

Power Reflection Meter NAP

0.2 to 2000 MHz
1 mW to 1950 W



Photo 35 663-2

Brief description

Power Reflection Meter NAP is used to measure power and matching on radio equipment and systems. Its main fields of application are in service and production as well as in development and quality control.

Main features

- Measurement of average power (AVG)
- Optional measurement of peak envelope power (PEP), depending on sensor
- Simultaneous display of forward and reflected power – digital and analog
- Direct readout in W or dBm, SWR, reflection coefficient, mismatch and return loss
- Ten exchangeable, detached power sensors

Characteristics

The handy design of the NAP makes it ideal for mobile use, eg for measurements on transceivers in motor vehicles. For laboratory measurements, continuous transmitter monitoring or use in systems a model with AC supply connector and IEC/IEEE-bus interface is available.

The extremely low insertion loss of the power sensors allows measurements on transmitter systems under operational conditions without affecting the matching between transmitter and load. Fields of application include transceivers in conventional analog and in the new digital networks (eg GSM and DCS 1800), low-power TV transmitters, ATC and paging systems, medical engineering and industrial radio telecontrol.

Display unit and power sensors are RF-pickup-proof, permitting error-free measurements even in the vicinity of antennas.

Display of results

Two 3¹/₂-digit displays are provided for simultaneous indication of the forward and reflected functions. The measured value is also shown in quasi-analog form by a 56-segment bargraph indicator provided below the digital display for trend indication.

Operation

The insertion unit connected between the signal source and the load measures the forward and reflected power – from which the basic unit computes the values of all the other measurement functions – so that no conversion tables are required.

The keys for selecting forward and reflected functions are combined in two groups and assigned to the related display. Routine measurement functions can be set by means of a single keystroke.

On power up the NAP performs a selftest for checking the essential functions of the display unit.

Analog output

An analog output for each the forward and the reflected power is provided on the rear panel. The DC voltages available at the outputs are proportional to the values displayed.

Peak Power Sensors NAP-Z7, -Z8, -Z10, -Z11

These sensors permit measurement of the peak envelope power (PEP) or of the average power (AVG) of modulated signals. Peak Power Sensors NAP-Z10 and -Z11 come in two versions. Model 02 is ideal for measuring the sync pulse power of low-power TV transmitters and for general applications with pulse widths from 2 μ s. Model 04 has been designed for the GSM network and measures the transmitter power within one time slot of mobile stations.

Specifications in brief: basic unit

Power measurement ranges	1/10/100% of max. sensor power, automatic/manual selection
Sensor connector	15- contact to DIN 41652
Displayed functions	forward/reflected power, PEP or AVG (W or dBm); SWR, reflection coefficient (%); mismatch/return loss(dB); forward/reflected power ratio (%); AM modulation depth (%); relative measurement (% or dB); minimum/maximum values
Display of results	digital: 3 1/2 digits, analog: 56-segment bargraph indicator
Analog outputs	for forward and reflected channels
EMF; Z _{out}	1 mV/digit of display; 2.2 kΩ
Accuracy	±20 mV, referred to reading
Remote control	model 04: IEC 625-1 (IEEE 488)
General data	
Power supply	
Batteries (model 02)	6 round cells 1.5 V (LR 20)
Service life	>400 h (alkaline-manganese batteries 8 h/day)
Rechargeable batteries (model 04)	6 NiCd button cells 1.2 V
Service life	approx. 100 h (switchoff after 30 min)

AC supply (model 04)	100 to 120/220 to 240 V ±10%, 47 to 63 Hz (14 VA)
Dimensions (W x H x D); weight	241 mm x 110 mm x 219 mm; 3.6 kg

Ordering information NAP

Power Reflection Meter		
Display unit, battery-operated	NAP	0392.4017.02
Display unit, AC supply/IEEE bus	NAP	0392.4017.04
Power Sensor		
	NAP-Z3	0392.6610.55
	NAP-Z4	0392.6910.55
	NAP-Z5	0392.7116.55
	NAP-Z6	0392.7316.54
	NAP-Z7	0350.8214.02
	NAP-Z8	0350.4619.02
	NAP-Z9	0392.5513.55
	NAP-Z10	0858.0000.02
		0858.0000.04
	NAP-Z11	0852.6707.02
		0852.6707.04
	NAP-Z42	0852.7403.02
Extras		
Extension Cable (25 m)	NAP-Z2	0392.5813.02
Adapters for RF connectors	see page 298	

