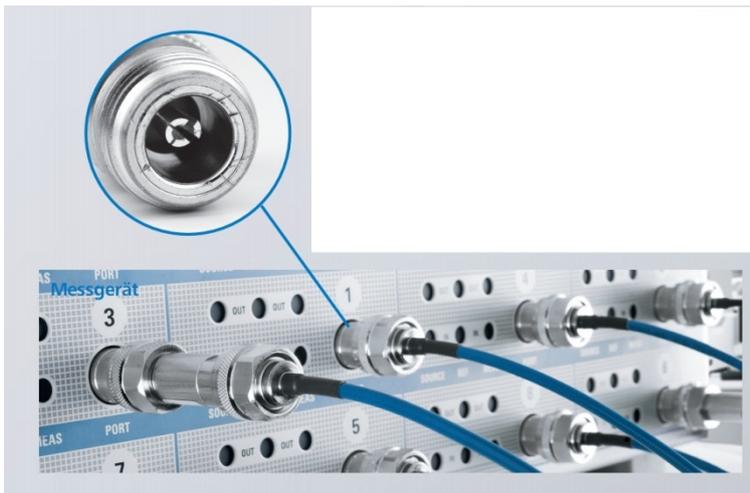


## Effective protection for Precise Test Ports

**Like all devices, measuring instruments in high frequency technology are subject to unavoidable wear. The high plugging cycles wear out the ports, usually leading to considerable costs and long downtimes for repairs. This can be prevented with appropriate Connector-Saver couplings.**

High quality HF measuring instruments are used by professionals under defined ambient conditions of course. But despite careful handling, mechanical stresses on the connections are unavoidable due to the constructional design of coaxial connectors alone - every coax transition represents not only an electromagnetic connection but also a force-fitted connection. The measuring instrument test ports are therefore exposed to unavoidable wear. The gold plating of the ports wears out, leading to a change in the contact resistance. Especially the contact springs of the inner conductors are stressed by frequent plugging and bent in extreme cases. If the ports continue to wear, the contact becomes unreliable and is eventually a real loose contact. The retaining force of the inner conductor also diminishes, causing it to be moved in the direction of the measuring instrument. The consequences: Accuracy and reproducibility of the measuring results are no longer guaranteed.



*Heavily worn socket due to frequent plugging cycles accuracy and reproducibility of the measuring results are no longer guaranteed.*

### Failure of the measuring station

The mechanical wear on the connections is checked during annual calibration. The same applies for the factory calibration which is obligatory for measuring instruments at ISO 9000-certified companies and in which the calibration kits are also checked. If a test port is worn or damaged, it will be repaired in the course of this action. Depending on the manufacturer and type of the measuring instrument, this can take time, up to several weeks in the worst case. The measuring station is out of action during this time. The consequence: Longer development times because the necessary measuring instruments are not available.

### Replaceable protection for test ports

The solution to this probably is incredibly easy. A high-precision RF coupling is screwed as a so-called Connector Saver to the measuring instrument socket and is left there. Measuring cables are only connected to the socket of the Connector Saver.



*Using a Connector Saver*

This prolongs the life of a test port: If, for example, the device socket is designed for 500 plug cycles, either a measuring cable can be plugged 500 times – or a Connector Saver which is also designed for 500 plug cycles. This means  $500 \times 500 = 250,000$  plug cycles before the measuring instrument socket has to be changed. The measuring technician can change the Connector Saver quickly and inexpensively in a few steps when necessary. The Connector Saver is unplugged and plugged like a measuring cable and only costs a fraction of what the replacement of the worn measuring instrument socket would cost.

### **Pay attention to quality**

As part of the measuring set-up, a Connector saver must meet higher demands than conventional couplings. High-precision, long-term stable dimensions at minimum tolerances and low loss and low reflection signal transition are essential. This begins already with the choice of materials. Only high quality materials bring satisfactory results. Of course, a lot can be compensated by the appropriate calibration in the laboratory but this makes the measurements more inaccurate.

Precise measurements also require a high quality mechanical structure because cheap products with poor mechanical precision especially can cause problems with the plug transition and lead to negative consequences in the measuring results. Special attention must be paid to fixing the inner conductor. If it is not sufficiently tight, the measuring instrument will soon be damaged.

But there is another challenge for the inner conductor: The so-called gap, the space between the two inner conductors of a connector in which there is a design-related diameter jump. The gap must be sufficiently large to prevent the inner conductor of the socket being pushed towards the device by the inner conductor of the plug; at the same time, it must be as small as possible to present as little impact point as possible. The influence of the gap in quality products is slight.

### **Practical experience is reflected in the detail**

Nowadays, measuring technology is also subject to the ever-present pressure of time. With quick connection variants with shorter threads, a measuring technician needs less time to plug and unplug the measuring leads which has a positive effect especially in extensive measuring series. A torque wrench also ensures high-precision measurements. Inter-series adapters with different plug faces at both ends simplify the measuring procedures with different test pieces.

The push-on variants of the Connector Saver are frequently used in automatic measurements such as in production technology for example. The measuring leads can be connected quickly and reliably.

**Conclusion:**

Great events often come from little causes. A simple component like the Connector Saver protects the test ports of high quality measuring instruments against mechanical wear which would incur high costs and long downtimes for expensive repairs to the measuring instrument. But attention must be paid to quality even in "small" components such as the Connector Saver. Components of the TestLine series from Telegärtner are designed especially for a high number of plug cycles and have excellent high frequency properties – indispensable requirements for precise, reproducible measuring results.