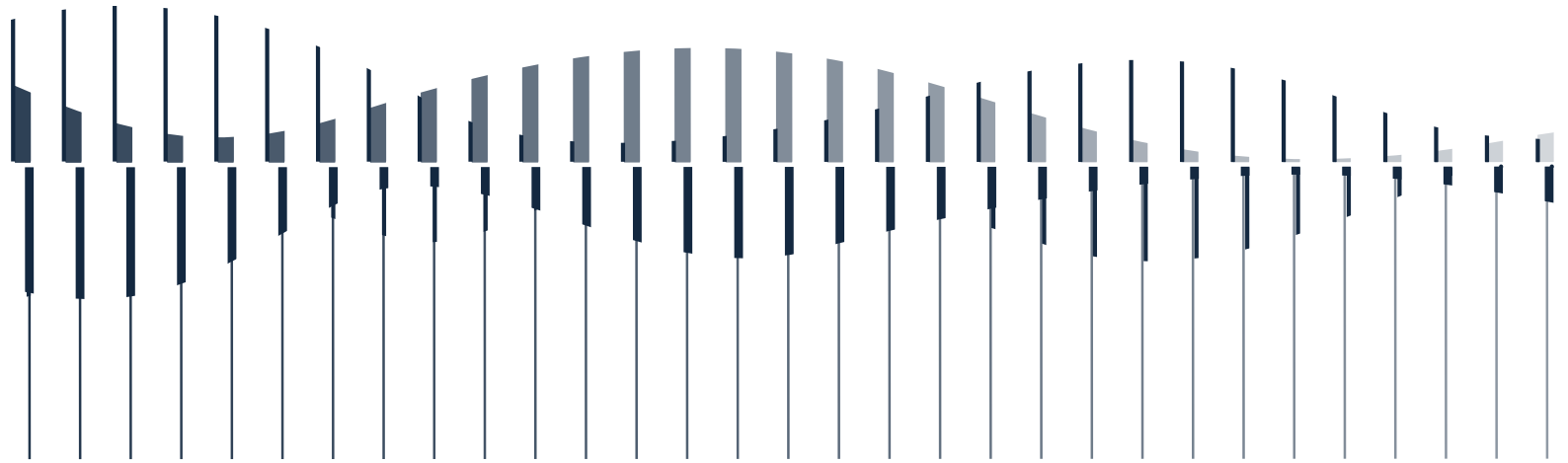
Instruction Manual

GRAS 12AX 4-Channel CCP Power Module with Gain



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GRAS

An Axiometrix Solutions Brand

Revision History

Any feedback or questions about this document are welcome at **gras@gras.dk**.

Revision	Date	Description
1	2015-06-09	First publication
2	2026-06-24	*Addede section:* Hum and Noise in your Measurement Setup. New GRAS logo, Small layout design changes.

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Contents

Introduction 4
Delivered Items 4
Principles of Operation 5
Signal Conditioning 5
Error Detection 5
Input Error 5
Output Overload 5
Controls and Connections 6
The Front Panel 6
The Rear Panel 6
Operation 7
Setting the Gain 7
Hum and Noise in your Measurement Setup 8
Ground Loops: 8
Interference from other instruments, EMC Interference: 8
Technical Specifications 9
Dimensions and Weight 9
Ordering Information 10
Warranty, Service and Repair 10
Warranty 10
Service and Repairs 10

Introduction

The GRAS 12AX is a 4-channel CCP power module with gain for powering of prepolarized microphone sets.

It is designed for use in a production environment, with a sturdy enclosure that offers protection against dirt, dust, and moisture.

It has 4 channels with 3 gain settings: 0 dB, 20 dB, and 40 dB. With these settings it is possible to adjust the signal level for best signal-to-noise performance.

Status information, including gain settings and error detection is via green and red LEDs on the front panel.

