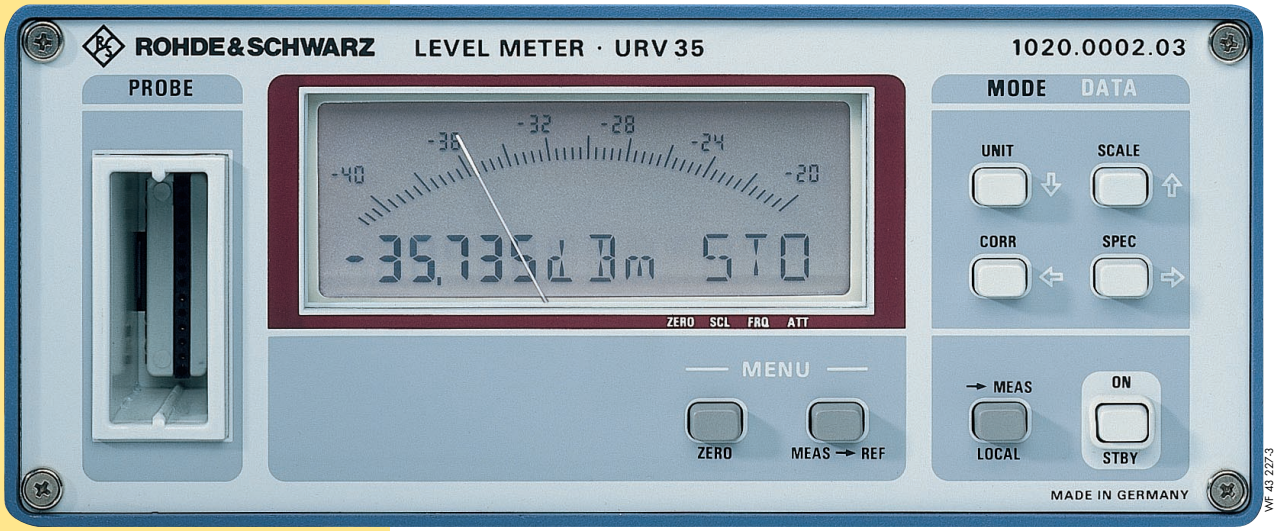
Level Meter URV35

Power and voltage measurements from DC to 40 GHz with analog/digital display

- Compact, handy and mobile
- Wide range of measuring heads
- Combined analog and digital display
- Battery or AC supply
- Menu-guided operation
- RS-232 interface

ROHDE&SCHWARZ



General

Level Meter URV35 from Rohde & Schwarz is a versatile voltmeter and power meter. Its rugged design, optional battery or AC supply operation and a remote-control interface are key features that afford manifold applications.

URV35 is just as suitable for use in service and production as for precise measurements in the laboratory.

The large variety of measuring heads available for the URV5-Z and NRV-Z series opens up a wide level and frequency range to the URV35. The high RF shielding provides for precise measurements even in the near field of antennas

Certified Quality System
ISO 9001
DQS REG. NO 1954-04

Operating concept

URV35 is menu-controlled – a feature that is normally found with larger instruments only. The menus allow the numerous measuring and setting functions to be selected in plain text and do away with difficult-to-remember numbers for special functions.

Each measuring head is calibrated individually. The entire information stored in the measuring head such as calibration data, temperature response, frequency response, detector type is automatically evaluated in the URV35. The measuring head impedance is also taken into account so that the values displayed in W or dBm are always correct. Thanks to this intelligent operating concept and the autorange facility, the user has only to read the measurement result displayed.

Resolution and measurement range

The filtering which is dependent on the level and resolution as well as the optional $4^1/_2$- or $3^1/_2$-digit readout guarantee a perfect display of the measured values for every application. The autorange facility ensures the correct setup of the instrument.

Frequency-response correction

With the frequency-response correction being enabled, the correction data stored in the measuring head are automatically taken into account to increase the measuring precision. For this purpose, the frequency is entered manually or via the serial interface. However, the frequency can also be entered in terms of an equivalent DC voltage at the DC FREQ input of the URV35. The full calibration precision is thus utilized during manual measurements with sweep generators. For this type of measurement, just two pairs of values (start, stop frequency + corresponding voltages) need to be entered.

