INSTRUCTION MANUAL

Nor850-MF1



Nor850-MF1

Multichannel measurement rack

Norsonic

Nor850 User Guide – January 2025 Edition
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Nor850-MF1

Multichannel measurement rack

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About this manual

The Nor850, multi channel analyser consists of a hardware and software platform. This manual describes the Nor850 hardware products, consisting of:

- Nor850-MF1, Mainframe, hosting up to 10 channels, Nor850-1, single channel input module.
- Nor850-1/SG, single channel input module with noise generator.
- Nor850-1/BNC same as Nor850-1 but with BNC connector for IEPE preamplifiers.
- Nor850-1/BNC/SG same as Nor850-1/SG but with BNC connector for IEPE preamplifiers.
- Nor850-1/IO, remote controlling unit for tapping machine Nor277 and microphone positioning device Nor265.

Hardware concept

The Nor850-MF1 Mainframe consists of a power supply and processor controlling unit. The Mainframe has space for up to ten single channel measurement units. Two remote control units for tapping machine and microphone positioning device may be inserted instead of two single channel measurement units.

The remote control unit, Nor850-1/IO must be mounted in the two rightmost positions in the mainframe.

Each of the single channel measurement modules is a self contained measurement unit consisting of a DSP, microphone power supply and data interface unit. It is based on the same technology as the well known Sound Analyser Nor140. Each input unit is supplying complete measurement data to the PC. Hence, no measurement data is calculated in the PC. The PC just acquires ready processed data from each of the input modules.

This concept requires less calculation power in the PC and sets lower requirements to a broad band communication channel between the front ends and the PC. It also enables the use of a combination of Nor140 Sound Analysers, Nor145 Sound Analyser or Nor150 Sound analyser and Nor850 multichannel modules. The use handheld sound analysers are especially suited for field applications or when a wireless communication is required from each of the measurement channels.

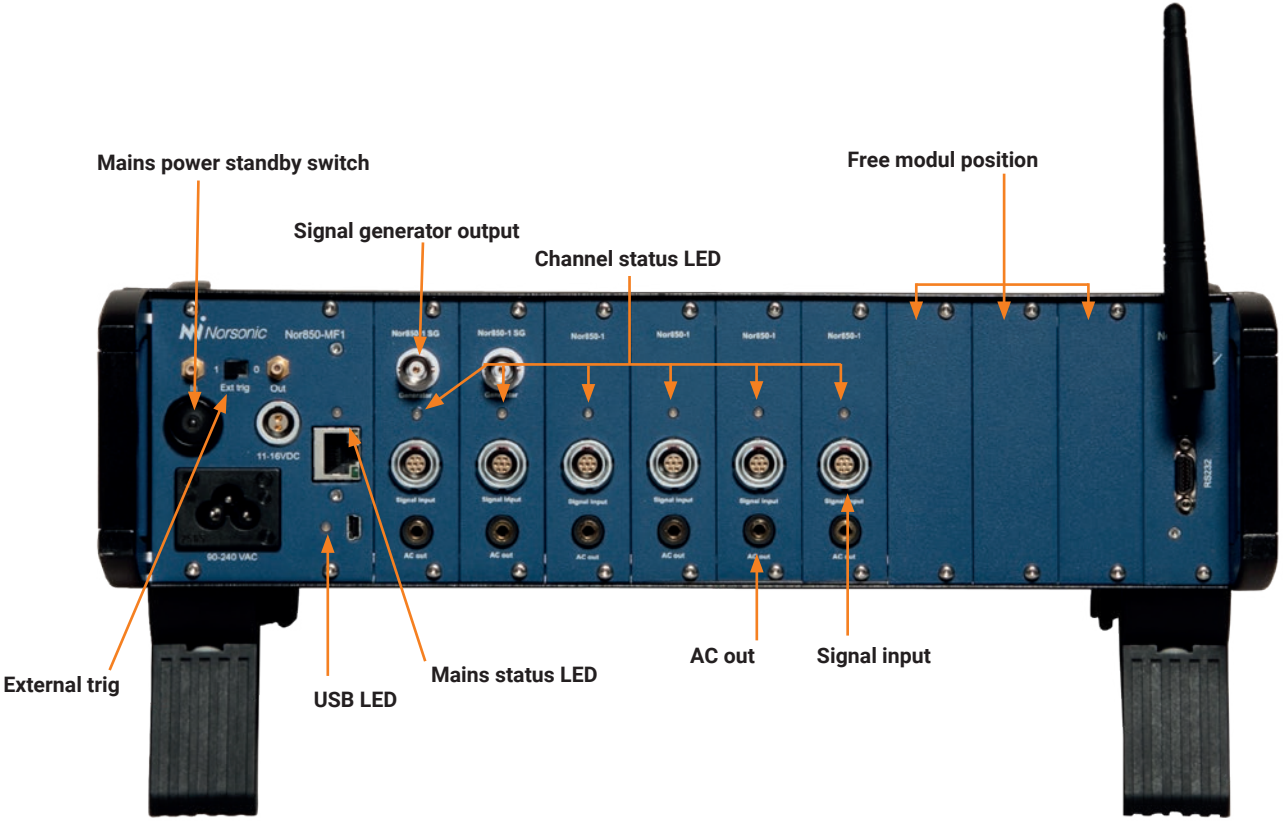
The single channel measurement unit is available in several versions;

- Nor850-1 is the basic single channel measurement unit.
- Nor850-1-SG is similar to Nor850-1, but with a signal generator output added.
- Nor850-1/BNC same as Nor850-1 but with BNC connector for IEPE preamplifiers.
- Nor850-1/BNC/SG same as Nor850-1/SG but with BNC connector for IEPE preamplifiers.

