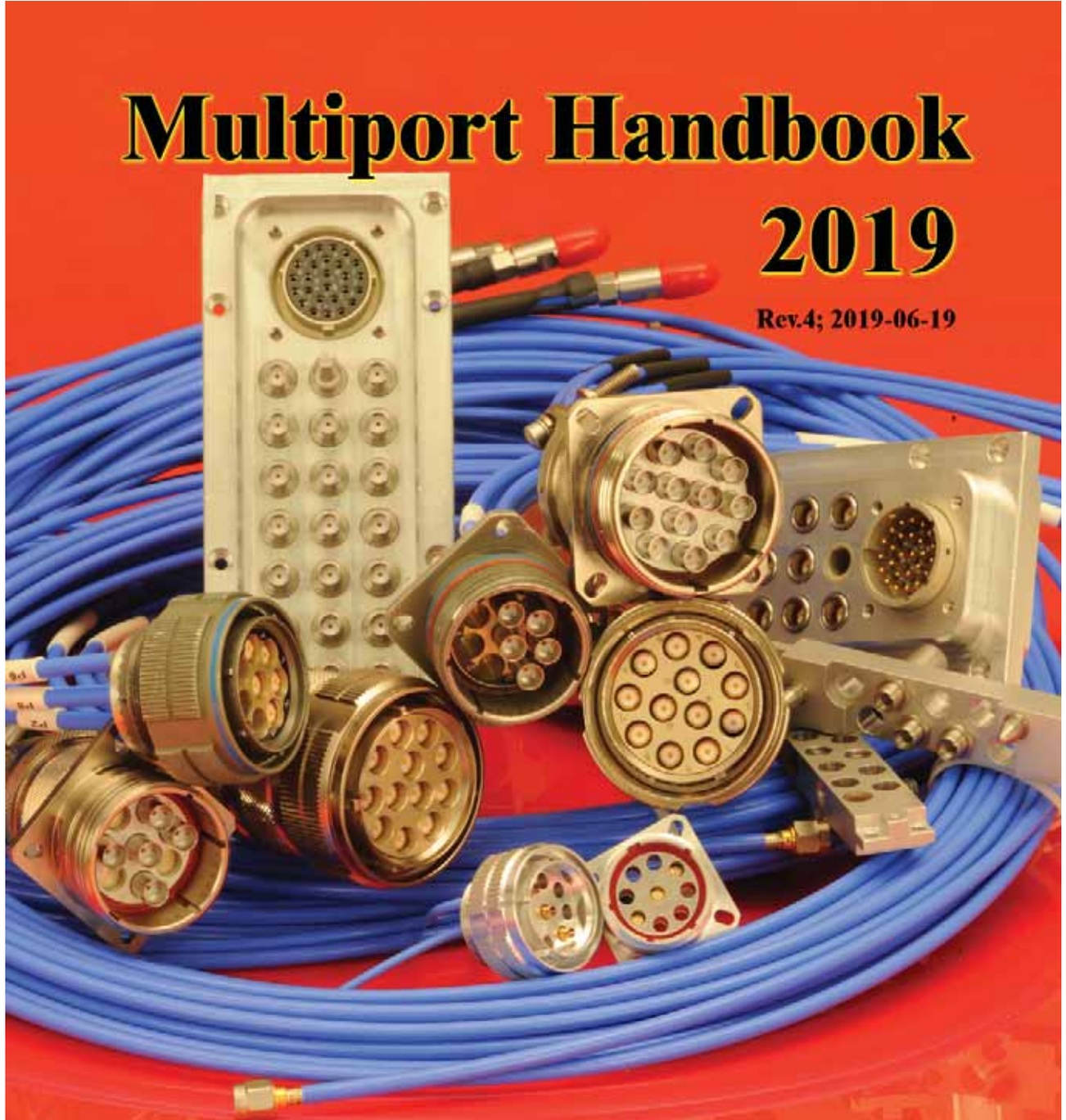
Multiport Handbook 2019

Rev.4; 2019-06-19



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when Quality is needed

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General Information

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 for its leadership in cutting-edge technologies. The Products: Spectrum's products are used in many commercial systems including cellular applications, radios, SatCom/VSAT, satellites, 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.

www.spectrum-et.com

Spectrum Elektrotechnik GmbH is a leading manufacturer of RF and Microwave Components in the Frequency Range of DC to 71 GHz. The products are published in eight individual catalogs, showing detailed information and comprehensive data.

Adapters, DC to 71 GHz, 50 Ohms
- Coaxial Adapters (In Series and Between Series)
- High Power Adapters
- Push-On Adapters
- Waveguide to Coax Adapters, Rectangular and Double Ridge

Cable Assemblies, DC to 71 GHz, 50 Ohms

ANA Test Cables

Flexible Cable Assemblies
- Coaxial Delay Lines
- Commercial Cable Assemblies
- HandyForm Cable Assemblies
- High Performance
- Interchangeable Connector Assemblie
- Multiport Assemblies, short overview
- Phase matched Assemblies
- Phase King Assemblies
- Phase stable Assemblies
- Semi Rigid Cable Assemblies
- Spectrum Flex Assemblies

Connector Outline Drawings

General Information

Circulators & Isolators
- Connectorized Isolators and Curculators
- Drop In Isolators and Curculators
- Lumped Design Isolators

Connectors, DC to 71 GHz, 50 Ohms
- Blind Mate Connectors
- Coaxial Connectors for Flexible Canle
- Coaxial Connectors for Semi Rigid Cable
- High Power Connectors
- Multi Pin / Multi Port Connectors
- **Push-On Connectors**
- Stripline Connectors

Multiport Connectors and Assemblies, DC to 65 GHz
- Circular Connectors, SQ-, TQ-, IQ-, BQ-, CQ-Series
- Rectangular Connectors, RQ-Series,

Phase Adjusters
- DC to 2 GHz
- DC to 12 GHz
- DC to 18 GHz
- DC to 26 GHz
- DC to 40 GHz
- DC to 50 GHz
- **DC to 63 GHz**

Product Portfolio

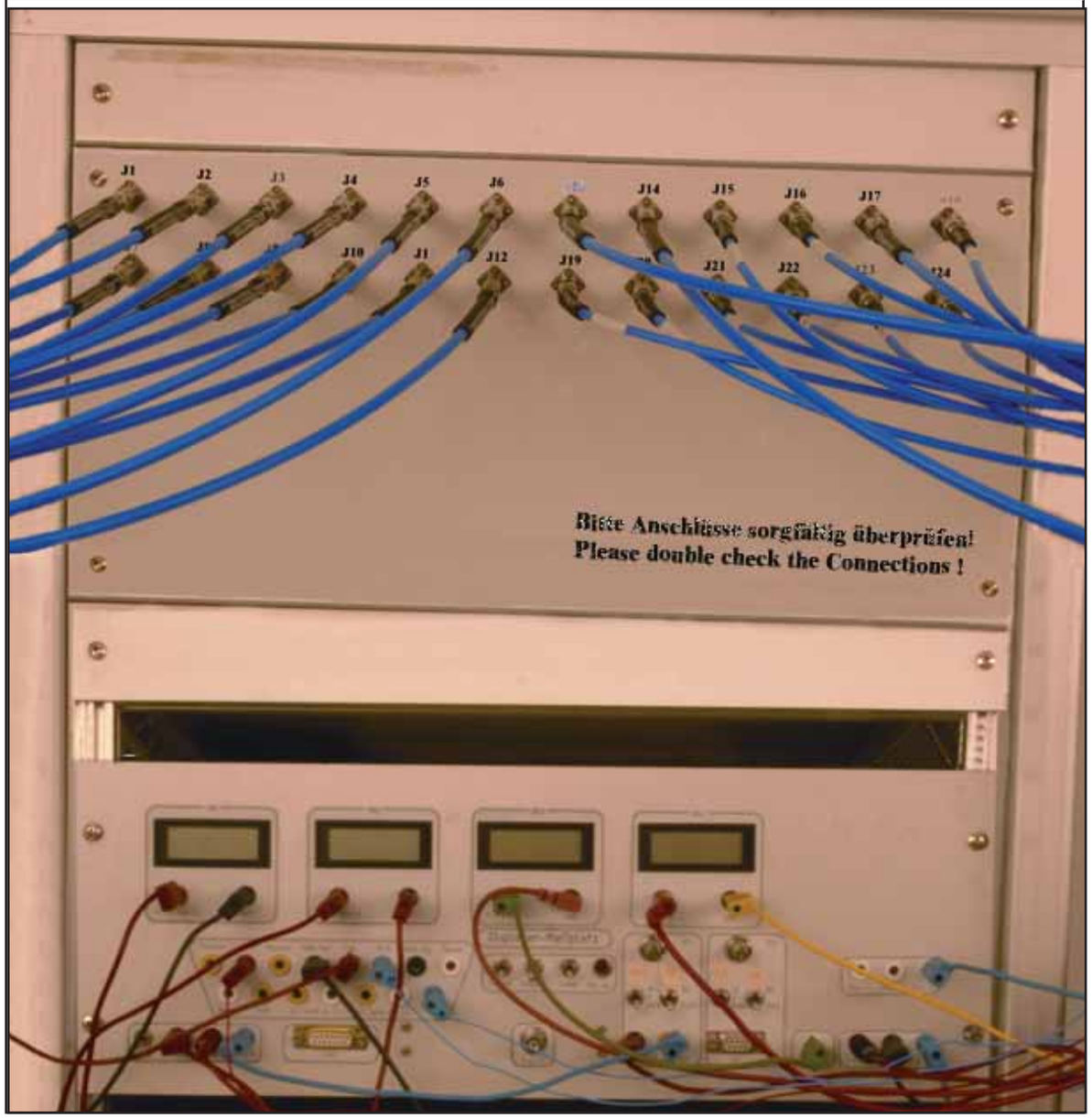
A Shortt Form Catalog showing a product overview

Quick Connections, 50 Ohms, DC to 65 GHz
- Blind Mate Connectors
- Multi Coax Connections, DC to 65 GHz, short overview
  - SQ-, TQ-, IQ-, BQ-, CQ-, RQ-Series,
- Push - On Adapters
- Push - On Connectors
- Push - On Cable Assemblies

Test Necessities and Accessories, DC to 65 GHz, 50 Ohms
- ANA Cable Assemblies
- Calibration Kits
- Interface Gauges
- LRL, TRL Calibration and Verification Kits
- Torque Wrenches and Tools
- Terminations

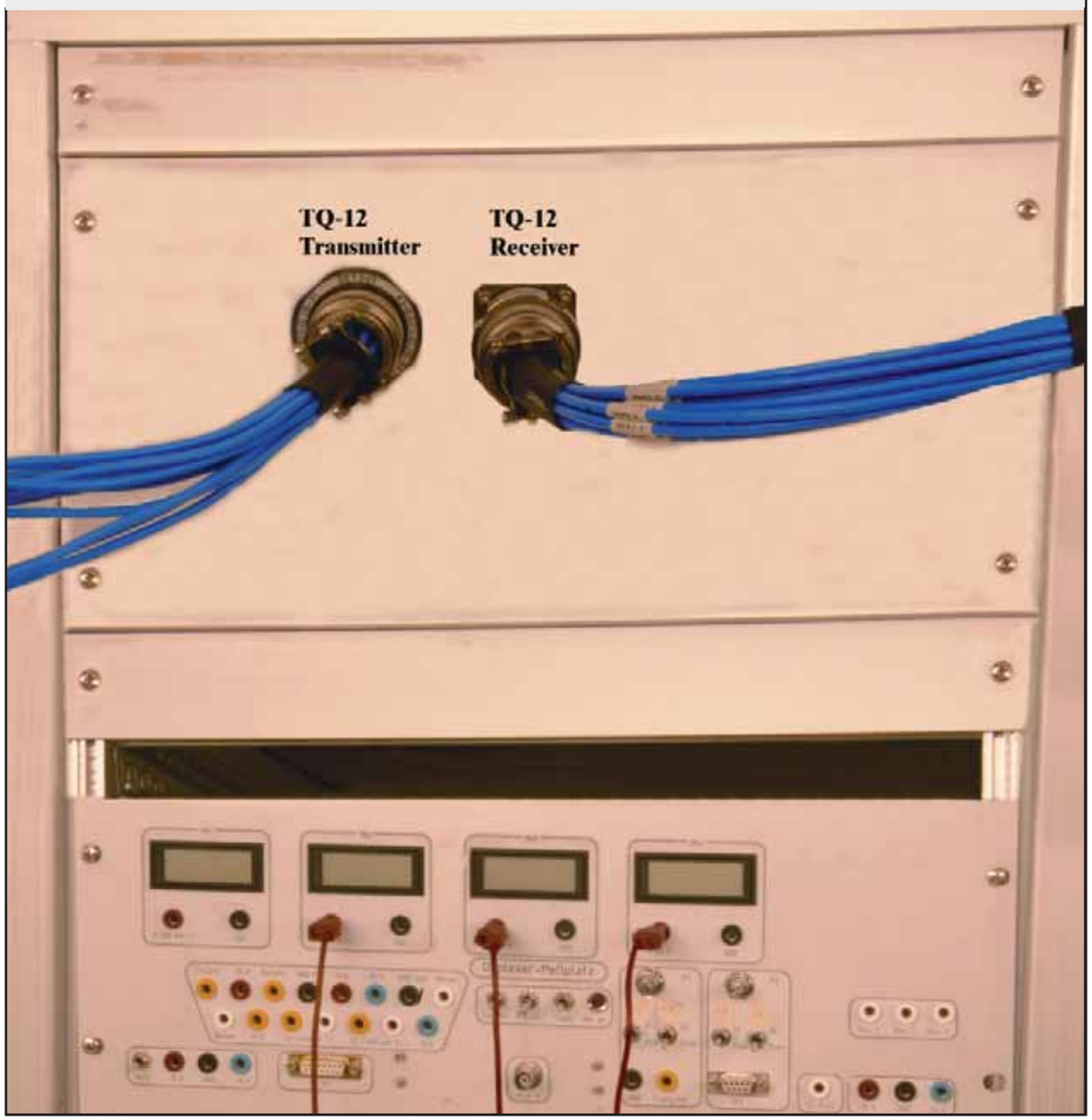
Contents

The Problem: In various applications many coaxial microwave links have to be connected and disconnected. This means threading and unthreading, torquing and untorquing. Very dense packaging is not possible, as there is still room needed for manual threading and for the use of a torque wrench. All connectors in helicopters and aircrafts usually have to be safely secured, e.g. by wiring the coupling nuts of the connectors, using wire holes, a time-consuming process. Threading and torquing, unthreading and untorquing 24 connections, a time consuming process, and lots of space is needed.



The Solution: Spectrum's Multipin Connectors are available with four (4), seven (7), eight (8), ten (10), twelve (12) and twenty-three (23) coaxial inserts (terminating the coaxial cable assemblies) at the Multipin end, connecting all the coaxial cable assemblies at once and in seconds with no need of a torque wrench, no need for safety wires and using minimum space.

24 cable assemblies in 2 connectors, safely connected and disconnected within seconds.



Circular Multiports

The traditional RF Multipin Connector SQ-8, per MIL-DTL-38999, Series III

The traditional model is the SQ-8 Multipin Connector using the circular size 21 shell per MIL-DTL-38999 Series III, supplied with eight (8) coaxial microwave inserts, terminating always one end of each cable assembly. As the inserts are spring loaded and use a bayonet catch, the cable assemblies can be inserted and replaced in seconds. The inserts were designed for Spectrum's Type 11 and Type 43 cables. The SQ-8 does not mate with the TQ-, IQ-, BQ or CQ-Series.

RF Multipin Connectors TQ- & IQ- Series, per MIL-DTL-38999, Series III

The new TQ-Series Multipin Connectors are using the circular size 21 shell per MIL-DTL-38999 Series III with four (4) or eight (8) inserts and size 25 with seven (7), ten (10) or twelve (12) inserts allowing the use of four different cables, Type 11, Type 43, Type 100 and Type 141, depending on flexibility and/or loss needed.

The new IQ-Series Multipin Connectors are almost identical with the TQ-series, with one major difference: The outer conductors of the coaxial lines and the connector shell do not use the same ground. So the coaxial lines can be guided in a metal hose, netmesh or armor, for lightening protection. TQ- and IQ-Series do mate with each other.

Circular Multiports

RF Multipin Connectors BQ- & CQ- Series, per MIL-DTL-38999, Series I

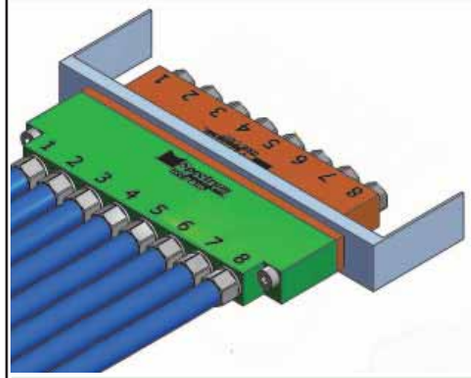
The new BQ-Series Multipin Connectors are almost identical with the TQ-Series. The only difference is in the shell. The BQ-Series do use the Bayonet catch shell per MIL-DTL-38999 Series I instead of the thread on shell per MIL-DTL-38999 Series III.

The new CQ-Series Multipin Connectors are almost identical with the BQ-Series, having one major difference: The outer conductor of the coaxial cable assemblies and the connector shell per MIL-DTL-38999 series 1 are not using the same ground. The coaxial lines can be guided in a metal hose, net mesh or armor, connected to the shells for lightening protection. TQ-,IQ-, BQ-, and CQ-Series mate with each other.

Rectangular Multiports

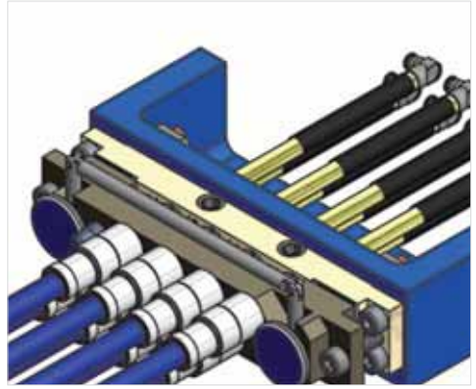
The RQ- Multiport Connectors are using a rectangular shells, developed by Spectrum Elektrotechnik GmbH, allowing dense packaging. The operating frequency depends on the inserts for frequencies to 65 GHz. Details can be seen at pages 54 to 67

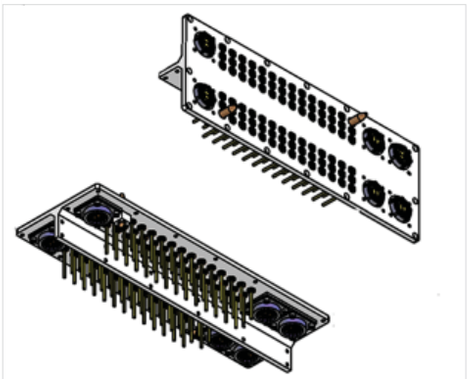
The RQ23-DC26 is employing twenty-three (23) coaxial cable assemblies plus twenty-six (26) signal lines in one connector and has been qualified in an airborne program. Coaxial cable of Type 11 and/or Type 43 and AWG20 wire for the lower frequency signals or supplies are being used. It can be modified for other coaxial cables.



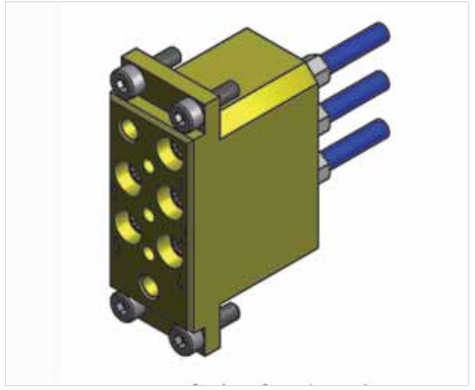
This RQ-8 design is using 8 coaxial connectors in-line in a very narrow package (7mm).

This RQ-8 with quick connect/release mechanism employs 8 coaxial lines in a Honeycomb package for space advantage





The most dense packaging ever proposed for a program, 80 coaxial connections and 120 signal lines.



Multiport Connector with 5 coaxial connections is operating to 40 GHz.

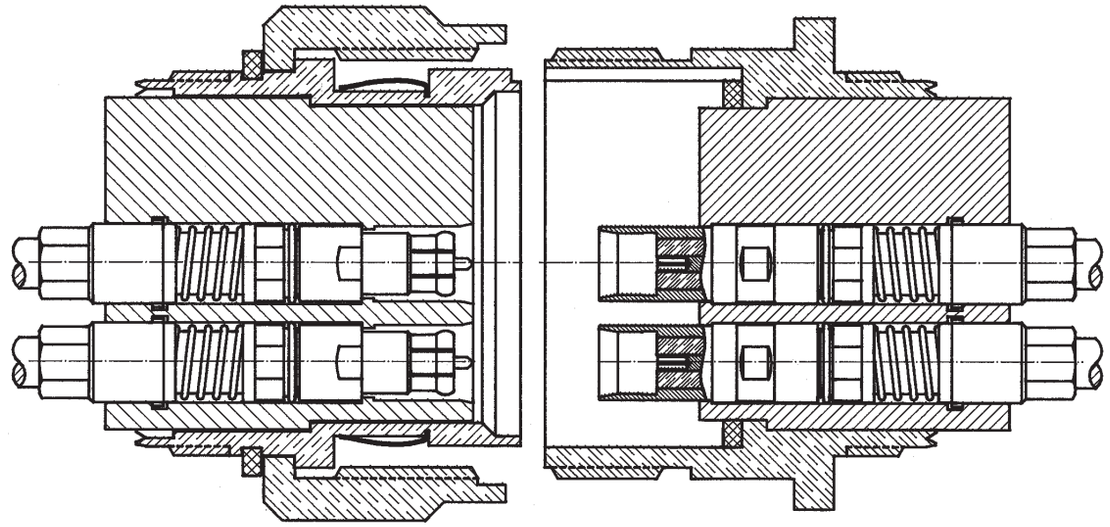
SQ-8

FEATURES

* **SHELLS:**
  per MIL-DTL-38999 Series III, sizes 21

* **CONNECTOR TYPES:**
  Male
  Female Four Hole Flange
  Bulkhead Feedthrough Jack

* **INSERTS (to be specified with the Cable Assemblies):**
  Spring loaded

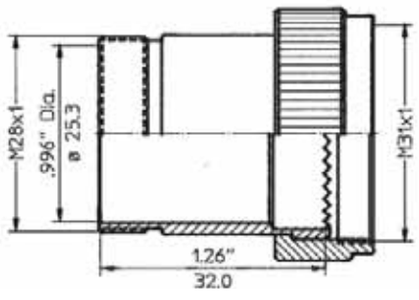


The cross section view demonstrates the perfect engineering that has lead to the success of the SQ-8: Every cable assembly terminated with an SQ-8 Insert can be replaced in minimum time by simply engaging/disengaging a bayonet catch. The inserts are spring loaded for blind mating / self alignment purposes. The outer conductor of the female insert protrudes 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.

SQ-8 Standard Back Body

SQ-8 Back Standard Body Part Number	Surface Treatment
BPSQ-2101-07	Black anodized
BPSQ-2101-15	Nickel plated

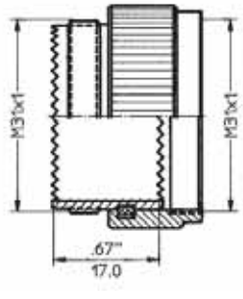
Material of Back Body is aluminium



SQ-8 Adapter Back Body

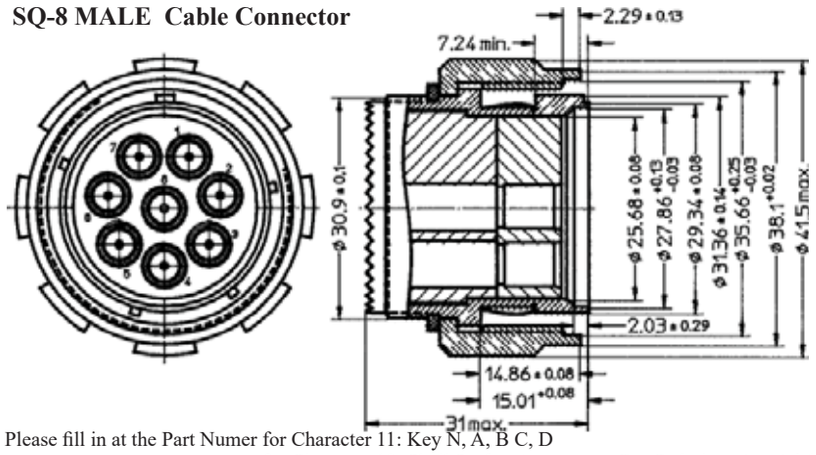
SQ-8 Back Standard Body Part Number	Surface Treatment
BPSQ-2102-07	Black anodized
BPSQ-2102-15	Nickel plated

Material of Back Body is aluminium



Interface Mating Dimensions (Per MIL-DTL-38999, Series III, Shell Size 21)

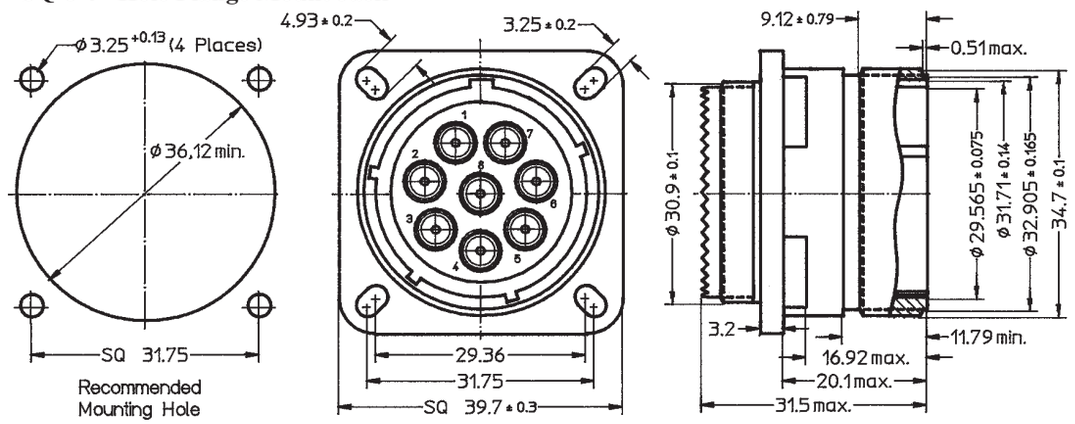
SQ-8 MALE Cable Connector



The Connector Part Number consists of 12 Characters. Please refer to Page 84 for explanation.

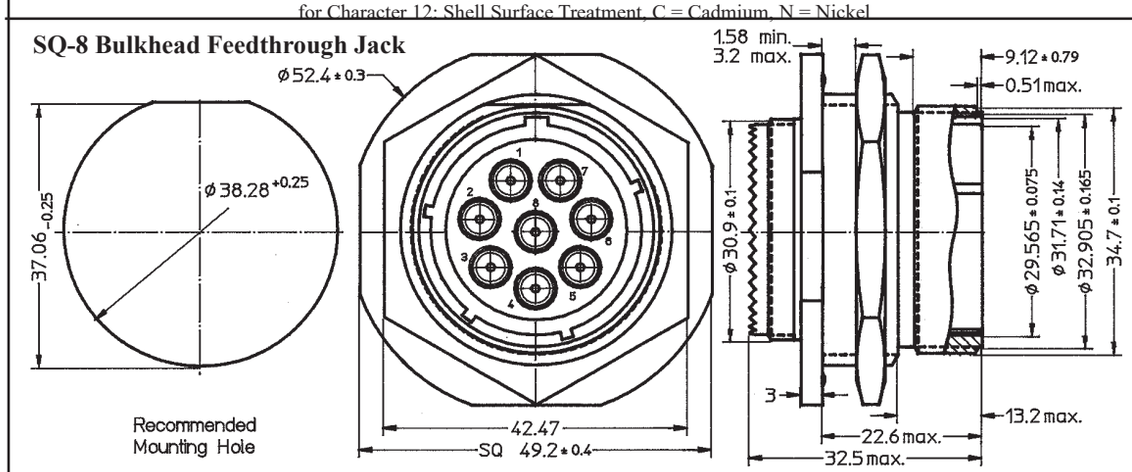
Please fill in at the Part Numer for Character 11: Key N, A, B C, D
for Character 12: Shell Surface Treatment, C = Cadmium, N = Nickel

SQ-8 4 - Hole Flange Mount Jack



Please fill in at the Part Numer for Character 11: Key N, A, B C, D
for Character 12: Shell Surface Treatment, C = Cadmium, N = Nickel

SQ-8 Bulkhead Feedthrough Jack



Please fill in at the Part Numer for Character 11: Key N, A, B C, D
for Character 12: Shell Surface Treatment, C = Cadmium, N = Nickel

SPECIFICATIONS OF THE SQ - 8 INSERTS

ELECTRICAL

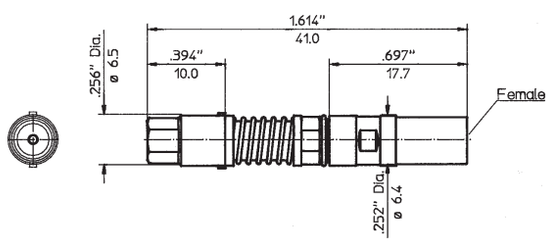
Frequency Range	DC - 24.0 GHz min., DC - 40.0 GHz optional.
Insulation Resistance	The insulation resistance shall not be less than 5,000 megohms.
Voltage Standing Wave Ratio (VSWR)	1.02 + .005 * f (GHz)
Contact Resistance	The center contact resistance drop shall not exceed 3.0 milliohms and the outer 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 voltage is 670 volts rms at 5 MHz.
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.

SQ-8 Insert Female

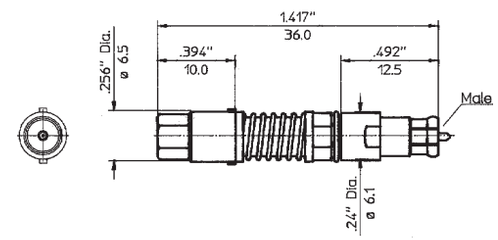
SQ-8 Insert female, P/N	Connector Code	Cable Type
SQ15-2101-02	QF	11



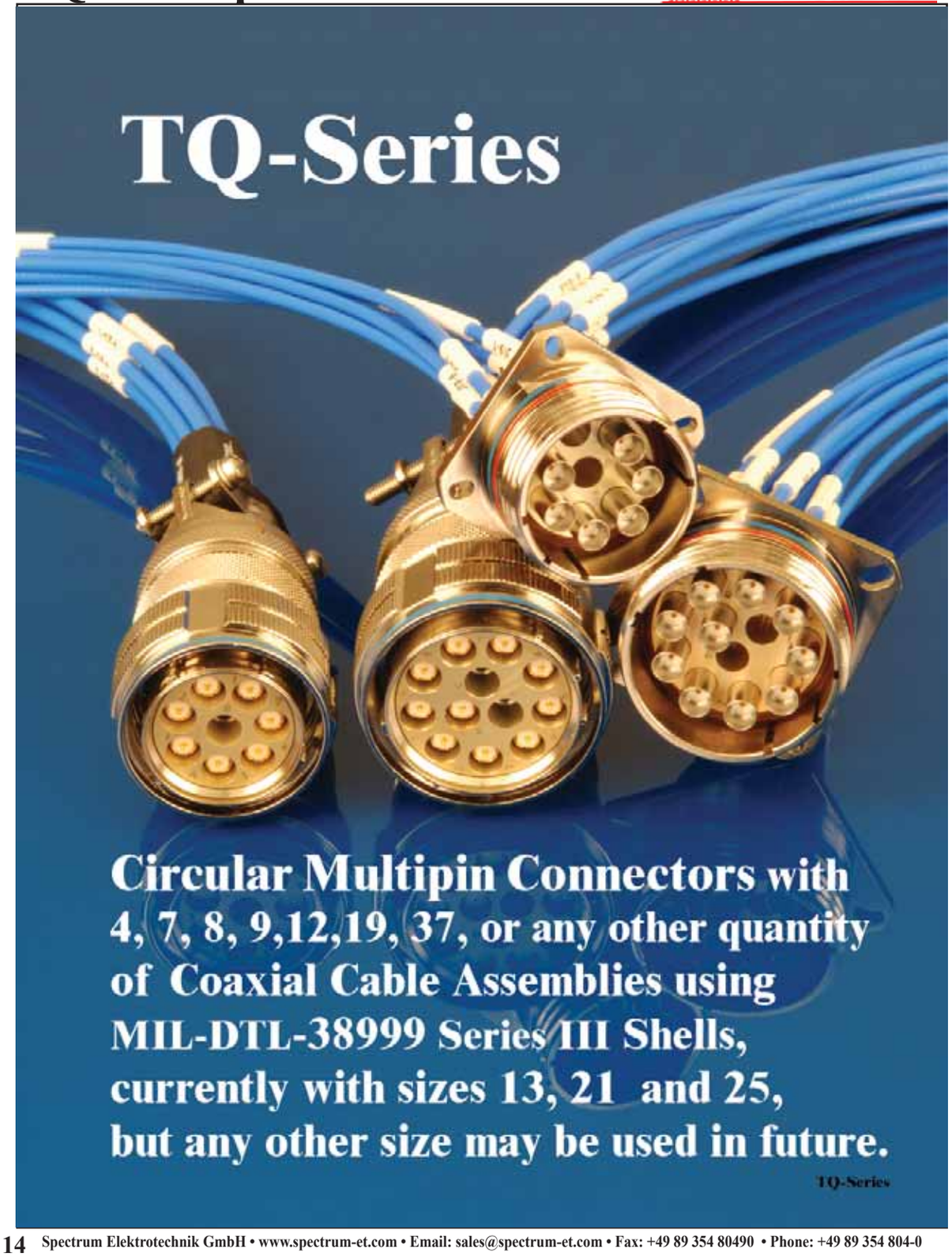
Connector outer conductor is passivated stainless steel.
Center contact is beryllium copper gold plated.
Dielectric is PTFE.

SQ-8 Insert Male

SQ-8 Insert male, P/N	Connector Code	Cable Type
SQ15-1102-02	QM	11



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

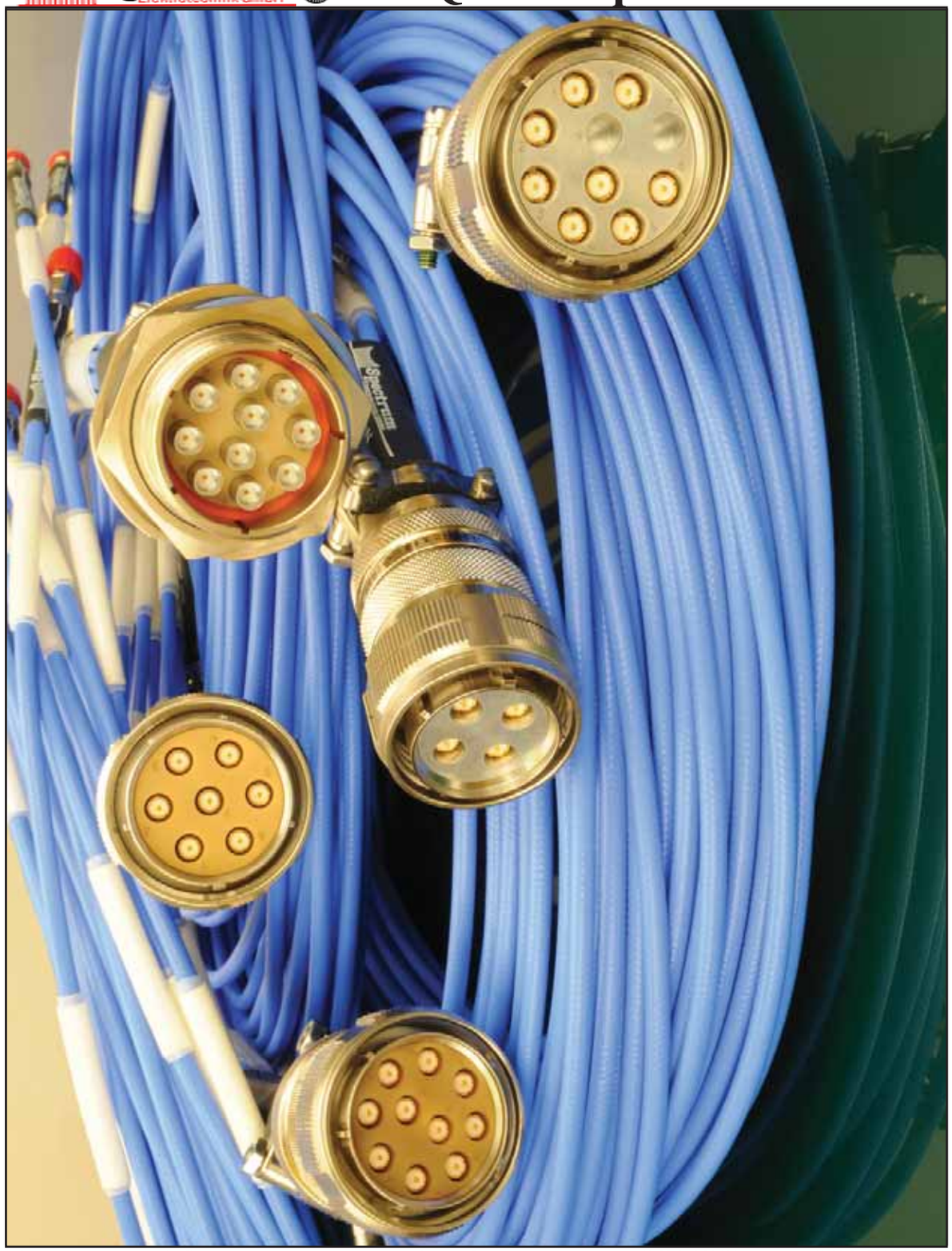


TQ- Multiport Assemblies

TQ- Multiport Assemblies

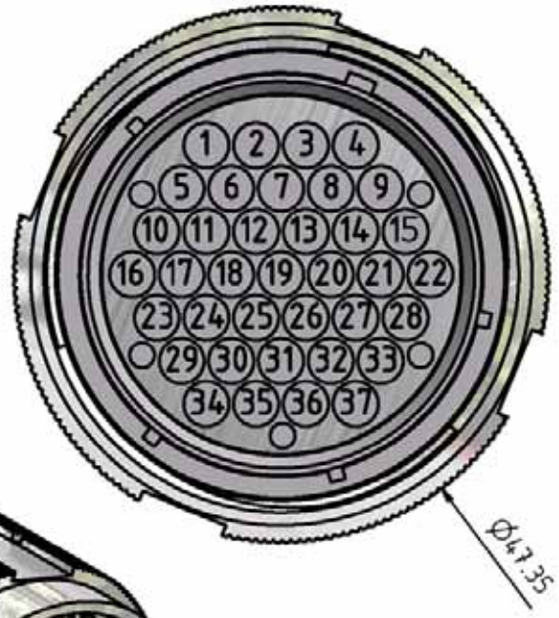
Spectrum Elektrotechnik GmbH

TQ- Multiport Assemblies



TQ-09 Multiport
DC to 65.0 GHz

TQ-19 Multiport
DC to 65.0 GHz

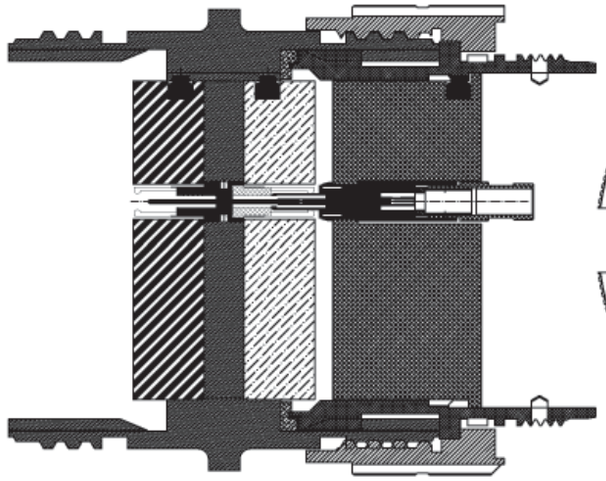


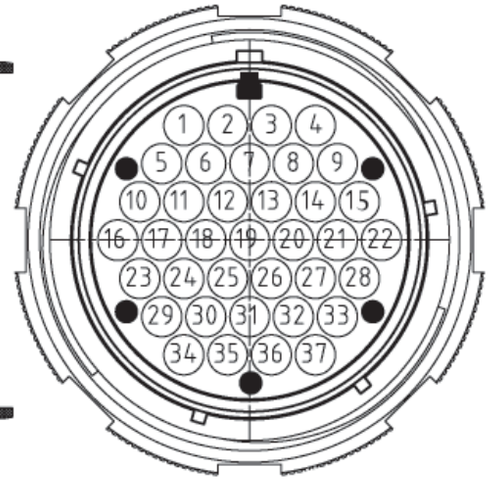
TQ-37

in a MIL-DTL-38999
Series III Shell, Size 25

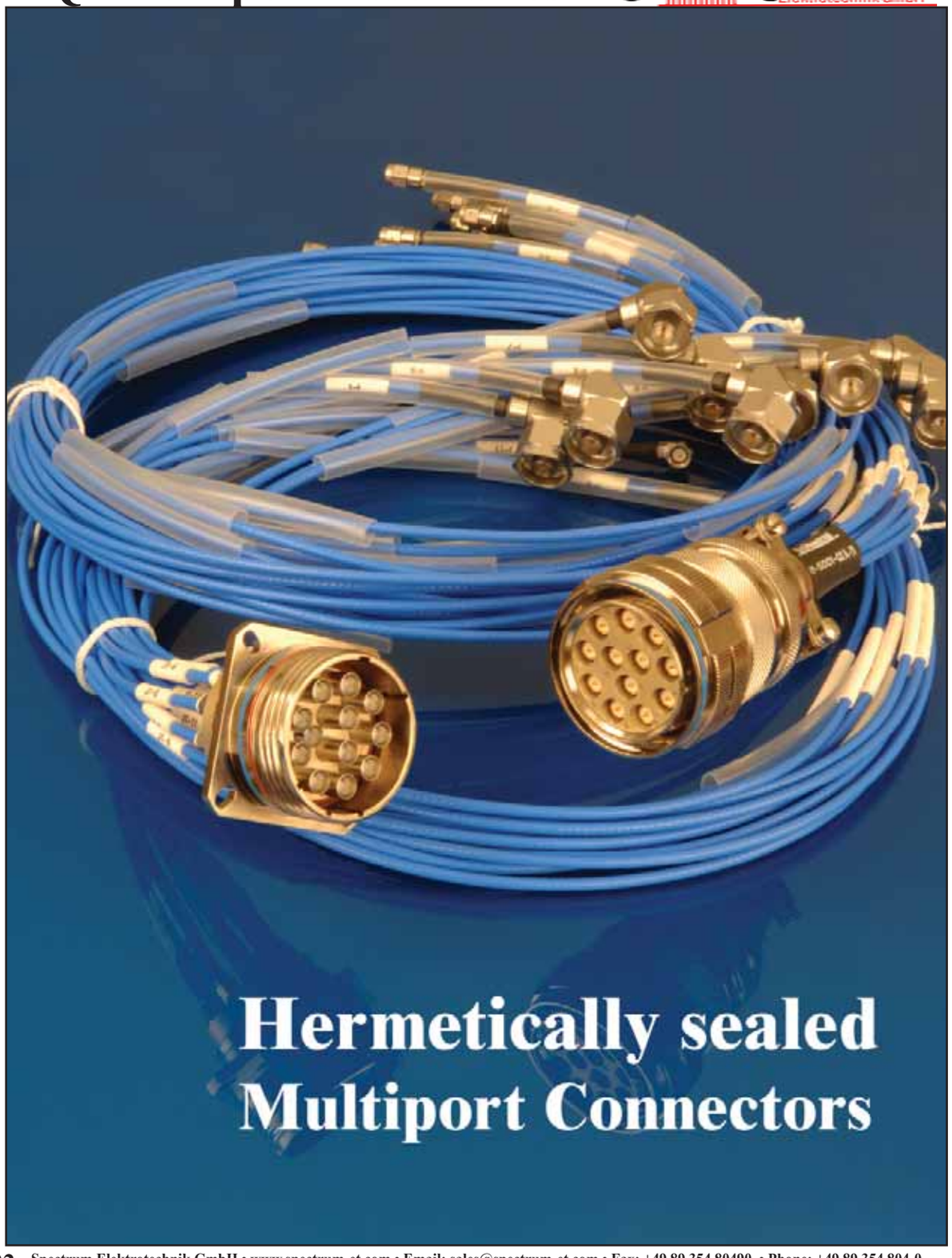
The TQ-37:

This is a new design, quoted for a program that needs 37 cable assemblies in one DTL-38999 Series III Shell of size 25





Spectrum Elektrotechnik GmbH is an engineering company, the right company to contact, if you need something special.



