Brüel & Kjær

product data
types 1624 and 1625

Octave Filter Set and Third Octave/Octave Filter Set

USES:

- **Filter Sets for Sound Level Meters**
- **Semi-automatic octave noise analysis (Type 1624)**
- **Automatic 1/3 octave and octave (with V1 or 1/3 oct. step) noise analysis (Type 1625)**
- **Attenuation of background noise**
- **Distortion measurements**
- **Loudness evaluation in accordance with IS0 R 532 (Stevens and Zwicker)**
- **Noise checking to octave and third-octave limiting curves**
- **Building acoustic measurements**
- **Sound power measurements on machines**

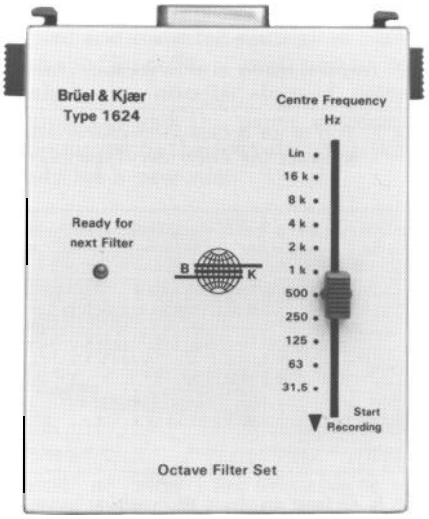
FEATURES 1624:

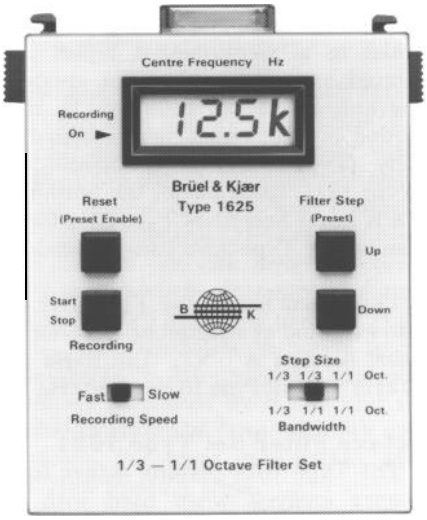
- **10 octave filters in accordance with IEC R 225-I 966, DIN 45651 and ANSI S1.11-I 966 Glass II requirements; and unweighted linear response**
- **Centre frequencies from 31,5Hz to 16 kHz, frequency range 22 Hz to 22 kHz (octave), 5 Hz to 75 kHz (Lin)**
- **OdB nominal filter attenuation**

FEATURES 1625:

- **31 third-octave and 31 overlapping octave filters in accordance with IEC R 225-I 966, DIN 45651, DIN 45652, and ANSI SI.II-1966 Class II & III requirements; and unweighted linear response**
- **Centre frequencies from 20 Hz to 20 kHz, frequency range 18 Hz to 22 kHz (1/3 Oct.) and 14 Hz to 28 kHz (Oct.), 3 Hz to 75 kHz (Lin)**
- **0 dB nominal filter attenuation**

Octave Filter Set Type 1624 and Third Octave/Octave Filter Set Type 1625 are primarily designed for use with Sound Level Meters Types 2230, 2231, 2233, 2234 and 2235 for in situ octave and 1/3 octave acoustic analyses. The Type 1624 enables octave analysis to be carried out, while Type 1625 offers 1/3 octave analysis and octave analysis in octave or 1/3 octave steps. Both filters are compatible with either of the Sound Level Meters, forming a complete, compact and portable, lightweight unit. Semi or fully automatic analysis recording is possible with a portable Level Recorder Type 2317 or 2309, or with a digital recorder when using the 2231.





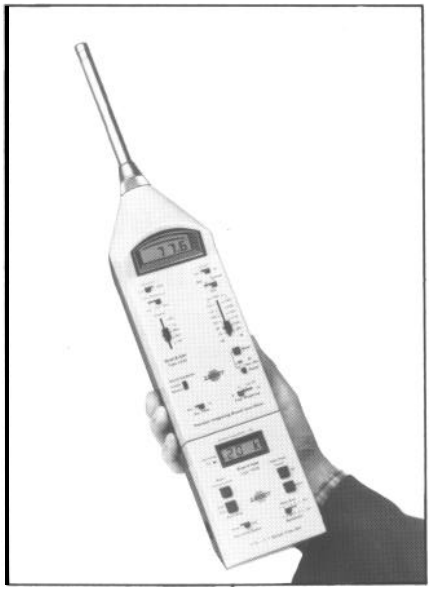


Fig. 1. Sound Level Meter Type 2230 with 1/3- 1/1 Octave Filter Set Type 1625

The Octave Filter Set Type 1624 and the Third Octave/Octave Filter Set Type 1625 are both active filters, which are small in size and light weight. Both are easily fitted to the bottom of the Sound Level Meter Type 2230, 2231, 2233, 2234 or 2235, ensuring both mechanical and electrical connections with proper matching of input and output impedances.

