Instruction Manual

Power Module Type 12HM

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Power Module
Type 12HM

Revision 05 12 2012

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1. Introduction and Description

The G.R.A.S. Power Module Type 12HM (Fig. 1.1) is a 10-channel power supply for the following types of G.R.A.S. preamplifiers and microphones when making low-noise measurements:

- 1-inch Preamplifier Type 26HF with 1-inch Microphone Type 40EH
- ½-inch Preamplifier Type 26HH with ½-inch Microphone Type 40AH

With these, sound-power measurents of low-noise products, such as disk drives, can be made under anechoic and/or semi-anechoic conditions according to IEC 3745:1977.

The Type 12HM provides:

- polarization voltages (200 V) for 10 condenser microphones
- voltage supplies (± 15 V) for powering 10 microphone preamplifiers
- individual response setting, Pressure or Free field, for each channel
- individual gain adjustment of ± 3 dB for each channel

1.1 Polarization Voltage

Polarization voltages of 200 V are supplied via the 7-pin LEMO EGA 307 1B sockets on the front panel.

1.2 Preamplifier Voltage Supplies

Preamplifier voltage supplies of ±15 V are supplied via the 7-pin LEMO EGA 307 1B sockets on the front panel.

1.3 Input/Output

Each channel of the Type 12HM has a 7-pin LEMO EGA 307 1B input socket for the G.R.A.S. microphone preamplifiers mentioned above, viz. Types 26HF, and 26HH. Fig. 2.3 shows the wiring diagram of this input socket.

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

Fig. 1.1 Power Module Type 12HM

1.4 Power Supply

The Type 12HM can run from a nominal mains/line supply of either:

- 115 V AC or
- 230 V AC

A voltage tap is provided on the rear panel for selecting one or the other. On delivery, it is set to 230 V AC.

2. External Features

2.1 Front Panel

2.1.1 Power Switch

See Fig. 2.1.

- **Power On** LED (green)
  The green LED lights up whenever the unit is switched on via the On/Off (**I**/**0**) toggle switch.
- Mains/line toggle switch On/Off (**I**/**0**)
  For mains/line AC supply. **Power On** LED illuminated when power is switched on.

*Fig. 2.1 On/Off (**I/0**)switch on front panel*

2.1.2 Channel Details

Front-panel details for each channel are as shown in Fig. 2.2.

- **Pressure** or **Free field** switch
  For selecting a frequency response corresponding to either pressure-microphone operation or free-field microphone operation:

  Pressure - to select the output of the compensating filter (in the preamplifier) which gives the system a linear pressure-frequency response.

  Free Field - to select the output of the compensating filter (in the preamplifier) which gives the system a linear free-field frequency response at 0 ° incidence.
- **Overload** warning LED
  Lights instantaneously and only while there is an overload; synchronised with the one on the preamplifier (Type 26HF or Type 26HH).
- **Level Adjust**ment switch and potentiometer
  On - enables the level-adjustment potentiometer; use a small screwdriver on the potentiometer to adjust the gain in signal level (± 3 dB)
  Off - disables the level-adjustment potentiometer.

  In either case, the signal level will already have been raised by 20 dB by the preamplifier to yield a nominal system sensitivity of:
  - 1.1 V/Pa with the 1-inch preamplifier and microphone, or
  - 0.9 V/Pa with the ½-inch preamplifier and microphone
- Preamplifier **Input**
  7-pin LEMO EGA 307 1B input socket for microphone preamplifier. Wiring diagram shown in Fig. 2.3
- **Ouput**
  BNC socket for the output signal either via signal conditioning or directly from the microphone preamplifier.

