

nemi G+

Small, wireless sensor for measuring accelerations, vibrations and rotation

Description

nemi G+ not only measures vibrations & accelerations, but also rotation rates, rotation angles and magnetic fields in and around all three axes. 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

- **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
- Transmission of **live raw data** or **smart data** pre-evaluated by edge computing
- **Weather resistant box** on request
- **Permanent installation** possible with wide range voltage input



High-resolution, triaxial, capacitive **MEMS accelerometer**; measuring range up to 8 g or up to 40 g



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



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



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



Continuous operation with **wide range voltage input** 8.5 - 28 V DC



nemi Link 2400 - i4M's own robust **high-speed radio technology** in the 2.4 GHz frequency band; range up to 20 m



nemi Link 2400 XR - i4M's robust **high-speed radio technology** in the 2.4 GHz frequency band; range up to 300 m



Internal rechargeable battery with more than 10 hours runtime at a sampling rate of 4 kHz (all three axes active)



Power supply/ battery charging and cabled data transfer via **micro USB**

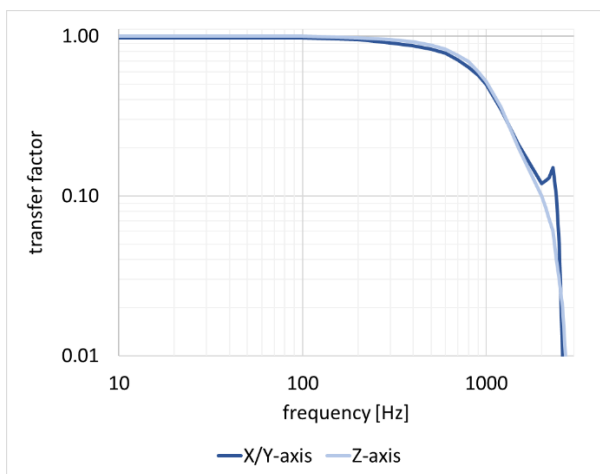
Specifications

General information		
Dimensions	31.6 x 31.6 x 22.3	mm
Weight	approx. 30	gram
Internal power supply	Lithium-ion battery, 1 cell	-
Runtime with full battery at 4000 Hz, (all three axes active)	> 10 Possible for several weeks depending on configuration	hours
Charging time (0 - 100 %)	approx. 3	hours
External power supply	5 (Micro USB) 8.5 - 28 (wide range voltage input)	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	4,000 / 2,000 / 1,000 / 500 / 250 / 125	Hz
Stability of the sampling rate (over the entire temperature range)	± 50	ppm
Realizable signal bandwidths (-3 dB)	800 / 500 / 250 / 125 / 62,5 / 31,25	Hz
Selectable measuring ranges		
Variant 08	± 8 / 4 / 2	g
Variant 40	± 40 / 20 / 10	g
Sensor resonance frequency		
Variant 08	2,400	Hz
Variant 40	5,500	Hz
Signal resolution	20	bit
Non-linearity (related to measuring range)	0.1	%
Cross-sensitivity	1.0	%
Inaccuracy (related to measuring range)		
Without calibration	< 8	%
With calibration (on request)	< 1	%
Additional integrated 9-DoF IMU per 3-axis MEMS accelerometer (ACC) / gyrometer (GYR) / magnetometer (MAG)		
Sampling rate	= 1/25 of the sampling rate of the main sensor e.g. = 160 Hz at 4,000 Hz	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

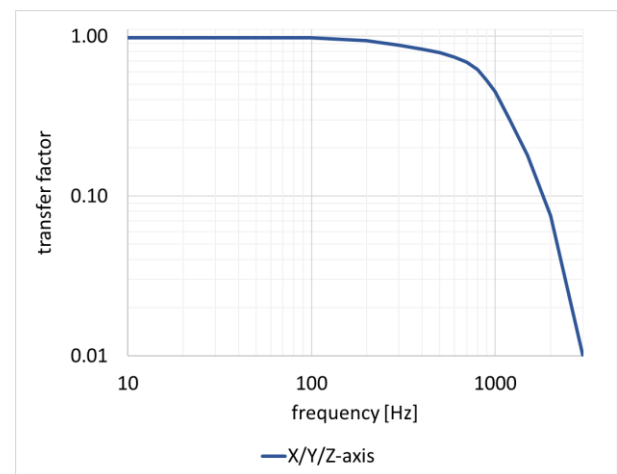
Internal temperature sensor		
Sampling rate	= 1/25 of the sampling rate of the main sensor e.g. = 160 Hz at 4,000 Hz	Hz
Measuring range	-20 to 60	°C
Signal resolution	0.1	°C

Frequency responses of the main sensor module

Variant 08: measuring range max. ± 8 g

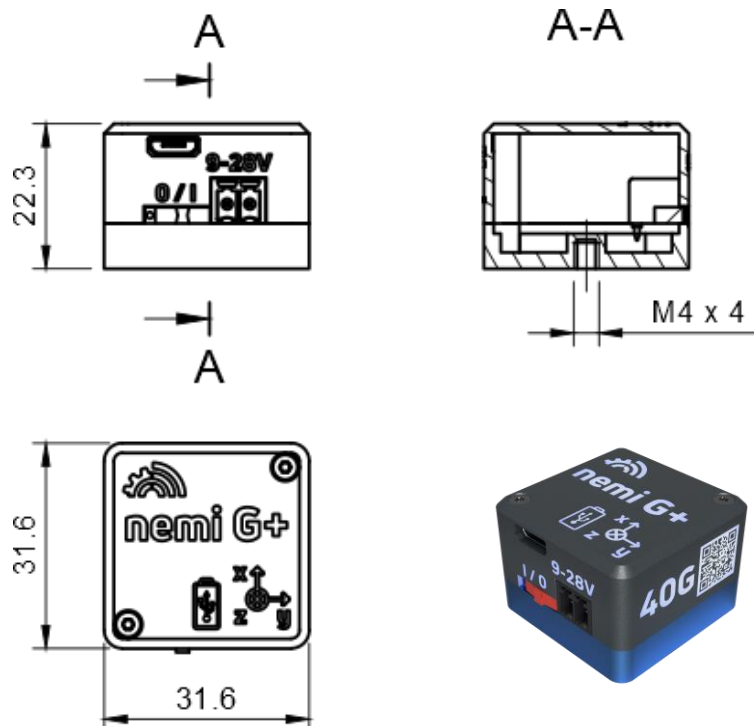


Variant 40: measuring range max. ± 40 g



Dimensions

(All dimensions in mm)