Adding more modules to an existing configuration

Adding more modules to an existing Nor850-MF1 configuration is possible. Please consult your local Norsonic service centre or the factory.

Front panel layout



Mains power standby switch

The main switch turns the mainframe into standby mode. The power to all the input channels is turned off, and the internal CE processor in the mainframe goes to standby mode. The system is turned on by activating the switch again, or by activating it from the 850 application software. The power standby switch may also be set to standby from the Nor850 application software.

The power standby switch has an internal LED that is lit when the system is on, and the switch is active. The switch is in a non active state as long as the LED is not lit, typically when the mains or DC power input is applied and the system is booting.

Mains input

The mains input accept 90 to 250Vac. Once the mains are connected, the system will start to boot up. It is redundant to push the mains switch if you connect the mains. The system will start the boot up process immediately. Pushing the mains switch during power on will start the power stand by process, if the LED in the power switch is lit.

DC power input socket

The Nor850-MF1 can either be powered from mains or from a 12VDC source. The voltage must be between 11 – 16 VDC. Positive terminal is located at the terminal pointing to the red spot mark on the socket. The boot up sequence is similar to the mains input. It is redundant to push the mains switch if you connect the DC voltage plug. The system will start the boot up process immediately. Pushing the mains switch during power on will start the power stand by process, if the LED in the power switch is lit.

Main Status LED

This LED indicates several states:

OFF – System is turned off or in standby mode

RED – System is starting up

Flashing RED – The system is searching for an valid IP address on the LAN network

GREEN – OK, system is ready.

USB LED

The USB connector is used for firmware upgrade and service purpose. If connected, this LED will be lit. The system must be shut down if you want to change between USB and LAN connection.

Channel Status LED

The Channel Status LED indicates the status for the individual channel.

OFF	Channel is not activated.
RED	The channel is in start-up mode, or an error has occurred.
GREEN	Ready. Channel is in idle
YELLOW	Channel is measuring / busy.

Signal Input.

The system is delivered either with 7 pin Lemo for standard preamplifiers or with BNC for IEPE preamplifiers.

The standard 7 pin Lemo connector following the Norsonic microphone preamplifier standard. See the specification section for pin out. The 7 pin Lemo standard was invented by Norsonic and later adopted by most other manufactures. It exist some variance, so please consult the manufactures documentation before connecting other microphone preamplifiers than Norsonic types to the system. If in doubt consult your local Norsonic office. You may connect an IEPE sensor to the signal input via a standard Lemo to BNC cable Nor1438. The ICP power is tuned on from the Nor850 software.

Nor850-1/IO

This module contains one radio channel for remote controlling the start/stop of the tapping machine Nor277. It additional contains a serial interface connector for controlling the Nor265 turn table / microphone boom. Use the interface cable Nor1441 to connect a Nor265 to the Nor850-1/IO module.

Signal generator output.

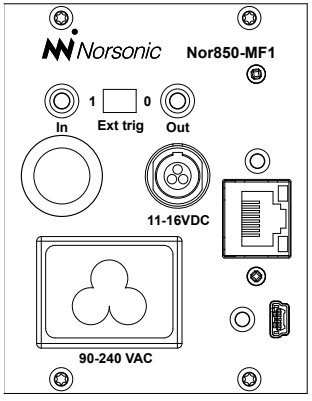
The signal generator output is a standard BNC connector. Maximum output is 1 Vrms and corresponds to 0dB setting of the attenuator in the signal generator (noise generator) menu.

AC out

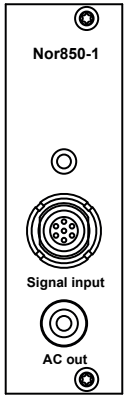
The AC output socket is a 3,5mm mini jack connector. Please refer to technical specification section in this manual for further details.

Nor850-MF1 moduls

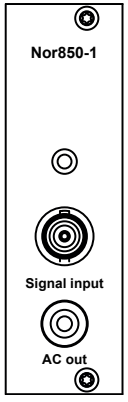
The Nor850-MF1 mainframe runs on 90-230Vac or 12Vdc. The controlling PC is connected via LAN interfaces. It has room for 10 slots, but the functionality is the same independent of the number of slots in use.
There is a choice of five different modules:



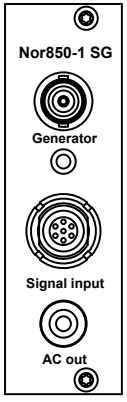
Nor850 I/O
Mainframe control module and power supply.



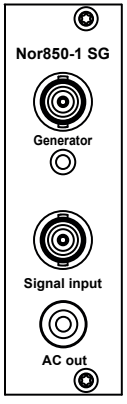
Nor850-1
standard single channel measuring module for traditional preamplifiers with 7 pin Lemo connector



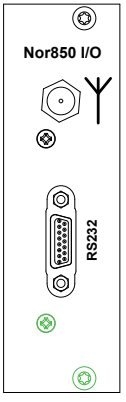
Nor850-1/BNC
Standard single channel measuring module for IEPE preamplifiers.



Nor850-1/SG
which in addition to the standard measuring features holds a signal generator with BNC output



Nor850-1/BNC/SG
Same as Nor850-1/BNC but includes a signal generator.



Nor850-1 I/O
this module can control one tapping machine Nor277. In addition it has a serial interface for controlling one microphone positioning device Nor265

Each Nor850-MF1 mainframe can hold maximum two Nor850-I/O modules.

