

Instruction Manual

Power Module Type 12AG



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**Power Module
Type 12AG**

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Contents

1. Introduction and Description	4
1.1 Polarization Voltage	4
1.2 Preamplifier Voltage Supplies	4
1.3 Signal Conditioning	7
Frequency Response	7
Gain	7
1.4 SysCheck (System Check)	7
1.5 Power Supplies	7
1.6 Input/Output	7
2. External Features	8
2.1 Front Panel	8
Channel Details	8
Top of Front Panel	9
2.2 Rear Panel	10
3. Internal Features	12
3.1 User-servicable Switches	12
4. Operation	13
4.1 Power Supplies	13
4.2 Polarization Voltage and Preamplifier Supply Voltage	13
4.3 Filter and Gain Settings, and Direct Mode	13
4.4 SysCheck (System Check)	13
5. Service and Repair	14
6. Specifications	15

1. Introduction and Description

The G.R.A.S. Power Module Type 12AG (Fig. 1.1) is an 8-channel power supply for preamplifiers used with condenser microphones. It is for general use in acoustic measurements as well as for intensity measurements; both in the laboratory and in the field.

It provides:

- polarization voltages for 8 condenser microphones
- voltage supplies for powering 8 microphone preamplifiers.
- individual choice of signal conditioning for each channel.

A block diagram of its main components is shown in Fig. 1.2.

1.1 Polarization Voltage

The polarization voltage can be set to either 0V or 200V via a pair of switches on the rear panel (see Fig. 2.4). The switches are latched to avoid inadvertently changing their settings. Just pull the latch on the switch in question before changing its setting. Use:

- 0V for prepolarized microphones, and
- 200V for externally-polarized microphones

Each switch applies to a group of four channels, i.e. 1 to 4 and 5 to 8.

1.2 Preamplifier Voltage Supplies

The preamplifier voltage supply can be set to either 28V DC or 120V DC via a pair internal switches (see section 3.1). Use:

- 28V for minimum power consumption, and
- 120V for maximum dynamic range (default setting)

Each switch applies to a group of four channels, i.e. 1 to 4 and 5 to 8.



