RF Multipin Connectors SQ-, TQ-, IQ-, and RQ-Series



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Spectrum

The Company: Spectrum Elektrotechnik GmbH was founded in 1981 and has become a leading supplier of state-of-theart 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.

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Spectrum Elektrotechnik GmbH is a leading manufacturer of RF and Microwave Components in the Frequency Range of DC to 65 GHz. The products are published in eight individual catalogs, showing detailed information and comprehensive data.

Adapters, DC - 65 GHz, 50 Ohms Coaxial Adapters (In Series and Between Series) High Power Adapters Push-On Adapters Waveguide to Coax Adapters

Connectors, DC - 65 GHz, 50 Ohms Blind Mate Connectors Coaxial Connectors High Power Connectors Multi Pin Connectors Push-On Connectors

Cable Assemblies, DC-65 GHz, 50 Ohms ANA Test Cables Flexible Cable Assemblies Low Loss Cable Assemblies Phase Stable Cable Assemblies Semi Rigid Cable Assemblies (Dia. 0.034" to 1")

Test Necessities and Accessories, DC-65 GHz, 50 Ohms LRL, TRL Calibration and Verification Kits

ANA Cable Assemblies Torque Wrenches Interface Gauges Calibration Kits Terminations

Components, 50 Ohms Attenuators Circulators **CDM-Components** Couplers Custom Components DC-Blocks, DC-18 GHz Duplexers Gain-Equalizers, DC-33 GHz Isolators, DC-40 GHz Limiters Mismatches Phase Shifters, DC-63 GHz Terminations, DC-65 GHz Waveguide Components

Quick Connections, 50 Ohms, DC-40 GHz Blind Mate Connectors Push - On Adapters Push - On Connectors Push - On Cable Assemblies SQ-, TQ-, IQ-, RQ-Series, Multi Coax Connections, DC-40 GHz

Components, 75 Ohms Adapters Connectors

Machines and Tools Coax Cable Cutting/Stripping Machines Flex Cable Cutting/Stripping Machines

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General RF Multipin Connectors



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

Threadening and torquing, unthreadening and untorquing 24 connections, a time consuming process, and lots of space is needed.



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Spectrum Elektrotechnik GmbH Ø **RF Multipin Connectors General**

The Solution: Spectrum's Multipin Connectors are available with four (4), seven (7), eight (8) 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.



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The different Multipin Series

- a) The traditional model is the SQ-8 Multipin Connector using the circular size 21 shell per MIL-DTL-38999, 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-8 or IQ-8.
- b) The new TQ-Series Multipin Connectors are using the circular size 21 shell per MIL-DTL-38999 with four (4) or eight (8) inserts and size 25 with seven (7) 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 insertion loss needed.
- c) The new **IQ-Series** Multipin Connectors are almost identical with the TQ-series, having one major difference: The outer conductors of the coaxial cable assemblies and the connector shell per MIL-DTL-38999 are not using the same ground. The coaxial lines can be guided in a metal hose, net mesh or armour, connected to the shells for lightening protection. TQand IQ-Series mate with each other.
- d) The new **RQ-Series** Multipin Connectors are using a rectangular shell developed by Spectrum Elektrotechnik GmbH, allowing the dense packaging of twenty three (23) coaxial cable assemblies plus twenty six (26) signal lines in one connector, using Type 11 and/or Type 43 coaxial cable and AWG20 wire for the lower frequency signals or supplies.











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The traditional RF Multipin Connector SQ-8

Circular Multipin Connector guiding 8 Coaxial Lines in a MIL - DTL - 38999 Shell of size 21

SQ-8 traditional

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SQ-8 RF Multipin Connector Inserts & Spectrum