HQ- Multiport Assemblies

HQ-Series

The TQ-Series and the HQ-Series are identical with just one major difference, the Hermeticity.

HQ-Series:
The coaxial cable assemblies in the MIL-DTL-38999 shell are hermetically sealed in the outer conductor of the female shell.

The circular female connector, either as Bulkhead Feedthrough, or 4-Hole Flange can have minimum 4 cable assemblies and currently maximum 12 , but in future probably up to 37 cable assemblies.

The female MIL-DTL-38999 shell can be mounted in the skin of the Vacuum Chamber and makes the need of hermetically sealed adapters unnecessary.

MQ-SeriesArt

IQ-Series

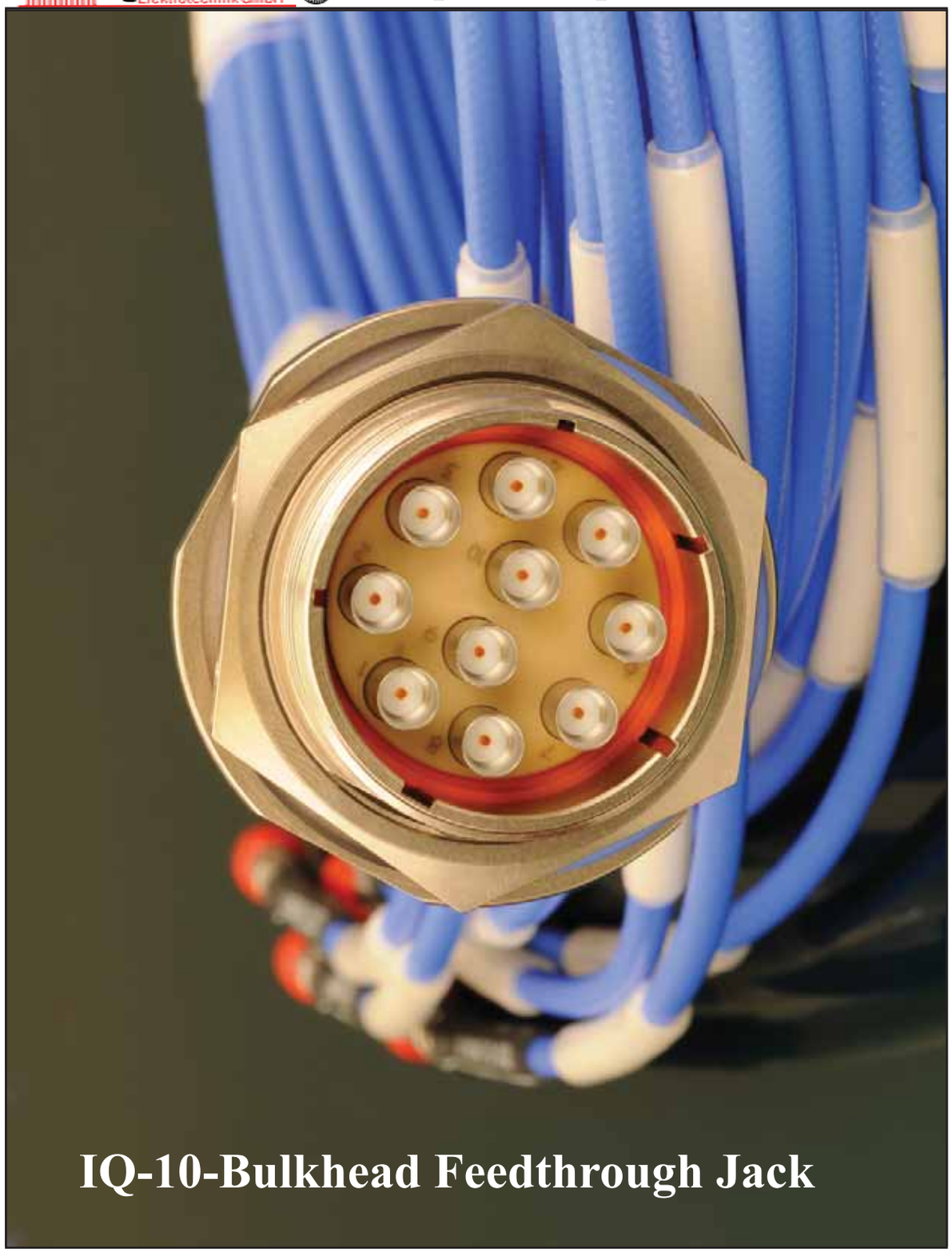
The TQ-Series and the IQ-Series are identical with just one major difference, the grounding of the assemblies.

TQ-Series:
The connector Body of the MIL-DTL-38999 shell and the outer conductors of the coaxial cable assemblies are using one common ground.

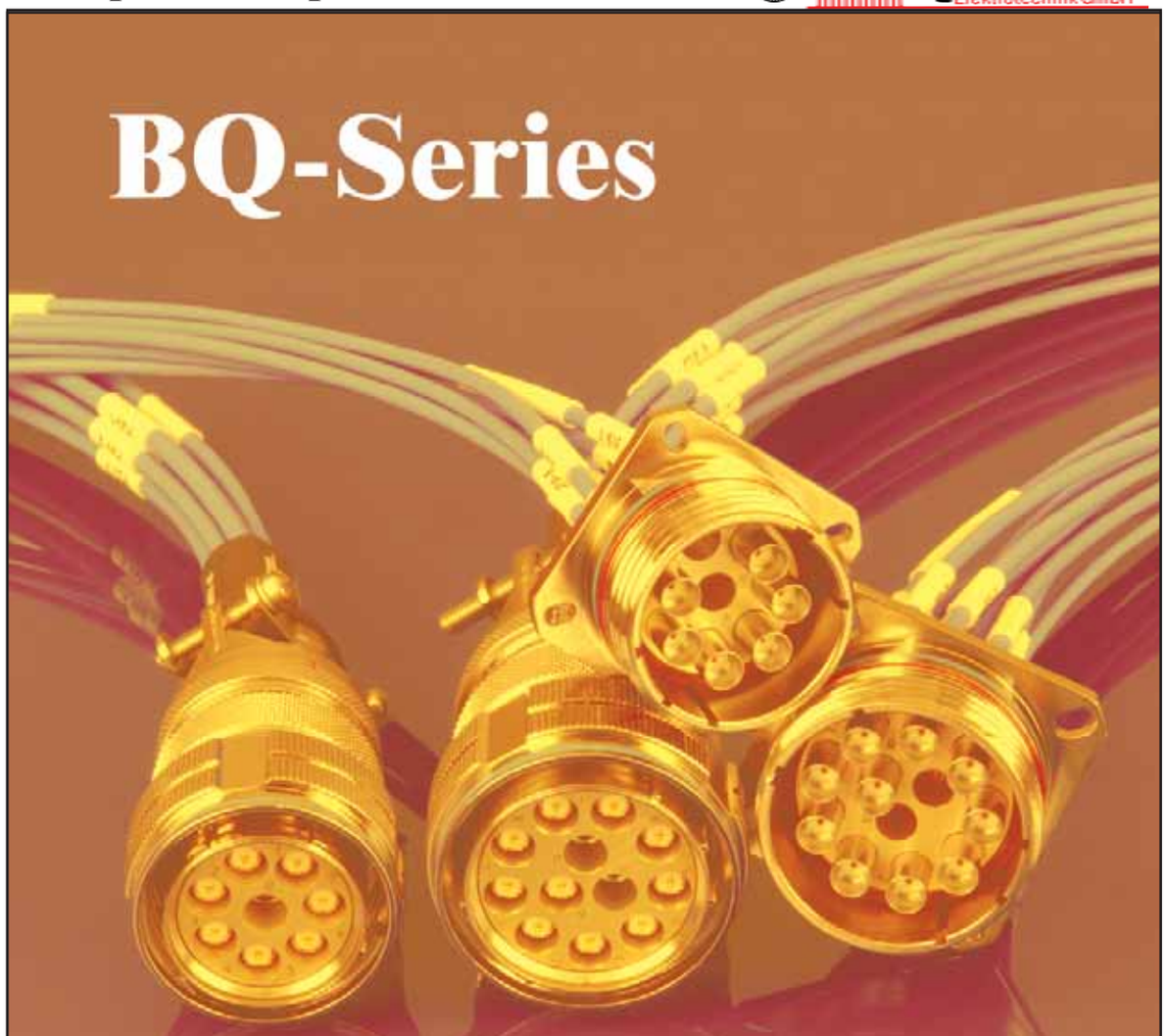
IQ-Series:
The connector Body of the MIL-DTL-38999 shell and the outer conductors of the coaxial cable assemblies are insulated from each other. Guiding the coaxial lines in metal armor or net mesh will protect the coaxial signal lines from lightening or other influences. In this case the harness is a Triax assembly

The Inserts used in the TQ- and IQ-Series are identical, as seen on pages 72ff of the catalog.


IQ-7 Male


IQ-10-Bulkhead Feedthrough Jack

BQ-Series



Circular Multipin Connectors with 4, 7, 8, 9,12,19, 37, or any other quantity of Coaxial Cable Assemblies using MIL-DTL-38999 Series I Shells, currently with sizes 13, 21 and 25, but any other size may be used in future.

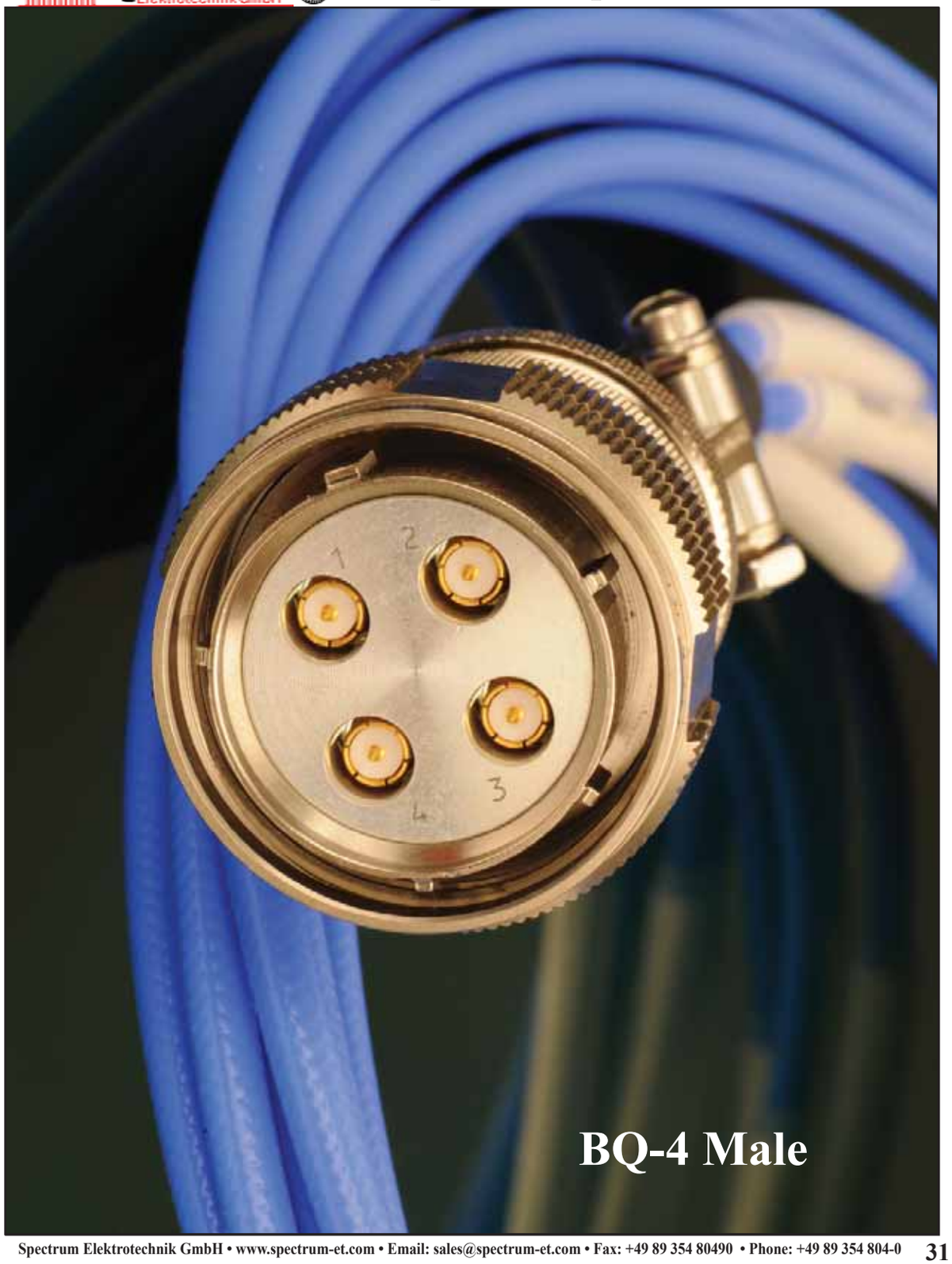
BQ-Series

FEATURES

* **SHELLS:**
  per MIL-DTL-38999 Series I, sizes 21 and 25

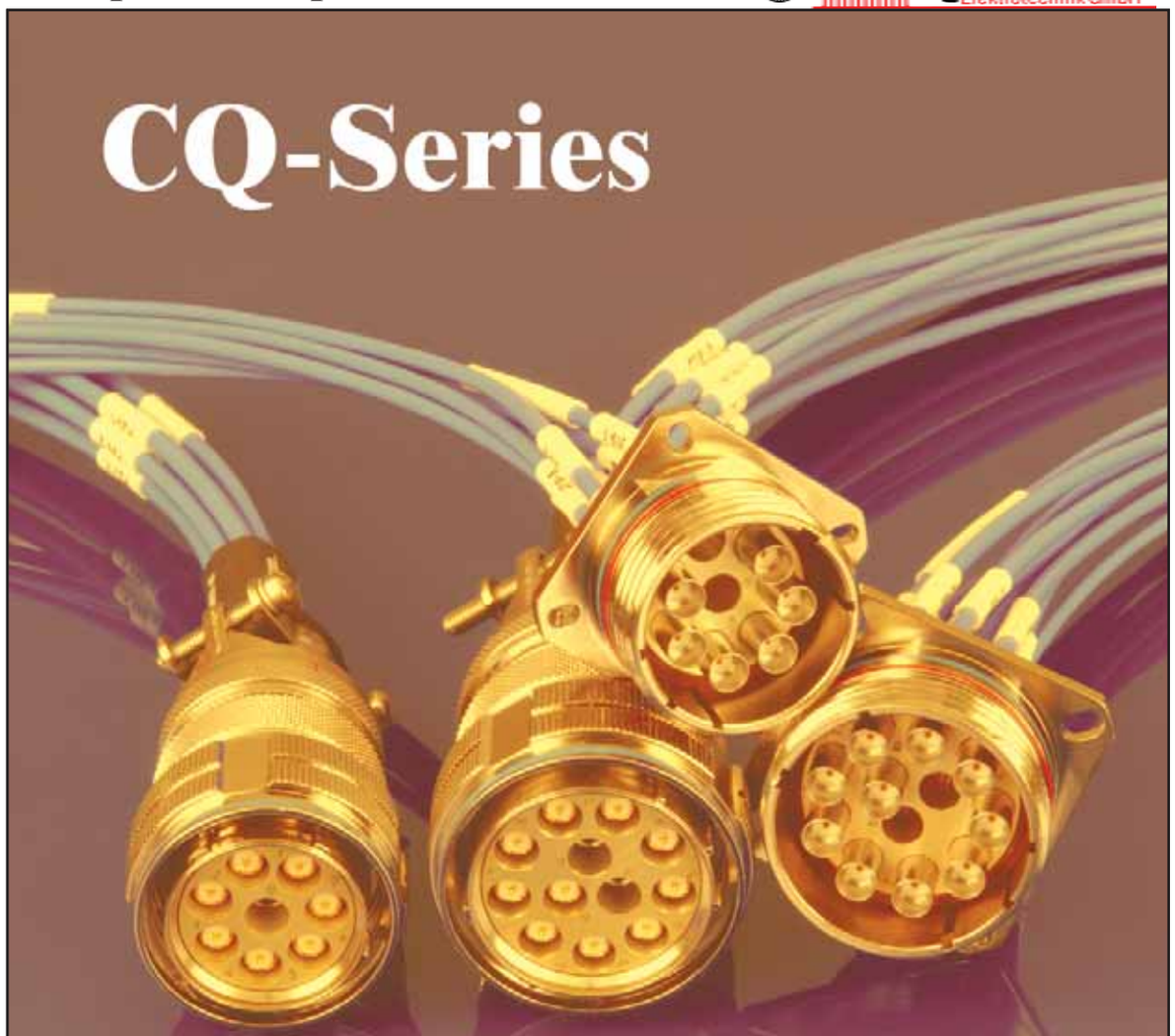
* **CONNECTOR TYPES:**
  Male
  Female Four Hole Flange
  Bulkhead Feedthrough Jack
  and also pressurized versions of the Female Four Hole Flange and the Bulkhead Feedthrough Jack

* **INSERTS (to be specified with the Cable Assemblies):**
  Spring loaded
  Limited spring loaded
  Fixed
  Pressurized



BQ-4 Male

CQ-Series



Circular Multipin Connectors with 4, 7, 8, 9,12,19, 37, or any other quantity of Coaxial Cable Assemblies using MIL-DTL-38999 Series III Shells, currently with sizes 13, 21 and 25, but any other size may be used in future.

CQ-Series

The BQ-Series and the CQ-Series are identical with just one major difference, the grounding of the assemblies.

BQ-Series:
The connector Body of the MIL-DTL-38999 Series I Shell and the outer conductors of the coaxial cable assemblies are using one common ground.

CQ-Series:
The connector Body of the MIL-DTL-38999 Series I Shell and the outer conductors of the coaxial cable assemblies are insulated from each other. Guiding the coaxial lines in metal armor or net mesh will protect the coaxial signal lines from lightning or other influences. In this case the harness is a Triax assembly

In the following we do show some examples of Multiport Connectors, using

- 9 cable assemblies using Shell Size 13
- 4 and 8 assemblies using Shell Size 21
- 4 and 7 assemblies using Shell Size 25
- 10 and 12 assemblies using Shell Size 25
- 19 cable assemblies using Shell Size 25

The examples show Series III connectors, but same configurations are available in Series I.
It is also mentioned in the following examples TQ and IQ - Series, but same applies to BQ- and CQ-Series.

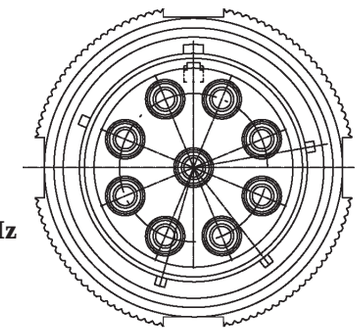
Spectrum Elektrotechnik GmbH is an engineering company. Whatever you need, but is not seen here, please talk to customer service. We even may have it already.

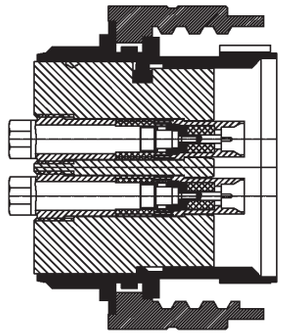
Connectors per MIL-DTL-38999, Series III

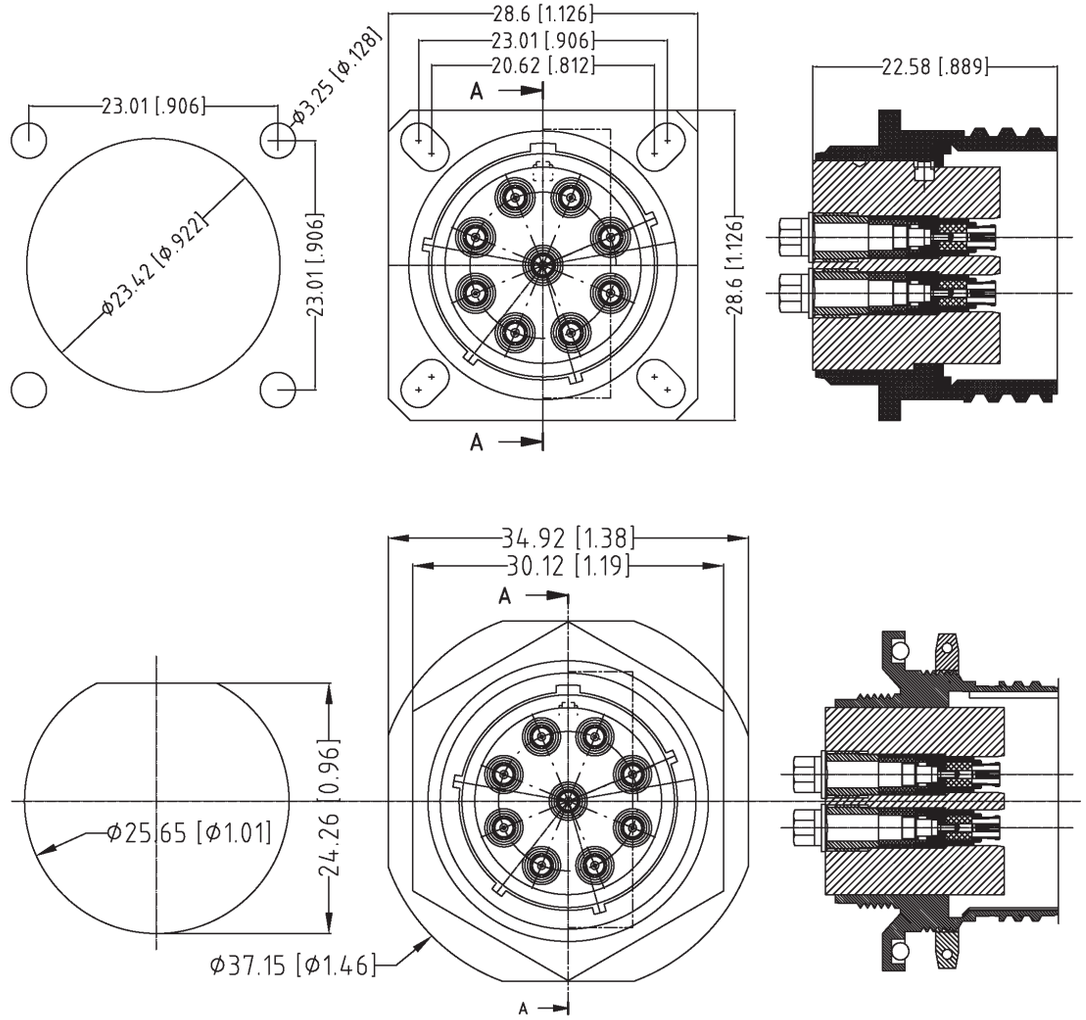
9 Cable Assemblies using either

- **the 2.3 mm cable of Type 677 3.46 dB/m @ 18 GHz;**
- **the 1.4 mm cable of Type 47F 3.46 dB/m @ 18 GHz; 13 dB/m @ 65 GHz**

Cable details and specifications at pages 100 an 103

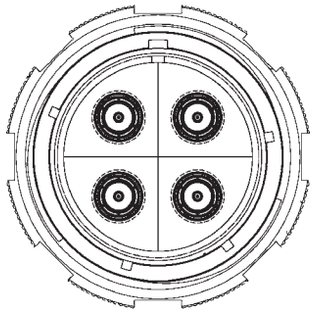


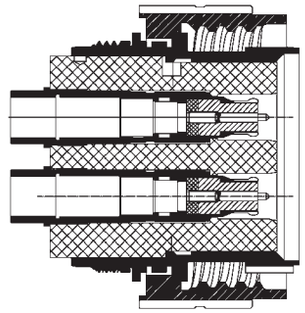




Connectors per MIL-DTL-38999, Series III

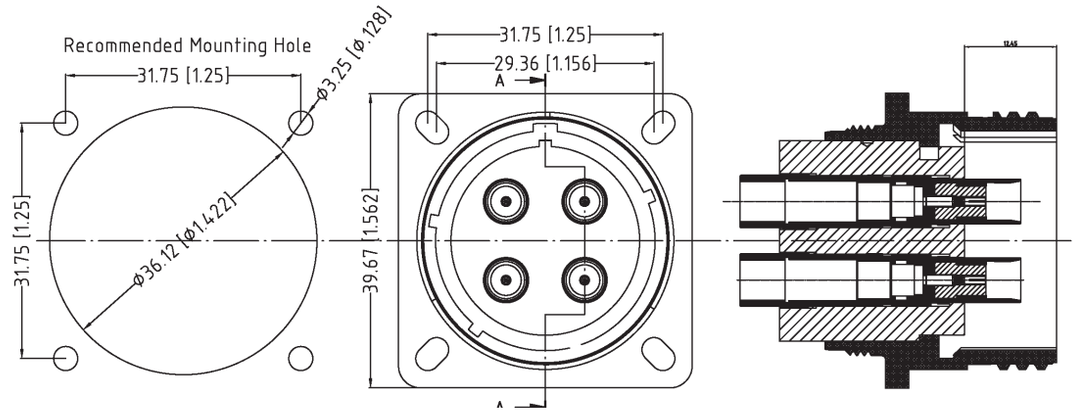
4 Cable Assemblies using either:

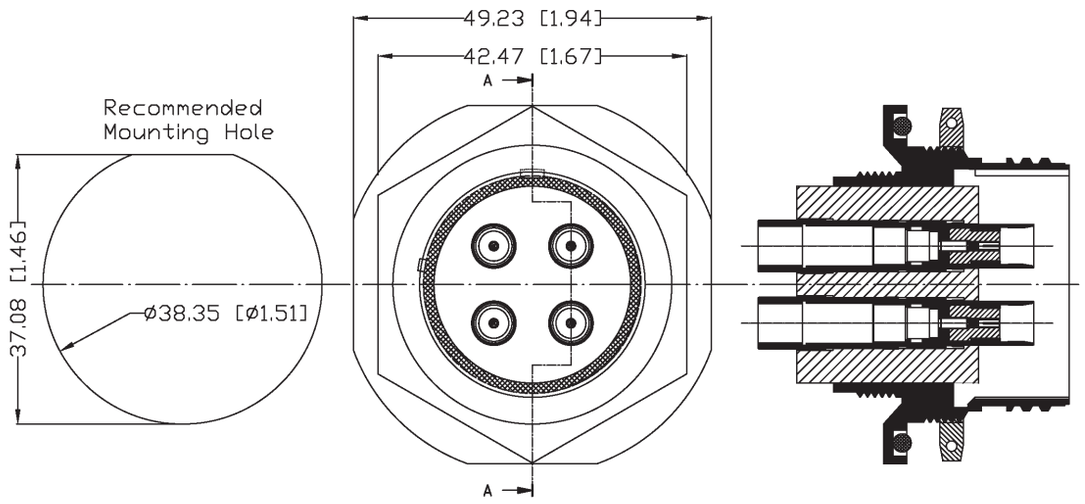




- **the 3.2 mm cable of Type 11**
  2.53 dB/m @ 18 GHz; 3.9 dB/m @ 40 GHz
- **the 4.3 mm cable of Type 43**
  2.12 dB/m @ 18 GHz; 2.6 dB/m @ 26.5 GHz
- **the 5.2 mm cable of Type 100**
  1.2 dB/m @ 18 GHz; 1.48/m dB @ 26.5 GHz

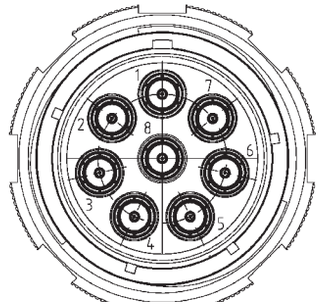
Cable details and specifications at pages 98, 99 and 100

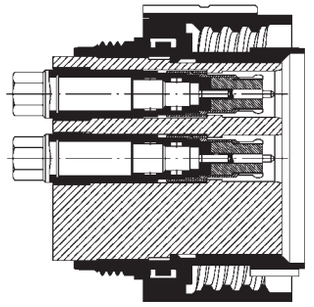




Connectors per MIL-DTL-38999, Series III

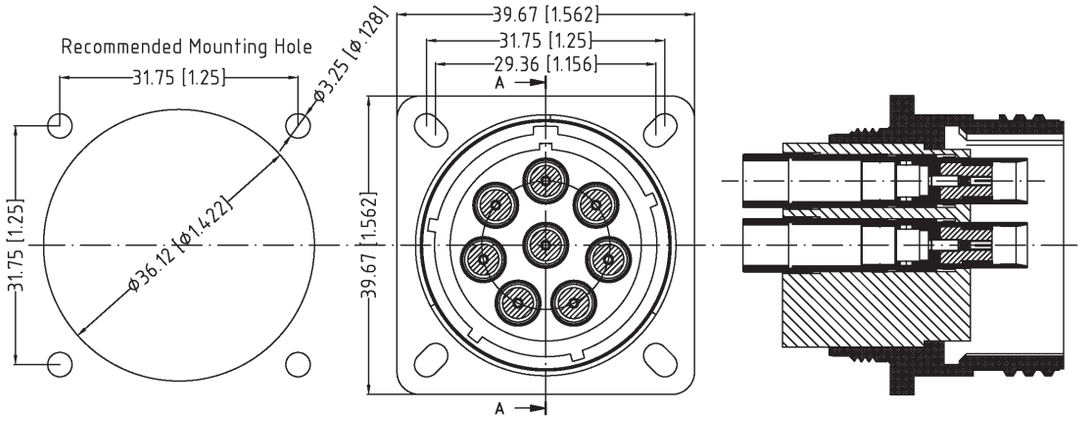
8 Cable Assemblies using either:

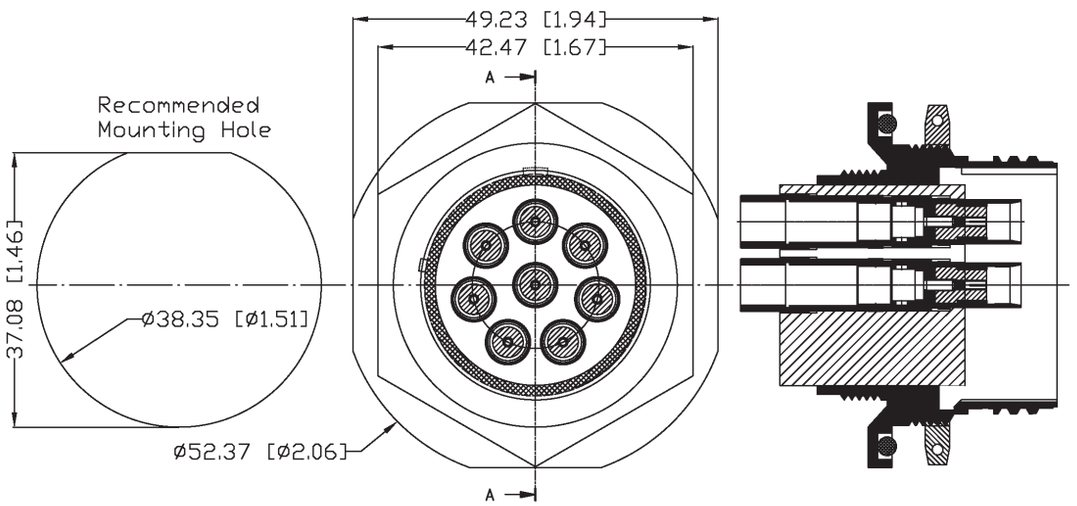




- **the 3.2 mm cable of Type 11**
  2.53 dB/m @ 18 GHz; 3.9 dB/m @ 40 GHz
- **the 4.3 mm cable of Type 43**
  2.12 dB/m @ 18 GHz; 2.6 dB/m @ 26.5 GHz

Cable details and specifications at pages 98 an 99



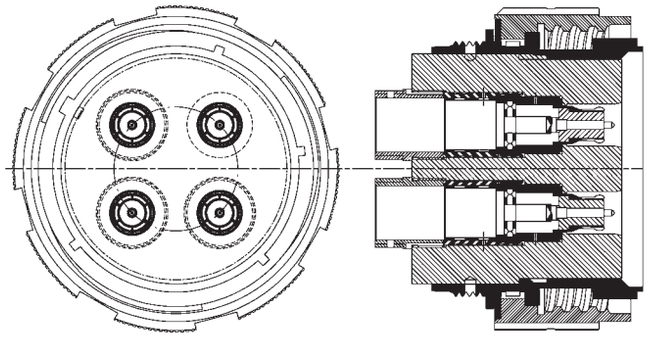


Connectors per MIL-DTL-38999, Series III

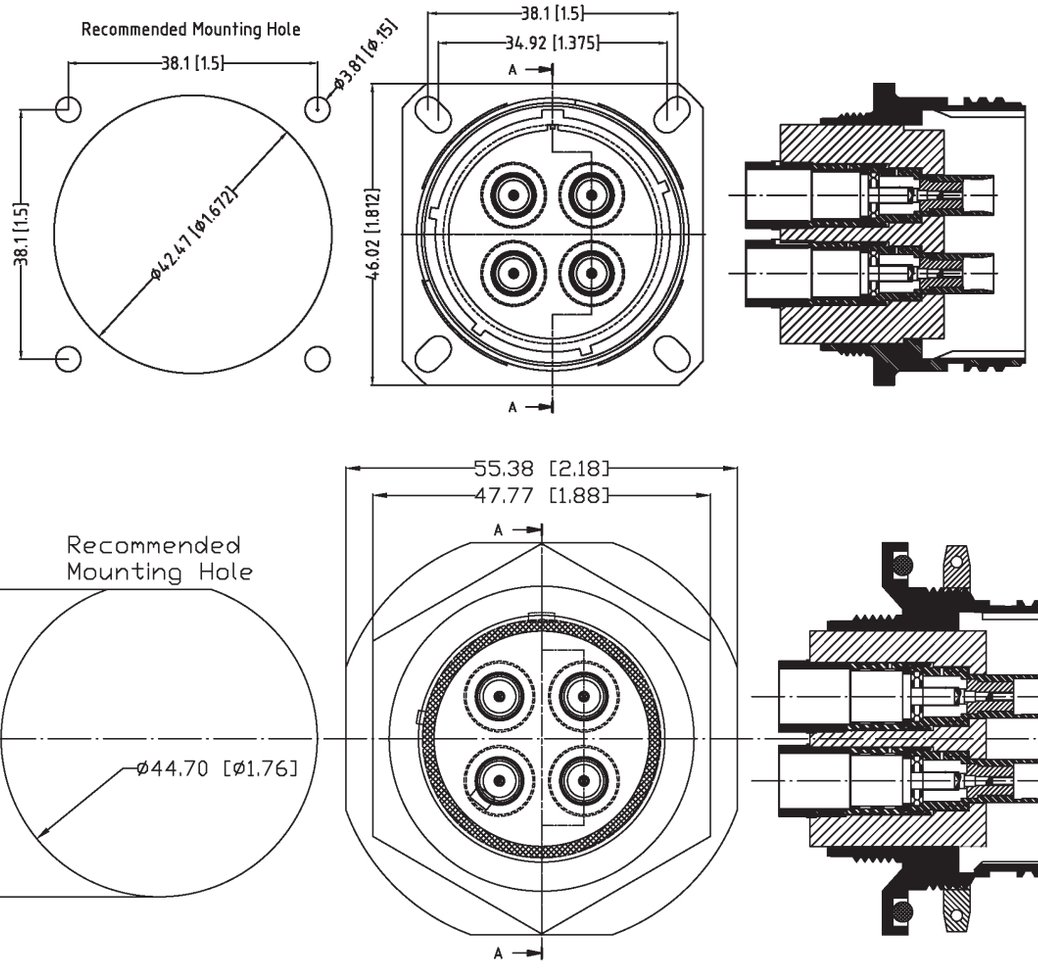
4 Cable Assemblies

using either:

- the 7.75 mm cable of Type 141
  0.66 dB/m @ 18 GHz;
- the 5.2 mm cable of Type 100
  1.2 dB/m @ 18 GHz; 1.48 dB/m @ 26.5 GHz
- the 4.3 mm cable of Type 43
  2.12 dB/m @ 18 GHz; 2.6 dB/m @ 26.5 GHz
- the 3.2 mm cable of Type 11
  2.53 dB/m @ 18 GHz; 3.9 dB/m @ 40 GHz