Fig. 1.1 Power Module Type 12AG

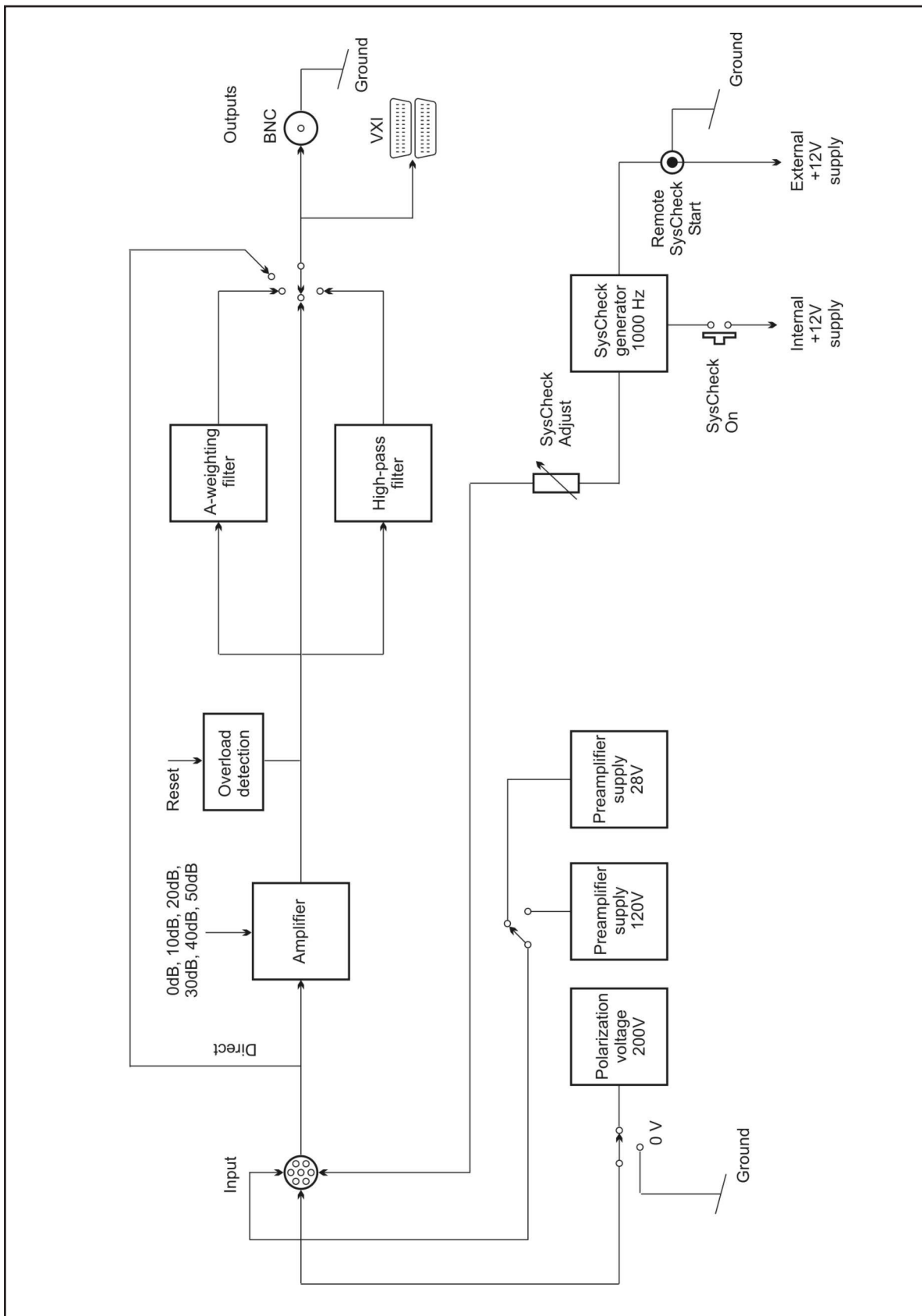


Fig. 1.2 Block diagram of one channel of the Type 12AG

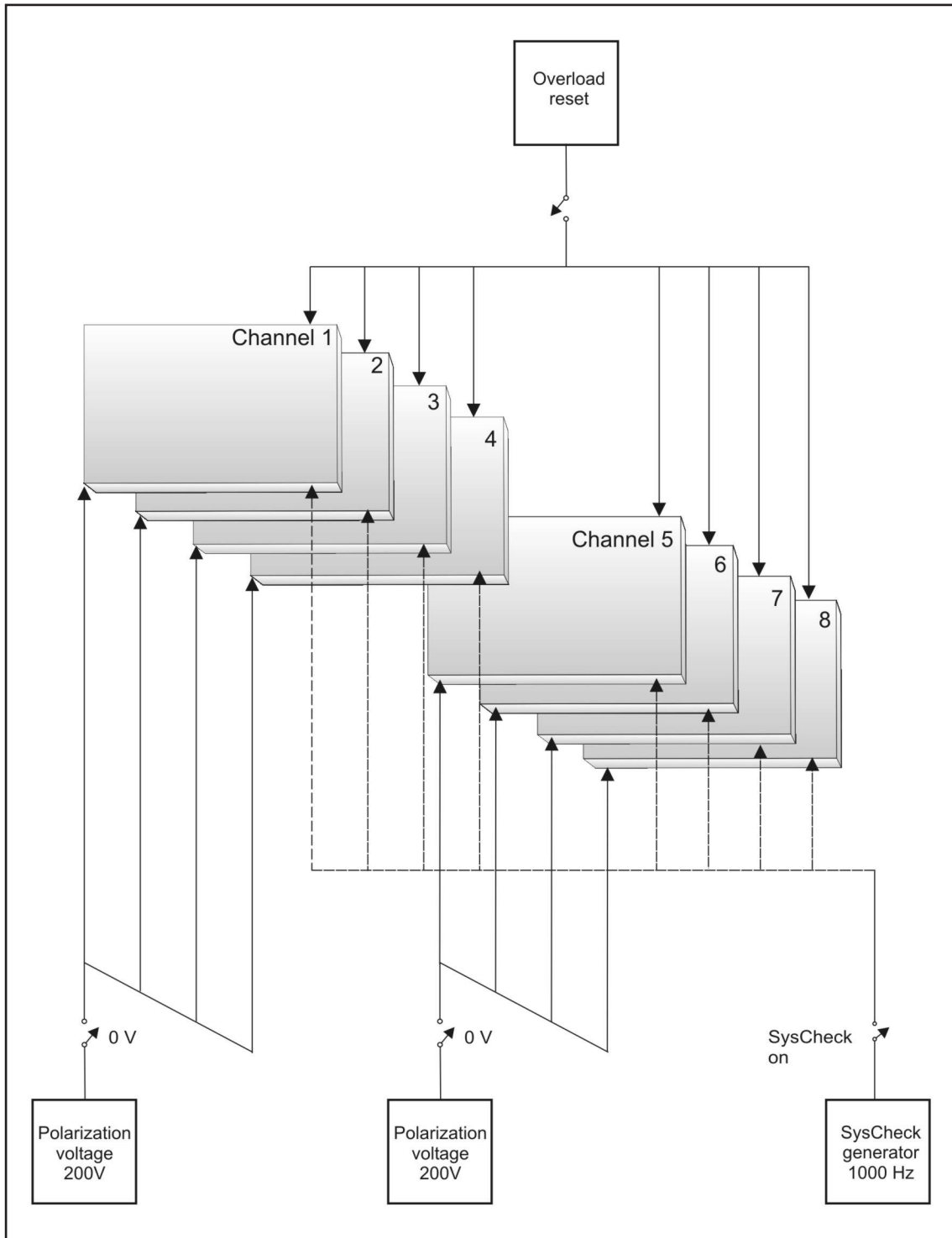


Fig. 1.3 Block diagram showing arrangement of features common to all 8 channels.
 Note: for clarity preamplifier voltage selection has been omitted

