

# Electronic Volt- and Phase Meters. Waveform Retriever

type 2429

## FEATURES:

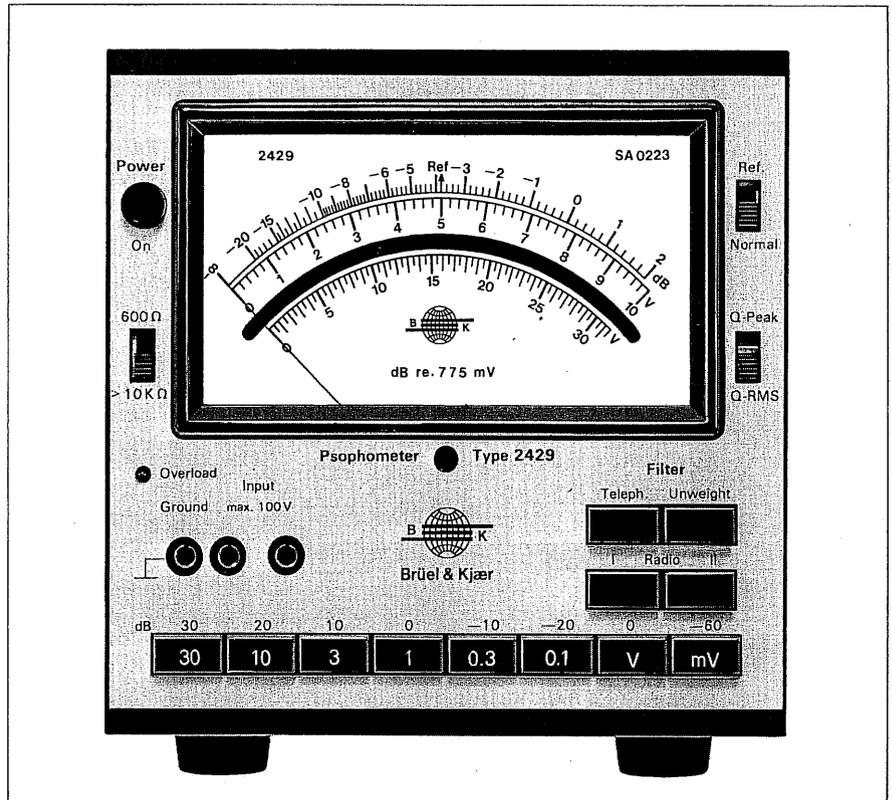
- Meets CCITT P53 and CCIR 468-1
- Balanced input 600 Ω or > 10 kΩ
- Four built-in weighting networks
- Built-in reference oscillator
- Easy calibration in any attenuator position
- Overload detector
- High overload margin
- Two meter rectifiers
- Warning of illogical attenuator settings
- AC and DC outputs
- Disconnectable chassis and signal ground

With compliments

**Helmut Singer Elektronik**

www.helmut-singer.de info@helmut-singer.de  
fon +49 241 155 315 fax +49 241 152 066  
Feldchen 16-24 D-52070 Aachen Germany

## Psophometer



## USES:

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

The Psophometer Type 2429 is a small size, general purpose instrument designed for normal psophometric measurements in accordance with CCITT P53 and CCIR 468-1. Generally speaking, psophometers are used to determine the subjective signal-to-noise ratio in communication channels where the information is received by the human ear. The Psophometer Type 2429 is extremely simple to operate and has both peak and RMS detectors and four different weighting networks built in. The amplification is calibrated and adjustable in 10 dB steps, which makes it suitable for use in set-ups where a calibrated amplifier with balanced input is

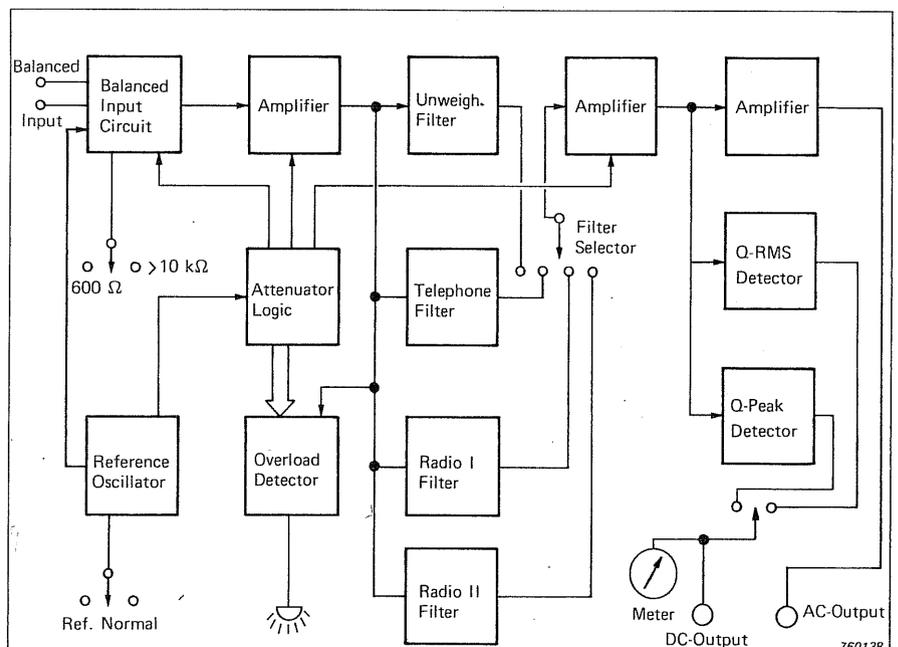


Fig.1. Block diagram of the Psophometer

needed. For this purpose AC and DC outputs are available.

