, is called the Coupled Line. Normally one port of the coupled line is terminated with a 50 Ohms load.

**Frequency:** The Coupling Characteristics are limited over finite frequency bands. Using creative ideas, Spectrum Elektrotechnik GmbH has designed Directional Couplers for higher power applications, operating over wider frequency ranges of more than one octave.

**Coupling:** The coupled power can be 40 dB below the power introduced into the main arm, depending on the specification. It varies with frequency at a limited amount. But the variation, or ripples can usually be optimized very well.

**Coupling** (dB) = **-10 Log (P3/P1)**

**Insertion Loss:** Every transmission line will cause loss, as energy will be dissipating into the circuit. A good design will offer good trade off between size of the component and its loss.

**Insertion Loss** (dB) = **-10 Log (1-P3/P1)**

**Directivity:** The power ratio between isolated port and coupled port is called Directivity. Ideal would be no power at Port 4, resulting in infinite Directivity, but in actual the isolated port never will become completely power free.

**Directivity** (dB) = **-10 Log (P4/P3)**

**Isolation:** The power ratio between port 4 and port 1 is called Isolation. Isolation is also another term to measure reflections into port 4.

**Isolation** (dB) = **-10 Log (P4/P1)**

**Isolation**(dB)=**Coupling**(dB)+**Directivity**(dB)

**VSWR:** Every microwave component shows reflections and discontinuities within the circuit, as no design can be perfect, and manufacturing tolerances do not allow perfect designs anyway. coupled port reduces the directivity by an amount, equal to the return loss of the mismatches.

**Return Loss**(dB)=**-10Log((VSWR-1)/(VSWR+1))$^2$**

# High Power Directional Coupler, used in an L - Band Radar Application.

# Impedance Transformers, 50 to 75 Ohms

**INTRODUCTION:** Impedance Transformers are passive linear coaxial components used to transform 50 Ohms impedance levels to 75 Ohms impedance levels or vice versa.

**Application:** Impedance Transformers are mainly used to connect components and measurement systems of different impedances. Signal sources and test systems using 50 Ohms impedances are mostly used. Some test systems may even be only available with 50 Ohms impedance. Employing an Impedance Transformer means that these 50 Ohms systems can be used for testing 75 Ohms components.

**Resistance Network Impedance Transformers:** These components are using a resistor network to transform from 75 Ohms to 50 Ohms or vice versa. As the resistors need to be small for integration into the coaxial circuit, and because of little reflections, the component is only specified for low power, normally 0.5 Watts, or even less. The operating frequency is only to a few hundred MHz, e.g. DC to 200 MHz. The insertion loss is high. Often the component is designed to have a voltage insertion loss of 10 dB.

**Multiple Quarterwave Impedance Transformers:** The unit consists of multiple sections of quaterwave length, properly cascaded for optimum performance and broad band properties. The operating bandwidths may be to 3.0 GHz with a max. insertion loss of 5 dB, an average power of 2 Watts and a peak power of 2 KW.

**Inductive Impedance Transformers:** These components consist of two windings, linked by a mutual magnetic field. The relationship between impedance of input and output depends on the ratio of the number of windings between primary and secondary coil. These components have low loss, but are only usable at lower frequencies. Normally the design is not used at all in coaxial Impedance Transformers.

**Average Power Handling:** This is the maximum allowable CW power to which the unit can be subjected to without suffering permanent damage.

**Connectors:** Impedance Transformers can be fitted with a number of connector styles. Of special interest are: N(50 Ohms) to N(75 Ohms), BNC(50 Ohms) to BNC(75 Ohms), TNC(50 Ohms) to TNC(75 Ohms), and 1.8/5.6 to 1.6/5.6. For special applications also units can be offered with different connector styles at the input and output.

**Custom Designs:** Spectrum Elektrotechnik GmbH has been designing and supplying special Impedance Transformers to suit particular requirements, such as certain bandwidths, unique mechanical outline, unusual mounting or special connector requirements, etc., etc.

**Frequency and Bandwidth:** As 75 Ohms systems are usually designed to operate at lower frequencies, there seems to be no need for Impedance Transformers operating at higher frequencies. Depending on the designs, Impedance Transformers may operate up to a few hundred MHz, only some are designed for frequencies to 3.0 GHz.

**High Reliability Components:** Impedance Transformers can also be supplied to Customers High Reliability Specifications, environmental, military or governmental requirements, and/or to customer test procedures.

**Impedance Transformers for other impedances:** Basically a unit for any impedance transformation needed, can be designed. Depending on the operating frequency and bandwidth, the appropriate design will be chosen for low development cost.

# 50 to 75 Ohms Impedance Transformers

**Insertion Loss:** This is the amount of power lost through the Impedance Transformer under matched conditions.

**One dB Bandwidth:** This is the frequency range over which the insertion loss variation is less than 1 dB, referenced to the midband insertion loss.

**Operating Temperature Range:** The temperature ranges from -54°C to +125°C, or even wider, depending on the application.

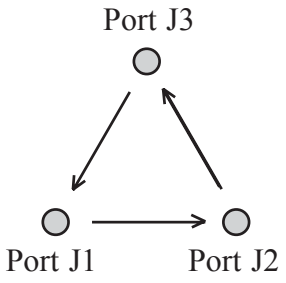
**Peak Power Handling:** This is the maximum allowable power to which the unit can be subjected to without suffering permanent damage, or without changing permanently the specified characteristics of the device. The peak power is transmitted at a certain pulse width and pulse repetition rate.

**Standard Products:** Although a number of products have been supplied to customers' orders, a standard product line on Impedance Transformers has not been designed yet. But there is a possibility that the product required has been designed already or that a design, very close to the requirement exists. Therefore please check your requirements with our sales force, or our engineering staff.

**VSWR:** VSWR is the ratio of the reflected signal and the incident signal. It is desired that the Impedance Transformers have little reflections. In reality, the units will show some reflections and discontinuities within the circuit, as no design is perfect, and manufacturing tolerances do not allow perfect designs anyway.

# Isolators & Circulators

**INTRODUCTION:** Isolators and Circulators are usually three port devices, and they are used to force the microwave energy into one direction only. The typical junction Circulator consists of a stripline circuit, sandwiched between two ferrite discs or triangles, an upper and a lower ground plane, magnetically biased by permanent magnets located outside the ground planes. In a Circulator, the magnetic field, applied through the vertical axis of the assembly, results into a circulation of the microwave energy from one port to the other, depending on where the energy is coming from.



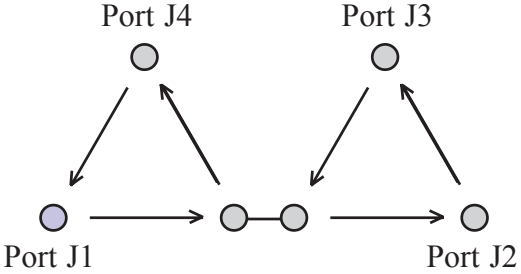

Microwave energy entering the device from port J1 is directed to port J2. Energy entering from port J2,is directed to port J3. Signals entering from port J3, are directed to port J1, etc. If one of the ports is terminated into a 50 Ohms load, the device becomes an Isolator. Signals then only can pass the unit with low loss in one direction, and only with high loss in the reverse direction. If e.g. port J3 is terminated into a 50 Ohms line, microwave energy only can pass the device with low loss from port J1 to port J2. An Isolator is used to "isolate" microwave components from each other, or to protect units from receiving damages when working into an open or short circuit. The output of an oscillator is usually protected by an isolator.

**Frequency and Bandwidth:** Coaxial and microstrip circulators and isolators operate either in the bias region above resonance or below resonance. Above-resonance circuits are usually used for smaller bandwidths and higher power designs, while below-resonance circuits achieve wider bandwidths. Theoretically, the above-resonance circuits have no lower frequency limit.

**Operating Temperature:** The performance depends on the magnetic field, applied to saturate the ferrite material. Temperature compensated magnets and ferrites need to be used where wide temperature ranges are required. Internal heaters can be installed, where temperature range and ferrite material do not allow other compensation.

**Input VSWR:** The input VSWR is a function of the VSWR of the other ports. At an isolator the higher output VSWR will cause reflected energy towards the terminated port, where it will be attenuated by the value of the isolation, and the balance is reflected back to the input, increasing the input VSWR.

**Four Port Devices:** Four Port Circulators and Isolators are used where higher directivity is needed. An Isolator would have the ports J3 and J4 terminated. In the schematic to the left, microwave energy is forced from port J1 to J2, or from port J3 to port J4, when crossing two ferrite junctions. The high isolation only applies when two ferrite junctions have been crossed, here between ports J2 and J1 with ports J3 and J4 terminated with matched loads.