1.3 Signal Conditioning

1.3.1 Frequency Response

The frequency response of each channel can be set to one of the following via a switch on the front panel (see section 2.1):

- Linear
- A-weighted
via standard A-weighting filters fulfilling the requirements of IEC Standard 60651 "Sound Level Meters" Type 0 and IEC 61672 Class 1.
- High-pass
via a 3-pole Butterworth high-pass filter with a -1 dB cut off at a frequency of 20 Hz
- Direct-mode coupling
the microphone signal from the preamplifier is coupled directly with the BNC output socket, thus by-passing all the above settings. Use this mode if extremely good phase response is required and/or to benefit from the preamplifier's full dynamic range in the setting for 120 V

1.3.2 Gain

The gain of each channel can be set to one of the following via a switch on the front panel (see section 2.1):

- 0 dB
- +10 dB
- +20 dB
- +30 dB
- +40 dB
- +50 dB

Note: Gain is disabled if Direct mode is selected.

1.4 SysCheck (System Check)

The Type 12AG has a built-in 1000 Hz SysCheck generator for simultaneously verifying the stability of the complete measuring system of each channel including the microphone.

The signal level from the generator can be pre-adjusted for each channel before it is applied to the measurement set-up. A system check can be activated locally via a push button on the front panel, or remotely via a Mini Jack socket on the rear panel.

SysCheck (or similar technique) can be used with preamplifiers supporting this feature, e.g. the G.R.A.S. preamplifiers Type 26AJ and Type 26AL.

1.5 Power Supplies

The Type 12AG can run from a mains/line supply of 110 - 240 V AC or from an external power supply of 12 - 18 V DC, e.g. a 12 V car battery.

1.6 Input/Output

Each channel of the Type 12AG has a 7-pin LEMO input for microphone preamplifier such as the G.R.A.S. Preamplifiers Types 26AM, 26AC and 26AK. Fig. 2.2 shows the wiring diagram of this input socket which is also compatible with a range of microphone preamplifiers from other suppliers such as Norsonic, L&D and Brüel & Kjær.

The output of each channel is available via a standard BNC socket for direct use with analyzers, voltmeters, oscilloscopes etc.

2. External Features

2.1 Front Panel

2.1.1 Channel Details

Front-panel details for each channel are as shown in Fig. 2.1.

- **SysCheck Adjustment** potentiometer
Use a small screwdriver to adjust the level of the SysCheck signal applied to pin 1 of the Preamplifier Input socket (Fig. 2.2). Signal adjustment ranges from 0 to 5.6V RMS. (The SysCheck signal is applied when the **SysCheck Start** push-button is pressed - see Fig. 2.3).
- **Overload** LEDs: both red
Inst. lights instantaneously and only while there is an overload.
Latch lights when there is an overload and remains lit (until reset via the **Overload Reset** button see Fig. 2.3).
- **Gain** switch
Adjust the gain to suit requirements without overload (**Overload** LEDs light up). **Gain** settings are from 0dB to +50dB in 10dB steps. Disabled if Direct mode is selected (see **Filter** below).
- **Filter** 4-position signal-conditioning switch;
 - **Lin.**
routes the signal through the amplifier alone.