Connecting and configuring the system

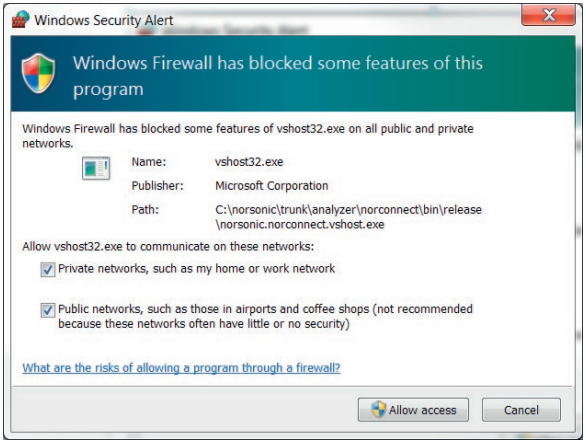
Nor850-MF1 has two interfaces, USB and LAN. The LAN interface is the one that is supported from the 850 software. The USB is for special purpose use such as firmware upgrade, and is not discussed in this manual.

The Nor850-MF1 is using DHCP mode when generating an IP address for addressing the system to a LAN connection. DHCP is supported by a LAN network, but not when connecting the PC directly to a Nor850-MF1. (I.E: the PC is not connected to a network or router, but direct to the Nor850-MF1). In this case the PC and Nor850-MF1 may take up to one minute of initialization before they can communicate, due to the automatic configuration feature in Windows.

If the 850-MF1 and the PC is connected to a LAN network and is communicating via the network the communication is inizilised and available after just a few seconds.

Firewall requirements for Norsonic products

The first time starting Nor850, a Windows Firewall security message will normally be displayed.

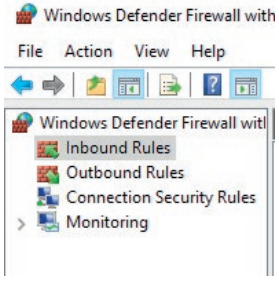


Access to private networks must be allowed, but also public networks depending on how you plan to use the Nor850 system. If you press “Cancel” in this dialog, Nor850 will not be able to communicate with any external devices.

If the security alert was not displayed or if you cancelled it, you must manually change the Windows firewall settings. The easiest way is to delete the Nor850 “rule” in the firewall settings. The Windows Firewall security alert should then be displayed when starting the Nor850 next time. The “rule” may also be configured manually. See below for more information.

Delete a Windows Firewall rule

Start the Windows Defender Firewall application and click “Inbound Rules”.

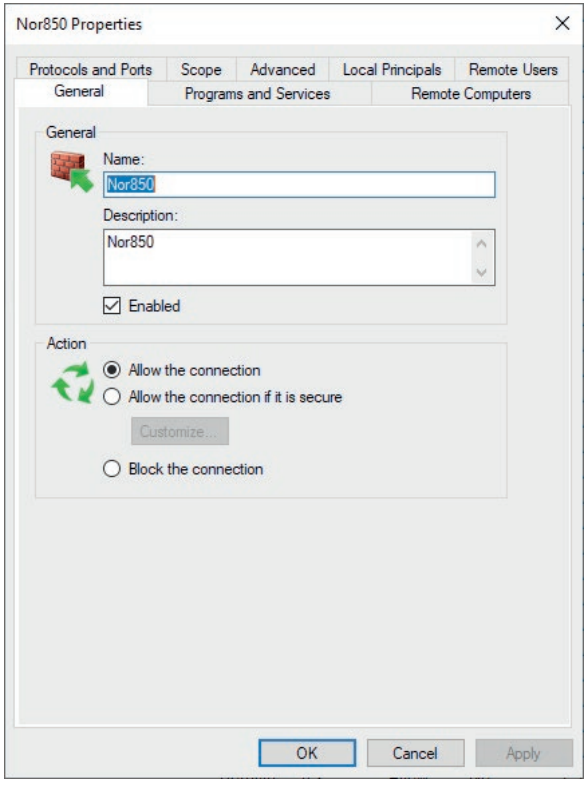


In the list of inbound rules, locate Nor850 (there may be more if you have had several versions of Nor850 installed in different locations) and delete them.

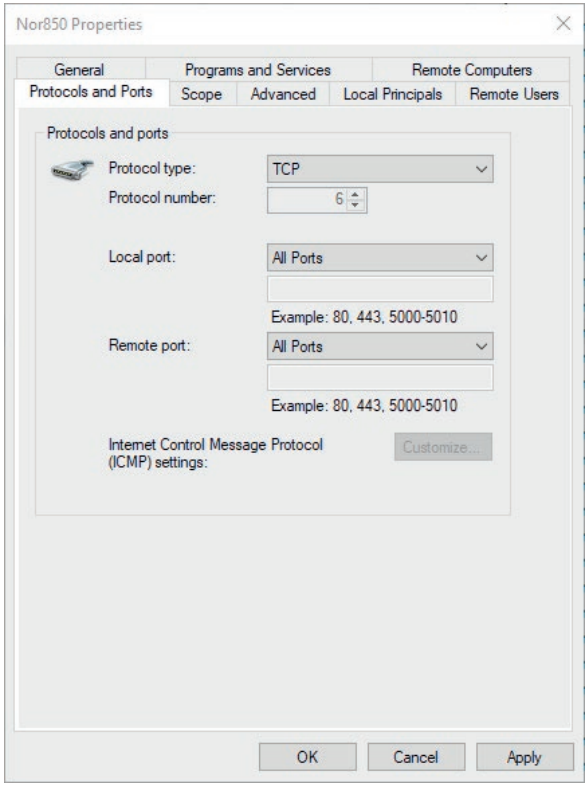
Configure a Windows Firewall rule

Start the Windows Defender Firewall application and click “Inbound Rules”. In the list of inbound rules, locate Nor850 (there may be more if you have had several versions of Nor850 installed in different locations). The ones which are no longer relevant may be deleted. Right-click the “current” Nor850 item and select “Properties”.

In the “General” page, make sure “Allow the connection” is selected.



