

Conditioning Charge Amplifier Type 12CB

Product Data and Specifications

Features

- 1 Hz to 1 MHz bandwidth
- Selectable input capacitance
- Selectable lower-frequency limit
- Six selectable voltage-gain settings (0 - 32 dB)
- Splash-proof aluminium cabinet

The G.R.A.S. Type 12CB (Fig. 1) is a compact low-noise conditioning charge amplifier for use with piezoelectric hydrophones and other piezoelectric transducers. It enables the use of long cables between hydrophone and amplifier without significantly affecting the hydrophone sensitivity.

The input capacitance of the Type 12CB can be selected to match the hydrophone capacitance for close-unity gain or to achieve an input gain of up to 20 dB.

It has 12 selectable input-resistance settings for controlling the -3 dB lower-limiting frequency and six selectable gain settings from 0 to 32 dB.

Brief Operating Guide

1) Input capacitance settings

To obtain close-unity input gain from a hydrophone, proceed as follows:

- a Select an input capacitance (C_{in}) to a value as close as possible to the transducer/hydrophone capacitance (C_{tr} - end of cable capacitance).
- b From these values, calculate the *input gain* in decibels as follows:

$$input\ gain = 20 \log (C_{tr} / C_{in})$$

Examples:

i) $C_{tr} = 1\ nF, C_{in} = 1\ nF$



Fig. 1 The Conditioning Charge Amplifier Type 12CB

$$input\ gain = 20 \log (1\ nF / 1\ nF) = 0\ dB$$

ii) $C_{tr} = 8\ nF, C_{in} = 4.7\ nF$

$$input\ gain = 20 \log (8\ nF / 4.7\ nF) = +4.62\ dB$$

2) DC Voltage supply

The required voltage supply is from 12 to 24 VDC. Use the Supply Cable TL 8088 (Fig. 4) to connect the Type 12CB to a suitable DC supply (battery or AC powered DC supply).

For minimum noise, the DC supply common/ground (see Fig. 2) should be in contact with water.

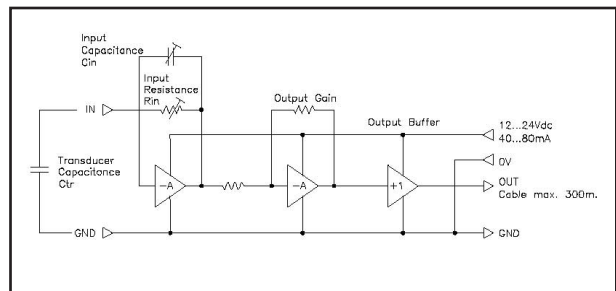


Fig. 2 Simplified circuit diagram of Type 12CB

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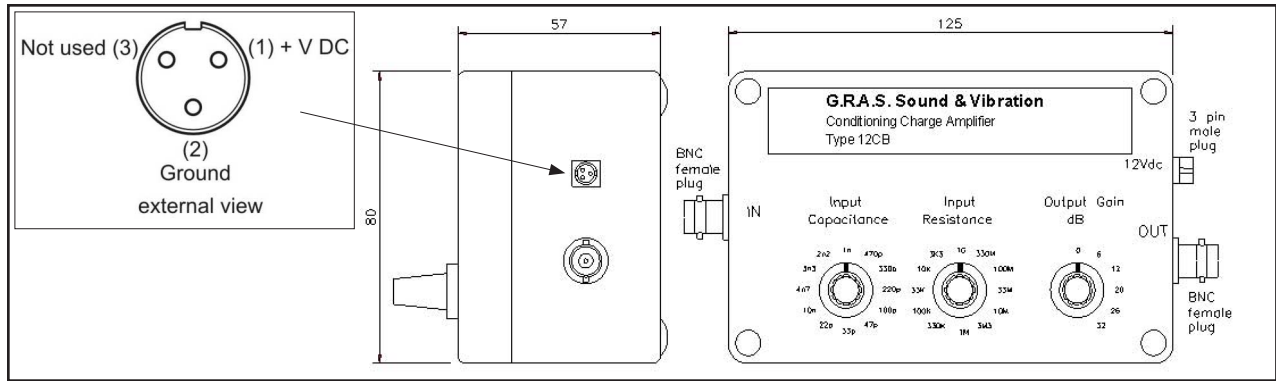


Fig. 3 Overall physical dimensions of the Conditioning Charge Amplifier Type 12CB

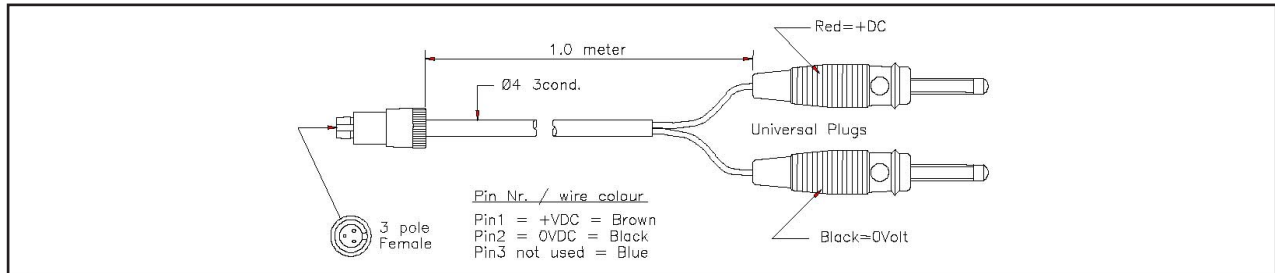


Fig. 4 Details of Supply Cable TL 8088

Specifications

Input:		33 kΩ	4.5 kHz
Max. impedance:	1 GΩ	10 kΩ	15 kHz
Max. input (at unity gain):	2.8 Vp	3.3 kΩ	45 kHz
Gain:	≈ 20 log (C _{in} /C _{in}) dB	Noise:	
Capacitance (12-step selector):	22 pF to 10 nF	Input termination:	1 nF to GND
Resistance (12-step selector):	3.3 kΩ to 1 GΩ	Output noise with selector settings	
Output:		1 nF/1 GΩ/0 dBA:	2 – 4 μV RMS
Gain settings:	0, 6, 12, 20, 26 and 32 dB	10 nF/1 GΩ/20 dBA:	8 – 10 μV RMS
Max. signal output:	2 Vp	1 nF/1 GΩ/20 dBA:	14 – 20 μV RMS
Impedance:	20 Ω	1 pF/1 GΩ/20 dBA:	80 – 110 μV RMS
DC offset:	0 V	Bandwidth:	
Low frequency limit:		Operating frequency range -3 dB at 20 dB gain:	
Frequency limits (-3 dB) versus input resistance at		1 Hz to 1 MHz	
1 nF input load:		Power supply:	
1 GΩ	0.3 Hz	Min. voltage:	12 VDC
330 MΩ	0.5 Hz	Max. voltage:	24 VDC
100 MΩ	1.5 Hz	Current consumption:	40 mA ± 10 mA
33 MΩ	4.5 Hz	at 12 VDC	
10 MΩ	15 Hz	Weight (including cable):	
3.3 MΩ	45 Hz	530 gm	
1 MΩ	150 Hz	Accessories included:	
330 kΩ	450 Hz	Supply cable:	TL 8088 (see Fig. 4)
100 kΩ	1.5 kHz		

G.R.A.S. Sound & Vibration reserves the right to change specifications and accessories without notice

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