Test+Measurement

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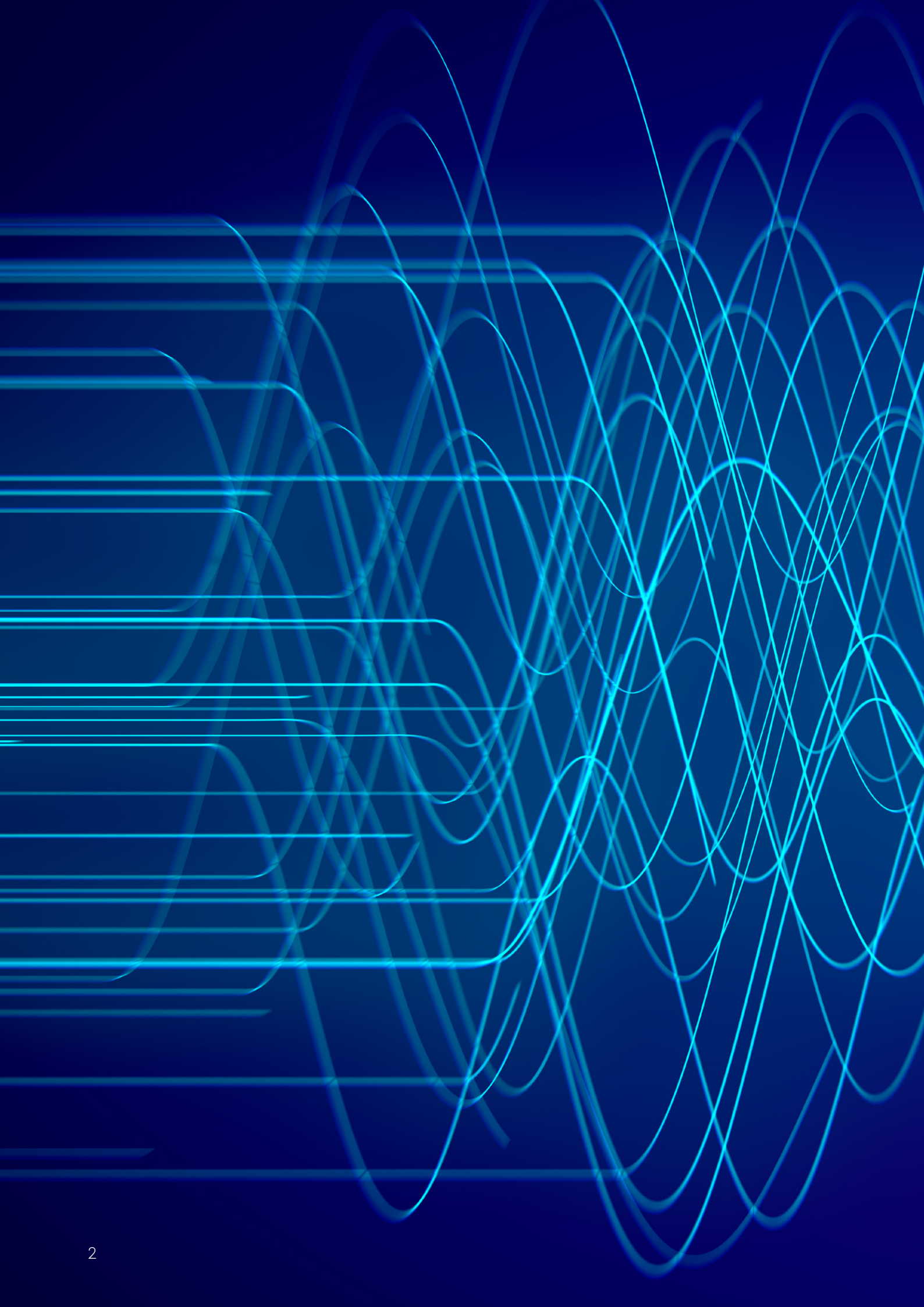
HUBER+SUHNER



Content

Solutions and services for Test+Measurement

The best measurement setup is only as good as its weakest link. To obtain reliable and repeatable measurement results, particular care must be taken in selecting the components required for the measurement setup.

HUBER+SUHNER's extensive range of high quality components are matched to the various needs in the field of test and measurement. All these products are distinguished by their high performance and stable characteristics – the result of years of experience in the development and production of radio frequency components.