Cable details and specifications at pages 98, 99, 101 and 103

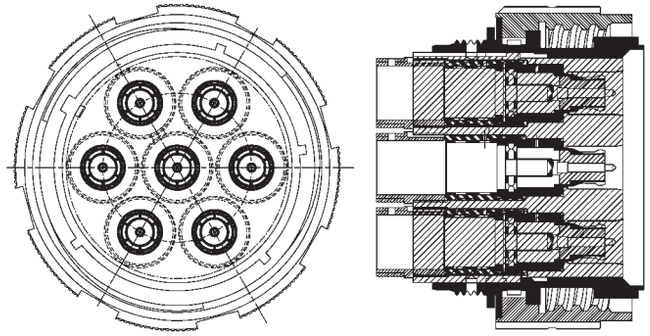


Connectors per MIL-DTL-38999, Series III

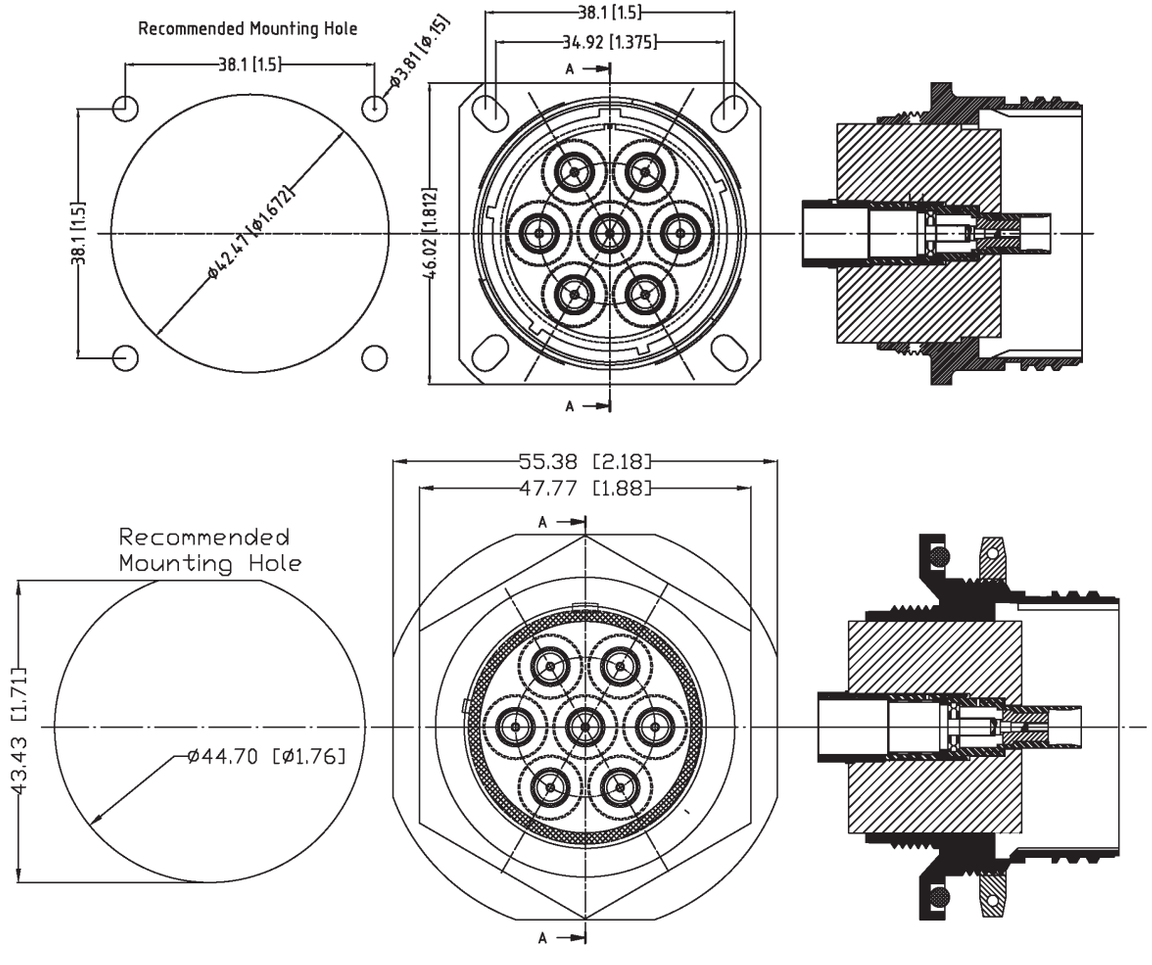
7 Cable Assemblies

using either:

- the 7.75 mm cable of Type 141
  0.66 dB/m @ 18 GHz;
- the 5.2 mm cable of Type 100
  1.2 dB/m @ 18 GHz; 1.48 dB/m @ 26.5 GHz
- the 4.3 mm cable of Type 43
  2.12 dB/m @ 18 GHz; 2.6 dB/m @ 26.5 GHz
- the 3.2 mm cable of Type 11
  2.53 dB/m @ 18 GHz; 3.9 dB/m @ 40 GHz



Cable details and specifications at pages 98, 99, 101 and 103

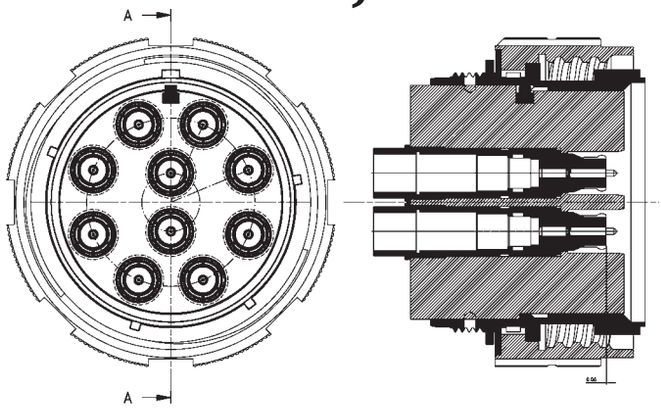


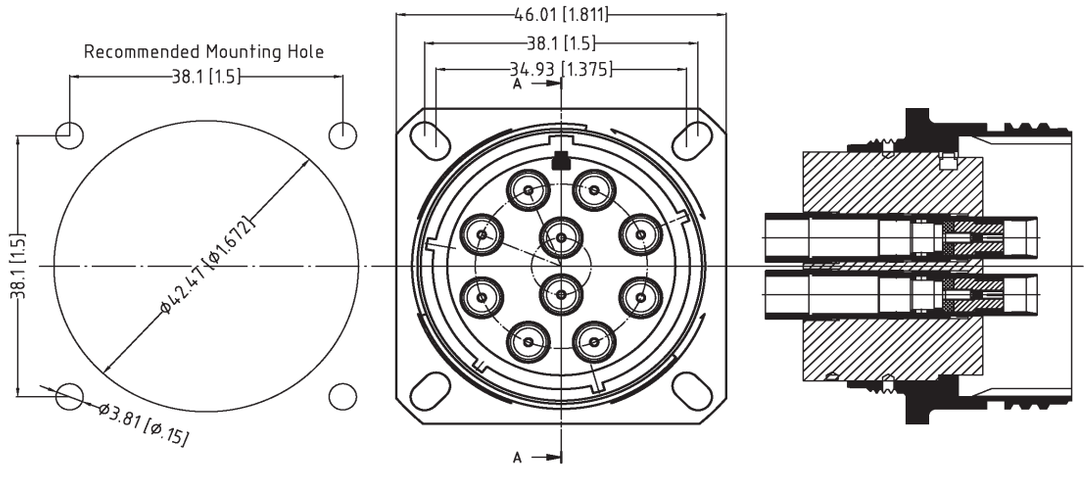
Connectors per MIL-DTL-38999, Series III

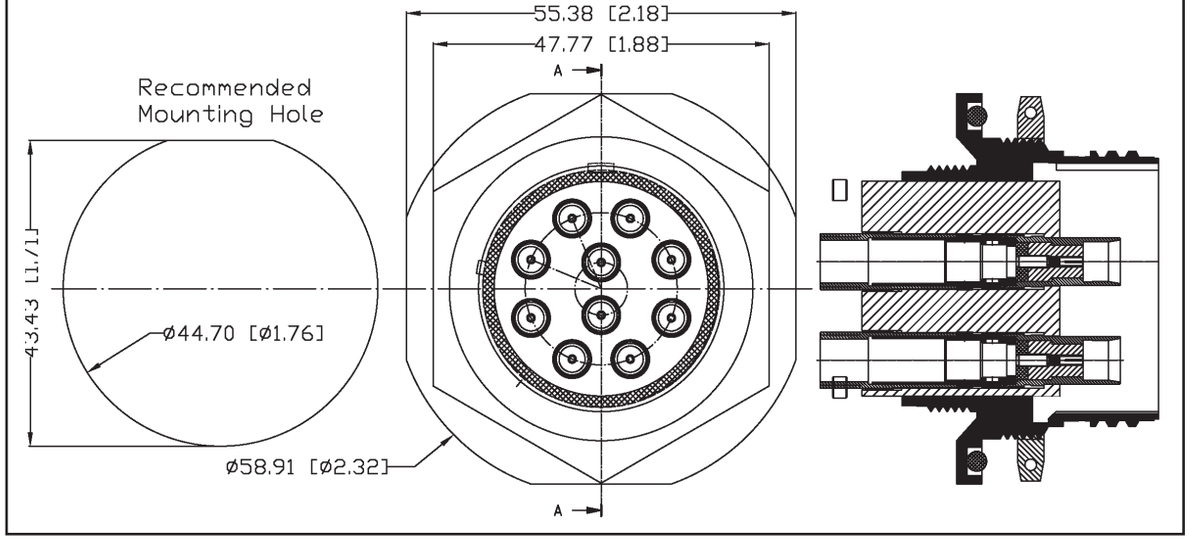
10 Cable Assemblies using either:

- the 5.2 mm cable of Type 100
  1.2 dB/m @ 18 GHz; 1.48 dB/m @ 26.5 GHz
- the 4.3 mm cable of Type 43
  2.12 dB/m @ 18 GHz; 2.6 dB/m @ 26.5 GHz
- the 3.2 mm cable of Type 11
  2.53 dB/m @ 18 GHz; 3.9 dB/m @ 40 GHz

Cable details and specifications at pages 98, 99 and 101





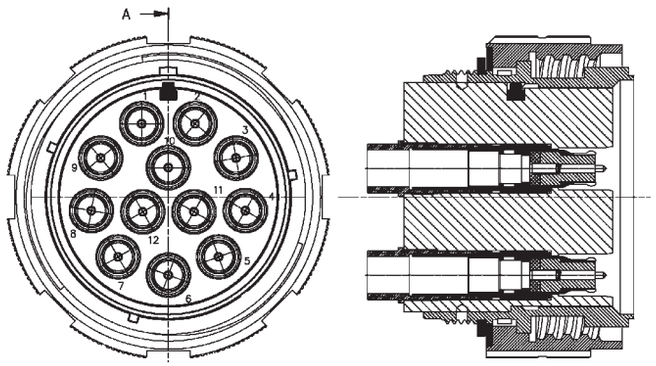


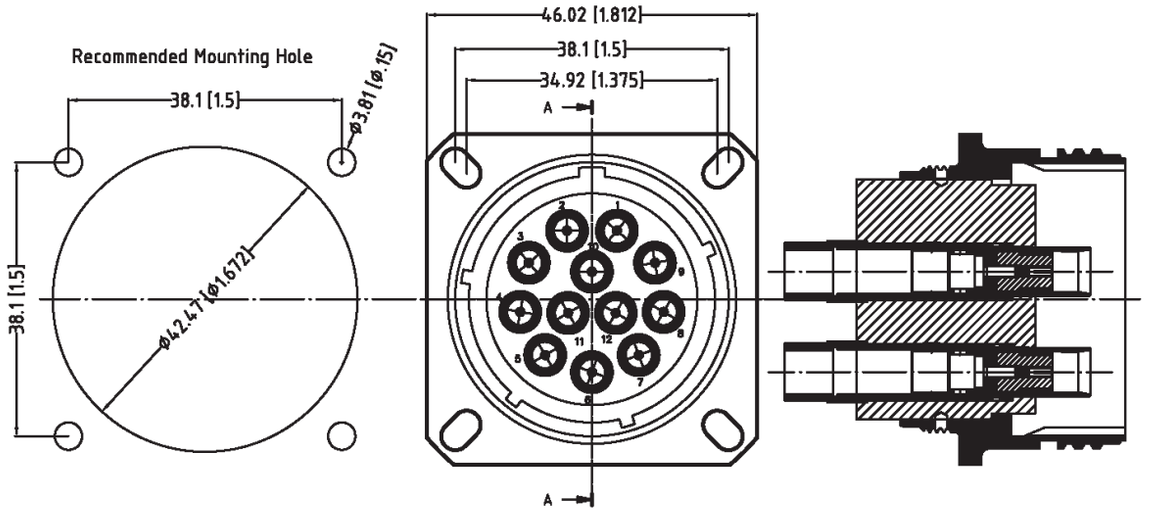
Connectors per MIL-DTL-38999, Series III

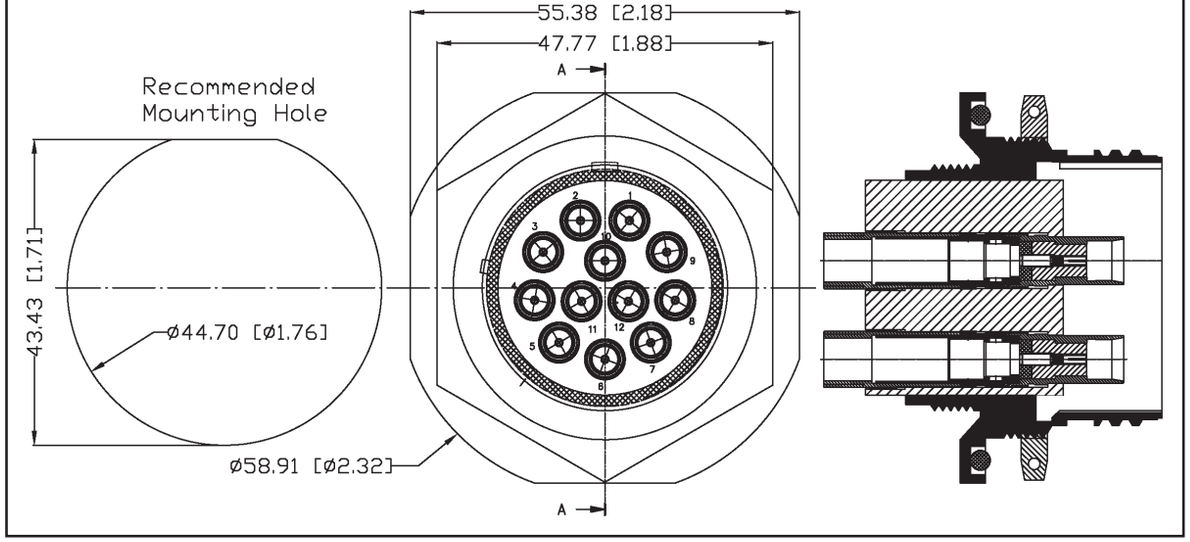
12 Cable Assemblies using either:

- the 4.3 mm cable of Type 43
  2.12 dB/m @ 18 GHz; 2.6 dB/m @ 26.5 GHz
- the 3.2 mm cable of Type 11
  2.53 dB/m @ 18 GHz; 3.9 dB/m @ 40 GHz

Cable details and specifications at pages 98 and 99



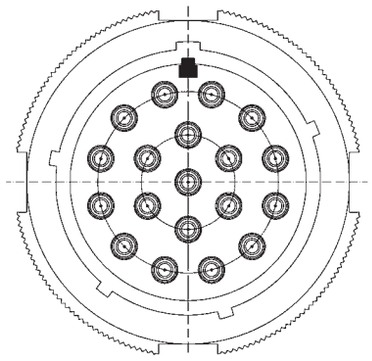


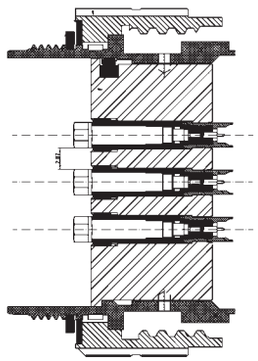


Connectors per MIL-DTL-38999, Series III

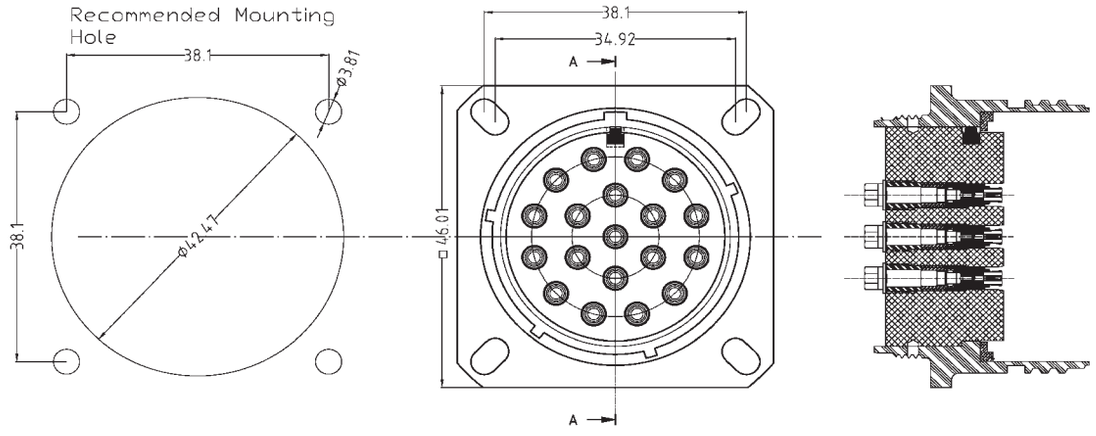
19 Cable Assemblies using either

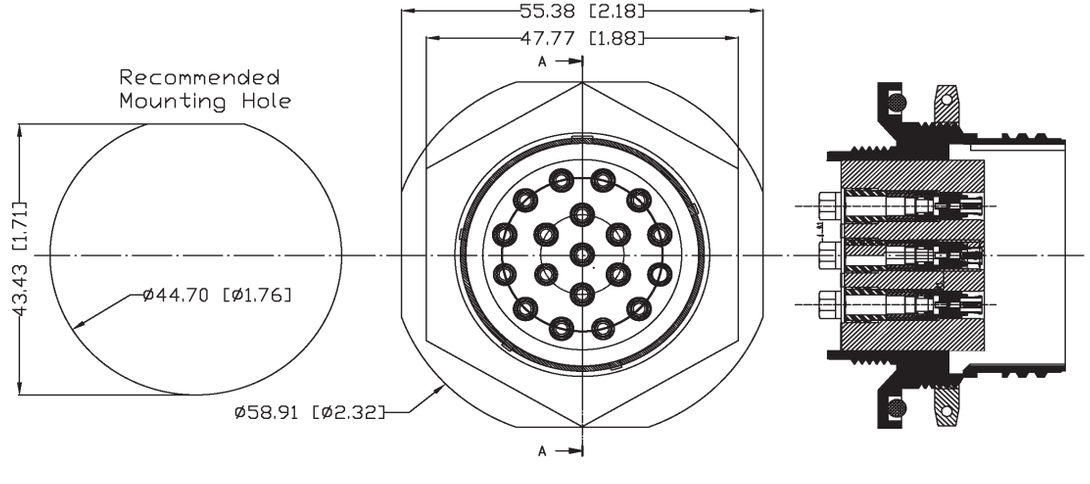
- **the 2.3 mm cable of Type 677 3.46 dB/m @ 18 GHz;**
- **the 1.4 mm cable of Type 47F 3.46 dB/m @ 18 GHz; 13 dB/m @ 65 GHz**

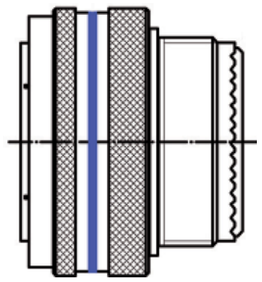


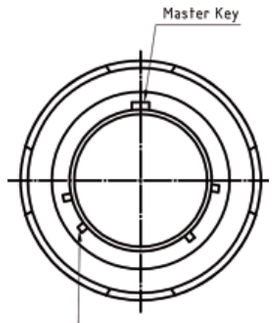


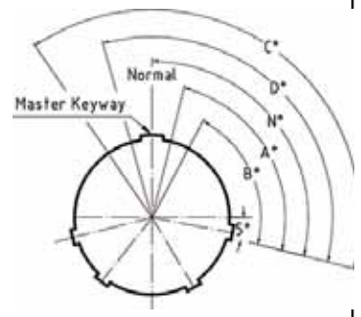
Cable details and specifications at pages 100 and 103

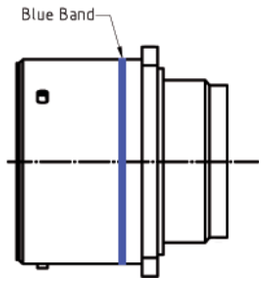


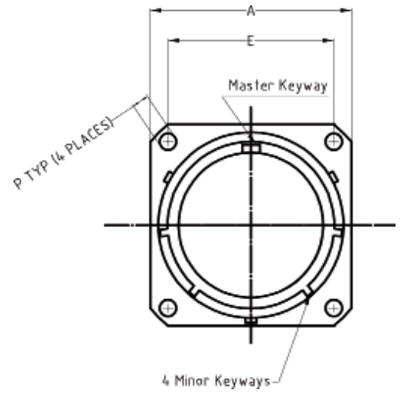


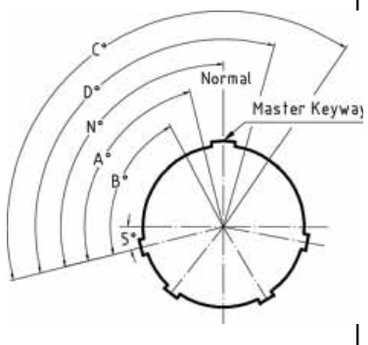


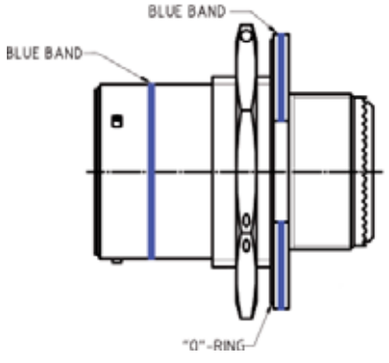


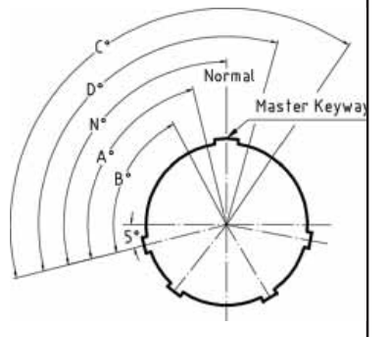








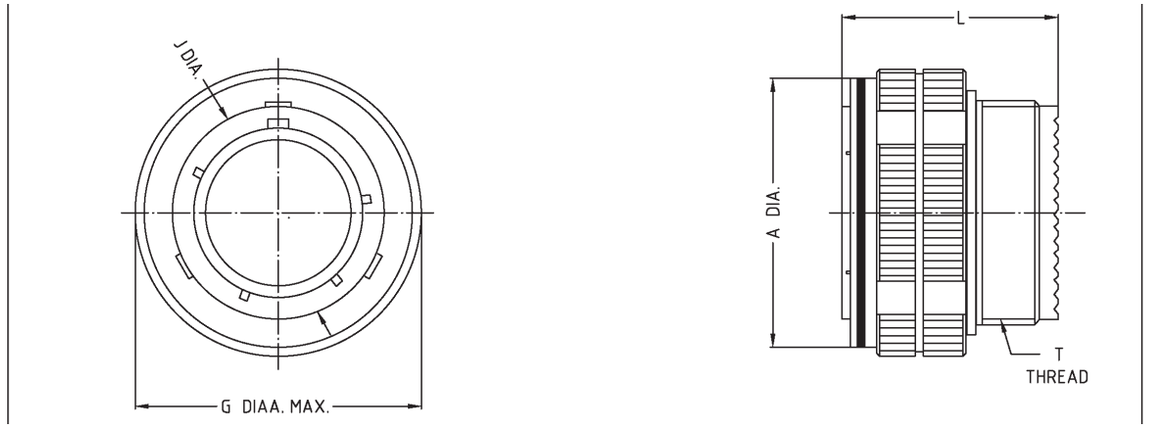




Key	A°	B°	C°	D°
N	80	142	196	293
A	135	170	200	310
B	49	169	200	244
C	66	140	200	257
D	62	145	180	280
E	79	153	197	272

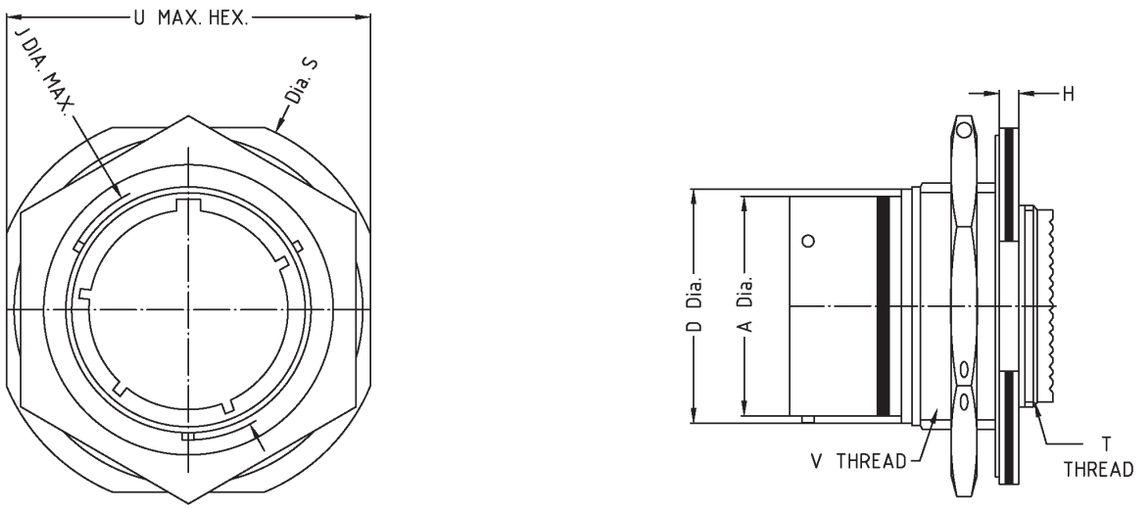
MIL-DTL-38999 Series I Straight Plug Dimensions

Shell Size	A max inch (mm)	G Dia. max. inch (mm)	J Dia. max. inch (mm)	L max. inch (mm)	Thread
13	0.866 (22.00)	1.156 (29.36)	0.760 (19.30)	1.234 (31.34)	11/16-24UNEF-2A
21	1.347 (34.21)	1.641 (41.68)	1.240 (31.50)	1.234 (31.34)	1-3/16-18UNEF-2A
25	1.597 (40.56)	1.891 (48.03)	1.490 (37.85)	1.234 (31.34)	1-7/16-18UNEF-2A



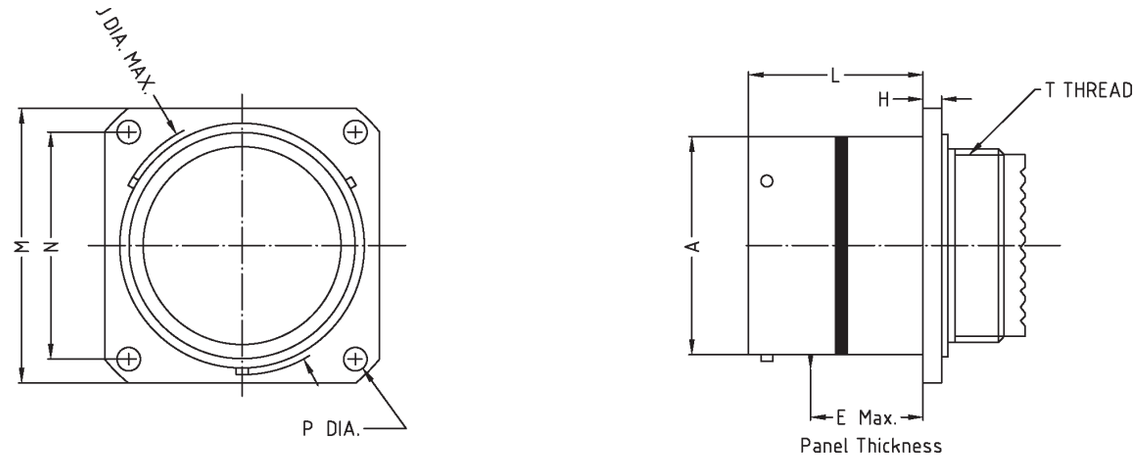
MIL-DTL-38999 Series I Bulkhead Feedthrough Jack Dimensions

Shell Size	A Dia max inch (mm)	D max. inch (mm)	H max. inch (mm)	J Dia. max. inch (mm)	S Dia. max. inch (mm)	T Thread	U Hex.ax. inch (mm)	Thread Class 2A
13	0.851 (21.62)	0.942 (23.93)	0.120 (3.05)	0.960 (24.38)	1.516 (35.51)	11/16-24UNEF-2A	1.205 (30.61)	1-20UNEF
21	1.333 (33.86)	1.441 (36.60)	0.151 (3.84)	1.442 (36.63)	2.078 (52.78)	1-3/16-18UNEF-2A	1.705 (43.31)	1-1/2-18UNEF
25	1.583 (40.21)	1.691 (42.95)	0.151 (3.84)	1.692 (42.98)	2.328 (59.13)	1-7/16-18UNEF-2A	20.17 (51.23)	1-3/4-18UNS



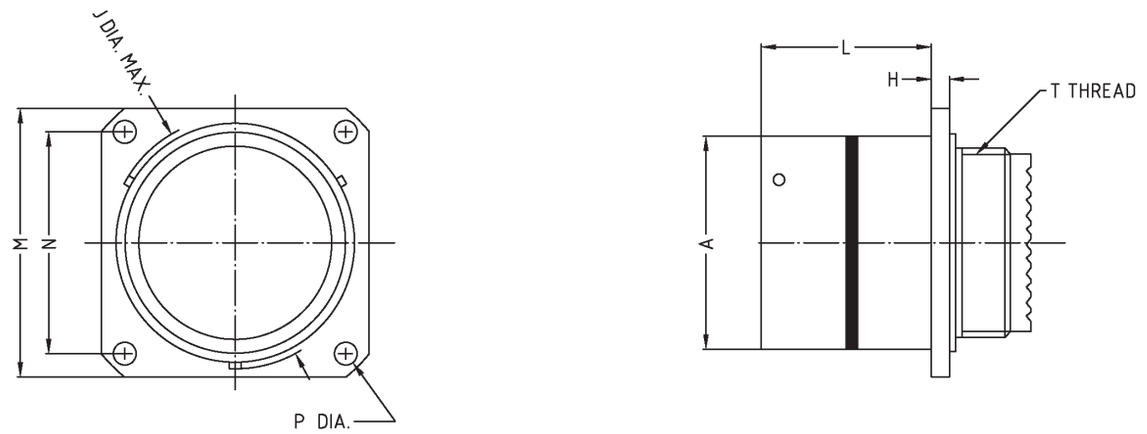
MIL-DTL-38999 Series I Wall Mounting Receptacle (Back Panel) Dimensions

Shell Size	A Dia max inch (mm)	E max. inch (mm)	H Dia. max. inch (mm)	J max. inch (mm)	L max. inch (mm)	M max. inch (mm)	N T.P. inch (mm)	P Dia. max. inch (mm)	Thread
13	0.851 (21.62)	0.234 (5.94)	0.100 (2.54)	0.960 (24.38))	.820 (20.83)	1.145 (29.08)	0.906 (23.01)	0.138 (3.51)	11/16-24UNEF-2A
21	1.333 (33.86)	0.204 (5.18)	0.130 (3.30)	1.442 (36.63)	0.790 (20.07)	1.582 (40.18)	1.250 (31.75)	0.138 (3.51)	1-3/16-18UNEF-2A
25	1.583 (40.21)	0.193 (4.90)	0.130 (3.30)	1.692 (42.98)	0.790 (20.07)	1.832 (46.53)	1.500 (38.10)	0.157 (3.99)	1-7/16-18UNEF-2A



MIL-DTL-38999 Series I Wall Mounting Receptacle (Front Panel) Dimensions

Shell Size	A Dia max inch (mm)	H max. inch (mm)	J Dia. max. inch (mm)	L max. inch (mm)	M max. inch (mm)	N T.P. inch (mm)	P Dia. max. inch (mm)	Thread
13	0.851 (21.62)	0.100 (2.54)	0.960 (24.38)	0.632 (16.05)	1.145 (29.08)	0.906 (23.01)	0.138 (3.51)	11/16-24UNEF-2A
21	1.333 (33.86)	0.130 (3.30)	1.442 (36.63)	0.602 (15.29)	1.582 (40.18)	1.250 (31.75)	0.138 (3.51)	1-3/16-18UNEF-2A
25	1.583 (40.21)	0.130 (3.30)	1.692 (42.98)	0.602 (15.29)	1.832 (46.53)	1.500 (38.10)	0.157 (3.99)	1-7/16-18UNEF-2A



MIL-DTL-38999 Series I Shells

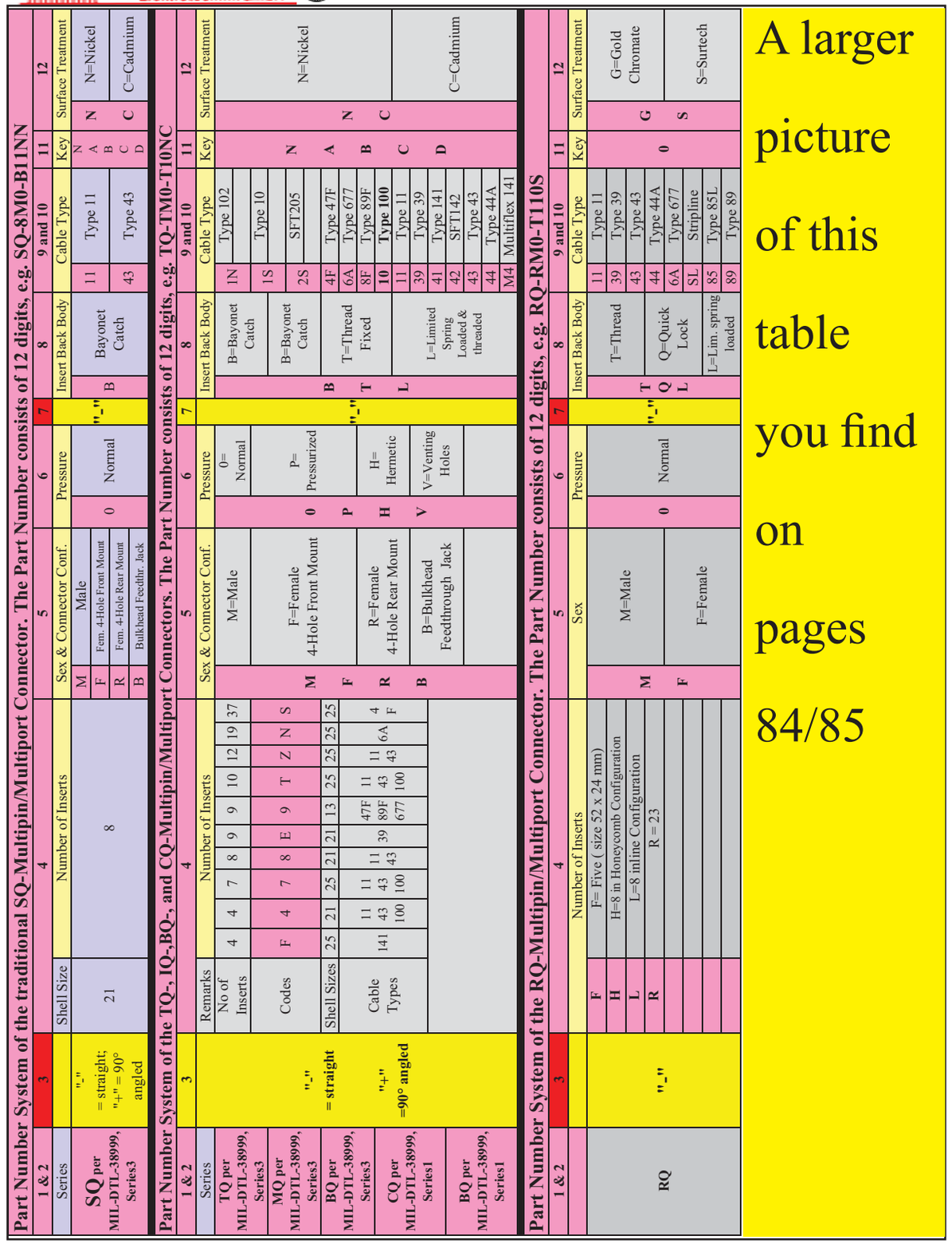
MIL-DTL-38999 Series I Panel Cutouts Dimensions

Shell Size	A Dia. inch (mm)	P Dia. inch (mm)	R inch (mm)	Mounting Screws	D +0.01 (0.25) -0 (0) inch (mm)	E +0 (0) -0.01 (0.25 inch (mm)
13	0.65 (24.51)	0.128 (3.25)	0.906 (23.01)	#4 (M3)	1.01 (25.65)	0.955 (24.26)
21	1.447 (36.75)	0.128 (3.25)	1.25 (31.75)	#4 (M3)	1.51 (38.35)	1.46 (37.08)
25	1.703 (43.25)	0.15 (3.81)	1.5 (38.1)	#6 (M3.5)	1.76 (44.7)	1.71 (43.43)

Part Number (12 Characters)

Characters 1 & 2	MIL-DTL-38999, Series 1: S1-, T1-,I1-, B1-, C1-, or RQ-
Character 3	"-" (=straight connector), "+"(=right angled connector)
Character 4	Shell Size & number of inserts
Character 5	Insert Connector configuration & sex,
Character 6	Pressure configuration, Normal, Pressurized, Hermetic
Character 7	"-"
Character 8	Back Body configuration
Character 9 & 10	Cable Type
Character 11	Keying configuration, N,A, B, C, D, or E
Character 12	Surface treatment, Nickel or Cadmium

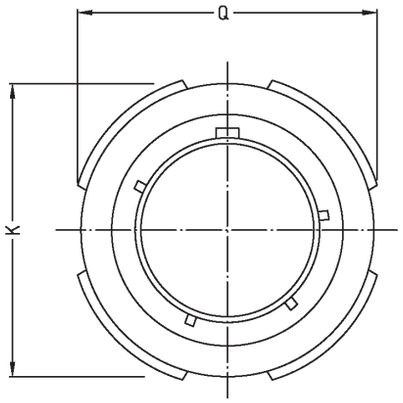
Detailed explanations of the specific Codes you will find at Pages 45, 49, or 84

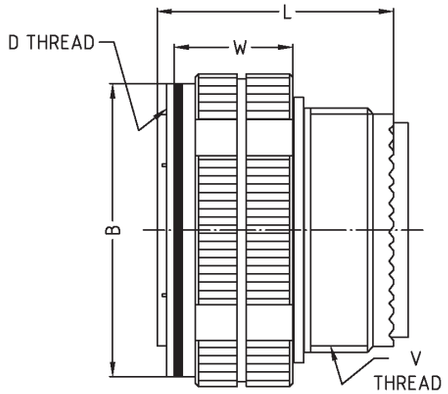


A larger picture of this table you find on pages 84/85

MIL-DTL-38999 Series III Straight Plug Dimensions

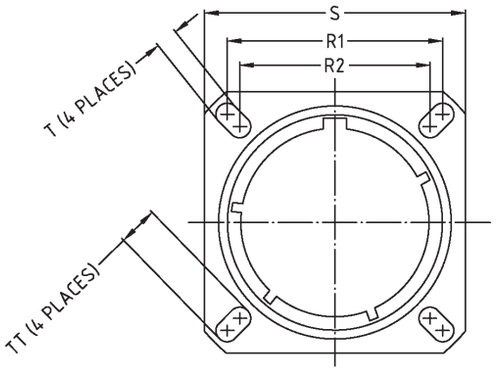
Shell Size	B +0.008 (0.2) -0 (0) inch (mm)	K max. inch (mm)	L max. inch (mm)	O Dia. max. inch (mm)	W +0.008 (0.2) -0.04 (0.1) inch (mm)	V Thread	D Thread Class 2A (Plated)
13	1.0 (25.4)	1.027 (26.1)	1.234 (31.34)	1.141 (28.98)	0.76 (19.3)	M18X1-6g0.100R	.8750-0.1P-0.3L-TS
21	1.5 (38.1)	1.524 (38.7)	1.234 (31.34)	1.625 (41.28)	0.76 (19.3)	M31X1-6g0.100R	1.3750-0.1P-0.3L-TS
25	1.744 (44.3)	1.768 (44.9)	1.234 (31.34)	1.875 (47.62)	0.76 (19.3)	M37X1-6g0.100R	1.6250-0.1P-0.3L-TS

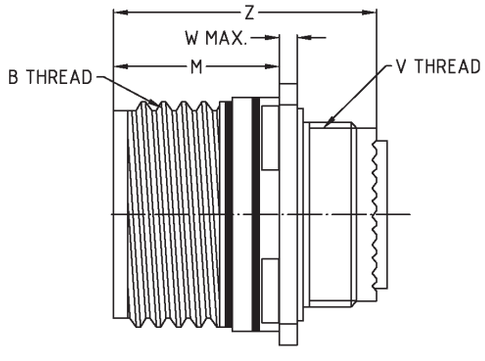




MIL-DTL-38999 Series III Wall Mounting Receptacle Dimensions

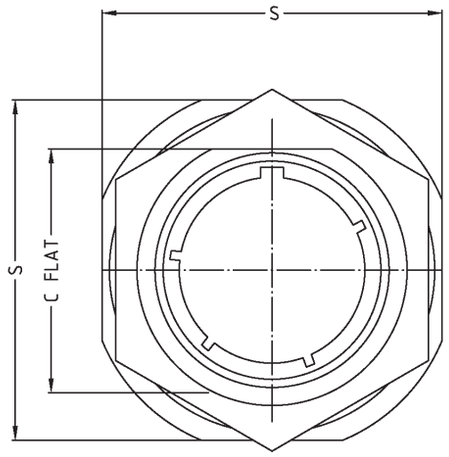
Shell Size	M +0 (0) -0.005 (0.130	R1 inch (mm)	R2 inch (mm)	S +/-0.012 (0.300) inch (mm)	T +0.004 (0.1) -0.002 (0.05) inch (mm)	TT +0.004 (0.1) -0.002 (0.05) inch (mm)	W max. inch (mm)	Z +0.005 (0.13) -0.10 (0.25) inch (mm)	V Thread	B Thread Class 2A (Plated)
13	.820 (20.83)	0.906 (23.01)	.812 (20.62)	1.125 (28.58)	0.128 (3.25)	0.194 (4.93)	0.098 (2.50)	1.235 (31.36)	M18X1-6g0.100R	.8750-0.1P-0.3L-TS
21	0.790 (20.07)	1.25 (31.75)	1.156 (29.36)	1.562 (39.67)	0.128 (3.25)	0.194 (4.93)	.126 (3.20)	1.235 (31.36)	M31X1-6g0.100R	1.3750-0.1P-0.3L-TS
25	0.790 (20.07)	1.5 (38.10)	0.602 (15.29)	1.375 (34.92)	0.154 (3.91)	0.242 (6.15)	.126 (3.20)	1.235 (31.36)	M37X1-6g0.100R	1.6250-0.1P-0.3L-TS

