Norsonic



Noise Sources

Power Amplifier Nor280
Power Amplifier Nor282
Dodecahedron Loudspeaker Nor283

Noise sources

Dodecahedron Loudspeaker Nor283

The loudspeaker Nor283 is a small, lightweighted, yet powerful and rugged dodecahedron loudspeaker designed for the most demanding field and laboratory applications.

It supersedes all previous Norsonic loudspeaker designs and performs impressive sound power level at low frequencies compared given the small physical size.

The output level when powered by the battery-operated power amplifier Nor282 is an impressive 123 dB Lw.



Technical Specification

Physical design	Dodecahedron
Sound power output	Using the Nor282 with pink noise and equalisation: 123 dB (Lin) Using the Nor280 with pink noise and equalisation: 120 dB (Lin)
Power (broadband)	AES Power Handling 360 W / Max Power Handling 720 W
Diameter	270 mm (10.63”)
Weight	5.3 kg (11.7 lb)
Tripod mounting rod	3/8” - 16 Tripod screw. 25 mm diameter rod
Impedance	2.7 Ohm
Accessories incl.	- Tripod - Speakon NL4FC plug, replaced by a 5m assembled cable, if ordered with Nor283 - 25 mm diameter rod included with Nor283 for mounting on the tripod

Key Features

123 dB sound power output.

Lightweight, small size and rugged design for both laboratory and field use.

Conforms to ISO 10140-5 Annex D for laboratory airborne sound insulation.

Conforms to ISO 16283-1 Annex A for in-situ airborne sound insulation.

Conforms to ISO 3382-1 Annex A: 3 - 1 for room acoustic parameters (reverberation time).

High sound power at low and high frequencies.

Supplied with individual calibration certificate confirming directional radiation response.

The Nor 283 has been designed for continuous operation for more than one hour at full power. It is mainly designed to be used with the Norsonic power amplifiers Nor280 and Nor282. These amplifiers have built in limitation circuits to protect the speaker from unwanted high and low frequency components outside the frequency bands required for sound insulation testing.

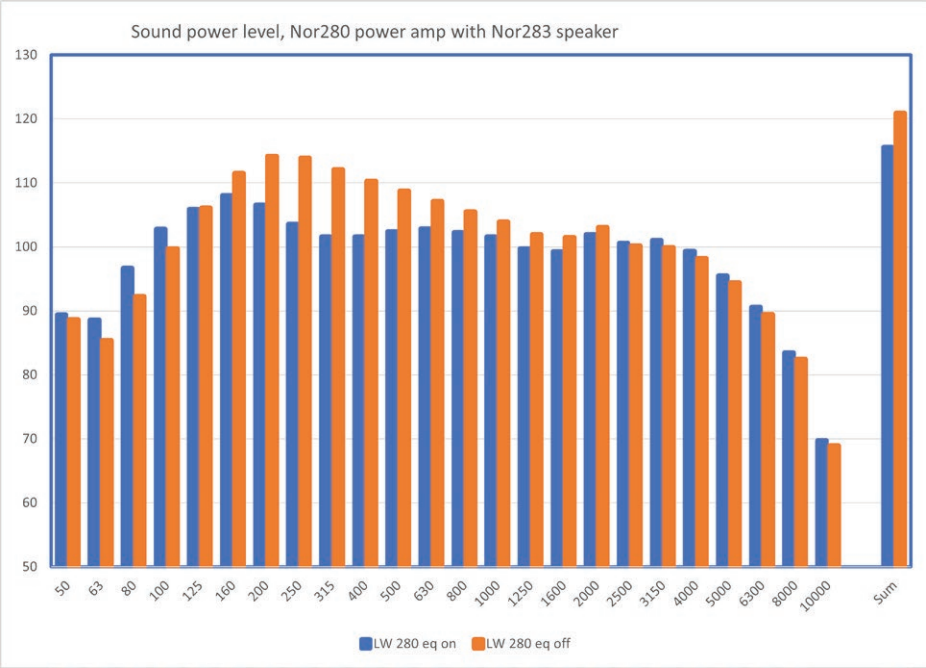
The battery-operated power amplifier Nor282 has preset functions to optimize the response of the Nor282. Further enhancement of the frequency response to match the room characteristic is easy using the built-in graphical equalizer.

The low weight of less than 5.3 kg is obtained by use of specially designed loudspeaker elements with neodymium magnets. The low weight, however, does not come at the expense of robustness.