In the “Protocols and Ports” page, check the settings for protocol types UDP and TCP. The default setting is “All Ports”. See the “Communication ports used by Nor850” section below for information about which ports the Nor850 is using.



Please note! Configuring the Windows Firewall most likely requires the assistance of an IT administrator.

Connecting to the Nor850 mainframe.

The Nor850 mainframe (rack) may be connected to the PC in two ways.

LAN cable directly between the rack and the PC

- Close the Nor850 application.
- Power off the rack by unplugging the power cable.
- Connect the LAN cable between the PC and the rack.
- Power on the rack by connecting the power cable.
- When the yellow LED located above the LAN plug stops blinking, the connection is established. Please note that this may take 30 – 40 seconds or more.
- Start the Nor850 application.
  The measurement channels should automatically be displayed in the list of available channels, but this may take some time.

Video link: *http://youtu.be/g4cJcwnzRD8.*



Using router

- Close the Nor850 application.
- Power off the rack by unplugging the power cable.
- Connect the LAN cable between the router and the rack.
- Connect the LAN cable between the router and the PC.
- Power on the rack by connecting the power cable.
- When the yellow LED located above the LAN plug stops blinking, the connection is established.
- Start the Nor850 application. The measurement channels should automatically be displayed in the list of available channels.

The rack must be connected to the router using a LAN cable, but a wireless router may be used to avoid LAN cable to the PC.

Video link: *http://youtu.be/oTSYW0-lOJY.*



Troubleshooting

If the Nor850 is not able to find the external devices, the reason is most likely that the PC or router is blocking communication. To troubleshoot this, the assistance of an IT administrator is probably necessary.

The Windows firewall may be blocking communication. See above for more information. 3'rd party anti-virus programs may also be blocking communication. Check the AV manufacturer's documentation for information about ways to troubleshoot this.

When using a router, the router may be blocking communication. Most commonly, the necessary communication ports are not open. Check the router manufacturer's documentation for how to open ports.

If the Nor850 system is connected to a company LAN, port access may be blocked centrally. The assistance of an IT administrator is necessary.

Verify that the LAN cables and router are working properly.

Communication ports used by Nor850

UDP port 8500 (for broadcast).

TCP ports 8501 – 8520 (Nor850 mainframe and Nor145/150).

TCP port 28200 (Nor282).

TCP port 1265 (Nor265A).

TCP ports 23, 502, 4001 and 8550 (devices like Moxa or Adam).

Technical information

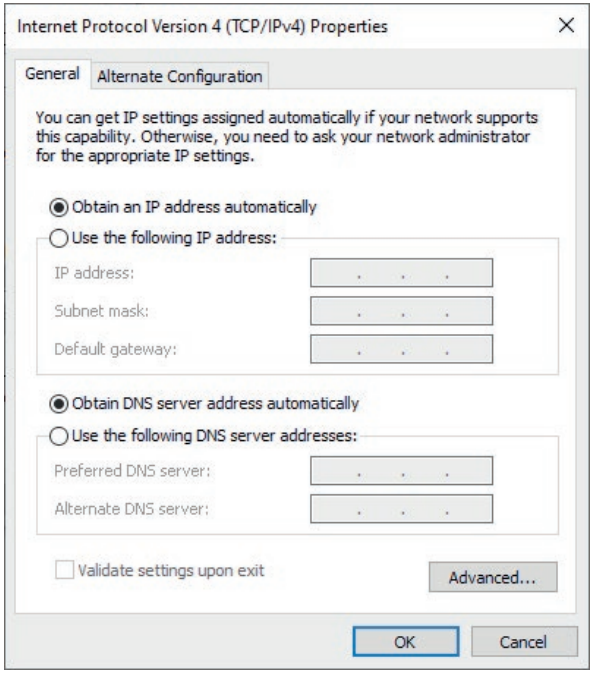
DHCP

The Dynamic Host Configuration Protocol (DHCP) is a network management protocol used on Internet Protocol (IP) networks for automatically assigning IP addresses and other communication parameters to devices connected to the network using a client–server architecture.

Using DHCP, a server will automatically give devices an IP-address. The server may be a router or a Windows server with DHCP included.

When the PC is set up to use DHCP and no DHCP server is available, default IP addressing will be used. In this case, the IP-address will be in the 254.169.nnn.nnn range. Units at the same LAN will then be able to reach each other, but this will only happen after a timeout of about 30 - 40 seconds. This is what we use when the Nor850 is connected directly to the mainframe with a LAN cable.

So, for the Nor850 network communication to work, your network adapter's TCP/IPv4 settings should be like this.



Upgrade software (firmware)

1. Find IP address to Firmware by using f ex Nor850. See Under “Multi-channel devices” at the bottom of Channels list information, open to see IP address.
2. Start Windows Explorer (Filebrowser) and set following into address line at the top: ftp:// YourIpAddress
3. In the list of folders, you will see “FlashDisk”. Go into this folder (ftp://IpAddress/FlashDisk).
4. In FlashDisk folder you will see folder “Nor850MF”. Rename this folder to “OldNor850MF”.
5. Unzip the Nor850MF.zip to a folder at you disk. The unzip will generate folder Nor850MF.
6. Kopi folder Nor850MF to nor850 rack (ftp:// IpAddress/Flashdisk)
7. Restart Nor850 rack by unplug and plug in power cable.

To uninstall installation

1. Repeat 1 to 3 above.
2. Rename folder “Nor850MF” to “NewNor850MF”.
3. Rename folder “OldNor850MF” to Nor850MF.
4. Restart Nor850 rack by unplug and plug in power cable.

Using more than one PC to control one or more Nor850-MF1 systems.