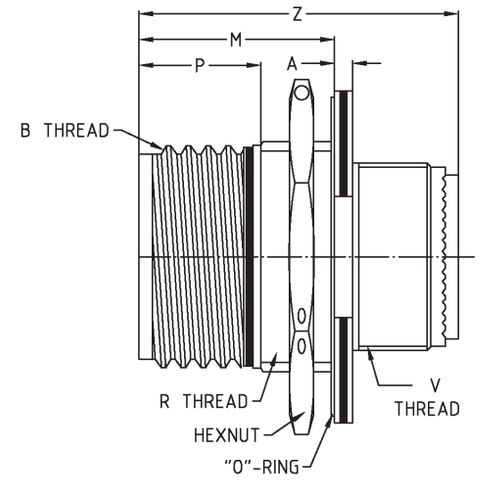




MIL-DTL-38999 Series III Bulkhead Feedthtough Dimensions

Shell Size	A +0.010 (0.25) -0.005 (0.130	C +0.004 (0.1) -0.01 (0.25) inch (mm)	Z +0.005 (0.13) -0.04 (0.1) inch (mm)	M +0.005 (0.13) -0.04 (0.1) inch (mm)	P +0.004 (0.41) -0.04 (0.1) inch (mm)	S +0.004 (0.1) -0.002 (0.05) inch (mm)	R Thread Class 2A (Plated)	V Thread (Plated)	B Thread Class 2A (Plated)
13	0.104 (264)	0.938 (23.82)	1.243 (31.57)	0.878 (22.3)	0.563 (14.3)	1.375 (34.92)	M25X1-6g0.100R	M18X1-6g0.100R	.8750-0.1P-0.3L-TS
21	0.135 (3.43)	1.437 (36.5)	1.243 (31.57)	0.878 (22.3)	0.563 (14.3)	1.938 (49.23)	M38X1-6g0.100R	M31X1-6g0.100R	1.3750-0.1P-0.3L-TS
25	0.135 (3.43)	1.687 (42.85)	1.243 (31.57)	0.878 (22.3)	0.563 (14.3)	2.188 (55.38)	M44X1-6g0.100R	M37X1-6g0.100R	1.6250-0.1P-0.3L-TS





MIL-DTL-38999 Series III Shells

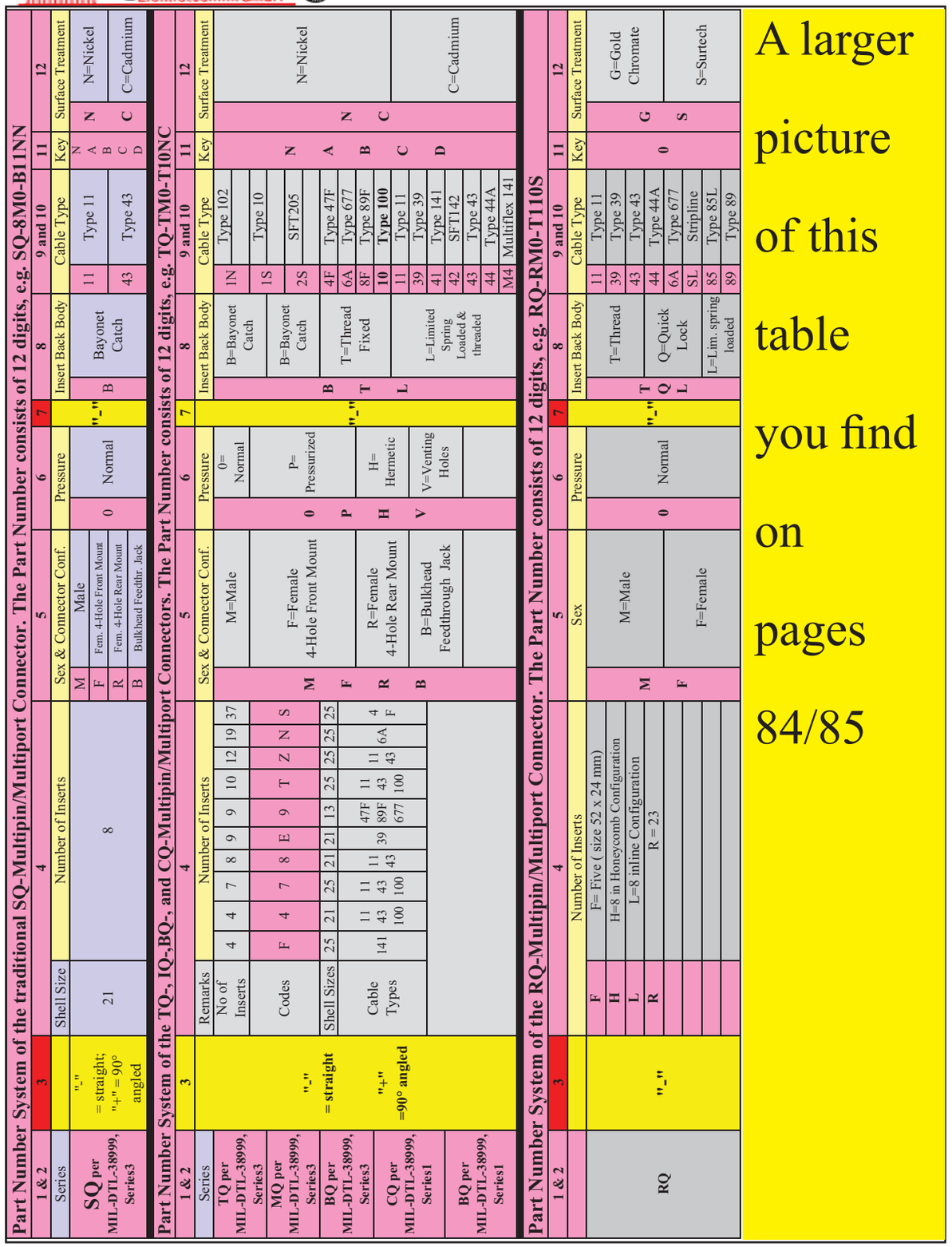
MIL-DTL-38999 Series III Panel Cutouts

Shell Size	A +0.01 (0.25) -0 (0) inch (mm)	B +0 (0) -0.01 (0.25 inch (mm)	Dia. H1 min. inch (mm)	Dia. H2 min. inch (mm)	R typ. inch (mm)	Dia. T +/- 0.050 (0.13
13	1.01 (25.65)	0.955 (24.26)	0.922 (23.42)	0.75 (19.05)	0.906 (23.01)	0.128 (3.25)
21	1.51 (38.25)	1.46 (37.08)	1.422 (36.12)	1.266 (36.16)	1.25 (31.75)	0.128 (3.25)
25	1.76 (44.7)	1.71 (43.43)	1.672 (42.47)	1.484 (37.69)	1.5 (38.1)	0.15 (3.81)

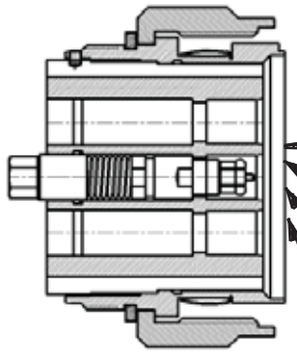
Part Number (12 Characters)

Characters 1 & 2	MIL-DTL-38999, Series 3: S3-, T3-,I3-, B3-, C3-, or RQ-
Character 3	"-" (=straight connector), "+"(=right angled connector)
Character 4	Shell Size & number of inserts
Character 5	Insert Connector configuration & sex,
Character 6	Pressure configuration, Normal, Pressurized, Hermetic
Character 7	"-"
Character 8	Back Body configuration
Character 9 & 10	Cable Type
Character 11	Keying configuration, N,A, B, C, D, or E
Character 12	Surface treatment, Nickel or Cadmium

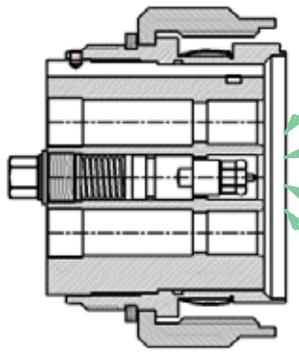
Detailed explanations of the specific Codes you will find at Pages 45, 49, or 84



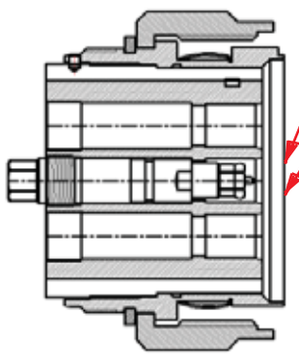
TQ- and IQ-MALE
per MIL-DTL-38999, Series 3
using Type "Q" spring loaded
Inserts with Bayonet Catch
BQ- and CQ-MALE
per MIL-DTL-38999, Series 1
using Type "Q" spring spring loaded
Inserts with Bayonet Catch

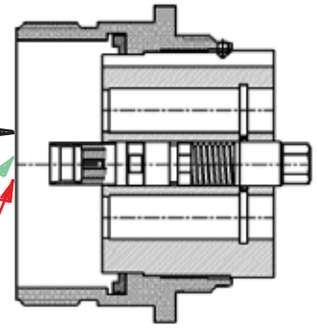


TQ- and IQ-MALE
per MIL-DTL-38999, Series 3
using Type "Q" firm mounted Inserts
but with Limited Floating
BQ- and CQ-MALE
per MIL-DTL-38999, Series 1
using Type "Q" firm mounted Inserts
but with Limited Floating

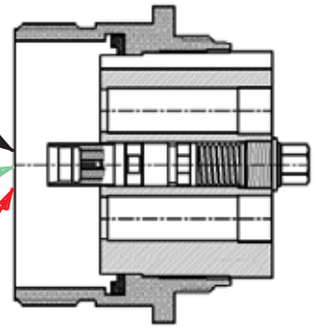


TQ- and IQ-MALE
per MIL-DTL-38999, Series 3
using Type "Q" firm mounted Inserts
BQ- and CQ-MALE
per MIL-DTL-38999, Series 1
using Type Q" firm mounted Inserts

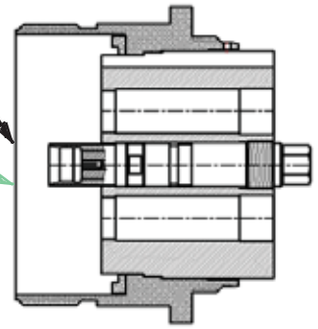




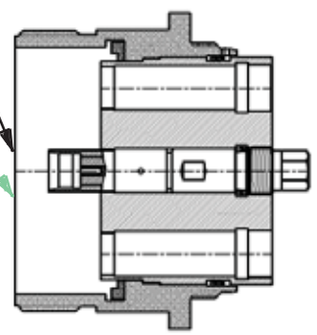
TQ- and IQ-FEMALE
per MIL-DTL-38999, Series 3
using Type "Q" spring loaded
Inserts with Bayonet Catch
BQ- and CQ-FEMALE
per MIL-DTL-38999, Series 1
using Type "Q" spring loaded
Inserts with Bayonet Catch



TQ-and IQ-FEMALE
per MIL-DTL-38999, Series 3
using Type "Q" firm mounted
inserts but with Limited Floating
BQ-and CQ-FEMALE
per MIL-DTL-38999, Series 1
using Type "Q" firm mounted
inserts but with Limited Floating

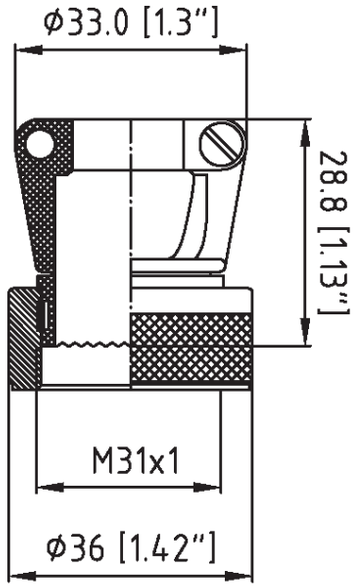


TQ- and IQ-FEMALE
per MIL-DTL-38999, Series 3
using Type "Q" firm mounted inserts
BQ- and CQ-FEMALE
per MIL-DTL-38999, Series 1
using Type "Q" firm mounted inserts

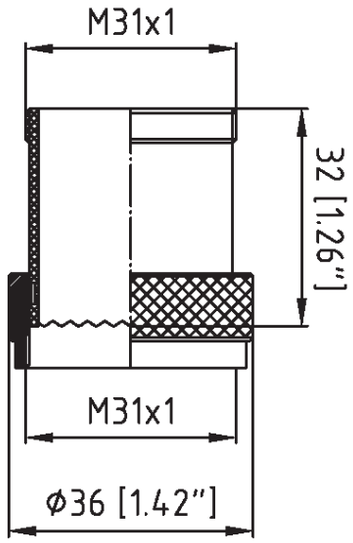


TQ- and IQ-FEMALE
per MIL-DTL-38999, Series 3
using Type "Q"pressurized firm
mounted inserts
BQ- and CQ-FEMALE
per MIL-DTL-38999, Series 1
using Type "Q"pressurized firm
mounted inserts

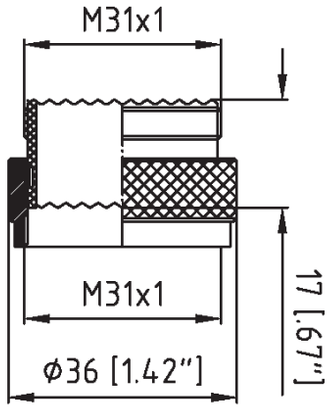
Circular Multipin Backparts of Size 21Shells



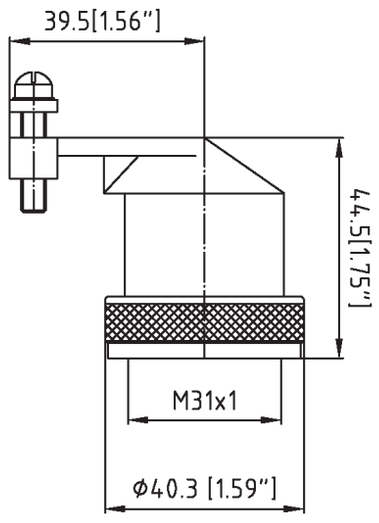
Straight Back Body with Clamps	
Standard Back Body Part Number	Material and Surface treatment
BPTQ-2101-07	Aluminum black anodized
BPTQ-2101-15	Aluminum nickel plated



Extender Back Body	
Standard Back Body Part Number	Material and Surface treatment
BPTQ-2102-07	Aluminum black anodized
BPTQ-2102-15	Aluminum nickel plated



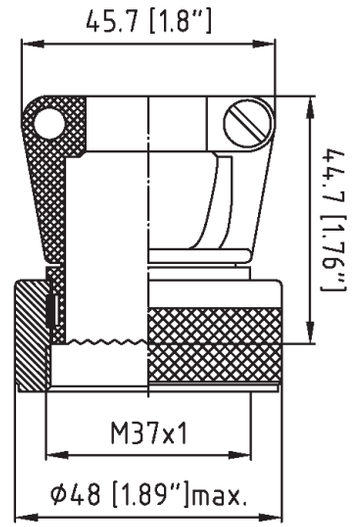
Short Back Body	
Standard Back Body Part Number	Material and Surface treatment
BPTQ-2103-07	Aluminum black anodized
BPTQ-2103-15	Aluminum nickel plated



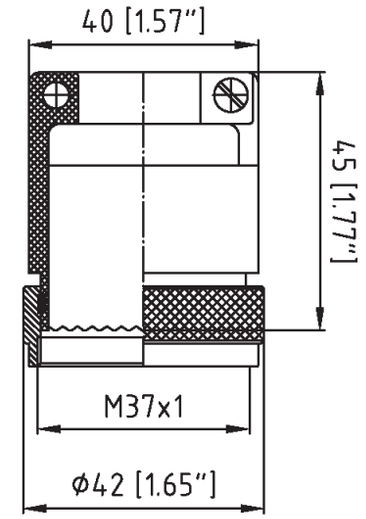
Right Angle Back Body	
Standard Back Body Part Number	Material and Surface treatment
BPTQ-2104-07	Aluminum black anodized
BPTQ-2104-15	Aluminum nickel plated

More Backbodies are available or can be developed on request.

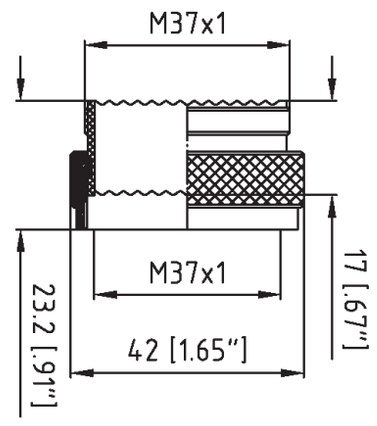
Circular Multipin Backparts of Size 25Shells



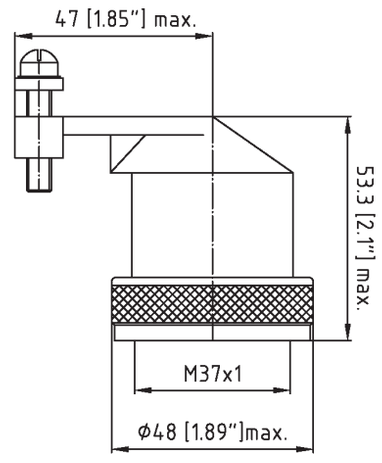
Straight Back Body with Clamps	
Standard Back Body Part Number	Material and Surface treatment
BPTQ-2501-07	Aluminum black anodized
BPTQ-2501-15	Aluminum nickel plated



Straight Back Body with Clamps	
Standard Back Body Part Number	Material and Surface treatment
BPTQ-2502-07	Aluminum black anodized
BPTQ-2502-15	Aluminum nickel plated



Short Back Body	
Standard Back Body Part Number	Material and Surface treatment
BPTQ-2503-07	Aluminum black anodized
BPTQ-2503-15	Aluminum nickel plated



Right Angle Back Body	
Standard Back Body Part Number	Material and Surface treatment
BPTQ-2504-07	Aluminum black anodized
BPTQ-2504-15	Aluminum nickel plated

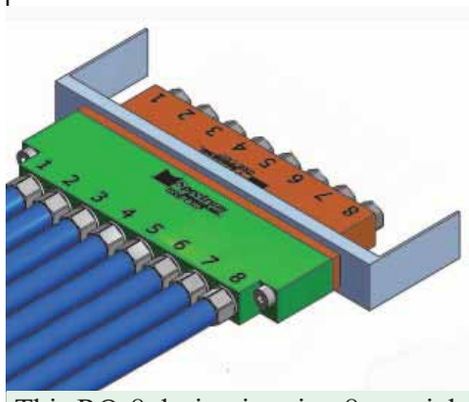
More Backbodies are available or can be developed on request.

Rectangular Multiports

The RQ- Multiport Connectors are using rectangular shells, developed by Spectrum Elektrotechnik GmbH, allowing dense packaging. The operating frequency depends on the inserts used, operating up to 65 GHz. Details can be seen on pages 56 to 67

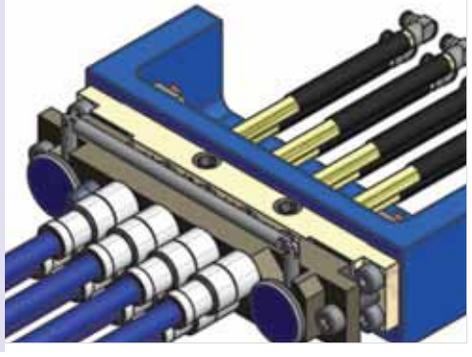
The RQ23-DC26 is employing twenty-three (23) coaxial cable assemblies plus twenty-six (26) signal lines in one connector and has been qualified in an airborne program. Coaxial cable of Type 11 and/or Type 43 and AWG20 wire for the lower frequency signals or supplies are being used. It can be modified for other coaxial cables.

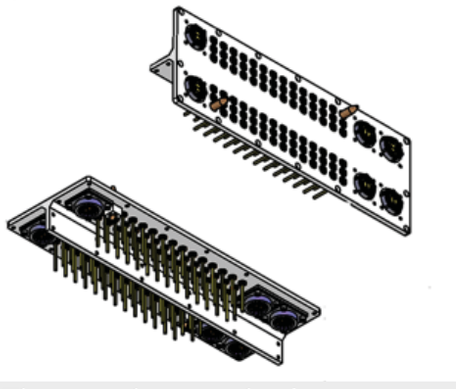

RQ23-DC26



This RQ-8 design is using 8 coaxial connectors in-line in a very narrow package (7mm).

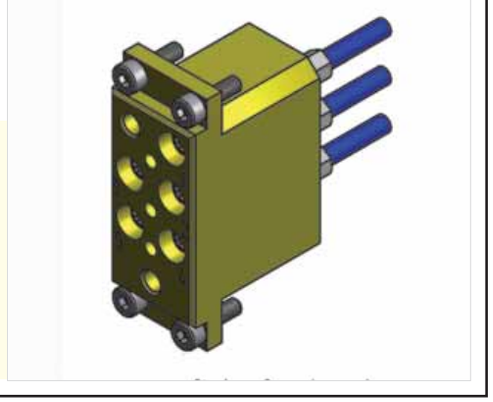
This RQ-8 with quick connect/release mechanism employs 8 coaxial lines in a Honeycomb package for space advantage





The most dense packaging ever proposed for a program, 80 coaxial connections and 120 signal lines.

Multiport Connector with 5 coaxial connections is operating to 40 GHz.



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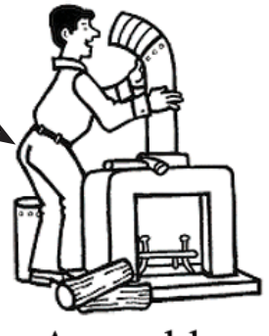
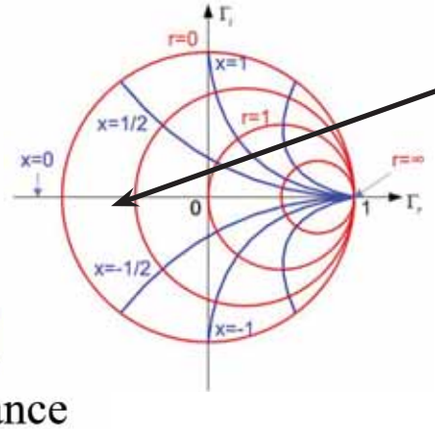
- **SHORT WAYS**
- **FAST RESPONSE TIME**
- **SHORT DELIVERY**
- **HIGHEST QUALITY**


Manufacturing

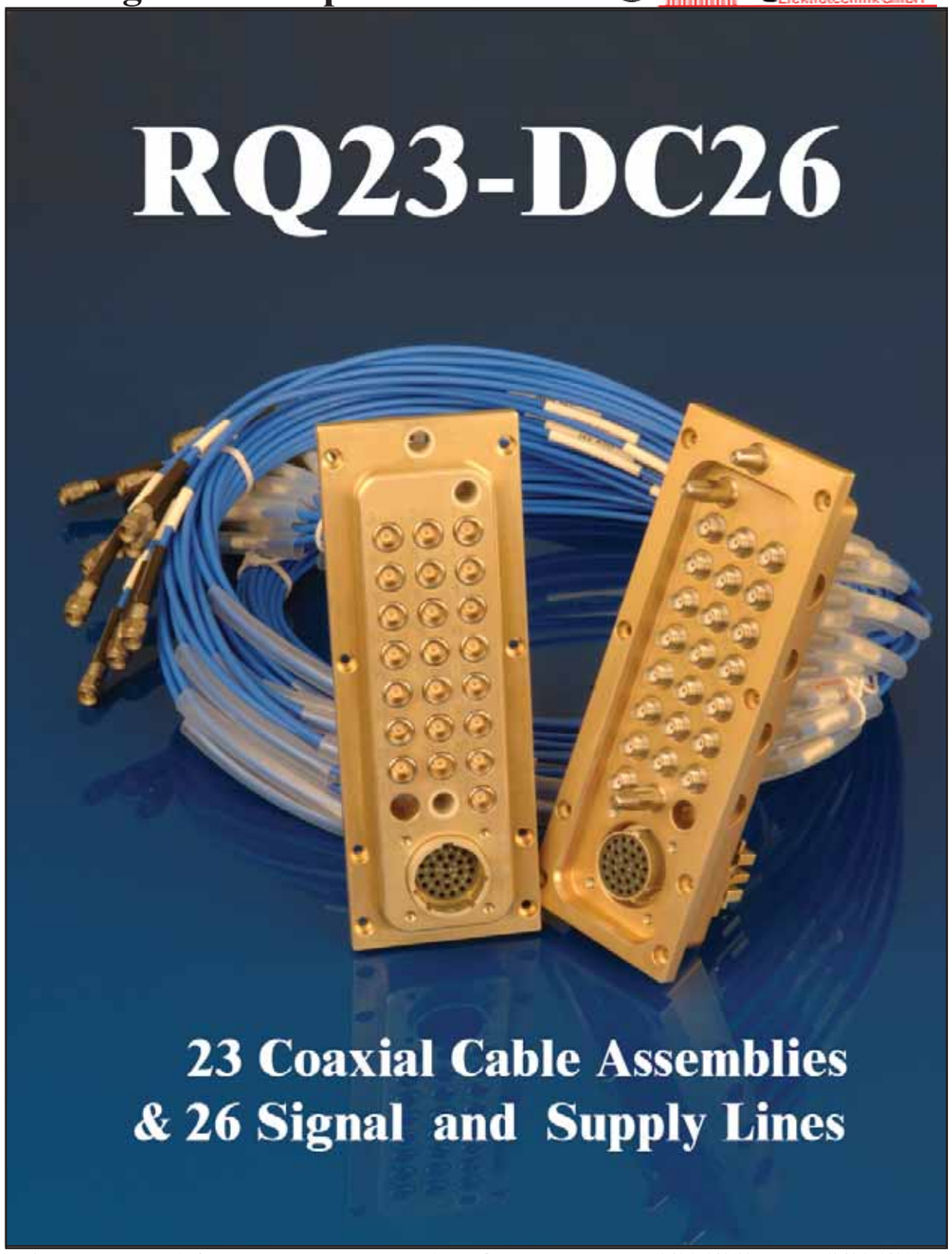

Design


Assembly

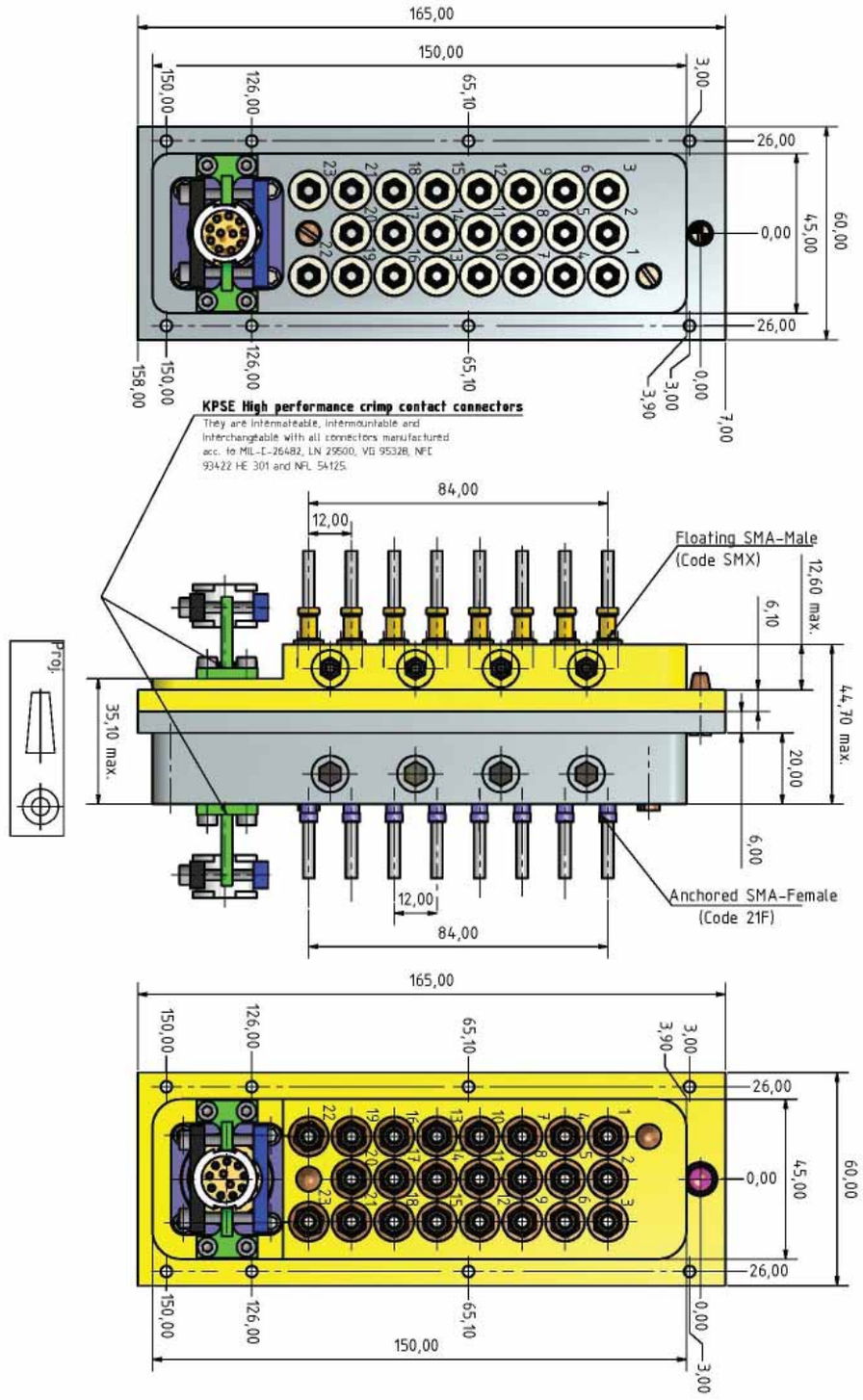

Quality Assurance

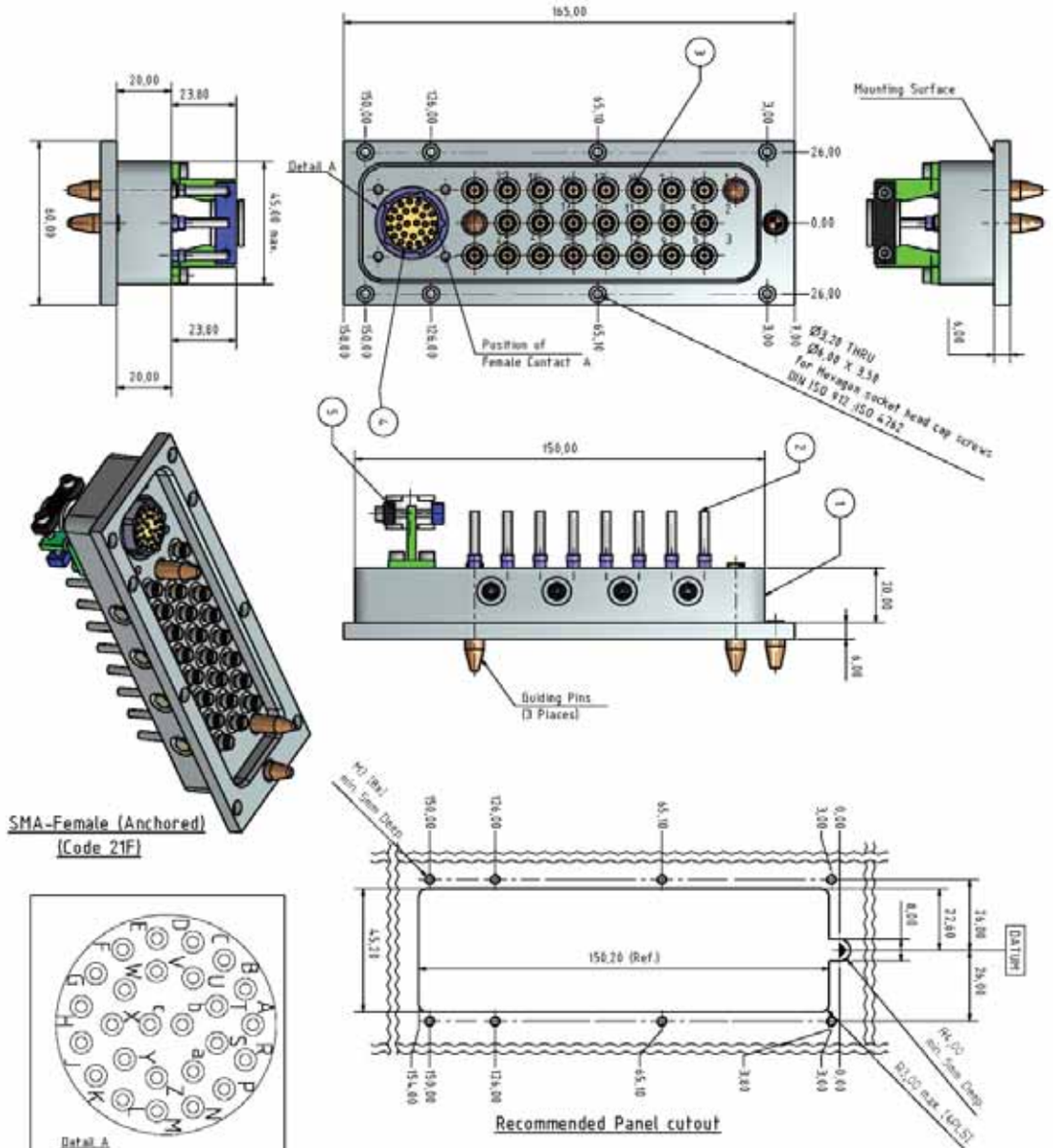


RQ23-DC26



23 Coaxial Cable Assemblies
& 26 Signal and Supply Lines



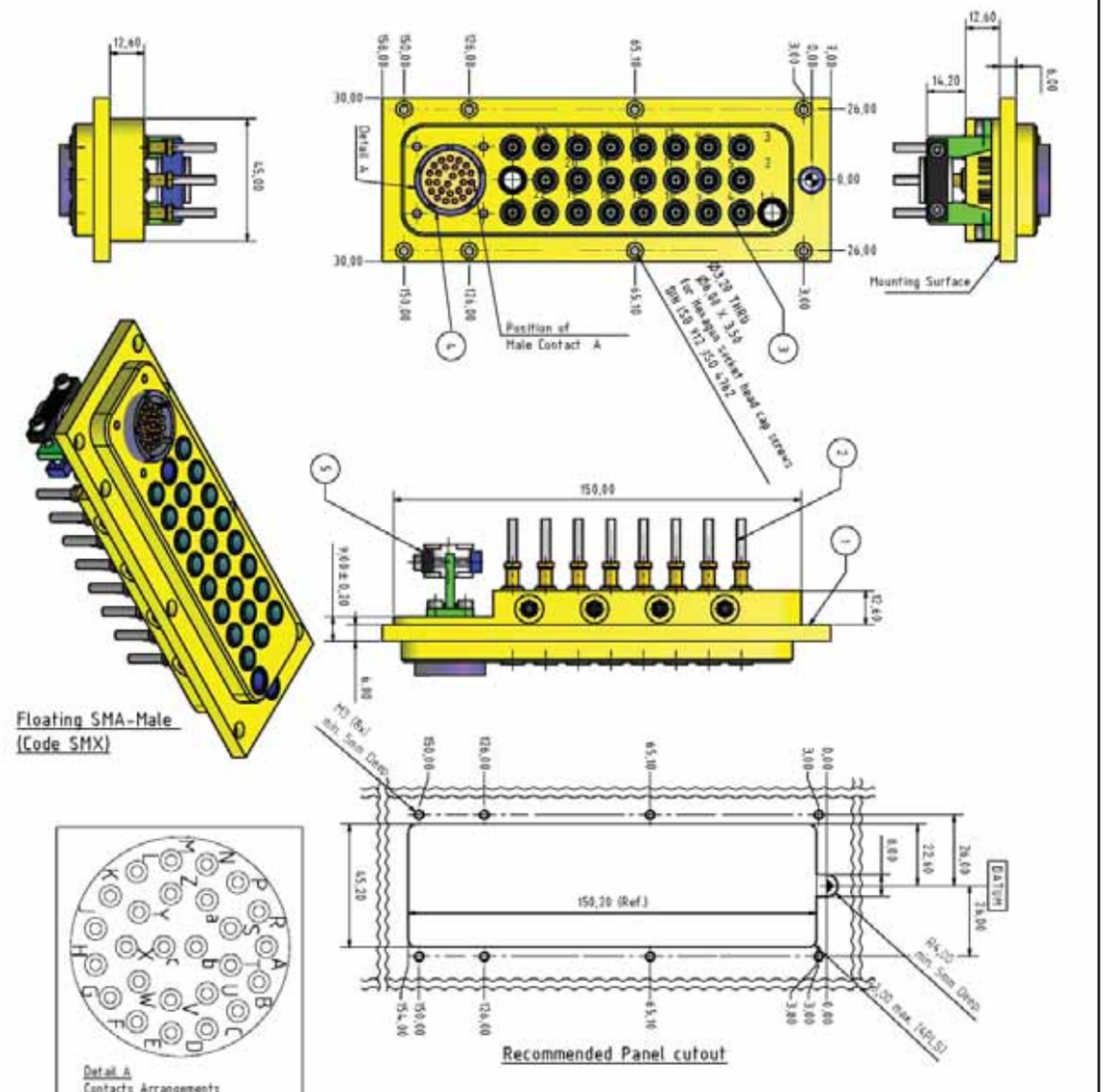


ITEM	Qty.	PART NUMBER		DESCRIPTION		MATERIAL AND FINISH
5	1	07-146-Z		Back Shell for AWG20-22		Material: AlMg4,5Mn; Alodine
4	1	07-058-Z		Receptacle Housing 06-KPT/KPSE-16 (26 Pole) With 26 Crimp Contacts AWG-20		Receptacle Housing Interface Per MIL-C-26482 / VG95328 ;Alodine (or Anodized Finish) With Crimp Contacts AWG-20 Gold Plated
3	23	RQ23-2101-02	RQ23-2102-02	SMA-Female Anchored		Interface Per MIL-STD- 348A Fig.310.2
2	23	TYP 11	TYP 43	Cable Typ 11	Cable Typ 43	Spectrum TYP 11 / Spectrum TYP 43
1	1	07-058-1		Housing		Material: AlMg4,5Mn; Alodine

DESCRIPTION	SPECIFICATIONS
INSERTION AND WITHDRAWAL OF MALE CONNECTOR	180N max
DURABILITY	200 CYCLES MIN

Tolerances ± 0,05mm

Proj.



ITEM	Qty.	PART NUMBER		DESCRIPTION		MATERIAL AND FINISH
5	1	07-146-Z		Back Shell for AWG20-22		Material: AlMg4,5Mn; Alodine
4	1	07-057-Z		Receptacle Housing 02-15KPT (26 Pole) With 26 Crimp Contacts AWG-20		Receptacle Housing Interface Per MIL-C-26482 / VG95328 ;Alodine (or Anodized Finish) With Crimp Contacts AWG-20 Gold Plated
3	23	RQ23-1101-02	RQ23-1102-02	SMA-male floating mount		Interface Per MIL-STD- 348A Fig.310.1
2	23	TYP 11	TYP 43	Cable Typ 11	Cable Typ 43	Spectrum TYP 11 / Spectrum TYP 43
1	1	07-057-1		Housing		Material: AlMg4,5Mn; Alodine

DESCRIPTION	SPECIFICATIONS
INSERTION AND WITHDRAWAL OF MALE CONNECTOR	180N max
DURABILITY	200 CYCLES MIN

Tolerances ± 0,05mm

Proj.