SPECIFICATION			TS
ELECTRICAL		X-0 HOLK	
Frequency Range Insulation Resistan Voltage Standing Contact Resistanc	Wave Ratio (V e	The i VSWR) 1.02 The conta	 - 24.0 GHz min., DC - 40.0 GHz optional. insulation resistance shall not be less than 5,000 megohms. + .005 * f (GHz) center contact resistance drop shall not exceed 3.0 milliohms and the outer act resistance drop shall not exceed 2.0 milliohms. magnitude of the test voltage shall be 1,000 volts rms at sea level.
Dielectric Withsta RF High Potential			RF high potential withstanding voltage is 670 volts rms at 5 MHz.
RF Leakage Insertion Loss		- (100	00 - f (GHz)) dB SQT(f(GHz))) dB
MECHANICAL			
Connector Durab	ility	insert show	connector is to be tested and its mating connector shall be subjected to 500 rtions and withdrawal cycles at 12 cycles per minute max. The connector shall v no evidence of mechanical failure and the connector shall meet the mating acteristic requirements.
Cable Retention F	orce	60 pc	bounds (267 N) min., without stress relief.
Coupling Nut Rete	ention Force	Not a	applicable.
Force to Engage a	nd Disengage	Not a	applicable.
Longitudinal Force	e max.	Long	gitudinal force is not applicable.
Mating Characteri	stics	(1.14	licable to Females only: oversize pin .0372 inch (.945 mm) max. dia.,.045 inch 4 mm) deep; insertion force 3 lbs. (13.34 N) max. with .037 inch (.94 mm) min. pin; withdrawal force 1.00 oz (.278 N) min. with .0355 inch (.90 mm) max. dia.
Recommended Ma	ting Torque	Not a	applicable.
SQ-8 Insert Female Part No. SQ15-2101-02	Connector Code QF	Cable Type	1614" 41.0 697" 10.0 17.7 Female
Connector outer cond Center contact is ber	ductor is pass yllium copper	ivated stainless	ss steel.
Dielectric is PTFE.			
			SQ-8 Insert Male
			1.417" 36.0 36.0 36.0 1.2.5 Male
SQ-8 Insert Male Part No.	Connector Code	Cable Type	
SQ15-1102-02	QM	43	
Connector outer con Center contact is ber Dielectric is PTFE.	1		s steel.

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TQ-Series

Circular Multipin Connectors with 4, 7, 8 or 12 Coaxial Cable Assemblies using MIL-DTL-38999 Shells, sizes 21 and 25

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TQ-Series

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RF Multipin Connectors TQ-Series





FEATURES

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

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

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

THE PART NUMBER SYSTEM FOR THE IQ-MULTI-PIN CONNECTORS

	6	Number of coaxial contact spaces in the shell		Connector Type		Keyed Version	Surface Treatment C = Cadmium N = Nickel
	1	04	BFJ	(Female spring loaded BFJ)	1	1.10	
		(Shell Size 21)	FBFJ	(Female firm BFJ)		Ν	12
		(51101 520 21)	FFMJ	(Female firm Flange)		1000	1
		07	FMJ	(Female spring loaded Flange)	2	Α	С
		(Shell Size 25)	FMLE	(Male firm)			C
TQ	-		LBFJ	(Female limited floating BFJ)	- /	В	
		08	LFM J	(Female limited floating Flange)	1.		Ν
		(Shell Size 21)	LMLE	(Male limited floating)	1	С	19
		10	MLE	(Male spring loaded)			
		12 (Shell Size 25)	PBFJ	(Female pressurized BFJ)		D	
		(Bleff Blee 23)	PFMJ	(Female pressurized Flange)			
Detaile		C' 1' 4		(Female pressurized Flange)			

Details about Finding the appropriate Part Number please refer to page 16



IQ-Series

Circular Multipin Connectors with 4, 7, 8 or 12 Coaxial Cable Assemblies using MIL-DTL-38999 Shells, sizes 21 and 25

nu pin. pir

IQ-Series

RF Multipin Connectors IQ-Series

IQ-Series

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

Spectrum

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 25 ff of the catalog.

THE PART NUMBER SYSTEM FOR THE IQ-MULTI-PIN CONNECTORS

		Number of coaxial contact spaces in the shell	Connector Type		Keyed Version	Surface Treatment C = Cadmium N = Nickel
		04 (Shell Size 21)	BFJ(Female spring loaded BFJ)FBFJ(Female firm BFJ)FFMJ(Female firm Flange)		N	2
		07 (Shell Size 25)	FM J(Female spring loaded Flange)FM LE(Male firm)	1	Α	С
IQ	-	08 (Shell Size 21)	LBFJ (Female limited floating BFJ) LFMJ (Female limited floating Flange) LMLE (Male limited floating)	-/	B C	Ν
	1	12 (Shell Size 25)	MLE(Male spring loaded)PBFJ(Female pressurized BFJ)PFMJ(Female pressurized Flange)		D	

Details about Finding the appropriate Part Number please refer to page 16

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Multipin Part Number



FINDING THE PART NUMBER OF THE MULTIPIN CONNECTOR Step 1:

Identify the Connector Series, IQ or TQ Example: **TQ** is chosen Part Number so far is: **TQ**-

Step 2:

Select the number of inserts you need in the Multipin Connector. The shells with 4 and 8 inserts are of size 21, the shells with 7 and 12 inserts are of size 25.

Important is also the cable you would like to use. Is size and flexibility of importance, or rather insertion loss? To identify your cable please refer to pages 44ff.

Example: **7 inserts** *are selected*

Part Number so far becomes: TQ-07

Step 3:

The connector type depends on the type of insert you are going to use. For details please refer to pages 14 and 15 for the connector shells and 25ff for details, advantages and disadvantages on the inserts.

