INSTRUCTION MANUAL



Nor280

Power Amplifier

Norsonic

Nor280 Instruction Manual – February 2024
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Nor280

Power Amplifier

Contents

Power Amplifier Nor280 7
Front panel layout 7
Source selector 7
Level selector 8
Equalizer switch 8
Error indicator 9
Remote on LED 9
Input connector 9
Output connector 9
Connecting to a speaker 9
Power output vs input voltage 10
Noise Generator 10
Wireless remote control 10
Using Nor280 with the speakers Nor275/276/283 11
Programming the hand switch 13

Power Amplifier Nor280



The Nor280 is a rugged, lightweight and powerful class D amplifier. It is specially designed for building acoustics applications.

The amplifier comes with a built in noise generator as standard and as an option it can be fitted with a wireless remote control for switching the signal on/off.

To optimise the power where it is needed a unique 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 amplifiers input stage 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 12kHz. This feature protects the speakers from distortion and concentrates power into the frequency bands where it is needed.

The output of the amplifier is short circuit protected and an automatic system will guard against overheating and high signal voltages through the input. The built in cooling fan is normally not required but will run at high room temperatures or during prolonged use of the amplifier at full power. 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.

Front panel layout

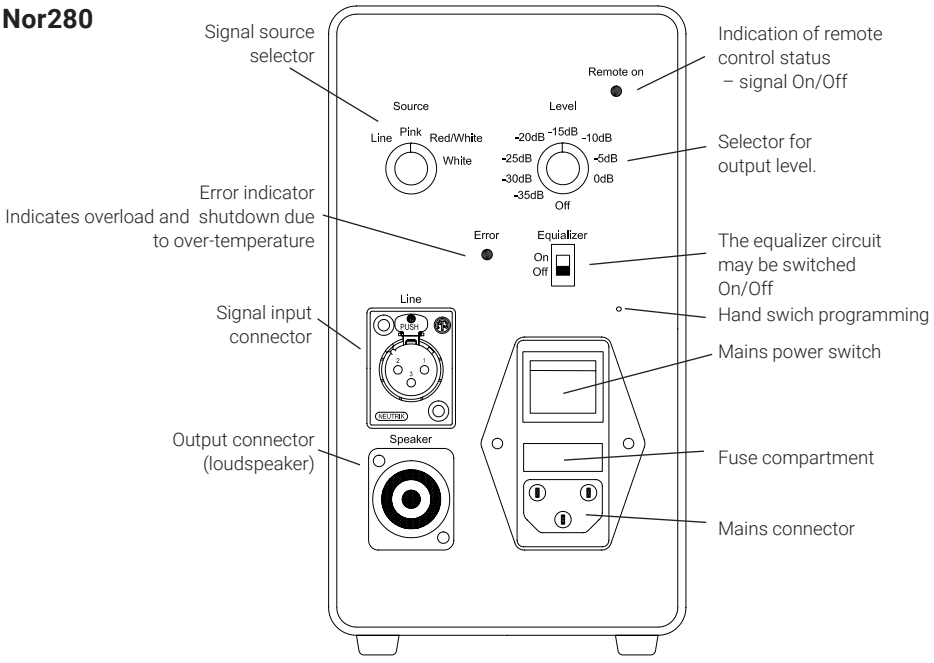
The front panel consist of a source selector, a level attenuator, a switch selecting the equaliser on/off, input and output connectors, mains connector, mains fuse and switch, an error indicator and a remote indicator.

Source selector

The Source selector has four positions:

- **Line.** Selects the input signal connector and disconnects the internal noise generator. This allows the use of an external signal source. Input sensitivity is 1 Vrms for full power output when using Norsonic speakers.
- **Pink.** Selects pink noise from the internal noise generator.
- **Red/White.** Selects Red/White noise from the internal noise generator.
- **White.** Selects White noise from the internal noise generator.

Front panel of Nor280



Level selector

The Level selector attenuates the output level in 5 dB steps from 0 dB (full power) to 35dB. The final position switches the signal off.