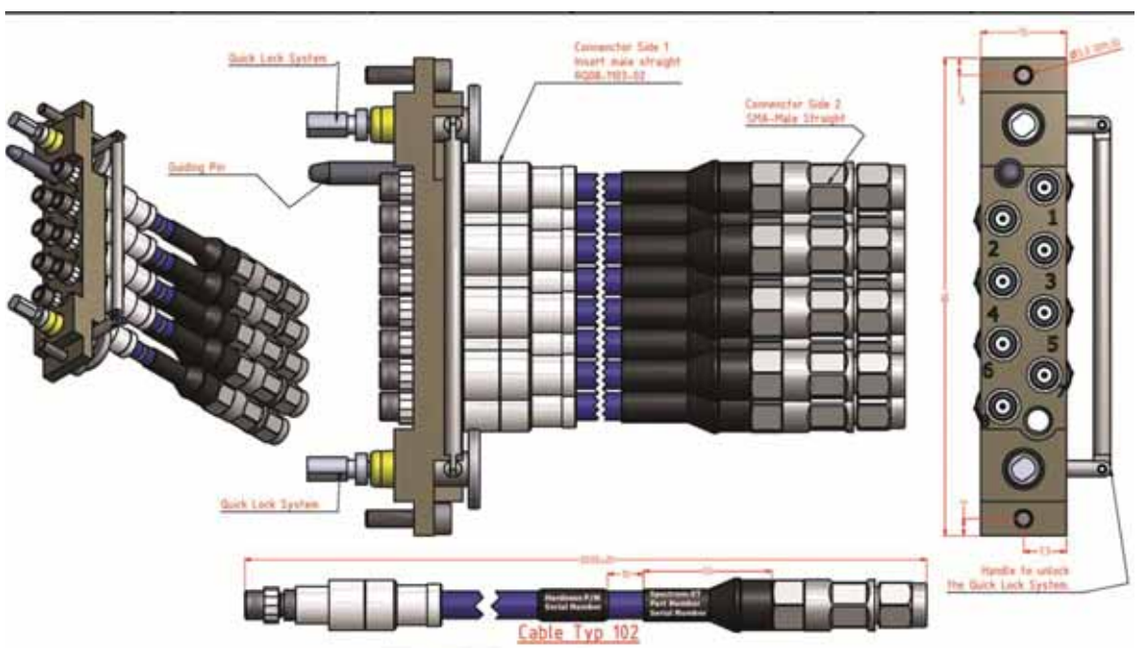
RQ-23 Cable Assembly Set

Rectangular Multiport Assemblies

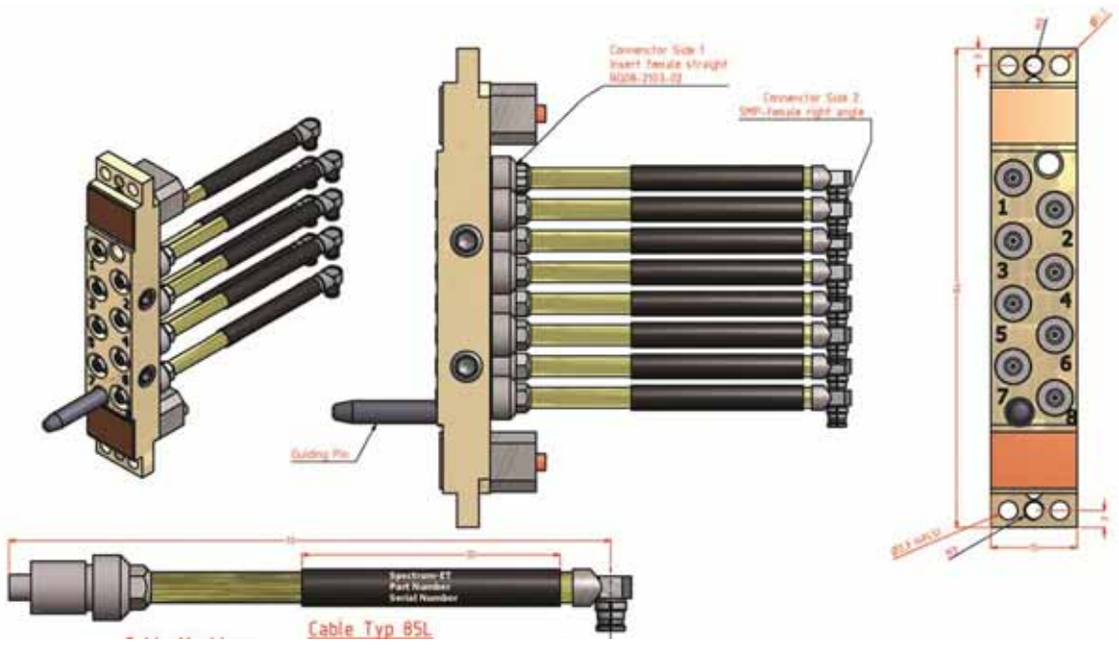
For certain applications even the coaxial connections of our circular TQ- and IQ- or CQ- and BQ- Series were too little, plus there was a need for DC signal and driver signals, challenging Spectrum to design a Multi COAX/DC Connector, the SR23-DC26, connecting and disconnecting 23 coaxial RF lines and 26 signal and supply lines at once and in seconds, and by using the smallest possible size for this complex design. The male coaxial insert is a modified version of our successful SMA Push-On for lower insertion force and withdrawal force, as we are specifying 150N maximum in total for the insertion and withdrawal of all 23 coaxial lines plus the 26 signal and supply lines. The female coax inserts terminating the cable use the standard SMA female interface, mating with any standard SMA male connector, while the male SMA Push-Ons mate with any standard SMA female connector by just being pushed on, instead of threadening and torquing. Using the standard SMA connector styles ensures that existing test cables terminated with SMA connectors can be used during testing.

With 23 coaxial cable assemblies there is a good chance that one, or even several may be damaged at some time and need to be replaced. Therefore the connectors were designed such that any of the coaxial cable assemblies can be replaced in a very short time by just taking out the proper mounting bolt, holding the coaxial inserts in groups of 4 or 8 in place, and replacing the assembly or assemblies and inserting and securing the mounting bolt again. The maximum operating frequency of the design to the left is guaranteed to 25 GHz when using the cable of Types 11 or 43.

Several modern systems require phase match of the cable assemblies of a harness. Spectrum is using utmost cable manufacturing, interface cutting techniques and advanced adjustable connector designs meeting almost any requirement a customer may have for phase match among the assemblies.
Selecting the proper materials and aging techniques in well defined processes is an important parameter as well to make cable assemblies and harnesses to operate in temperature ranges of minus 54°C to plus 115°C as standard. Spectrum offers also extended temperature ranges from minus 72° C to plus 200°C. All connectors are RoHS compliant and meet the condition and corrosion requirement to MIL-STD-202, method 101, condition B. The Connector series are compliant to thermal shock to MIL-STD-202, method 107, condition B, vibration to MIL-STD-202, method 204, condition D, and shock to MIL-STD-202, method 213.

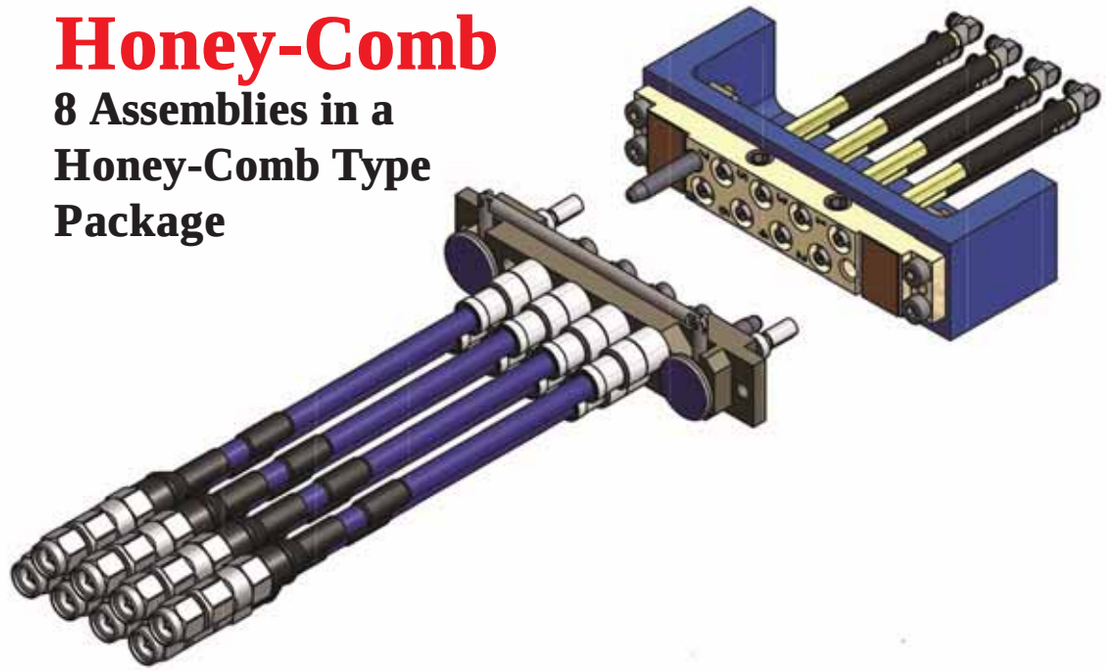


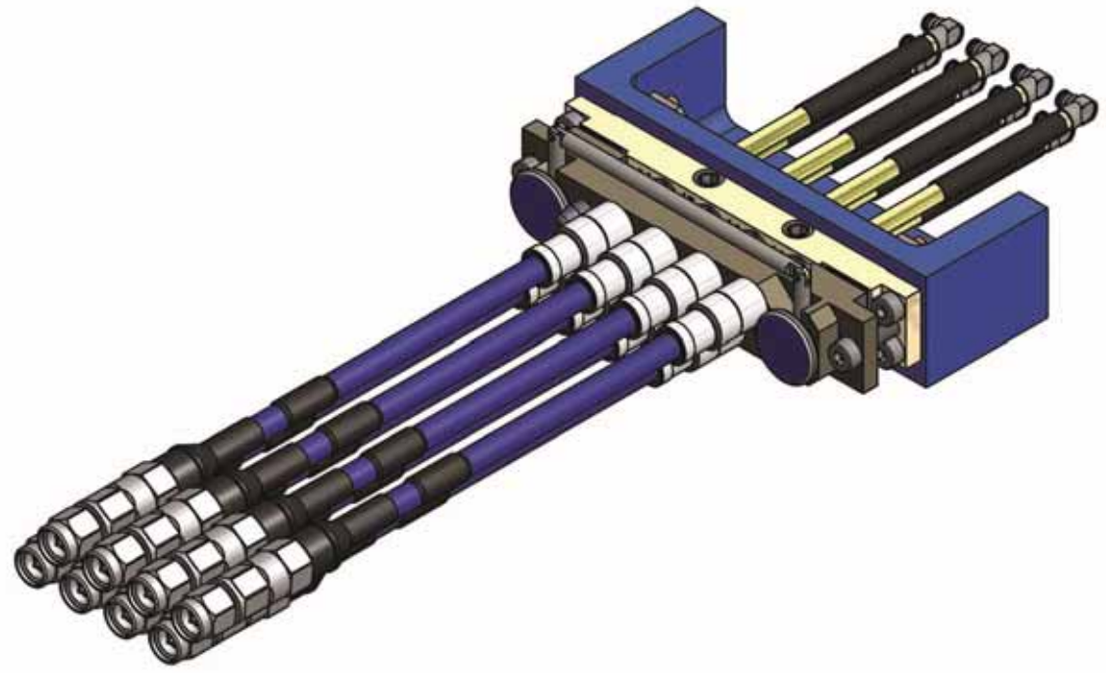
Honey-Comb 8 Cable Assemblies in a small package.

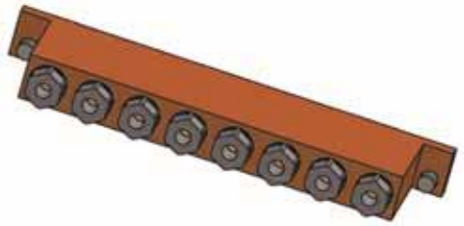


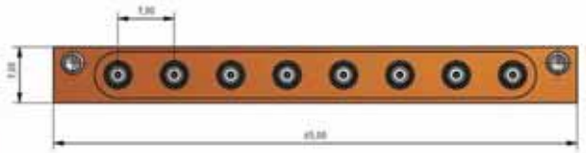
Honey-Comb

8 Assemblies in a Honey-Comb Type Package



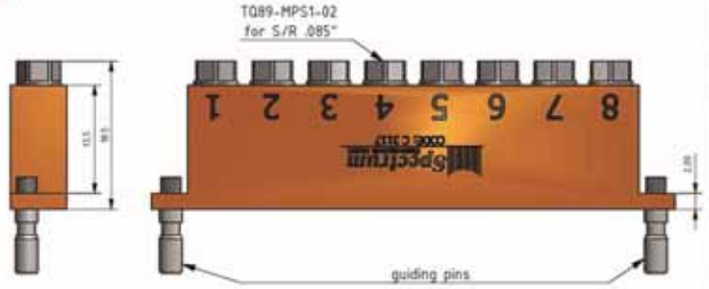


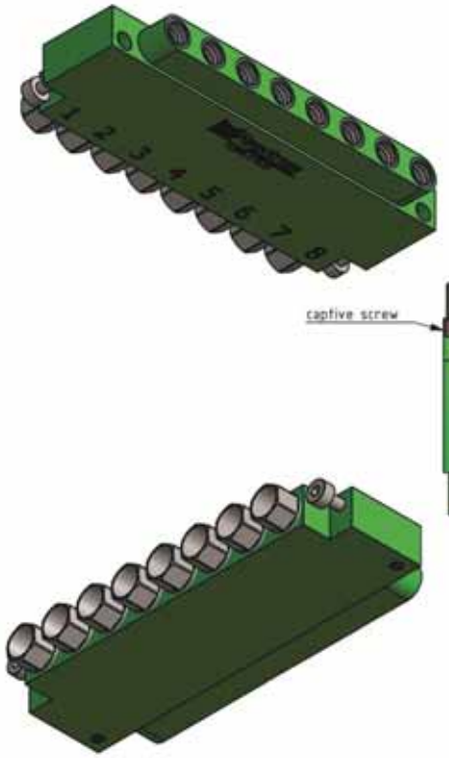


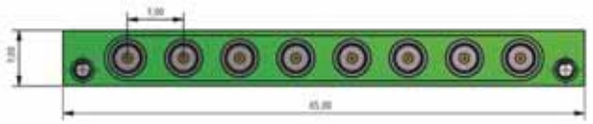


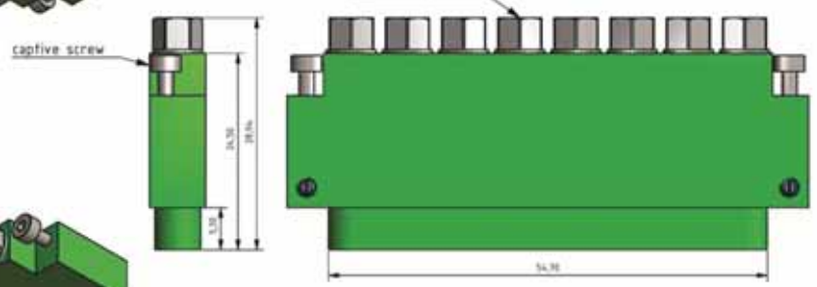
RQ-07

8 Assemblies in a 7mm wide Package



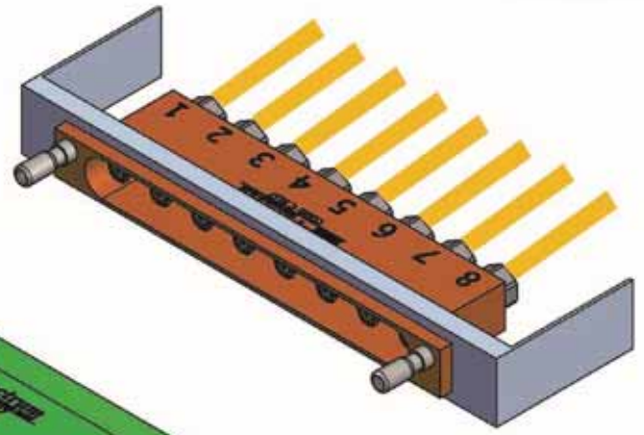


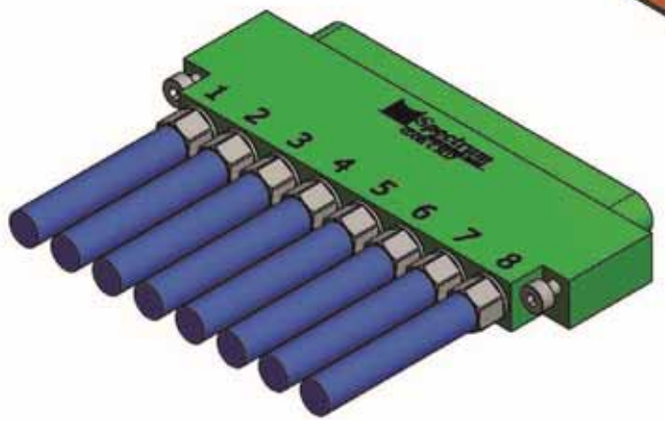


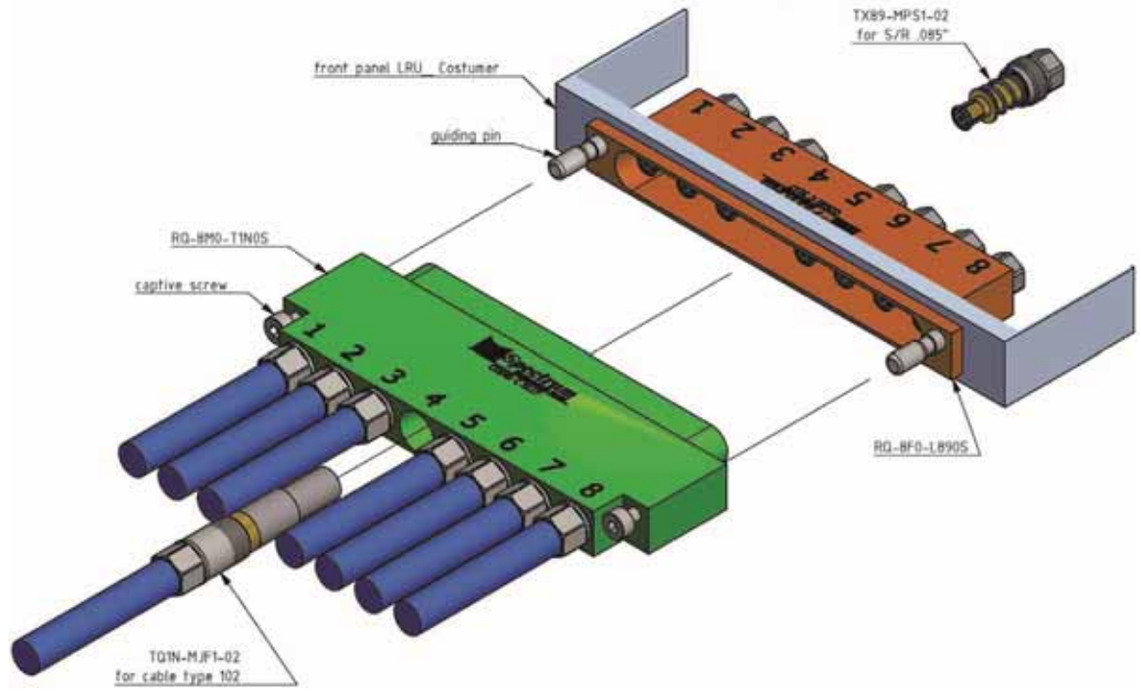


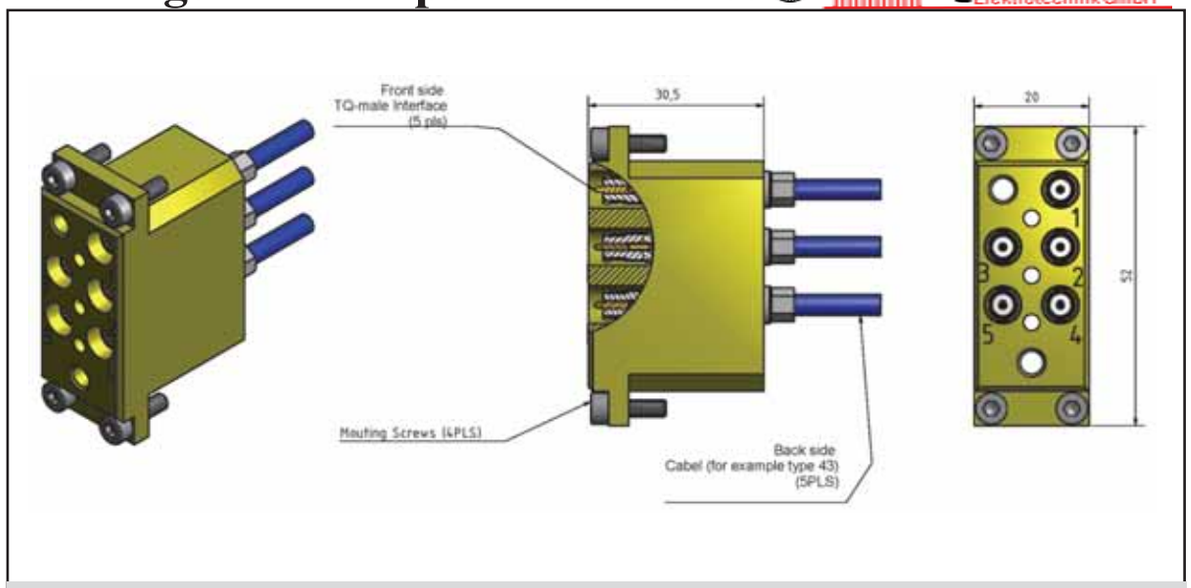
RQ-07

8 Assemblies in a 7mm wide Package



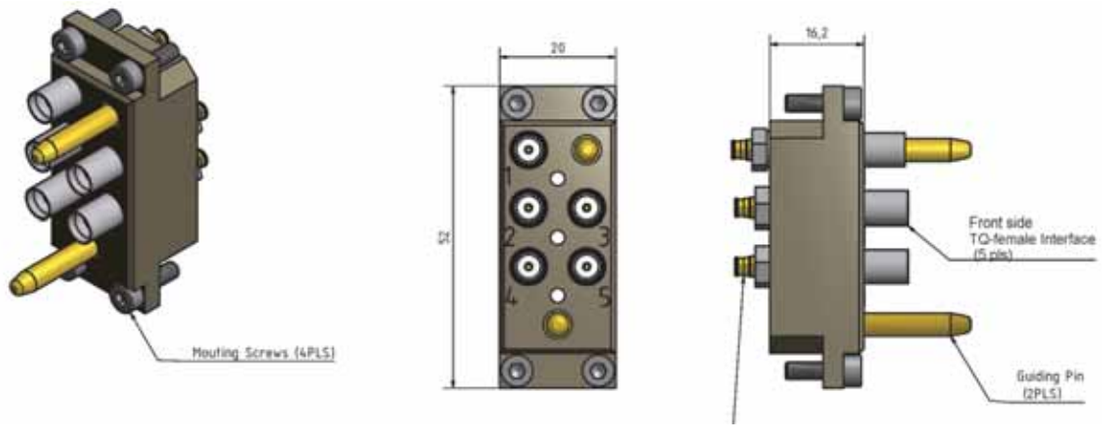






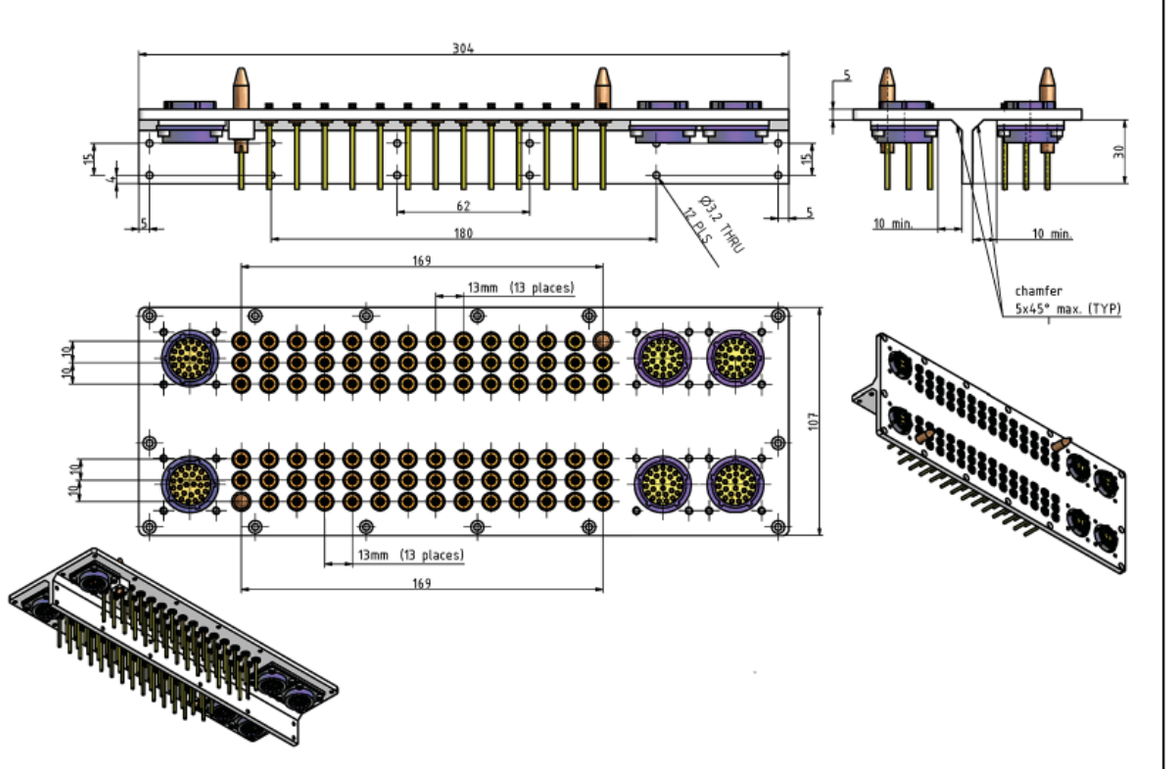
RQ-05

5 Cable Assemblies in a dense rectangular Package



RQ80-DC120

A study for packaging 80 RF Connectors and 120 Signal Connectors in one Unit. Sizewise it can be done within the given limits.
Probematic is the insertion- and withdrawal force. A brand new connector design would need to be engineered for low insertion- and withdrawal force but still for guaranteeing safe and secured connection.



What is an Insert and where is it used?

We call the little connector that is located in the Multiport and terminated to the cable the "Insert", or "Insert-Connector".

The Inserts and specifications are shown on the following pages:

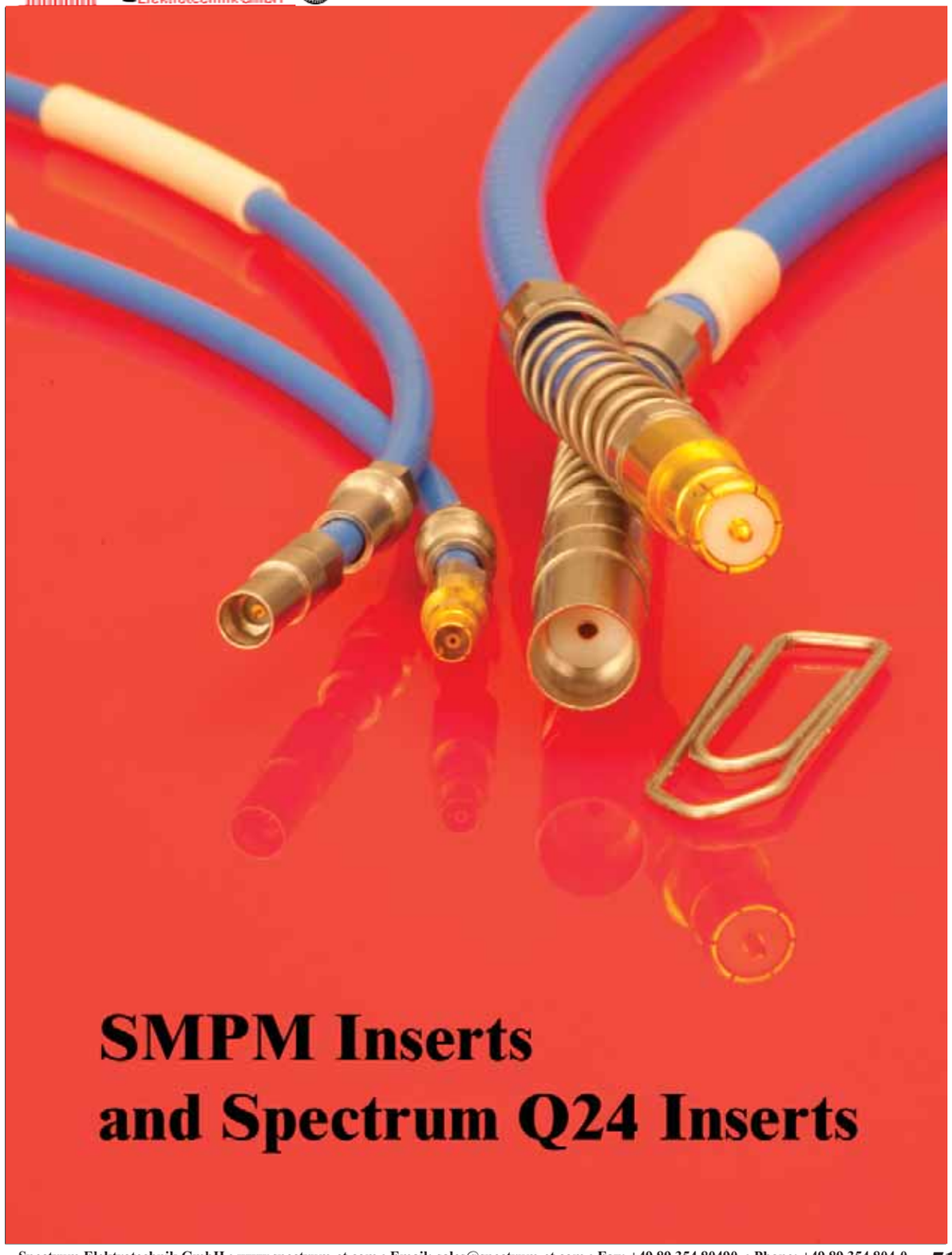
1) The standard Q24 Insert, is used in most applications with the MIL-DTL-3899 shells, usually of sizes 21 and 25 and in the frequency range of DC to 24.0 GHz. Already the traditional SQ-Series are using this unit. The Inserts are available in different versions, spring loaded, limited spring loaded, fixed and pressurized.

2) The standard Q40 Insert, is used in most applications with the MIL-DTL-3899 shells, usually of sizes 21 and 25 and in the frequency range of DC to 40.0 GHz. The Inserts are also available in different versions, spring loaded, limited spring loaded, fixed and pressurized.

3) The Push-On SMA male, together with the standard SMA female, as used in the rectangular Multiport RQ23-DC26.
The reason for using this connector configuration was the customer request that a standard series connector had to be used for best test application with his standard SMA test cables he wanted to have in place.

3) The SMP connector, used in some special Multiports.

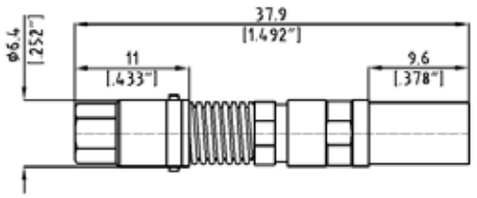
4) The SMPM connector, as used in the TQ-09 and the TQ-19 of the MIL-DTL- 38999 Size 13 and Size 25 shell. 9 cable assemblies were to be hooked up in the small shell of size 13, and 19 cable assemblies in the size 25 shell.



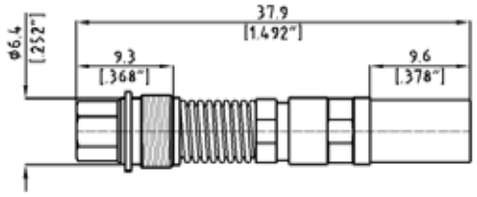
SMPM Inserts
and Spectrum Q24 Inserts

Q24-Inserts, DC-24 GHz

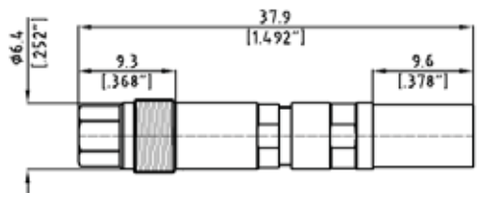
Cable Type over Insert Part Number		
11	141	43
TQ11-2101-02	TQ41-2101-02	TQ43-2101-02
Connector Code: QF		
Q-Inserts female spring loaded, Bayonet Catch for TQ-, IQ-, BQ-, CQ- Shells		



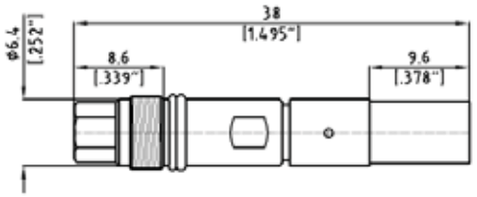
Cable Type over Insert Part Number		
11	141	43
TQ11-21S1-02	TQ41-21S1-02	TQ43-21S1-02
Connector Code: QFE		
Q-Inserts female, limited spring loaded, treaded nut for TQ-, IQ-, BQ-, CQ- Shells		



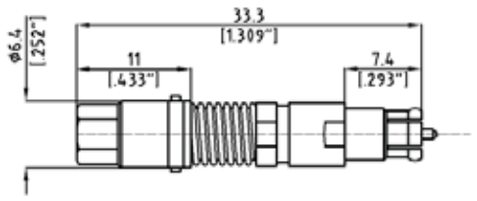
Cable Type over Insert Part Number		
11	141	43
TQ11-21E1-02	TQ41-21E1-02	TQ43-21E1-02
Connector Code: QFF		
Q-Inserts female. firm, threaded nut for TQ-, IQ-, BQ-, CQ- Shells		



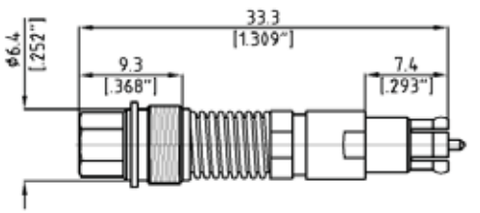
Cable Type over Insert Part Number		
11	141	43
TQ11-21P1-02	TQ41-21P1-02	TQ43-21P1-02
Connector Code: QPF		
Q-Inserts female, pressurized, threaded nut for TQ-, IQ-, BQ-, CQ- Shells		



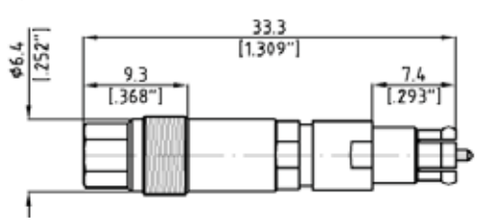
Cable Type over Insert Part Number		
11	141	43
TQ11-1102-02	TQ41-1102-02	TQ43-1102-02
Connector Code: QM		
Q-Inserts male spring loaded, Bayonet Catch for TQ-, IQ-, BQ-, CQ- Shells		



Cable Type over Insert Part Number		
11	141	43
TQ11-11S1-02	TQ41-11S1-02	TQ43-11S1-02
Connector Code: QME		
Q-Inserts male, limited spring loaded, treaded nut for TQ-, IQ-, BQ-, CQ- Shells		



Cable Type over Insert Part Number		
11	141	43
TQ11-11F1-02	TQ41-11F1-02	TQ43-11F1-02
Connector Code: QMF		
Q-Inserts male. firm, threaded nut for TQ-, IQ-, BQ-, CQ- Shells		

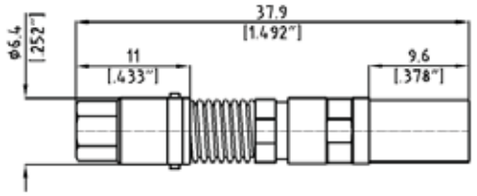


Type "Q" RF-Inserts Specification DC-24 GHz

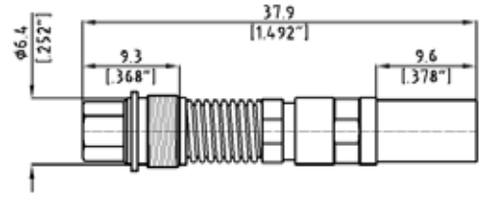
The specifications below are general specifications for all Q-Inserts for TQ-, IQ-, BQ-, and CQ- Shells. Specific Data for VSWR, Insertion Loss, R.F. leakage, etc., are available from the factory upon request. Specifications in the following table are recommended for any procurement documents or drawings. In the event of any conflict between these specifications and General Specifications MIL-PRF-39012, these specifications shall govern. The paragraph numbers refer to the associated requirement paragraphs of MIL-PRF-39012/C. These specifications are subject to change according to the latest revision.

REQUIREMENT	§	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). ALUMINUM AlMg4.5Mn per DIN 1725, AlMgSi0.5 per DIN 1725, AlMgSi1 per DIN 1725 (6061-T6 per QQ-A-225/8). BRASS CuZn39Pb3 per DIN 17660 (UNS C 38500). COPPER BERYLLIUM 33-25 CuBe2Pb H per DIN 17666 (ASTM B 196). TFE Fluorocarbon per DIN 52900 (MIL-P-19468 and L-P403). SILICONE RUBBER per DIN 3771 (MIL-R-5847 and ZZ-R-765, Class II B,) Grade 50 - 75. 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 (1.25 µm) in accordance with ASTM B 488, Type 3, Code C, Class 1.25.
STAINLESS STEEL		shall be passivated per ASTM A 967.
ALUMINUM		Conductive Parts shall have an iridited finish per MIL-C-5541. Other parts, such as Coupling Nuts and Back-Bodies shall be anodized per MIL-A-8625.
BRASS		.00003 inch (0.75 µm) min.gold plating per ASTM B 488, Type 3, Code C, or nicle plating per QQ-N-290, as specified.
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	1.02 + .005 * f (GHz)
Contact Resistance	3.16	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	3.17	The magnitude of the test voltage shall be 1,000 volts rms at sea level.
RF High Potential	3.23	The RF high potential withstanding voltage is 670 volts rms at 5 MHz. Leakage is not applicable.
RF Leakage	3.26	- (90 - f (GHz)) dB
Insertion Loss	3.27	(.03 SQT(f(GHz))) dB
MECHANICAL		
Connector Durability	3.15	The Insert is to be tested and its mating connector shall be subjected to 500 insertions and withdrawal cycles at 12 cycles per minute max. The Insert shall show no evidence of mechanical failure and the Insert shall meet the mating characteristic requirements.
Cable Retention Force	3.24	60 pounds (267 N) min.
Coupling Nut Retention Force	3.25	Not applicable
Force to Engage and Disengage	3.5.1	Not applicable
Longitudinal Force max.		Longitudinal force is not applicable.
Mating Characteristics	3.7	See interface dimensions.
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.
Corona Level	3.22	The connector shall not exhibit breakdown (corona) when the applied voltage is 250 volts rms and the altitude is 70,000 feet.

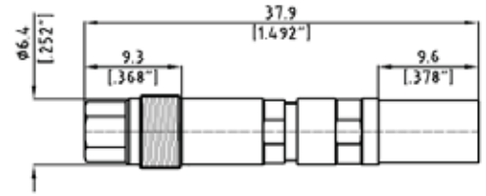
X40 Inserts, DC-40 GHz



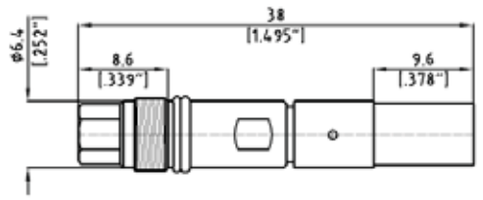
Cable Type over Insert Part Number
11
TX11-2101-02
Connector Code: XF
X-Inserts female, spring loaded, Bayonet Catch for TQ-, IQ-, BQ-, CQ- Shells



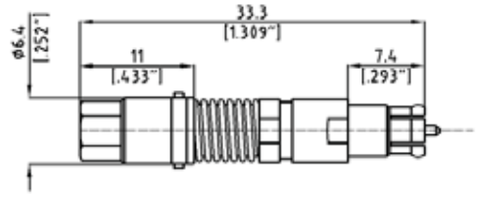
Cable Type over Insert Part Number
11
TX11-21S01-02
Connector Code: XFE
X-Inserts female, limited spring loaded, treaded nut for TQ-, IQ-, BQ-, CQ- Shells



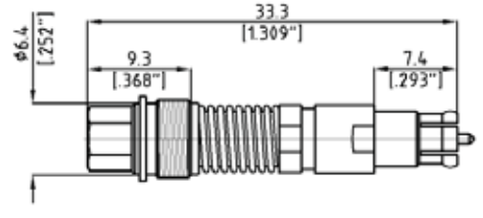
Cable Type over Insert Part Number
11
TX11-21E01-02
Connector Code: XFF
X-Inserts female. firm, threaded nut for TQ-, IQ-, BQ-, CQ- Shells



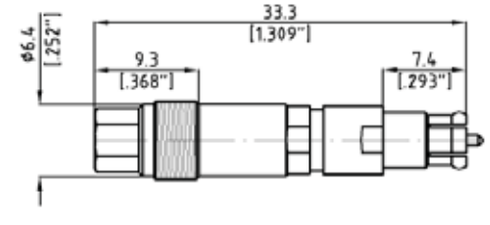
Cable Type over Insert Part Number
11
TX11-21P01-02
Connector Code: XPF
X-Inserts female, pressurized, threaded nut for TQ-, IQ-, BQ-, CQ- Shells



Cable Type over Insert Part Number
11
TX11-1102-02
Connector Code: XM
X-Inserts male, spring loaded, Bayonet Catch for TQ-, IQ-, BQ-, CQ- Shells



Cable Type over Insert Part Number
11
TX11-11S1-02
Connector Code: XME
X-Inserts male, limited spring loaded, treaded nut for TQ-, IQ-, BQ-, CQ- Shells



Cable Type over Insert Part Number
11
TX11-11F1-02
Connector Code: XMF
X-Inserts male. firm, threaded nut for TQ-, IQ-, BQ-, CQ- Shells

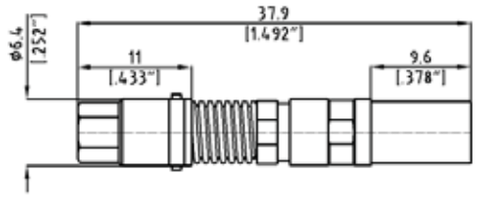
Type "X" RF-Inserts Specification DC-40 GHz

The specifications below are general specifications for all Q-Inserts for TQ-, IQ-, BQ-, and CQ- Shells. 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 MIL-PRF-39012, these specifications shall govern. The paragraph numbers refer to the associated requirement paragraphs of MIL-PRF-39012/C. These specifications are subject to change according to the latest revision.