Example: The female Bulkhead Shell using spring loaded inserts with bayonet catch *is* selected

Part Number so far becomes: TQ-07BFJ-

Step 4:

5 differently keyed connectors are available, N for normal or standard, and then A, B, C and D. For details please refer to page 15.

Example: N is selected

Part Number so far becomes: **TQ-07BFJ-N**

Step 5:

The surface treatment of the shells needs to be selected, C for Cadmium, N for Nickel *Example:* **C** *is selected* The final Part Number is: **TQ-07BFJ**–**NC**

Note 1: Selecting the female shell for 7 inserts you need to select the male shell also for 7 inserts. Only the shells with the same number of inserts and with the same key are mating with each other.

Note 2: The Part Number above describes the Multipin Connector without the cable assemblies. To identify the cable assemblies with the inserts or connectors terminating the cable selected, please refer to pages 37ff.

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TQ-and IQ-Series Co	ombinations	Spectru	m nDH
TQ- and IQ-MALE using spring loaded inserts with Bayonet Catch P/N TQ-ABMLE-XY			
AB: NUMBER OF INSERTS (04, 07, 08, 12) X: K	EY (N, A, B, C, D) Y: SHELL SURFA	CE TREATMENT (C = CADMIUM; N = NICKEL)	Χ /
TQ- and IQ-MALE using firm mounted inserts but with Limited Floating P/N TQ-ABLMLE-XY AB: NUMBER OF INSERTS (04, 07, 08, 12) X: KI	EY (N, A, B, C, D) Y: SHELL SURFA	KE TREATMENT (C = CADMIUM; N = NICKEL)	
TQ- and IQ-MALE using firm mounted inserts P/N TQ-ABFMLE-XY			
AB: NUMBER OF INSERTS (04, 07, 08, 12) X: K	EY (N, A, B, C, D) Y: SHELL SURFA	CE TREATMENT (C = CADMIUM; N = NICKEL)	
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Insert Specification Circular Multipin

The Inserts

V

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Several different inserts, as needed for the individual applications are available, as shown on the next pages, Frequency ranges: DC - 24 GHz and DC - 40 GHz

OPECIFICATION OF THE CO. INC.	
SPECIFICATION OF THE SQ - INST ELECTRICAL	EKIS
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 2.0 milliohms and the outer contact resistance drop shall not exceed 2.0 milliohms.
Dielectric Withstanding Voltage	The magnitude of the test voltage shall be 1,000 volts rms at sea level.
RF High Potential Withstanding Voltage	The RF high potential withstanding voltage is 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.

This catalog only covers the Multipin Connector Series. Spectrum manufactures many more products. A short overview you will find on pages 50ff. Detailed information about all our products you will find on our Web Page. But at any time please feel free to contact our engineering staff for any product you are looking for. We may have designed already the unit you need.

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Advantage and Disadvantage RF - Inserts, TQ- and IQ-Multipin

Advantage	Disadvantage	
Very easy connection and replacement by using a bayonet catch	The cable assembly moves in axial direction during connection and disconnection of the TQ- and IQ-Multipin Connector	
Connection and replacement by using a threaded back body. The connector still moves in radial direction ensuring perfect alignment when mating.	None	
Connection and replacement by using a threaded back body. The connector is fixed in the TQ-Multipin Housing	None, but the mating connector needs to be limited spring loaded or spring loaded	
Connector is pressurized, only for Bulkhead Feedthrough Shells, mounted in walls between chambers of different pressure. Connection and replacement by using a threaded back body. The connector is fixed in the TQ-Multipin Housing	None, but the mating connector needs to be limited spring loaded or spring loaded	
Very easy connection and replacement by using a bayonet catch	The cable assembly moves in axial direction during connection and disconnection of the TQ- and IQ-Multipin Connector	
Connection and replacement by using a threaded back body. The connector still moves in radial direction ensuring perfect alignment when mating.	None	
Connection and replacement by using a threaded back body. The connector is fixed in the TQ-and and IQ-Multipin Housing	None, but the mating connector needs to be limited spring loaded or spring loaded	