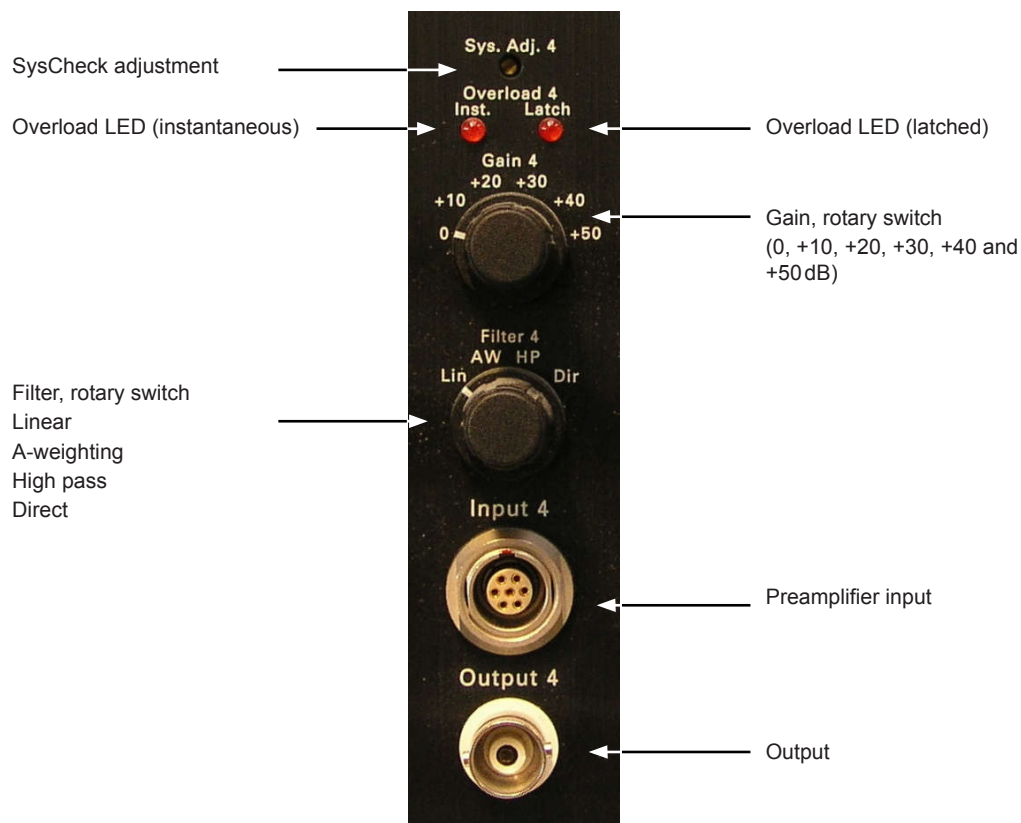


Fig. 2.1 Front-panel details for each channel of the Power Module Type 12AG

- **AW**
routes the signal through the amplifier and the A-weighting network.
- **HP**
routes the signal through the amplifier and the 20Hz high-pass filter (e.g. to suppress infra-sound).
- **Dir.**
selects the Direct mode and by-passes all **Gain** and **Filter** selections (see also section 1.3.1).
- **Preamplifier Input**
7-pin LEMO input connector for microphone preamplifier. Wiring diagram shown in Fig. 2.2
- **Ouput**
BNC socket for the output signal either via signal conditioning or directly from the microphone preamplifier.

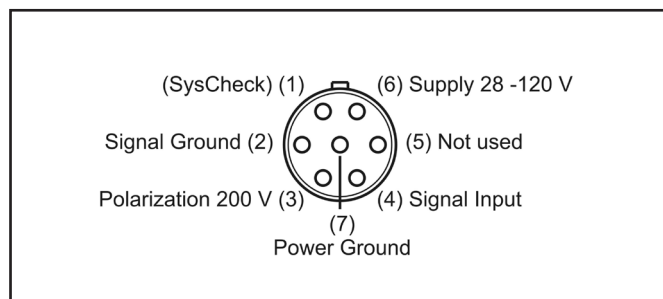


Fig. 2.2 7-pin LEMO female socket 1B (external view)

2.1.2 Top of Front Panel

Fig. 2.3 shows the details at the top of the front panel.

- **Overload Reset**
Press to reset the latched overloads and extinguish their LEDs (applies to all channels)
- **SysCheck Start** push-button.
Press and hold to activate the 1000 Hz SysCheck generator. The signal from the generator will be applied to pin 1 (see Fig. 2.2) of each Preamplifier Input socket.
- **Power LED** (green)
The green LED lights up whenever the unit is energised and ready for use.

