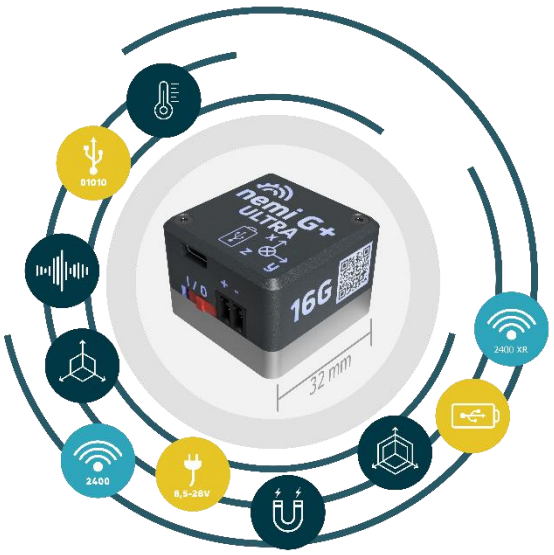
nemi G+ ultra

Wireless vibration sensor up to 26.7 kHz with built-in battery, IMU and temperature sensor, suitable for monitoring bearings, gearboxes, pumps and much more

Description

nemi G+ ultra not only measures vibrations & accelerations, but also rotation rates, rotation angles and magnetic fields in and around all three axes. Compared to our nemi G+, nemi G+ ultra offers higher sampling rates and higher signal bandwidths for measurements in highly dynamic applications. Steep integrated filters allow high bandwidths even at lower sampling rates, for example up to 1.2 kHz – 3dB bandwidth at 3.3 kHz sampling rate. This allows the requirements of the standards ISO/DIN ISO 20816 and DIN ISO 2954 to be met. Hence it can be used for condition monitoring, predictive maintenance and measurements on bearings, gearboxes, pumps and in many more applications. With its integrated rechargeable battery, radio connection nemi Link 2400 and i4M's highly efficient technology, nemi G+ can be operated completely wirelessly for many hours. It is also suitable for permanent installations using its wide-range voltage input.

Key Features



- **High-bandwidth MEMS accelerometer** with a signal bandwidth from 0 Hz (static) up to 6.7 kHz (−3 dB)
- Meets the requirements of **ISO/DIN ISO 20816** and **DIN ISO 2954**
- **Compact & lightweight design** (32 x 32 x 23) mm, 30 grams
- **Completely wireless and maximized battery life** due to our radio technology nemi Link 2400
- **Long radio range** of up to 100 m
- Transmission of **live raw data** or **smart data** pre-evaluated by edge computing
- **Weather resistant IP 67 rating** on request
- **Permanent installation** possible with wide range voltage input

High-resolution, high-speed, triaxial, capacitive **MEMS accelerometer**; frequency range 6.7 kHz, measuring range up to 16 g

nemi Link 2400 - i4M's robust **high-speed radio technology** in the 2.4 GHz frequency band

IMU sensor module for measuring accelerations and rotation rates in and around all 3 axes; ACC up to 16 g; GYR up to 4000 °/s

Internal rechargeable battery with more than 6 hours runtime at a sampling rate of 26.7 kHz (one axis active)

Triaxial **magnetometer**; measuring range up to 16 Gauss

Power supply/ battery charging via **micro USB**

Internal **temperature sensor**; measuring range- 20 - 60 °C

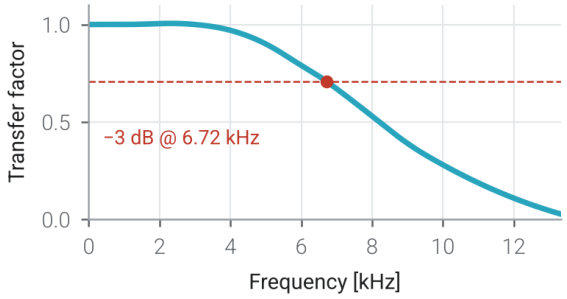
Continuous operation with **wide range voltage input 3.3** - 30 V DC