A Nor850-MF1 can be accessed and used by several PCs running Nor850 software. The channels that are not busy are listed as available and may be used by any PC that is connected to the Nor850-MF1 via the LAN network and are running the Nor850 software.

External trigger

The external trigger is used for cascade connecting more than one Nor850-MF1 systems together. It is also possible to use the external trigger input connector for starting all channels simultaneously by an external digital signal or hand switch. Set the external trig switch to 1. A trigger signal is generated once the external trigger input socket (marked IN) is short circuited.

Measuring low noise signals

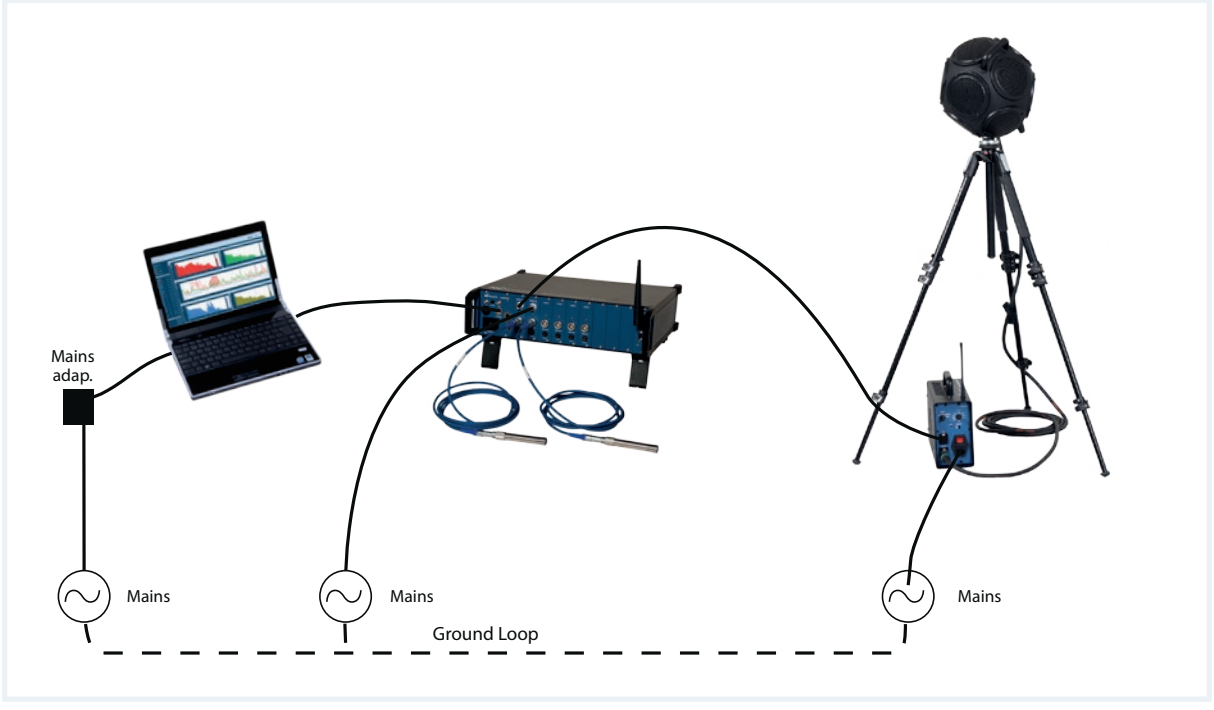
The Nor850 system is well suited for low noise measurment applications, using the low noise microphone system GRAS 40HL-N. Please note that the -N version must be used. This system has similar specification as the GRAS 40 HL except that the TEBS feature is disabled on the -N version.

Ground loops - how to avoid them

The Nor850MF-1 and its input modules are designed for low noise measurement applications. However, when connecting the system to mains, you may experience unexpected noise, either on the microphone input or the signal output. This is often caused by current flowing in the ground system. The source of this current could be your PC, the monitor, a charger for the laptop or any other instrumentation that shares the same mains and is connected to Nor850MF-1.

To find the source you have to break the ground loop. If your PC is a laptop, you should try running it on batteries. Other ground loop is easiest found if you disconnect one cable at the time until the unwanted noise is removed. Then try separating the different mains supply by connecting the Nor850MF-1, preferably to another mains fuse distribution, than the other instrumentation. This will in most cases brake the ground loop, caused by the signal current flowing in the mains ground system. If not, an electrostatically shielded transformer can be inserted to isolate the mains power supplying the Nor850MF-1.

Experience shows that some laptops, PCs and monitors may generate more noise than others. The mains adapter for laptops may in some cases generate less noise when the battery is fully charged compared to charging an empty battery. That may be a source to different noise levels with the same wiring setup.



Technical specifications

Unless stated otherwise, the specifications are for the complete Nor850-MF1 equipped with 10 input channels, microphone type Nor1225 and microphone preamplifier type Nor1209 controlled by the Nor850 general analyser software. Values are based on the sensitivity set to the nominal value for the microphone: –26.0 dB corresponding to 50 mV/Pa.

A microphone cable Nor1408 with up to 20m length or a standard BNC cable for /BNC modules with a of length up to 30 m may be used between the microphone preamplifier and the Nor850-MF1 without loss of performance. Longer cables may be used if maximum sound pressure level or frequency is reduced.

The definition of terms is based on IEC 61672-1 (2013): Electro acoustics - Sound level meters - Part 1: Specifications.

Special note to systems with BNC input using a standard 50mV/Pa microphone and standard IEPE preamplifier, such as the Nor1207/BNC and microphone Nor1227.

The IEPE supply voltage limits the maximum output voltage of a IEPE preamplifier. The maximum sound pressure level range, upper SPL level, is typically 5dB less (132dB rms @1kHz) on the Nor850-1/BNC and Nor850-1/BNC/SG module if you use a Nor1207/BNC and a microphone with a sensitivity of 50mv/Pa, such as the Nor1227.