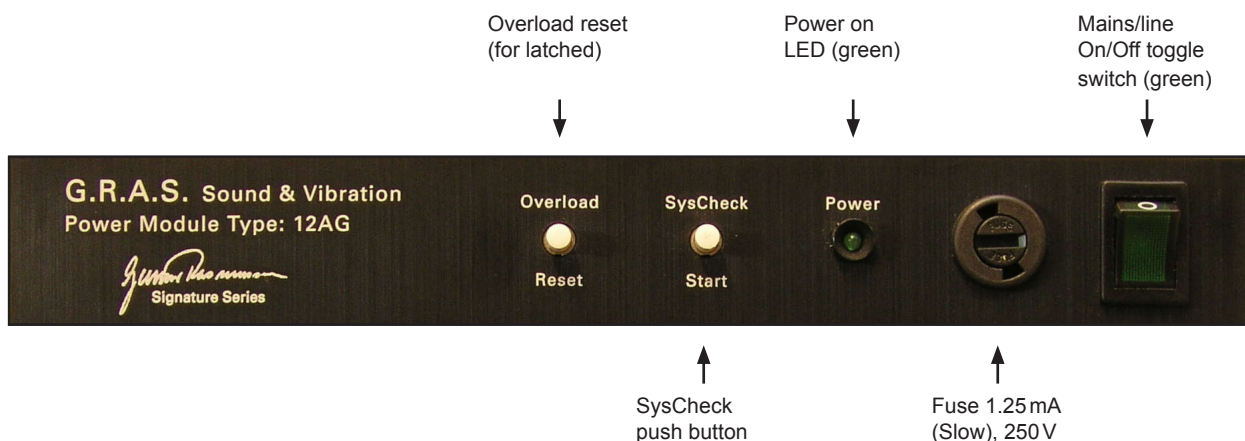


Fig. 2.3 Details at the top of the front panel of the Power Module Type 12AG

- Twist/release holder for 1.25mA, 250V (Slow) fuse.
- Mains/line toggle switch (On/Off)
For 110 - 240V AC supply. Illuminated green when power is switched on.

2.2 Rear Panel

The rear panel has the following features (see Fig. 2.4)

- **Pol. V Ch. 5 - 8**
Latched switch for selecting the polarization voltage for channels 5, 6, 7 and 8. Just pull the latch on the switch before changing its setting. Use:
 - **0V** for prepolarized microphones, or
 - **200V** for externally-polarized microphones
- **Pol. V Ch. 1 - 4**
Similar to the above but applies to channels 1, 2, 3 and 4.
- **110 - 240V AC**
Input socket for mains/line AC power supply. Centre pin is earth/ground.
- **Supply Select**
Latched switch for selecting how the Type 12AG is to be powered. Just pull the latch on the switch before changing its setting. Select as required:
 - **AC** for a mains/line AC power supply, or
 - **Ext** for an external power supply of 12 - 18V DC
- **Ext DC 12-18 V**
Input socket for an external power supply of **12 - 18V DC**; centre pin +terminal.
- **Remote SysCheck Start.**
Mini Jack input for remote SysCheck start. Apply a + DC voltage of 5V to activate the Sys-Check generator; tip of Mini Jack +terminal. The signal from the generator will be applied to pin 1 (see Fig. 2.2) of each Preamplifier Input socket.