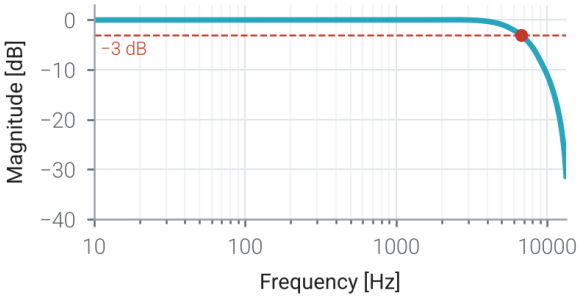
Specifications

General information		
Dimensions	31.6 x 31.6 x 22.3	mm
Weight	approx. 30 (with aluminum base plate) / 50 (with stainless steel base plate; standard)	gram
Internal power supply	Lithium-ion battery, 1 cell	-
Runtime with full battery at 3333 Hz (all three axes active)	> 10 continuously	hours
Charging time (0 - 100 %)	approx. 3	hours
External power supply	5 (Micro USB) > 5 - 30 (wide range voltage input) 3.3 – 5.5 (factory option)	V
Temperature range permitted during operation	-20 to 60	°C
Onboard MCU, usable for edge computing	64 MHz ARM Cortex M4F, 1 MB Flash, 256 KB RAM; various hardware crypto features	-
Housing protection class	IP 41	-
Main sensor device (MEMS accelerometer)		
Selectable sampling rates	26.666 / 13.333 / 6.666 / 3.333	kHz
Realizable signal bandwidths (-3 dB)	6.72 / 4.66 / 2.35 / 1.17	kHz
Selectable measuring ranges	± 16 / 8 / 4 / 2	g
Sensor resonance frequency	6.9	kHz
Signal resolution	16	bit
Static 3D Inaccuracy (related to measuring range) Without calibration With calibration (on request)	 < 2 < 0.5	 % %
Additional integrated 9-DoF IMU per 3-axis MEMS accelerometer (ACC) / gyrometer (GYR) / magnetometer (MAG)		
Sampling rate	104	Hz
Selectable measuring ranges ACC	± 16 / 8 / 4 / 2	g
Selectable measuring ranges GYR	± 4,000 / 2,000 / 1,000 / 500 / 250 / 125	°/s
Selectable measuring ranges MAG	± 16 / 12 / 8 / 4	Gauss
Signal resolution	16	bit
Internal temperature sensor		
Sampling rate	1	Hz
Measuring range	-20 to 60	°C
Signal resolution	0.1	°C

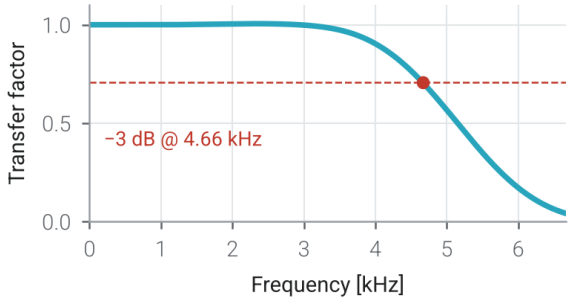
Frequency responses of the main sensor

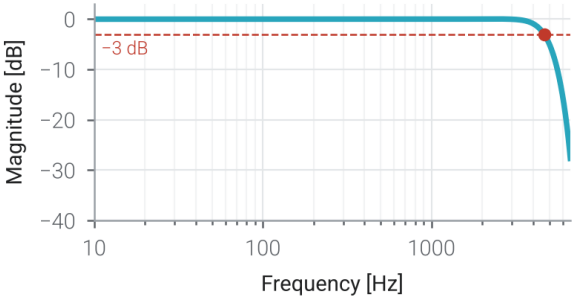
Frequency response at 26.666 kHz sampling rate



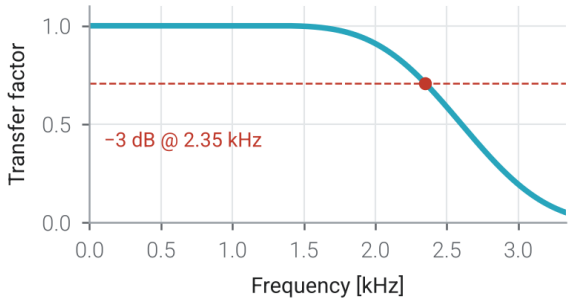


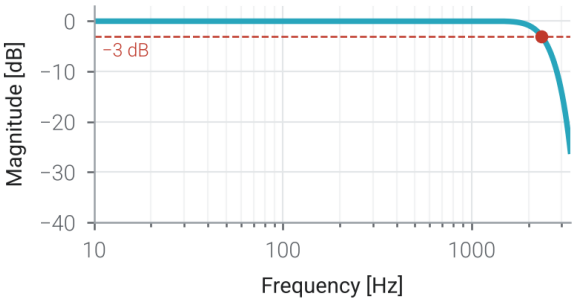
Frequency response at 13.333 kHz sampling rate