Applicable measurements standards

The system fulfils the following international measurement standards:

- IEC 61672-1, class 1, group X. . Sound level meter standard measuring exponential time-weighted levels, integrating-averaging levels and sound expo sure levels
- IEC 61260 class 1 digital IIR filters, base 10 - 1/1 octave-band and 1/3 octave-band filters. The system also complies with the previous standard IEC 225
- IEC 60 651 type 1
- IEC 60804 type 1.

It conforms to a number of national standards such as:

- DIN 45677 (1997)
- ANSI S1.4-1983 and ANSI S1.4A-1985, Type 1
- ANSI S1.43-1997, Type 1.
- ANSI S1.11-2004, class 1.

Analogue input 7 pin Lemo socket

Applies to Nor850-1
Nor850-1/SG

Number of channels: 1

Measurement range: 0.3 µV to 7 V (RMS) in one range corresponding to –10 dB to 137 dB with a microphone sensitivity of 50 mV/Pa. The maximum peak value ±10 V corresponds to 140 dB.

Input connector: 7 pin LEMO connector for Norsonic microphone systems. (LEMO ECG.1B.307.CLL)

Preamplifier: The input supports all traditional Norsonic 7 pin Lemo preamplifiers (Nor1209, Nor1206 or Nor1201) or the IEPE-type Nor1207(via adapter cable) by menu selection. Other types and brands of preamplifiers may also be used. Please consult manufactures specification and pinout.

Preamplifier supply voltage: ± 15 volt, max 20 mA

Polarisation voltage: 0 V and 200 V, selectable.

Maximum input signal: ± 11 V peak

Input impedance: > 100 kohm, 450 pF

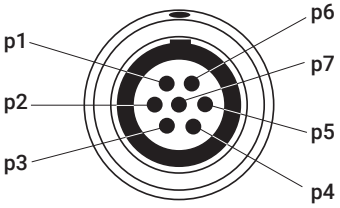
IEPESupply current: 3mA

IEPESupply voltage: 24V

IEPE Input impedance: > 100 kohm, 450 pF

Microphone input socket (outside view)

Pin	Function
1	Microphone system check
2	GND – signal reference
3	Polarisation voltage – selectable: 0±1 V, 200±1 V or adjustable 70 to 74V
4	Signal input. When IEPE is selected in the setup, a constant current of 3 mA is supplied (24 volt source).
5	+15±1 V preamplifier supply voltage, max 20 mA (Connected to pin 6)
6	Connected to pin 5
7	-15±1 V, preamp. supply voltage, max 20 mA Housing is GND instrument casing.



Analogue input – BNC socket

Input connector: BNC connector with IEPE supply on signal (center pin)

Polarisation voltage: No polarization voltage is supplied.

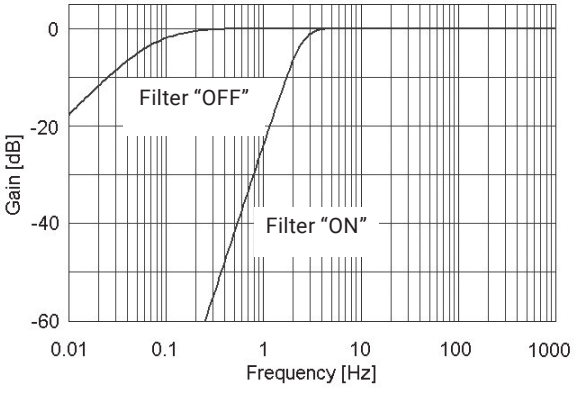
IEPE Supply current: 3mA

IEPE Supply voltage: 24V

Input impedance: > 100 kΩ, <650 pF Measurement range: 0.3 µV to 7 V (RMS) in one range corresponding to –10 dB to 137 dB with a microphone sensitivity of 50 mV/Pa. The maximum peak value ±10 V corresponds to 140 dB. Please note that the IEPE supply voltage may limit the preamplifiers capacity to handle signal ±10 V peak. See below

Special note to systems with BNC input using a standard 50mV/Pa microphone and standard IEPE preamplifier, such as the Nor1207/BNC and microphone Nor1227. The IEPE supply voltage limits the maximum output voltage of a IEPE preamplifier. The maximum sound pressure level range, upper SPL level, is typically 5dB less (132dB rms @1kHz) on the Nor850-1/BNC and Nor850-1/BNC/SG module if you use a Nor1207/BNC and a microphone with a sensitivity of 50mv/Pa, such as the Nor1227.

Highpass filter frequency response



Highpass filter

The input section is equipped with an analogue highpass filter to reduce noise from wind or other sources with frequencies below the frequency range for measurements. The filter is switched on if the limited frequency range is selected (+>6,3Hz). When this filter is "Off" the lower frequency is 0.4 Hz.

Filter type: 3rd order HP filter (-3 dB at 3,4 Hz, Butterworth response)

Analogue to digital conversion

The analogue input signal is converted to a digital signal by a multirange sigma-delta converter with an effective sampling frequency of 48 kHz. The anti-aliasing filter is a combination of an analogue and a digital filter.

Frequency weightings

Weighting networks

Simultaneous measurement of three weighting networks A, C and Z

The Z-weighting network may either be set to Normal mode covering the frequency range from 6.3 Hz to 20 kHz, or to Wide mode where the low frequency range is extended down to 0.4 Hz. The -0.5dB points for the two versions of the Z-network are 10Hz and 1.6Hz respectively.

The 1/1 octave band or 1/3 octave band levels may be measured simultaneously with the weighting networks

Filters

1/1 octave filters: 0,5 Hz – 16 kHz
1/3 octave filters: 0,4 Hz – 20 kHz
Filter type: Class 1, digital IIR filters, base 10 system, according to IEC 61260.