Long-term measurements

For long-term measurements, a YT recorder can be connected to the rear analog output.

Measuring heads

Probes

URV5-Z1 **395.0512.02**	**DC Probe** 1 mV to 400 V, 9 MΩ ||3 pF	For low-capacitance DC voltage measurements in RF circuits at minimum load
URV5-Z7 **395.2615.02**	**RF Probe** 200 µV to 10 V, 20 kHz to 1 GHz	For measurements in open RF circuits at low capacitive and resistive load
with 20 dB plug-on divider*)	2 mV to 100 V, 1 to 500 MHz	The 20 dB and 40 dB plug-on dividers increase the voltage measuring range of the RF probe; the high Q factor of the capacitive divider makes the resistive loading negligible, the capacitive loading goes down to 0.5 pF (40 dB divider)
with 40 dB plug-on divider*)	20 mV to 1000 V, 500 kHz to 500 MHz	
with 50 Ω Adapter URV-Z50	200 µV to 10 V, 20 kHz to 1 GHz	With integrated termination for power or level measurements on test items with a source impedance of 50 Ω in the frequency range up to 1 GHz (BNC female/male)
with 75 Ω Adapter URV-Z3	200 µV to 10 V, 20 kHz to 500 MHz	With integrated termination for power or level measurements in 75 Ω systems such as antenna or video assemblies (BNC male)

*) included in accessory URV-Z6 (Order No. 292.5364.02)

RF insertion units (with N male/female connectors)

URV5-Z2 **395.1019.02**	**10 V Insertion Unit 50 Ω** 200 µV to 10 V, 9 kHz to 3 GHz	Low-load RF voltage measurements in coaxial 50 Ω systems, low-loss power measurements on well-matched RF lines
URV5-Z4 **395.1619.02**	**100 V Insertion Unit 50 Ω** 2 mV to 100 V, 100 kHz to 3 GHz	Virtually no-load RF voltage measurements in coaxial 50 Ω systems even at higher voltages. Due to minimum insertion loss and reflection coeffi-cient this unit causes practically no interference on a 50 Ω line

Power sensors (unless otherwise specified, power sensors come with N male connectors)

NRV-Z1 **828.3018.02**	**Diode Power Sensor 50 Ω** 10 MHz to 18 GHz, 200 pW to 20 mW	Power measurements of highest sensitivity up to 18 GHz in 50 Ω systems
NRV-Z2 **828.3218.02**	**Diode Power Sensor 50 Ω** 10 MHz to 18 GHz, 20 nW to 500 mW	Power measurements with minimum mismatch, for high powers in 50 Ω systems
NRV-Z3 **828.3418.02**	**Diode Power Sensor 75 Ω** 1 MHz to 2.5 GHz, 100 pW to 13 mW	Power measurements in 75-Ω systems
NRV-Z4 **828.3618.02**	**Diode Power Sensor 50 Ω** 100 kHz to 6 GHz, 100 pW to 20 mW	Power measurements of highest sensitivity in the frequency range 100 kHz to 6 GHz, very large dynamic range
NRV-Z5 **828.3818.02**	**Diode Power Sensor 50 Ω** 100 kHz to 6 GHz, 10 nW to 500 mW	Like NRV-Z4, but for high powers and minimum mismatch
NRV-Z6 **828.5010.02**	**Diode Power Sensor 50 Ω** 50 MHz to 26.5 GHz, 400 pW to 20 mW	Power measurements up to 26.5 GHz with high sensitivity in 50 Ω systems (PC3.5 connector, male)
NRV-Z15 **1081.2305.02**	**Diode Power Sensor 50 Ω** 50 MHz to 40 GHz, 400 pW to 20 mW	Power measurements up to 40 GHz with high sensitivity in 50 Ω systems (2.92 mm connector, male)
NRV-Z31 **857.9604.02/3/4**	**Peak Power Sensor 50 Ω** 30 MHz to 6 GHz, 1 µW to 20 mW	Peak power measurements, pulse width ≥2 (200) µs, pulse repetition rate ≥10 (100) Hz, 3 models
NRV-Z32 **1031.6807.04/5**	**Peak Power Sensor 50 Ω** 30 MHz to 6 GHz, 100 µW to 2(4) W	Peak power measurements, pulse width ≥2 (200) µs, pulse repetition rate ≥25 (100) Hz, 2 models
NRV-Z33 **1031.6507.03/4**	**Peak Power Sensor 50 Ω** 30 MHz to 6 GHz, 1 mW to 20 W	Peak power measurements up to 20 W, pulse width ≥2 (200) µs, pulse repetition rate ≥100 Hz, 2 models
NRV-Z51 **857.9004.02**	**Thermal Power Sensor 50 Ω** DC to 18 GHz, 1 µW to 100 mW	High-precision power measurements also with non-sinusoidal signals
NRV-Z52 **857.9204.02**	**Thermal Power Sensor 50 Ω** DC to 26.5 GHz, 1 µW to 100 mW	Like NRV-Z51, but with PC3.5 connector (male) for measurements up to 26.5 GHz
NRV-Z53 **858.0500.02**	**Thermal Power Sensor 50 Ω** DC to 18 GHz, 100 µW to 10 W	High-power measurements up to 10 W also with non-sinusoidal signals
NRV-Z54 **858.0800.02**	**Thermal Power Sensor 50 Ω** DC to 18 GHz, 300 µW to 30 W	High-power measurements up to 30 W also with non-sinusoidal signals
NRV-Z55 **1081.2005.02**	**Thermal Power Sensor 50 Ω** DC to 40 GHz, 1 µW to 100 mW	Like NRV-Z51, but with 2.92 mm connector (male) for measurements up to 40 GHz