Test+Measurement equipment

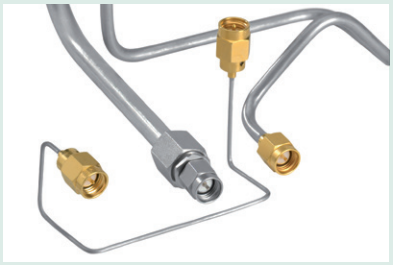
Electronic test equipment has the main function of creating signals and capturing responses from electronic devices under test (DUT). In this way, the proper operation of the DUT can be proven and faults in the device's performance can be detected and corrected.

The HUBER+SUHNER cost-effective product line-up for your test equipment always helps you to achieve highest precision and reliability. Whether you're developing or producing equipment to test active or passive devices, the right mix of quality, performance and reliability gives you an edge.

Applications

- Network analyzers
- PCI Extensions for Instrumentation (PXI)
- Spectrum / Signal Analyzers
- Bit Error Testers
- Handhelds

Semi-rigid



The semi-rigid cable is unique in that it is easily bent to the desired finished shape and still maintains its set after bending. This property makes it ideal for use with automated bending equipment, as well as hand forming by bending tools.

- Applicable in frequencies up to 67GHz
- Form stable
- Excellent return loss and RF leakage

LINK

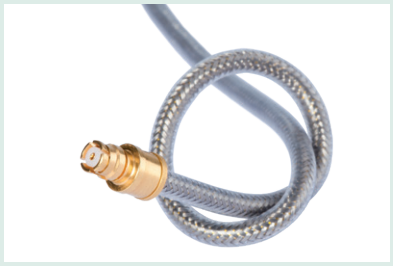
Sucoform

Sucoform microwave coaxial cables offer distinct mechanical advantages over semi-rigid cables. They are based on the same design as the standard PTFE insulated semi-rigid cables, but have a tin-soaked copper braid for the outer conductor, giving them outstanding hand-formability. Thanks to their small bending radii, they allow space saving routing and packaging.

- Applicable in frequencies up to 40GHz
- Hand-formable
- Low intermodulation distortion levels (PIM)

LINK

MINIBEND®

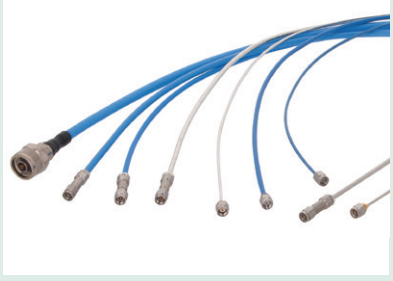


The MINIBEND series is a flexible, pre-assembled coaxial cable assembly line, designed for internal point-to-point interconnections between RF modules within systems. Allowing bending immediately behind the connector with excellent resistance to flame and corrosion, the series boasts impressive pull strength and mechanical durability. It is 100% tested to ensure the highest quality performance.

- Applicable in frequencies up to 65GHz
- 100% tested preassembled coaxial cable assembly
- Patented solder-less cable junction

LINK

CT Technology



The HUBER+SUHNER CT product family was developed for phase-critical applications that require precision electrical length connectivity. Creating a stable and reliable interconnect solution to satisfy a huge range of applications, these products provide industry-leading phase vs. temperature performance, alongside a unique range of cable constructions to meet customer demands.

- Applicable for frequencies up to 40GHz
- Optimized phase and insertion loss stability over temperature
- Easy installation

BROCHURE **PRODUCTS**

RF raw cables & cable assemblies

The HUBER+SUHNER performance line contains RG and Enviroflex RF cables, which are designed for high performance applications. While the RG series provides a wide temperature range, Enviroflex offers a halogen free and environmental friendly alternative. The product line is available with a comprehensive connector portfolio which results in individual and flexible cable assembly solutions.

- Wide temperature range
- High performance
- RG standard

PRODUCT SERIES **RF CABLE SELECTION GUIDE**

Connectors

HUBER+SUHNER is a leading global provider of radio frequency connectors for the transmission of analogue and digital signals and has many years of experience in the engineering and production of coaxial connectors. In addition to a broad selection of standard connectors for a wide range of different applications, customer-specific solutions are also developed and manufactured.

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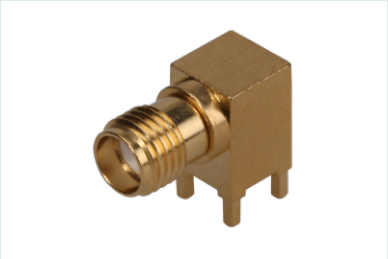


Series SMP/SMPM

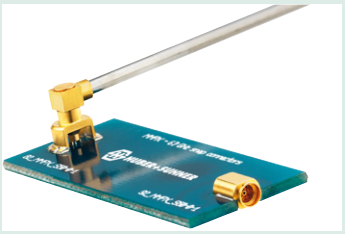
HUBER+SUHNER SMP and SMPM connectors provide a robust, proven and fully compatible plug-in solution for RF applications up to 40 and 67GHz. HUBER+SUHNER offers a large portfolio of different PCB mount SMP and SMPM connectors that have been designed with optimised PCB trace launch geometries to offer a complete interconnect design solution from “wire-to-trace”.