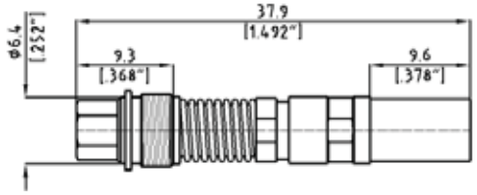
REQUIREMENT	§	GENERAL SPECIFICATIONS
GENERAL		
Standard Materials	3.3	STEEL corrosion resistant 1.4305 per DIN 17440 (QQ-S-764, class 303 or ASTM-A-582-80). ALUMINUM AlMg4.5Mn per DIN 1725, AlMgSi0.5 per DIN 1725, AlMgSi1 per DIN 1725 (6061-T6 per QQ-A-225/8). BRASS CuZn39Pb3 per DIN 17660 (UNS C 38500). COPPER BERYLLIUM 33-25 CuBe2Pb H per DIN 17666 (ASTM B 196). TFE Fluorocarbon per DIN 52900 (MIL-P-19468 and L-P403). SILICONE RUBBER per DIN 3771 (MIL-R-5847 and ZZ-R-765, Class II B,) Grade 50 - 75. 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 (1.25 µm) in accordance with ASTM B 488, Type 3, Code C, Class 1.25.
STAINLESS STEEL		shall be passivated per ASTM A 967.
ALUMINUM		Conductive Parts shall have an iridited finish per MIL-C-5541. Other parts, such as Coupling Nuts and Back-Bodies shall be anodized per MIL-A-8625.
BRASS		.00003 inch (0.75 µm) min.gold plating per ASTM B 488, Type 3, Code C, or nicle plating per QQ-N-290, as specified.
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 - 40.0 GHz min.
Insulation Resistance	3.11	Insulation resistance is not applicable.
Voltage Standing Wave Ratio (VSWR)	3.14	1.01 + .003 * f (GHz)
Contact Resistance	3.16	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	3.17	The magnitude of the test voltage shall be 1,000 volts rms at sea level.
RF High Potential	3.23	RF high potential withstanding voltage not applicable.
RF Leakage	3.26	- (90- f (GHz)) dB
Insertion Loss	3.27	(.03 SQT(f(GHz)))
MECHANICAL		
Connector Durability	3.15	The Insert is to be tested and its mating connector shall be subjected to 500 insertions and withdrawal cycles at 12 cycles per minute max. The Insert shall show no evidence of mechanical failure and the Insert shall meet the mating characteristic requirements.
Cable Retention Force	3.24	60 pounds (267 N) min.
Coupling Nut Retention Force	3.25	Not applicable
Force to Engage and Disengage	3.5.1	Not applicable
Longitudinal Force max.		Longitudinal force is not applicable.
Mating Characteristics	3.7	See interface dimensions.
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.
Corona Level	3.22	The connector shall not exhibit breakdown (corona) when the applied voltage is 250 volts rms and the altitude is 70,000 feet.

Q24-Inserts, DC-24 GHz

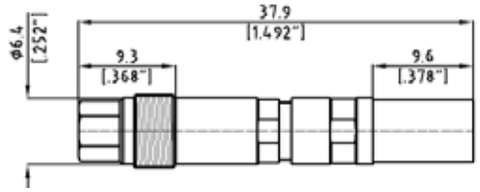
Cable Type over Insert Part Number		
11	141	43
TQ11-2101-02	TQ41-2101-02	TQ43-2101-02
Connector Code: QF		
Q-Inserts female spring loaded, Bayonet Catch for TQ-, IQ-, BQ-, CQ- Shells		



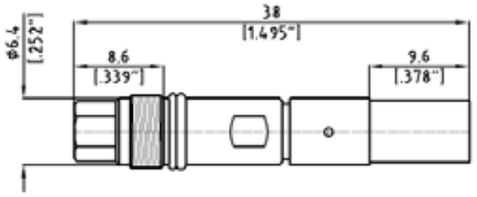
Cable Type over Insert Part Number		
11	141	43
TQ11-21S1-02	TQ41-21S1-02	TQ43-21S1-02
Connector Code: QFE		
Q-Inserts female, limited spring loaded, treaded nut for TQ-, IQ-, BQ-, CQ- Shells		



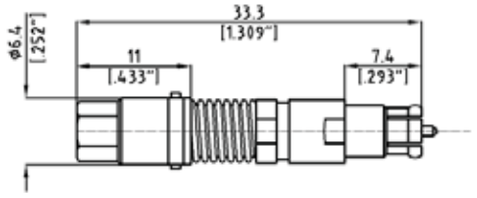
Cable Type over Insert Part Number		
11	141	43
TQ11-21E1-02	TQ41-21E1-02	TQ43-21E1-02
Connector Code: QFF		
Q-Inserts female. firm, threaded nut for TQ-, IQ-, BQ-, CQ- Shells		



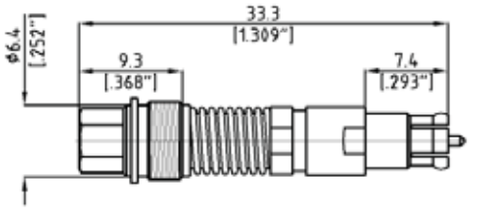
Cable Type over Insert Part Number		
11	141	43
TQ11-21P1-02	TQ41-21P1-02	TQ43-21P1-02
Connector Code: QPF		
Q-Inserts female, pressurized, threaded nut for TQ-, IQ-, BQ-, CQ- Shells		



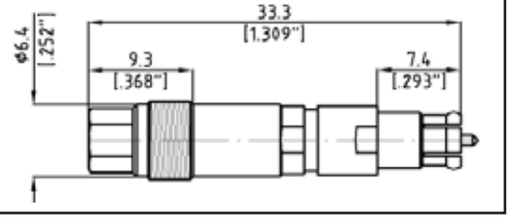
Cable Type over Insert Part Number		
11	141	43
TQ11-1102-02	TQ41-1102-02	TQ43-1102-02
Connector Code: QM		
Q-Inserts male spring loaded, Bayonet Catch for TQ-, IQ-, BQ-, CQ- Shells		



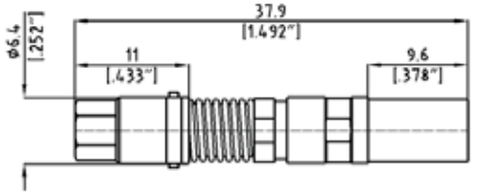
Cable Type over Insert Part Number		
11	141	43
TQ11-11S1-02	TQ41-11S1-02	TQ43-11S1-02
Connector Code: QME		
Q-Inserts male, limited spring loaded, treaded nut for TQ-, IQ-, BQ-, CQ- Shells		



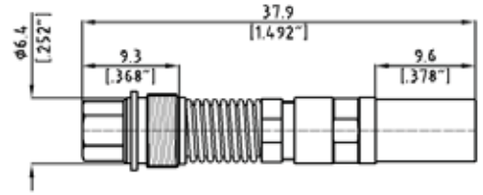
Cable Type over Insert Part Number		
11	141	43
TQ11-11F1-02	TQ41-11F1-02	TQ43-11F1-02
Connector Code: QMF		
Q-Inserts male. firm, threaded nut for TQ-, IQ-, BQ-, CQ- Shells		



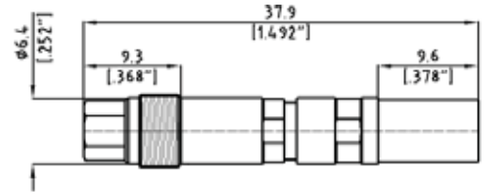
X40 Inserts, DC-40 GHz



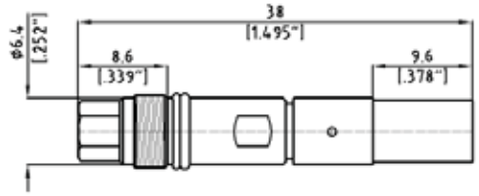
Cable Type over Insert Part Number
11
TX11-2101-02
Connector Code: XF
X-Inserts female, spring loaded, Bayonet Catch for TQ-, IQ-, BQ-, CQ- Shells



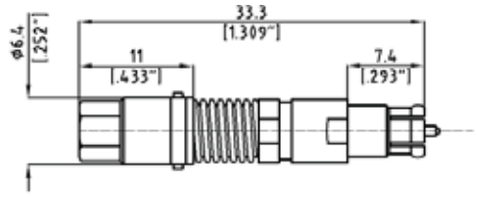
Cable Type over Insert Part Number
11
TX11-21S01-02
Connector Code: XFE
X-Inserts female, limited spring loaded, treaded nut for TQ-, IQ-, BQ-, CQ- Shells



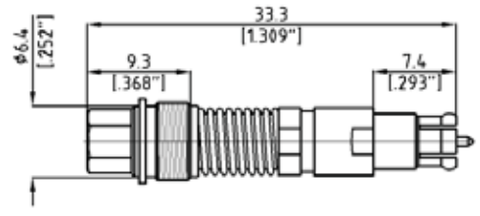
Cable Type over Insert Part Number
11
TX11-21E01-02
Connector Code: XFF
X-Inserts female. firm, threaded nut for TQ-, IQ-, BQ-, CQ- Shells



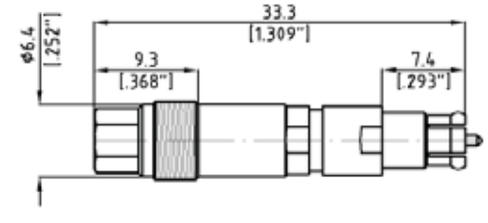
Cable Type over Insert Part Number
11
TX11-21P01-02
Connector Code: XPF
X-Inserts female, pressurized, threaded nut for TQ-, IQ-, BQ-, CQ- Shells



Cable Type over Insert Part Number
11
TX11-1102-02
Connector Code: XM
X-Inserts male, spring loaded, Bayonet Catch for TQ-, IQ-, BQ-, CQ- Shells



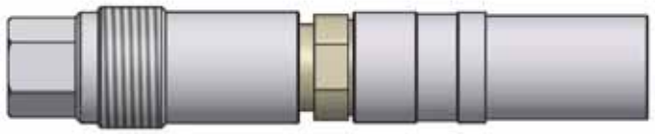
Cable Type over Insert Part Number
11
TX11-11S1-02
Connector Code: XME
X-Inserts male, limited spring loaded, treaded nut for TQ-, IQ-, BQ-, CQ- Shells



Cable Type over Insert Part Number
11
TX11-11F1-02
Connector Code: XMF
X-Inserts male. firm, threaded nut for TQ-, IQ-, BQ-, CQ- Shells

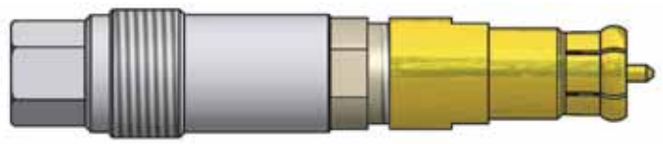
TQ-Insert female, spring loaded, Bayonet Catch

TQ-Insert female, limited spring loaded, Threaded Nut

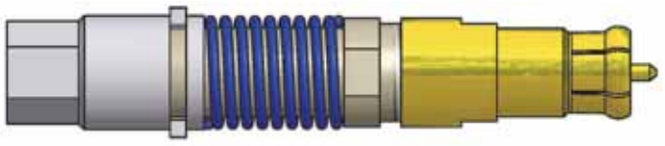


TQ-Insert female, fixed, Threaded Nut

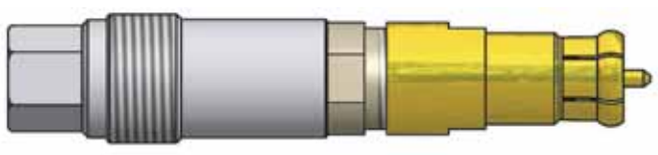
TQ-Insert female, pressurized, Threaded Nut



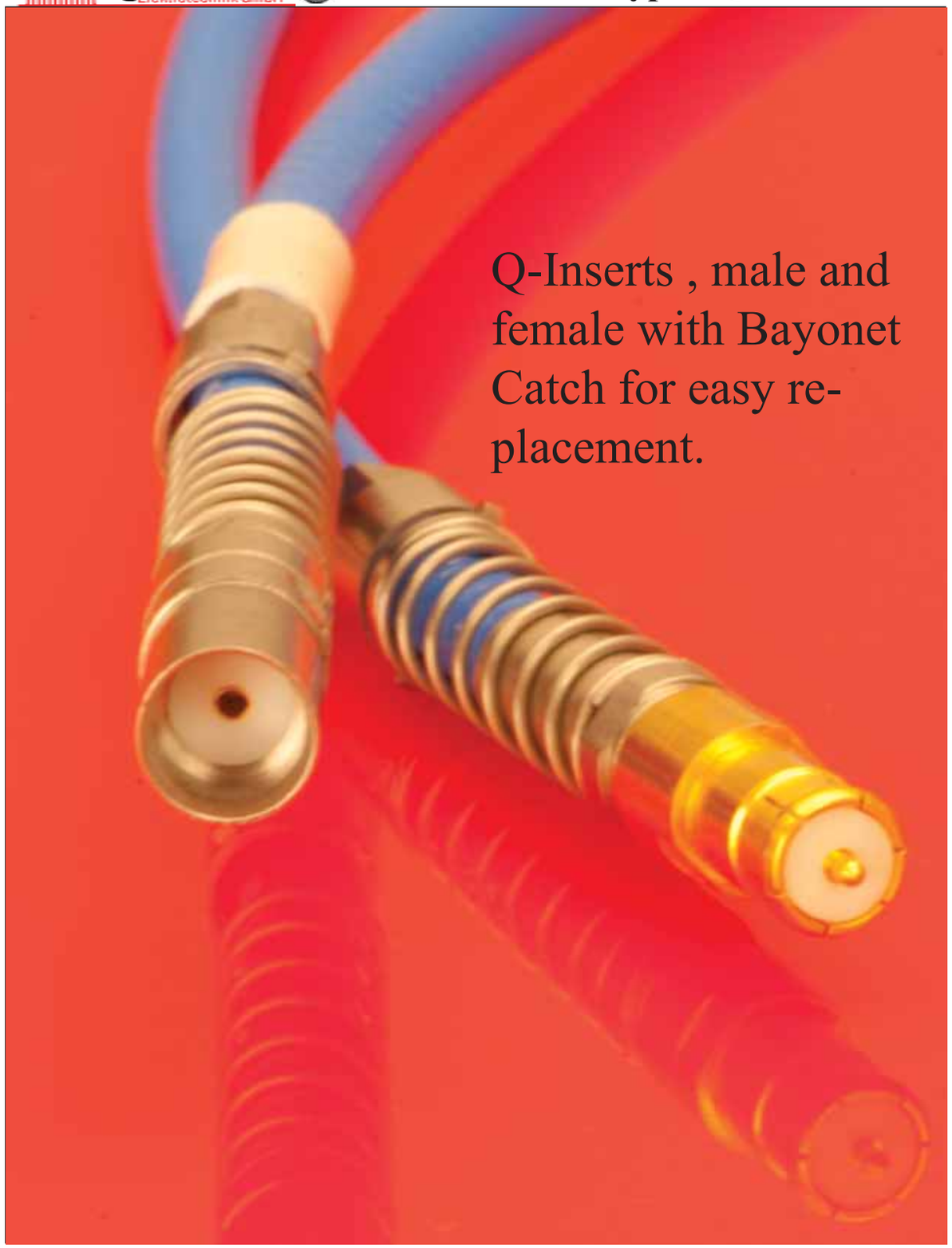
TQ-Insert male, spring loaded, Bayonet Catch



TQ-Insert male, limited spring loaded, Threaded Nut

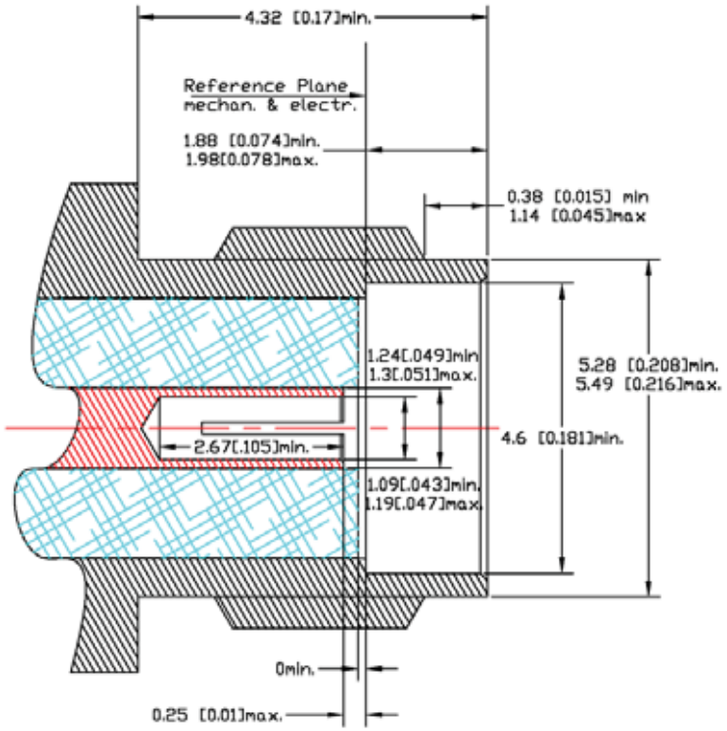


TQ-Insert male, fixed, Threaded Nut

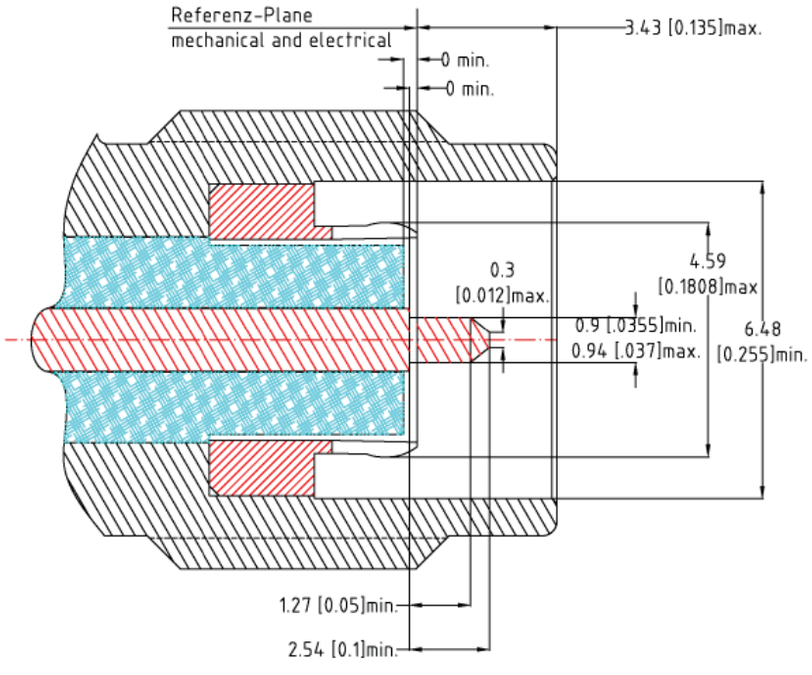


Spectrum Elektrotechnik GmbH

Standard SMA Female



Push-On SMA Male



The SMA Male Push-On is used at the rectangular RQ26-DC26 Connector

Spectrum Elektrotechnik GmbH

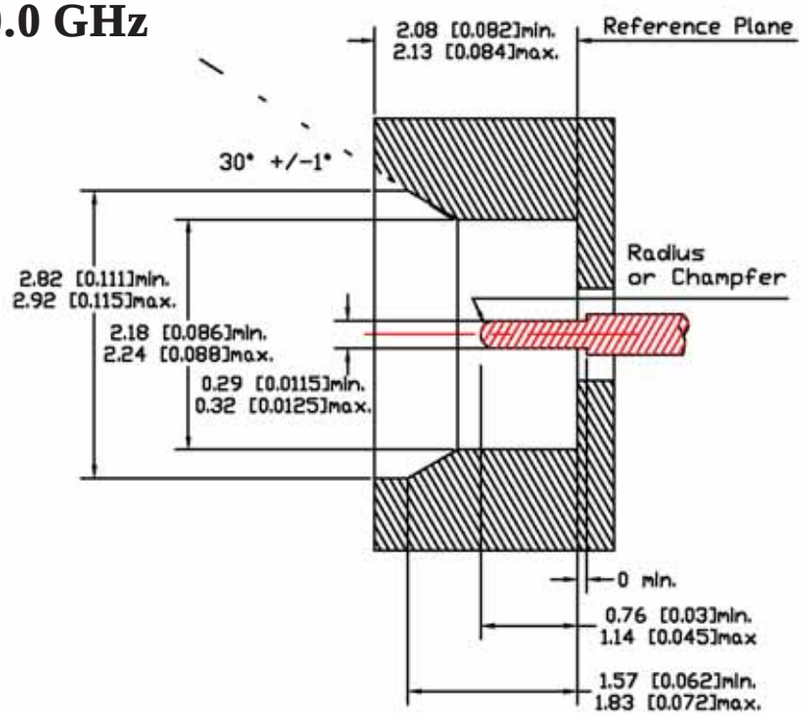
The specifications below are general specifications for all SMA PUSH-ON connectors. Specifications in the following table are recommended for any procurement documents or drawings. In the event of any conflict, these specifications shall govern.The PUSH-ON Connectors were developed to eliminate the time 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	§	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). ALUMINUM AlMg4.5Mn per DIN 1725, AlMgSi0.5 per DIN 1725, AlMgSi1 per DIN 1725 (6061-T6 per QQ-A-225/8). BRASS CuZn39Pb3 per DIN 17660 (UNS C 38500). COPPER BERYLLIUM 33-25 CuBe2Pb H per DIN 17666 (ASTM B 196). TFE Fluorocarbon per DIN 52900 (MIL-P-19468 and L-P403). SILICONE RUBBER per DIN 3771 (MIL-R-5847 and ZZ-R-765, Class II B,) Grade 50 - 75. 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 (1.25 µm) in accordance with ASTM B 488, Type 3, Code C, Class 1.25.
STAINLESS STEEL		shall be passivated per ASTM A 967.
ALUMINUM		Conductive Parts shall have an iridited finish per MIL-C-5541. Other parts, such as Coupling Nuts and Back-Bodies shall be anodized per MIL-A-8625.
BRASS		.00003 inch (0.75 µm) min.gold plating per ASTM B 488, Type 3, Code C, or nicle plating per QQ-N-290, as specified.
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 and the outer contact resistance drop shall not exceed 3.0 milliohms.
Dielectric Withstanding Voltage	3.17	The magnitude of the test voltage shall be 1,000 volts rms at sea level.
RF High Potential	3.23	The RF high potential withstanding voltage is 670 volts rms at 5 MHz. Leakage is not applicable.
RF Leakage	3.26	-80 dB max. to 3.0 GHz, -65 dB max. to 26.5 GHz
Insertion Loss	3.27	(.03 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 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	3.24	60 pounds (267 N) min.
Coupling Nut Retention Force	3.25	Not applicable
Force to Engage and Disengage	3.5.1	Not applicable
Longitudinal Force max.		Longitudinal force is not applicable.
Mating Characteristics	3.7	See interface dimensions.
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.
Corona Level	3.22	The connector shall not exhibit breakdown (corona) when the applied voltage is 250 volts rms and the altitude is 70,000 feet.

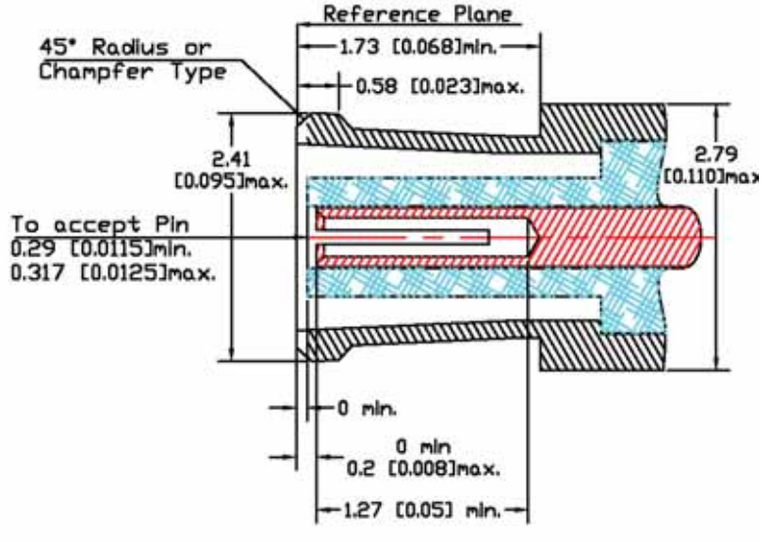
SMP

SMP DC - 40.0 GHz

male



female



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 MIL-STD-348B, these specifications shall govern. These specifications are subject to change according to the latest revision.

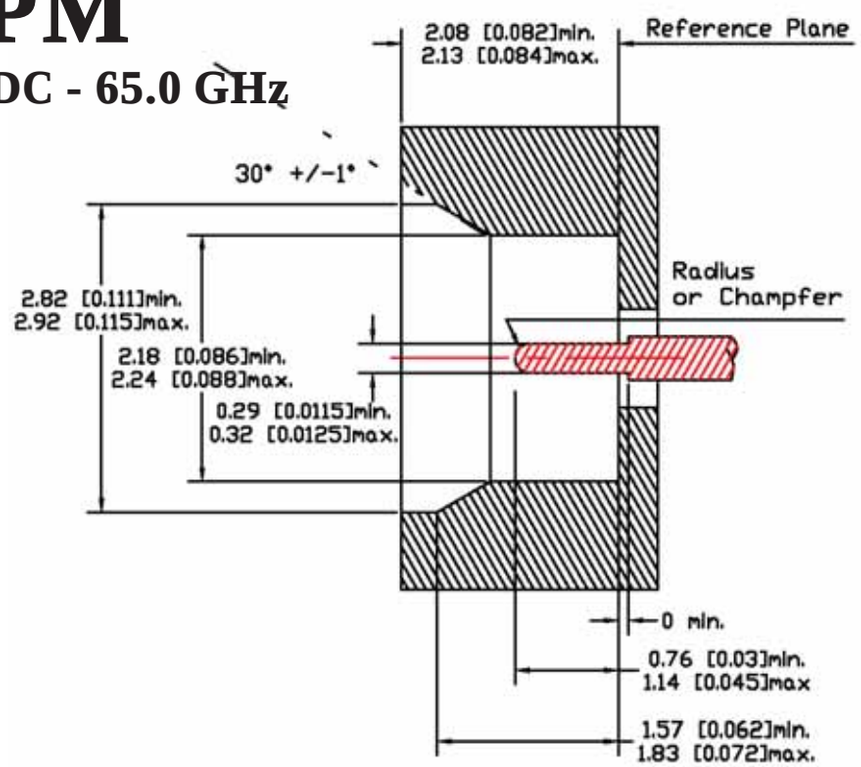
REQUIREMENT	§	GENERAL SPECIFICATIONS
GENERAL		
Standard Materials	3.3	STEEL corrosion resistant 1.4305 per DIN 17440 (QQ-S-764, class 303 or ASTM-A-582-80). ALUMINUM AlMg4.5Mn per DIN 1725, AlMgSi0.5 per DIN 1725, AlMgSi1 per DIN 1725 (6061-T6 per QQ-A-225/8). BRASS CuZn39Pb3 per DIN 17660 (UNS C 38500). COPPER BERYLLIUM 33-25 CuBe2Pb H per DIN 17666 (ASTM B 196). TFE Fluorocarbon per DIN 52900 (MIL-P-19468 and L-P403). SILICONE RUBBER per DIN 3771 (MIL-R-5847 and ZZ-R-765, Class II B,) Grade 50 - 75. 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 (1.25 µm) in accordance with ASTM B 488, Type 3, Code C, Class 1.25.
STAINLESS STEEL		shall be passivated per ASTM A 967.
ALUMINUM		Conductive Parts shall have an iridited finish per MIL-C-5541. Other parts, such as Coupling Nuts and Back-Bodies shall be anodized per MIL-A-8625.
BRASS		.00003 inch (0.75 µm) min.gold plating per ASTM B 488, Type 3, Code C, or nicle plating per QQ-N-290, as specified.
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 - 40.0 GHz min.
Insulation Resistance	3.11	The insulation resistance shall not be less than 5,000 megohms.
Voltage Standing Wave Ratio (VSWR)	3.14	1.5 : 1 max. to 40.0 GHz
Contact Resistance	3.16	The center contact resistance drop is 6.0 milliohms max.
Dielectric Withstanding Voltage	3.17	The magnitude of the test voltage shall be 500 volts rms at sea level.
RF High Potential	3.23	The RF high potential withstanding voltage is 325 volts rms at 5 MHz. Leakage is not applicable.
RF Leakage	3.26	RF Leakage is not applicable.
Insertion Loss	3.27	(.10 SQT(f(GHz))) dB
MECHANICAL		
Connector Durability	3.15	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	3.24	20 pounds (88.9 N) min.
Coupling Nut Retention Force	3.25	Not applicable
Force to Engage and Disengage	3.5.1	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).
Longitudinal Force max.		Longitudinal force is not applicable.
Mating Characteristics	3.7	See interface dimensions.
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.
Corona Level	3.22	The connector shall not exhibit breakdown (corona) when the applied voltage is 250 volts rms and the altitude is 70,000 feet.

SMPM

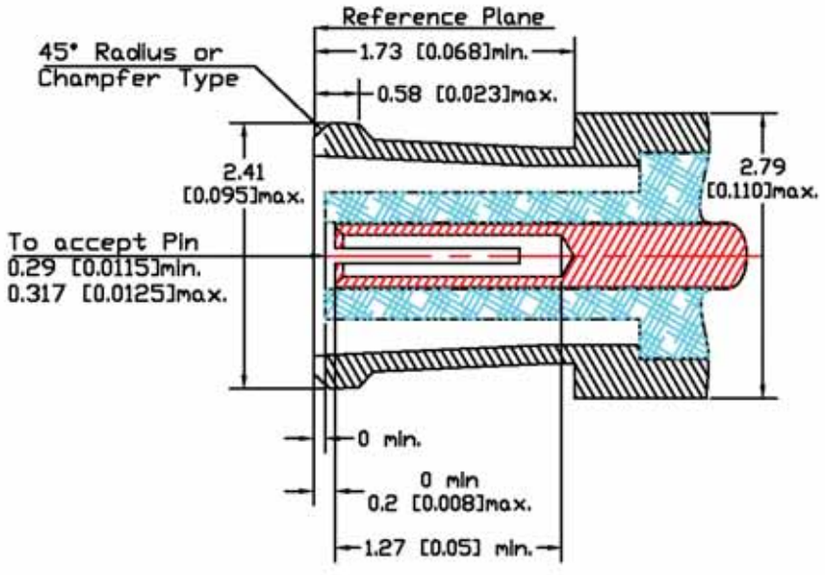
SMPM DC - 65.0 GHz

The SMPM Inserts are used in the 65 GHz Multiports of sizes 13 and 25

male



female



The specifications below are general specifications for all SMPM 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 of MIL-STD-348B shall govern. These specifications are subject to change according to the latest revision.

REQUIREMENT	§	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). ALUMINUM AlMg4.5Mn per DIN 1725, AlMgSi0.5 per DIN 1725, AlMgSi1 per DIN 1725 (6061-T6 per QQ-A-225/8). BRASS CuZn39Pb3 per DIN 17660 (UNS C 38500). COPPER BERYLLIUM 33-25 CuBe2Pb H per DIN 17666 (ASTM B 196). TFE Fluorocarbon per DIN 52900 (MIL-P-19468 and L-P403). SILICONE RUBBER per DIN 3771 (MIL-R-5847 and ZZ-R-765, Class II B,) Grade 50 - 75. 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 (1.25 µm) in accordance with ASTM B 488, Type 3, Code C, Class 1.25.
STAINLESS STEEL		shall be passivated per ASTM A 967.
ALUMINUM		Conductive Parts shall have an iridited finish per MIL-C-5541. Other parts, such as Coupling Nuts and Back-Bodies shall be anodized per MIL-A-8625.
BRASS		.00003 inch (0.75 µm) min.gold plating per ASTM B 488, Type 3, Code C, or nicle plating per QQ-N-290, as specified.
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 - 65.0 GHz min.
Insulation Resistance	3.11	The insulation resistance shall not be less than 5,000 megohms.
Voltage Standing Wave Ratio (VSWR)	3.14	1.5 : 1 max. to 65.0 GHz
Contact Resistance	3.16	The center contact resistance drop is 6.0 milliohms max.
Dielectric Withstanding Voltage	3.17	The magnitude of the test voltage shall be 500 volts rms at sea level.
RF High Potential	3.23	The RF high potential withstanding voltage is 325 volts rms at 5 MHz. Leakage is not applicable.
RF Leakage	3.26	RF Leakage is not applicable.
Insertion Loss	3.27	(.10 SQT(f(GHz))) dB
MECHANICAL		
Connector Durability	3.15	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	3.24	20 pounds (88.9 N) min.
Coupling Nut Retention Force	3.25	Not applicable
Force to Engage and Disengage	3.5.1	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).
Longitudinal Force max.		Longitudinal force is not applicable.
Mating Characteristics	3.7	See interface dimensions.
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.
Corona Level	3.22	The connector shall not exhibit breakdown (corona) when the applied voltage is 250 volts rms and the altitude is 70,000 feet.

The specifications below are general specifications for all SMPM 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 of MIL-STD-348B shall govern. These specifications are subject to change according to the latest revision.

REQUIREMENT	§	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). ALUMINUM AlMg4.5Mn per DIN 1725, AlMgSi0.5 per DIN 1725, AlMgSi1 per DIN 1725 (6061-T6 per QQ-A-225/8). BRASS CuZn39Pb3 per DIN 17660 (UNS C 38500). COPPER BERYLLIUM 33-25 CuBe2Pb H per DIN 17666 (ASTM B 196). TFE Fluorocarbon per DIN 52900 (MIL-P-19468 and L-P403). SILICONE RUBBER per DIN 3771 (MIL-R-5847 and ZZ-R-765, Class II B,) Grade 50 - 75. 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 (1.25 µm) in accordance with ASTM B 488, Type 3, Code C, Class 1.25.
STAINLESS STEEL		shall be passivated per ASTM A 967.
ALUMINUM		Conductive Parts shall have an iridited finish per MIL-C-5541. Other parts, such as Coupling Nuts and Back-Bodies shall be anodized per MIL-A-8625.
BRASS		.00003 inch (0.75 µm) min.gold plating per ASTM B 488, Type 3, Code C, or nicle plating per QQ-N-290, as specified.
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 - 65.0 GHz min.
Insulation Resistance	3.11	The insulation resistance shall not be less than 5,000 megohms.
Voltage Standing Wave Ratio (VSWR)	3.14	1.5 : 1 max. to 65.0 GHz
Contact Resistance	3.16	The center contact resistance drop is 6.0 milliohms max.
Dielectric Withstanding Voltage	3.17	The magnitude of the test voltage shall be 500 volts rms at sea level.
RF High Potential	3.23	The RF high potential withstanding voltage is 325 volts rms at 5 MHz. Leakage is not applicable.
RF Leakage	3.26	RF Leakage is not applicable.
Insertion Loss	3.27	(.10 SQT(f(GHz))) dB
MECHANICAL		
Connector Durability	3.15	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	3.24	20 pounds (88.9 N) min.
Coupling Nut Retention Force	3.25	Not applicable
Force to Engage and Disengage	3.5.1	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).
Longitudinal Force max.		Longitudinal force is not applicable.
Mating Characteristics	3.7	See interface dimensions.
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.
Corona Level	3.22	The connector shall not exhibit breakdown (corona) when the applied voltage is 250 volts rms and the altitude is 70,000 feet.

Multipin- / Multiport- Cable Assemblies

Build your own Multipin/Multiport Connector by using the Table below.

Update 2019-06-19

Part Number System of the traditional SQ-Multipin/Multiport Connector. The Part Number consists of 12 digits, e.g. SQ-8M0-B11NN

1 & 2	3	4		5		6		7	8		9 and 10		11	12	
Series		Shell Size	Number of Inserts	Sex & Connector Conf.		Pressure			Insert Back Body		Cable Type		Key	Surface Treatment	
SQ per MIL-DTL-38999, Series3	"-" = straight; "+" = 90° angled	21	8	M	Male	0	Normal	"-"	B	Bayonet Catch	11	Type 11	N A B C D	**N**	N=Nickel
				F	Fem. 4-Hole Front Mount						43	Type 43		**C**	C=Cadmium
				R	Fem. 4-Hole Rear Mount										
				B	Bulkhead Feedthr. Jack										

Part Number System of the TQ-, IQ-,BQ-, and CQ-Multipin/Multiport Connectors. The Part Number consists of 12 digits, e.g. TQ-TM0-T10NC

1 & 2	3	4											5		6		7	8		9 and 10		11	12	
Series		Remarks	Number of Inserts										Sex & Connector Conf.		Pressure			Insert Back Body		Cable Type		Key	Surface Treatment	
TQ per MIL-DTL-38999, Series3	"-" = straight	No of Inserts	4	4	7	8	9	9	10	12	19	37	M=Male		0= Normal		"-"	B	B=Bayonet Catch	1N	Type 102	N A B C D	N	N=Nickel
MQ per MIL-DTL-38999, Series3		Codes	F	4	7	8	E	9	T	Z	N	S	F=Female 4-Hole Front Mount		P= Pressurized					1S	Type 10			
BQ per MIL-DTL-38999, Series3		Shell Sizes	25	21	25	21	21	13	25	25	25	25	R=Female 4-Hole Rear Mount		H= Hermetic				B=Bayonet Catch	2S	SFT205			
CQ per MIL-DTL-38999, Series1	"+" =90° angled	Cable Types	141	11 43 100	11 43 100	11 43	39	47F 89F 677	11 43 100	11 43	6A	4 F	B=Bulkhead Feedthrough Jack		V= Venting Holes			T	T=Thread Fixed	4F	Type 47F			
BQ per MIL-DTL-38999, Series1																		L	L=Limited Spring Loaded & threaded	6A	Type 677			
																				8F	Type 89F			
																				10	**Type 100**			
																				11	Type 11			
																				39	Type 39			
																				41	Type 141			
																				42	SFT142			
																				43	Type 43			
																				44	Type 44A			
																				M4	Multiflex 141			

Part Number System of the RQ-Multipin/Multiport Connector. The Part Number consists of 12 digits, e.g. RQ-RM0-T110S

1 & 2	3	4		5		6		7	8		9 and 10		11	12	
		Number of Inserts		Sex		Pressure			Insert Back Body		Cable Type		Key	Surface Treatment	
RQ	"-"	**F**	F= Five (size 52 x 24 mm)	M	M=Male	0	Normal	"-"	T	T=Thread	11	Type 11	0	G S	G=Gold Chromate
		H	H=8 in Honeycomb Configuration								39	Type 39			
		L	L=8 inline Configuration								43	Type 43			
		R	R = 23						Q	Q=Quick Lock	44	Type 44A			
				F	F=Female						6A	Type 677			S=Surtech
											SL	Stripline			
									L	L=Lim. spring loaded	85	Type 85L			
											89	Type 89			

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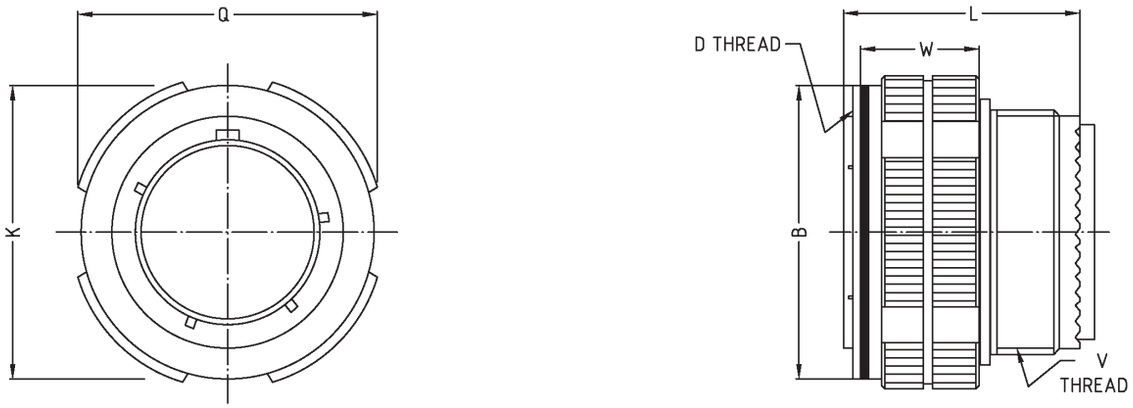
Step 1:

Identifying the Multiport Connector that is supposed to be used.You find detailed information at pages 42 to 47

Example; The subject connector is supposed to be per **MIL-DTL-38999 Series III Straight Plug, Size 25,** as shown below

MIL-DTL-38999 Series III Straight Plug Dimensions

Shell Size	B +0.008 (0.2) -0 (0) inch (mm)	K max. inch (mm)	L max. inch (mm)	O Dia. max. inch (mm)	W +0.008 (0.2) -0.04 (0.1) inch (mm)	V Thread	D Thread Class 2A (Plated)
25	1.744 (44.3)	1.768 (44.9)	1.234 (31.34)	1.875 (47.62)	0.76 (19.3)	M37X1-6g0.100R	1.6250-0.1P-0.3L-TS

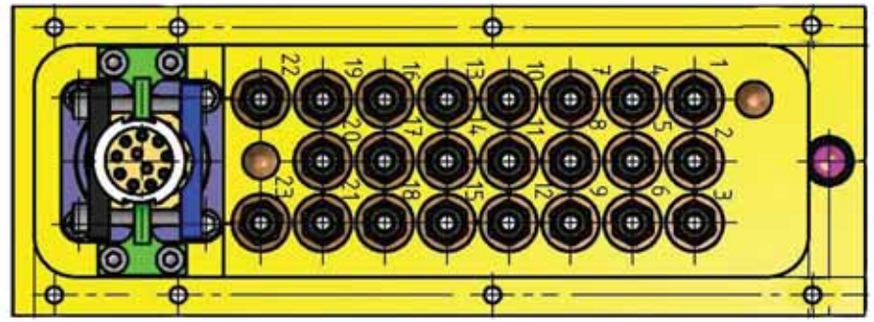


You may identify the Part Number by using the table at Page 84/85 for

- Connector Series
- Straight or Right Angle
- Shell Size
- Number of Inserts
- Sex
- Normal Application, or Pressure tight, or Hermetic, or Venting Holes required
- Specifics of the Back Body of the Insert
- Cable Type selected from Pages 98 to 103. But please note that the Multiport Dimension may limit the dimension of the outer diameter of the cable.
- Keying Selction at the Multiport from Page 41
- Surface treatment of the Multiport

or contact Customer Support and let them do it for you.

