

Volt, Phase and Flutter Meters, Measuring Amplifiers

type 2429 Psophometer

FEATURES:

- Meets CCITT P53 and CCIR 468-1
- Balanced input, 600 Ω or > 10 k Ω impedance
- Telephone, Radio I and Radio II weighting filters plus unweighted operation
- Twelve input ranges 0,1 mV to 30 V full scale
- Built-in reference oscillator for easy calibration regardless of range setting
- Overload indication
- High overload margin
- Selectable Q-Peak and Q-RMS rectifiers
- Linear buffered DC recorder output
- Buffered AC outputs for 'phones and recorder
- Large, illuminated meter with mirrored back and linear voltage scales

USES:

- Measurements on telephone circuits
- Measurements on radio broadcasting equipment
- Unweighted measurements with balanced input

The Psophometer Type 2429 is a compact instrument for measuring noise in telephone circuits, AM and FM radio channels and audio-frequency communication links. Its three active psophometric weighting filters conform to the internationally agreed characteristics laid down in CCITT P53 and CCIR 468-1. These characteristics are the result of statistical experiments on human subjects. They take account of the characteristics of the ear, the typical frequency response of the communica-

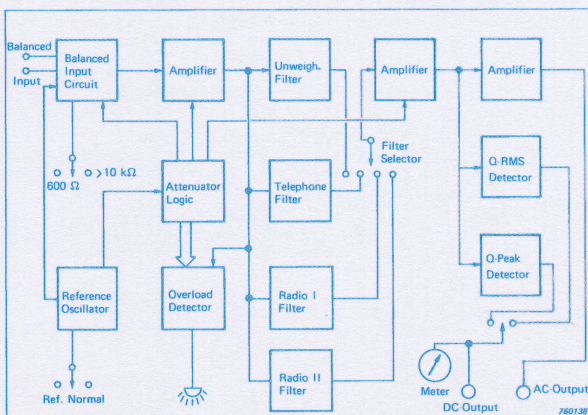
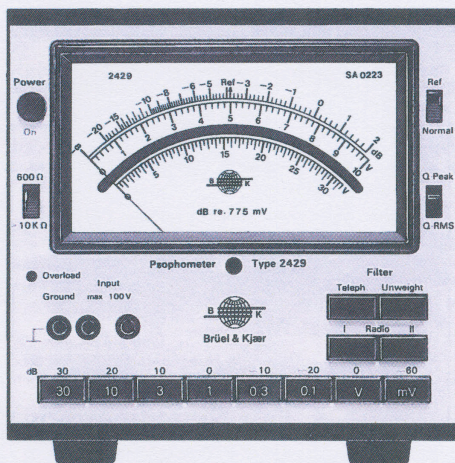


Fig. 1. Block diagram of the Psophometer

tion system, and the relative annoyance of noise in different frequency bands. The Type 2429 can be used unweighted as a multi-range electronic AC voltmeter, as well as making noise measurements to CCITT P53 and CCIR 468-1.

The Type 2429 has a balanced input with a selectable 600 Ω termination and 500V isolation from longitudinal (common mode) voltages. Twelve input sensitivity ranges cover 100 μ V to 30V full scale in 10 dB steps.



A 1 kHz sine wave reference oscillator and screwdriver adjustment permit easy calibration in any range setting. The 1 kHz is injected at the input, thereby proving the entire signal chain. The appropriate range is set up automatically when "Ref." is selected.

A choice of Quasi-RMS and Quasi-Peak rectifiers is included. It is the design of the rectifiers which ensures the excellent linearity of both the meter voltage scales and the fully-buffered DC recorder output. The Quasi-RMS rectifier provides true-RMS indication for sine-waves and Gaussian random signals. The illuminated meter also carries a decibel scale referred to 0,775 V as 0 dB (1 mW in 600 Ω). Separate fully-buffered AC outputs are provided for headphones and a graphic level recorder (e.g., B & K Type 2306) or tape recorder (e.g., B & K Type 7003). Loading the outputs has no effect on meter readings.