DC-24 GHz, TQ- and IQ-Multipin, RF-Inserts

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SPECIFICATIONS OF THE RQ - IN	SERTS
ELECTRICAL Frequency Range	DC - 24.0 GHz and DC - 40.0 GHz.
requerey range	
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 2.0 milliohms and the outer contact resistance drop shall not exceed 2.0 milliohms.
Dielectric Withstanding Voltage	The magnitude of the test voltage shall be 1,000 volts rms at sea level.
RF High Potential Withstanding Voltage	The RF high potential withstanding voltage is 670 volts rms at 5 MHz.
RF Leakage	- (100 - f (GHz)) dB
Insertion Loss	(.03 SQT(f(GHz))) dB
MECHANICAL	
Connector Durability	200 cycles min. for Male Inserts 500 cycles min. for Female Inserts
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.
Recommended Mating Torque	Not applicable.
ENVIRONMENTAL CHARACTERIS	TICS
Operating Temperature	-71°C to +115°C
Vibration	MIL-STD-202, Method 204, Condition D
Mechanical shock	MIL-STD-202, Method 213, Condition I
Thermal shock	MIL-STD-202, Method 107, Condition G
Moisture resistance	MIL-STD-202, Method 106
Corrosion	MIL-STD-202, Method 101, Condition B
MATERIAL AND FINISH	
Contact	Beryllium Copper 33-25 CuBe2PbH per DIN 17666 (ASTM B 196) gold plated per ASTM B 488, Type II, Code C
Outer Conductor	Stainless steel passivated per ASTM A 967
Insulator	PTFE Fluorocarbon per ASTM D 1710
Ferrule	Brass CuZn39Pb3 per DIN EN 12163/12164 CW614N ASTM B16 gold plated per ASTM B 488, Type II, Code C

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RQ-Series Multipin Connector

For certain applications even the 12 RF coaxial connections of our circular TQand IQ-Series were too little, plus the 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.

Spectrum

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 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.



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Spectrum & Cable Assemblies Series SQ-TQ-IQ

Finding the Part Number for an Assembly as needed in a Circular Multipin Connector

Step 1: Fill in the Cable Code for the first 4 digits (ABCD).

Identify the Cable you intend to use; for technical information please refer to pages 45ff.

- For SQ-Series only Cable Types 11 and 43 are available
- For TQ- and IQ-Series Cable Types 11, 43 are available for both shell sizes 21 and 25 (4, 7, 8 and 12 inserts), Types 100 and 141 are only available for shell size 21 with 4 inserts and for shell size 25 with 7 inserts.

Example: Cable of Type 43 is chosen

Part Number so far is: 43- (although 4 digits are available, only digits used are filled in)

Step 2: Fill in the length of the Cable Assembly, next 4 digits (EFGH)

- The length of the assembly needs to be in Millimeters (mm) for assembly lengths up to 9999mm (393.7 inches).
- For length over 9999mm the length will be inserted in Decimeters (dm) with a leading d, and then 3 digits for the length (1dm=10cm=3.94 inches). This works up to 999dm (=99.90m =30.47 ft=3.933 inches)
- For longer lengths please consult the factory

Example: A length of 1.6m is needed: 1600 (1.6m = 63 inches)

Part Number so far becomes: 43-1600-

Step 3: Identify the insert you want to use, next 3 digits (JKL)

- For the SQ-Series only the fully spring loaded inserts are available,
 - Codes QF or XF for the fully spring loaded female insert,
 - Codes QM or XM for the fully spring loaded male insert.
 - > QF and QM inserts operate to 24.0 GHz, XM and XF inserts to 40.0 GHz
 - For the TQ- and IQ-Series please refer to page 42 for the appropriate code

Example: for the TQ-Series a firm mounted female insert to 24 GHz *is selected* Part Number so far becomes: 43-1600-QFF-

Step 4: Identify the insert or connector for the other end, next 3 digits (MNO)

- For the Code please refer to pages 42 and 43
- Not for every Cable every connector listed will be available as standard.
- For connectors not listed please consult the factory.

Example: TNC male right angle is selected

The final Part Number is: 43-1600-QFF-35

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40 Spectrum Elektrotechnik GmbH P.O. Box 45 05 33, 80905 Munich, Germany Tel. +49-89-3548-040, Fax +49-89-3548-0490 www.spectrum-et.com Email: Sales@Spectrum-et.com

Spectrum &

Finding the Part Number for an Assembly as needed in a Rectangular Multipin Connector RQ23-DC26

Step 1: Fill in the Cable Code for the first 4 digits (ABCD).

Identify the Cable you intend to use; for technical information please refer to pages 45ff.

- For RQ-Series only Cable Types 11 and 43 are available as standard
- Please consult the factory if you are interested in using a different cable.