Adding a Filter Set to a Sound Level Meter greatly extends the uses of the instrument, enabling detailed frequency analysis to be carried out.

The overall frequency range of both filters sets covers the entire audio-frequency range with the centre frequencies arranged according to the preferred frequencies of IS0 R 266, DIN 45401 and ANSI S 1.6-1960. The filters may be switched in successively manually (Type 1624 or 1625), or automatically (Type 1625). The level in each frequency band is displayed on the Sound Level Meter and may be noted in a measurement report or plotted on graph paper. For greater convenience the analysis can be recorded in situ, either semi-automatically (Type 1624) or automatically (Type 1625) using one of the portable B&K Level Recorders Type 2317 (one channel) or Type 2309 (two channels).

The signal fed to the Filter Set is also weighted as selected on the Sound Level Meter ("A", "C", "Lin. 20 Hz to 20 kHz" or "All Pass 10 Hz to 50 kHz").

Octave Filter Set Type 1624

The Type 1624 permits octave frequency analysis when used with a Sound Level Meter. The analysis can be recorded semi-automatically with the Level Recorder Type 2317 or 2309.

The Type 1624 contains 10 active octave filters with centre frequencies from 31,5Hz to 16 kHz. Each octave filter satisfies the requirements of IEC Recommendation R 225-1966, DIN 45651 and ANSI Sl.ll-1966 Class II, see Fig.2. The total frequency range is from 22 Hz to 22 kHz as can be seen in Fig.3. A linear position is also available covering the frequency range from 5 Hz to 75 kHz (-1 dB).

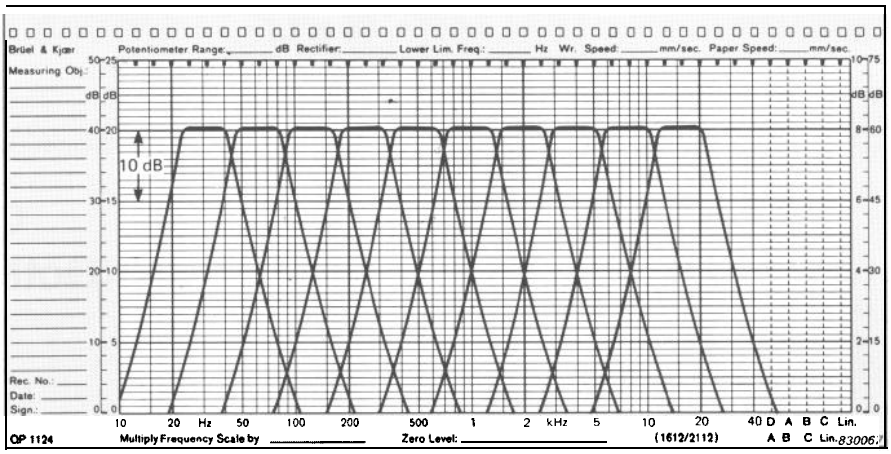


Fig. 3. Frequency characteristics of the 10 octave filters in Type 1624

For semi-automatic recordings, the Filter Set is connected to the Level Recorder by the control cable AQ 0034. The ground connection is ensured by cable A0 0173 used to connect the Sound Level Meter to the Level Recorder. See Fig.4. The SPL for the selected frequency band is obtained from the Sound Level Meter Output, and the start/stop of paper movement is controlled by the Filter Set. The recording is made on graduated paper with a scale of 15 mm/octave, such as QP 0124 for Type 2317.

