

GENELEC®

4020B

Operating Manual



4020B

Active Loudspeaker

General

The bi-amplified Genelec 4020B is an extremely compact two way active loudspeaker designed for fixed installations. As an active loudspeaker, it contains drivers, power amplifiers, active crossover filters and protection circuitry. The 4020B is designed for indoor use only, in temperatures between 15 to 35 degrees Celsius and relative humidity between 20 % and 90 %.

The MDE™ (Minimum Diffraction Enclosure™) loudspeaker enclosure is made of die-cast aluminium and shaped to reduce edge diffraction. Combined with the advanced Directivity Control Waveguide™ (DCW™), this design provides excellent frequency balance in difficult acoustic environments.

Positioning the loudspeaker

Each 4020B is supplied with an integrated amplifier unit, mains cable, a 5-pin connector for audio signal and 12 V trigger voltage, a keyhole type wallmount and an operating manual. After unpacking, place the loudspeaker in its required listening position, taking note of the line of the acoustic axis. The axis should be pointed towards the center of the listening area.

Connections

Before connecting up, ensure that the loudspeakers and the signal source have been switched off. The power switch of the 4020B is located on the back

panel (see Figure 3). Connect the loudspeaker to an earthed mains connection with the supplied mains cable. Never connect the loudspeaker to an un-earthed mains supply or using an unearthed mains cable. Audio input is via a 10 kOhm balanced connector. The connector also has two pins for 12 V trigger voltage for power switching. The current fed into the 12 V trigger connection must not exceed 200 mA. The pin sequence of the connector is shown in Figure 2.

Connect the signal cable and 12 V trigger voltage to the 5-pole plug provided with the loudspeaker and secure the connections by tightening the screws on each pole. Push the plug into the connector on the loudspeaker.

Never connect the 4020B to the loudspeaker outputs of a power amplifier or an integrated amplifier or receiver.

Once the connections have been made, the loudspeakers are ready to be switched on.

Autostart And Remote Control

The 4020B is equipped with an Autostart function, which automatically turns the amplifier to Standby mode if an input signal has not been detected for approximately 1 hour.

The amplifier mode can also be switched by a 12 V DC trigger type remote control. The remote

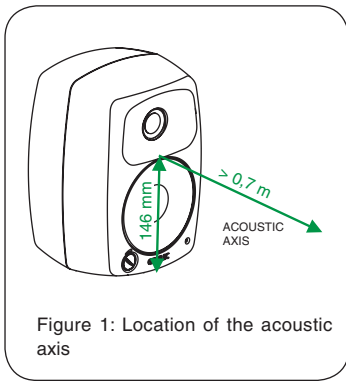


Figure 1: Location of the acoustic axis

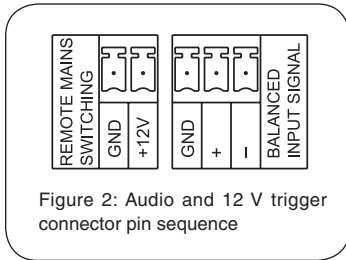


Figure 2: Audio and 12 V trigger connector pin sequence

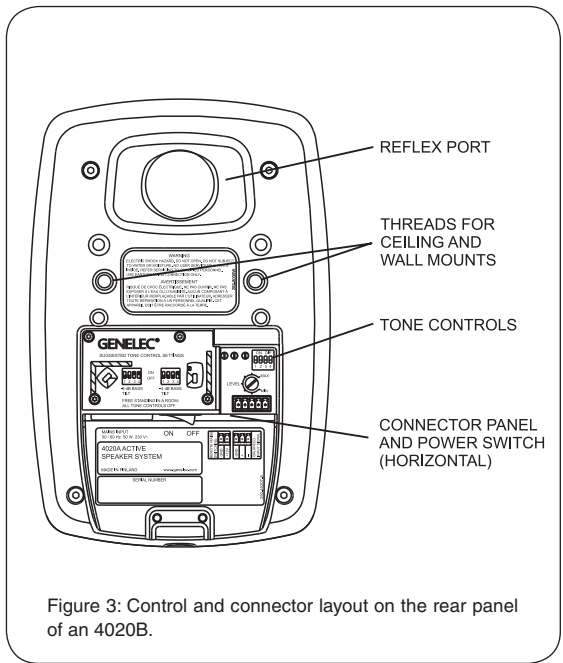


Figure 3: Control and connector layout on the rear panel of an 4020B.

control wires can be connected to the first two (starting from left) poles of the Phoenix connector (See Figure 2 for the connector pin sequence). Remote control overrides the Autostart function.

Level control

The input sensitivity of the loudspeaker can be matched to the output of the signal source by adjusting the level control on the rear panel.

