



These next generation power sensors are extremely contact-friendly. They can be operated via the optional R&S®NRP2 base unit as well as via their USB port on a PC or on various Rohde & Schwarz measuring instruments. All models offer a version with LAN port.

Power boost

Highest measurement accuracy, speed and dynamic range have always been the distinguishing features of Rohde & Schwarz power meters. But now a new generation shows that it can get even better.

The next generation of R&S®NRPxxX power sensors pushes performance to the limits of what is currently feasible. And the practical aspects were not forgotten. Now each sensor is also available as a model with a LAN port – ideal when some distance is required between the DUT and the user. The sensors only have to be connected to a power over Ethernet (PoE) switch or a PoE-capable network. Another unique feature: Rohde & Schwarz also offers 40 GHz and 50 GHz models, making the T&M expert the only manufacturer in the world to offer fast multipath diode power sensors for the K_a and Q bands that are quickly gaining in significance in satellite communications.

Depending on the model, the sensors measure frequencies up to 110 GHz (the range is constantly being expanded). The following models are currently available:

- R&S®NRPxxS three-path diode power sensors (10 MHz to 50 GHz)

- R&S®NRPxxT thermal power sensors (DC to 110 GHz)
- R&S®NRPxxA power sensors for EMC applications (8 kHz to 18 GHz)
- Special power sensors for use in a thermal vacuum (see box on page 25).

Models with LAN port have an additional “N” in the type designation, e.g. R&S®NRPxxSN. The product brochure contains a detailed overview of this comprehensive program and the different power classes.

Contact-friendly via USB and LAN

Like their predecessors, the new sensors are self-contained, calibrated power meters. There is a base unit for display and operation, however the sensors can also be operated via a PC as well as via other Rohde & Schwarz measuring instruments thanks to their USB interface (Fig. 1).

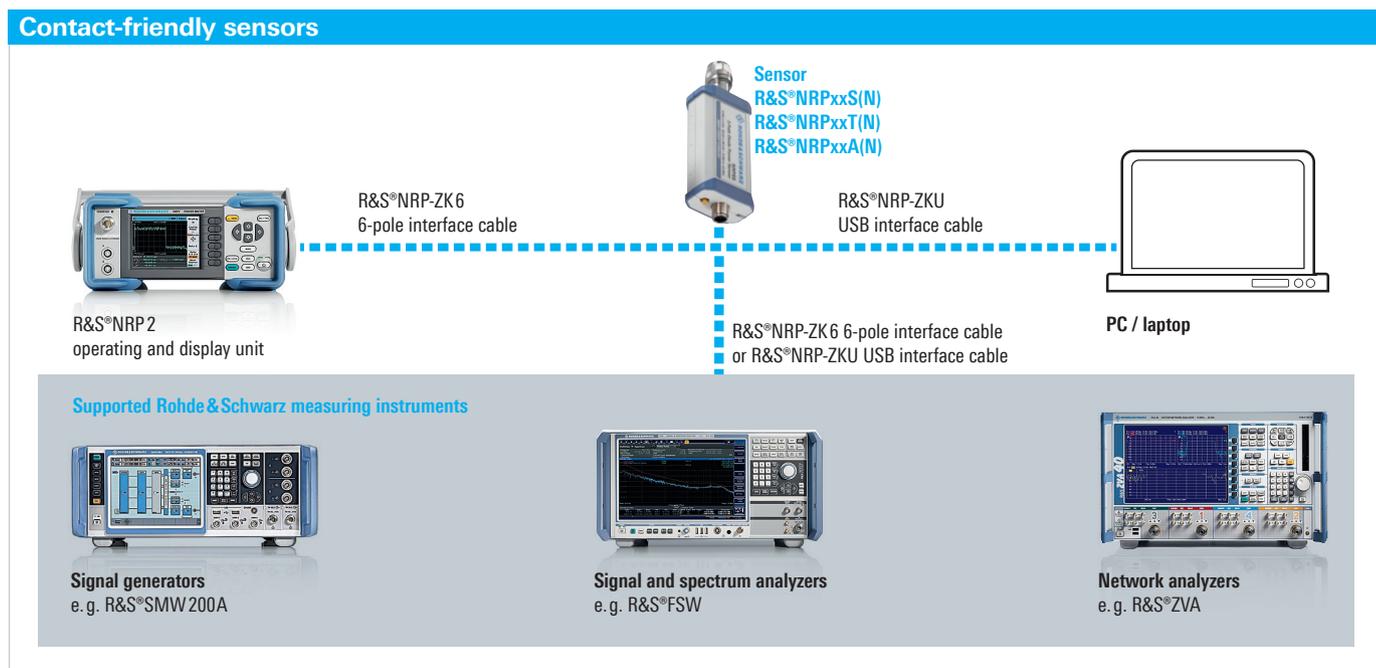


Fig. 1: The various ways to operate the power sensors. All models can be supplied with a LAN port. The interface cables have screw terminals to connect to the sensor and are available in lengths up to 5 m.