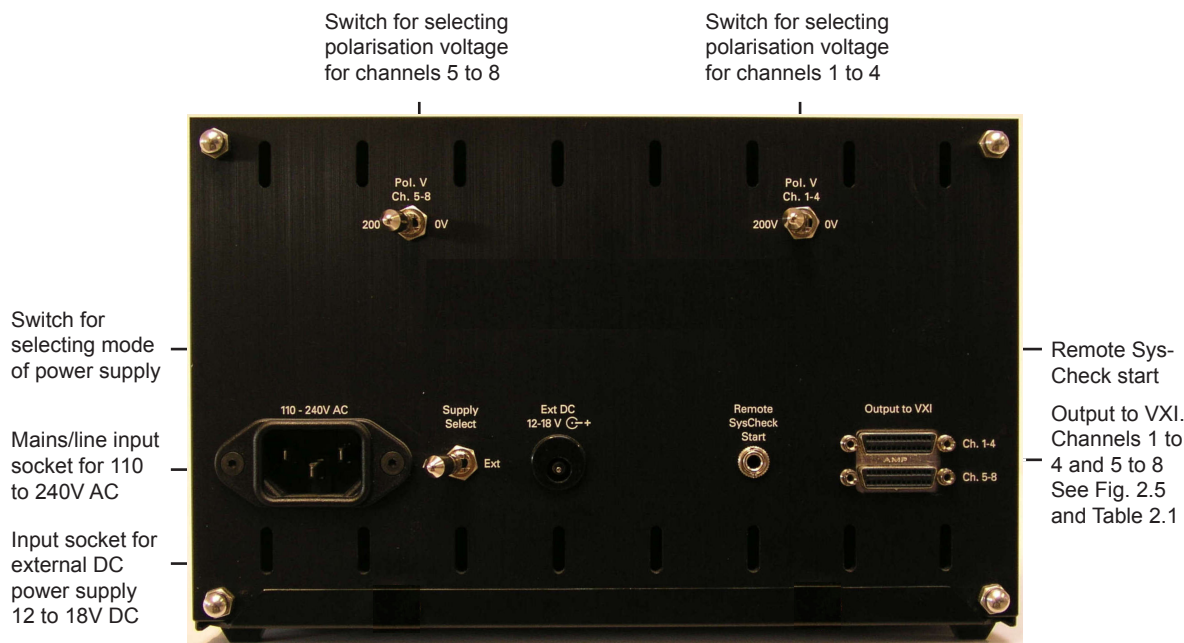


Fig. 2.4 Rear panel of the Power Module Type 12AG

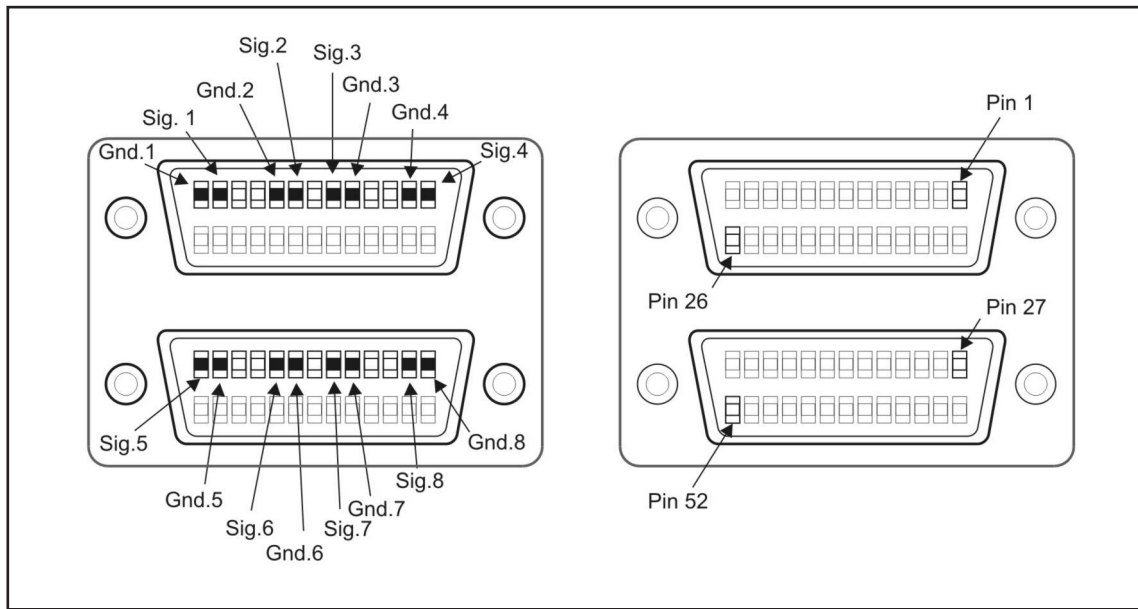


Fig. 2.5 VXI connector (external view) showing: Left; signal output and ground for each channel number and Right; pin numbering system (see also Table 2.1)

- Output to VXI**
 VXI output connector for each output signal and ground of each channel of the Type 12AG.
 - Ch. 1 - 4** (upper socket) is for channels 1, 2, 3, and 4
 - Ch. 5 - 8** (lower socket) is for channels 5, 6, 7, and 8
 See Fig. 2.5 and Table 2.1 for connection details.
- Locking screws**
 Unscrew and slide the baseplate out first before attempting to remove the cover (in order to gain access to the preamplifiers' voltage supply switches see section 3).

Channel No.	Signal Pin No.	Ground Pin No.
1	12	13
2	8	9
3	5	6
4	1	2
5	38	39
6	34	35
7	31	32
8	27	28

Table 2.1 Pin connections on the VXI output connector

3. Internal Features

Note: switch the Type 12AG off and disconnect it from any external power supply before removing the baseplate and the cabinet cover for any reason. Afterwards replace cabinet cover and baseplate.

The user-servicable switches are contained within the cabinet of the Type 12AG. To gain access to these, proceed as follows:

1. unscrew and remove the four screws on the sides of the cabinet
2. lift the cover off
3. change/check switch settings
4. replace cover and baseplate before applying power

3.1 User-servicable Switches

The locations of a pair of user-servicable slide switches for selecting preamplifier voltages are shown in Fig. 3.1. Each switch applies to a group of channels as indicated in Fig. 3.1. The switches can have similar settings or differing settings. Whatever they are, they should be remembered. Use:

- 28V for minimum power consumption, and
- 120V for maximum dynamic range (default setting)

