type 1405

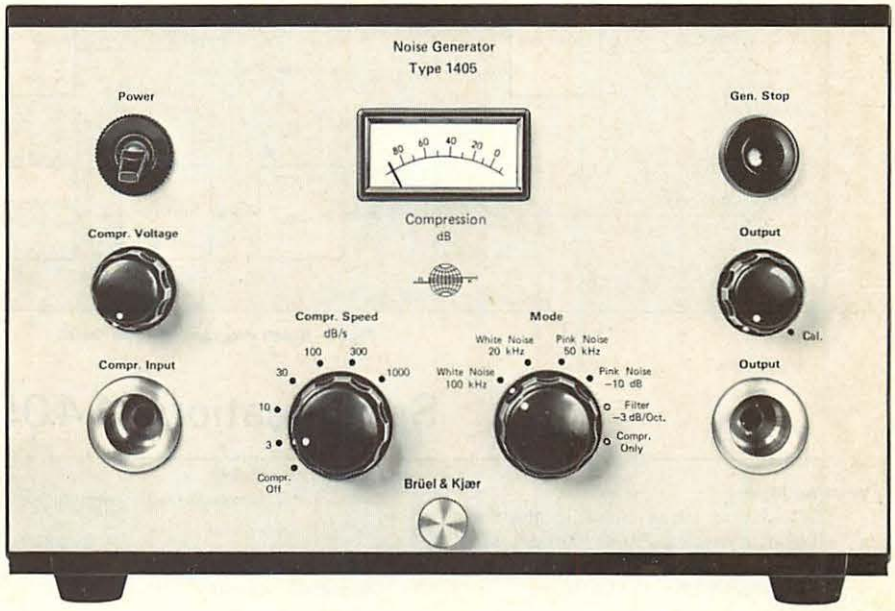
Noise Generator

FEATURES:

- White Noise in the frequency range 20 Hz to 100 kHz
- Uniform spectral density 10^{-4} V^2/Hz
- Pink Noise in the frequency range 20 Hz to 50 kHz
- Built-in —3 dB/octave filter can be used separately
- Built-in compressor amplifier with meter
- Six compressor speeds
- Signal/hum ratio better than 90 dB
- Manual and remote generator stop
- Mains or ext. battery operation

USES:

- Sound insulation measurement
- Frequency response measurement
- Vibration testing
- Electro acoustic measurements
- Reverberation measurement
- Sound distribution measurement
- Cross talk measurement
- Signal to noise ratio measurement on communication lines



The Noise Generator Type 1405 is designed to supply well defined white noise in the frequency range 20 Hz to 100 kHz. The generator has a built-in —3 dB/octave filter which is used to weight the white noise in order to produce pink noise in the frequency range 20 Hz to 50 kHz. The filter may also be used separately for other weighting purposes such as automatic bandwidth compensation. The generator also contains a compressor amplifier which is useful when performing frequency response measurements in various applications within the fields of sound and vibration. In such cases the noise generator is often combined with a filter in order to obtain a narrow band signal which is then used to control the compressor. Also the compressor amplifier may be used separately.

The Type 1405 is built-into a standard B & K cassette which enables easy combination with other instruments and mounting in racks (for example with Power Amplifier Type 2706 for high output power).

Description

The white noise is made in the generator (see block diagram Fig.1) which is built up around two zener diodes kept at constant temperature in an oven. It has a uniform spectral density of 10^{-4} V^2/Hz. The signal from the generator is passed on to the first of two filters via an attenuator which sets the output level. The signal from the attenuator can be short-circuited to stop the output, a feature necessary for reverberation measurements. The generator stop can be controlled manually as well as automatically.

The two low pass filter/amplifier sections limit the upper frequency

of the white noise signal, the first to 100 kHz and the second to 20 kHz. Both filters are 3 pole filters, the second is of the Chebichev type. The output signals from the filters are available, via the mode switch, at the output of the generator.

The 20 Hz to 100 kHz signal from the output of the first filter is also fed to a —3 dB/octave weighting network in order to make a pink noise signal in the frequency range 20 Hz to 50 kHz.

The mentioned output signals are also fed to a compressor amplifier system which compresses them according to the signal present at the compressor input.

The degree of compression can be read-off the built-in meter.