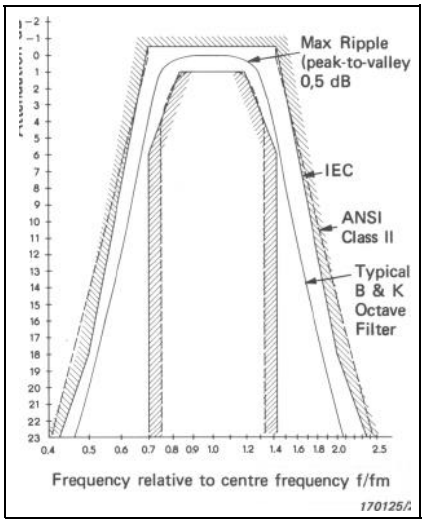


Fig. 2. Top of an octave filter characteristic from the Filter Set Type 1624

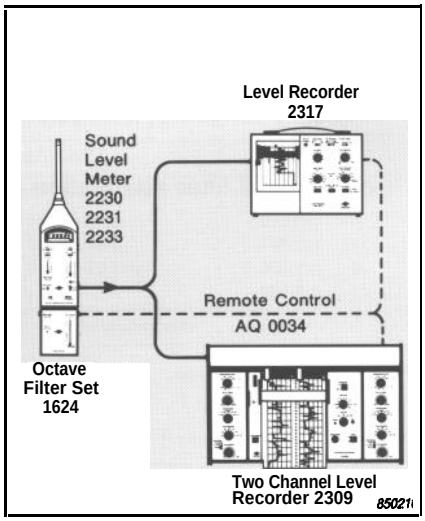


Fig. 4. Set-ups for semi-automatic octave analysis and recording with Type 2317 or 2309

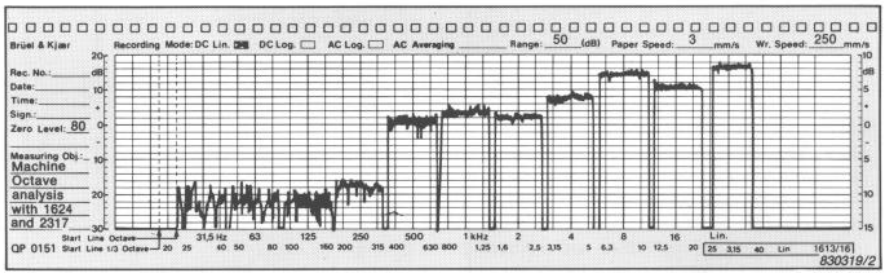


Fig. 5. Octave analysis of machine noise using the set-up in Fig.4

When recording each octave, the filter output is disconnected from the Sound Level Meter during the first millimetre which corresponds to the settling time. Once the recording of one octave is completed, the paper stops and the indicator READY FOR NEXT FILTER lights up. At the end of the analysis the SPL with the linear weighting (or "A" or "C" if applied on the SLM) is recorded.

1/3-1/1 Oct. Filter Set Type 1625

The Type 1625 permits 1/3 octave and octave frequency analysis. Octave frequency analysis can be made with octave or 1/3 octave step size. An unweighted frequency response (Lin) from 3 Hz to 75 kHz is also available.

The Type 1625 contains 31 active 1/3 octave filters and 31 overlapping 1/1 octave filters at 1/3 octave intervals covering 11 octaves. Centre frequencies are from 20Hz to 20 kHz. Each filter fulfils the requirements of IEC recommendation 225-1966, DIN 45 652 and ANSI S1.11-1966 Class III for 1/3 octave filters; and DIN 45651 and ANSI S1.11-1966 Class II for 1/1 octave filters, see Fig.6. The total frequency range is from 18 Hz to 22 kHz (1/3 oct.) and from 14Hz to 28kHz (1/1 oct.).

The level in each frequency band can be read on the Sound Level Meter's digital display, the centre frequency of the filter being displayed on the Filter Set. The filter centre frequency being selected manually by push button.

When the Filter is connected to a Level Recorder Type 2317 or 2309 the recording of the analysis and the filter stepping is carried out automatically. The Level Recorder is connected to the Sound Level Meter using cable AO 0173, and to the Filter Set using control cable AQ 0034. See Fig.7.

The filter scanning is electronically programmed and controlled to obtain an RMS read out error less than 0,5 dB over the whole analysis range. The settling time and the paper drive speed are controlled by the Filter Set to ensure a precise recording in a minimum time.

The filter scanning is electronically controlled and programmed to optimise the recording. The Filter Set increases the Level Recorder paper speed as the analysis band centre frequency is increased. Thus, an accurate recording is obtained in a minimum of time.