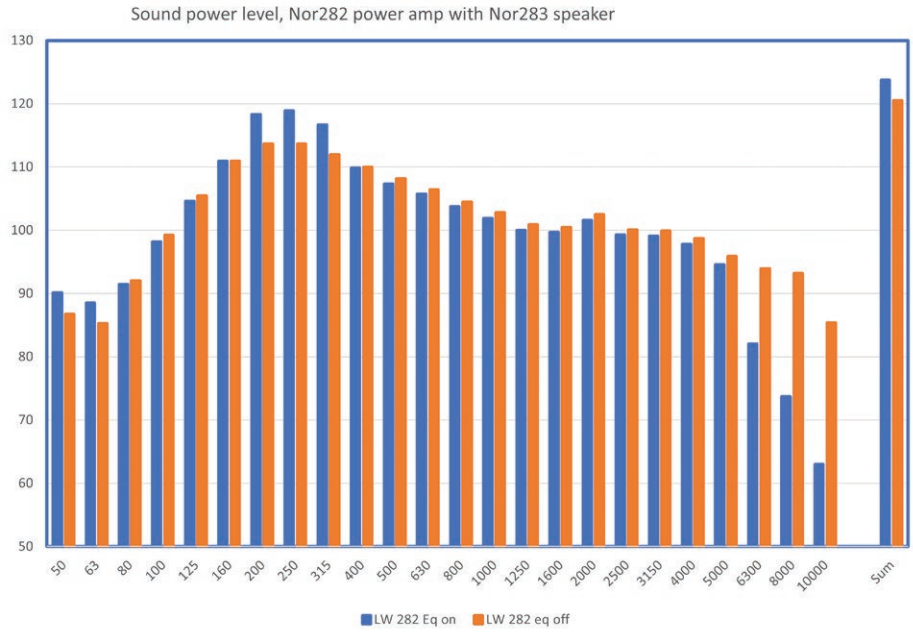
The cabinet is molded in high density polyethylene and the speakers are protected by bespoken steel grids.

The speaker comes with a high-quality tripod ensuring correct placement so that unwanted reflections and structural transmissions are kept at a minimum. Inside the 25 mm tripod tube mount on the speaker there is a 8 mm threaded screw allowing the speaker to be easily mounted upside down in the sealing of an anechoic chamber or similar.

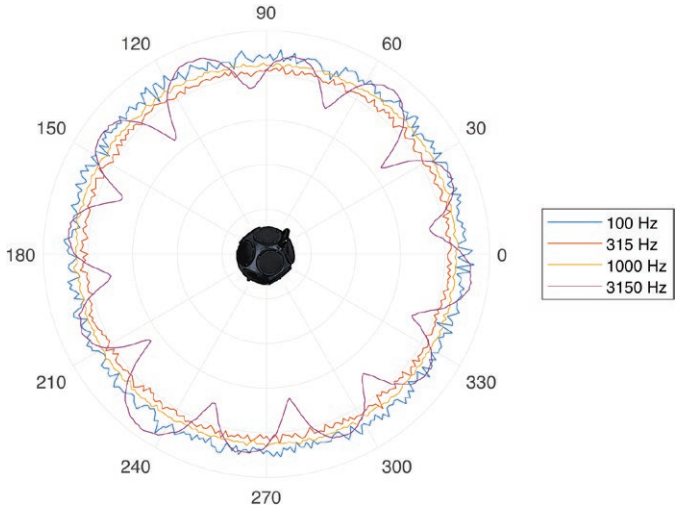




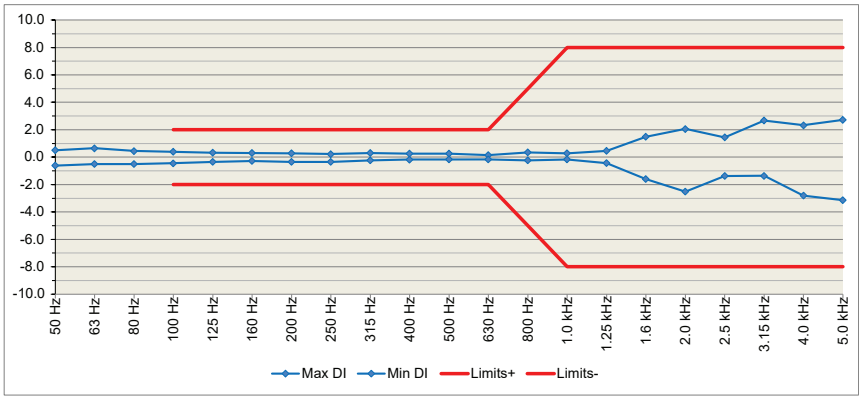
Typical sound power level vs. frequency of the loudspeaker Nor283 when used with the pink noise source and equalizer included in the power amplifier Nor280.