Example: Cable of Type **11** *is chosen*

Part Number so far is: 11- (although 4 digits are available, only digits used are filled in)

Step 2: Fill in the length of the Cable Assembly, next 4 digits (EFGH)

- The length of the assembly needs to be in Millimeters (mm) for assembly lengths up to 9999mm (393.7 inches).
- For length over 9999mm the length will be inserted in Decimeters (dm) with a leading d, and then 3 digits for the length (1dm=10cm=3.94 inches). This works up to 999dm (=99.9m = 30.47ft = 3,933 inches)

• For longer lengths please consult the factory

Example: a length of 2.9m is needed: **2900** (2.9m = 114.2 inches) Part Number so far becomes: **11-2900-**

Step 3: Identify the insert you want to use, next 3 digits

- Code SMX stands for the fully spring loaded male Push-On.
- Code 21F stands for the firm mounted SMA female.

Example: The male Push-On is selected

Part Number so far becomes: 11-2900-SMX-

Step 4: Identify the insert or connector for the other end, next 3 digits (MNO)

- For the Code please refer to pages 42 and 43
- Not for every Cable every connector listed will be available as standard.
- For connectors not listed please consult the factory.

Example: A short SMA male right angle is selected

The final Part Number is: 11-2900-SMX-152

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Connector Index



Cycle Code Cycle Cycle Cycle Code Cycle Code Cycle Code Cycle Code Cycle Cycl		necu	or maex				Elektrotechn	ik GmbH
1.85mm Male Straight VM N Female Right Angle Marcel, 4Hole-Flange 61 2.4 mm Female Straight, 24/06-Flange HF N Female Straight, 1mtrchangeable Edit 2.4 mm Female Straight, 24/06-Flange H2 N Female Straight, 1mtrchangeable Edit 2.4 mm Male Straight, 24/06-Flange H4 N N Female Straight, 1mtrchangeable Edit 2.4 mm Male Straight, Maxi Nut M2 N Male Straight, 1mtrchangeable Straight NNS 2.4 mm Male Straight, 1mtrchangeable Straight, 1mtrchangeable <th>Туре</th> <th>Sex</th> <th>Description</th> <th></th> <th>Туре</th> <th>Sex</th> <th>Description</th> <th>Conn. Code</th>	Туре	Sex	Description		Туре	Sex	Description	Conn. Code
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2.4 mm Female Straight, Hole-Flange HT2 N Female Straight, Hole-Flange HT2 2.4 mm Female Straight, Hole-Flange HV N Female Straight, High Power 614 2.4 mm Male Straight, High Power HD N Male Plat-On Brass aller plat, full och NBS 2.4 mm Male Straight, Maxi Nut M2 N Male Straight, Beryline Straight, Maxi Nut M2 N Male Straight, Beryline Straight, Maxi Nut M2 N Male Straight, Maxi Nut M2 N Male Straight, Beryline Coppersiver pl. 50 2.20mm Female Straight, Maxi Nut KF2 N Male Straight, Moxi Nut Straight, Maxi Nut N Male Straight, Maxi Nut </td <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>								
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N Female BFJ 63 SMP Female Straight TMP			4-Hole-Flange Straight		SMP	Female	Float Mount	SPV
								SPQ

FemaleBFJ63SMPFemaleStraightStraightSpectrum Elektrotechnik GmbHP.O. Box 45 05 33, 80905 Munich, GermanyTel. +49-89-3548-040, Fax +49-89-3548-0400 42 Email: Sales@Spectrum-et.com www.spectrum-et.com

Spectrum C/A

Description

Straight, BFJ,Float Mount Straight, DC-18 GHz Straight, DC-26.5 GHz Straight, DC-40 GHz

Straight, EMI-Gasket

Straight, Float Mount

BFJ Smooth Bore

Straight, High Power

135 Deg. Angle, BFJ

Straight, gold plated

Right Angle Mitred

Straight, High Power

Straight, High Power

Straight, Interchangeable

Straight, High Power Straight, High Power Straight, Interchangeable

135 Degree Angle, 12.4 GHz 135 Degree Angle, 18 GHz

BFJ. Pressurized

Straight

Straight

Straight

Straight

Straight

BFJ

ht, Test Conn.

Straight, Commercial Straight, Full Det. 2-Hole-Flange

Insert, Spring Load., DC-24 GHz

Insert, Spring Load., DC-24 GHz

Radius Right Angle, 4-H.-Fl. Gold Pl. Radius Right Angle, 4-H.-Fl.

Straight 4-Hole-Flange Straight 4-Hole-Flange, gold plated

Right Angle Mired, Brass Ni-plated Right Angle Mitred, High Power Right Angle Mitred,Phase Adjustable

Туре

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SMP SMP SMP

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Connector Index

MATERIALS

Conn.

Code

SPU SPF SPE PF

SPG

SPT

STS

SPW

тмј

SRF

РМ

QF

QM

SZF

42

43

43P

46 47

41 40

45

44

41H

41U

E41

36R

36

35

34 35H

35L

31

31H

31U

E31

РМН

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 μ m) min. gold plating per ASTM B 488 Type 2, Code C, Class 0.75, or nickel plating per SAE AMS-OO-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.