Equalizer switch

The equalizer switch selects the equalization network on/off. The switch should be left in the on position when using Nor275, Nor276 or Nor283 loudspeakers for maximum power to the speaker system. It also ensures that there is less than 6 dB between each adjacent 1/3 octave band (free field conditions) when using any of the above mentioned speakers, as required by ISO 10140-5:2021 Annex D.

The equalization network is adapted to the Nor275, Nor276 and Nor283loudspeakers. When using other speakers, it is recommended to switch the equalizer off, or use the network with care in order not to damage the speaker.

The high and low pass filter is always a part of the signal path regardless of the setting of the equalization switch.

Error indicator

The error indicator is illuminated and the output signal is turned off when one of the following error conditions occurs:

- Short circuit. If the output current exceeds 35Amp due to a short circuit of the output stage or a speaker system with a nominal impedance less than 2 ohm is connected.
- Over temperature. If the temperature exceeds the temperature limit, the amplifier is turned off and the cooling fan is turned on at full speed.

The signal is turned on again as soon as the error condition is removed.

Please note that the fan is turned on if the temperature inside the amplifier exceeds 35 ºC and the input signal exceeds 100mVrms. The amplifier however is still well suited for reverberation time measurements in areas of low background noise since the fan is turned off when the input signal drops below 100mVrms.

Remote on LED

The “remote on” LED indication is normally illuminated. If the wireless remote on/off control option is added, the output to the speaker can be switched on/off from the small remote hand switch. The remote on indicator is turned off if the output is switched off from the remote switch.

Input connector

The input connector is a 3 pin female XLR. The input stage is balanced in order to remove influence from external noise such as hum and crosstalk. A BNC to XLR adaptor is a part of the delivery schedule. It is recommended to use a XLR cable from the Nor280 to the external signal, and convert it to a BNC or other single ended cable system as close to the signal source as possible. This ensures a minimum influence from external hum and noise.

Output connector

The output connector is a 4 pole Speakon NL4MP type. 1+ and 2+ are connected together to form the + output, and 1- and 2- are connected together to form the – output.

WARNING! The balanced speaker outputs are both “hot” with a common DC voltage separate from ground. Shorting one of the terminals to ground results in an over-current situation.

Connecting to a speaker

Connect the amplifier to the speaker. Connect the signal input to the amplifier or select the noise source. Set the signal attenuator to off. Switch on the amplifier and increase the signal to the desired leve. Precaution should be taken against hearing loss – wear hearing protectors!

Power output vs input voltage

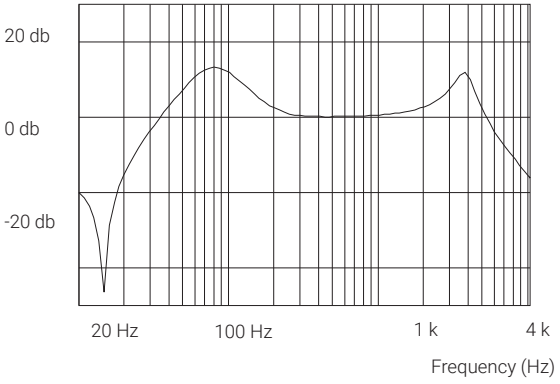
The input sensitivity when connected to a Norsonic speaker is 1.0 Vrms. This give a power output to the speaker of about 100 Wrms for the Nor275 and 200 Wrms for the Nor276.

If higher power is required for other speakers than Norsonic, the input voltage to the amplifier may be increased. Max. utput power is 500 Wrms/250 Wrms in 4/8 ohm. This correspons to a input level of appr. 2 Vrms.

0 dB on the input attenuator/noise generator correspons to 1 Vrms.

CAUTION! Consult the table on page 15 for selecting the level of the noise. If your speaker is not listed, precaution must be taken in order not to damage the speaker system.

