

## Power Sensors NRV-Z

### Brief description

For all power measurements with instruments from the URV/NRV families, 15 power sensors in all cover the frequency range from DC to 40 GHz. Three classes of sensitivity allow direct measurement of any power between 100 pW and 30 W. A 75- $\Omega$  sensor is available for TV and video applications.

The calibration data memory integrated in the sensor contains all the relevant information. With the sensor plugged in, a fully calibrated meter is ready for measurements. The calibration of all sensors can be traced to the relevant standards of the Federal German Bureau of Standards.

For calculating the total measurement uncertainty of the source power delivered to  $Z_0$  load the following factors have to be taken into account: mismatch uncertainty, calibration uncertainty, linearity error, meter noise, zero error, temperature effect, pulse measurement uncertainty (peak power sensors only) and measurement uncertainty of basic unit.



Calibration data for each sensor are stored in an EPROM in the sensor's connector (photo 37902)

500 mW for sinewave signals. Compared to thermocouple sensors, shorter measurement times can be attained with these sensors.

### Thermocouple Power Sensors NRV-Z51 to -Z55

They measure the average power irrespective of the waveform and therefore are also suitable for spread spectrum, IS-95 CDMA and W-CDMA measurements, irrespective of the peak-to-average power ratio of the waveform concerned. Being individually calibrated, these sensors feature an unrivalled linearity over the entire dynamic range.

### Peak Power Sensors NRV-Z31 to -Z33

These sensors measure the peak envelope power (PEP) of modulated or pulsed signals. The TDMA models 04 of the sensors allow fast and precise measurement of the transmitter power of mobile stations in GSM900/1800/1900 networks. Models 03 are suitable for measuring the sync pulse power of TV transmitters. Model 02 with a minimum pulse repetition frequency of 10 Hz is designed for general applications. Model 05 of NRV-Z32 enables measurement of the power peak value of mobile stations to NADC and PDC standard.

### Overview of models

#### High-Sensitivity Sensors NRV-Z1, -Z3, -Z4, -Z6, -Z15

These sensors measure the true RMS power from about 100 pW to 10  $\mu$ W and can be used in this level range for signals with harmonic contents, noisy or modulated signals. For sinewave signals, the measurement range extends to 20 mW (13 mW into 75  $\Omega$ ).

#### Medium-Sensitivity Sensors NRV-Z2, -Z5

Based on diode detectors with 20 dB attenuator, these sensors provide true RMS power measurement in the range from 10 nW to 1 mW and up to

### Specifications in brief

Model	Frequency range Min. pulse width Min. PRF	Power range Max. power	Max. SWR (reflection coefficient)	Zero error ( $\pm$ )	Meter noise	Linearity uncertainty in dB	Calibration uncertainty in dB
NRV-Z1 N; 50 $\Omega$	10 MHz to 18 GHz	200 pW to 20 mW 100 mW (AVG) 100 mW (PK)	0.01 to 1 GHz: 1.06 (0.03) >1 to 2 GHz: 1.13 (0.06) >2 to 4 GHz: 1.27 (0.12) >4 to 18 GHz: 1.41 (0.17)	100 pW	40 pW	0.03	0.07 0.07 0.08 0.08 to 0.15
NRV-Z2 N; 50 $\Omega$	10 MHz to 18 GHz	20 nW to 500 mW 2 W (AVG) 10 W (PK)	0.01 to 4 GHz: 1.05 (0.024) >4 to 8 GHz: 1.1 (0.048) >8 to 12.4 GHz: 1.15 (0.07) >12.4 to 18 GHz: 1.2 (0.09)	10 nW	4 nW	0.03	0.07 0.07 0.07 0.09 to 0.13
NRV-Z3 N; 75 $\Omega$	1 MHz to 2.5 GHz	100 pW to 13 mW 70 mW (AVG) 70 mW (PK)	1 to 100 MHz: 1.11 (0.05) >0.1 to 1 GHz: 1.11 (0.05) >1 to 2.5 GHz: 1.2 (0.09)	40 pW	16 pW	0.03	0.06 0.07 0.07