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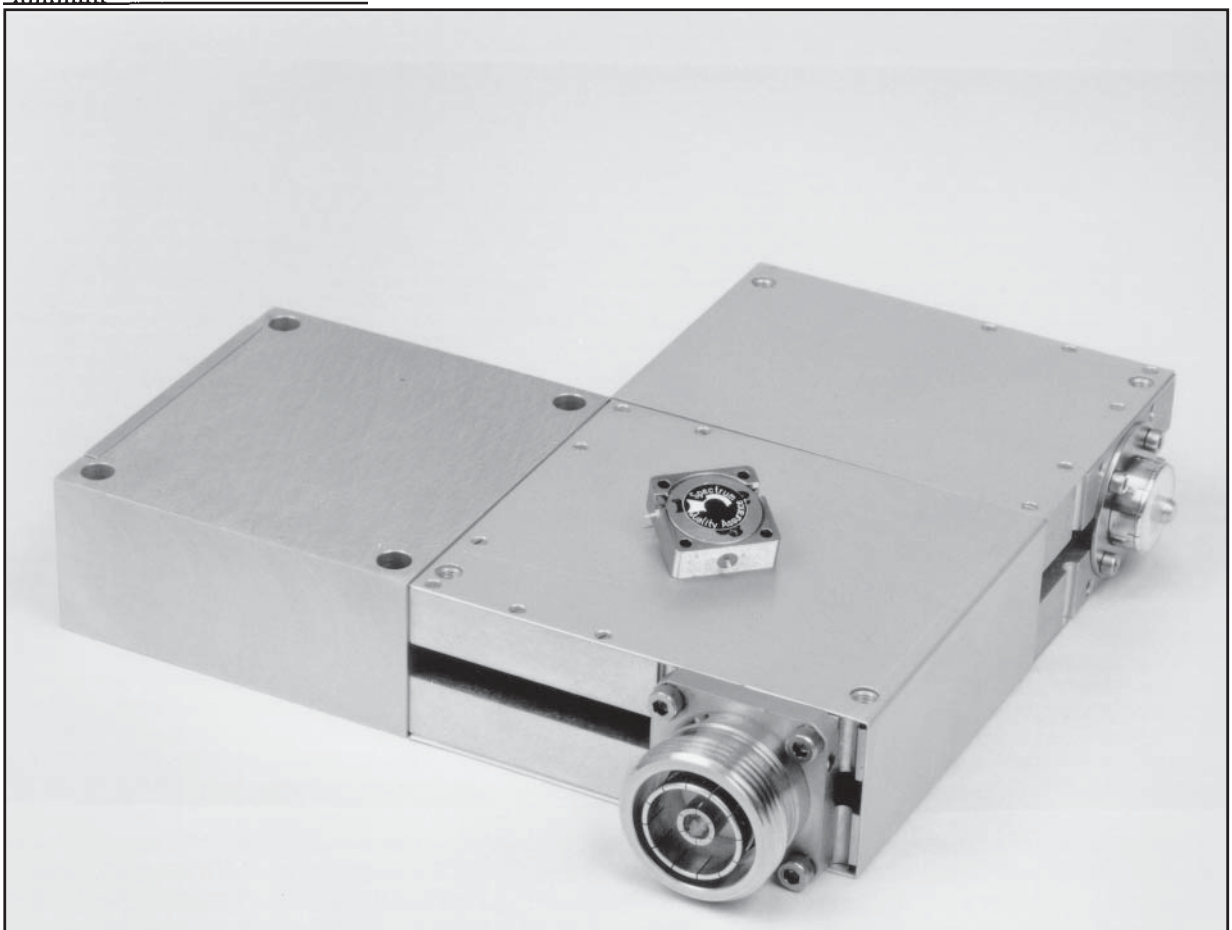

# Designing Components to Customer Specifications!

## Circulators for High Power Applications & Smallest Devices for Employment as "Drop In".

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# Lightning Surge Suppressors

**INTRODUCTION:** Lightning has potential damaging effects on electronic equipment. Therefore modern equipment usually incorporates surge suppressors in the RF path in order to protect the equipment.
Spectrum Elektrotechnik GmbH has developed several types of lightning surge suppressors. They were engineered especially for the cellular communications industry. The designs are usually employing in the connector or the adapter a built-in fuse. But it has to be noted that the surge suppressor needs maintenance and replacement as soon as it has done its job of protection.
Another method for protecting the circuits against lightning, is the use of quarter wave stub devices. They have the advantage of being maintenance free, offer high attenuation and effectively a short circuit to incoming pulses outside the operating frequency. On the other hand they have the big disadvantage of needing to be tuned by the stub length to the center frequency, the equipment is working at, and have an operating bandwidth which is very narrow and usually only in the range of only +/- 70 MHz around the center frequency.

**Application:** Not protecting equipment against lightning strikes and allowing the energy of the surge to enter the equipment is a quite dangerous practice and usually ends up in destroyed equipment.
Lightning surge suppressing devices are therefore likely to be found in most applications, especially when modern systems are being designed. The protection of the equipment of cellular communication base station, connected directly with the antenna is one of the most important criteria.
Good applications for surge suppressors are also the protection of transceivers of radios on vehicles. The arc suppression device is usually built into the input connector at the long whip antenna.

**Connectors:** Surge Suppression devices are available with a large variety of connectors, such as 7/16, HN, N, SMA, etc., meeting the appropriate standard interface specifications, such as MIL-Standards, DIN- or IEC- Specifications.

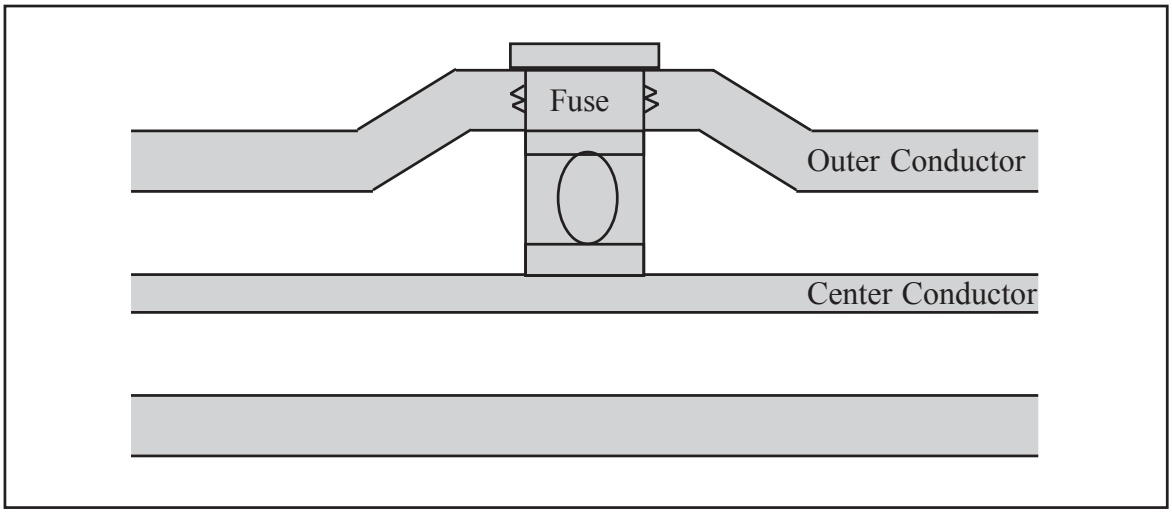
**Custom Designs:** Designs have been made to suit particular specifications, such as unique mechanical outline, unusual mounting, special electrical requirements, rough environment, etc., etc. Experienced engineers are available and they are interested to hear about the system needs and they are eager to offer solutions that meet exactly the requirements needed in the application.

**Frequency:** The frequency range for the connectors and adapters being equipped with surge suppression is usually below 3.0 GHz.

**Operating Temperature Range:** The temperature ranges from -54°C to +125°C, or even wider, depending on the application, the design and the materials used. Engineering can usually offer something that fits perfectly the system use.

**Risetime/Voltage:** Depending on the design and the type of fuse being incorporated, the devices will trigger in microseconds, or even nanoseconds. The pulse rise time is normally very fast and measured in kV/µs.

**VSWR:** VSWR is the ratio of the reflected signal and the incident signal. Because of the built in fuse, incorporated in the RF path, electrically the device is not ideal at all anymore. But as the fuse is normally small, compared to the wavelength of the operating frequency, the voltage standing wave ratio is in general still good enough for the application, or in other words: a degredation in VSWR is not noticeable. Corrective actions integrated in the design, will help in addition to keep the reflected signal to a minimum.




Schematic cross section view of a lightning surge suppressor, to demonstrate the structural arrangement between outer conductor, center conductor and fuse.

The picture shows a four hole flange mount adapter with surge suppression, being used between the antenna and the vehicle mount radio equipment.

# Limiters

**INTRODUCTION:** Limiters are used to protect RF components against excessive incident power levels.The devices are designed and manufactured to meet stringent requirements, mechanically, electrically and environmentally. It is the specialty of Spectrum Elektrotechnik GmbH to design and manufacture devices to meet stringent specifications, electrically, mechanically and environmentally.

**Fundamentals:** The power limiting circuit consists of a single PIN diode or several diodes, shunted across a transmission line, requiring a DC return in order to achieve proper limiting operation. Low input power passes with the minimum insertion loss of the circuit. Power levels, greater than the threshold level will cause greater insertion loss, resulting in leakage power that the output power of the device remains at constant level.

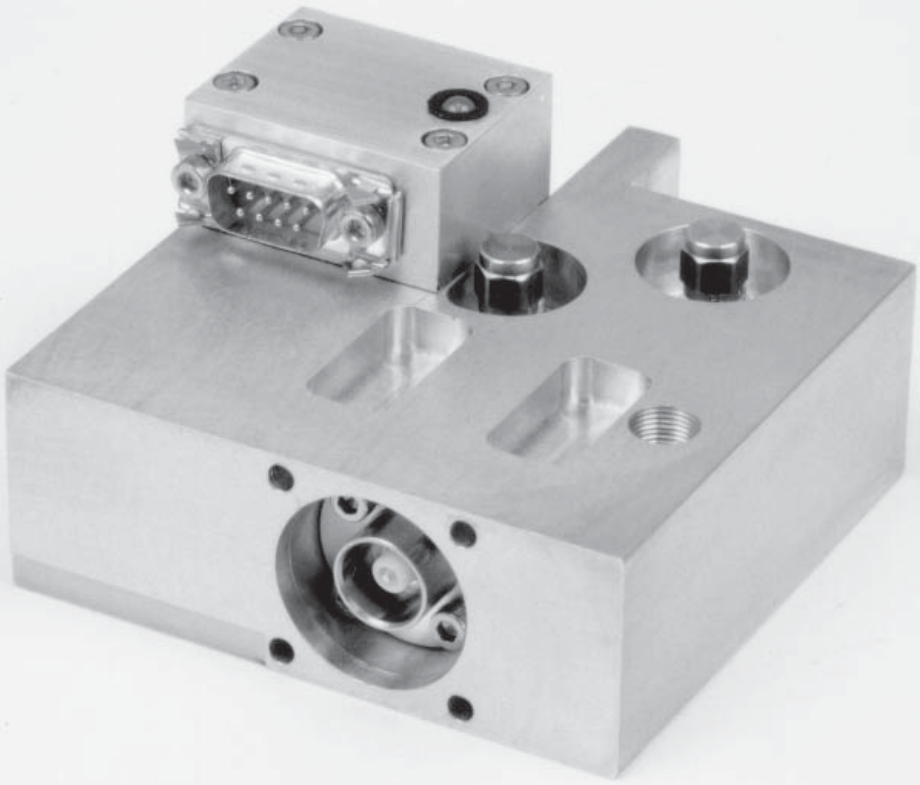
**High Power Limiters:** In radar applications a limiter is normally installed to protect the receiver against excessive power, caused by unwanted reflections from other nearby radars or objects that accidentally come close to the radar. For normal power levels the limiter will operate like the classic device. But even high power levels arrive, the limiter will act as a reflective unit, protecting the receiver by returning all the power that cannot be absorbed back into the line. To control the reflected power, usually a circulator is installed at the input of the limiter, directing the excessive power to a high power load where it will be absorbed.

