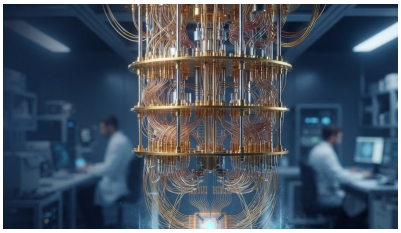


Quantum Technologies – ISOTEC

Product Description



Specific interconnect features are required, including the ability to withstand cryogenic (very low) temperatures, as well as being non-magnetic, with high frequency and low loss. ISOTEC offers a range of high-quality cryogenic and non-magnetic RF components with the capability of performing at extremely low temperatures.

Connectors are manufactured under strict quality controls, and this strict adherence to quality control ensures that all precautions are taken to avoid any contact with ferromagnetic materials during the manufacturing process.

Features

- Snap-on, push-on or threaded couplings
- Available in custom non-magnetic solutions, including contacts, connectors and cable assemblies

Applications

- Quantum Computing
- Medical Equipment
- Military Communications
- Aerospace Satellites

Connector Types

- K-Connector
- MMCX
- MCX
- SMA
- SMB
- SMP
- Additional types available on request
- SMPM
- SMPS
- VITA67
- BMA
- BMMA

Materials

Plug and Receptacle Bodies	Non-magnetic brass
Outer Contacts	Beryllium copper per ASTM B196 (for MCX type)
Insulators	Teflon (PTFE) per ASTM D1710
Male Contacts	Non-magnetic brass (for SMA connector)
Female Contacts	Beryllium copper per ASTM B196
Retaining Rings	Beryllium copper per ASTM B196 (for MMCX, SMB, SMA types)
Ferrules and Caps	Non-magnetic brass
Gaskets	Silicone rubber

Non-Magnetic Test Method

Precision Magnetic Permeability Testing

At ISOTEC, we perform non-magnetic inspections of RF connectors, adapters, and cryogenic cables using the FERROMASTER Magnetic Permeability Meter.

This precision instrument measures the relative magnetic permeability (μr) of materials, enabling us to evaluate their magnetic characteristics and verify compliance with specified non-magnetic requirements.

Inspection Highlights

Equipment	FERROMASTER Magnetic Permeability Meter
Measurement	Relative Magnetic Permeability (μr)
Measurement Range	1.001 – 1.999
Resolution	0.001
Test Standards	ASTM A342 / EN 60404-15

Through material and component-level inspections, we strive to ensure consistent quality and reliability for demanding applications in quantum computing, cryogenic systems, and scientific instrumentation.

Acceptance criteria are defined according to customer specifications and application requirements.







Electrical Ratings

MMCX Non-Magnetic Connectors

IMPEDANCE	FREQUENCY RANGE	INSULATION RESISTANCE
50 Ω	0–6 GHz	1,000 MΩ min

VSWR (f = GHz)	Straight	Right Angle
.047 dia. flexible cable connectors	1.20	1.14 + 0.7f
RG-178, RG-316, RG-316 DS cable connectors	1.20	1.25
Working Voltage		
Connectors	170 VRMS at sea level	
Dielectric Withstanding Voltage		
Connectors	500 VRMS at sea level	
Contact Resistance (mΩ max)	**Initial**	**After Environmental**
Center contact (straight cabled connectors and uncabled receptacles)	5.0	8.0
Center contact (right angle cabled connectors)	5.0	15.0
Outer contact (all connectors)	1.0	1.5
Corona Level		
Connectors	190 V min at 70,000 ft	
Insertion Loss (dB max, tested at 1 GHz)		
Straight cabled connectors	0.1	
Right angle cabled connectors	0.2	
Uncabled receptacles	N/A	
RF Leakage (dB min, tested at 2.5 GHz)		
Flexible cable connectors	-60 dB	
RF High Potential Withstanding Voltage		
Connectors (tested at 4 and 7 MHz)	400 VRMS min	