In order to identify the Rectangular Multiport Connector that can be used, you will find detailed information at pages 54 to 67



You may identify the Part Number by using the table at Page 84/85 for

- Connector Series
- Straight or Right Angle
- Shell Size
- Number of Inserts
- Sex
- Normal Application, or Pressure tight, or Hermetic, or Venting Holes required
- Specifics of the Back Body of the Insert
- Cable Type you selected from Pages 98 to 103 But please note that the Multiport Dimension may limit the dimension of outer diameter of the cable diameter.
- Surface treatment of the Multiport

or contact Customer Support and let them do it for you.

Step 2: Identifying the P/N of the Cable Asseblies that are supposed to be used

The Part Number Sequence for each Cable is:

ABCD-EFGH-JKL-MNO

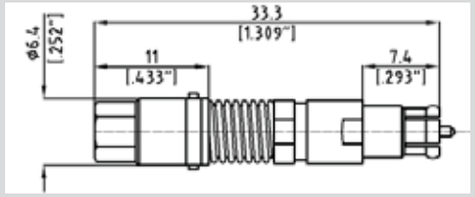
Cable-Code **Length in mm** **Connector1 Code** **Connector2 Code**

a) Specifying the Cable:
The Cable used should be Type 100, as seen on Page 101
The Cable Code ABCD becomes 0100, omitting the leading 0 = 100

b) Specifying the length EFGH of the cable from interface to Interface (for angled connectors the middle of the mitred unit is used:
Length of 650mm: the code is 0650 (not omitting the leading 0)
Length of 32m: 32000mm = 320 dm = D320 (320 Decimeter**s)**

c) As Insert Connector JKL the following unit has been picked:

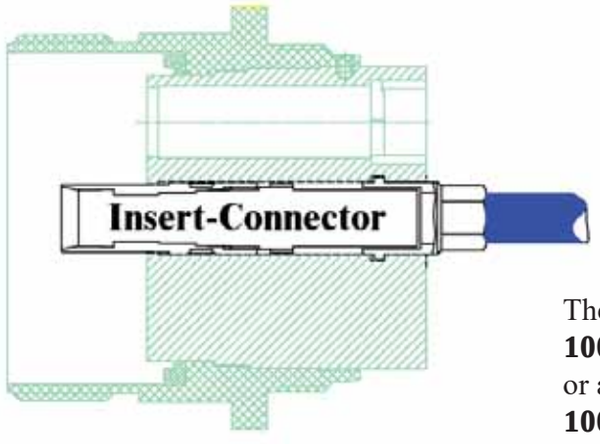
Cable Type over Insert Part Number		
11	141	43
TQ11-1102-02	TQ41-1102-02	TQ43-1102-02
Connector Code: QM		
Q-Inserts male spring loaded, Bayonet Catch for TQ-, IQ-, BQ-, CQ- Shells		

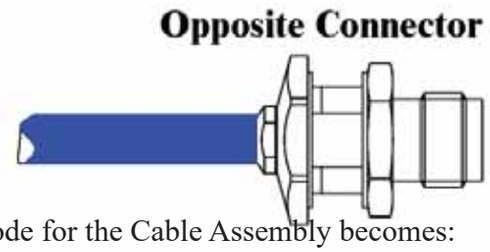


The Code is QM (omitting the blank character)

d) As opposite Connector the TNC BFJ has been picked. The Code MNO becomes 43, as seen on Page 91ff (omitting the blank character)

Female	**Bulkhead Feedthrough**	**Pressure Tight**	**43P**
Female	**Bulkhead Feedthrough**		**43**
Female	**Mitred Right Angle**	**4-Hole Flange**	**48**





The Code for the Cable Assembly becomes:
100-0650-QM-43
or alternatively for 32m length:
100-D320-QM-43

Besides the Spectrum Inserts of Types "Q" (Q24) and "X" (X40) also other Connectors Styles have been used as Inserts in several Multiports:

- **SMP**
- **SMPM**
- **SMA Push-On male Connector**
- **Size 16 Contact**

Using Connector **SMP** as Insert			
Cable Type over Insert Part Number			
11	39	47F	677
TM11-1101-02	TM39-1101-02	TM47-1101-02	TM67-1101-02
Connector Code: TMM			
TMM-Inserts male fixed, threaded nut for TQ-, IQ-, BQ-, CQ- Shells			
Cable Type over Insert Part Number			
11	39	47F	677
TM11-21S1-02	TM39-21S1-02	TM47-21S1-02	TM67-21S1-02
Connector Code: TMF			
TMF-Inserts female limited spring loaded, threaded nut for TQ-, IQ-, BQ-, CQ- Shells			

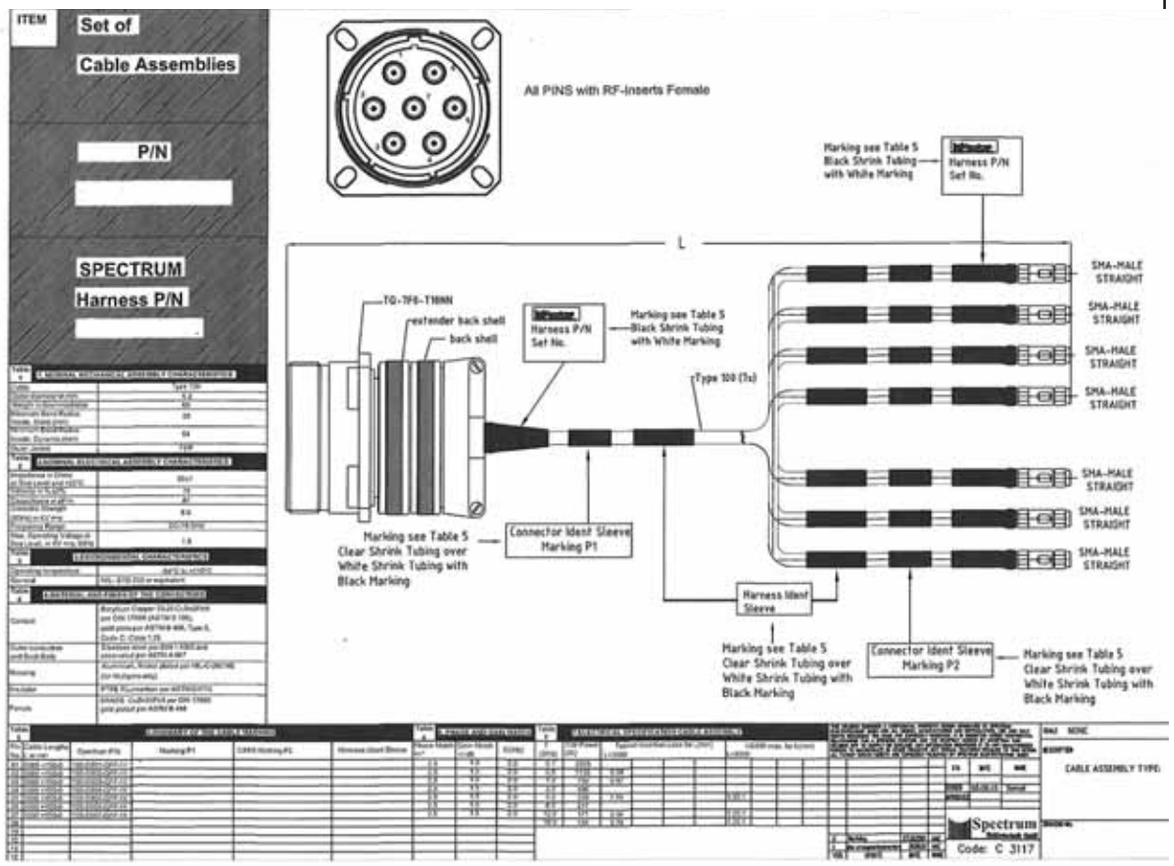
Using Connector **SMPM** as Insert			
Cable Type over Insert Part Number			
11	39	47F	677
TP11-1101-02	TP39-1101-02	TP47-1101-02	TP67-1101-02
Connector Code: TPM			
TPM-Inserts male fixed threaded nut for TQ-, IQ-, BQ-, CQ- Shells			
Cable Type over Insert Part Number			
11	39	47F	677
TP11-21S1-02	TP39-21S1-02	TP47-21S1-02	TP67-21S1-02
Connector Code: TPF			
TPF-Inserts female limited spring loaded, threaded nut for TQ-, IQ-, BQ-, CQ- Shells			

Using Connector **SMA Push-On male** as Insert			
Cable Type over Insert Part Number			
11	39	43	100
SM11-1101-02	SM39-1101-02	SM43-1101-02	SM10-1101-02
Connector Code: SM			
TPF-Inserts male fixes for TQ-, IQ-, BQ-, CQ- Shells			

Using Size 16 Connector as Insert			
Cable Type over Insert Part Number			
		47F	677
Connector Code:			
TMM-Inserts male fixed, threaded nut for TQ-, IQ-, BQ-, CQ- Shells			

Step 3:

Spectrum will then assign a special Part Number for the Harness and will, if required, issue a data sheet showing all details of the product.



Always keep in mind that customer service at Spectrum Elektrotechnik GmbH will be happy to do all this for you. Just a short communication is needed.

Connector Selection vs. Frequency Range

Coaxial Connector Frequency Range Chart

Frequency in (GHz) →	1	2	3	4	8	12.0	15	18	26.5	30	40	50	65
Band	L	S		C	X		KU		K	KA			

Connector Type	Operational Range →	Applicable MIL, DIN or IEC Spec
1.4/4.4	DC - 20.0 GHz	DIN 47298
1.8/5.6	DC - 10.0 GHz	DIN 47226
2/5.5	DC - 14.0 GHz	DIN 47235
1.85 mm	DC - 71.0 GHz for some Designs	IEEE-STD 287
2.4 mm	DC - 50.0 GHz	IEEE-STD 287
2.92 mm	DC - 40.0 GHz	MIL-STD-348A
3.5 mm	DC - 35.0 GHz	IEEE-STD 287
7 mm	DC - 18.0 GHz	IEEE-STD 287
7/16	DC - 7.5 GHz	DIN 47223
BMA	DC - 22.0 GHz	MIL-PRF-39012/1B
BNC	DC - 4.0 GHz	MIL-STD-348A/MIL-PRF-39012
C	DC - 10.0 GHz	MIL-STD-348A/MIL-PRF-39012
HN	DC - 8.0 GHz	MIL-STD-348A/MIL-PRF-39012
N	DC - 18.0 GHz min., optional DC - 20.0 GHz	MIL-STD-348A/MIL-PRF-39012
SBC	Frequency Range depending on Design and Application	Spectrum Specification
SBX	DC - 8.0 GHz	Spectrum Specification
SBY	DC - 12.0 GHz	Spectrum Specification
SBZ	Frequency Range depending on Design and Application	
SC	DC - 10.0 GHz	MIL-STD-348A/MIL-PRF-39012
SMA	DC - 18.0 GHz	MIL-STD-348A/MIL-PRF-39012
SMP	DC - 40.0 GHz	MIL-STD-348A/MIL-PRF-39012
SMPM	DC - 65.0 GHz	MIL-STD-348A/MIL-PRF-39012
TNC	DC - 11.0 GHz	MIL-STD-348A/MIL-PRF-39012
TNCA	DC - 18.0 GHz	MIL-STD-348A/MIL-PRF-39012
TNX	DC - 18.0 GHz	Spectrum Specification

Connector Selection Chart

Type	Sex	Description	Details	Code	Finish
1.4/4.4	Male	Straight		03	Brass Silver Plated
.8/5.6	Female	Mitred Right Angle		06	Brass Gold Plated
	Female	Straight		04	
	Male	Mitred Right Angle		05	
	Male	Straight		07	
1.85mm	Female	Radius Right Angle		VF9	Stainless Steel Passivated
	Female	Straight		VF	
	Female	Straight	NMD	V2	
	Male	Straight	Maxi Nut	MV	
	Male	Radius Right Angle		VM9	
	Male	Straight		VM	
	Male	Straight	NMD	V2M	
13/30	Female	Straight		ZB1	Brass Silver Plated
	Male	Straight		Z13	
2.4mm	Female	Bulkhead Feedthrough		HB	Stainless Steel Passivated
	Female	Radius Right Angle		HF9	
	Female	Straight	2-Hole Flange Mount	HF2	
	Female	Straight	4-Hole Flange Mount	HF4	
	Female	Straight	NMD	H2	
	Female	Straight		HF	
	Male	Radius Right Angle		HM9	
	Male	Straight	Maxi Nut	M2	
	Male	Straight	NMD	H2M	
	Male	Straight		HM	
2/5.5	Male	Mitred Right Angle		02	Brass Silver Plated
2.92mm	Female	Bulkhead Feedthrough		KFB	Stainless Steel Passivated
	Female	Radius Right Angle		KF9	
	Male	Radius Right Angle		KM9	
	Male	Radius Right Angle	Ultem Bead	KU9	
	Male	Radius Right Angle	Ultem Bead	KUN	Stainless Steel Gold Plated
	Female	Straight	2-Hole Flange Mount	KF2	Stainless Steel Passivated
	Female	Straight	4-Hole Flange Mount	KF4	
	Female	Straight	NMD	WI	
	Female	Straight		KF	
	Female	Straight	Venting Holes	KFV	
	Male	Straight	Hex Nut	KM	
	Male	Straight	Hex/Knurl Nut	KMK	
	Male	Straight	Extreme Short Connector	KMS	
	Male	Straight	High Power Hex/Knurl Nut	KMQ	
	Male	Straight	High Power Hex Nut	KMU	
	Male	Straight	Venting Holes	KMV	
	Male	Straight	Maxi-Nut	MK	
	Male	Straight	NMD	WIM	

Connector Selection Chart Update 2017-06-23

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Type	Sex	Description	Details	Code	Finish
3.5mm	Female	Straight	2-Hole Flange Mount	922	Stainless Steel Passivated
	Female	Straight	4-Hole Flange Mount	924	
	Female	Straight	NMD	H3	
	Female	Straight		92	
	Female	Straight	Venting Holes	92V	
	Male	Straight	Maxi Nut	M3	
	Male	Straight	NMD	H3M	
	Male	Straight		91	
	Male	Straight	Venting Holes	91V	
7 mm	Male	Straight	4 Slots Center Contact	90	Stainless Steel Passivated
	Male	Straight	6 Slots Center Contact	96	
	Male	Straight	Field Replaceable 4 sl.	E90	
	Male	Straight	Field Replaceable 6 sl.	E96	
7/16	Female	Bulkhead Feedthrough		753	Stainless Steel Passivated
	Female	Straight	4-Hole Flange Mount	754	
	Female	Straight	High Power	76H	
	Female	Straight		76	
	Male	Mitred Right Angle		755	
	Male	Straight	High Power	75H	
	Male	Straight		75	
BMA	Female	Bulkhead Feedthrough		BB	Stainless Steel Passivated
	Female	Straight	2-Hole Flange	BF	
	Female	Straight		BW	
	Female	Straight	Customer Phase Adjustable	BWA	
	Male	Straight		BM	
	Male	Straight	2 hole flange	BM2	
	Male	Straight	Customer Phase Adjustable	BMA	
BNC	Female	Bulkhead Feedhrough		81B	Brass Nickel Plated
	Female	Bulkhead Feedthrough		85	
	Female	Mitred Right Angle		83	
	Female	Straight	4-Hole Flange	84	
	Female	Straight		81	
	Male	Mitred Right Angle		74	
	Male	Straight		71	
	Male	Straight		72	Stainless Steel Passivated
C	Female	Straight		89	Stainless Steel Passivated
	Male	Straight		88	
EIA 1 5/8	Male	Straight		EA5	Brass Silver Plated
EIA 3 1/8	Male	Straight	4-Hole Flange	EA3	Brass Silver Plated
HN	Female	Bulkhead Feedthrough		68B	Stainless Steel Passivated
	Female	Straight		68	
	Male	Right Angle		67	
	Male	Straight	for Armoring	69	

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Connector Selection Chart Update 2017-06-26

Type	Sex	Description	Details	Code	Finish
Multi Inserts for BQ,CQ,IQ SQ,TQ	Female	Firm, DC - 24.0 GHz		QFF	Stainless Steel Passivated
	Female	F irm, DC - 24.0 GHz	Test Connector	TFF	
	Female	F irm, DC - 24.0 GHz	Venting Holes	VFF	
	Female	Firm, DC - 40.0 GHz		XFF	
	Female	Lim. Spring Load, DC - 24.0 GHz		QFE	
	Female	Lim. Spring Load, DC - 40.0 GHz		XFE	
	Female	Pressurized DC - 24.0 GHz		QPF	
	Female	Pressurized DC - 40.0 GHz		XPF	
	Female	Spring Loaded, DC - 24.0 GHz		QF	
	Female	Spring Loaded, DC - 40.0 GHz		XF	
	Male	Firm, DC - 24.0 GHz		QMF	
	Male	Firm, DC - 24.0 GHz	Test Connector	TMF	
	Male	Firm, DC - 40.0 GHz		XMF	
	Male	Lim. Spring Load, DC - 24.0 GHz		QME	
	Male	Lim. Spring Load, DC - 40.0 GHz		XME	
	Male	Spring Loaded, DC - 24.0 GHz		QM	
	Male	Spring Loaded, DC - 40.0 GHz		XM	
N	Female	Bulkhead Feedthrough		63	Stainless Steel Passivated
	Female	Mitred Right Angle	4-Hole Flange	5C	
	Female	Mitred Right Angle	Bulkhead Feedthrough	5A	
	Female	Straight	4-Hole Flange	65	
	Female	Straight	4-Hole Flange Hi.Power	64H	
	Female	Straight	High Power	61H	
	Female	Straight	Hugh Power Bead	61U	
	Female	Straight	Interchangeable Connector	E61	
	Female	Straight		61	
	Male	135° Angle		53	
	Male	Mitred Right Angle		55	
	Male	Mitred Right Angle	Water Protected IP66	55W	
	Male	Push-On, Full Locking		NS	
	Male	Push-On, Full Locking	Double "D"	ND	
	Male	Push-On, Full Locking	Double "D"	NDB	Brass Silver Plated
	Male	Push-On, Full Locking		NDS	Stainless Steel Passivated
	Male	Right Angle	Double "D", Hi. Power	55H	
	Male	Straight	90° Cable Bent	51B	
	Male	Straight	Factory Phase Adjustable	51L	
	Male	Straight	Water Protected IP66	51W	
	Male	Straight	Hex/Knurl Nut without wire holes	510	
	Male	Straight	Hex/Knurl Nut with wire holes	511	
	Male	Straight	High Power	50	BeCu2 Silver Plated
	Male	Straight	High Power	51H	Stainless Steel Passivated
	Male	Straight	Interchangeable Connector	E51	
	Male	Straight	Phase Adj. C. .100°@18GHz	51A	
	Male	Straight	Phase Adj. C. .240°@18GHz	51C	
	Male	Straight	Phase Adj. C. .280°@18GHz	51B	
	Male	Straight	Ruggedized	52	
	Male	Straight	Venting Holes	51V	
	Male	Straight		51	
	Male	Straight	GOST Norm	51G	
	Male	Straight, Push-On, Full Lockg		NSB	Brass Silver Plated

Connector Selection Chart Update 2017-06-23

Type	Sex	Description	Details	Code	Finish
QMA	Female	Straight		Q2	Stainless Steel Passivated
	Female	Bulkhead Feedthr. Locking	factory phase adjustable	QFL	
	Female	4-Hole Flange Locking	factory phase adjustable	Q4L	
	Male	Straight		Q1	
	Male	Straight Locking		Q1L	
	Male	Straight Locking	factory phase adjustable	Q1P	
	Male	Bulkhead Feedthr. Locking	factory phase adjustable	QML	
RQ23	Female	Insert, Firm	Multipin Insert	21F	Stainless Steel Passivated
	Male	Insert, Spring Loaded		SMX	
SBX	Female	Bulkhead Feedthrough		XFR	Stainless Steel Passivated
	Female	Push-On; 4-Hole Flge Float Mount	High Power	XF4	
SBY	Female	Straight		YF	Stainless Steel Passivated
	Male	Straight		YM	
SC	Female	Bulkhead Feedthrough	High Power	78H	Stainless Steel Passivated
	Female	Bulkhead Feedthrough		78	
	Female	Straight	High Power	79H	
SC	Female	Straight		79	Stainless Steel Passivated
	Male	Mitred Right Angle		77	
	Male	Mitred Right Angle	High Power	77H	
	Male	Straight	High Power	80H	
	Male	Straight	High Power & Water protected	8HP	
	Male	Straight	Venting Holes	80V	
	Male	Straight		80	
SMA continuing at next Page	Female	Radius Right Angle	Reverse Sex	R99	Stainless Steel Passivated
	Female	Bulkhead Feedthrough		22	
	Female	Bulkhead Feedthrough		23	
	Female	Mitred Right Angle	Long Neck	18L	
	Female	Mitred Right Angle	Regular Neck	18R	
	Female	Mitred Right Angle		18	Stainless Steel Gold Plated
	Female	Radius Right Angle		19	Stainless Steel Passivated
	Female	Radius Right Angle		28	Stainless Steel Gold Plated
	Female	Radius Right Angle	4-Hole Flange	29	
	Female	Right Angle, Water Protected	Water Protected	14P	Stainless Steel Passivated
	Female	Straight		20	Stainless Steel Gold Plated
	Female	Straight	2-Hole Flange	26	
	Female	Straight	4-Hole Flange	24	
	Female	Straight	4-Hole Flange	25	Stainless Steel Passivated
	Female	Straight	High Power	21H	
	Female	Straight	Venting Holes	21V	
	Female	Straight	Interchangeable Connector	E21	
	Female	Straight		21	
	Female	Straight	Water Protected	21P	
	Female	Radius Right Angle		18	Stainless Steel Gold Plated
	Female	Straight, Phase Adjustable	4-Hole Flange	PH1	Stainless Steel Passivated
	Male	180 Degree Bow		8W	
	Male	Mitred Right Angle	Long Neck	153	
	Male	Mitred Right Angle	Regular Neck	151	
	Male	Mitred Right Angle	Short Neck	152	
	Male	Mitred Right Angle		14	Stainless Steel Gold Plated
	Male	Mitred Right Angle		15	Stainless Steel Passivated
	Male	Mitred Right Angle, Wire-holes	Long	156	

Connector Selection Chart Update 2017-06-26

Type	Sex	Description	Details	Code	Finish
SMA continued	Male	Mitred Right Angle, Wire-holes	Regular	154	Stainless Steel Passivated
	Male	Mitred Right Angle, Wire-holes	Short Neck	155	
	Male	Push-On		SM	
	Male	Radius Right Angle		16	
	Male	Radius Right Angle		17	
	Male	Straight	2-Hole Flange	27	
	Male	Straight	Across Flats at the cable entry	1S	
	Male	Straight	for Armoring	1E	
	Male	Straight	Maxi Nut	MA	
	Male	Straight	Phase Adjustable	PH	
	Male	Straight	Regular	10	Stainless Steel gold plated
	Male	Straight	Short Connector	10S	
	Male	Straight	Regular	11	Stainless Steel Passivated
	Male	Straight, Self Locking	Phase Adj. C. .280°@18GHz	11B	
	Male	Straight, Self Locking	Phase Adj. C. .240°@18GHz	11C	
	Male	Straight, Self Locking	Phase Adj. C. .100°@18GHz	11A	
	Male	Straight	Water Protected	11P	
	Male	Straight	Phase Adjustable Connector	11D	
	Male	Straight, DC - 26.5 GHz		11K	
	Male	Straight, DC - 26.5 GHz	Venting Holes	1KV	
	Male	Straight, DC - 18.0 GHz	Factory Phase Adjustable,	11L	
	Male	Straight, DC - 26.5 GHz	Factory Phase Adjustable,	1LK	
	Male	Straight	Short Connector	11S	
	Male	Straight	Venting Holes	11V	
	Male	Straight, using Cable C. Conductor		12	
SMA reverse sex	Female	Straight		20R	Stainless Steel gold plated
	Male	Straight		10R	
	Male	Straight		11R	Stainless Steel passivated
	Male	Right Angle, Mitred		15R	
SMB	Female	Right Angle, Mitred		RB	Brass Gold Plated
	Female	Straight, Push-On		FB	
	Male	Straight		MB	
SMC	Male	Mitred Right Angle		CW	Brass Gold Plated
	Male	Straight		MC	
	Female	Straight		FC	
SMP	Female	Bulkhead Feedthrough		SPU	BeCu2 Gold Plated
	Female	Float Mount		SPV	
	Female	Mitred Right Angle		MPR	
	Female	Mitred Right Angle		SPQ	
	Female	Mitred Right Angle	EMI Gasket, Anti Rock Ring	SPA	
	Female	Push-On, Right Angle, Mitred		SPR	
	Female	Straight	EMI-Gasket	SPG	
	Female	Straight		SPT	
	Female	Straight, DC - 18.0 GHz	Test Connector	TMP	Stainless Steel Passivated
	Female	Straight, DC - 18.0 GHz	Test Connector	TJ	
	Female	Straight, DC - 18.0 GHz	Test Connector Limited Det.	TJL	BeCu2 Gold Plated
	Female	Straight, DC - 18.0 GHz	Test Connector Full Detent	TJF	
	Female	Straight, DC - 18.0 GHz		SPF	
	Female	Straight, DC - 18.0 GHz	Locking	SPL	Stainless Steel Passivated
	Female	Mitred Right Angle	Locking	SPN	
	Female	Straight, DC - 26.5 GHz		SPE	BeCu2 Gold Plated
	Female	Straight, DC - 40.0 GHz		PF	
	Male	Bulkhead Feedthrough	Smooth Bore	STS	Stainless Steel Passivated
	Male	Bulkhead Feedthrough	Limited Detent	STL	
	Male	Bulkhead Feedthrough	Full Detent	STF	
	Male	Straight	Test Connector Commercial	TMJ	
	Male	Straight	Smooth Bore	SPW	
	Male	Straight	Limited Detent	SRL	
	Male	Straight, 2-Hole Flange	Full Detent	SRF	
	Male	Straight Panel Mount	Smoot Bore	SPS	
SMPM	Female	Straight		SZF	BeCu2 Gold Plated
	Male	Straight		SZM	Stainless Steel Passivated

Connector Selection Chart Update 2017-06-23

Type	Sex	Description	Details	Code	Finish
SPM	Female	Bulkhead Feedthrough		PGF	Stainless Steel Passivated
	Female	Straight	2- Hole Flange	PG2	
	Female	Straight	4- Hole Flange	PG4	
	Female	Straight		PJ	
	Male	Straight	High Power	PMH	
	Male	Straight		PM	
SSMA	Female	Straight		SSF	Stainless Steel Passivated
	Male	Straight		SSM	
TNC	Female	135° Angle, Bulkhead Feethrough		42	
	Female	Bulkhead Feedthrough	High Power	43H	
	Female	Bulkhead Feedthrough	Pressure Tight	43P	
	Female	Bulkhead Feedthrough		43	
	Female	Mitred Right Angle	4-Hole Flange	48	
	Female	Mitred Right Angle	4-Hole Flange High Power	48H	
	Female	Radius Right Angle	4- Hole Flange	46	
	Female	Radius Right Angle	4- Hole Flange	47	
	Female	Straight		41	
	Female	Straight	4-Hole Flange	41H	
	Female	Straight	High Power	41U	
	Female	Straight	High Power, 4-Hole Flange	45H	
	Female	Straight	Interchangeable Connector	E41	
	Female	Straight	Venting Holes	41V	
	Female	Straight, 4-Hole Flange		44	
	Female	Straight, 4-Hole Flange		45	
	Female	Straight		40	
	Male	135° Angle		36R	
	Male	135° Angle, 18.0 GHz		36	
	Male	Mitred Right Angle	Phase Adj. C. .280°@18GHz	35B	Stainless Steel Passivated
	Male	Mitred Right Angle	Phase Adj. C. .240°@18GHz	35C	
	Male	Mitred Right Angle	Phase Adj. C. .100°@18GHz	35A	
	Male	Mitred Right Angle	High Power	35H	
	Male	Mitred Right Angle	High Power, Factory Phase Adj.	35L	
	Male	Mitred Right Angle	Long Neck	35M	
	Male	Mitred Right Angle	Very Long Neck	35N	
	Male	Mitred Right Angle		35	
	Male	Radius Right Angle		35R	
	Male	Straight	90° Radius at Cable	31B	
	Male	Straight	High Power	31H	
	Male	Straight	High Power, Factory Phase Adj.	31L	
	Male	Straight		31	
	Male	Straight	Interchangeable Connector	E31	
	Male	Straight, Self Locking	Phase Adj. C. .280°@18GHz	31B	
	Male	Straight, Self Locking	Phase Adj. C. .240°@18GHz	31C	
	Male	Straight, Self Locking	Phase Adj. C. .100°@18GHz	31A	
	Male	Straight	Phase Adjustable Connector	31D	
	Male	Straight	Venting Holes	31V	
	Male	Straight, Push-On	Full Locking	TS	
TNX	Female	Straight		49	Stainless Steel Passivated
	Male	Straight		39	

Connector Selection Chart Update 2017-06-26

Type	WG Designation	Groove and Gasket at the Flange	Square, or Double Ridge	Top- or End-Launched	Flange Type	Code	Material & Finish
WG with direct cable attach-ment	WR-137	No	Square	End Launched		137	Aluminum Surtech 650
	WRD250-D30	No	Double Ridge	End Launched		D25	
	WRD500-D36	No	Double Ridge	End Launched		D50	
	WRD650-D28	No	Double Ridge	EndLaunched		D65	
	WRD650-D28	Yes	Double Ridge	End Launched		X65	
	WRD750-D24	No	Double Ridge	End Launched		D75	

CONNECTOR SPECIFICATION

MATERIALS
STEEL corrosion resistant 1.4305 per DIN EN 10088-3
or ASTM A 582.
ALUMINUM AlMg4.5Mn, AlMgSi0.5, AlMgSi1 per DIN EN 573-3 or SAE AMS QQ-A-225/8.
BRASS CuZn39Pb3 per DIN EN 12163/12164 or CW614N or ASTM B 16
COPPER BERYLLIUM 33-25 CuBe2PbH per ASTM B196
TFE Flurocarbon per ASTM D 1710
SILICONE RUBBER per A A 59588
BORRIUM NITRITE Dielectric for high power applications per in house specification.

FINISH
CENTER CONTACTS shall be gold plated to a minimum thickness of .00005 inch (1.27 µm) in accordance with
ASTM B 488 Type 2, Code C, Class 1.25.
STAINLESS STEEL shall be passivated per ASTM-A967.
ALUMINUM: Conductive Parts shall have an iridited
finish per MIL-DTL-5541, Other parts, such as Coupling Nuts and Back Bodies shall be anodized per MIL-A-8625.
BRASS: .00003 inch (0.8 µm) min. gold plating per ASTM B 488 Type 2, Code C, Class 0.75, or nickel plating per
SAE AMS-QQ-N-290, as specified.
VARIOUS: Imoloy .0001 inch (2.5 µm) min. plating, consisting of 55% Copper / 20% Zinc / 25% Tin (on special request).

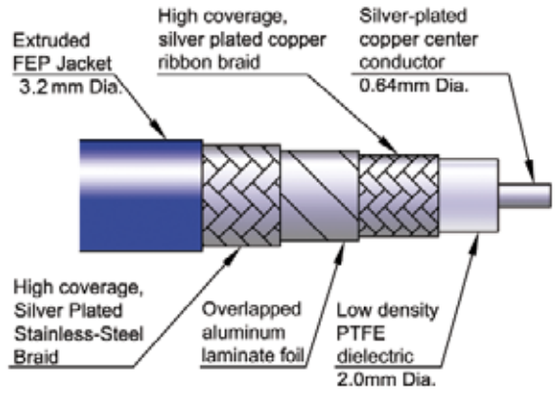
ELECTRICAL
Please refer to the appropriate connector specification.
MECHANICAL
Please refer to the appropriate connector specification.

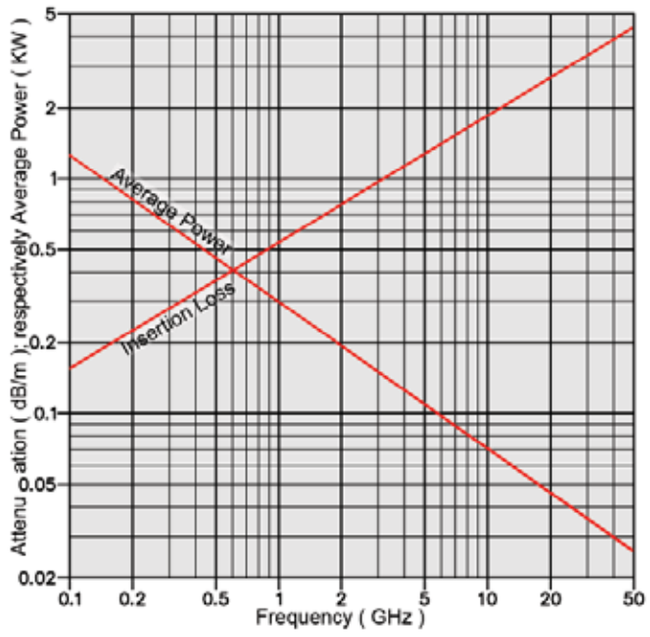
ENVIRONMENTAL
Corrosion (Salt Spray): Specification MIL-STD-202, Method 101, Test Condition B. The salt solution shall be 5%.
Vibration: Specification MIL-STD-202, Method 204, Test Condition D.
Shock: Specification MIL-STD-202, Method 213, Test Condition I.
Moisture Resistance: Specification MIL-STD-202, 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 connecor shall not exhibit breakdown (corona) when the applied voltage is 375 volts rms and
the altitude is 70,000 feet.

Cable - Type 11
DC - 50.0 GHz

SPECIFICATION		Type 11
Cable Code	Standard	11
	Armored	11x
	X: Please find Armor & Ruggedizing Options n Section S.	
Frequency Range		DC to 50.0 GHz
Outer Diameter in mm		3.2
Impedance in Ohms at Sea Level and +25°C		50 ± 2
Velocity in %, ± 2%		74
Capacitance in pF/m		90
Dielectric Strength (60 Hz) in KV rms		5.0
Max. Operating Voltage at Sea Level, in KV rms, 60 Hz		0.5
Insertion Loss in dB/m vs. Frequency	0.5 GHz	0.37
	2.0 GHz	0.76
	5.0 GHz	1.24
	10.0 GHz	1.80
	18.0 GHz	2.53
	26.5 GHz	2.98
	40.0 GHz	3.90
	50.0 GHz	4.40
Nominal CW-Power in Watts, vs. Frequency, at Sea Level and + 20°C	0.5 GHz	470
	2.0 GHz	190
	5.0 GHz	107
	10.0 GHz	65
	18.0 GHz	48
	26.5 GHz	38
	40.0 GHz	30
	50.0 GHz	26
RF - Leakage at 18.0 GHz		- 90 dBC
Operating Temperature Range		-54°C to +150°C
Outer Conductor Construction		Silver Plated Copper Braid, Overlapping Aluminum Film, Silver Plated Copper Braid
Outer Jacket		FEP
Dielectric Diameter in mm		2.0
Dielectric Material		Low Density PTFE
Dielectric Constant		1.8
Center Conductor Material		Copper, Silver Plated
Center Conductor Dia. in mm		0.64
Weight in Grams/Meter		26.2
Connector Retention Force (N)		130
Minimum Bend Radius, Inside, Static (mm)		12.7
Minimum Bend Radius, Inside, Dynamic (mm)		31.7

Characteristics:
* Low Loss Performance to 50.0 GHz
* 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: 2.4mm, 2.92mm 3.5mm, 7mm, N, SMA, SBX, SBY, BQ-, CQ-, IQ-, RQ-, SQ- TQ-Series and TNC. For Connector Outline Drawings please refer to Section Q.
* For Connector Code details please refer to Section S.
* For information on armor please refer to Section S as well.
* For ordering information please refer to Section A.