**Custom Units:** Spectrum Elektrotechnik GmbH offers mainly custom designed limiters, special components, using different or an even unique mechanical configuration, special frequency ranges than normally offered, higher power levels, etc. Spectrum Elektrotechnik GmbH is a very innovative company. It employs a strong and successful team of experienced engineers. They will always do their best to propose something that will perfectly fit the requirements.

**Frequency and Bandwidth:** Limiters have been designed and manufactured to serve multi octave bandwidths, from very low frequencies up to Ku band. Wide operating bandwidths usually apply for low power limiters. The higher the power level becomes, the narrower the bandwidth will be.

**Housing and Connector Configuration:** Most of the designs, Spectrum Elektrotechnik GmbH can offer, will be engineered exactly to the customer specifications, size and shape of the housing supplied with the necessary connector configuration, providing that the frequency range of the connectors do not limit the frequency range of the application. As Spectrum Elektrotechnik GmbH is manufacturing its own housings and its own connectors, almost every mechanical configuration needed and every connector style preferred may become reality.

**VSWR:** VSWR is the ratio of the reflected signal and the incident signal. Every microwave component shows reflections and discontinuities within the circuit, as no design is perfect, and manufacturing tolerances do not allow perfect designs anyway.



# High Power Limiter, built on a Modular Bases, using the SBY - Connector.

# Machines, CNCA-700

Coaxial cables interconnect the many modules and components found in a high-frequency system. In recent years, manufacturers of high-speed computers have resorted to semirigid and flexible coaxial cables to make connections between printed-circuit boards (PCBs). While most designers try to minimize the lengths (depending upon phase relationships) and numbers of coaxial cables found in a system, they are necessary for signal-routing operations. For those systems integrators who require moderate to large amounts of coaxial cable, help in handling has finally arrived: the CNCA-700 automatic cable cutting and stripping machine from Spectrum Elektrotechnik GmbH. The machine, which handles semirigid and flexible cables with diameters to 0.5 in., features fast setup time and standard tooling.

Spectrum Elektrotechnik GmbH, which is well-known as an international supplier of coaxial connectors, cables and cable assemblies through 50.0 GHz, has long used embedded-computer-controlled CNCA-700 internally for processing cables. The same machine is now available to other cable manufacturers requiring large numbers of cable assemblies.

In operation, a cable mounted on the CNCA-700 is turned by and between two spindles which can be positioned very closely together. Both spindles move simultaneously, each driven by its own stepper motor. The stepper motors can stop the spindles with an accuracy of 0.0004 in. (0.01mm). Adjustments in stripping length can be made with 0.002-in. (0.05-mm) resolution and adjustments in stripping diameter can be made with 0.0004-in. (0.01-mm) resolution.

The cable feed is at one spindle. The other spindle works as a push/pull device, picking up the cable and pulling it to length and /or pushing it back when necessary and supporting the cable again during the machining of the cable/connector interface.

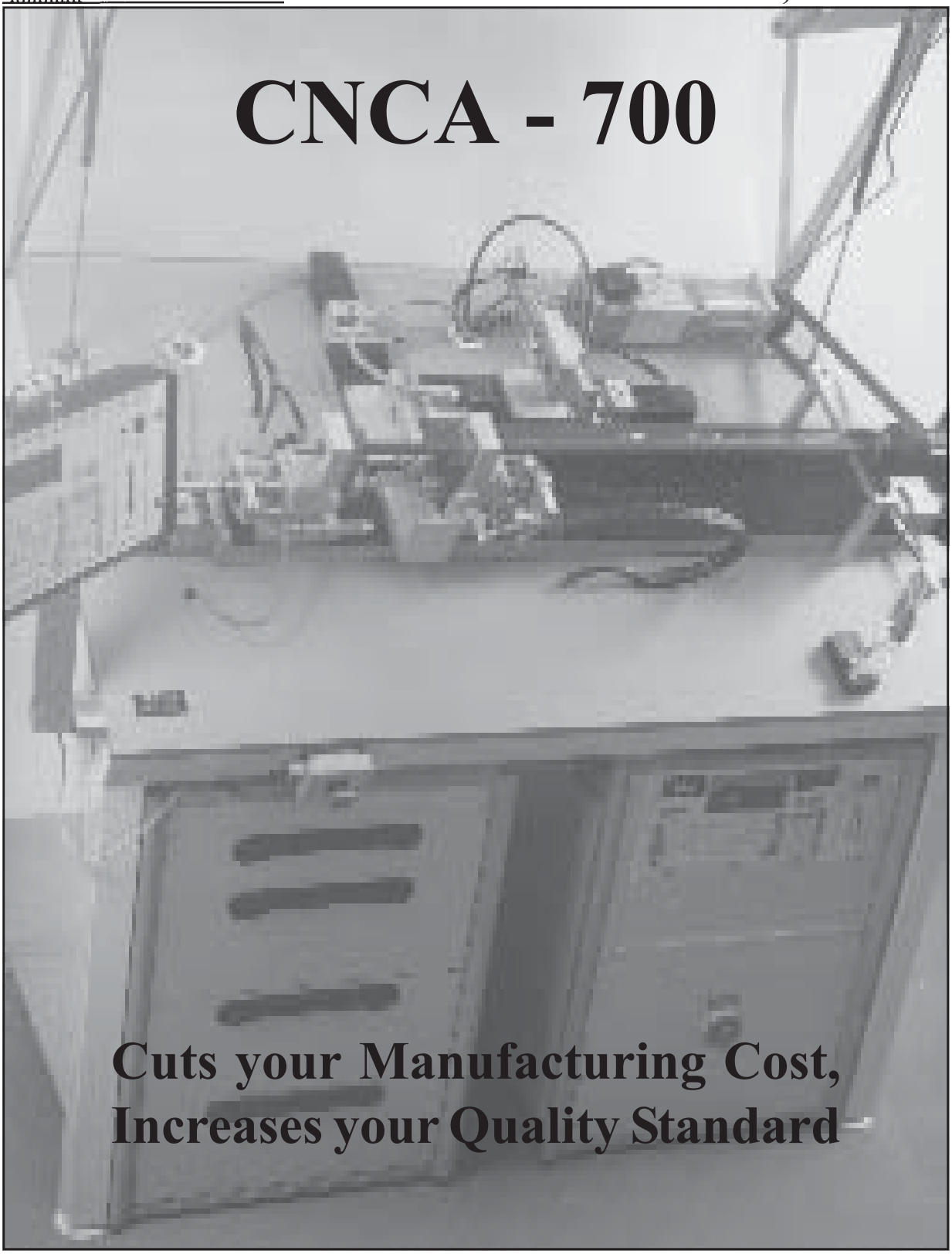
The cutting device is a standard tungsten saw, located in another stepper motor drive. The saw turns at high speed, providing rapid and clean cuts. The cutting speed can be readily adjusted to optimum speeds for different metals, such as aluminum, copper, or stainless steel. The tungsten saw also points the center conductors.

Cable assemblies are cut, stripped and transported onto a conveyer belt under computer control. To aid program development, a standard personal computer can be connected to the CNCA-700.

The CNCA-700 permits the user to change certain parameters during operation. For example, by entering depth corrections or values for a cable assembly length via a computer keyboard, the cutting depth and/or cable length can be changed during operation. By exchanging the brackets at the stripping arm and the standard collects in the CNCA-700's spindles, and selecting a new software program from the menu, the machine can be adjusted within minutes for a different cable diameter.

The CNCA-700 is shipped with a variety of dedicated software tools for cutting and stripping standard semirigid cables from 0.034 to 0.5 in. in diameter. Programs are also included for stripping some standard flexible cables.

# CNCA - 700



## Cuts your Manufacturing Cost, Increases your Quality Standard

# Precision Mismatches

**INTRODUCTION:** Mismatches for 50 Ohm lines are terminations which have been designed for terminating lines with a characteristic impedance other than 50 Ohms. For example a termination, designed for reflectionless termination of a 25 Ohms line, will cause a mismatch of 2:1 when used on a 50 Ohm line (50:25 = 2:1).

**Applications:** Mismatches are used as standards of reflections in calibrating reflectometer setups and/or other impedance measurement devices. Mismatches are also used to simulate known impedances other than 50 Ohms, to introduce test conditions in a system and to measure the results that would be encountered, once the actual component is installed in the system.

**Mismatch Values:** Standard Mismatch Values for a 50 Ohm transmission line are known as 1.25:1, 1.5:1, 2:1, 4:1, etc. For specific applications any mismatch value can be designed.

**Frequency Range:** The frequency range of the Mismatches depends on the design. Theoretically Mismatches can be designed for almost any frequency range.

**Power:** Precision Mismatches are usually designed and needed for test and calibration purposes, operating at low power. For other applications units can be supplied as special, engineered exactly to the customers' needs.

**VSWR:** VSWR is the ratio of the reflected signal and the incident signal. Mismatches are designed to provide reflectionless termination of a line other than 50 Ohms. For the 50 Ohm line however they show a known VSWR over the frequency range specified. The better the design and the lower the manufacturing tolerances, the more constant the VSWR will be over the frequency range.

**Connector Configuration:** Most of the Mismatches manufactured by Spectrum Elektrotechnik GmbH are available with different connector configurations, providing that the frequency range of the connectors do not limit the frequency range of the application. BNC connectors operate to 4.0 GHz, HN and SBX connectors to 8.0 GHz, C, SC and 1.8/5.6 to 10.0 GHz, TNC (per MIL-C-39012) operate min. to 11.0 GHz (as per MIL-Specification, but this can be extended to 14 or even 16 GHz). SBY work to 12.0 GHz, 2/5.5 connectors operate to 14.0 GHz, SMA, SPM, N, TNC (per MIL-C-87104/2),TNX, BMA and 7mm connectors can be used to 18.0 GHz, 1.4/4.4 to 20.0 GHz, 3.5mm connectors to 26.5 GHz, or respectively to 35.0 GHz. K* and SMP connectors are designed to operate to 40.0 GHz and 2.4mm connectors to 50.0 GHz.