Setting the tone controls

The frequency response of the Genelec 4020B can be adjusted to match the acoustic environment by setting the tone control switches on the rear panel. The controls are “Treble Tilt”, “Bass Tilt” and “Bass Roll-Off”. An acoustic measuring

system such as WinMLS or comparable is recommended for analyzing the effects of the adjustments, however, careful listening with suitable test recordings can also lead to good results if a test system is not available. Table 1 shows some examples of typical settings in various situations. Figure 4 shows the effect of the controls on the anechoic response.

Treble Tilt

The Treble Tilt control (switch 1) attenuates the treble response of the loudspeaker at frequencies above 5 kHz by 2 dB, which can be used for smoothening down an excessively bright sounding system.

Loudspeaker Mounting Position	Treble Tilt	Bass Tilt	Bass Roll-Off
Flat anechoic response	OFF	OFF	OFF
Free standing in a damped room	OFF	OFF	OFF
Free standing in a reverberant room	OFF	-2 dB	OFF
Near field or desktop	OFF	-4 dB	OFF
Near to a wall	OFF	-6 dB	OFF

Table 1: Suggested tone control settings for differing acoustical environments

Bass Tilt

The Bass Tilt control offers three attenuation levels for the bass response of the loudspeaker below 2 kHz, usually necessary when the loudspeakers are placed near a wall or other room boundaries. The attenuation levels are -2 dB (switch 3 “ON”), -4 dB (switch 4 “ON”) and -6 dB (both switches “ON”).

Bass Roll-Off

The Bass Roll-Off (switch 2) activates high-pass filtering at 85 Hz to match the low frequency cutoff of the 4020B to subwoofers using 85 Hz low-pass filtering.

The factory setting for all tone controls is “OFF” to give a flat anechoic response. Always start adjustment by setting all switches to “OFF” position. Measure or listen systematically through the different combinations of settings to find the best frequency balance.

Mounting considerations

Align the loudspeakers correctly

Always place the loudspeakers so that their acoustic axes (see figure 1) are aimed towards the center of the listening area. Only vertical placement is preferred, as it minimises acoustical cancellation problems around the crossover frequency.

Minimise reflections

Acoustic reflections from objects close to the loudspeakers like walls, cabinets etc. can cause unwanted colouration blurring of the sound image. These can be minimised by placing the loudspeaker clear of reflective surfaces.

Minimum clearances

Sufficient clearance for cooling of the amplifier and functioning of the reflex port must be ensured if the loudspeaker is installed in a restricted space such as a cabinet or integrated into a wall structure. The surroundings of the loudspeaker must always be open to the listening room with a minimum clearance of 3 centimeters ($1\frac{3}{16}$ ”) behind, above and on both sides of the loudspeaker. The space adjacent to the amplifier must either be ventilated or sufficiently large to dissipate heat so that the ambient temperature does not rise above 35 degrees Celsius (95°F)

Mounting options

The Genelec 4020B offers several mounting options: On the base of the loudspeaker is a 3/8” UNC threaded hole compatible with a standard microphone stand. On the rear there are two M6x10 mm threaded holes for Omnimount® size

20.5 brackets or the keyhole wall mount adapter provided with the loudspeaker. See Genelec Accessories Catalogue on www.genelec.com for a complete list of mounting hardware options.

Maintenance

No user serviceable parts are to be found within the amplifier unit. Any maintenance or repair of the 4020B unit should only be undertaken by qualified service personnel.

Safety considerations

Although the 4020B has been designed in accordance with international safety standards, the following warnings and cautions should be observed to ensure safe operation and to maintain the loudspeaker under safe operating conditions:

- Servicing and adjustment must only be performed by qualified service personnel. The loudspeaker must not be opened.
- Do not use this product with an unearthed mains cable or an unearthed mains connection as this may compromise electrical safety.
- Do not expose the loudspeaker to water or moisture. Do not place any objects filled with liquid, such as vases on the loudspeaker or near it.
- This loudspeaker is capable of producing sound pressure levels in excess of 85 dB, which may cause permanent hearing damage.
- Free flow of air behind the loudspeaker is necessary to maintain sufficient cooling. Do not obstruct airflow around the loudspeaker.

- Note that the amplifier is not completely disconnected from the AC mains service unless the mains power cord is removed from the amplifier or the mains outlet.

Guarantee

This product is guaranteed for a period of two years against faults in materials or workmanship. Refer to supplier for full sales and guarantee terms.

Compliance to FCC rules

This device complies with part 15 of the FCC Rules. Operation is subject to the following conditions:

- This device may not cause harmful interference, and
- This device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment under FCC rules.