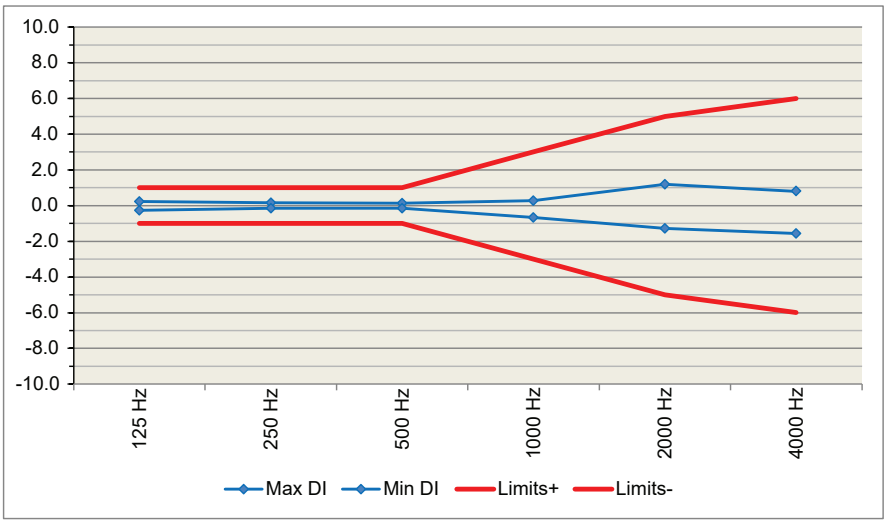
Typical sound power level vs. frequency of the loudspeaker Nor283 when used with the pink noise source and equalizer included in the power amplifier Nor282.



Sound power in different directions for Nor283. The measurement is done in a horizontal plane through the centre of the loudspeaker for the frequencies 100 Hz, 315 Hz, 1 kHz and 3,15 kHz. Each concentric circumference represents a difference of 10 dB with its adjacent ones.



Maximum and minimum directivity indices in different directions according to the requirements in ISO 10140-2:2021 and ISO 16283-1:2014 compared to the tolerance limits.



Maximum and minimum directivity indices in different directions according to the requirements in ISO 3382-1 compared to the tolerance limits.

Noise sources

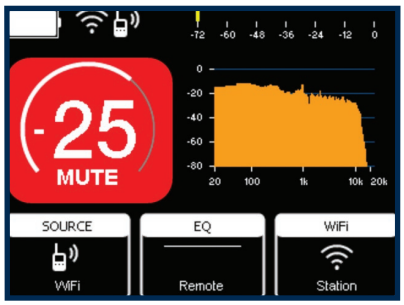
Power Amplifier Nor282

Specially designed for building acoustics and room acoustics measurements.

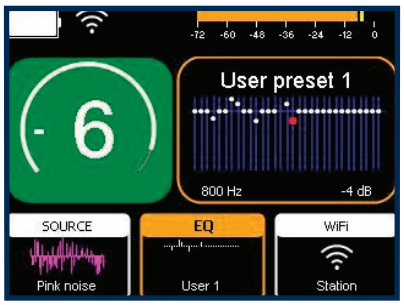
The power amplifier ensures that you get the maximum sound pressure level out of the Norsonic range of speakers.

With the Nor282 we have removed the need for signal and mains cable and added a graphical equalizer. Thanks to the large colour display and the graphical equalizer it is easy to adapt the speaker's frequency response to the room response to fulfill the requirements for difference between adjacent 1/3 octave bands as per ISO 10140-5 and ISO 16283-1.

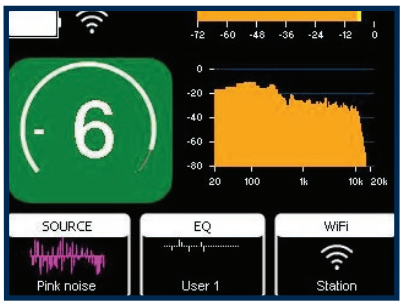




Wireless connectivity avaliable to control Nor283 from an external device.