**Standard Products:** Although a number of products have been supplied to customer orders, a standard product line on Mismatches has not been established yet. But there is a possibility that the product required has been designed already or that a design, very close to the requirement exists. Therefore please check your requirements with our sales force, or our engineering staff.

**Custom Designs:** Spectrum Elektrotechnik GmbH has been designing and supplying special Mismatches to suit particular requirements, such as wide bandwidths, unique mechanical outline, unusual mounting or special connector requirements, etc., etc.

**Operating Temperature Range:** It usually ranges from -54°C to +125°C, or it is even wider. The temperature range will affect the power handling of the devices.




Spectrum Elektrotechnik GmbH P.O. Box 45 05 33, 80905 Munich, Germany **Tel. (89) 354 804-0, Fax (89) 354 804-90** (Country Code: 49)
* 'K' Connector is a trademark of Wiltron Company.

**Spectrum Elektrotechnik GmbH manufactures precision mismatches to customer specifications: To the requested mismatch value, frequency range, power limits, temperature range, connector configuration, mechanical outline, etc., etc.**

# Rotary Joints

**INTRODUCTION:** There are applications where a stationary RF line needs to be connected to a rotating component.The Rotary Joint has been developed to service these needs, translating the electromagnetic energy from a stationary line to a rotating line. As the Rotary Joint is a dynamic device, the electrical performance depends very much on a reliable mechanical design that is engineered for the satisfaction of the dynamic requirements and the RF performance. The electrical specification of the Rotary Joint is not supposed to change over its guaranteed lifetime.

**The Coaxial Line Rotary Joint:** The device has coaxial input and output terminals and is using a transmission path that is also a coaxial line.For the electromagnetic propagation the TEM mode is used. The unit can usually cover a wide frequency range. The power handling capability is normally only restricted by the power limits of the connectors.

**The Waveguide Rotary Joint:** This device is using rectangular waveguide for input and output, and for the transmission line itself. The unit operates in the TE10 mode and can provide low VSWR at high power levels. As coupling for the rotation element, normally a noncontacting choke coupling is employed. The frequency band of operation is limited by the waveguide and in addition by the frequency sensitivity of the coupling choke.

**The Waveguide to Coaxial Rotary Joint:** For Input and output of the device rectangular waveguide is used, while the transmission line path is provided as coaxial line, connecting to the waveguide sections. The modes of operation are TE10 mode in the waveguide sections and TEM in the coaxial path. The operating frequency is limited by the waveguide, the power is limited by the coaxial part.

**The Rectangular to Circular Waveguide Rotary Joint:** Input and output of the device are provided as rectangular waveguide, the transmission line uses circular waveguide. The modes of operation are the TE10 mode in the rectangular sections and the TM01 mode in the circular waveguide. As coupling for the rotation element, normally a noncontacting choke coupling is used. The frequency band of operation is limited by the waveguide and in addition by the frequency sensitivity of the coupling choke.

**Frequency Range:** Spectrum Elektrotechnik GmbH has manufactured units in different frequency bands, usually designed exactly to the customers' specifications. Engineering is currently designing Standard Coaxial Rotary Joints for the frequency ranges DC-2.0 GHz, DC-18.0 GHz and DC-26.5 GHz, operating in a regular environment.
A rather simple design will meet all the requirements at lower frequency ranges, while only a most precise and state-of-the-art unit can be used at higher frequencies.

**Rotary Joint Life:** The life expectancy will mainly depend on the lifetime of the ball bearings, seals, and contact junctions. Other parameters that are limiting life, are rotational speed, and external mechanical loading, or pressurizing the unit. Harsh environment, subjecting the rotary joint to vibrations, shock, extremely low or high temperatures, humidity, etc. may further shorten the lifetime. It is therefore of utmost importance to identify in detail the environment the device is supposed to operate in.

**VSWR:** Every microwave component shows reflections and discontinuities within the circuit, as no design can be perfect, and manufacturing tolerances unfortunately do not allow perfect designs. VSWR is the ratio of the reflected signal and the incident signal. Rotary Joints are also characterized by the tendency of having to use a high number of parts. The tolerances on the dimensions need to be as tight as possible, not only for mechanical purposes, but also for electrical reasons, in order to assure that reflections cannot increase after some time of operation.


**Spectrum Elektrotechnik GmbH manufactures coaxial rotary joints to customer specifications: To the specific frequency range, power limits, return loss, insertion loss, temperature range, rotational speed, connector configuration, mechanical outline, etc., etc.**

# Supercomponents

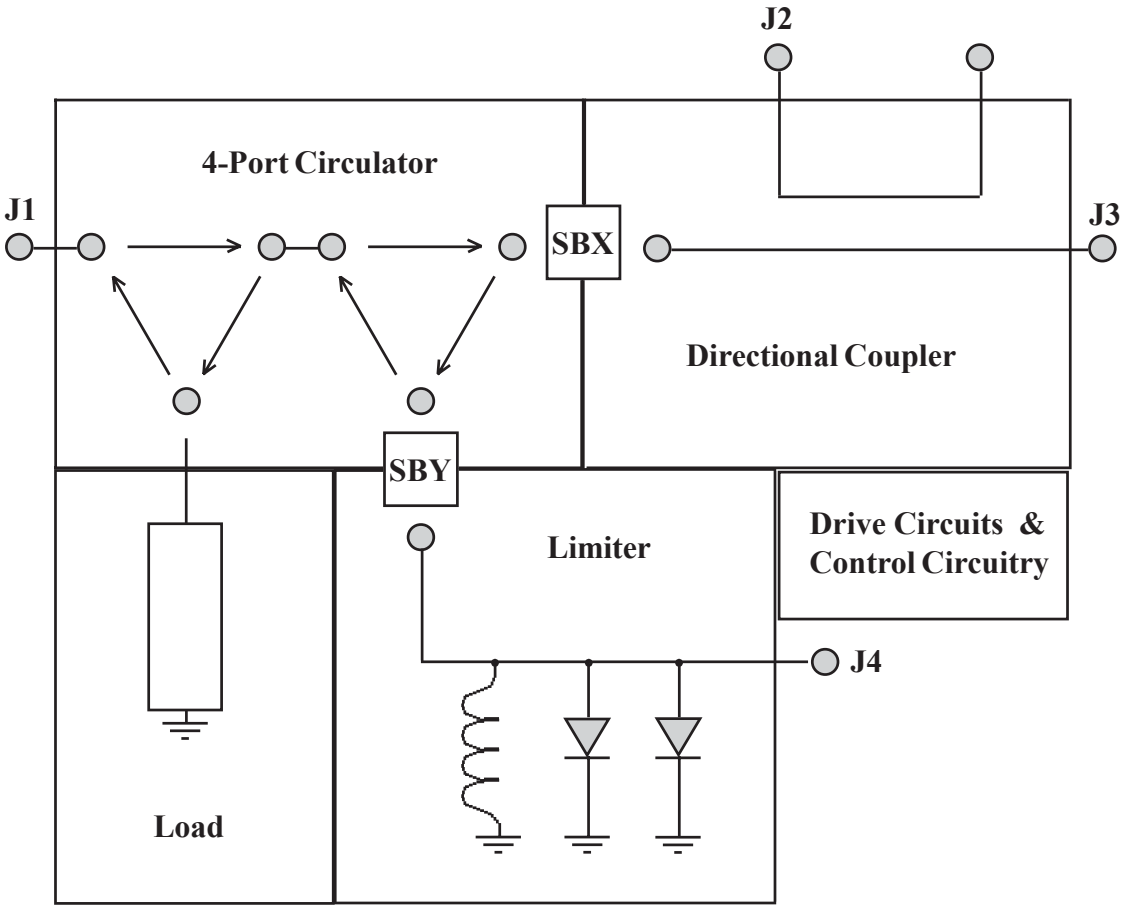
**INTRODUCTION:** By integrating components, assemblies are engineered that exhibit a number of advantages against the common designs, such as reduced package size at lower cost and superior RF performance. A Supercomponent can achieve a volume reduction of 10 to 1, or even more. Electrically, the integration may result into lower transmission loss, flat attenuation and improved VSWR.
The success of integrated packaging depends on the total understanding and the control of the components that are supposed to be integrated. Spectrum Elektrotechnik GmbH has an extensive capability in a variety of passive and active components.

**Modular Packaging:** Spectrum Elektrotechnik GmbH has an intensive product capability in devices such as attenuators, limiters, couplers, detectors, filters, power dividers, terminations, etc. By using this specific component experience, Spectrum Elektrotechnik GmbH can produce effectively integrated packages, using stripline or microstrip circuitry.