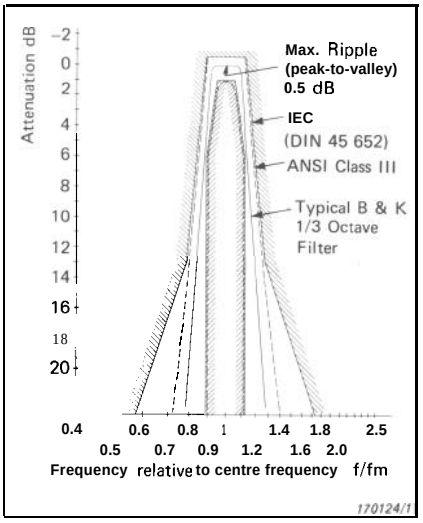


Fig. 6. Top of a 1/3 octave filter characteristic from the Filter Set Type 1625

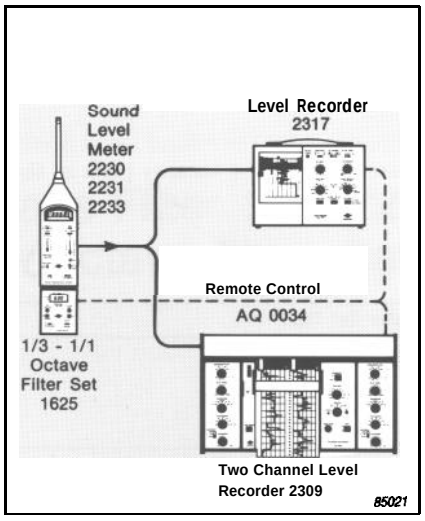


Fig. 7. Automatic 1/3 octave analysis and recording with Type 2317 or 2309

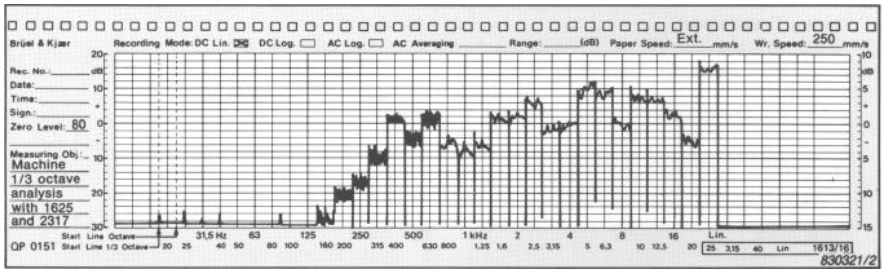


Fig. 8. Third-octave analysis of machine noise using the set-up in Fig.7

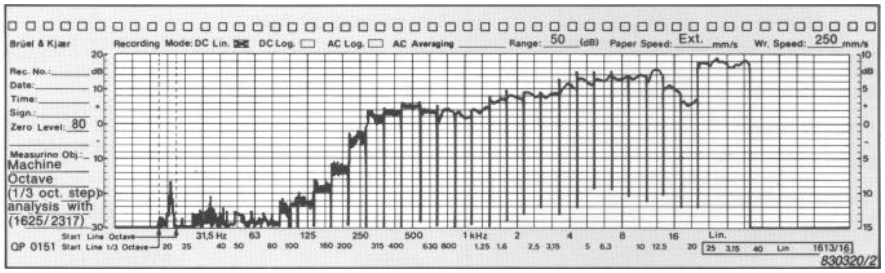


Fig. 9. Octave analysis with 1/3 oct. step size of machine noise using the set-up in Fig.7

The starting frequency is selectable to eliminate low frequency components and the analysis can be interrupted and restarted during recording with the "Start/Stop" push button. An analysis can also be stopped before completion and the paper automatically moved to the next start position, ready for a new run.

Recording of octave analysis with 1/3 octave or 1/1 octave step size is also automatic. For octave analysis with octave step size, a choice between three series of centre frequencies is offered (lowest frequencies 20, 25 or 31,5 Hz).

Two analysis recording speeds ("Fast" or "Slow") are available to allow for stabilization of the Sound Level Meter detector depending on whether a "Fast" or "Slow" time weighting is selected on the Sound Level Meter.

Use with Type 2231 and BZ 7103

BZ **7103 is an Application Module designed for frequency analyses with** Types 2231,1625 and a digital printer. In this set-up, the 2231 fully controls the 1625 to measure the average level and the max. and min. levels in octave or 1/3 octave bands. Averaging of many spectra, taken from one point or spatially distributed (sound power measurements), is also possible. The results are presented by the printer in digital or graphical form, with full annotation. For more information, see BZ 7103 Product Data.