To avoid accidental change to the settings, these can only be changed if a cover at the top plate is removed and jumpers on the main board are moved.

12AX is delivered with a mains adapter that provides 15 V DC.

Delivered Items

Item	GRAS Number
4-Channel CCP Power Module with Gain	12AX
Power Supply (15 V DC)	–

Principles of Operation

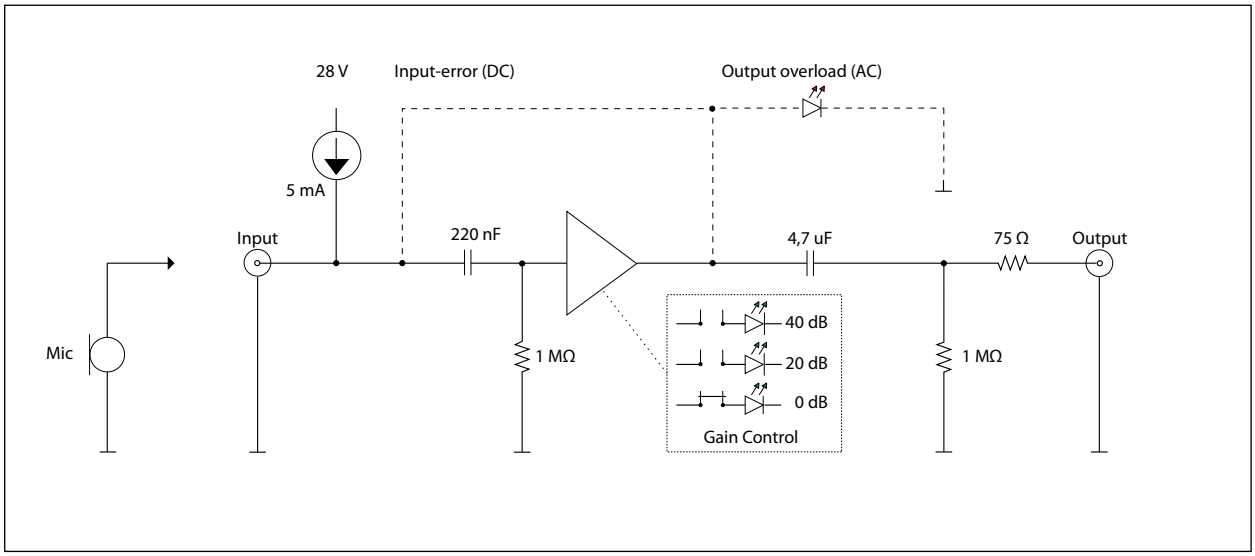

Fig. 1. *Principles of operation.*

Signal Conditioning

Each channel provides a 5 mA current at 28 V DC compliance voltage for the microphone preamplifier. The gain can be set to either 0, 20, and 40 dB for best signal to noise ratio.

Error Detection

12AX has DC-error detection at the input and overload detection at the output.

Input Error

The error detection at the input monitors the DC level. If it falls below 2.2 V or exceeds 24 V, the red overload led on the front panel will warn about it. This will happen if the input is shorted, the cable broken, or the preamplifier faulty.

Output Overload

The signal level is monitored at the output of the amplifier. If it exceeds 22 V ACp-p, the red overload LED on the front panel will warn about it. This warning indicates that the signal level exceeds what the 12AX can handle without clipping. The remedy will be to lower the gain, see “Setting the Gain” on page 7.
If you experience overload with the gain set to 0 dB, the remedy is to lower the input signal by using a microphone with a lower sensitivity.

Please note that 12AX’s overload detection is a warning of (electrical) signal clipping in 12AX’s electronics. It does not detect if the microphone is overloaded by the acoustical signal it measures.

12AX can handle long cables without significant degradation of the frequency performance.