Level detector

Detector type: Digital true root-mean-square (RMS) detection and peak detection.
Crest factor capability: The crest factor is only limited by the capability to measure the peak-value of the signal.

Time weightings and measured functions

Simultaneous measurement of the following functions:

- F–time-weighted sound pressure level, instantaneous
- Maximum F–time-weighted sound pressure level
- Minimum F–time-weighted sound pressure level
- S–time-weighted sound pressure level, instantaneous
- Maximum S–time-weighted sound pressure level
- Minimum S–time-weighted sound pressure level
- I–time-weighted sound pressure level, instantaneous
- Maximum I–time-weighted sound pressure level
- Minimum I–time-weighted sound pressure level
- Integrated-averaged sound pressure level
- Sound exposure level
- Peak sound level
- Exceeding level for F–time-weighted sound pressure level (cumulative distribution)
- Integrated-averaged I–time-weighted sound pressure level
- I–time-weighted sound exposure level
- Taktmaximalpegel – DIN 45657, F time response, 5 seconds Takt.

Level distribution

The calculation is done for frequency weightings A, C and Z and for 1/1 octave or 1/3 octave filters using the F time weighted level.

Class width: 0.2 dB
Number of classes: 652 for levels between 10 dB above full scale (140 dB) and 120 dB below full scale (10 dB). The classes for the highest and lowest levels are extended to also include levels above and below, respectively.
Sampling frequency for level: 10 samples per second.
Display resolution: 0.1 dB based on interpolation.

Indication range

The calibration allows microphones with sensitivity in the range –84 dB to +15.9 dB relative to 1 volt/Pascal to be applied. The corresponding display range for the indicated sound level is –50 dB to +180 dB.

Self-noise levels

The self-noise is measured with the calibration set to –26.0 dB corresponding to a microphone sensitivity of 50 mV/Pa. For voltage input, the level 0 dB then corresponds to 1µV. Typical values for the self-noise are 5 dB lower than the values stated.

Z-wide considerations

The Z-wide network requires several minutes to stabilize at a low level. The preamplifier between the microphone and the sound level meter is a very high impendence device and due to their construction they all have a noise spectrum with increased levels at lower frequencies. There may be relatively large variations in this noise level between the different samples of preamplifiers. The sensitivity to vibration will appear as higher than normal at low frequencies. This makes this network unsuited for real low level, low frequency measurements.

Noise measured with 18 pF microphone dummy and microphone preamplifier Nor1209, averaged over 30 s of measurement time:

Spectral weighting functions
A-weighted: 13 dB
C-weighted: 15 dB
Z-normal -weighted: 25 dB
Z-wide -weighted: 45 dB

Filter bands
1/3 oct: 0,4 Hz to 5,0 Hz:45 dB
1/3 oct: 6.3 Hz to 250 Hz: 10 dB
1/3 oct: 315 Hz to 20 kHz: 5 dB

Noise measured with Nor1225 microphone and preamplifier Nor1209, averaged over 30 s of measurement time:

Spectral weighting functions
A-weighted: 18 dB
C-weighted: 22 dB
Z-normal -weighted: 30 dB
Z-wide -weighted: 50 dB

Filter bands
1/3 oct: 0,4 Hz to 5,0 Hz: 45 dB)
1/3 oct: 6.3 Hz to 250 Hz: 15 dB
1/3 oct: 315 Hz to 20 kHz: 10 dB

Noise measured with the input terminal short-circuited to ground, averaged over 30 s of measurement time:

Spectral weighting functions

A-weighted: 10 dB
C-weighted: 10 dB

Z-normal -weighted: 15 dB
Z-wide -weighted: 15 dB

Filter bands
1/3 oct: 0,4 Hz to 5,0 Hz: -5 dB
1/3 oct: 6.3 Hz to 250 Hz: 0 dB
1/3 oct: 315 Hz to 20 kHz: 7 dB

Channel separation between any channels
130 dB

Timing accuracy

The measurement duration and resolution is locked to the extremely accurate internal clock. Within the temperature range 0°C to +40°C the maximum drift is ±3 ppm corresponding to an accuracy of better than 10 seconds per month. Aging for 10 years may increase the figure with additional 13 seconds per month.

Measurement range

Total range for measurement of A-weighted levels
The linear operating range is identical to the total range.

Frequency	31.5 Hz	1 kHz	4 kHz	8 kHz	12.5 kHz
Upper level	98 dB	137 dB	138 dB	136 dB	133 dB
Lower level	24 dB	24 dB	24 dB	24 dB	24 dB
Ref level test	94 dB	114 dB	114 dB	114 dB	114 dB

The primary indicator range for compliance with IEC 60651 type 1 is 24 dB to 117 dB. For compliance with IEC 60804 type 1, the linearity range is 24 to 137 dB, and the pulse range 24 dB to 140 dB, respectively.

Total range for measurement of C-weighted levels
The linear operating range is identical to the total range.

Frequency	31.5 Hz	1 kHz	4 kHz	8 kHz	12.5 kHz
Upper level	134 dB	137 dB	136 dB	134 dB	131 dB
Lower level	30 dB	30 dB	30 dB	30 dB	30 dB
Ref level test	114 dB	114 dB	114 dB	114 dB	114 dB

Total range for measurement of Z-normal -weighted levels
The linear operating range is identical to the total range.

Frequency	31.5 Hz	1 kHz	4 kHz	8 kHz	12.5 kHz
Upper level	137 dB	137 dB	137 dB	137 dB	137 dB
Lower level	40 dB	40 dB	40 dB	40 dB	40 dB
Ref level test	114 dB	114 dB	114 dB	114 dB	114 dB

Total range for measurement of Z-wide -weighted levels
The linear operating range is identical to the total range.