Specifications in brief: Power Sensors NAP-Z

NAP with Power Sensor	NAP-Z7	NAP-Z8	NAP-Z9	NAP-Z3	NAP-Z4	NAP-Z5	NAP-Z6
Measurement range AVG PEP	0.1 to 195 W 0.5 to 195 W	1 to 1950 W 5 to 1950 W	1 mW to 1.1 W -	0.02 to 35 W -	0.05 to 110 W -	0.2 to 350 W -	0.5 to 1100 W -
Frequency range AVG PEP	0.4 to 80 MHz 0.4 to 80 MHz	0.2 to 80 MHz 0.4 to 80 MHz	100 to 1000 MHz -	25 to 1000 MHz -			-
Modulation frequency range (AM) Pulse width (PM) PEP Pulse repetition freq. (PM)	30 Hz to 10 kHz ≥20 μs ≥30 Hz			-			
Power meas. accuracy AVG ¹⁾ +1 digit + 0.01%P _{max} (sensor)	≤6%, ≤4% taking into account the recorded calibration factors (in frequency range 1.5 to 30 MHz)			≤6%			
Temperature effect AVG	≤0.25%/K						
Directivity	≥35 dB (1.5 to 30 MHz)		≥30 dB (>170 MHz) ≥26 dB (<170 MHz)	≥30 dB (30 to 1000 MHz) ≥26 dB (25 to 30 MHz)			
SWR	≤1.02 (≤30 MHz) ≤1.03 (30 to 80 MHz)		≤1.03				
RF connectors	N male/female, 50 Ω						
Measurement time (with- out range switching) Digital value (manual) via IEC/IEEE bus Analog value, AC supply Battery operation	400 ms AVG: 500 ms, PEP: 1500 ms			400 ms 400 ms			
	80 ms 400 ms (80 ms selectable with special function)						
Dimensions (mm)	118 x 118 x 45		118 x 105 x 45			125 x 105 x 45	
Weight (kg)	0.7		0.6			0.7	

¹⁾ Specified accuracy applies to power measurement in W directly at power sensor at 20 to 25 °C and with autoranging. All other values indicated are determined by way of conversion.

Power Reflection Meter NAP

Specifications in brief: Power Sensors NAP-Z

NAP with Power Sensor	NAP-Z10 mod. 02	NAP-Z11 mod. 02	NAP-Z10 mod. 03	NAP-Z11 mod. 03	NAP-Z42
Measurement range AVG PEP	0.01 to 19.5 W 0.05 to 19.5 W	0.1 to 195 W 0.5 to 195 W	0.01 to 19.5 W 0.02 to 19.5 W	0.1 to 195 W 0.2 to 195 W	0.05 to 110 W –
Frequency range AVG PEP	35 MHz to 1 GHz 35 MHz to 1 GHz		890 to 960 MHz 890 to 960 MHz		0.9 to 2 GHz –
Modulation frequency range (AM) Pulse width (PM) PEP Pulse repetition freq. (PM)	50 Hz to 100 kHz 4.5 μ s \geq 50 Hz		– 577 μ s 216.7 Hz		–
Power meas. accuracy AVG ¹⁾ +1 digit + 0.01% P _{max} (sensor)	\leq 6.5%		\leq 4.5%		\leq 5% taking into account the recorded calibration data
Temperature effect AVG	\leq 0.25%/K				
Directivity	\geq 30 dB (400 to 1000 MHz) \geq 26 dB (35 to 40 MHz)		\geq 30 dB		\geq 24 dB (typ. 30 dB)
SWR	\leq 1.03				\leq 1.08
RF connectors	N male/female, 50 Ω				
Measurement time (with- out range switching) Digital value, manual via IEC/IEEE bus	400 ms AVG: 500 ms, PEP: 1500 ms		400 ms 400 ms AVG: 500 ms, PEP: 1500 ms		400 ms
Analog value, AC supply Battery operation	80 ms 400 ms (80 ms selectable with special function)				
Dimensions (mm) Weight (kg)	118 x 118 x 45 0.7				118 x 105 x 45 0.8

¹⁾ Specified accuracy applies to power measurement in W directly at power sensor at 20 to 25°C and with autoranging. All other values indicated are determined by way of conversion.

6