Power supply

The active filters contained in the Filter Sets are powered from the Sound Level Meter through the 15 pin connector, provided the EXT. FILTER switch on the Sound Level Meter is set to "In". The battery pack in the Filter Set contains 4 cells IEC LR 6 (B&K No. QB 0013) and is always connected in parallel with the battery pack in the Sound Level Meter. The battery life (alkaline cells) of the Sound Level Meter/Filter Set is approximately 12 hours with the Type 1624 and approximately 8 hours with the Type 1625. The Mains Power Supply and Charger ZG 0254, including a drawer with rechargeable cells can be used to power the Filter Set.

Specifications 1624 and 1625

Filter Set Type	1624 Octave	1625 Third-Octave and Octave
Frequency Range		
Selective	**22 Hz to 22 kHz**	18 Hz to 22 kHz (1/3 Oct.), 14 Hz to 28 kHz (1/1 oct.)
Linear	**Typical 5 Hz to 75 kHz (-1 dB)**	Typical 3 Hz to 75 kHz (-1 dB)
land-Pass Filters	**10 active B-pole Butterworth octave filters**	31 active 6-pole Butterworth third-octave filters and 31 overlapping 1/1 oct. filters at 1/3 oct. intervals covering 11 octaves
In accordance with standard	IEC R **225-1966. DIN 45 651 and ANSI S 1.1 I-1966, Class II**	IEC R 225-1966, DIN 45 652, DIN 45 651 and ANSI S1.11-1966, Class II & III
Centre Frequencies	**31,5 Hz to 16 kHz**	20 Hz to 20 kHz
Attenuation at Centre Frequency	**0dB ± 0,5dB**	OdB ± 0,5dB
Peak-to-valley Ripple	**< 0,5 dB**	< 0,5 dB
Attenuation outside Pass Band	**See Fig.2 & 3, > 60 dB at 8 f_o and 1/8 f_o**	See Fig.6, > 75 dB at 5 f_o and 1/5 f_o (1/3 oct.) > 60 dB at 6 f_o and 1/8 f_o (1/1 oct.)
Filter Shift	**Slider switch Green lamp indicates time for filter switching when used with** Level Recorder	Manual or Automatic with Level Recorder. 1/3 oct. or 1/1 Oct. steps for 1/1 oct. analysis
Remote Control	**Semi automatic of Level Recorders Types 2317 and 2309 via cable AQ 0034**	Automatic to/from Level Recorders Types 2317 and 2309 via cable AQ 0034
nput Impedance	10 kΩ in series with 5 μF	10 kΩ in series with 15 μF
nput Terminating Impedance	< 100 Ω	⩽ 100 Ω
nput Voltage	Max. **2 V sinus (2,8 V peak)**	Max. 2 V sinus (2.8 V peak)
Ouput **Impedance**	< 5 Ω in series with 15 μF	< 5 Ω in series with 2,2 μF
Output Terminating Impedance	**3 10 kΩ // 1 nF**	⩾ 10 kΩ // 1 nF
nherent Noise	f_o Hz — max. μV: 31.5 Hz 200 140); 63 Hz-16 kHz 150 (typ. 70); Lin 250 (typ. 120)	f_o Hz (oct. or 1/3 oct.) — max. μV: 20 Hz-40 kHz 250 (typ. 170); 50 Hz-10 kHz 150 (typ. 80); 12,5 kHz–20 kHz 200 (typ.110); Lin 250 (typ. 120)
Magnetic Sensitivity (50 Hz)	**Approximately 1 mV output** for 100 A/m field strength	
Operating Temperature	**-10 to + 50°C (+ 14 to +122°F)**	
Storage Temperature	**-20 to +50°C (-4 to +122°F) Batteries Removed**	
Influence of Temperature on Attenuation	< 0,5 dB **(-10 to +50°C)**	
Influence of Humidity on Attenuation	< 0,5 dB for 0 to 90% relative humidity at ⩽ 40°C without condensation	
Batteries	**4 × 1,5 V IEC Type LR6** (QB 0013). Batteries used as extra supply for SLM	
Dimensions	**Length 105 mm** (4,1 in) – Width 85 mm (3,3 in) – Height 47 mm (1,8 in)	
Weight	**450 g** (1 lb) including batteries	
Accessories Included	**4 Alkaline batteries QB 0013** **1 Plug JP 0802**	
Accessories Available	**1,5 m control cable AQ 0034** **Mains Power Supply and Charger ZG0254**	

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