Radio technology nemi Link 2400

nemi Link 2400 HS (High-speed wireless network)

Our own radio technology nemi Link 2400 is a **wireless, battery-powered sensor network** in the 2.4 GHz frequency band with star topology and one receiver module. 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.

Radio technology nemi Link 2400		
Radio channel	between 2,402 – 2,478 (adjustable in 1 MHz steps)	MHz
Time synchronization deviation	< 100	µs
Radio range	up to 20 (indoor) up to 300 (outside line of sight)	m
Max. sum sampling rate at 24 bits per sample	approx. 36,000	Hz
Sensor nodes per receiver module	3	-

nemi Link 2400 XR (Extended Range wireless network)

To provide a compromise between our high-speed network nemi Link 2400 and our long- range network nemi Link 868 we developed our new network nemi Link 2400 XR. In comparison to nemi Link 2400 it has an extended range, lower data rates and still enables long battery life. It is using the 2.4 GHz frequency band and is available as firmware upgrade. nemi Link 2400 XR can be used with our standard nemione® products.

Radio technology nemi Link 2400 XR		
Radio channel	between 2,402 – 2,478 (adjustable in 1 MHz steps)	MHz
Time synchronization deviation	< 100	µs
Radio range	up to 300 (urban environment) up to 1.800 (theoretical)	m
Max. sum sampling rate at 24 bits per sample	500 - 1500	Hz
Sensor nodes per receiver module	8	-

In addition, **other modes** are available with sampling rates and ranges between the high-speed mode and the extended range mode. Please get in contact for further information:

info@nemi.one

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

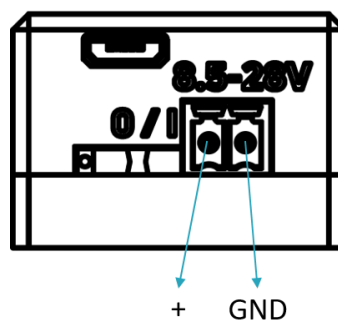


nemi Log

Alternatively, nemi G+ can be connected directly to a computer via USB cable without a wireless connection.

Wide range voltage input

The following picture shows the ports of the wide range voltage input:



GND \triangleq Ground

Application

Due to its robust design and easy mounting, nemi G+ works perfect in **highly dynamic applications** such as roller coasters, but also **on rotating or moving components** such as pitch bearings of wind turbines or gearboxes. For permanent installations, it can be operated with a wide-range voltage input. Examples of specific use cases for nemi G+ are:

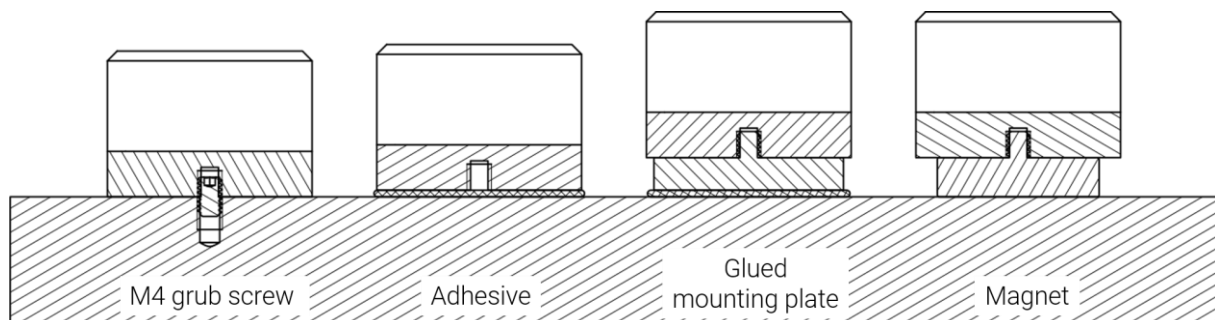
- Wireless condition monitoring systems on rotating machine parts, for example on wind turbine main shafts
- Long-term vibration measurements for the implementation of predictive maintenance on machines and systems, for example on production machines
- Measurement of translational and rotational movements on machine elements, systems and vehicles, for example roller coasters

Download use cases:



Mounting options

The compact, lightweight and completely wireless nemi G+ 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+ are affected.

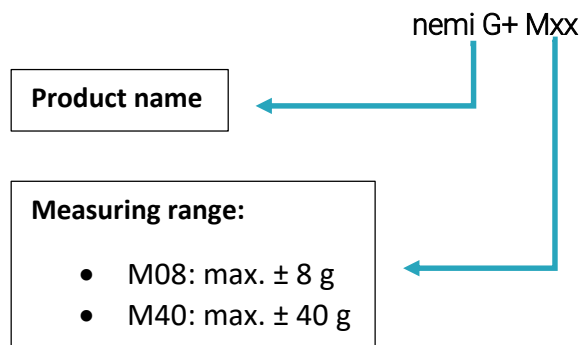
Data Analysis

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.

Ordering options of nemi G+



Contact

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