Please refer to the appropriate connector specification.

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.

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43

MECHANICAL Connector **ENVIRONMENTAL** Housings are stainless steel passivated if not mentioned differently.

Cable Types for SQ-, TQ- and IQ-Series



Connector Series	Cable			
SQ-08	Type 11 regular Type 43 regular			
	For the cable specification please refer to pages 45 ff.			
TQ-04, IQ-04	Type 11 regular + armored			
A	Type 43 regular + armored			
	Type 100 regular + armored			
	Type 141 regular + armored			
	For the cable specification please refer to pages 45 ff.			
TQ-07, IQ-07	Type 11 regular + armored			
	Type 43 regular + armored			
	Type 100 regular			
	Type 141 regular			
Đ.	For the cable specification please refer to pages 45 ff.			
TQ-08, IQ-08	Tupe 11 regular			
,	Type 11 regular			
	Type 43 regular			
	For the cable specification please refer to pages 45 ff.			
TQ-12, IQ-12	Type 11 regular			
	Type 43 regular			
	For the cable specification please refer to pages 45 ff.			
A Creatrym Elektrotechnik	GmbH P.O. Box 45 05 33, 80905 Munich, Germany Tel. +49-89-3548-040, Fax +49-89-3548-0490			

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Cable - Type 11

Ś

DC - 40.0 GHz

	Standard	11	1
Cable Code	Armored	11x	1
Frequency Range	DC 40.0 GHz		
Outer Diameter	Standard	3.2	
in mm	Armored	t.b.d.	
Impedance in Ohms a		50 ± 2	1
Sea Level and +25°C Velocity in %, ± 2%	1	74	
Capacitance in pF/m		90	
Dielectric Strength			
(60 Hz) in KV rms		5.0	
Max. Operating Voltage Sea Level, in KV rms		0.5	1
	0.5 GHz	0.39	
	2.0 GHz	0.77	
Nominal Insertion	5.0 GHz	1.21	1
Loss in dB/m vs.	10.0 GHz	1.74]
Frequency	18.0 GHz	2.45	
	26.5 GHz	3.0	
	40.0 GHz	4.0	
	0.5 GHz	405	
Nominal CW-Power	2.0 GHz	180	
in Watts, vs.	5.0 GHz	105	
Frequency, at Sea	10.0 GHz	70	2
Level and + 20°C	18.0 GHz	48	×
	26.5 GHz 40.0 GHz	38 28	r (
RF - Leakage at 18.0		- 100 dBC	e Me
		-54°C to +110°C	Po Po
Operating Temperatu	ie naliye	Silver Plated	ae
		Copper Braid,	era
Outer Canduater Corr	atruation	Overlapping	Ave
Outer Conductor Con	siruction	Aluminum Film,	>
		Silver Plated	ve
		Copper Braid	cti
Outer Jacket	PTFE	e di	
Dielectric Diameter in	2.0	res	
Dielectric Material	Low Density PTFE	-	
Dielectric Constant	1.8	3/m	
Center Conductor Ma	Copper, Silver Plated	Attenuation(dB/m), respectively Average Power(KW	
Center Conductor Dia	0.64	ion l	
Weight in Grams/Met	26	uat	
Minimum Bend Radiu Static (mm)	13	tten	
Minimum Bend Radiu Dynamic (mm)	32	▼ * 'K	

Characteristics:

- · Low Loss Performance to 40.0 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: 1.4/4.4, 2.4mm, 3.5mm, BMA, K*,
 - N, SMA, and TNC.



Frequency in GHz

Mult

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

Characteristics:

Center

Conductor

www.spectrum-et.com

- · Performance to 26.5 GHz, when terminated with K* or 3.5mm connectors (mating with SMA).
- · Procurement for completely terminated assemblies, fully tested. The test documentation for VSWR and Insertion Loss will be supplied with the cable assembly. · Available connectors: 1.4/4.4, 2.4mm, 3.5mm, 7mm,

7/16, HN, K*, N, SBX, SBY, SQ8, SMA, SPM and TNC.