Controls and Connections

The Front Panel

12AX has 4 LED status indicators for each channel. Green LEDs indicate the chosen gain setting. A red LED indicates DC-error or overload. The overload detector measures the voltage swing at the output and will be triggered if the signal exceeds 22 V^{p-p}. If a DC error occurs at the input, i.e. a short, a broken cable or faulty preamplifier, the red LED will also warn of this. The power switch is also located on the front panel.

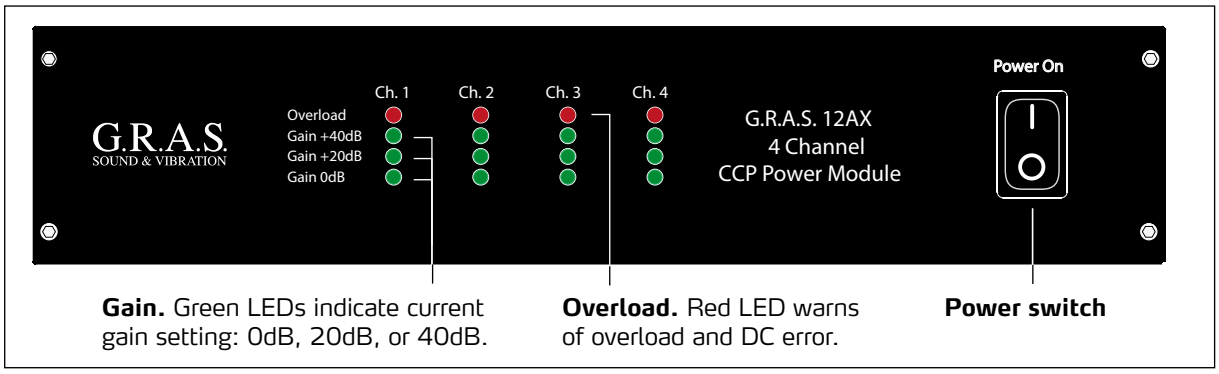

Fig. 2. *The front panel with power switch and LEDs for indication of gain and overload.*

The Rear Panel

The rear panel has a socket for power supply and 8 BNC sockets, 4 for input and 4 for output.

It requires a DC supply of 9 to 18 V DC. The included power adapter supplies 15 V DC, 500 mA.

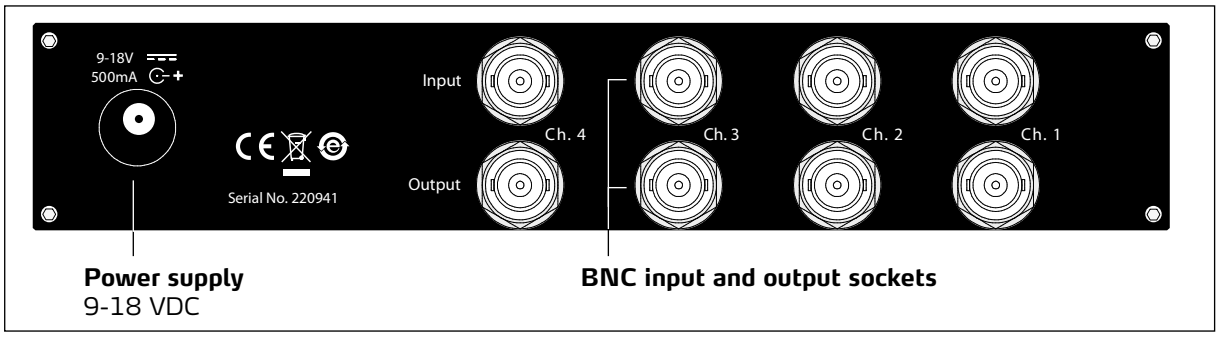

Fig. 3. *Rear panel with sockets for power, input, and output.*

Operation

12AX is designed for unattended use and does not require any user input during operation. However, you may want to adjust the gain setting to avoid overload and obtain the best signal to noise ratio.

Setting the Gain

The gain is selected by means of jumpers accessible by removing a cover on the top plate.