LINK

Series MMPX – 67 GHz snap-on connectors

The MMPX snap-on connector family is the most ideal coaxial-to-PCB system solution for operating frequencies up to 67 GHz. The comprehensive product range consists of cable connectors and assemblies. PCB connectors and adaptors to open standards are available as well. MMPX connectors feature excellent electrical performance at smallest mechanical dimensions. The broadband characteristics, small size and outstanding performance permit new solutions for applications in numerous markets such as high speed digital and radio frequency testing.

LINK



SMPM-T

SMPM-T is the smallest threaded, open source connector on the market. Its unique and innovative combination of a MIL-STD-348 SMPM female interface connector, together with a retractable threaded nut, provides an integrated solution offering unprecedented electrical and mechanical performance. The SMPM-T handles high density requirements with a connector centreline-to-centreline spacing of just 5 mm (0.20 in) while offering unmatched electrical stability at frequencies up to 67 GHz in even the harshest operating environments.
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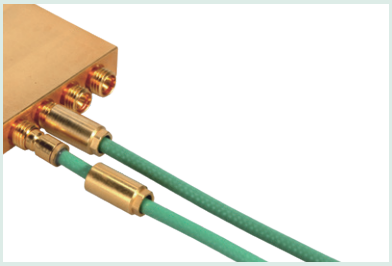


Adaptors

HUBER+SUHNER manufactures a wide range of adaptors to realise transitions from one interface style to another. Our RF adaptor assortment covers all commercially available RF interfaces, gender configurations, frequency requirement, and return loss specification. Any RF coaxial adaptor can be modified to fit specific applications.
LINK

Lab testing

Any research and development, test, or quality assurance department that works with RF signals relies on precise and repeatable measurements. Since the quality of a test configuration is only as strong as the weakest link, HUBER+SUHNER offers a wide range of superior, flexible and rugged cable assemblies with excellent amplitude and phase stability, as well as high-precision connectors, terminations and adaptors. This guarantees reduced equipment downtime, which is an economical advantage for testing in laboratories.

SUCOFLEX® 500

Customised SUCOFLEX assemblies guarantee the highest level of satisfaction. Thanks to their unique cable and connector design, they deliver the best phase and amplitude stability. These assemblies also feature outstanding return and insertion loss. Developed to ensure longevity, the customised assemblies deliver exceptional value. HUBER+SUHNER guarantees the perfect solution is delivered as quickly as possible to suit every requirement.

- Applicable in frequencies up to 70GHz
- Excellent insertion and return loss
- Phase and amplitude stable

LINK

SUCOTEST / TL-8A

The extensive range of high-quality standard test cables are specifically optimised for test and measurement environments. Distinguished by their high-performance and stable characteristics, these test assemblies guarantee a long-lasting, precise and cost-effective solution. HUBER+SUHNER also offers fast delivery on all standard lengths.

- Applicable in frequencies up to 18GHz
- Excellent insertion and return loss
- Phase- and amplitude stable

TEST LEADS **PRODUCTS SUCOTEST** **PRODUCTS TL-8A**

Precision adaptors

HUBER+SUHNER manufactures a wide range of standard and high-performance adaptors that are ideal for lab and production test applications where measurement accuracy, repeatability, and optimum electrical performance are critical.

- Precision interfaces
- Excellent electrical performance
- Premium base materials and platings
- For precision laboratory measurements
- High repeatability and accuracy