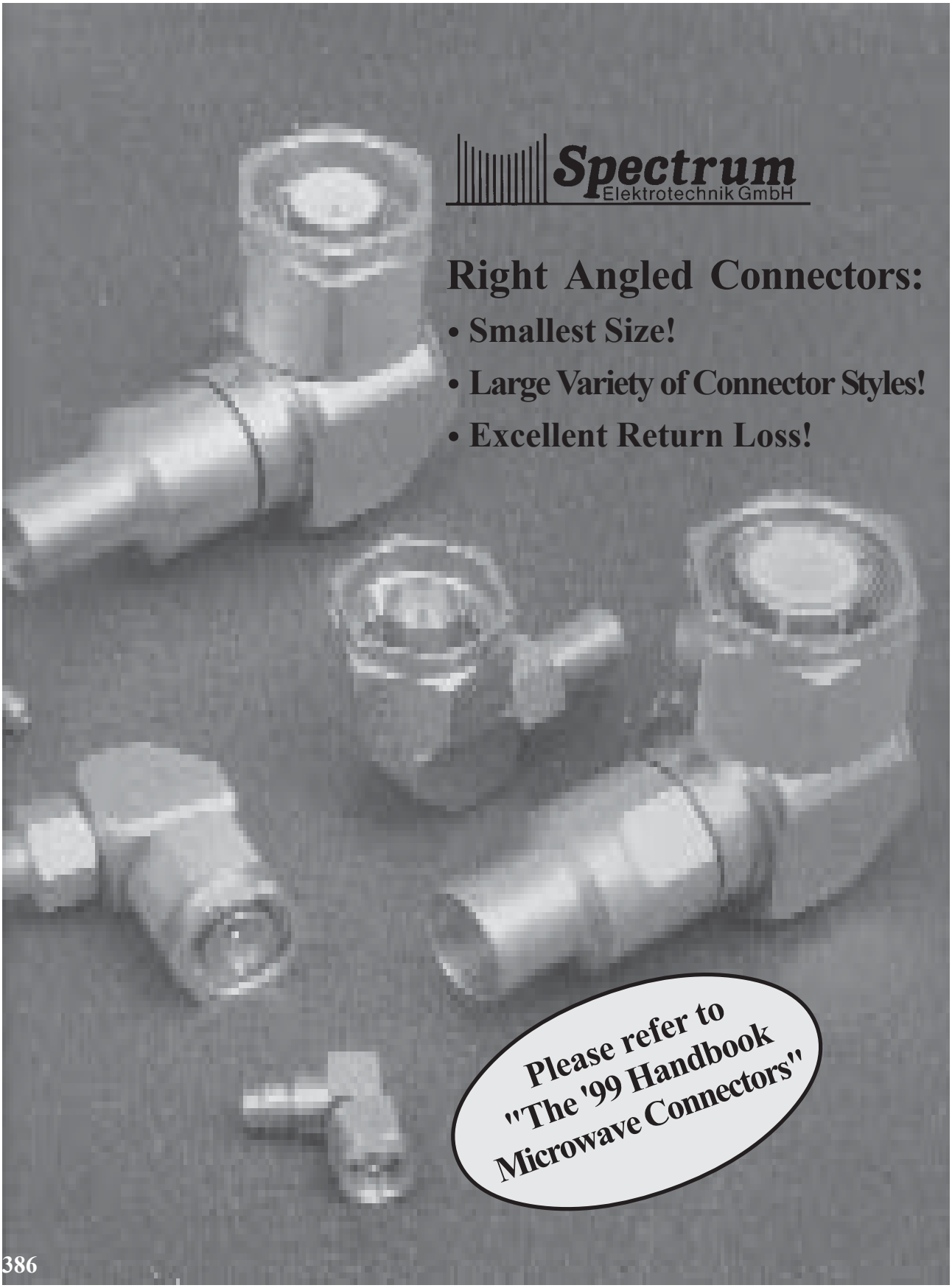
**Modular Power Component Packaging :** This is a higher level of components integration, generally used for higher power devices. The components or groups of components are usually interconnected by special blind mate connectors, integrated directly into the component housings. Thus, the connectors can´t even been seen, when the components are connected, providing shortest distance between the components, which is desirable, especially at those high power levels.

**Power Interconnections:** Spectrum Elektrotechnik GmbH did design and manufacture two completely new connector series, the SBX and SBY, and is offering these now to other manufacturers for modular packaging purposes. Modular Packaging means not only integration, it furthermore provides the advantage of easy maintainability and replacement of faulty components. Spectrum Elektrotechnik GmbH has been a leader in modular integration of high power components.

**Example:** A High Power Duplexer in a Radar Program did consist of several individual components: a Circulator, a Load, a Directional Coupler, a Limiter and Drive Circuitry. The Components were mounted to heat sinks and interconnected by cable assemblies.
For the next generation radar Spectrum Elektrotechnik GmbH was awarded the contract for a complete redesign: The new space saving design features a compact integration of modular components. All interconnecting cable assemblies were eliminated, and replaced by using the connector series SBX and SBY. A drive circuit was added and accommodated into the limiter housing, together with an over temperature sensor circuit.
In case one of the components becomes defective, or needs to be tested or replaced, only the locking screws have to be unfastened, and the component can be removed, and replaced, within no time.




**Schematic of a Super Component, consisting of Circulator, Coupler, Limiter, Load and the necessary Drive and Control Circuitry. The Component is built in a Modular Basis and is using the High Power Blind Mate Connectors of Series SBX and SBY.**


Spectrum
Elektrotechnik GmbH
Right Angled Connectors:
• Smallest Size!
• Large Variety of Connector Styles!
• Excellent Return Loss!
Please refer to
"The '99 Handbook
Microwave Connectors"

# Appendix

- Glossary
- Cable Index
- Connector Index
- Part Number Index
- Alphabetical Index
- Sales Representatives

# RF Measurement Chart

Spectrum Elektrotechnik GmbH

| VSWR $\frac{1+R}{1-R}$ | Reflection Coefficient R | Return Loss (dB) | Relative to Unity Reference | | | |
|---|---|---|---|---|---|---|
| | | | X dB Below Reference | Ref + x (dB) | Ref - x (dB) | Ref ± x Pk to Pk Ripple (dB) |
| ∞ | 1.00 | 0 | 0 | -6.00 | ∞ | ∞ |
| 17.40 | 0.891 | 1 | 1 | -5.53 | 19.28 | 24.81 |
| 8.72 | 0.794 | 2 | 2 | -5.08 | 13.74 | 18.81 |
| 5.85 | 0.708 | 3 | 3 | -4.65 | 10.69 | 15.34 |
| 4.42 | 0.631 | 4 | 4 | -4.25 | 8.66 | 12.91 |
| 3.57 | 0.562 | 5 | 5 | -3.87 | 7.18 | 11.05 |
| 3.01 | 0.501 | 6 | 6 | -3.53 | 6.22 | 9.75 |
| 2.61 | 0.447 | 7 | 7 | -3.21 | 5.14 | 8.35 |
| 2.32 | 0.398 | 8 | 8 | -2.91 | 4.41 | 7.32 |
| 2.10 | 0.355 | 9 | 9 | -2.64 | 3.81 | 6.45 |
| 1.92 | 0.316 | 10 | 10 | -2.39 | 3.30 | 5.69 |
| 1.78 | 0.282 | 11 | 11 | -2.16 | 2.88 | 5.03 |
| 1.67 | 0.251 | 12 | 12 | -1.95 | 2.51 | 4.46 |
| 1.58 | 0.224 | 13 | 13 | -1.76 | 2.20 | 3.96 |
| 1.50 | 0.200 | 14 | 14 | -1.58 | 1.93 | 3.51 |
| 1.43 | 0.178 | 15 | 15 | -1.42 | 1.70 | 3.12 |
| 1.38 | 0.159 | 16 | 16 | -1.28 | 1.50 | 2.78 |
| 1.33 | 0.141 | 17 | 17 | -1.15 | 1.32 | 2.47 |
| 1.29 | 0.126 | 18 | 18 | -1.03 | 1.17 | 2.20 |
| 1.25 | 0.112 | 19 | 19 | -0.92 | 1.03 | 1.96 |
| 1.22 | 0.100 | 20 | 20 | -0.83 | 0.92 | 1.74 |
| 1.196 | 0.0891 | 21 | 21 | -0.741 | 0.811 | 1.552 |
| 1.172 | 0.0794 | 22 | 22 | -0.644 | 0.719 | 1.382 |
| 1.152 | 0.0708 | 23 | 23 | -0.594 | 0.638 | 1.232 |
| 1.134 | 0.0631 | 24 | 24 | -0.531 | 0.566 | 1.098 |
| 1.119 | 0.0562 | 25 | 25 | -0.475 | 0.502 | 0.977 |
| 1.107 | 0.0501 | 26 | 26 | -0.434 | 0.446 | 0.880 |
| 1.096 | 0.0447 | 27 | 27 | -0.380 | 0.397 | 0.777 |
| 1.083 | 0.0398 | 28 | 28 | -0.338 | 0.353 | 0.691 |
| 1.074 | 0.0355 | 29 | 29 | -0.303 | 0.314 | 0.556 |
| 1.065 | 0.0316 | 30 | 30 | -0.270 | 0.279 | 0.549 |
| 1.058 | 0.0282 | 31 | 31 | -0.242 | 0.248 | 0.490 |
| 1.052 | 0.0251 | 32 | 32 | -0.215 | 0.221 | 0.436 |
| 1.046 | 0.0224 | 33 | 33 | -0.192 | 0.197 | 0.389 |
| 1.041 | 0.0200 | 34 | 34 | -0.172 | 0.174 | 0.347 |
| 1.036 | 0.0178 | 35 | 35 | -0.153 | 0.156 | 0.309 |
| 1.032 | 0.0159 | 36 | 36 | -0.137 | 0.138 | 0.275 |
| 1.029 | 0.0141 | 37 | 37 | -0.122 | 0.123 | 0.245 |
| 1.026 | 0.0126 | 38 | 38 | -0.109 | 0.110 | 0.219 |
| 1.023 | 0.0112 | 39 | 39 | -0.098 | 0.098 | 0.196 |
| 1.020 | 0.0100 | 40 | 40 | -0.086 | 0.087 | 0.173 |
| 1.0112 | 0.0056 | 45 | 45 | -0.049 | 0.049 | 0.097 |
| 1.0064 | 0.0032 | 50 | 50 | -0.028 | 0.028 | 0.056 |
| 1.0036 | 0.0018 | 55 | 55 | -0.016 | 0.016 | 0.031 |
| 1.0020 | 0.0010 | 60 | 60 | -0.0086 | 0.0086 | 0.0172 |