Overlapping

Aluminum

Jacket

4.3mm Dia



Cable - Type 43 DC - 26.5 GHz

SPECIFICATION Type 43 Standard 43 **Cable Code** 43x Armored DC 26.5 GHz Frequency Range Standard 4.3 Outer Diameter t.b.d. in mm Armored Impedance in Ohms 50 ± 2 at Sea Level and +25°C Velocity in %, ± 2% 72 79 Capacitance in pF/m Dielectric Strength (60 Hz) in 5.0 KV rms Max. Operating Voltage at Sea 0.7 Level, in KV rms, 60 Hz 0.28 0.5 GHz 2.0 GHz 0.61 4.0 GHz 0.85 Nominal Insertion 8.0 GHz 1.28 Loss in dB/m vs. Frequency 12.4 GHz 1.70 18.0 GHz 2.10 26.5 GHz 2.70 0.5 GHz 800 2.0 GHz 340 Nominal CW-Power 4.0 GHz 220 in Watts, vs. 8.0 GHz 150 Frequency, at Sea 12.4 GHz 120 Level and + 20°C 90 18.0 GHz 75 26.5 GHz RF - Leakage at 18.0 GHz -90 dBC 54°C to +110°C **Operating Temperature Range** Silver Plated Copper, Outer Conductor Construction Aluminium Film, Silver Plated Copper Outer Jacket PTFE 2.95 Dielectric Diameter in mm Low Density **Dielectric Material** PTFE Dielectric Constant 1.9 Copper, Center Conductor Material Silver Plated Center Conductor Dia. in mm 0.94 Weight in Grams/Meter 45 Minimum Bend Radius, Inside, 40 Static (mm)Minimum Bend Radius, Inside, 100 Dynamic (mm)



Email: Sales@Spectrum-et.com

Spectrum Elektrotechnik GmbH Ø Cable - Type 100 Low Loss, Low Cost **High Performance** DC - 26.5 GHz

	Standard	100	
Cable Code	Armored	100x	
Frequency Range			
Outer Diameter	Standard	DC 26.5 GHz 5.2	
in mm	Armored	t.b.d.	
mpedance in Ohms a	50 ± 1		
Sea Level and +25°C			
Velocity in %, ± 2%		75	
Capacitance in pF/m Dielectric Strength		87	
(60 Hz) in KV rms		6.0	
Max. Operating Volta	ge at	4 5	
Sea Level, in KV rms	, 60 Hz	1.5	
	0.5 GHz	0.18	
Nominal Insertion	2.0 GHz	0.40	
Loss in dB/m vs.	5.0 GHz	0.63	
Frequency	10.0 GHz	0.97	
	18.0 GHz 26.5 GHz	1.35 1.70	
	0.5 GHz	950	
Nominal CW-Power		421	
in Watts, vs.	5.0 GHz	244	
Frequency, at Sea	10.0 GHz	162	
Level and + 20°C	18.0 GHz	114	
	26.5 GHz	91	
Peak-Power, 10% Du	ity Cycle	4 x CW-Power	
RF - Leakage at 18.0) GHz	- 100 dBC	
Operating Temperatu	re Range	-54°C to +110°C	
		Copper Ribbon Braid,	
Outer Conductor Con	struction	Overlapping	
		Aluminum Film,	
		Silver Plated Copper Braid	
Outer Jacket	PTFE		
Dielectric Diameter in	n mm	3.7	
Dielectric Material	Low Density		
	PTFE		
Dielectric Constant	1.8 Copper,		
Center Conductor Ma	Silver Plated		
Center Conductor Dia	1.29		
Weight in Grams/Met	69		
Minimum Bend Radiu Static (mm)	26		
Minimum Bend Radiu	60		
Dynamia (mm)	00		

Multipi

Dynamic (mm)

Characteristics:

- Performance to 26.5 GHz, when terminated with K* or 3.5 mm connectors (mating with SMA). Rugged Construction.
- · Short delivery; certain lengths with preferred connector styles may be in stock.
- The cable mostly used; significant price advantage over other similar products.
- Procurement for completely terminated assemblies, fully tested. The test documentation for VSWR and Insertion Loss will be supplied with the cable assembly. Available connectors: 1.4/4.4, 2.4mm, 3.5mm, 7mm,
- 7/16, HN, K*, N, SBX, SBY, SC, SMA, SPM and TNC.



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Characteristics:

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Procurement for completely terminated assemblies, fully tested. The test documentation for VSWR and Insertion Loss will be supplied with the cable assembly. Available connectors: 7 mm, N, SC, SMA, and TNC.