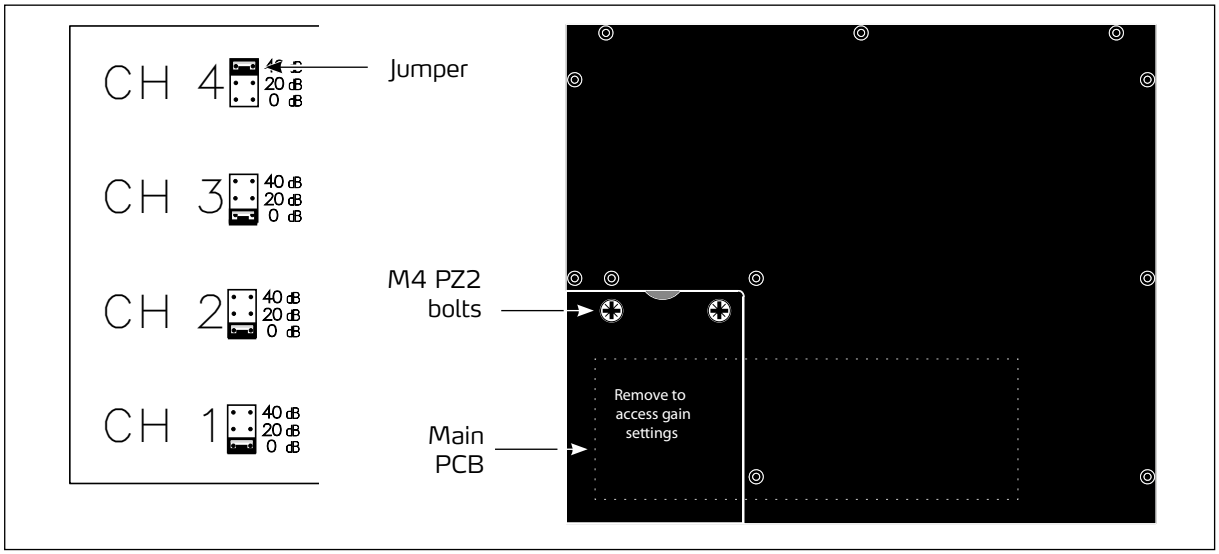

Fig. 4. *The jumpers for setting the gain (left) and the removable cover (right).*

The factory default gain setting is 0 dB. If you need to change the gain, proceed as follows:

1. Power off the 12AX.

   CAUTION. To avoid damage to the electronics, the 12AX must be switched off when the gain settings are changed.

2. Unscrew the two M4 bolts securing the removable cover.
3. Remove the cover.
4. Place the jumpers at the appropriate dB setting.
5. Reinstall the cover.

Hum and Noise in your Measurement Setup

If you unexpectedly experience hum and noise in your measurement setup, this can be caused by ground loops or interference from other equipment, EMC interference.

Ground Loops:

Ground loops are primary caused by difference in electrical potential between the instrumentation in a measurement setup due to separate grounding points between the different instruments.

This can result in an unwanted current flow through the ground conductor, which will cause hum, buzz, and interference in the whole system, typically at lower frequencies around 50 – 60 Hz and their higher harmonics.

To avoid ground loops the different instruments in the measurement setup must be connected to the same power outlet or have the same ground connection.