The LAN-capable models are easy to operate via any common web browser because their integrated web server provides all available measurement functions on a well-organized user interface. No additional software is required (Fig. 2).

Three-path diode power sensors: all-rounders with a high dynamic range

This sensor type is quite versatile because it measures power independent of the signal bandwidth and modulation type. Highlights includes its dynamic range of 93 dB with a lower measurement limit of -70 dBm and its measurement speed of up to 50,000 measurements/s. These sensors currently cover the frequency range from 10 MHz to 50 GHz, making them ideal for measuring wireless signals such as LTE and LTE-A as well as for applications in the K_a and Q bands, for example.

Thanks to the improved three-path diode technology, the lower measurement limit was lowered from the previous -67 dBm to -70 dBm. This 3 dB reduction in the noise component not only means that even lower powers can be measured, it also increases the measurement speed by a factor of four.

Thermal sensors: maximum precision and highest frequencies

Thermal power sensors are used when highest measurement accuracy is required, e.g. in calibration labs. With a lower measurement limit of -35 dBm, the R&S®NRPxxT(N) models have the widest dynamic range (55 dB) for this sensor type available on the market. Because thermal sensors measure power independent of the bandwidth, they can be used for wideband signal sources such as photodetectors and photo-receivers for the 100 Gbit Ethernet up to 110 GHz.

The top model covers the frequency range from DC to 110 GHz. This range makes it possible to perform interruption-free level calibration of a network analyzer (e.g. the R&S®ZVA110) on the 1 mm test port.

While measurement accuracy is paramount for thermal sensors, measurement speed also plays an important role. That's why the thermal test cell of the new sensors has been optimized so that its temperature very quickly follows changes in the applied power. The new sensors measure up to three times faster than comparable solutions on the market – without compromising accuracy.



Fig. 2: The integrated web server in the LAN-capable power sensors provides a well-organized display of all functions and results in a common web browser.

Out-of-this-world good: TVAC-compatible power sensor up to 33 GHz

In the satellite industry, components, subsystems and even entire satellites must be qualified under realistic operating conditions, i. e. for use in a thermal vacuum (TVAC). This increasingly requires highly accurate power measurements directly on the DUT, i. e. in a TVAC chamber. Therefore, the power sensor not only has to function in a high vacuum, it also must be able to withstand wide temperature fluctuations. And it must not pollute its environment through outgassing.

The new **R&S®NRP33SN-V sensor** was developed just for these conditions. All components are baked in a vacuum chamber during the production process so that subsequent outgassing is minimized. Venting holes in the housing equalize the pressure between the inside of the sensor and the environment. The power sensor covers the common satellite commu-

nications frequency range up to 33 GHz and enables fast, highly accurate power measurements over a dynamic range of 93 dB, independent of signal bandwidth

and modulation type. The power sensors can be controlled and monitored from outside the chamber via the integrated LAN port.



Special sensors for EMC applications

Power sensors for EMC applications not only have to determine the average power, they also have to measure frequencies down to 8 kHz – both quickly and at low power levels. These sensors also use improved three-path technology and therefore benefit from the extended dynamic range and the resulting increase in measurement speed at low levels.

Summary

The R&S®NRPxxX(N) sensor generation features improved specifications and expands the scope of applications by offering new types and connectivity options. The portfolio includes highly precise thermal sensors up to 110 GHz as well as extremely fast, high dynamic range, three-path diode power sensors up to 50 GHz such as are required for directional and satellite radio. Special models take into account the special requirements of EMC measurements and when operating in a thermal vacuum. The unique combination of USB and LAN interfaces on a single sensor, such as offered by the N models, opens up new application areas when a great distance between sensor and user has to be bridged.

The portfolio is being continually expanded.

Michael Kaltenbach