User defined spectrum shape.



Electrical output signal is shown as live FFT spectrum.

Graphical equalizer

Thanks to the large colour display and the graphical equalizer it is easy to adapt the speaker's frequency response to the room response to fulfill the requirements for difference between adjacent 1/3 octave bands as per ISO 10140-5 and ISO 16283-1.

Fixed spectrum adaption is made for the Norsonic range of speakers which easily can be adjusted to optimize the spectrum to the room response. Additionally, three user defined spectrum may be configured.

A low and high pass filter is added to prevent the speakers from frequency content outside the desired frequency range for BA testing. This is to prevent the noise signal causing the speaker cone to move with higher amplitude outside its design limits and wasted energy in the low frequency area. For special use, all filtering can be turned off.

The output signal including the equalized spectrum shaping is displayed in real time on the colour display, including a separate bargraph on the top of the spectrum indicating the overall noise level.

Key Features

Graphical user defined equalizer to optimize acoustic output from speaker.

Compact, lightweight and rugged construction.

Battery operated
The built-in battery has an operating time of up to 90 minutes @ full power with equalizer when connected to Nor283. Switching between mains and battery operation is seamless. Batteries are charged once mains is applied.

High power level - even battery operated
Emits 123 dB sound power level in the 50 - 5000 Hz frequency range when used with Norsonic dodecahedron loudspeaker Nor283.

WiFi - no signal cable needed!
Nor282 can be connected to a WiFi network or be set as an access point. The latter is useful for field application where you can establish a 1:1 connection to a Nor145, Nor150 or Nor850. From the instrument or the 850 software you take full control of the power amplifiers signal generator, equalizer and output level.

Remote hand-switch
A wireless remote hand-switch to turn on/off the noise signal is included.

Noise types

The built-in signal generator features White, Pink, Brown, 1/3 and 1/1 band pass filtered noise, Sinewave and STIPA. In addition is swept sine supported when connected to Nor850. Additionally, any signal may be connected to the signal input connector.

The signal generator signals are also available on the BNC connector for optional connection to other equipment.

Other useful features

The output attenuator can be set to any level between 0 and -70 dB. Unlike many other amplifiers on the market, the output attenuator is well protected from accidentally change. The attenuator is controlled by a rotary switch with well-defined steps. The step ratio may be user preset to 1, 3, 5, 6 or 10 dB.

The Nor282 is protected against defective / short circuited speakers and cables, overvoltage and overtemperatures. A built in two speed fan turns automatically off when the output signal is turned off, ensuring no interference when performing reverberation time measurements.



Technical Specifications Nor282

Output power	>123 dB Lw if connected to a Nor283. Preset equalizer network for Nor275, Nor276 and Nor283
Protection	Short-circuit and over-temperature protected
Output connector	Speakon NL4MP
Input sensitivity	1.0 Vrms
Input impedance	47 kΩ / 220pF
Equalizer	+6 to -24 dB (1dB step) in 1/3 octave bands from 20 Hz - 20 kHz
Noise types	Pink, White, Brown, 1/1 and 1/3 octave BP noise, Sine, Stipa and external via BNC or WiFi. Swept sine is supported from Nor850.
WiFi	802.11b/g/n - 2.4 Ghz band ex channel 13. Supports Infrastructure and Access Point
Temperature range	Operating / Storage / Charging: -10 to +35 °C / -10 to +50 °C / 5 –40 °C Charging is aborted if outside temp range
Humidity	Operating, Storage and Charge; 20-90% Non-condensing
Enclosure class	IP20
Dimensions / Weight	240x120x256 mm (DxWxH) / 5.1 kg
Mains	90 - 250 Vac 40 - 60 Hz
Battery operating time	90 minutes at full power with equalizer when connected to Nor283 / Nor276 Dodecahedron speaker
Battery type / Capacity	48V LiFePO4 (Lithium Iron Phosphate) / 288 Wh
Recharge time	2.5 h
CE conformity standards	EMC: EN-55032-2015+A11+A1-2020, EN-55035-2017+A11-2020, EN 301 489-1 V2.2.3, EN 301 489-17 V3.2.4 Radio spectrum efficiency: EN 300 328 V2.2.2 Safety and health: EN 62368-1 :2014+A11:2017. IEC 62311:2007 / EN 62311:2008, EN 61010-1:2010/A1 2019
Accessories included	Mains cable, WiFi and remote antennas, remote handswitch
Optonal accessories	Nor1494/5: Cable (5m) for connecting Nor275/Nor276/Nor283 to Nor282 Nor1494/01: Opt. 1 - special length, add/subtract per metre (max. length 25 m)

Noise sources

Power Amplifier Nor280

Specially designed for building acoustics and room acoustics measurements.