Frequency	3.15 Hz	31.5 Hz	1 kHz	4 kHz	8 kHz	12.5 kHz
Upper level	137 dB	137 dB	137 dB	137 dB	137 dB	137 dB
Lower level	50 dB	50 dB	50 dB	50 dB	50 dB	50 dB
Ref level test	114 dB	114 dB	114 dB	114 dB	114 dB	114 dB

Measurement range for C-weighted peak levels

Frequency	31.5 Hz	1 kHz	4 kHz	8 kHz	12.5 kHz
Upper level	137 dB	140 dB	139 dB	137 dB	134 dB
Lower level	45 dB	45 dB	45 dB	45 dB	45 dB
Ref level test	114 dB	114 dB	114 dB	114 dB	114 dB

Power supply

Mains: 90 - 240 VAC - 25 W

External DC: 11 – 16 volt. Power consumption approximately 1.2 watt per channel + 2W for the mainframe. External DC source should have source-impedance less than 1 ohm and be able to supply at least 3 A.

Socket for external DC: Lemo 1B302CLL, Red dot indicate positive terminal.
The instrument will automatically switch off if the battery or external voltage is too low for operation within the stated specifications.

Signal generator output

An analogue output from the internal signal (noise) generator.
Max output voltage: ±10 volt.
Output impedance: < 100 ohm. The output is short-circuit proof to GND and output current is in excess of 3 mA
Gain accuracy at 1 kHz: ±0.2 dB.
Frequency response re. 1 kHz:
±0,5dB for 20 Hz < f < 16 kHz.

Nor850-/TTL only:

Digital inputs

The digital input signal is 3.3 V CMOS signal. The voltage levels must be within –0.25 V to +5.25 V to avoid harming the input.
Input impedance: 10 kohm connected to the positive supply 3.3 volt. Any open input will therefore be in the high state. The digital input is connected to the DI2 signal input.

Digital outputs

The digital output signal is 3.3 V CMOS signal.
Maximum output impedance: 100 ohm. During power-up the output lines will be low or in a high-impedance state (100 kohm to ground). The digital output signal is connected to DO4.

AC-out

3,5 mm stereo jack. Both channels have identical signals driven by two separate amplifiers. Load impedance shall be 16 ohm or more. Output voltage is generated by the 48 kHz DAC based on data from DSP. Normally a replica of the normalised microphone signal. Full scale on the display bar graph corresponds to 100 mV.
Output impedance: Less than 10 ohm, AC-coupled 100 μF.
Gain accuracy 1 kHz: ±0,2 dB
Frequency response re. 1 kHz: ±0,5 dB for 20 Hz ≤ f ≤ 16 kHz.

LAN interface

Standard RJ45 socket

Environmental conditions

Reference conditions. The reference conditions for the system as specified by IEC 61672-1
Temperature: 23°C
Humidity: 50% RH
Atmospheric pressure: 101.325 kPa

Environmental condition for operation
Temperature: –10°C to +50°C
Humidity: 5% to 90% RH, dewpoint less than 40°C
Atmospheric pressure: 85 kPa to 108 kPa

Environmental condition for storage
Temperature: –30°C to +60°C
Humidity: 5% to 90% RH, dewpoint less than 40°C
Atmospheric pressure: 50 kPa to 108 kPa

Warm-up time

The warm-up time for the system without preamplifier/ microphone is very short and it obtains the final accuracy as soon as the status LED on each channel indicate a GREEN state. Used with a preamplifier and microphone, this time is prolonged due to the charging of the microphone with the polarisation voltage. Normal sensitivity is reached within one minute. Before a recalibration is attempted, at least three minutes for warm-up is recommended.

Sensitivity for vibration

The vibration will mainly affect the microphone, which is most sensitive if the vibration is applied perpendicular to the diaphragm. Typical values are 55 dB to 65 dB for acceleration values of 1 ms-2 perpendicular to the diaphragm.

Sensitivity for magnetic fields

The maximum indication for exposure to magnetic field of 80 A/m and any orientation is typically less than 20 dB.

Size and weight

Main frame 850 - MFI fittet with 10 measurement channels.
Depth: 305 mm (12”)
Width: 350 mm (13,8”)
Height: 113 mm (4,5”)
Weight: 5,2 kg (11,4 lbs)

Information for conformance testing

Reference Sound Pressure Level: 114.0 dB re 20 µPa. The reference frequency is 1000 Hz.

Reference Level Range: The system has one level range only.

Electromagnetic Compatibility: When the system is tested for conformance to electromagnetic compatibility requirements, it should be in the measurement mode, as this normally will generate the highest levels of emissions.

For further information related to type approval periodic verification, consult the factory.

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Declaration of Conformity

We, Norsonic AS, Gunnersbråtan 2, N-3409 Tranby, Norway, declare under our sole responsibility that the product:

Nor850 MF-1

equipped with any combination of:
Nor850-1, Nor850-1/SG, Nor850-1/BNC, Nor850-1/BNC/SG, Nor850 I/O

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

Standards	:	EN/IEC 61672-1:2013 Class 1, EN/IEC 61260 class 1:2014 , EN/IEC 61043:1993 ANSI S1.4 2014 type 1, ANSI S1.43 1997 type 1, ANSI S1.11 2004 type 1
Safety	:	EN 61010-1:2010/A1:2019 Portable equipment and pollution category 2
EMC	:	EN/IEC 61672-1:2013 Class 1
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. Calibrated equipment – traceable to national and international standards – has been used to carry out these tests.

This Declaration of Conformity does not affect our warranty obligations.

Tranby, February 2021

Jens Petter Ringvold
Cheif Engineer



Norsonic

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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.