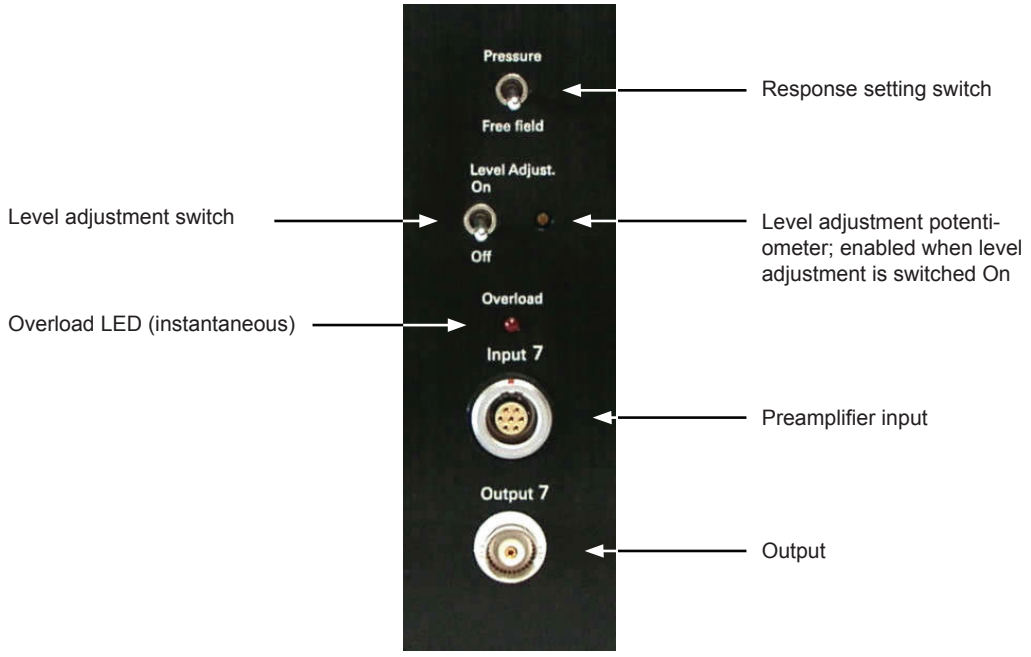

Fig. 2.2 Front-panel details for each channel of the Power Module Type 12HM

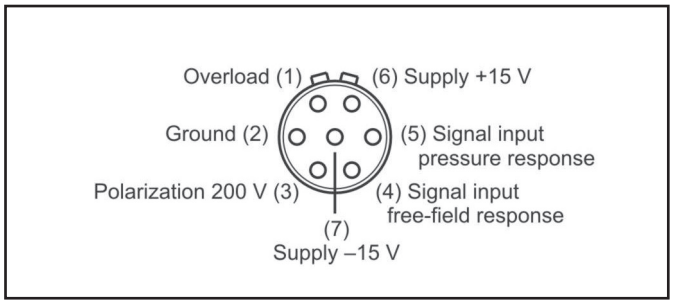

Fig. 2.3 7-pin LEMO EGA 307 1B input socket (external view)

2.2 Rear Panel

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

- **AC Mains 50 - 60 Hz, 35 VA**
  Input socket for mains/line AC power supply. Centre pin is earth/ground.
- **Fuse**
  Pull-out fuse box for two fuses, one active (innermost) and one spare. Fuse rating:
  315 mA (Slow) for 115 V AC mains/line supply, or
  160 mA (Slow) for 230 V AC mains/line supply
- **Mains Voltage Selector**
  Voltage tap for matching the Type 12HM to the available AC power supply voltage, select.
  - **230** for an AC mains/line power supply of nominally 230 V AC, or
  - **115** for an AC mains/line power supply of nominally 115 V AC

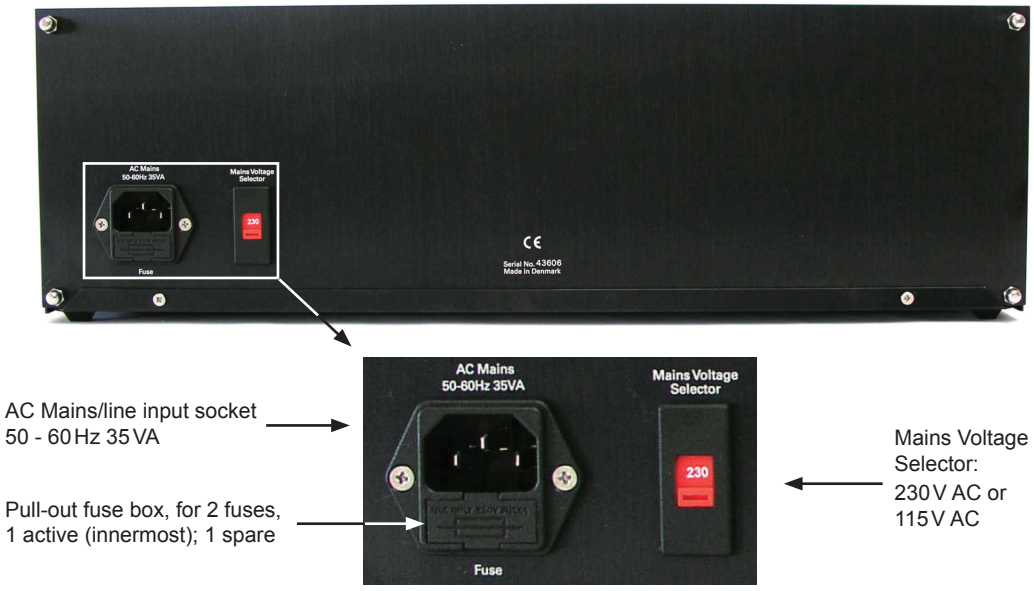

Fig. 2.4 Rear panel of the Power Module Type 12HM

3. Operation

Note: this chapter assumes that the Type 12HM is being used with either of the following G.R.A.S. preamplifiers (no others can be used):

- 1-inch Preamplifier Type 26HF with 1-inch Microphone Type 40EH
- ½-inch Preamplifier Type 26HH with ½-inch Microphone Type 40AH

3.1 Power Supply

Before connecting the Type 12HM to an AC mains/line supply and swithcing it on, make sure the **Mains Voltage Selector** on the rear panel (see Fig. 2.4) matches the local AC voltage supply. Select:

- **230** for an AC mains/line power supply of nominally 230 V AC, or
- **115** for an AC mains/line power supply of nominally 115 V AC

Check also that the correct fuse is in place and not blown (see Fig. 2.4).