Specifications

Frequency range	DC to 40 GHz, depending on sensor
Display	backlit LCD for display of measured value plus unit and for meter scale; additional moving-coil meter with short response time
Readout absolute	in dBm, V, W or dBµV
relative	in dB referred to reference value
Resolution of digital display	HI: 4½ digits (19,999 steps) 0.001 dB with readout in dB, dBm or dBµV LO: 3½ digits (1,999 steps) 0.01 dB with readout in dB, dBm or dBµV
Analog display	steps of 1/2.5/5 with readout in V, W or dB; steps of 5 (10) dB with readout in dBm or dBµV and windows of 10(20) dB, manually or automatically selected; free scaling by entry of left-hand and right-hand scale limits
Display noise	see diagram; negligible for DC Probe URV5-Z1
Display filtering	level-dependent digital averaging filter 4½-digit resolution: averaging over 16 to 256 readings, 3½-digit resolution: averaging over 1 to 32 readings
Measurement rate	approx. 5 readouts per s in manual operation; measurement time in case of triggered measurement (RS-232): see diagram; with DC Probe URV5-Z1 approx. 0.1 s (3½ digits) or 0.25 s (4½ digits)

Error limits	Digital display	Moving-coil meter
18 to 28 °C	±0.02 dB ±1 digit	1.5% of scale length
10 to 40 °C	±0.04 dB ±1 digit	2.5% of scale length
0 to 50 °C	±0.06 dB ±1 digit	3.5% of scale length

Zero adjustment	via RS-232 interface or key, duration approx. 4 s, for residual error see measuring head specifications
Frequency-response correction	sensor-specific calibration factors taken into account; input of frequency via keypad, serial interface or DC voltage at rear control input
Attenuation compensation	ext. attenuation or gain taken into account; data entry via serial interface or keypad, range ±199.99 dB
Input of reference value	measured value on keystroke, or numerical value entered via serial interface or keypad
HOLD function	displayed measurement result retained upon keystroke
Reference impedance	50 Ω or 75 Ω depending on sensor, 50 Ω/75 Ω selectable for RF probe
Remote control	all device functions controlled via serial interface (V.24, RS-232); X_{on}/X_{off} protocol; 110, 300, 1200, 2400, 4800, 9600 bauds; parity: odd, even, none; 8 data, 1 start, 1 stop plus 1 parity bit, if required; 9-contact D-sub connector (male)
DC voltage input DC FREQ for control of frequency-response correction	±12 V (max. 50 V), 9 MΩ, freely selectable linear scaling, BNC connector (female)
DC voltage output	EMF proportional to pointer deflection, left-hand scale limit corresponding to 0 V, right-hand scale limit corresponding to +3 V, 1 kΩ source impedance, additional settling time 250 ms, error ≤5 mV, ripple typ. 5 mV pp, BNC connector (female)

