



## **BenchMaster 21M**

**Highpass / Lowpass Filter System**  
**Gain to x50 (+34dB)**

- Easy to Use
- BNC connectors
- 9800 : 1 cutoff span
- Input overload indication
- Switchable High / Low pass
- 6 Gain steps to x50 (+34dB)
- AC / DC / IEPE(ICP®) inputs
- Switchable 'pulse' response
- Full range of filter responses
- Single ended / differential input
- 2 Rugged racks, AC or DC power



8 Channel BenchMaster 21M with Ethernet Control Option

The BenchMaster 21M, is an easy to use, versatile manual filter system. Available in a single channel DC powered case, or up to 9 channels in AC or DC powered racks. The simple easy to use front panel make this system ideal for general purpose filtering, and on- site work.

Inputs are front panel switched, AC/DC coupling and a 24VDC, 4mA source for IEPE (ICP®) transducers.

Two stage gain provide steps of 1,2,5,10,20,50, with 4 level indication of input signal level. A front panel switch selects either high pass or low pass filtering. Front panel input and output connectors are BNC.

There are three operating modes, normal filter response, bypass, and a minimum overshoot mode for impulsive signals. Frequency is set by two digital thumbwheels, and a 3 position decade switch. This provides 2 ranges of 98:1 filtering. Two frequency options are available, 1 Hz to 9 800 Hz and 10 Hz to 98 000 Hz. Filter bypass is frequency setting '99', and external control '00'.

The BenchMaster 21M is available with the full range of Kemo filter responses, Butterworth, Bessel, anti-aliasing, general purpose linear phase and the legacy response 37 to ensure compatibility with existing installations.

BenchMaster 21M filters can be fitted to a Kemo 19" rack, available with AC or optional DC power, or can be fitted to the compact 1 channel case. A neat portable high/lowpass filter with gain and easy operation.

The BenchMaster 21M is a versatile easy to use high pass/lowpass filter which offers a cost effective and highly versatile solution for a wide range of challenging field and lab-based applications.

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### **Kemo Limited**

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## BenchMaster 21M, Filter Amplifier System Performance Specification

Electronic: Typical specifications after 30 minutes warm up at 20 °C ambient temperature.

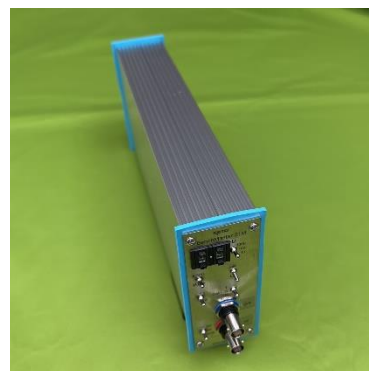
<b>Frequency range:</b> 2 models (specify range when ordering) <b>A</b> - 10 Hz – 98 kHz <b>B</b> - 1 – 9 800 Hz <b>Filter cutoff resolution:</b> 98:1 in 3 ranges <b>Cutoff accuracy:</b> 2 % of $F_c$ <b>Input impedance:</b> 100k $\Omega$ , 100pF <b>Input voltage, linear:</b> +/- 10 V <b>Input voltage maximum:</b> +/- 40 V <b>Input gain:</b> x 50+ 34 dB 6 steps: x1, 2, 5, 10, 20, 50, <b>Input modes:</b> Single Ended/Diff. , IEPE (ICP®) (4 mA, 24VDC) <b>Input coupling:</b> DC, AC, -3 dB @ 0.17 Hz (matched AC coupling for differential input)	<b>Filter Bypass</b> Yes <b>Output type:</b> Single ended <b>Output impedance:</b> 50 $\Omega$ <b>Output voltage:</b> +/- 10 V (load > 2k $\Omega$ ) <b>Output noise:</b> < 200 nV/ $\sqrt{\text{Hz}}$ <b>Output linearity:</b> < 0.03% <b>Offset voltage:</b> < 5 mV <b>Offset drift:</b> 200 $\mu\text{V}/^\circ\text{C}$ <b>Cross talk:</b> > -80dB <b>Amplitude matching:</b> +/- 0.1 dB to 0.8 of $F_c$ <b>Phase matching:</b> +/- 1° to 0.8 of $F_c$
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### Ordering Information and Filter Responses

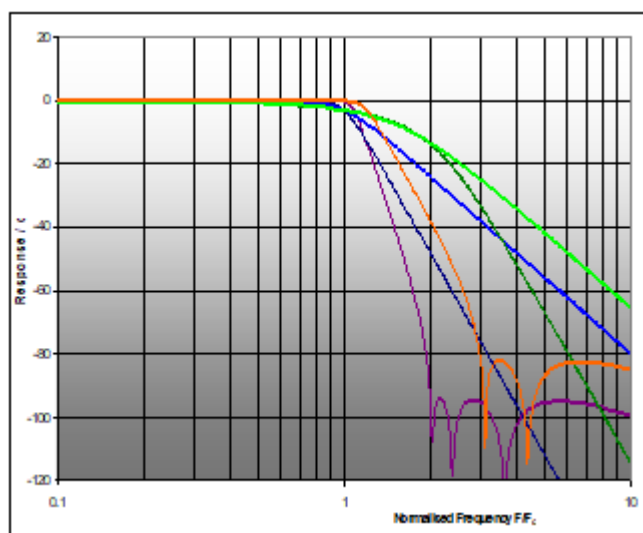
The BenchMaster 21M is available with a range of filter responses. When ordering select the frequency and a suitable filter response.

The response types are shown below and can be ordered as:-

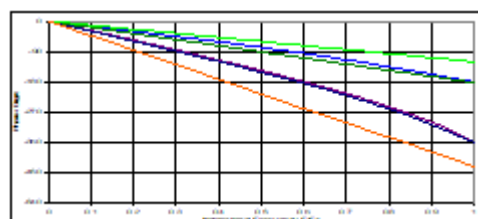
- 05 4 pole Butterworth, 24 dB/Octave, monotonic stopband.
- 03 8 pole Butterworth, 48 dB/Octave, monotonic stopband.
- 09 4 pole Bessel, 24 dB/Octave, monotonic stopband.
- 07 8 pole Bessel, 48 dB/Octave, monotonic stopband.
- 13 Elliptic type response, 94 dB/Octave, - 90 dB stopband.
- 37 Elliptic type response, 51 dB/Octave, - 80 dB stopband.
- 41 Flat, linear phase response, 52 dB/Octave, - 80 dB stopband.



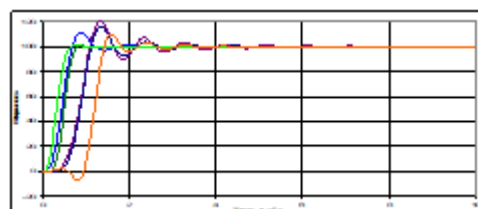
Single Channel  
Benchmaster 21M in  
mini rack



Benchmaster 21M filter responses



Benchmaster 21M Phase responses



Benchmaster 21M Amplitude responses

Due to continued product development Kemo Limited reserve the right to change specification without notice.

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