Spectrum

Cable - Type 141

DC - 19.5 GHz

SPECIFIC	Type 141	
Cable Code	Standard	141
Frequency Range		DC 19.5 GHz
Outer Diameter in mm	Standard	7.74
Impedance in Ohms at Sea Level and +25	5°C	50 ± 2
Velocity in %, ± 2%		84
Capacitance in pF/m		79
	1 GHz	0.16
	2.0 GHz	0.23
Nominal Insertion	4.0 GHz	0.31
Loss in dB/m vs.	8.0 GHz	0.44
Frequency	12.4 GHz	0.54
	18.0 GHz	0.64
	1 GHz	1900
Nominal CW-Power	2.0 GHz	1450
in Watts, vs.	4.0 GHz	900
Frequency, at Sea	8.0 GHz	830
Level and + 20°C	12.4 GHz	560
	18.0 GHz	420
RF - Leakage at 18.0) GHz	-90 dBC
Operating Temperatu	re Range	-65°C to +135°C
Outer Conductor Con	Silver Plated Copper Foil, Silver Plated Copper	
Outer Jacket	FEP	
Dielectric Diameter in	6,25	
Dielectric Material	Low Density PTFE	
Dielectric Constant	1.4	
Center Conductor Ma	Copper, Silver Plated	
Center Conductor Dia	2,31	
Weight in Grams/Met	116	
Minimum Bend Radiu Static (mm)	44	
Minimum Bend Radiu Dynamic (mm)	t.b.d.	

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Mil Spec PCB connectors: 220 series=modular, 2mm pitch, 2 row, 2-50 contacts, 3A or 1-12 mixed layout (signal, 50/75 ohm coax, or 10-20A power), SMD, thru hole or crimp & schielded; HE801-HE810 series, 1mm, etc. *www.ati-eletronique.fr*

RII (EUROPEAN MADE)

Microtech inter-mateable & miniature .2" & .4"dia. circular threaded metal connectors & assemblies for sensor, mil, robotic, or industrial applications. Hermetic, coax, 1, 4, or 12 contacts, shielded & environmental to 200° C, 3kV, 5kV, 10kV, 30kV, 40kV high voltage connectors, etc.

IMS

Coaxial connectors: 1.6/5.6, 7/16, BNC, FME, MMCX, MCX, N, QLS, SMA, SMB, SMBA (FAKRA), SMC, SMS, SMM, SSMB-Nano, TNC, S-sub & DIN coax inserts, RF switches, antenna & pogo pin contacts. *www.imscsusa.com*

DELTRON AG

D-sub connectors: EMI/RFI filtered, IP67 water resistant, filtered water resistant, mixed layout, D-sub hoods, quick lock hoods, assemblies, etc. *www.deltron.ch*

RATIOPLAST-ELECTRONICS GMBH

PCB connectors, ROHS pin & female headers, 0.5mm to 2.54mm pitch. *www.ratioplast.com*

PANTA GMBH

JUMPER CABLES, HIGH FLEX, CUSTOM DESIGN, SMD, OR WITH MOUNTED COMPONENTS. *WWW.PANTA.DE*

RENNSTEIG GMBH

Precision tool & machines for cutting, stripping, & crimping, & F.O. cable tools. *www.rennsteig.de*

MICROWAVE

SPECTRUM ELEKTROTECHNIK GMBH

Microwave & push-on connectors DC to 65GHz. (2.4mm, 2.92mm, 3.5mm, 7mm, 7/16, BMA, BNC, C, HN, K, N, SBX, SBY, SC, SMA, SMP, SSMP, TNC, TNC, TNX). RF and coax adapters. Phase adjusters. Equalizers. Calibration components, phase adjusted cable assemblies, etc. *www.spectrum-et.com*

OSCILLATORS

RII

OSCILLATORS & CRYSTALS: XO, VCO, VCXO, TCXO, FCXO, OCXO, DUAL OSCILLATORS, SYNTHESIZER, PLO (PHASE LOCKED OSCIL.)/SYNTHESIZER, & CUSTOM OSCILLATOR MODULES.

CHIP INDUCTORS

STELCO GMBH

Chip inductors (wirewound & laser trimmed), size 1008 chip transformers (SMD), rod core chokes, EMI filters & filter plates, feedthru & tubular capacitors, ceramic chip LEDs, piezoceramics, etc. *www.stelco.de*

FIBER OPTICS

ADECOMM

FIBER OPTIC CONNECTOS, ADAPTERS, CABLE, SPLICE CLOSURES, 19" & ETSI RACKS, TRAYS, FDB BOXES, ETC.

RATIOPLAST-OPTOELECTRONICS GMBH

POLYMER OPTICAL FIBER (POF) FIBER OPTIC CABLE, CABLE ASSEMBLIES, CONNECTORS, TRANSMITTERS, RECEIVERS, INTERFACES, POF SWITCHES, FAST ETHERNET SWITCHES, TOOLS, WALL PLUG, MEDIA CONVERTERS. (GLASS F.O. COMPONENTS & ASSEMBLIES ALSO AVAIL. COMPLETE POF INTERCONNECT SYSTEMS, WITH SCHEMATICS & PART NUMBERS. RUGGE-DIZED 8 & 12 MULTICONTACT POF/ GLASS/POWER CONNECTORS. *WWW.RATIOPLAST.COM*