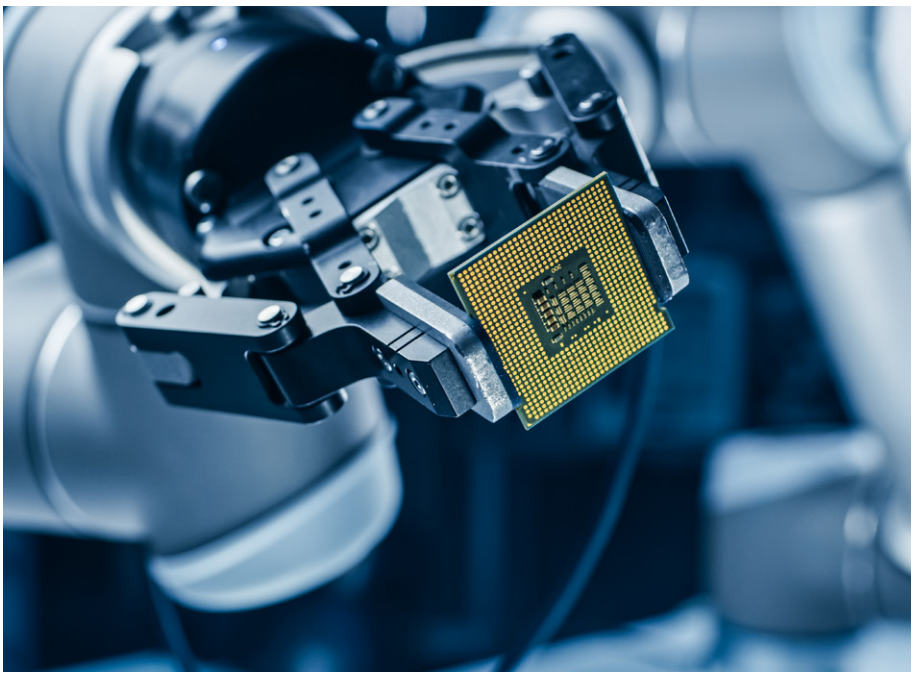
LINK

RF components

The comprehensive range of high-quality radio frequency attenuators, terminations, and DC blocks is based on the varying needs of test and measurement applications. These components are inter-compatible and demonstrate highly stable characteristics and exceptional quality - the consequence of long-running experience and expertise in the development and production of RF components.

PRODUCTS **CATALOGUE**

Factory testing



In a factory environment, improvement in the overall efficiency of the supply chain is the main criteria. High repeatability, longer service life, and efficient usage are features of our HUBER+SUHNER factory test portfolio, which helps to decrease total operating costs through reduced replacement, retesting, and recalibration.

TL-8A

HUBER+SUHNER TL-8A assemblies are designed for testing components or equipment up to 8 GHz with network analyzers (NA). This economical assembly family is made with a PE foamed double screened cable and protected with an armouring using a moulded cable entry. The excellent electrical performance combined with a high mechanical endurance is ideal for use in test labs and in operations.

- High mechanical endurance
- Excellent insertion and return loss
- High mating cycle
- N connector with quick-lock nut

PRODUCTS **CATALOGUE**

Sucotest 18 – the highest standard of measurement

Sucotest 18 is suitable for daily use in component and assembly shops, test labs, and high speed digital testing applications. Sucotest 18A armoured test assemblies are ideal for testing wireless communication infrastructures and outdoor use.

Sucotest 18 test assemblies

- Excellent durability
- Excellent return loss
- High flexibility

TEST LEADS **CATALOGUE**

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- Applicable in frequencies up to 70GHz
- Excellent insertion and return loss
- Phase and amplitude stable

LINK

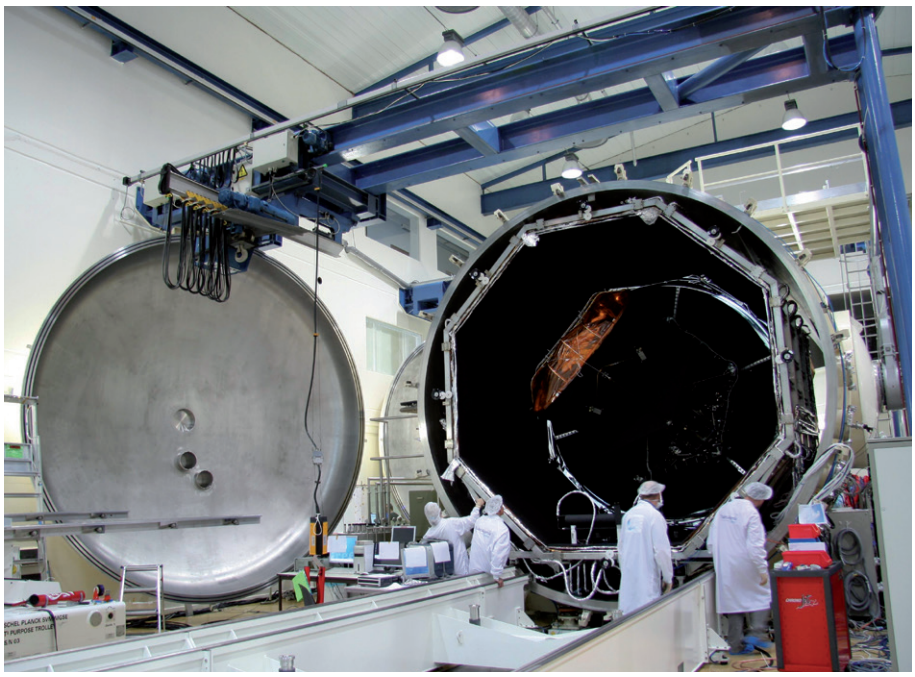
Standard and precision adaptors

HUBER+SUHNER manufactures a wide range of standard and high-performance adaptors that are ideal for lab and production test applications, where measurement accuracy, repeatability and optimum electrical performance are critical.