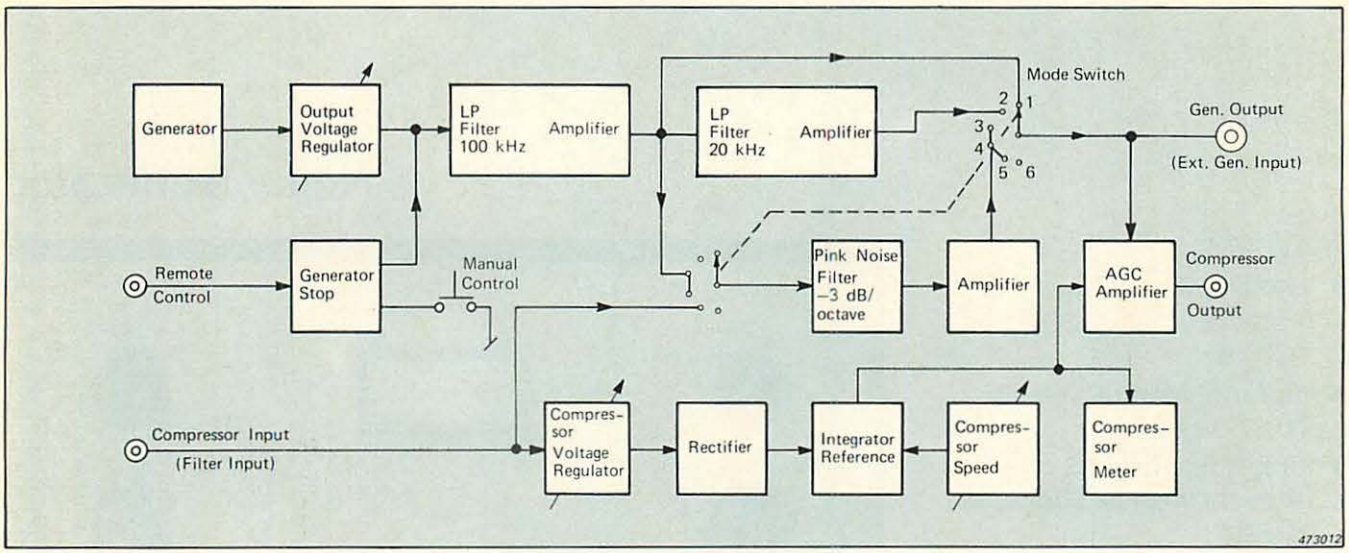
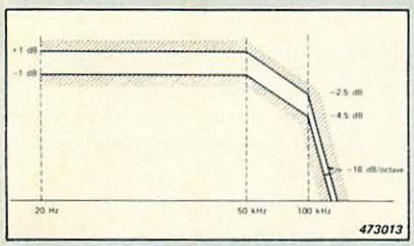


Fig.1. Block diagram of Type 1405

Specifications 1405

Working Modes:

1. Output of white noise in the frequency range 20 Hz to 100 kHz with uniform spectral density of 10^{-4} V²/Hz (Up to 50 kHz)



2. Output of white noise in the frequency range 20 Hz to 20 kHz. Level within ± 1 dB in the range
   Fall off slope above 20 kHz:
   >18 dB/octave
3. Output of pink noise (white noise decreasing 3 dB/octave) in the frequency range 20 Hz to 50 kHz within ± 1 dB
4. Same as mode 3 but at a 10 dB lower level. (Used when 1405 is combined with 1/3 Octave Filter Set Type 1616)
5. Use as a —3 dB/octave filter
6. Use as a compressor amplifier

Amplitude Distribution:
Symmetrical Gaussian with crest factor up to five

Output Level:
Calibrated output: 3,16 V RMS in 100 kHz pos.
Continuously variable down to 0 V

Output Load Impedance:
Output: ≥ 5 kΩ
Compressor Output: ≥ 5 kΩ

Signal to Hum Ratio:
> 90 dB for "white noise" output
> 70 dB for "pink noise" output

Stability of Output Level:
Better than ± 0,3 dB in the range —10° to 40°C

Compressor:
Speed: 3; 10; 30; 100; 300 1000 dB/s
Range: > 80 dB
Min. input signal: 0,5 V avg
Max. input signal: 9,5 V avg
Input impedance: > 18 kΩ on compressor input
82 kΩ on ext. gen. input
Frequency range: 20 Hz to 200 kHz
Meter: Calibrated in dB compression (min. compr. at 0 dB)

Distortion: approx. 1% with 3 V RMS on ext. sine gen.

Generator Stop Function:
Operated manually or remotely
Remote operation: 5 V positive logic, contact or a DC voltage
0 to 2,5 V: Stop, 2,5 to 20 V: signal

Temperature Range:
– 10 to + 40°C (+ 14 to + 104°F)

Max. Humidity:
90% RH (non condensing) at 30°C

Power Supply:
100, 115, 127, 220, 240 V AC
± 10% 50 — 60 Hz, approx. 5 VA
Complies with safety class I of IEC 348
Batteries: 2 × 22 to 30 V, 2 × 2 W

Dimensions:
Height: 132,6 mm (5,2 in)
Width: 209,5 mm (8,3 in)
Depth: 200,0 mm (7,9 in)
(B & K module cabinet KK 0025, 6/12 of 19" rack module)

Weight:
2 kg (4,5 lb)

Accessories Included:
1 Power cable AN 0010
1 100 mA fuse VF 0026
1 50 mA fuse VF 0016