The frequency response of the equalisation circuitry of the Nor280 Power Amplifier



Noise Generator

The built in noise generator is a random type with a repetition period in excess of 4 hours. It features three different noise types; Pink, Red/White and White. The output can be attenuated in 5 dB steps by the level selector from 0 to –35dB in addition to signal off.

Connecting other noise generators than found in Norsonic sound level meters may damage the loudspeaker. If usinger other sources, make sure the maximum output voltage of the noise generator is 1,0 Vrms. **Higher voltage will damage the speaker.**

Wireless remote control

Option 1, wireless remote control of signal on/off, enables the user to control the on/off without being present in the source room. The output to the speaker can be switched on/off from the small remote hand switch. Typical range is 100m in free field but will also transmit through a concrete wall/floor. The remote on LED indication is normally illuminated. The remote on indicator is turned off if the output is switched off from the remote switch.

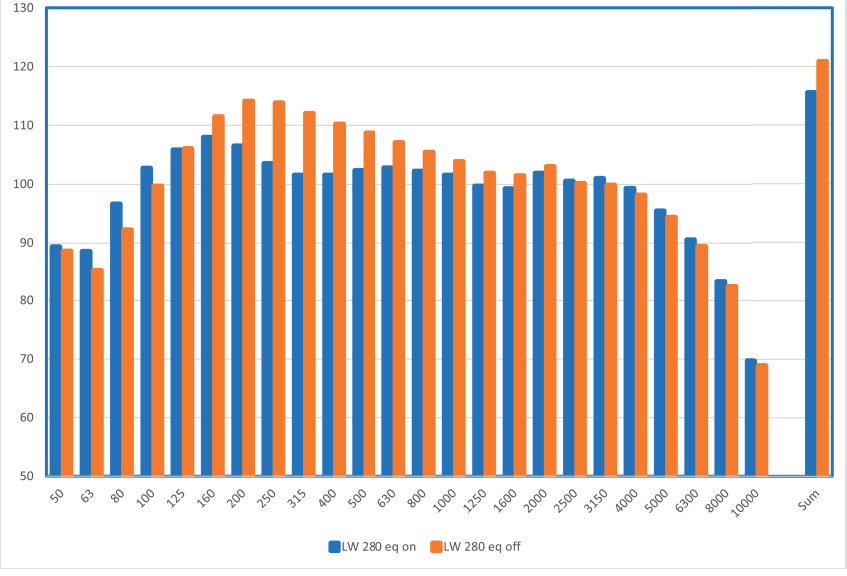
Using Nor280 with the Norsonic speakers

The power amplifier Nor280 is extremely powerful, so care must be taken not to destroy loudspeaker systems connected to it. The below table provides an indication of maximum permissible amplifier input signal. Max input signal to the amplifier is 1 Vrms. The following settings should NOT be exceeded:

Signal type	Nor223 [1)]	Nor229[2)]	Nor270/270H/250	Nor275/276/283
White/pink noise	0 dB	-3 dB	0 dB	0 dB
Octave & third octave filtered pink noise, f< 200 Hz	-3 dB	-6 dB	- 3 dB	0 dB
Octave & third octave filtered pink noise, f> 200 Hz	0 dB	-3 dB	0 dB	0 dB
Red/white noise with equalisation On/Off	- 3 dB / 0 dB	-6 dB / -3 dB	–3 dB / 0 dB	0 dB
All dB values are dB re. 1VRMS				