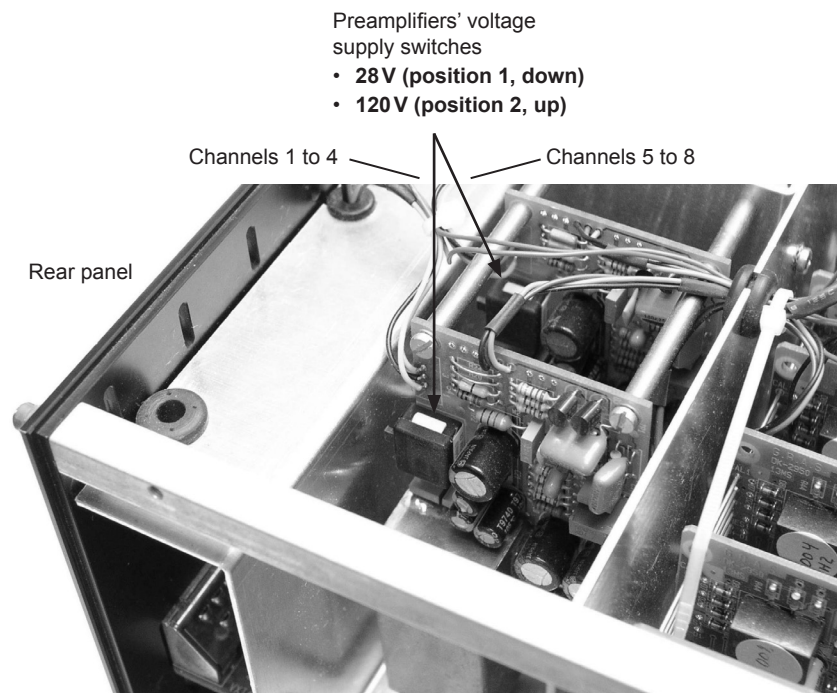


Fig. 3.1 Showing the location of a pair of slide switches for selecting preamplifier voltages

4. Operation

4.1 Power Supplies

The Type 12AG can run from a mains/line supply of 110 - 240 V AC or from an external power supply of 12 - 18 V DC, e.g. a 12 V car battery. Both power supplies are via inputs on the rear panel. If both power supplies are connected to the Type 12AG, power is taken from whatever the **Supply Select** switch on the rear panel is set to (Fig. 2.4).

Whichever way the Type 12AG is powered, the green **Power** LED on the front panel (Fig. 2.3) will be lit to indicate correct operation. If it doesn't, check the power source currently in use (as selected via the **Supply Select** switch).

The green on/off toggle switch on the front panel is illuminated when switched on only if the Type 12AG is connected to an AC power supply; irrespective of whether this source of power is currently in use or not.

4.2 Polarization Voltage and Preamplicifier Supply Voltage

Polarization voltages can be switched from 200 V to 0 V (see section 2.2). Use 200 V for standard externally-polarized condenser microphones, and 0 V for prepolarized (electret) microphones.

Preamplicifier supply voltages can be switched from 28 V or 120 V (see section 3.1). Use 28 V for minimising power consumption if this is critical, it is also sufficient for most applications but limits the dynamic range of the microphone preamplicifiers used with the Type 12AG. Use 120 V to utilise the full dynamic range of the microphone preamplicifiers. In this case the dynamic range will be determined by the Type 12AG which (for the channels in question) should be switched to its Direct mode or its Gain switched to 0 dB to avoid overload (see section 2.1.1).

4.3 Filter and Gain Settings, and Direct Mode

The **Gain** switch in each channel can be used in conjunction with the first three positions of the **Filter** switch, viz. (a) **Lin.** (linear), (b) **AW** (A-weighting) or (c) **HP** (high-pass) filtering. The **Gain** switch is disabled if the **Filter** switch is set to **Dir** (direct mode).

In Direct mode, all amplification and filtering circuits are by-passed; the signal goes directly from LEMO input to BNC output.

Direct mode is preferable when very good phase response is required, e.g. when using the Type 12AG in intensity measurements, and/or to benefit from the preamplicifier's full dynamic range in the setting for 120 V. In this mode, the **Gain** switch on the front panel has no effect and the overload LEDs register nothing.

In all other modes the input signals can be amplified internally and passed through a selected filter. Use **Lin.** if no filtering is required. Use **AW** if A weighting is required by the measurement standard. Use **HP** if low frequencies (below 20 Hz) are to be suppressed, e.g. wind-induced noise.

4.4 SysCheck (System Check)

SysCheck (or similar technique) can be used with preamplicifiers supporting this feature, e.g. the G.R.A.S. preamplicifier Type 26AJ and Type 26AL.

Use SysCheck to verify the stability of a complete measurement set-up. If the signal registered by the measuring equipment as a result of activating a SysCheck remains unchanged, then system stability (including the microphone) can be assumed.

5. Service and Repair

Repairs should be carried out only by qualified personal. The Power Module Type 12AG should not be dismantled with power on because of high-voltage circuits.