Provision is made for increasing

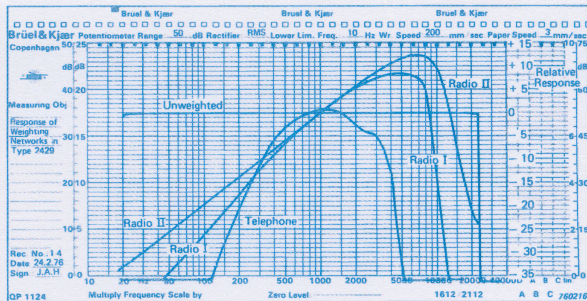


Fig. 2. Response curves of the built-in weighting networks

the rectifier time-constant by connection of an external capacitor. Range selection is by easy-to-use interlocked push-buttons. If an inconsistent combination is selected, a red indicator flashes. The same indicator also lights if the signal exceeds the high overload margin of the Psophometer.

The Type 2429 may be mounted if required in the B & K Modular Cassette system for 19-inch rack or

field use. The electrical earth of the instrument may be disconnected from the chassis by an external link. Measurement accuracy is not affected by use of the instrument with a 24 V potential (up to 1 kHz) between its electrical earth and chassis. The instrument may be powered from AC mains, batteries, or the DC supplies commonly available in telephone installations. The amplifiers and active filters are all solid state, with negligible warm-up time.

Specifications 2429

Input:

Connector: standard 3 pin flat connector in accordance with DIN 41 628
Characteristics: balanced (symmetrical) in accordance with CCITT Recommendation P53
Isolation: 500 V
Impedance: 600 Ω \pm 2% or > 10 k Ω , switch selectable
Range: 100 μ V to 30 V (-78 dB to +32 dB referred to 0,775 V) for full scale indication. Selectable in 10 dB steps

Rectifiers:

Q-RMS: in accordance with CCITT P53
Q-Peak: in accordance with DIN 45405 and CCIR 468-1
Time-constant: may be increased by the addition of an external capacitor
Linearity: (at 1000 Hz, referred to meter FSD)
 \pm 0,2 dB from 32% to 100% FSD
 \pm 0,5 dB from 10% to 320% FSD

Weighting:

Unweighted: in accordance with DIN 45405
Telephone: in accordance with CCITT P53 and DIN 45405
Radio I: in accordance with CCITT P53 and DIN 45405
Radio II: in accordance with CCIR 468-1
Accuracy: \pm 0,3 dB of absolute calibration

Equivalent Input Noise with Q-RMS Rectifier:

Unweighted: < 8 μ V
Telephone: \sim 6 μ V
Radio I: < 10 μ V
Radio II: \sim 14 μ V

Outputs:

Level: 3,16 V corresponds to full scale indication, at the AC, DC and Phones outputs
AC: < 5 Ω impedance, short-circuit protected, gain range +90 dB to -20 dB. Standard BNC connector
DC: 47 Ω impedance, short-circuit protected Standard BNC connector. Positive output voltage
Phones: 600 Ω impedance short-circuit protected. Pair of screw terminals accepting bare wires, spades or 4-mm plugs JB 0002

Calibration Reference Oscillator:

Frequency: 1,0 kHz \pm 2%
Level accuracy: \pm 0,05 dB

Overload Margins:

Pre-filter: > 30 dB except for Telephone weighting below 1500 Hz, where the margin is approx. 20 dB per decade, 60 dB at 50 Hz. In mV settings, input should not exceed 10 V at extremely low frequencies

Post-filter: > 20 dB in accordance with CCIR 468-1
Indication: red LED flashes for pre-filter overload

Power Supplies (AC or DC):

AC: 100, 115, 127, 220, 240 V single phase 50 to 400 Hz AC mains, 16 VA approx. Conforms to IEC 348 Safety Class I
DC: +18 to +25 V DC on standard 7-pin DIN socket. Typical current +200 mA and -100 mA. Includes duplicated AC and DC outputs and connection for external capacitor

Temperature Range:

5° to 40°C (41° to 104°F)

Weight:

3,4 kg (7,5 lb) approx

Dimensions:

Height: 132,6 mm (5,2 in)
Width: 139,5 mm (5,5 in)
Depth: 200,0 mm (7,9 in)
 (B & K module cabinet: KK 0024, 4/12 of 19-inch rack module)

Accessories Included:

1 mains cable	AN 0010
1 63 mA fuse	VF 0047
1 125 mA fuse	VF 0030
1 BNC plug	JP 0035
1 3-pin flat plug to DIN 41 638	JP 0316