- De-embedding
- Phase matched adaptors

LINK

Thermal vacuum measurement



HUBER+SUHNER has emerged as the preferred partner for passive microwave components that can be used for satellite testing in clean rooms as well as in thermal-vacuum environment. These components support the satellite during the entire trial period prior to launch. The comprehensive product range is optimally matched to the needs of the space customers. From the comprehensive range of TVAC components in the vacuum chamber of the hermetic adaptors to the test assemblies in the clean room, the procurement process is simplified by offering “one stop shopping”. This is true both for low power and high power applications.

The power handling capability of all assemblies is determined using simulations which are verified with real power tests and therefore performance predictions are accurate.

Our thermal vacuum assemblies pass thermal cycling qualification to guarantee stable interface dimensions. By request, our cable assemblies can be produced in clean room environment and stabilisation thermal cycling can be applied.

TVAC cable assemblies

They are exposed to vacuum and extreme temperature variations. One important requirement is that the assemblies used within the vacuum chamber must meet the ECSS-Q-ST-70-02 C and NASA reference publication 1124 outgassing standard to prevent contamination of the chamber or equipment by solvents evaporating from certain materials.
To prevent the assemblies becoming stressed and to ensure an extended service life, HUBER+SUHNER TVAC connectors contain venting holes that allow an unimpeded flow of air into and out of the components during the pressurisation/depressurisation cycles.
LINK

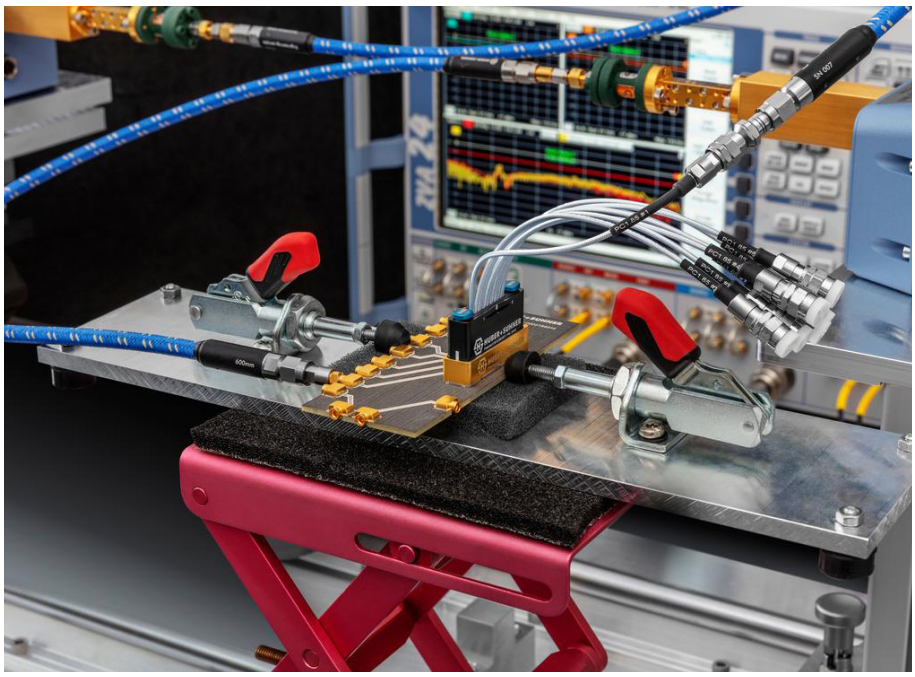
Hermetic adaptors

HUBER+SUHNER offers a wide array of hermetic feed-thru style adaptors that offer both in-series and between series interface solutions for TVAC testing applications. The hermeticity is provided by a glass-fired seal within the adaptor body. The glass material is selected to provide the best electrical performance while also matching the coefficient of thermal expansion of the surrounding body and contact as closely as possible to prevent any loss of hermeticity. All of the hermetic adaptors are 100 % tested for hermeticity in accordance with ASTM E-498, MIL-STD-202, and MIL-STD-883.
LINK