The operation of the instrument is fast and simple, and it has a very high overload margin. If an illogical attenuator setting is chosen by accident, the overload detector will flash. Resistance against AC voltages between the cabinet and signal ground is high and the calibration is performed in seconds since a reference oscillator is built-in and because the attenuator logic automatically selects the correct range and returns to the measurement setting when calibration ends.

The instrument is built into a cabinet of the B & K Modular Cassette System enabling easy combination with other instruments and easy mounting in racks.

## Description

From the block diagram, Fig.1, it is seen that the signal first enters the balanced input section. The in-

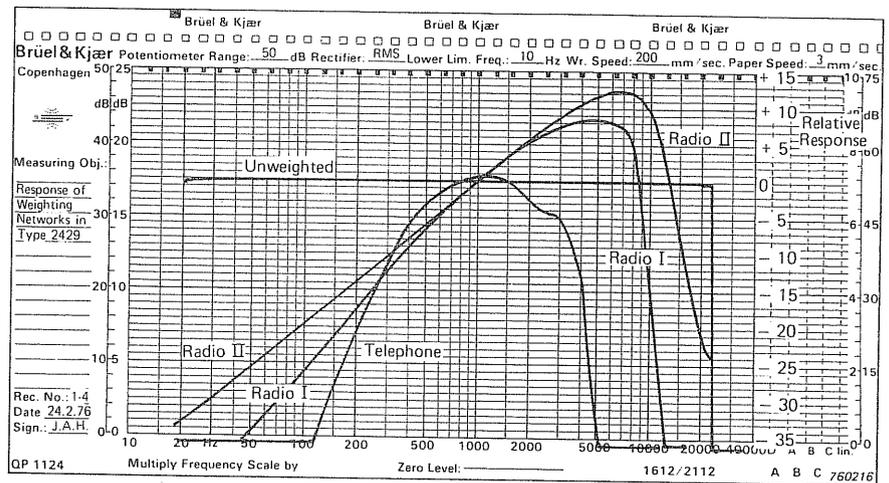


Fig.2. Response curves of the built-in weighting networks

put impedance may be chosen to be 600  $\Omega$  or  $> 10$  k $\Omega$ . In the calibration mode the reference signal is applied directly at the input, leaving no circuits unchecked. The input section is followed by the preamplifier, the output of which is routed to all the filters plus the overload detector. The gain of both the pre- and second amplifier is controlled by the logic circuit driven by the push-button attenuator. From the selected fil-

ter the signal is fed to the second amplifier, which drives the meter rectifiers, and to the output amplifier. From the selected rectifier, the DC-voltage is applied to the meter and the DC output. The AC output is taken from the output amplifier. The responses of the four built-in weighting networks are shown in Fig.2.

## Specifications 2429

### Input:

**Connector:** In accordance with DIN 41628  
**Construction:** Symmetrical in accordance with CCITT Recommendation P53  
**Impedance:** 600  $\Omega$   $\pm 2\%$  or  $> 10$  k $\Omega$  (both symmetrical)

### Amplifiers:

**Accuracy:**  $\pm 0.3$  dB of absolute calibration  
**Voltage range:** 100  $\mu$ V to 30 V FSD in 1.0 dB steps  
**dB range:**  $-78$  dB to  $+32$  dB FSD relative to 775 mV  
**Output:** 3.16 V RMS corresponding to FSD (BNC)  
**Output impedance:**  $< 5 \Omega$ , short circuit protected  
**Gain range:**  $+90$  dB to  $-20$  dB  
**Attenuator:** 12 pushbutton combinations, with overload indication of illogical settings  
**Earphone output:** 3.16 V RMS corresponding to FSD, 600  $\Omega$

### Overload margins:

Pre filter overload indicated by flashing LED  
**Pre filter:** at least 30 dB  
**Pre telephone filter:** at least 30 dB

$+20$  dB per decade below 1500 Hz (approx. 60 dB at 50 Hz)  
**Post filter:** at least 20 dB in accordance with CCIR 468-1

### Weighting networks:

- "Unweighted": in accordance with DIN 45405
- "Telephone": in accordance with CCITT P53 & DIN 45405
- "Radio 1": in accordance with CCITT P53 & DIN 45405
- "Radio 2": in accordance with CCIR 468-1

All filters are active solid-state circuits

### Noise:

Equivalent input noise utilizing the RMS-detector  
**1. Unweighted:**  $< 8 \mu$ V  
**2. Telephone:**  $< 6 \mu$ V  
**3. Radio 1:**  $< 10 \mu$ V  
**4. Radio 2:**  $< 14 \mu$ V

### Detectors:

**Q-RMS detector:** in accordance with CCITT P53  
**Q-peak detector:** In accordance with DIN 45405 & CCIR 468-1  
**DC output:** 3.16 V DC corresponding to FSD (BNC)

**Impedance:** 47  $\Omega$ , short circuit protected

### Linearity:

Linearity of both detectors re. FSD  
 $0$  dB to  $-10$  dB:  $\pm 0.2$  dB  
 $+10$  dB to  $-20$  dB:  $\pm 0.5$  dB

### Reference Oscillator:

**Level accuracy:**  $\pm 0.05$  dB  
**Frequency accuracy:**  $\pm 2\%$

### Power supply:

100 to 250 V AC line 50 to 400 Hz or two 18 to 25 V batteries

### Temperature range:

5 to 40°C

### Weight:

3.4 kg approx. (7.5 lb)

### Dimensions:

**Height:** 132.6 mm (5.2 in)  
**Width:** 139.5 mm (5.5 in)  
**Depth:** 200 mm (7.9 in)  
 (B & K module cabinet KK 0024, 4/12 of 19" rack module)

### Accessories included:

1 BNC plug JP 0035  
 1 3-pin plug to DIN 41628 JP 0316  
 Various fuses and lamps and a power cord