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# Conversion Factors

| To Convert | Into | Multiply by | Conversely Multiply by |
|---|---|---|---|
| Ampere-hours (Ah) | coulombs (C) | 3600 | $2.778 \times 10^{-4}$ |
| Celsius (centigrade, °C) | Fahrenheit (°F) | | °C = (°F - 32) / 1.8 |
| centimeters (cm) | feet (ft) | 0.03281 | 30.48 |
| centimeters (cm) | inches (in) | 0.3937 | 2.54 |
| ergs (erg) | joules (J) | $10^{-7}$ | $10^{7}$ |
| Fahrenheit (°F) | Celsius (centigrade, °C) | | °F = °C * 1.8 + 32 |
| feet (ft) | centimeters (cm) | 30.48 | 0.03281 |
| feet (ft) | yards (yd) | 0.33333 | 3 |
| gallons, US (gal) | liters (l) | 3.785 | 0.2642 |
| grams (g) | ounces (oz) | 0.03527 | 28.35 |
| horsepower (hp) | kilowatts (kW) | 0.745 | 1.342 |
| inches (in) | centimeters (cm) | 2.54 | 0.3937 |
| inches (in) | feet (ft) | 0.08333 | 12 |
| inch-pounds (inlbf) | newton-meters (Nm) | 0.11298 | 8.8512 |
| joules (J) | ergs (erg) | $10^{7}$ | $10^{-7}$ |
| joules (J) | kilowatt-hours (kWh) | $2.778 \times 10^{-7}$ | $3.6 \times 10^{6}$ |
| kilograms (kg m/s$^2$) | kilopond (kp) | 0.1020 | 9.807 |
| kilograms (kg) | pounds (lb) | 2.205 | 0.4536 |
| kilopond (kp) | kilograms (kg m/s$^2$) | 9.807 | 0.1020 |
| kilopond (Kp) | newtons (N) | 9.807 | 0.1020 |
| kilowatt-hours (kWh) | joules (J) | $3.6 \times 10^{6}$ | $2.778 \times 10^{-7}$ |
| kilowatts (kW) | horsepower (hp) | 1.342 | 0.745 |
| liters (l) | gallons, US (gal) | 0.2642 | 3.785 |
| meters (m) | microns [micrometer], (µm) | $10^{6}$ | $10^{-6}$ |
| meters (m) | miles [nautical], (nmi) | $5.4 \times 10^{-4}$ | 1852 |
| meters (m) | miles [statue], (mi) | $6.215 \times 10^{-4}$ | 1609 |
| meters (m) | mils (mil) | $3.937 \times 10^{-4}$ | $2.54 \times 10^{-5}$ |
| microns [micrometer], (µm) | meters (m) | $10^{-6}$ | $10^{6}$ |
| miles [nautical], (nmi) | meters (m) | 1852 | $5.4 \times 10^{-4}$ |
| miles [statue], (mi) | meters (m) | 1609 | $6.215 \times 10^{-4}$ |
| mils (mil) | meters (m) | $2.54 \times 10^{-5}$ | $3.937 \times 10^{-4}$ |
| newtons (N) | kilopond (kp) | 0.1020 | 9.807 |
| newtons (N) | ounces [force], (oz) | 3.5968 | 0.2780 |
| newtons (N) | pounds [force], (lbf) | 0.2248 | 4.448 |
| newton-meters (Nm) | inch-pounds (inlbf) | 8.8512 | 0.11298 |
| newton-meters (Nm) | ounce-inches | $1.416 \times 10^{2}$ | $7.062 \times 10^{-3}$ |
| ounces (oz) | grams (g) | 28.35 | 0.03527 |
| ounces [force], (oz) | newtons (N) | 0.2780 | 3.5968 |
| ounce-inches | newton-meters (Nm) | $7.062 \times 10^{-3}$ | $1.416 \times 10^{2}$ |
| pounds (lb) | kilograms (kg) | 0.4536 | 2.205 |
| pounds [force], (lbf) | newtons (N) | 4.448 | 0.2248 |
| yards (yd) | feet (ft) | 3 | 0.33333 |

# Cable Index

| Cable Type | Description | Part Number | Frequency | Page |
|---|---|---|---|---|
| **03** | High Performance Cable | - | DC - 9.5 | * |
| **05** | Semi - Rigid Cable with Low Density Dielectric | 421-307 | DC - 65.0 | **264** |
| **06** | Semi - Rigid Cable with Low Density Dielectric | 421-307-1 | DC - 65.0 | **264** |
| **07** | Semi - Rigid Cable with Low Density Dielectric | 421-307-3 | DC - 65.0 | **264** |
| **08** | Semi - Rigid Cable with solid Dielectric | 421-608-3 | DC - 14.0 | * |
| **10** | High Performance Cable | - | DC - 26.5 | * |
| **11** | High Performance Cable | - | DC - 40.0 | * |
| **12** | High Performance Cable | - | DC - 12.4 | * |
| **14** | High Performance Cable | - | DC - 20.0 | * |
| **16** | ANA - Cable | - | DC - 50.0 | * |
| **17** | High Performance Cable | - | DC - 18.0 | **246** |
| **18** | ANA - Cable | - | DC - 26.5 | **247** |
| **20** | Semi - Rigid Cable with Low Density Dielectric | 421-202 | DC - 10.0 | * |
| **21** | RG - 214/U | RG - 214/U | DC - 10.0 | **248** |
| **22** | ANA - Cable | - | DC - 26.5 | **249** |
| **23** | RG - 223/U | RG - 223/U | DC - 10.0 | * |
| **27** | Semi - Rigid Cable with Low Density Dielectric | 421-227 | DC - 14.0 | * |
| **31** | RG - 316/U | RG - 316/U | DC - 3.0 | **250** |
| **32** | RD - 316/U | RD - 316/U | DC - 3.0 | **251** |
| **33** | Handy Form: SL - Flex | - | DC - 24.0 | * |
| **36** | Semi - Rigid Cable with Low Density Dielectric | 421-336 | DC - 20.0 | * |
| **37** | High Performance Cable | - | DC - 50.0 | * |
| **39** | High Performance Cable | - | DC - 40.0 | * |
| **40** | RG - 400/U | RG - 400/U | DC - 12.4 | **252** |
| **42** | RG - 142B/U | RG - 142B/U | DC - 12.4 | **253** |
| **43** | High Performance Cable | - | DC - 26.5 | **254** |
| **46** | Semi - Rigid Cable with solid Dielectric | 421-047 | DC - 109.0 | **262** |
| **47L** | Handy Form II, Low Density | 422-100-3 | DC - 110.0 | **264** |
| **47** | Semi - Rigid Cable with solid Dielectric | 421-047-1 | DC - 109.0 | **262** |
| **48** | Semi - Rigid Cable with solid Dielectric | 421-047-3 | DC - 109.0 | **262** |
| **50** | Semi - Rigid Cable with solid Dielectric | 421-250 | DC - 19.0 | **263** |
| **51** | High Performance Cable | - | DC - 18.0 | * |
| **52** | Semi - Rigid Cable with solid Dielectric | 421-252 | DC - 19.0 | **263** |
| **53** | Semi - Rigid Cable with solid Dielectric | 421-252-1 | DC - 19.0 | **263** |
| **54** | Semi - Rigid Cable with solid Dielectric | 421-252-3 | DC - 19.0 | **263** |
| **57** | High Performance Cable | - | DC - 18.0 | * |
| **58** | RG - 58C/U | RG - 58C/U | DC - 3.0 | * |
| **60** | Type 60A or 60B. High Performance Cable | - | DC - 18.0 | * |
| **65** | High Performance Cable | - | DC - 26.5 | * |
| **66** | Handy Form I | 502-13 | DC - 26.5 | * |
| **67** | Handy Form I | 501-19 | DC - 26.5 | * |
| **69** | Semi - Rigid Cable with solid Dielectric | 421-669 | DC - 33.0 | **262** |

* Please refer to The "97' Handbook Cable Assemblies

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| Cable Type | Description | Part Number | Frequency | Page |
|---|---|---|---|---|
| **69D** | Semi - Rigid Cable with solid Dielectric | 421-669-DS | DC - 33.0 | **263** |
| **69S** | Semi - Rigid Cable with solid Dielectric | 421-669-SS | DC - 33.0 | **263** |
| **70** | Semi - Rigid Cable with solid Dielectric | 421-669-1 | DC - 33.0 | **263** |
| **71** | Semi - Rigid Cable with solid Dielectric | 421-669-3 | DC - 18.0 | **263** |
| **72** | Semi - Rigid Cable with solid Dielectric | 421-669-3 | DC - 33.0 | **263** |
| **76** | Semi - Rigid Cable with solid Dielectric | 421-669-SSSS | DC - 33.0 | **263** |
| **78** | Flexible Cable | - | DC - 3.0 | **255** |
| **78D** | Flexible Cable | - | DC - 3.0 | **256** |
| **81** | Semi - Rigid Cable with Low Density Dielectric | 421-281 | DC - 20.0 | * |
| **83** | Semi - Rigid Cable with solid Dielectric | 421-087 | DC - 60.0 | **262** |
| **84** | Semi - Rigid Cable with solid Dielectric | 421-087-1 | DC - 60.0 | **262** |
| **85L** | Handy Form II, Low Density | 422-700-3 | DC - 60.0 | * |
| **85** | Semi - Rigid Cable with solid Dielectric | 421-087-3 | DC - 60.0 | **262** |
| **86D** | Semi - Rigid Cable with solid Dielectric | 421-086-DS | DC - 60.0 | **262** |
| **89** | Semi - Rigid Cable with solid Dielectric | 421-086 | DC - 60.0 | **262** |
| **90** | Semi - Rigid Cable with solid Dielectric | 421-086-1 | DC - 60.0 | **262** |
| **91** | Semi - Rigid Cable with solid Dielectric | 421-086-3 | DC - 60.0 | **262** |
| **92** | Semi - Rigid Cable with solid Dielectric | 421-086-G | DC - 60.0 | **262** |
| **94** | Semi - Rigid Cable with solid Dielectric | 421-086-SS | DC - 60.0 | **262** |
| **97** | Semi - Rigid Cable with Low Density Dielectric | 421-298-1 | DC - 35.0 | **264** |
| **98** | Semi - Rigid Cable with Low Density Dielectric | 421-298 | DC - 35.0 | **264** |
| **99** | Semi - Rigid Cable with Low Density Dielectric | 421-298-3 | DC - 35.0 | **264** |
| **100** | High Performance Cable | - | DC - 26.5 | **256** |
| **120** | High Performance Cable | - | DC - 12.4 | * |
| **140** | High Performance Cable | - | DC - 20.0 | **258** |
| **141L** | Handy Form II, Low Density | 422-900-3 | DC - 40.0 | * |
| **145** | Handy Form II | 422-130 | DC - 110.0 | * |
| **146** | Handy Form II | 422-130-3 | DC - 110.0 | * |
| **150** | Handy Form II | 422-121-3 | DC - 20.0 | * |
| **165** | Handy Form II | 422-600 | DC - 40.0 | * |
| **166** | Handy Form II | 422-600-3 | DC - 40.0 | * |
| **167** | Handy Form II | 422-800-3 | DC - 36.0 | * |
| **168** | Handy Form II | 422-800 | DC - 36.0 | * |
| **250L** | Handy Form II, Low Density | 422-250-3 | DC - 20.0 | * |
| **300** | High Performance Cable | - | DC - 9.5 | * |
| **361** | Semi - Rigid Cable with Low Density Dielectric | 421-336-1 | DC - 20.0 | * |
| **363** | Semi - Rigid Cable with Low Density Dielectric | 421-336-3 | DC - 20.0 | * |
| **670** | Semi - Rigid Cable with solid Dielectric | 421-670 | DC - 33.0 | **263** |
| **671** | Semi - Rigid Cable with solid Dielectric | 421-670-1 | DC - 33.0 | **263** |
| **673** | Semi - Rigid Cable with solid Dielectric | 421-670-3 | DC - 33.0 | **263** |
| **677** | High Performance Flexible Cable | - | DC - 18.0 | **259** |
| **700** | High Performance Flexible Cable | - | DC - 18.0 | **260** |