RF components

The comprehensive range of high-quality radio frequency attenuators, terminations, and DC blocks is based on the varying needs of test and measurement applications. These components are inter-compatible and demonstrate highly stable characteristics and exceptional quality - the consequence of long-running experience and expertise in the development and production of RF components.
PRODUCTS **CATALOGUE**

High speed digital



With continually increasing data rates, driven by trends such as big data, IoT (Internet of things), connected mobility, social and medical software platforms and many others, the processing power and complexity of semiconductor and hardware solutions requires successive adaptation. As bandwidth and speeds required increase, a larger and larger fraction of signals requires SI analysis, and only through the highest precision measurement solutions can semiconductor development and signal integrity specialists optimise the electrical performance of wires and other packaging structures used to move signals about within an electronic product.

HUBER+SUHNER is offers a broad range of high-end RF test components and assemblies, developed and optimised for high speed digital testing. We stand for highest density, lowest loss and highest performance coaxial-to-PCB transitions and cabling solutions. Our solutions include extensive technical support, libraries of 3D files, electrical modelling data and customer-specific optimised footprints. With our unique, single channel MMPX solution measurements up to 80GBps (80GHz) are possible while our MXP and MXPM multicoax solutions allow 8 or 16 channel measurements up to 18, 40 or 50, 70 and even 90 GBps.

MXPM90/MXPM70

MXPM90 is the pioneering multicoax solution that supports up to 90 GHz/E-band range. By offering a high density pitch of 2.54 mm (0.1 inch), the MXPM line guarantees a hassle-free experience with its user-friendly magnet-mount connection, delivering performance, reliability and value. MXPM90 is mechanically compatible with MXPM70.

LINK

MXP50/MXP40/MXP18

- Operating range at up to 50 Gbps/50 GHz
- Standard absolute phase matching down to ± 2 ps
- Highest density – lowest loss
- Slide-on mating – no threading
- Highly flexible and ultra stable Multiflex cable
- Extensive technical support

LINK

MMPX

- True 65 GHz/80 Gbps coaxial-to-PCB transition
- Broadband characteristics from DC to 65 GHz
- Excellent return loss
- Excellent shielding, low cross talk
- Via-in-pad capable
- 5.08 mm pitch (0.2 inch)
- Mechanically robust design
- Extensive technical support

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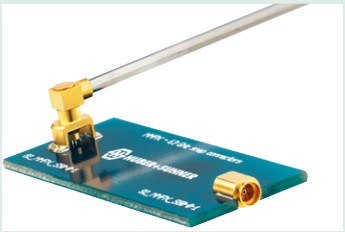

SUCOFLEX® 500

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- Applicable in frequencies up to 70GHz
- Excellent insertion and return loss
- Phase and amplitude stable

LINK

SMPM-T/SMPM/SMP

The SMPM-T is the smallest threaded open source connector on the market and offers unprecedented electrical and mechanical performance. The SMPM-T handles high density requirements with a connector centerline-to-centerline spacing of just 5 mm (0.20 inch) while offering unmatched electrical stability at frequencies up to 65 GHz in even the harshest operating environments.

- No electrical length and phase variation under vibration, shock, or any other kind of movement
- The smallest threaded interface available that complies with MIL-STD-348
- A mated SMPM-T connector pair offers a 75 % size and 85 % mass reduction in comparison to a SMA connector solution