Electrical Ratings

MCX Non-Magnetic Connectors

IMPEDANCE	FREQUENCY RANGE	INSULATION RESISTANCE
50 Ω	0–6 GHz	10,000 MΩ min

VSWR (f = GHz)	Straight	Right Angle
RG-178 cable connectors	1.17 + 0.9f	1.07 + 0.6f
RG-316 cable connectors	1.13 + 0.4f	1.07 + 0.4f
Uncabled receptacles	N/A	
Working Voltage (VRMS max)	**Sea Level**	**70K Feet**
RG-178 cable connectors	250	65
RG-316 cable connectors	335	85
Dielectric Withstanding Voltage (VRMS min at sea level)		
RG-178 connectors, uncabled receptacles	750	
RG-316 connectors, uncabled receptacles	1,000	
Contact Resistance (mΩ max)	**Initial**	**After Environmental**
Center contact (straight cabled connectors, uncabled receptacles)	5.0	8.0
Center contact (right angle cabled connectors)	5.0	15.0
Outer contact	1.0	1.5
Braid to body	1.0	N/A
Corona Level (V min at 70,000 ft)		
RG-178 connectors, uncabled receptacles	190	
RG-316 connectors, uncabled receptacles	250	
Insertion Loss (dB max, tested at 1 GHz)		
Straight cable connectors	0.1 dB	
Right angle cable connectors	0.2 dB	
RF High Potential Withstanding Voltage (VRMS min, tested at 4 and 7 MHz)		
Connectors for RG-178	500	
Connectors for RG-316	700	
Uncabled receptacles	600	



Electrical Ratings

SMB Non-Magnetic Connectors

IMPEDANCE	FREQUENCY RANGE	INSULATION RESISTANCE
50 Ω	0–4 GHz	1,000 MΩ min

VSWR (f = GHz)	Straight	Right Angle
RG-316 cable connectors	1.25 + 0.4f	1.35 + 0.4f
Uncabled receptacles	N/A	
Working Voltage (VRMS max)	**Sea Level**	**70K Feet**
RG-316 connectors, uncabled connectors	335	85
Dielectric Withstanding Voltage (VRMS min at sea level)		
RG-316 connectors, uncabled receptacles	1,000	
Contact Resistance (mΩ max)	**Initial**	**After Environmental**
Center contact (straight cabled connectors and uncabled receptacles)	6.0	8.0
Center contact (right angle cabled connectors)	12.0	16.0
Outer contact	1.0	1.5
Braid to body	1.0	N/A
Corona Level (V min at 70,000 ft)		
Connectors for RG-316	250	
Uncabled receptacles	N/A	
Insertion Loss (dB max, tested at 1.5 GHz)		
Straight cable connectors	0.30 dB	
Right angle cable connectors	0.60 dB	
Uncabled receptacles	N/A	
RF Leakage (dB min, tested at 2.5 GHz)		
Cable connectors	-55 dB	
Uncabled receptacles	N/A	
RF High Potential Withstanding Voltage (VRMS min, tested at 4 and 7 MHz)		
Connectors for RG-316	700	
Uncabled receptacles	600	



Electrical Ratings

SMA Non-Magnetic Connectors

IMPEDANCE	FREQ. RANGE (CABLE / RECEPTACLE)	INSULATION RESISTANCE
50 Ω	0–12.4 / 0–18.0 GHz	5,000 MΩ min

VSWR (f = GHz)	Straight	Right Angle
RG-316 cable connectors	1.15 + 0.2f	1.15 + 0.3f
RG-58 cable connectors	1.15 + 0.1f	1.15 + 0.2f
Uncabled receptacles	N/A	
Working Voltage (VRMS max)	**Sea Level**	**70K Feet**
RG-316 cable connectors	250	65
RG-58 connectors, uncabled receptacles	335	85
Dielectric Withstanding Voltage (VRMS min at sea level)		
Connectors for RG-316	750	
Connectors for RG-58, uncabled receptacles	1,000	
Contact Resistance (mΩ max)	**Initial**	**After Environmental**
Center contact (straight cabled connectors and uncabled receptacles)	3.0	4.0
Center contact (right angle cabled connectors)	4.0	6.0
Outer contact (all connectors)	2.0	N/A
Braid to body	0.5	N/A
Corona Level (V min, tested at 70,000 ft)		
Connectors for RG-316	190	
Connectors for RG-58, uncabled receptacles	250	
Insertion Loss (dB max; f in GHz, tested at 6 GHz)		
Straight flexible cable connectors	0.06√f (CHz)	
Right angle flexible cable connectors	0.15√f (CHz)	
Uncabled receptacles	N/A	
RF Leakage (dB min, tested at 2.5 GHz)		
Flexible cable connectors	-60 dB	
Uncabled receptacles	N/A	
RF High Potential Withstanding Voltage (VRMS min, tested at 4 and 7 MHz)		
Connectors for RG-316	500	
Connectors for RG-58, uncabled receptacles	670	