* Please refer to The "97' Handbook Cable Assemblies

# Connector Index

| Connector Code | Type | Sex | Description |
|---|---|---|---|
| **BB** | BMA | Female | PUSH-ON Bulkhead Feedthrough, Passivated Stainless Steel |
| **BF** | BMA | Female | PUSH-ON Floating Rear Mount, 2-Hole Flange Mount, Passivated Stainless Steel |
| **BM** | BMA | Male | PUSH-ON, Passivated Stainless Steel |
| **BW** | BMA | Female | straight |
| **CW** | SMC | Male | Right Angle |
| **E11** | SMA | Male | straight, Interchangeable |
| **E21** | SMA | Female | straight, Interchangeable |
| **E31** | TNC | Male | straight, Interchangeable |
| **E41** | TNC | Female | straight, Interchangeable |
| **E51** | N | Male | straight, Interchangeable |
| **E61** | N | Female | straight, Interchangeable |
| **E90** | 7mm | Connector | straight, 4 slots Contact |
| **E96** | 7mm | Connector | straight, 6 slots Contact |
| **FB** | SMB | Female | straight |
| **FC** | SMC | Female | straight |
| **H2** | 2.4mm | Female | straight, HP direct connection |
| **H3** | 3.5mm | Female | HP direct Connection |
| **H2M** | 2.4mm | Male | straight, NMD |
| **H3M** | 3.5mm | Male | straight, NMD |
| **HB** | 2.4mm | Female | Bulkhead Feedthrough |
| **HF2** | 2.4mm | Female | 2-Hole Flange Mount |
| **HF4** | 2.4mm | Female | 4-Hole Flange Mount |
| **HF** | 2.4mm | Female | straight |
| **HM** | 2.4mm | Male | straight |
| **HN** | 2.4mm | Male | 2-Hole Flange Mount |
| **KF** | K* | Female | straight |
| **KFB** | K* | Female | Bulkhead Feedthrough |
| **KF2** | K* | Female | 2-Hole Flange |
| **KF4** | K* | Female | 4-Hole Flange |
| **KM** | K* | Male | straight, Regular length |
| **KMS** | K* | Male | straight, Short |
| **M2** | 2.4mm | Male | straight, Maxi-Nut |
| **M3** | 3.5mm | Male | straight, Maxi-Nut |
| **MA** | SMA | Male | straight, Maxi-Nut |
| **MB** | SMB | Male | straight |
| **MC** | SMC | Male | straight |
| **MK** | K* | Male | straight, Maxi-Nut |
| **MPR** | SMP | Female | Right Angle |
| **ND** | N | Male | straight |
| **NDB** | N | Male | PUSH - ON Full Locking, Double "D", Brass Silver plated |
| **NDC** | N | Male | PUSH - ON Locking with Non-Locking Rear Nut, Double "D", Brass Silver plated |
| **NDL** | N | Male | PUSH - ON Locking with Non-Locking Rear Nut, Double "D", Passivated Stainless Steel |
| **NDS** | N | Male | PUSH - ON Full Locking, Double "D", Passivated Stainless Steel |
| **NL** | N | Male | PUSH - ON Locking with Non-Locking Rear Nut, Passivated Stainless Steel |
| **NLB** | N | Male | PUSH - ON Locking with Non-Locking Rear Nut, Double "D", Brass Silver plated |
| **NN** | N | Male | PUSH - ON Non-Locking, Passivated Stainless Steel |
| **NNB** | N | Male | PUSH - ON Non-Locking, Brass Silver plated |
| **NS** | N | Male | PUSH-ON Full Locking, Passivated Stainless Steel |
| **NSB** | N | Male | PUSH-ON Full Locking, Brass Silver plated |
| **PG2** | SPM | Female | 2-Hole Flange Mount |
| **PG4** | SPM | Female | 4-Hole Flange Mount |
| **PGF** | SPM | Female | Bulkhead Feedthrough |
| **PH** | SMA | Male | straight, Phase Adjustable |
| **PJ** | SPM | Female | straight |
| **PM** | SPM | Male | straight |
| **RM** | SMA | Female/Male | PUSH-ON Reverse Sex, Non-Locking, Passivated Stainless Steel |
| **RML** | SMA | Female/Male | PUSH-ON Reverse Sex, Locking with Non-Locking Rear Nut, Passivated Stainless Steel |
| **RMM** | SMA | Female/Male | PUSH-ON Reverse Sex, Non-Locking, Passivated Stainless Steel |
| **RMR** | SMA | Female/Male | PUSH-ON Reverse Sex, Non-Locking, Passivated Stainless Steel |
| **SM** | SMA | Male | PUSH - ON Non-Locking, Passivated Stainless Steel |
| **SML** | SMA | Male | PUSH - ON Locking with Non Locking Rear Nut, Passivated Stainless Steel |
| **SMM** | SMA | Male | PUSH-ON, Non-Locking, Passivated Stainless Steel |
| **SMR** | SMA | Male | PUSH-ON, Non-Locking, Passivated Stainless Steel |
| **SPA** | SMP | Female | PUSH-ON, Right Angle, Beryllium Copper, Gold plated |
| **SPB** | SMP | Female | PUSH-ON, Right Angle, Beryllium Copper, Gold plated |
| **SPC** | SMP | Female | PUSH-ON, Right Angle, Beryllium Copper, Gold plated |
| **SPD** | SMP | Female | PUSH-ON, Right Angle, Beryllium Copper, Gold plated |
| **SPE** | SMP | Female | PUSH-ON, DC-26.5 GHz, Beryllium Copper, Gold plated |
| **SPF** | SMP | Female | PUSH-ON, DC-18.0 GHz, Beryllium Copper, Gold plated |
| **SPG** | SMP | Female | PUSH-ON, Beryllium Copper, Gold plated |
| **SPH** | SMP | Female | PUSH-ON, Right Angle, Beryllium Copper, Gold plated |
| **SPJ** | SMP | Female | PUSH-ON, Right Angle, Beryllium Copper, Gold plated |
| **SPN** | SMP | Female | PUSH-ON, Float Mount, Beryllium Copper, Gold plated |