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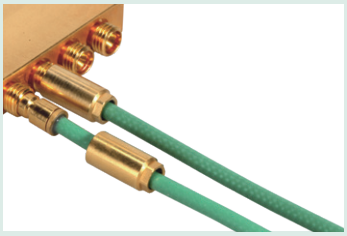
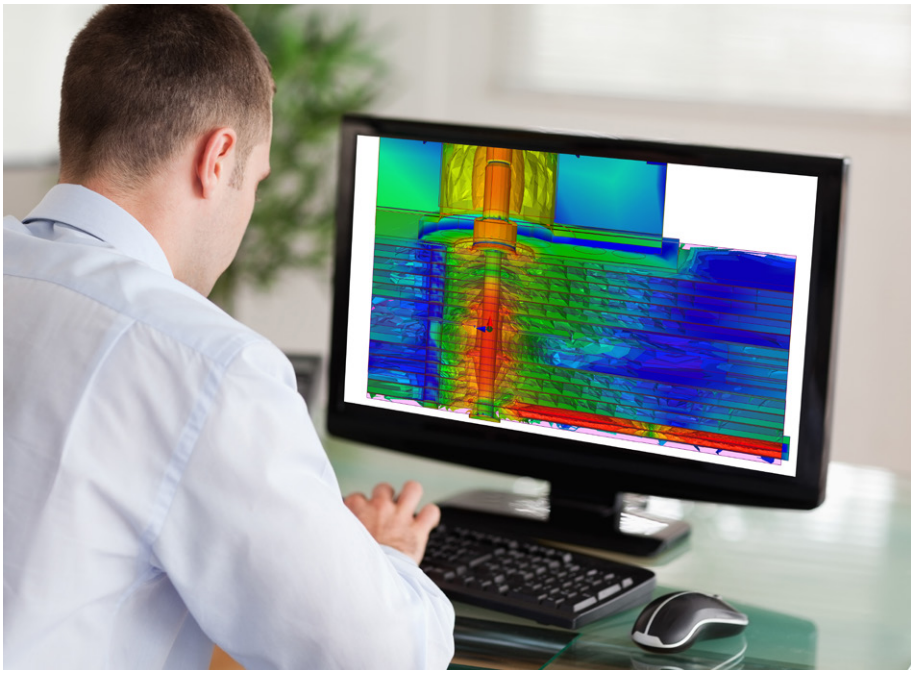


Service and support



HUBER+SUHNER is committed to delivering more value to our customers. To this end, our RF systems team has quickly evolved into a hub for hybrid assemblies, multi-product configurations, and black box solutions (especially RF-over-Fiber). The sub-systems area, which includes hybrid assemblies and multi-product configurations, is adding significant value for our customers. HUBER+SUHNER is now able to provide complete models, which simplifies both the customer's supply chain, as well as the system integration activities.

System solutions – HUBER+SUHNER offers design support which goes beyond the development of a connector, a cable or cable assembly. We have a dedicated in-house team which, in close cooperation with the customer, can provide:

- Systems: A "black box" solution for specific applications or a solution which, via a design service, configures/links HUBER+SUHNER and 3rd party products.
- Sub-systems: A product, which is designed by the customer, but engineered and produced by HUBER+SUHNER at an international location that is appropriate for the customer. These products may contain 3rd party content.
- Services: A service, whereby we provide kitting and other value-adding services, such as painted antennas, to customers in order to simplify the integration into a system or sub-system.

Customised connector solutions

While HUBER+SUHNER offers an extensive product line of connectors and adaptors, we also understand that some application needs are unique. HUBER+SUHNER offers custom-engineered solutions through innovative design, using state-of-the-art development tools. These powerful tools allow us to demonstrate product feasibility, including prototyping, in a short amount of time. Our in-house type testing capabilities will further prove the design through intensive verification tests according to MIL standards or your specific requirements.

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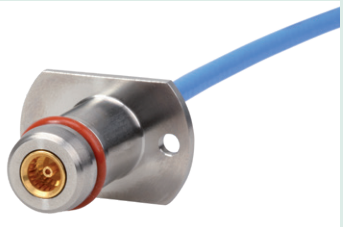
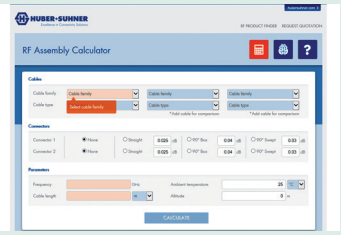


Online support tools

HUBER+SUHNER offers a set of online tools which assist you in finding the right product, calculate the electrical performasnce of specific cable assembly configurations, and inquire about the products once defined.

- Dynamic Product Finder
- **RF Assembly Calculator**
- **RF Assembly Configurator** (Request For Quotation)



Optimized connector/PCB solutions

Only by using an optimized footprint can the performance of the connectors be unleashed. HUBER+SUHNER offers optimized connector/board solutions:

- 3D field simulation
- Optimized footprints (incl. connector) as gerber files

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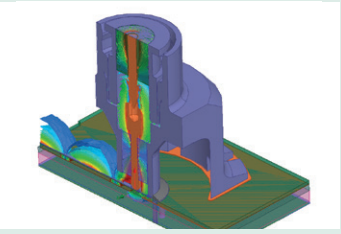

Measurement accessories

Additional tools and accessories will allow extended possible applications for the HUBER+SUHNER RF connectors, like