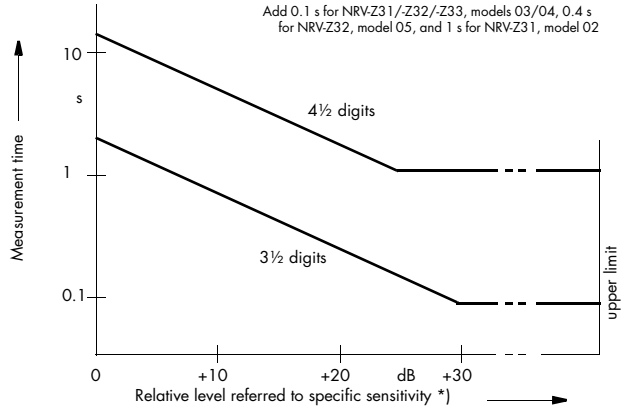
Sensor Check Source NRVS-B1 (option)

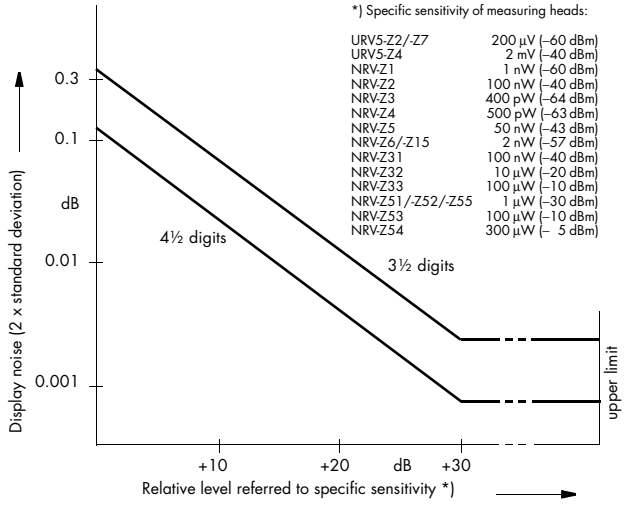
Frequency	50 MHz, crystal-stabilized
Power	1.00 mW; factory-set to ±0.7% (traceable to PTB)
Deviation from nominal	1.2% max. (0.9% RSS) at 10 to 40 °C or 1.6% (1.2% RSS) at 0 to 50 °C, for 1 year in each case
SWR	1.05
RF connector	N female (at rear panel); N male/SMA female adapter for NRV-Z6/-Z52/-Z15/-Z55 included

The sensor check source is permanently on. The operating time of one set of cells/rechargeable batteries (model 02) is reduced by approximately 25%.

General data

Temperature range	to DIN IEC 68-2-1/68-2-2
Operating	0 to +50 °C
Storage	–40 to +70 °C
Permissible humidity	max. 80%, without condensation
Sinusoidal vibration	5 to 55 Hz, max. 2 g; 55 to 150 Hz, 0.5 g cont. (DIN IEC 68-2-6, IEC 1010-1, MIL-T-28800 D, class 5 complied with)
Random vibration	10 to 500 Hz, 1.9 g rms (to DIN IEC 68-2-36)
Shock	40 g shock spectrum (to MIL-STD-810 D; DIN IEC 68-2-27 complied with)
EMC	to EN 50081-1 and 50082-1, EMC directive of EC (89/336/EEC) and EMC law of the Federal Republic of Germany
Safety	to EN 61010-1
Power supply	
Model 02 (battery operation)	5 x 1.5 V dry cell LR20, approx. 125 h (included in scope of supplies), or 5 x 1.2 V NiCd storage battery to IEC KR35/62, approx. 60 h; charging time with UZ-35 approx. 24 h
Model 02 (AC supply)	with plug-in Power Unit/Battery Charger UZ-35 for 230 V ±10%, 47 Hz to 63 Hz, Euro connector (Mod. 02) or 120 V ±10%, 57 Hz to 63 Hz, US connector (Mod. 04); dimensions of UZ-35: 96 mm x 55 mm x 58 mm
Model 03 (AC supply)	115 V +15%/–22%, 47 to 440 Hz or 230 V +15%/–22%, 47 to 63 Hz (selectable) 6 VA, safety class 1 to VDE 0411 and IEC 348, AC transformer with integrated thermal overload protection
Dimensions (W x H x D)	219 mm x 103 mm x 240 mm
Weight	3.1 kg with batteries (model 02) 2.4 kg (model 03)