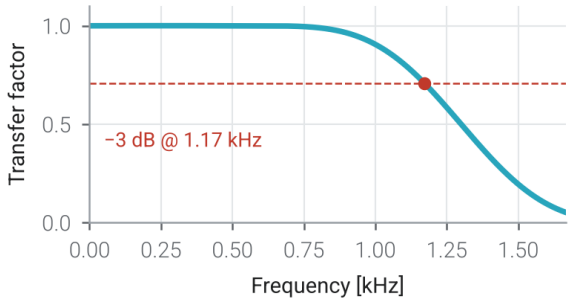


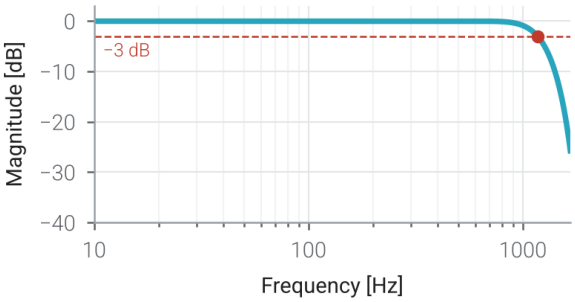
Frequency response at 6.666 kHz sampling rate





Frequency response at 3.333 kHz sampling rate

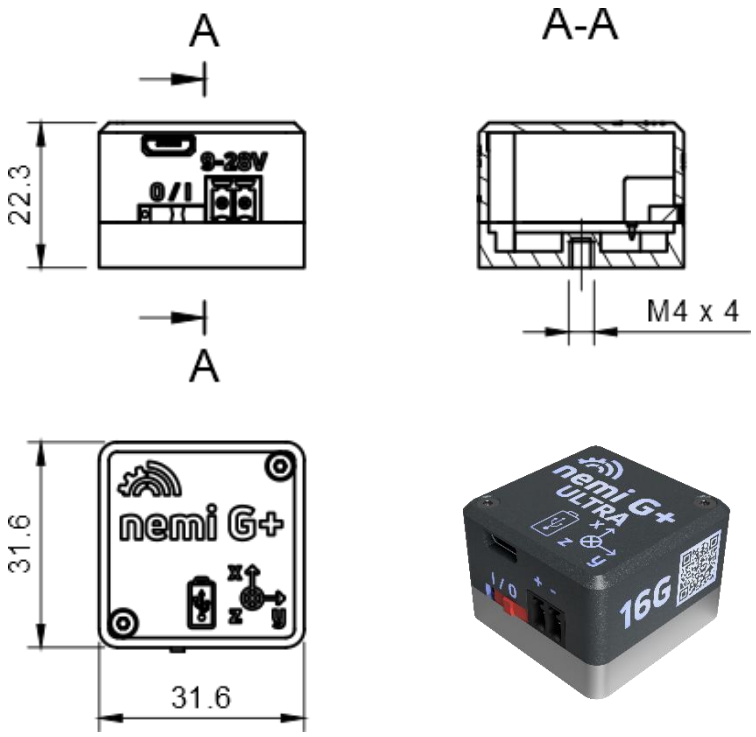




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Dimensions

(All dimensions in mm)



Radio technology nemi Link 2400

Our radio technology nemi Link 2400 is a wireless sensor network in the 2.4 GHz frequency band with star topology and one receiver module. This high-speed network enables the reliable transmission of data at high sampling rates and over long ranges of up to 100 m with nemi G+ ultra. The high efficiency of our robust radio technology enables very long battery runtimes of our products. Our wireless sensors synchronize their internal clocks to the clock of the receiver module with extremely small deviations.