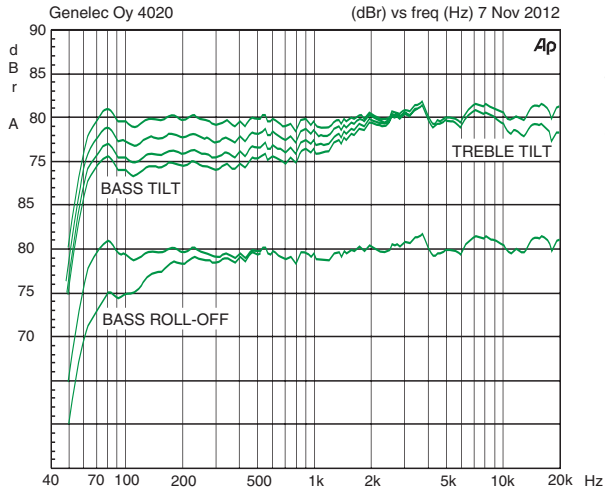


Figure 4. The curves show the effect of the “Bass Tilt”, “Treble Tilt” and “Bass Roll-Off” controls on the free field response of the 4020B

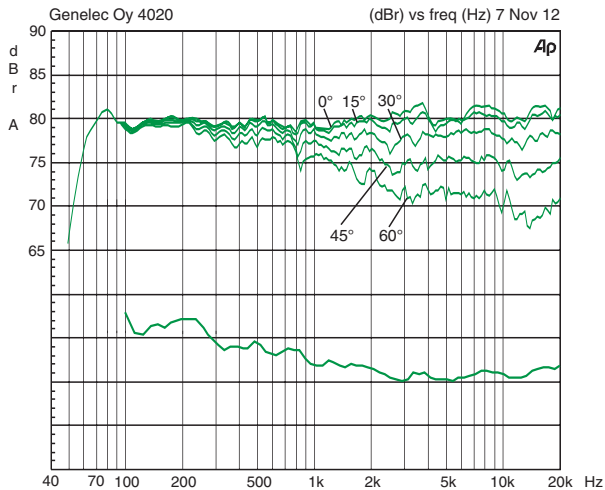


Figure 5. The upper curve group shows the horizontal directivity characteristics of the 4020B measured at 1 m. The lower curve shows the system's power response.

SYSTEM SPECIFICATIONS

Lower cut-off frequency, -3 dB: ≤ 65 Hz

Upper cut-off frequency, -3 dB: ≥ 21 kHz

Free field frequency response of system:
66 Hz – 20 kHz (± 2.5 dB)

Maximum short term sine wave acoustic output on axis in half space, averaged from 100 Hz to 3 kHz:
@ 1 m ≥ 96 dB SPL
@ 0.5 m ≥ 102 dB SPL

Maximum long term RMS acoustic output in same conditions with IEC weighted noise (limited by driver unit protection circuit):
@ 1 m ≥ 95 dB SPL

Maximum peak acoustic output per pair on top of console, @ 1 m distance with music material: ≥ 105 dB

Self generated noise level in free field @ 1m on axis:
 ≤ 10 dB (A-weighted)

Harmonic distortion at 85 dB SPL @ 1m on axis:
Freq: 50...100 Hz < 3 %
> 100 Hz < 0.5 %

Drivers: Bass 105 mm (4") cone
Treble 19 mm ($\frac{3}{4}$ ") metal dome
Both drivers are magnetically shielded

Weight: 3.6 kg (7.9 lb)

Dimensions:
Height 226 mm ($8\frac{7}{8}$ ")
Width 151 mm (6")
Depth 142 mm ($5\frac{5}{8}$ ")

CROSSOVER SECTION

Input connector: Balanced 10 kOhm

Input level for 100 dB SPL output at 1 m:
-6 dBu at volume control max

Volume control range:
-40 dB relative to max output

Crossover frequency, Bass/Treble: 3.0 kHz

Treble Tilt control operating range:
0 to -2 dB @ 15 kHz

Bass Roll-Off control operating in a -6 dB step @ 85 Hz

Bass Tilt control operating range in -2 dB steps:
0 to -6 dB @ 100 Hz

The 'CAL' position is with all tone controls set to 'off' and the input sensitivity control to maximum (fully clockwise).

AMPLIFIER SECTION

Bass amplifier output power with an 8 Ohm load: 20 W
Treble amplifier output power with an 8 Ohm load: 20 W
Long term output power is limited by driver unit protection circuitry.

Amplifier system distortion at nominal output:
THD ≤ 0.08 %
SMPTE-IM ≤ 0.08 %
CCIF-IM ≤ 0.08 %
DIM 100 ≤ 0.08 %

Signal to Noise ratio, referred to full output:
Bass ≥ 95 dB
Treble ≥ 95 dB

Mains voltage: 100, 120, 220 or 230 V
according to region
Voltage operating range: ± 10 %

Power consumption:
Idle 5 W
Standby <0,5 W
Full output 50 W

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