| Connector Code | Type | Sex | Description |
|---|---|---|---|
| **SPP** | SMP | Female | PUSH-ON, Float Mount, Beryllium Copper, Gold plated |
| **SPQ** | SMP | Female | PUSH-ON, Right Angle, Beryllium Copper, Gold plated |
| **SPR** | SMP | Female | PUSH-ON, Right Angle, Beryllium Copper, Gold plated |
| **SPS** | SMP | Male | PUSH-ON, Panel Mount, Beryllium Copper, Gold plated |
| **SPT** | SMP | Female | PUSH-ON, Float Mount, Beryllium Copper, Gold plated |
| **SPU** | SMP | Female | PUSH-ON, Float Mount Bulkhead, Beryllium Copper, Gold plated |
| **SPW** | SMP | Male | PUSH-ON, Bulkhead, Stainless Steel, Gold plated |
| **SRF** | SMP | Male | PUSH-ON, Full Detent, Stainless Steel, Gold plated |
| **SRL** | SMP | Male | PUSH-ON, Limited Detent, Stainless Steel, Gold plated |
| **SRS** | SMP | Male | PUSH-ON, Smooth Bore, Stainless Steel, Gold plated |
| **SSF** | SSMA | Female | straight |
| **SSM** | SSMA | Male | straight |
| **STF** | SMP | Male | PUSH-ON, Bulkhead Full Detent, Beryllium Copper, Gold plated |
| **STL** | SMP | Male | PUSH-ON, Bulkhead Limited Detent, Beryllium Copper, Gold plated |
| **STS** | SMP | Male | PUSH-ON, Bulkhead Smooth Bore, Beryllium Copper, Gold plated |
| **TJ** | SMP | Female | PUSH-ON, Test Connector, Passivated Stainless Steel |
| **TJF** | SMP | Female | PUSH-ON, Test Connector to SMP-m Full Detent ,Passivated Stainless Steel |
| **TJL** | SMP | Female | PUSH-ON, Test Connector to SMP-m Limited Detent, Passivated Stainless Steel |
| **TMJ** | SMP | Male | straight |
| **TMP** | SMP | Female | straight |
| **TN** | TNC | Male | PUSH-ON, Non-Locking (18.0 GHz), Passivated Stainless Steel |
| **TN3** | TNC | Male | PUSH-ON, Non-Locking (11.0 GHz), Passivated Stainless Steel |
| **TP** | SMP | Male | PUSH-ON, Test Connector, Passivated Stainless Steel |
| **TPC** | SMP | Male | PUSH-ON, Test Connector, Passivated Stainless Steel |
| **TR** | TNC | Male | PUSH-ON, Locking with Non-Locking Rear Nut (18.0 GHz), Passivated Stainless Steel |
| **TR3** | TNC | Male | PUSH-ON, Locking with Non-Locking Rear Nut (11.0 GHz), Passivated Stainless Steel |
| **TS** | TNC | Male | PUSH-ON, Full Locking (18.0 GHz), Passivated Stainless Steel |
| **TS3** | TNC | Male | PUSH-ON, Full Locking (11.0 GHz), Passivated Stainless Steel |
| **WI** | K* | Female | Wiltron direct connection |
| **WIM** | K* | Male | straight, NMD |
| **XF** | SBX | Female | straight |
| **XF4** | SBX | Female | PUSH-ON, Float Mount, 4-Hole Flange Mount, Passivated Stainless Steel |
| **XFR** | SBX | Female | PUSH-ON, Float Mount, 4-Hole Flange Mount, Passivated Stainless Steel |
| **XM** | SBX | Male | PUSH-ON, 4-Hole Flange Mount, Passivated Stainless Steel |
| **YF** | SBY | Female | straight |
| **YF4** | SBY | Female | PUSH-ON, Float Mount, 4-Hole Flange Mount, Passivated Stainless Steel |
| **YFR** | SBY | Female | PUSH-ON, Float Mount, 4-Hole Flange Mount, Passivated Stainless Steel |
| **YM** | SBY | Male | PUSH-ON, 4-Hole Flange Mount, Passivated Stainless Steel |
| **02** | 2/5.5 | Male | Right Angle |
| **03** | 1.4/4.4 | Connector | straight |
| **04** | 1.8/5.6 | Female | straight |
| **05** | 1.8/5.6 | Male | Right Angle |
| **06** | 1.8/5.6 | Female | Right Angle |
| **07** | 1.8/5.6 | Male | straight |
| **1S** | SMA | Male | straight, Across Flats |
| **5A** | N | Female | Bulkhead Feedthrough, R.A. |
| **5B** | N | Female | Bulkhead Feedthrough, R.A. |
| **5C** | N | Female | 4-Hole Flange Mount, R.A. |
| **7N** | 7/16 | Male | PUSH-ON, Non-Locking, Passivated Stainless Steel |
| **7NB** | 7/16 | Male | PUSH-ON, Non-Locking, Brass Silver plated |
| **7R** | 7/16 | Male | PUSH-ON, Locking with Non-Locking Rear Nut, Passivated Stainless Steel |
| **7RB** | 7/16 | Male | PUSH-ON, Locking with Non-Locking Rear Nut, Brass Silver plated |
| **7S** | 7/16 | Male | PUSH-ON, Full Locking, Passivated Stainless Steel |
| **7SB** | 7/16 | Male | PUSH-ON, Full Locking, Brass Silver plated |
| **10S** | SMA | Male | straight, Short |
| **10** | SMA | Male | straight, Regular |
| **11** | SMA | Male | straight |
| **11S** | SMA | Male | straight, Short |
| **14** | SMA | Male | Right Angle |
| **15** | SMA | Male | Right Angle |
| **16** | SMA | Male | Radius Right Angle |
| **17L** | SMA | Male | Radius Right Angle, Long |
| **17** | SMA | Male | Radius Right Angle |
| **18L** | SMA | Female | Right Angle, Long |
| **18R** | SMA | Female | Right Angle, Regular |
| **19** | SMA | Female | Radius Right Angle |
| **20** | SMA | Female | straight |
| **21** | SMA | Female | straight |
| **22** | SMA | Female | Bulkhead Feedthrough |
| **23** | SMA | Female | Bulkhead Feedthrough |
| **24** | SMA | Female | 4-Hole Flange Mount |
| **25** | SMA | Female | 4-Hole Flange Mount |
| **26** | SMA | Female | 2-Hole Flange Mount |

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| Connector Code | Type | Sex | Description |
|---|---|---|---|
| **27** | SMA | Female | 2-Hole Flange Mount |
| **28** | SMA | Female | Radius Right Angle |
| **31** | TNC | Male | straight |
| **31H** | TNC | Male | High Power |
| **35** | TNC | Male | Right Angle |
| **39** | TNX | Male | straight |
| **40** | TNC | Female | straight |
| **41** | TNC | Female | straight |
| **41H** | TNC | Female | High Power |
| **43** | TNC | Female | Bulkhead Feedthrough |
| **44** | TNC | Female | 4-Hole Flange Mount |
| **45** | TNC | Female | 4-Hole Flange Mount |
| **46** | TNC | Female | 4-Hole Flange Mount, R.R.A. |
| **49** | TNX | Female | straight |
| **51** | N | Male | straight |
| **51H** | N | Male | High Power |
| **55** | N | Male | Right Angle |
| **61** | N | Female | straight |
| **61H** | N | Female | High Power |
| **63** | N | Female | Bulkhead Feedthrough |
| **65** | N | Female | 4-Hole Flange Mount, R.A. |
| **67** | HN | Male | Right Angle |
| **68** | HN | Female | straight |
| **69** | HN | Male | straight |
| **71** | BNC | Male | straight |
| **75** | 7/16 | Male | straight |
| **76** | 7/16 | Female | straight |
| **77** | SC | Male | Right Angle |
| **78** | SC | Female | Bulkhead Feedthrough |
| **79H** | SC | Female | High Power |
| **79** | SC | Female | straight |
| **80H** | SC | Male | High Power |
| **80** | SC | Male | straight |
| **81** | BNC | Female | straight |
| **88** | C | Male | straight |
| **89** | C | Female | straight |
| **90** | 7mm | Connector | straight, 4 slots Contact |
| **91** | 3.5mm | Male | straight |
| **92** | 3.5mm | Female | straight |
| **92B** | 3.5mm | Female | Bulkhead Feedthrough |
| **96** | 7mm | Connector | straight, 6 slots Contact |
| **101** | SMA | Male | straight |
| **151** | SMA | Male | Right Angle, Regular |
| **152** | SMA | Male | Right Angle, Short |
| **153** | SMA | Male | Right Angle, Long |
| **154** | SMA | Male | Right Angle, Regular |
| **155** | SMA | Male | Right Angle, Short |
| **156** | SMA | Male | Right Angle, Long |
| **510** | N | Male | Hexagonal Knurl Nut |
| **753** | 7/16 | Female | Bulkhead Feedthrough |
| **754** | 7/16 | Female | 4-Hole Flange Mount |
| **922** | 3.5mm | Female | 2-Hole Flange Mount |
| **924** | 3.5mm | Female | 4-Hole Flange Mount |

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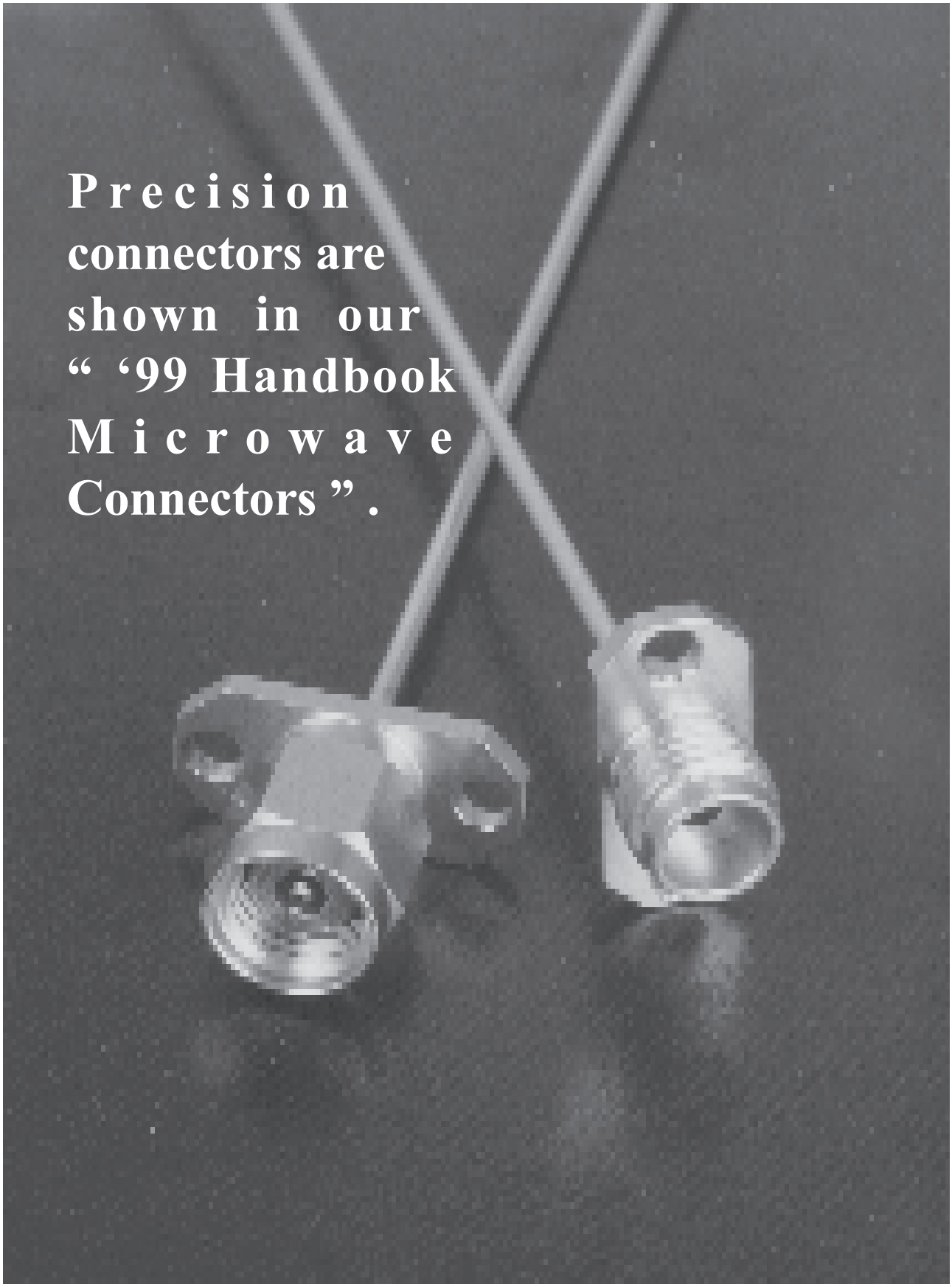
Precision
connectors are
shown in our
“ ‘99 Handbook
Microwave
Connectors ”.