To optimize the wireless performance for every use case, nemi Link 2400 offers the possibility to adjust the number of sensor nodes per radio channel and the radio speed to achieve the perfect balance between range, data rate and runtimes for each application.

Please find detailed information in the nemi Link 2400 info sheet.

Compatible receiver modules in the nemi Link 2400 wireless network

nemi G+ is compatible with all receiver modules in i4M's nemi Link 2400 network. The following products are available under the nemione® trademark:



nemi EdgeBase



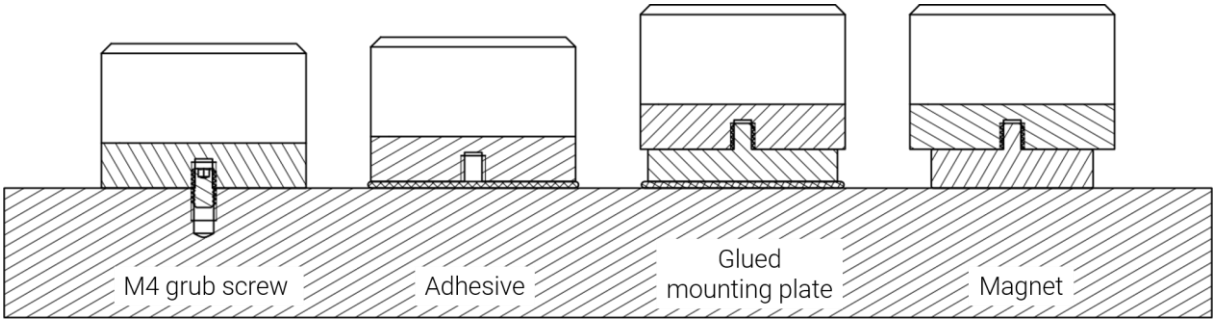
nemi Connect



nemi Log (+ cellular)

Mounting options

The compact, lightweight and completely wireless nemi G+ ultra is very easy to mount. It is manufactured with an M4 thread in the base. This means that it can not only be glued on, but also screwed on or magnetically fastened. The best vibration transmission is realized with a grub screw connection.



Adhesive, mounting plate and magnet are not included.

For magnetic mounting we recommend the following magnets:
https://www.supermagnete.de/topfmagnete-mit-gewindezapfen

Attention: When fastening with a magnet, the measurements of the magnetometer installed in the nemi G+ ultra are affected.

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LED Blink Codes

The nemione® nemi G+ has integrated LEDs that are visible through the housing. This flashing indicates the various operating states of the sensor node:

Operating Mode	Description
Rapid flashing in the sequence white, green, red, blue	Indicates a restart of the sensor node.
Red LED, continuously	The battery is charging, power supply via USB or wide-range voltage input.
Red LED no longer lights up continuously	The battery is fully charged.
Green lights up continuously, yellow flashes simultaneously	A USB port with a data connection has been detected. The sensor node is waiting for a virtual COM port to open.
Green lights up continuously, blue flashes simultaneously	The virtual COM port has been opened. The sensor node is waiting for new RF parameters or settings from the PC software.
Regular short red flashes for approx. 2 seconds	The sensor node samples and transmits measurement data.
Regular short green flashes all 10 seconds for approx. 1 second	The sensor node is in sleep mode.
Regular short blue flashes for approx. 1 second	The sensor node resynchronizes with the wireless network (time synchronization).
The green LED lights up temporarily or continuously in wireless mode	The internal data memory (ring buffer) is 80 % full as the data could not be transmitted via radio link. There is a risk of data loss.

Data Analysis

Upon request, we will be happy to support you with data analysis. The data analyses can be performed directly in the sensor or in the gateway by edge analytics as well as on the server or measuring computer. A great advantage of edge analytics is the reduction of the transmitted data to the essentials ("smart data"). This reduces storage space and increases battery runtimes.

Based on our knowledge from a multitude of previous projects, we have developed algorithms for data evaluation to generate maximum added value for our customers. We will gladly advise you on this. In addition to our existing algorithms, we create individualized scripts upon request.

At the same time, the data remains your capital: We do not rely on big cloud providers but keep the data in your IT ecosystem. Alternatively, you can rely on our nemione® cloud solutions - hosted in the European Union.

Contact

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