3.2 Calibration

3.2.1 Based on Channel Sensitivity

Since the microphone signal is amplified in the Preamplifier by 20 dB, the nominal sensitivity at the output of the channel in question corresponds to:

- 1.1 V/Pa with the 1-inch preamplifier and microphone, or
- 0.9 V/Pa with the ½-inch preamplifier and microphone

Correspondingly (if **Level Adjust** is swithched **Off** - see Fig. 2.2), when the measured RMS output voltage from the channel is 1.1 V or 0.9 V, the microphone in question is being subjected to 94 dB re. 20 µPa.

Based on this information, proceed as follows:

1. Connect the channel output to the analyzer to be used and switch both units on.
2. Adjust the analyzer to indicate 94 dB re. 20 µPa for an RMS input of *S* volts; where *S* is the sensitivity (1.1 V/Pa or 0.9 V/Pa, see above) of the channel in question.

3.2.2 Pistonphone

A G.R.A.S. Pistonphone Type 42AA fitted with a G.R.A.S. Coupler RA0090 can be used to produce 94 dB re. 20 µPa on a microphone.

Note: a Pistonphone fitted with a normal 1-inch coupler (RA0023) cannot be used because this will overload the channel with a level of 114 dB re. 20 µPa.

Proceed as follows:

1. Connect the channel output to the analyzer to be used and switch both units on.
2. Unscrew and remove the normal coupler of the Pistonphone.
3. Screw the Coupler RA0090 to the Pistonphone, see Fig. 3.1.
4. Insert the microphone of the channel in question in the Coupler as shown in Fig. 3.2 and switch the Pistonphone on. Note: for a ½-inch microphone, use the adapter GR0619 supplied with the Coupler RA0090.
5. Adjust the analyzer to indicate 94 dB re. 20 µPa.

3.3 Measurements

1. Connect the preamplifier (with microphone) to the LEMO EGA input of the channel in question.
2. Connect the output from the channel to an analyzer

3. Switch on both units
4. Calibrate the set up via one of the methods described in section 3.2.
5. Select which microphone operation to use via the switch on the front panel marked **Pressure** / **Free Field** (see Fig. 2.2).

At this point you can make your measurements but keep an eye on the relevant overload warning LEDs (one on the front panel for each channel and one on the preamplifier) to avoid overloading the system and invalidating the measurements.

Fig. 3.1 Pistonphone without its normal coupler and ready to accept the Coupler RA0090

Fig. 3.2 Pistonphone fitted with Coupler RA0090 and the microphone inserted into the Coupler

4. Service and Repair

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

5. Specifications

Input/Output sockets per channel:

Input:	7-pin LEMO EGA 307 1B
Output:	BNC coaxial

Gain Adjustment per channel:

±3 dB

Frequency response:

with 1-inch Preamplifier Type 26HF and 1-inch Microphone Type 40EH

10 Hz - 10 kHz	±2.0 dB
12.5 Hz - 4 kHz:	±1.0 dB
6 Hz - 12.5 kHz:	+2.0 dB, –3.0 dB

with ½-inch Preamplifier Type 26HH and ½-inch Microphone Type 40AH

10 Hz - 16 kHz	±2.0 dB
12.5 Hz - 10 kHz:	±1.0 dB
6 Hz - 20 kHz:	+2.0 dB, –3.0 dB

Nominal sensitivity:

with 1-inch Preamplifier Type 26HF and 1-inch Microphone Type 40EH

Channel:	1.1 V/Pa
Microphone:	110 mV/Pa

with ½-inch Preamplifier Type 26HH and ½-inch Microphone Type 40AH

Channel:	0.9 V/Pa
Microphone:	90 mV/Pa

Microphone polarization voltage:

200 V

Channel separation:

20 Hz - 20 kHz:	>90 dB

Output impedance:

30 Ω

Output voltage:

Max:	$\pm 10 V_{p\text{-}p}$

Power supply:

Mains/line:	115 V or 230 V AC (nominal)

Power consumption:

With 10 G.R.A.S preamplifiers	35 VA

Fuse:

315 mA (Slow) for 115 V AC mains/line supply, or
160 mA (Slow) for 230 V AC mains/line supply

Operating temperature range:

-10 °C to +50 °C

Dimensions:

Height:	132.6 mm (5¼ in)
Width:	420.0 mm (16½ in)
Depth:	196.0 mm (7.7 in)

Weight:

5.5 kg (12.1 lbs)

Accessories included:

Mains/line cable

Accessories available:

Type 26HF	1-inch preamplifier
Type 40EH	1-inch microphone
Type 26HH	½-inch preamplifier
Type 40AH	½-inch microphone

Manufactured to conform with:

CE marking directive:
93/68/EEC

WEEE directive:
2002/96/EC

RoHS directive:
2002/95/EC