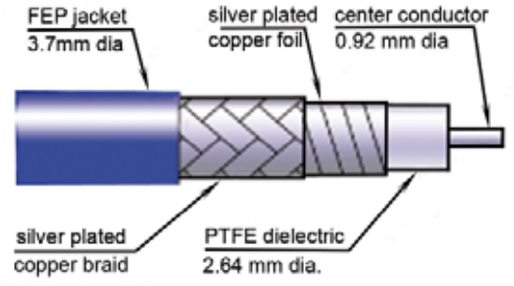


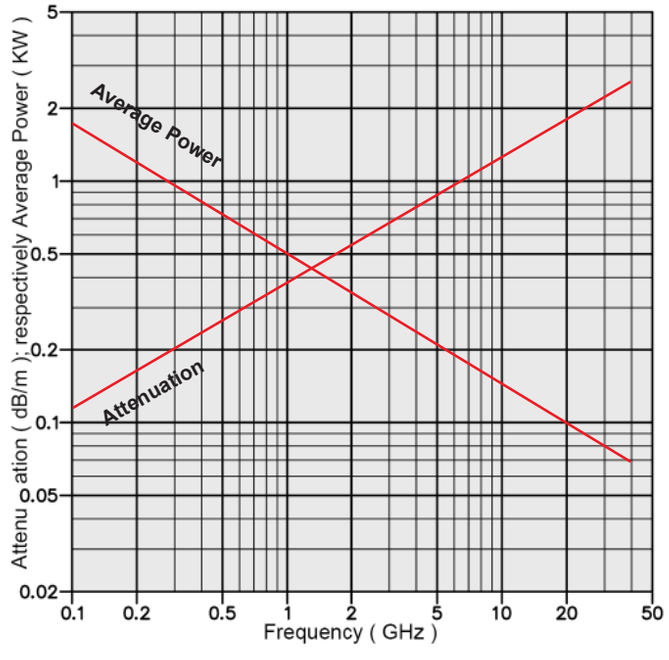


Cable - Type 39
Ultimate Performance
DC - 45.0 GHz

SPECIFICATION		Type 39
Cable Code	Standard	39
	Armored	39x
	X: Please find Armor & Ruggedizing Options in Section S.	
Frequency Range		DC to 45.0 GHz
Outer Diameter in mm	Standard	3.7
Impedance in Ohms at Sea Level and +25°C		50 ± 2
Velocity in %, ± 2%		84
Capacitance in pF/m		79
Dielectric Strength (60 Hz) in KV rms		2.0
Max. Operating Voltage at Sea Level, in KV rms, 60 Hz		1.3
Nominal Insertion Loss in dB/m vs. Frequency	1.0 GHz	0.36
	4.0 GHz	0.73
	8.0 GHz	1.04
	12.0 GHz	1.29
	18.0 GHz	1.60
	26.0 GHz	1.94
	40.0 GHz	2.46
Nominal CW-Power in Watts, vs. Frequency, at Sea Level and + 20°C	1.0 GHz	500
	4.0 GHz	260
	8.0 GHz	180
	12.0 GHz	150
	18.0 GHz	120
	26.0 GHz	100
	40.0 GHz	75
RF - Leakage at 18.0 GHz		- 100 dBC
Operating Temperature Range		-65°C to +200°C
Outer Conductor Construction		Silver-Plated Copper Foil, Silver-Plated Copper Braid
Outer Jacket		FEP
Dielectric Diameter in mm		2.64
Dielectric Material		Low Density PTFE
Dielectric Constant		1.6
Center Conductor Material		Copper, Silver Plated
Center Conductor Dia. in mm		0.92
Weight in Grams/Meter		33
Connector Retention Force (N)		140
Minimum Bend Radius, Inside, Static (mm)		19
Minimum Bend Radius, Inside, Dynamic (mm)		75

Characteristics:
* Excellent Performance DC to 45 GHz.
* Small diameter
* Excellent Flexibility
* Meeting the very highest Quality Standards.
* 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, 2.92mm 3.5mm, 7mm, N, SMA, SBX, SBY, BQ-, CQ-, IQ-, RQ-, SQ- TQ-Series and TNC.. For Connector Outline Drawings please refer to Section Q.
* For Connector Code details please refer to Section S.
* For information on armor please refer to Section S as well.
* For ordering information please refer to Section A.





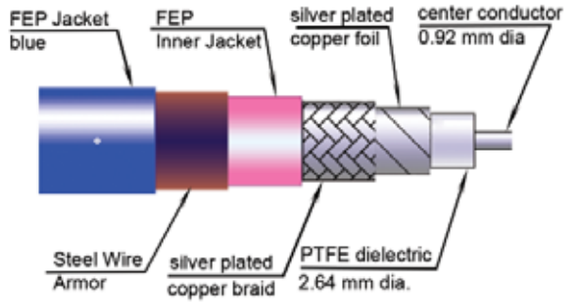
Cable -Type 39S

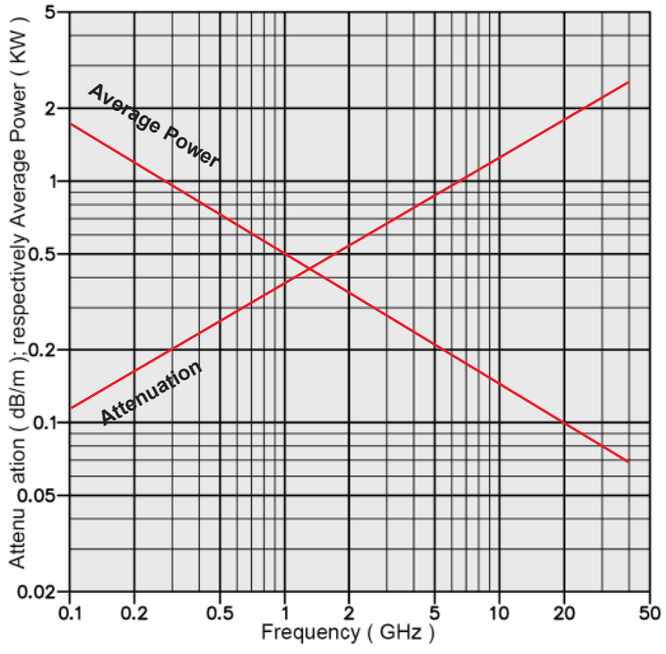
Ultimate Performance
DC - 45.0 GHz

SPECIFICATION		Type 39C
Cable Code	Standard	39S
	Armored	39Sx
	X: Please find Armor & Ruggedizing Options in Section S.	
Frequency Range		DC to 45.0 GHz
Outer Diameter in mm	Standard	4.9
Impedance in Ohms at Sea Level and +25°C		50 ± 2
Velocity in %, ± 2%		84
Capacitance in pF/m		79
Dielectric Strength (60 Hz) in KV rms		2.0
Max. Operating Voltage at Sea Level, in KV rms, 60 Hz		1.3
Nominal Insertion Loss in dB/m vs. Frequency	1.0 GHz	0.36
	4.0 GHz	0.73
	8.0 GHz	1.04
	12.0 GHz	1.29
	18.0 GHz	1.60
	26.0 GHz	1.94
	40.0 GHz	2.46
Nominal CW-Power in Watts, vs. Frequency, at Sea Level and + 20°C	1.0 GHz	500
	4.0 GHz	260
	8.0 GHz	180
	12.0 GHz	150
	18.0 GHz	120
	26.0 GHz	100
	40.0 GHz	75
RF - Leakage at 18.0 GHz		- 100 dBC
Operating Temperature Range		-65°C to +200°C
Outer Conductor Construction		Silver-Plated Copper Foil, Silver-Plated Copper Braid
Outer Jacket		FEP
Dielectric Diameter in mm		2.64
Dielectric Material		Low Density PTFE
Dielectric Constant		1.6
Center Conductor Material		Copper, Silver Plated
Center Conductor Dia. in mm		0.92
Weight in Grams/Meter		70
Connector Retention Force (N)		140
Minimum Bend Radius, Inside, Static (mm)		19
Minimum Bend Radius, Inside, Dynamic (mm)		75

Excellent Performance DC to 45 GHz.

* **Steel wire armor under outer jacket**
* Small diameter
* Excellent Flexibility
* Meeting the very highest Quality Standards.
* 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, 2.92mm 3.5mm, 7mm, N, SMA, SBX, SBY, BQ-, CQ-, IQ-, RQ-, SQ- TQ-Series and TNC.. For Connector Outline Drawings please refer to Section Q.
* For Connector Code details please refer to Section S.
* For information on armor please refer to Section S as well.
* For ordering information please refer to Section A.





Cable - Type 43

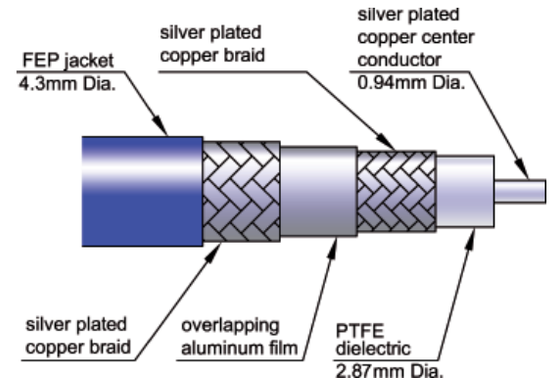
DC - 26.5 GHz

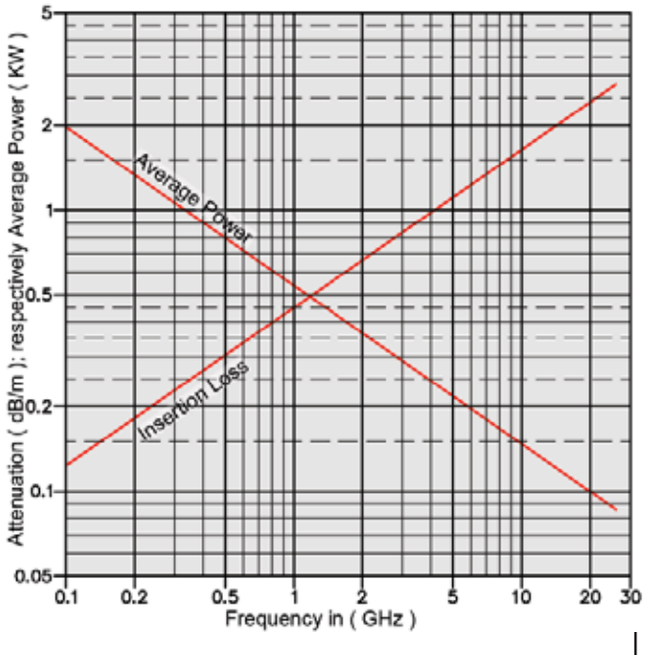
SPECIFICATION		Type 43
Cable Code	Standard	43
	Armored	43x
	X: Please find Armor & Ruggedizing Options in Section S.	
Frequency Range		DC to 26.5 GHz
Outer Diameter in mm	Standard	4.3
Impedance in Ohms at Sea Level and +25°C		50 ± 2
Velocity in %, ± 2%		72
Capacitance in pF/m		93.5
Dielectric Strength (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	0.30
	2.0 GHz	0.63
	4.0 GHz	0.93
	8.0 GHz	1.36
	12.4 GHz	1.69
	18.0 GHz	2.12
	26.5 GHz	2.60
Nominal CW-Power in Watts, vs. Frequency, at Sea Level and + 20°C	0.5 GHz	785
	2.0 GHz	344
	4.0 GHz	227
	8.0 GHz	150
	12.4 GHz	118
	18.0 GHz	93
	26.5 GHz	75
RF - Leakage at 18.0 GHz		-90 dBC
Operating Temperature Range		-54°C to +125°C
Outer Conductor Construction		Silver Plated Copper braid, Aluminum Film, Silver Plated Copper braid
Outer Jacket		FEP
Dielectric Diameter in mm		2.87
Dielectric Material		Low Density PTFE
Dielectric Constant		1.9
Center Conductor Material		Copper, Silver Plated
Center Conductor Dia. in mm		0.94
Weight in Grams/Meter		45
Connector Retention Force (N)		140
Minimum Bend Radius, Inside, Static (mm)		26
Minimum Bend Radius, Inside, Dynamic (mm)		55

Characteristics:

* Excellent Performance to 26.5 GHz.
* Meeting the very highest Quality Standard
* 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, 2.92mm 3.5mm, 7mm, N, SMA, SBX, SBY, BQ-, CQ-, IQ-, RQ-, SQ- TQ-Series and TNC.. For Connector Outline Drawings please refer to Section Q.
* For Connector Code details please refer to Section S.
* For information on armor please refer to Section S as well.
* For ordering information please refer to Section A.

TOP FOLDER





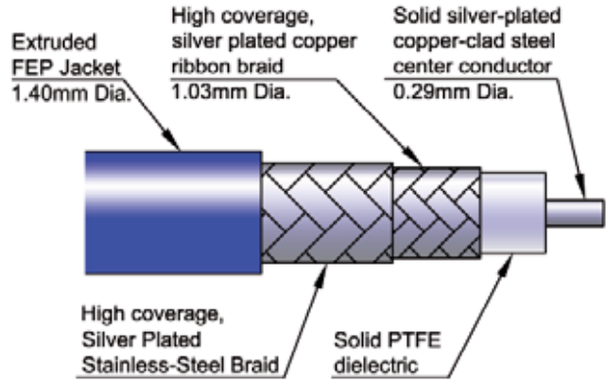
Cable - Type 47F

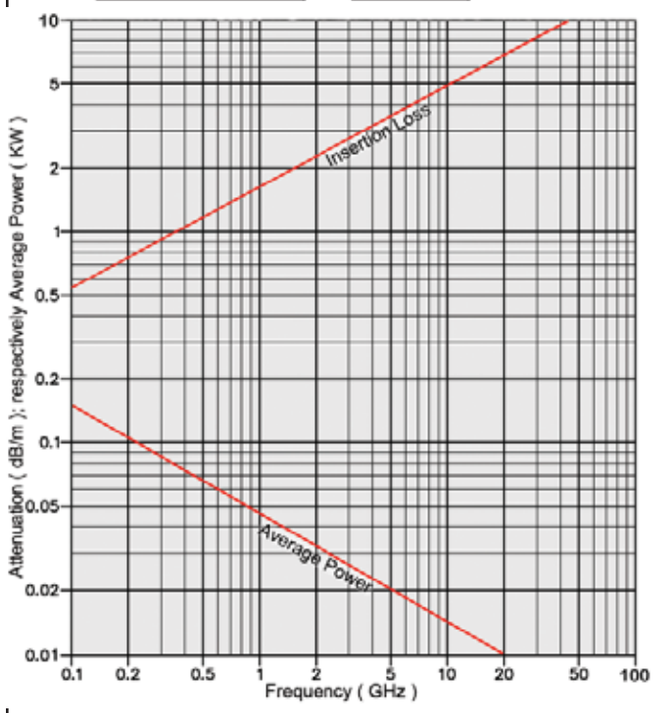
DC - 65.0 GHz

SPECIFICATION	SpectrumFlex 47F	
Cable Code	**47F**	
Frequency Range	DC - 65.0 GHz	
Outer Diameter in mm	1.40	
Impedance in Ohms at Sea Level and +25°C	50 ± 2	
Velocity in %	70.5	
Delay (ns/m) (nominal)	4.75	
Power Handling Avg. in Watts at 1.0 GHz	50	
Capacitance nominal pF/m	94.8	
Operating Temperature Range	-54°C to +125°C	
Nominal Insertion Loss in dB/m vs. Frequency	1.0 GHz	1,35
	2.5 GHz	2,15
	10.0 GHz	4,5
	18.0 GHz	6,2
	26.5 GHz	7,6
	40.0 GHz	9,7
	50.0 GHz	11.35
	65.0 GHz	13.06
Nominal CW-Power in Watts, vs. Frequency, at Sea Level and + 20°C	1.0 GHz	46
	2.5 GHz	28
	10.0 GHz	14
	18.0 GHz	10
	26.5 GHz	7
	40.0 GHz	6
	50.0 GHz	5
	65.0 GHz	3
Outer Conductor Construction	High coverage, silver-plated copper ribbon braid, High coverage, silver-plated stainless-steel braid	
Outer Jacket	Extruded FEP jacke	
Dielectric Diameter in mm	0.91	
Dielectric Material	Solid PTFE	
Dielectric Constant	2.0	
Center Conductor Material	Solid silver-plated copper-clad steel	
Center Conductor Dia. in mm	0.29	
Connector retention (N)	45	
Weight in Grams/Meter	6	
Minimum Bend Radius (mm)	dynamic	15.25
	static	2.54

Characteristics:

- Performance to 65.0 GHz.
- Solid PTFE dielectric featuring Ultra-high strength, multilayer outer braid:
- High compression resistance and greater durability
- Eliminates cable breakage associated with repeated bending and handling
- Flexible alternative to 0.047"" Semi Rigid
- Eliminates costs associated with time-consuming cable layout
- Increased phase stability versus temperature and bending
- SpectrumFlex cables can be configured to solve tough packaging challenges





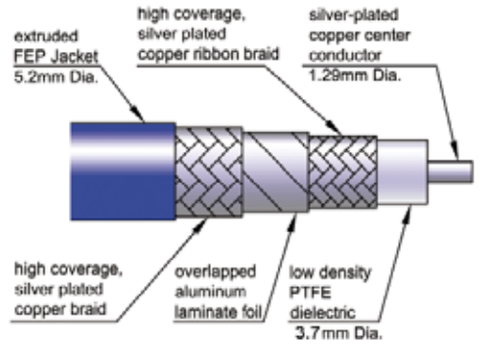
Cable - Type 100

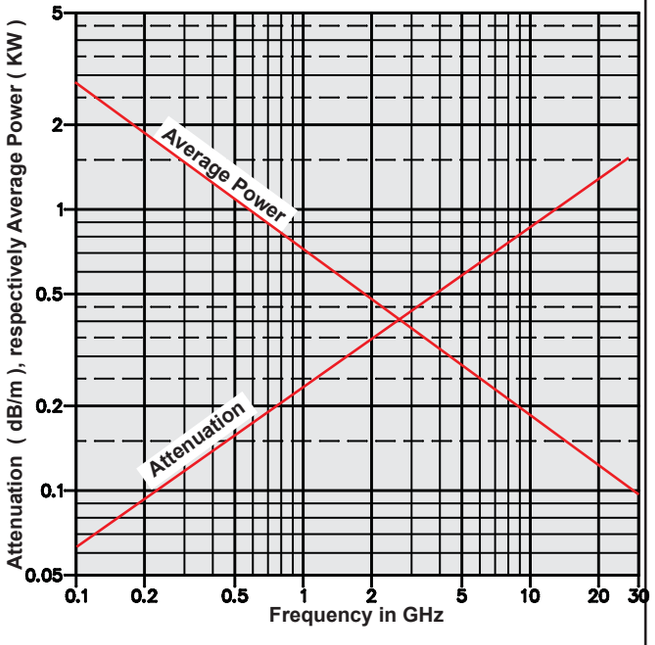
Low Loss, Low Cost
High Performance
DC - 26.5 GHz

SPECIFICATION		Type 100
Cable Code	Standard	100
	Armored	100x
	X: Please find Armor & Ruggedizing Options in Section S.	
Frequency Range		DC to 26.5 GHz
Outer Diameter in mm	Standard	5.2
Impedance in Ohms at Sea Level and +25°C		50 ± 2
Velocity in %, ± 2%		75
Capacitance in pF/m		89
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	0.16
	2.0 GHz	0.35
	5.0 GHz	0.58
	10.0 GHz	0.86
	18.0 GHz	1.20
	26.5 GHz	1.48
Nominal CW-Power in Watts, vs. Frequency, at Sea Level and + 20°C	0.5 GHz	1133
	1.0 GHz	750
	2.0 GHz	496
	5.0 GHz	288
	10.0 GHz	190
	18.0 GHz	134
	26.5 GHz	108
RF - Leakage at 18.0 GHz		- 90 dBC
Operating Temperature Range		-54°C to +150°C
Outer Conductor Construction		Copper Ribbon Braid, Overlapping Aluminum Film, Silver Plated Copper Braid
Outer Jacket		FEP
Dielectric Diameter in mm		3.7
Dielectric Material		Low Density PTFE
Dielectric Constant		1.6
Center Conductor Material		Copper, Silver Plated
Center Conductor Dia. in mm		1.29
Weight in Grams/Meter		66
Connector Retention Force (N)		140
Minimum Bend Radius, Inside, Static (mm)		26
Minimum Bend Radius, Inside, Dynamic (mm)		54

Characteristics:

* Performance to 26.5 GHz, when terminated with 2.92mm or 3.5mm connectors (mating with SMA), or Spectrum´s High Performance SMA (Code 11K)
* Meeting the very highest Quality Standard, as needed for crucial applications in harsh environment
* 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, 7/16, HN, 2.92mm, N, SBX, SBY, SC, SMA, SPM, TNC, and Push-On Type Connectors os Series N, TNC and SMA.
  For Connector Outline Drawings please refer to Section Q.
* For Connector Code details please refer to Section S.
* For information on armor please refer to Section S as well.
* For ordering information please refer to Section A.





Cable -Type 141

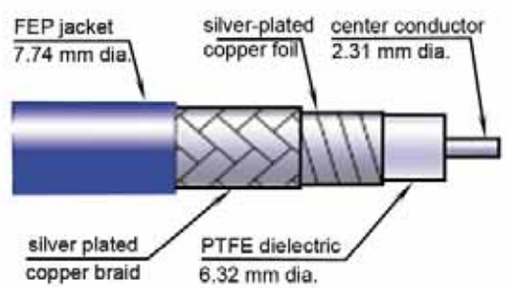
Ultra Low Loss to 19.5 GHz

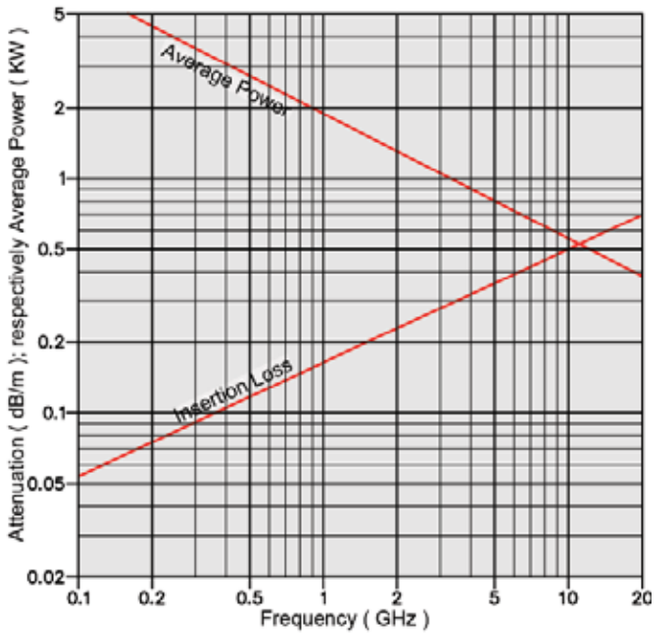
Cables of Types 141 and 143 are identical with the exception of the shielding and O.D.

SPECIFICATION		Type 141
Cable Code	Standard	141
	Armored	141x
	X: Please find Armor & Ruggedizing Options in Section S.	
Frequency Range		DC to 19.5 GHz
Outer Diameter in mm	Standard	7.74
Impedance in Ohms at Sea Level and +25°C		50 ± 2
Velocity in %, ± 2%		84
Capacitance in pF/m		79
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	1.0 GHz	0.16
	2.0 GHz	0.23
	4.0 GHz	0.32
	8.0 GHz	0.45
	12.4 GHz	0.54
	18.0 GHz	0.66
Nominal CW-Power in Watts, vs. Frequency, at Sea Level and + 20°C	1 GHz	1900
	2.0 GHz	1306
	4.0 GHz	900
	8.0 GHz	618
	12.4 GHz	496
	18.0 GHz	400
RF - Leakage at 18.0 GHz		-90 dBC
Operating Temperature Range		-65°C to +200°C
Outer Conductor Construction		Silver Plated Copper Foil, Silver Plated Copper Braid
Outer Jacket		FEP
Dielectric Diameter in mm		6.32
Dielectric Material		Low Density EPTFE
Dielectric Constant		1.4
Center Conductor Material		Copper, Silver Plated
Center Conductor Dia. in mm		2.31
Weight in Grams/Meter		116
Connector Retention Force (N)		200
Minimum Bend Radius, Inside, Static (mm)		44
Minimum Bend Radius, Inside, Dynamic (mm)		400

Characteristics:

* Excellent Performance to 19.5 GHz.
* Very Rugged Construction.
* Meets the very highest Quality Standard, as needed for crucial applications in harsh environment
* Procurement for completely terminated assemblies, fully tested. The test documentation for VSWR and Insertion Loss will be supplied with the cable assembly.
* Available connectors: 7mm, N, SMA, SBX, SBY, BQ-, CQ-, IQ-, RQ-, SQ- TQ-Series and TNC.. For Connector Outline Drawings please refer to Section Q.
* For Connector Code details please refer to Section S.
* For information on armor please refer to Section S as well.
* For ordering information please refer to Section A.





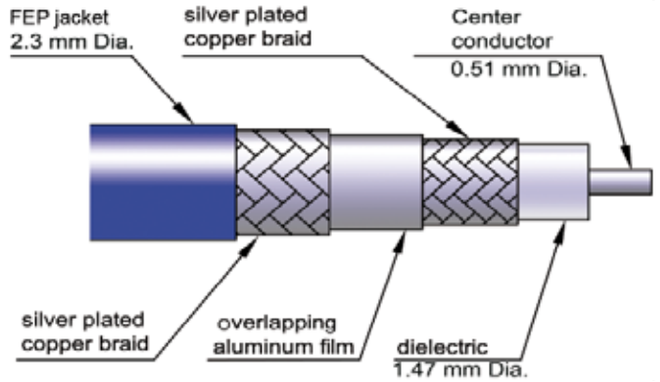
Cable - Type 677

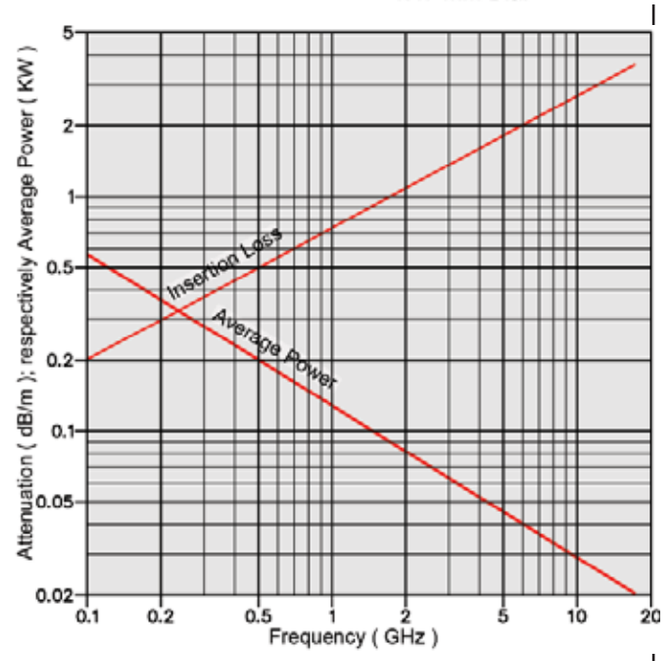
Small Diameter
Good Performance
DC - 18.0 GHz

SPECIFICATION		Type 677
Cable Code		677
Frequency Range		DC to 18 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	2.80
	18.0 GHz	3.46
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 9.5 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		Copper, Silver Plated
Center Conductor Dia. in mm		0.51
Weight in Grams/Meter		13
Connector Retention Force (N)		65
Minimum Bend Radius, Inside, Static (mm)		11.5
Minimum Bend Radius, Inside, Dynamic (mm)		23

Characteristics:

* Performance to 18 GHz.
* Meeting the very highest Quality Standard, as needed for crucial applications in harsh environment
* 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, 2.92mm, 3.5mm, SMP and SMPM.
  For Connector Outline Drawings please refer to Section Q.
* For Connector Code details please refer to Section S.
* For information on armor please refer to Section S as well.
* For ordering information please refer to Section A.



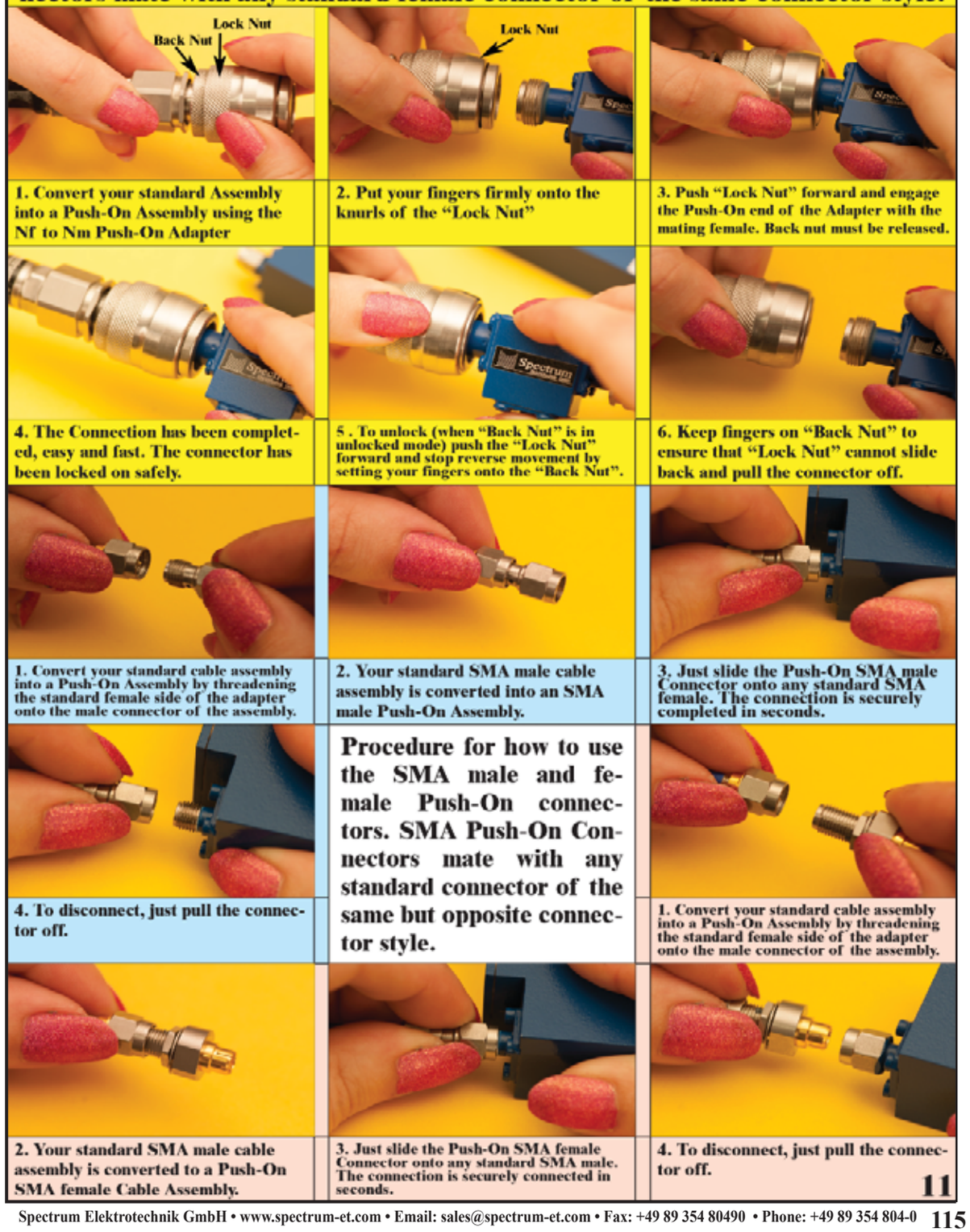


RF Measurement Chart

VSWR = (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	0.477	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	0.466	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	-0.008	0.0086	0.0172

Our other Products

Procedure for how to use the N, TNC and 7/16 Push-On male. Push-On Connectors mate with any standard female connector of the same connector style.



1. Convert your standard Assembly into a Push-On Assembly using the Nf to Nm Push-On Adapter

2. Put your fingers firmly onto the knurls of the "Lock Nut"

3. Push "Lock Nut" forward and engage the Push-On end of the Adapter with the mating female. Back nut must be released.

4. The Connection has been completed, easy and fast. The connector has been locked on safely.

5 . To unlock (when "Back Nut" is in unlocked mode) push the "Lock Nut" forward and stop reverse movement by setting your fingers onto the "Back Nut".

6. Keep fingers on "Back Nut" to ensure that "Lock Nut" cannot slide back and pull the connector off.

1. Convert your standard cable assembly into a Push-On Assembly by threadening the standard female side of the adapter onto the male connector of the assembly.

2. Your standard SMA male cable assembly is converted into an SMA male Push-On Assembly.

3. Just slide the Push-On SMA male Connector onto any standard SMA female. The connection is securely completed in seconds.

4. To disconnect, just pull the connector off.

Procedure for how to use the SMA male and female Push-On connectors. SMA Push-On Connectors mate with any standard connector of the same but opposite connector style.

1. Convert your standard cable assembly into a Push-On Assembly by threadening the standard female side of the adapter onto the male connector of the assembly.

2. Your standard SMA male cable assembly is converted to a Push-On SMA female Cable Assembly.

3. Just slide the Push-On SMA female Connector onto any standard SMA male. The connection is securely connected in seconds.

4. To disconnect, just pull the connector off.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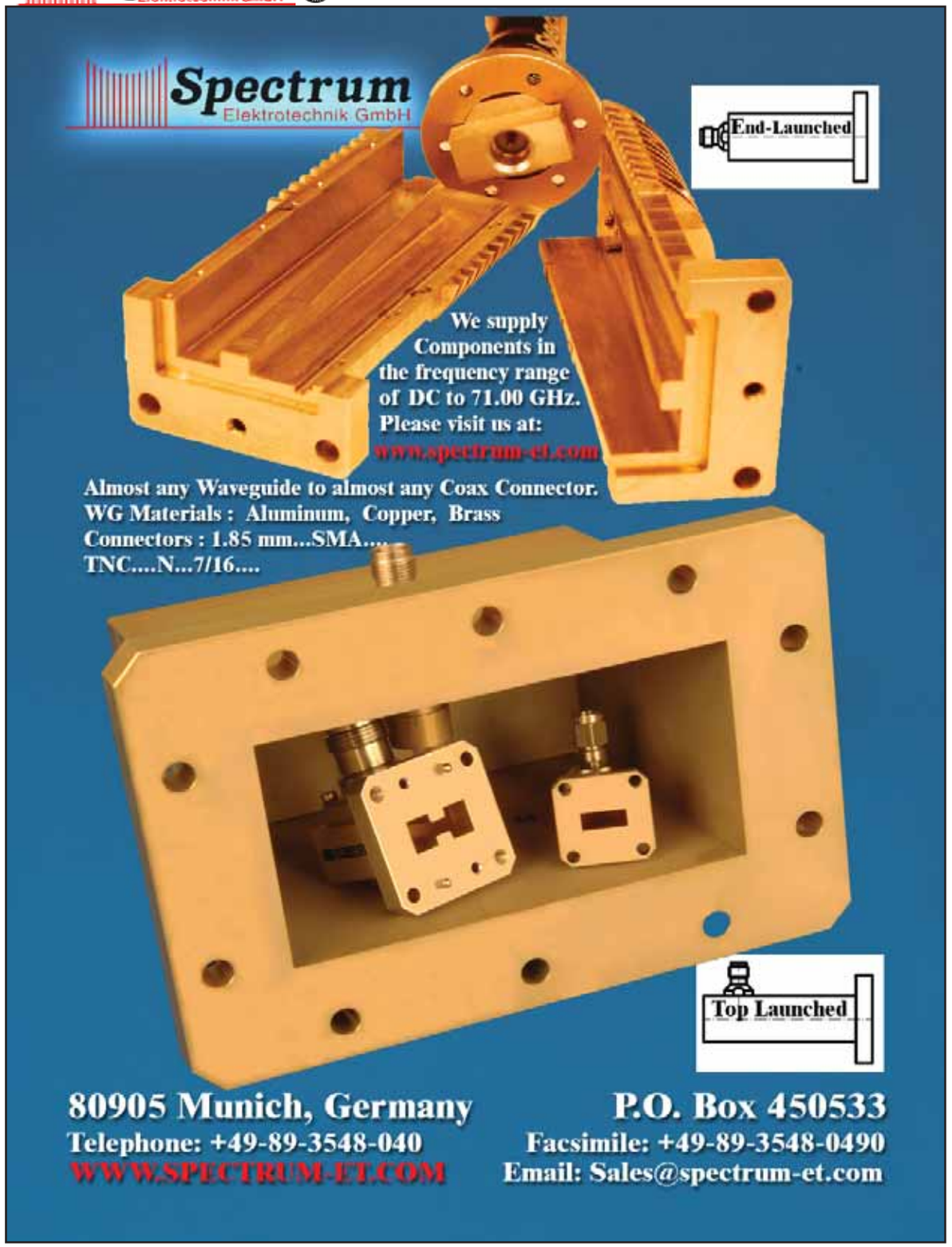
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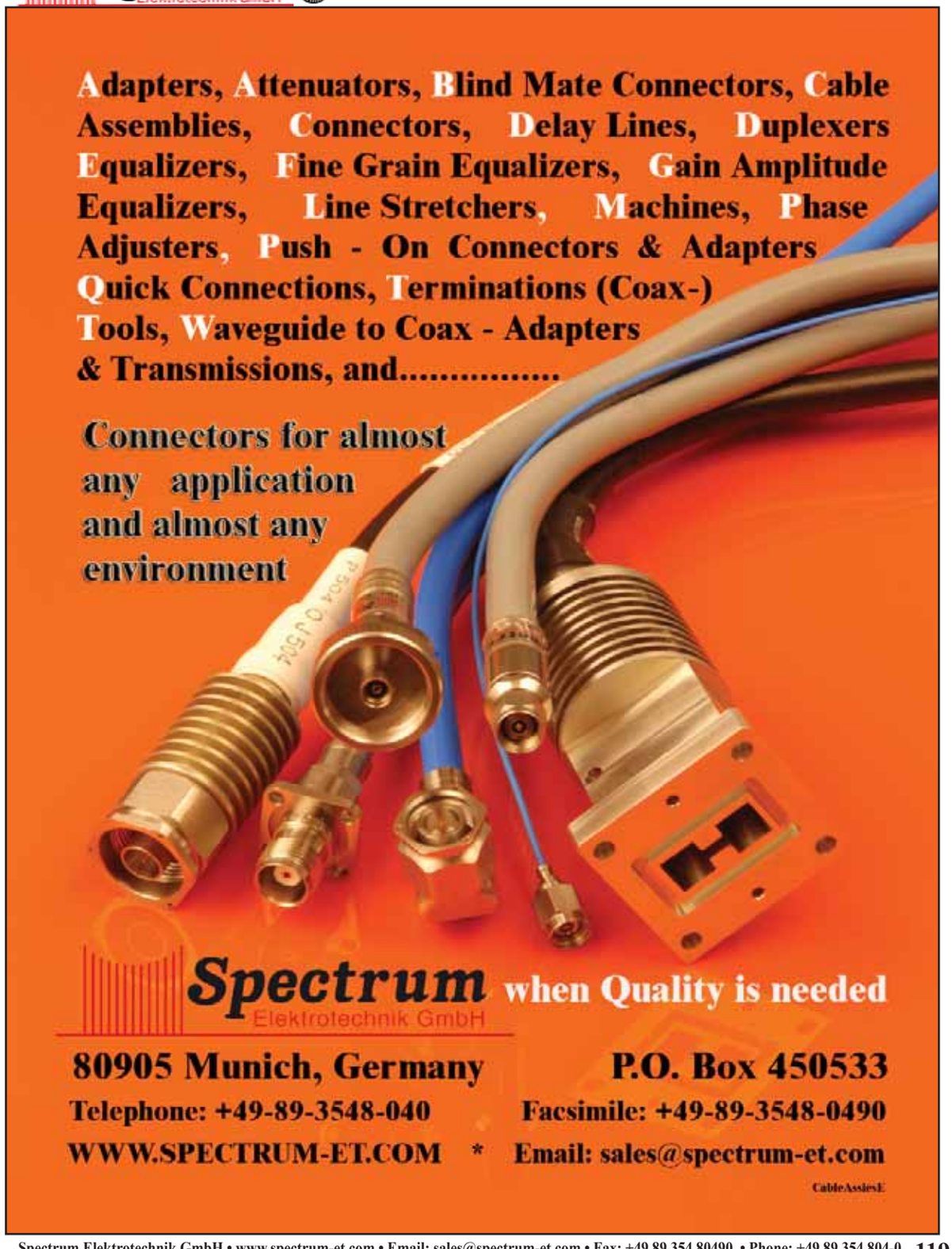
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General Terms and Conditions

Ordering

Please include both, 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 150 Euro.

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 F.C.A. or F.O.B., 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 customer.

Damaged Materials/Shortages

All orders should be inspected upon receipt for both completeness and to insure 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.

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 of 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 the applicable specifications or ratings.

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 is 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 F. O. B. 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.

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.

Catalogs

Spectrum Electrotechnik GmbH is a leading manufacturer of RF and Microwave Components in the Frequency Range of DC to 71.0 GHz. The products are published in seven individual catalogs and one Product Portfolio, showing detailed information and comprehensive data.

Adapters,
DC - 71 GHz, 50 Ohms
Coaxial Adapters (In Series and Between Series)
Hermetically Sealed Adapters
High Power Adapters
Push-On Adapters
Waveguide to Coax Adapters

Multiports
DC to 65 GHz
Circular Connectors,
SQ-, TQ-, IQ-, BQ-, CQ-Series
Rectangular Connectors,
RQ-Series

Cable Assemblies,
DC - 50 GHz, 50 Ohms
ANA Test Cables
Flexible Cable Assemblies
Low Loss Cable Assemblies
Phase Stable Cable Assemblies
Semi Rigid Cable Assemblies
(Dia. 0.34" to 1")

Quick Connections,
DC to 65 GHz, 50 Ohms
Blind Mate Connectors
Multi Coax Connections,
SQ-, TQ-, IQ-, BQ-, CQ-, and RQ-Series,
Push - On Adapters, Connectors, and Push-On Cable Assemblies

Circulators and Isolators
Connectorized Isolators and Circulators
Drop In Isolators and Circulators
Lumped Design Isolators

Test Necessities and Accessories,
DC - 71 GHz, 50 Ohms
LRL, TRL Calibration and Verification Kits
ANA Cable Assemblies
Torque Wrenches
Interface Gauges
Calibration Kits
Terminations

Connectors,
DC - 50 GHz, 50 Ohms
Blind Mate Connectors
Coaxial Connectors
High Power Connectors
Multi Pin Connectors
Push-On Connectors

Product Portfolio
Coaxial Connectors and Adapters
Multiport Assemblies
Coaxial Delay Lines
Waveguide to Coax-Adapters
Phase Adjusters
Gain Amplitude Equalizers
Cable Assemblies etc.