The power amplifier ensures that you get the maximum sound pressure level out of the Norsonic range of speakers.



Unique design

Sound insulations testing place heavy demands on loudspeakers and as such many may be destroyed if traditional PA power amplifiers are used to drive them. These amplifiers are normally very powerful and designed to give a flat frequency response covering a much wider frequency range that the speaker system can handle. Feeding these systems with broadband pink or red/white noise may destroy the speaker; the low frequency content of the noise causes the speaker cone to move with much higher amplitude than its design limits. Hence, the speaker coil or the cone itself may be destroyed. In addition a lot of energy is wasted in the low frequency area below 15 Hz.

To overcome this problem, and to optimise the power where it is needed, a built in equalization network compensates for the falling frequency response of the speaker system in both the low and high frequency areas. A part of the equalization network is a high pass filter that removes low frequency signals that lie below the required frequency range for building acoustic measurements and a low pass filter that removes all frequencies above 12 kHz. This feature protects the speakers from distortion and concentrates power into the frequency bands where it is needed.

Powerful

The class D amplifier construction ensures low weight, high power output and low heat dissipation. The amplifier delivers up to 500 WRMS into a 4 ohm load and an output current of up to 35 Amp!

Protection circuits

Both the input and output of the amplifier are short circuit protected and an automatic system will guard against overheating and too high signal voltage on the input. The built in cooling fan is normally not running. Only at high room temperatures or prolonged use of the amplifier at full power will the fan switch on. It will however, immediately switch off when the input signal goes off; this feature makes the unit well suited to reverberation measurements in areas of low background noise.

Key Features

Specially designed for Building Acoustic measurements:
- Sound insulation measurements
- Reverberation time measurements
- Absorption coefficient measurements

Lightweight and rugged construction.

Self contained noise generator.

500 Wrms output power.

Emits 120 dB sound power level in the 50 - 5000 Hz frequency range when used with Norsonic loudspeakers types Nor275, Nor276 or Nor283.

Wireless remote control of noise generator.

Equalization network to optimise acoustic output.

Balanced signal input for low noise and limited cross talk problems.

Noise generation

The internal noise generator features both Pink, White and Red/White noise excitation signals. The noise or line signal can be attenuated in 5 dB steps to –35 dB.

With the wireless on/off remote control you may switch on/off the signal remotely and wireless from another room. The balanced line input ensures minimum cross talk and induced noise when using long signal cables.



Technical Specifications Nor280

Output power	120 dB Lw if connected to Nor283 500 WRMS into 4 ohm 250 WRMS into 8 ohm HD+N < 0.1% The built-in LP and HP filters ensure that the output power matches the Norsonic Nor275, Nor276 and Nor283 loudspeakers
Protection	Short-circuit and over-temperature protected
Output connector	Speakon NL4MP
Peak power	>1 kWPEAK into 4 ohm
Input	Balanced input to avoid looks and cross talk
Input connector	XLR
Input sensitivity	1.0 Vrms
Input impedance	10 kΩ / 220 pF
Noise types	Pink, White, Red/White and line input.
Temperature range	-20 to +35 °C
Humidity	0-90%
Enclosure class	IP20
Dimensions	275x110x246 mm / 11x4.3x9.7 inch (DxWxH)
Weight	3.5 kg
Mains	220 VAC (±10%) or 110 VAC (±10%)
Fuse	T 3.15A (220 V), T 6A (110 V)
CE conformity standards	EMC compliance according to EN50081-1 and EN50082-1, Safety according to EN61010-1-1993 and Machine directive 89/392. EMC and Safety Standards: EN55103-1, EN55103-2, IEC61340-5 part 1&2, IEC61010, FCC part 15b part 1&2
Accessories included	Mains cable, Output connector, Wireless on/off remote control
Optonal accessories	Nor1494/5: Cable (5m) for connecting Nor275/Nor276/Nor283 to Nor280. Nor1494/01: Opt. 1 - special length, add/subtract per metre (max. length 25 m).

Norsonic

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