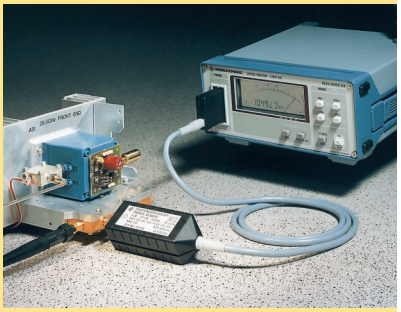




Applications ▼

WF 39 815

WF 39 8172



WF 39 819

WF 39 881-3

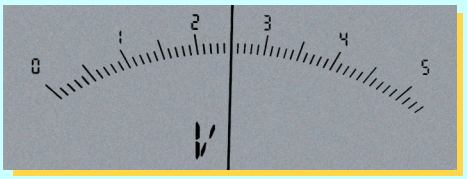
Unsurpassed display unit

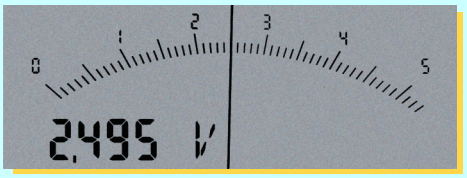
Analog or digital – no problem for the URV35, as it has a combined analog/digital display which optimally integrates the advantages of a true moving-coil meter with those of a digital display. The results are indicated in all the usual units of measurement either as absolute or relative values. The scaling on the LCD is freely selectable, which provides for an unprecedented ease of reading:

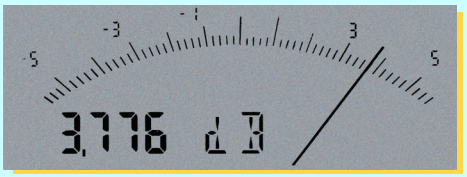
- In the AUTO mode, the measurement range and the matching scale are selected automatically.
- In the FIX mode, the scale selected is retained. Scaling is made in steps of 1/2.5/5 as in the AUTO mode. The digital display shows correct values but the deflection of the analog pointer is limited according to the scale selected.
- In the LIMIT mode, the desired left-hand and right-hand scale limits can be entered; this allows a specific section of the scale to be displayed (zoom function).

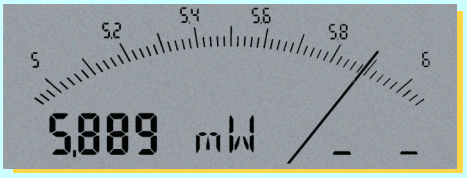
Depending on the application, it is possible to choose between three display modes, ie analog, digital, analog plus digital.

The selectable display backlighting ensures good readability of the measured values even under unfavourable ambient lighting.









Ordering information

Order designation	Level Meter URV 35	
Battery-operated model		1020.0002.02
AC supply model		1020.0002.03
Option Sensor Check Source	NRVS-B1	1029.2908.02
Recommended extras		
Power Supply/Charger		
for European AC supply	UZ-35	1020.1709.02
for US AC supply	UZ-35	1020.1709.04
Transit Case	UZ-22	1029.2008.02
Accessory Bag	ZZT-91	0827.6365.00
Carrying Strap	ZZT-96	0396.9813.00
Rack Adapter	ZZA-97	0827.4527.00
Service Kit	URV35-S1	1029.2608.02