[1)] assuming an impedance of 5.4Ω
[2)] assuming an impedance of 6Ω

Sound power level, Nor280 power amplifier with Nor283 speaker



Specifications Nor280	
Output	Short circuit and over temperature protected
Output connector	Speakon NL4MP
Output power	500Wrms (4ohm) and 250Wrms (8ohm) measured as THD+N<0.1%.The built-in LP and HP filters ensure that the output power matches the Norsonic Nor275, Nor276 and Nor283 series of dodecahedron loudspeakers when used with Norsonic sound level meters.
Peak power	>1 kW
Output current	Maximum 35 A
Input	Balanced input to avoid ground loops and cross talk to signal cables
Input sensitivity	1V (0dB) equals to 100w in 5Ω
Input impedance	10k ohm//220pF
Input connector	3 pin female XLR
Weight	3,5Kg (7,7 lb)
Dimensions	275 x 110 x 246 (mm) (D x W x H) / 11 x 4,3 x 9,7 (inch)
Operation temperature	-20 to + 35 °C
Mains voltage	220Vac (190 - 265Vac, 45-55Hz) or 110Vac (90 - 132Vac, 55-65Hz).
Enclosure class	IP20
Mains voltage	220Vac (190 - 265Vac, 45-55Hz) or 110Vac (90 - 132Vac, 55-65Hz).
Mains fuse	T 3,15A for 220Vac and T 6A for 110Vac The unit is only safety approved using the following fuses, as appropriate: Wickman 181 1630 000 (1000pcs) or 002 (10 pcs) (110V) or Wickman 181 1315 000 (1000pcs) or 002 (10 pcs) (230V)

EMC and safety standards:
EN 55103-1, EN 55103-2, IEC 61340-5 part 1&2, IEC 61010, FCC part 15b class A

Licence Exemption:
Europe: The transmitter encoders use ECM compliant radio transmitter modules and complies with ETSI330-220 and ETSI300-683.
USA: The device comples with part 15 of the FCC Rules. Operation is subject to the following two conditions:
1. The device may not cause harmful interference, and
2. This device must acceptany interface received, including interference that may cause undesired operation.

Schedule of parts
Wireless remote on/off switch, Mains input lead, BNC to XLR female adapter, Output connector or a complete assembled cable 5m if ordered with a Norsonic Nor250, Nor270, Nor270H, Nor275, Nor276 or Nor283 speaker. User manual with conformance certification.

Programming the hand switch

The remote hand switch is pre-programmed for the supplied Nor280. Several hand switches can be programmed for one or more amplifiers or vice versa.

The procedure is as follow:

- Switch on the amplifier.
- Push a small rod (paperclip) into the tiny hole located to the right above the mains switch. This activates a push button.
- Press and release the button located on the remote hand switch.
- Repeat the press and release.
- Wait 20 seconds.
- The hand switch is now programmed to the new Nor280.

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Declaration of Conformity

We, Norsonic AS, Gunnersbråtan 2, Tranby, Norway, declare under our sole responsibility that the product:

Nor280 Power Amplifier

to which this declaration relates, is in conformity with the following standards or other normative documents:

EMC and safety standards: EN 55103-1, EN 55103-2, IEC 61340-5 part 1&2, IEC 61010, FCC part 15b class A (Nor280 is only safety approved using the specified fuses).

The optional remote control transmitter use ECM compliant radio transmitter modules complies with ETSI330-220 and ETSI300-683 and part 15 of the FCC Rules, as applicable (see Specifications).

Safety: EN 61010-1:2010/A1:2019 Portable equipment and pollution category 2.
EMC: EN 61000-6-3;2007/A1:2011, EN 61000-6-2:2019

RoHS: Directive 2011/65/EU, 2015/863/EU

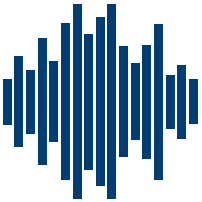
WEEE: Directive 2012/19/EU

This product has been manufactured in compliance with the provisions of the relevant internal Norsonic production standards. All our products are tested individually before they leave the factory.

This Declaration of Conformity does not affect our warranty obligations.

Tranby, August 2023

Jens Petter Ringvold
Cheif Engineer



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Norsonic AS supplies a complete range of instrumentation for acoustics – from sound calibrators, microphones and preamplifiers; via small handheld sound level meters to advanced, yet portable, real time analysers, but also spectrum shapers, building acoustics analysers and complete community, industry and airport noise monitoring systems. Contact your local representative or the factory for information on our complete range of instrumentation.