6. Specifications

Input/Output sockets per channel:

Input:	7-pin LEMO 1B female
Output:	BNC coaxial

VXI outputs:

1 for	channels 1-4
1 for	channels 5-8

Gain:

0 to +50 dB in 10 dB steps, and direct-mode coupling

Output-voltages (four channels, 1 - 4, 5 - 8):

Preamplifier supply:	28 V or 120 V (internal switches)
Polarization voltage:	0 V or 200 V (rear-panel switches)

Gain error:

<0.2 dB

Frequency response (Lin setting):

20 Hz - 20 kHz:	±0.2 dB
2 Hz - 200 kHz (gain ≤ +40 dB):	±1.0 dB
2 Hz - 100 kHz (gain = +50 dB):	±1.0 dB

Inherent noise:

(20 Hz - 20 kHz with input grounded)

A-weighted:	<2.8 μV
Lin:	<4 μV

(20 Hz - 20 kHz with G.R.A.S. preamplifier and 20 pF dummy microphone)

A-weighted:	<4 μV
Lin:	<5.6 μV

Channel separation:

20 Hz - 20 kHz:	>65 dB
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A-weighting filters:

Compliant with IEC 60651 Type 0 and IEC 61672 Class 1 (see Fig. 6.1)

High-pass filter:

3-pole Butterworth, -1 dB at 20 Hz

Output impedance:

30 Ω

Power supply:

Mains/line:	110 V - 240 V AC
External DC supply:	12 V - 18 V DC

Power consumption (220 V AC):

With 8 G.R.A.S preamplifiers using:-

120 V:	100 mA
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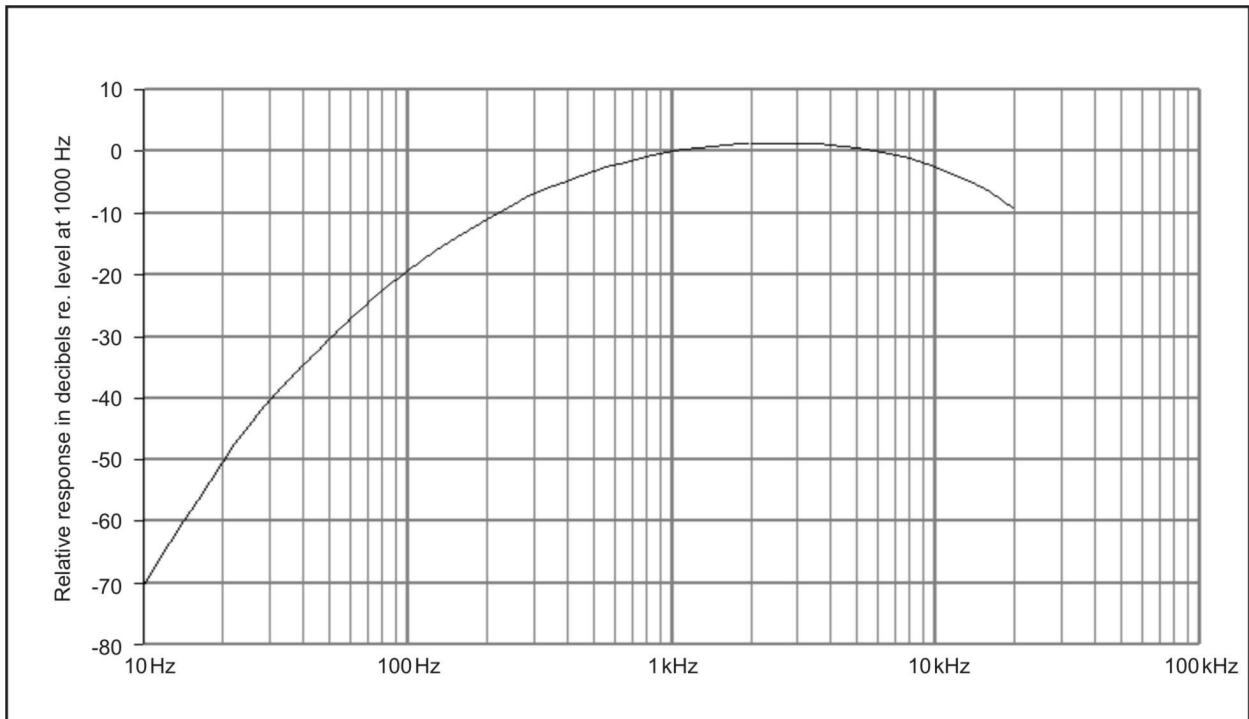


Fig. 6.1 Frequency response of A-weighting filter shown graphically

Fuse:

1.25A (Slow), 250V

Operating temperature range:

-10 °C to +50 °C

Dimensions:

(½ of a standard 19-inch rack)

Height: 132.6 mm (5¼ in)

Width: 215.0 mm (8½ in)

Depth: 196.0 mm (7.7 in)

Weight:

2.5 kg (7.5 lbs)

Accessories included:

Mains/line cable

Accessories available:

AK0040

19-inch Rack-mounting System

Manufactured to conform with:

CE marking directive:
93/68/EEC



WEEE directive:
2002/96/EC



RoHS directive:
2002/95/EC



G.R.A.S. Sound & Vibration continually strives to improve the quality of our products for our customers; therefore, the specifications and accessories are subject to change.