- Precision torque wrench
- MMPX – decoupling tools

CATALOGUE p. 551 et seq

Cable/connector portfolio – quick assem

High flexibility	Phase matching	Low insertion loss	Phase stability (mechanical)	Armouring	Cost efficient	Cable attenuation dB/m @ 18 GHz	Cable diameter (mm)	Interfaces / Cables	N				SMA				PC 3.5			
									Male straight	Male right angle	Female straight	Female bulkhead	Male straight	Male right angle	Female straight	Female bulkhead	Male straight	Male right angle	Female straight	Female bulkhead
								Frequency in GHz	18 (14 GHz: 32071)								26.5			
•				•	•	1.1 db/m @ 8 GHz	10.30	TL-8A	•		•		•							
						1.3 db/m @ 4 GHz	10.30	TL-P	•											
		•			•	1.6	4.60	Sucotest_18	•				•		•					
•			•	•		1.6	10.30	Sucotest_18A	•		•									
		•				1.7	4.80	Sucotest_26					•*	•*	•*					
		•				1.7	4.80	Sucotest_40												
	•	•		•		2.0	3.65	SUCOFLEX_101					•	•						
•	•		•	•		3.0	3.65	SUCOFLEX_101_P(E)					•	•						
	•	•		•		1.7	4.00	SUCOFLEX_102	•				•	•	•	•	•		•	
	•	•		•		1.3	4.60	SUCOFLEX_103	•	•		•	•	•	•		•		•	
	•	•		•		1.1	5.50	SUCOFLEX_104	•	•	•	•	•	•	•	•	•	•	•	
•	•	•	•	•		1.1	5.50	SUCOFLEX_126 (E)	•	•	•	•	•	•	•	•	•	•	•	
	•	•		•		0.8	7.90	SUCOFLEX_106	•	•		•	•	•	•	•				
•	•		•	•		0.8	7.90	SUCOFLEX_118	•	•	•	•	•	•	•	•				
•	•	•	•	•		1.1	7.70	SUCOFLEX 526S	•		•		•				•		•	
•			•	•		2.7	13.0	SUCOFLEX 526V									•		•	
•	•	•	•	•		2.0	3.75	SUCOFLEX 550 (E)									•			
•	•	•	•	•		2.0	6.10	SUCOFLEX 550S									•			
•	•	•	•	•		2.9	3.30	SUCOFLEX 570 (E)												
•	•	•	•	•		2.9	5.80	SUCOFLEX 570S												
•	•		•			5.7	1.74	Multiflex_53-02					•		•					
•	•		•			3.6	2.65	Multiflex_86_HE	•	•	•	•	•	•	•	•	•		•	•
•	•		•			2.1	4.14	Multiflex_141	•	•	•	•	•	•	•	•	•		•	•
	•		•		•	5.4	1.20	Sucoform_47_CU					•	•	•	•				
	•		•		•	3.4	2.10	Sucoform_86	•	•	•	•	•	•	•	•	•		•	•
	•		•		•	2.2	3.58	Sucoform_141	•	•	•	•	•	•	•	•	•		•	•
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•	•	•				4.7	1.91	MICROBEND					•		•	•				
•	•	•				4.7	1.91	MICROBEND 1R												
•	•	•				3.8	2.49	MINIBEND					•	•	•	•				
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	•		•			5.1	1.19	SR_47_TP_M17					•	•	•	•				
	•		•			5.4	1.19	SR_47_AL_TP					•	•	•	•				
	•	•	•			2.0	2.18	SR_86_LA_TP												
	•		•			3.2	2.18	SR_86_TP_M17	•	•	•	•	•	•	•	•	•		•	•
	•		•			3.3	2.18	SR_86_AL_TP_M17	•	•	•	•	•	•	•	•	•		•	•
	•		•			1.8	2.95	SR_118_TP												
	•		•			2.1	3.58	SR_141_TP_M17	•	•	•	•	•	•	•	•	•		•	•
	•		•			2.2	3.58	SR_141_AL_TP_M17	•	•	•	•	•	•	•	•	•		•	•

bly selection matrix

SK (2.92 mm)				SMP	MXP		PC 2.4				PC 1.85				MMPX				SMPM-T	MXPM				PC1.0		
Male straight	Male right angle	Female straight	Female bulkhead	Male straight	1x8	2x8	Male straight	Male right angle	Female straight	Female bulkhead	Male straight	Male right angle	Female straight	Female bulkhead	Male straight	Male right angle	Female straight	Female bulkhead	Female straight	1x8	2x8	1x8	2x8	Male straight	Female straight	Male bulkhead straight
40					50						70											90		110		
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•* SMAs are 26.5 GHz

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HUBER+SUHNER is certified to ISO 9001, ISO 14001, ISO 45001, EN/AS 9100, IATF 16949 and ISO/TS 22163-IRIS.