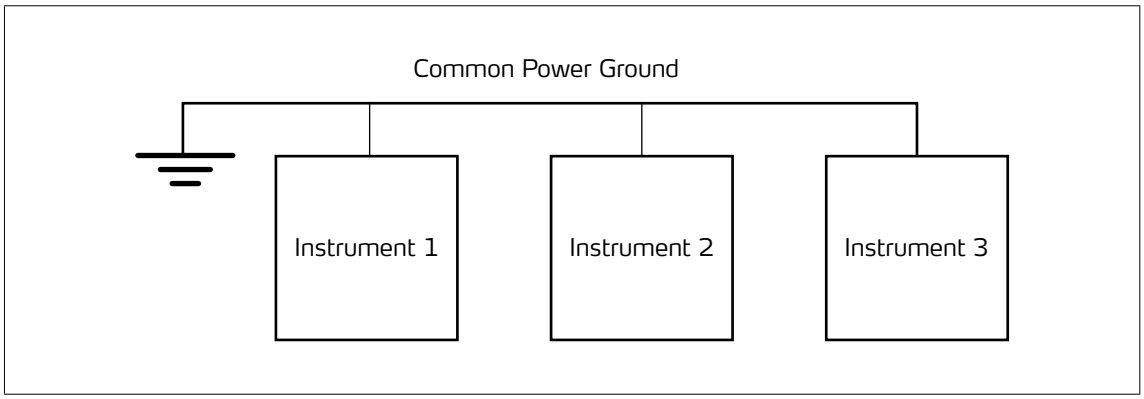

Fig. 4.1 *Correct Ground Connection*

Interference from other instruments, EMC Interference:

Other instruments might create a field which will interfere with the rest of the instruments in the measurement setup. This interference is normally caused by an electromagnetic interference. In most cases due to an electrical transformer and switching circuit, such as the one used in many Mains Power Supplies, such as GRAS AB0002, AB0003, AB0005 (12AL only) and AB0006, available for the GRAS Microphone Power Modules.

For switching circuit in power supply AB0005, the interference might be seen at the mains frequency and its higher harmonics as well as the switching frequencies.

Note: To avoid this interference, the instruments creating the electromagnetic interference must be isolated from the rest of the measurement setup. This can be done by moving these instruments away from the rest of the instrumentation and place signal cables as far away as possible from these instruments.

Note: Cables transporting high power might also interfere with low power signal cables. To avoid this, the High-Power cables must be separated from the signal cables and placed in a certain distance from each other.

Technical Specifications

Frequency response		
+1/-3 dB, 1 MΩ load, gain 0 dB	Hz	1 to 300 k
+1/-3 dB, 1 MΩ load, gain +20 dB	Hz	1 to 200 k
+1/-3 dB, 1 MΩ load, gain +40 dB	Hz	1 to 70 k
Noise		
20 to 20 kHz, gain 0 dB	µV rms	1.5
20 to 20 kHz, gain +20 dB	µV rms	15
20 to 20 kHz, gain +40 dB	µV rms	150
Gain	dB	0, 20, 40
Input channels		4 BNC
Output channels		4 BNC
Output impedance	Ω	75
CCP preamplifier supply	mA	5
CCP open loop voltage	V	24-28
Input DC error detection levels	V DC	<2.5 and >24
Output AC overload detection level	V AC^{p-p}	22
Power Supply	V DC	15
Power consumption, at 15 V DC, typical	mA	150

Dimensions and Weight

Width	mm	207
Height	mm	42.7
Depth	mm	176
Weight	kg / oz	1.1 / 38.8

Ordering Information

Refer to www.grasacoustics.com/products/product/690-12AX

Warranty, Service and Repair

Warranty

All GRAS products are made of high-quality materials that will ensure life-long stability and robustness. The 12AX is delivered with a 2-year warranty.

The warranty does not cover products that are damaged due to negligent use.

Service and Repairs

All repairs are made at GRAS International Support Center located in Denmark. Our Support Center is equipped with the newest test equipment and staffed with dedicated and highly skilled engineers. Upon request, we make cost estimates based on fixed repair categories. If a product covered by warranty is sent for service, it is repaired free of charge, unless the damage is the result of negligent use or other violations of the warranty. All repairs are delivered with a service report, as well as an updated calibration chart.

Manufactured to conform with:

CE marking directive: 93/68/EEC

WEEE directive: 2002/96/EC

RoHS directive: 2002/95/EC