NEWTON-1

Single antenna high performance GNSS, INS Receiver

- GPS L1, L2/L5, GLONASS G1, G2, Galileo E1, E5a/E5b, BeiDou B1, B2, NavIC(IRNSS) L5, S-band, SBAS L1
- Autonomous, SBAS, PPP, RTK positioning
- GNSS+INS capabilities for Position, Velocity and Attitude (up to 1000 Hz)
- MEMS 3-axis gyro and 3-axis accelerometer
- Access to IMU data (up to 1000 Hz)
- Access to raw GNSS measurements (up to 20 Hz)
- Rugged single enclosure solution (IP 67) or OEM boards
- Technical support and help with equipment setup

The Newton-1 products line is represented by the high performance multi-constellation multi-frequency GNSS Receivers that are capable of PPP, RTK, INS Engines, offering flexible positioning capabilities and expanding the application area: from standard accuracy GNSS Receiver to high performance high accuracy GNSS-Aided INS Receiver (GNSS+INS Receiver).

GNSS receivers provide reliable and accurate positioning using multi-frequency multi-constellation GNSS technology. The performance of GNSS receivers is improved by regional Satellite Based Augmentation Systems (WAAS, EGNOS, GAGAN, MSAS, SDCM and other SBAS-compatible services). The RTK and PPP are the powerful technology that are used to provide highly accurate navigation data.

The robust loosely-coupled GNSS+INS integration algorithm allows the real-time fuse of GNSS data and IMU data by Extended Kalman Filter to provide optimal estimates of Position, Velocity, and Attitude. The GNSS+INS Receiver is ideal solution for application requiring continuous positioning even in GNSS-denied environments.

In addition to the increasing positioning availability under the most demanding conditions and high data update rate, the high performance GNSS-aided INS provide full object's orientation – Attitude (Roll, Pitch, Yaw/Heading). The Newton-1 supports the variety of MEMS IMUs and can be performed on Cost-effective IMU or High Stability IMU.
The use of PPP and RTK Engines makes the position estimation more accurate for such receiver.

The full access to raw GNSS measurements (Pseudoranges measured by code and carrier phase, SNR, Doppler) and IMU data (raw accelerometer, raw gyro, temperature) allows data collection for their post processing (PPK) providing greater device flexibility and more capabilities for the user.

GUI (available for free download) provides a software tool for easy setup, configuration, and data logging or viewing.

For integration into existing equipment, OEM version is available (without enclosure).

Our technical support team will help make using our products as easy and straightforward as possible.

If you would like more information about this product, please contact us by completing our GET QUOTE form at https://kosminis-vytis.lt/product/newton-1/

TECHNICAL SPECIFICATION

Supported GNSS constellations	GPS L1C/A, L2C / L5; GLONASS G1C/A, G2C/A; Galileo E1, E5b/E5a; BeiDou B1, B2; NavIC L5, S-band; SBAS L1
GNSS Receiver:	
Position Accuracy (RMS), Horizontal / Vertical	
Autonomous	1.1 m / 1.8 m
SBAS	0.6 m / 0.9 m
PPP	0.05 m / 0.1 m
RTK	0.005 m + 0.5 ppm/ 0.008 m + 1.0 ppm
Velocity	0.02 m/s / 0.03 m/s
Output Data Rate	
Autonomous (PVT)	up to 20 Hz
PPP (PVT)	up to 20 Hz
RTK (PVT)	up to 20 Hz
Raw GNSS measurements	up to 20 Hz
Data output format	NMEA-0183 (ver. 2.3, ver. 4.11), NTL Binary, RTCM SC-104 (ver.3.4)
Data input format	RTCM SC-104 (ver.3.4 or 3.X)
Time-To-First-Fix (Cold start)	< 60 s
Re-acquisition [1]	< 3 s
Operation conditions[2]	
Altitude	up to 18000 m
Velocity	up to 515 m/s
Acceleration	up to 8 g
GNSS+INS Receiver:	
Attitude Accuracy [3](RMS)	
Roll	< 1°
Pitch	< 1°
Heading	< 1°
Output Data Rate	
Position, Velocity & Attitude	up to 1000 Hz
IMU data [4]	up to 1000 Hz
Data output format	Binary
MEMS IMU:[5]	
Accelerometer Range	± 16 g
Gyroscope Range	± 490 °/s
Interfaces:	
1 x GNSS PPS out	+/- 20 ns
2 x RS422	Nav. data, raw GNSS measurements, Attitude, IMU data
1 x Ethernet[6]	Nav. data, raw GNSS measurements
Mechanical/Electrical:	
Operating voltage	9 V ... 36 V DC (24 V typ.)
Power consumption	up to 4.5 W
Environmental protection	IP67
Dimensions [7]	135 mm x 81 mm x 51 mm; 167.4 mm x 80.5 mm x 51 mm
Weight [7]	450 g; 500 g
Environmental:	
Operating temperature	-40 °C ... +85 °C
Storage temperature	-40 °C ... +85 °C

[1] When the GNSS signals are interrupted for less than 10 s and then restored.

[2] Contact us for more information.

[3] If GNSS solution is available.

[4] Raw accelerometer, raw gyro, temperature.

[5] The default range for cost-effective MEMS. Available MEMS options: accelerometer range (optional): ±4; ±8; ±32; ±40; gyroscope range (optional): ±125; ±250; ±1000; ±2000; ±4000. Contact us for more information.

[6] For AX, BX Firmware Options.

[7] It depends on MEMS type (Cost-effective IMU or High Stability IMU).

High Stability IMU Parameters

Parameter	Accelerometer	Gyroscope
Input Range	±40 g	±490 °/s[1]
Bias Instability	6 µg	0.8 °/h
Bandwidth	480 Hz	480 Hz
Random Walk	0.02 (m/s)/√h	0.08 °/√h
One-year bias repeatability	1,500 µg	250°/h

[1]2000°/s version is export controlled. Contact us for more information.

Cost-effective IMU Parameters

Parameter	Accelerometer	Gyroscope
Input Range	±16 g [1]	±490 °/s[2]
Linear acceleration zero-g level offset accuracy	±10 mg	
Angular rate zero-rate level		±1 °/s

[1] Optional range: ±2g; ±4g; ±8g; ±32g

[2] Optional range: ±125°/s; ±250°/s; ±1000°/s; ±2000 °/s, ±4000 °/s

NEWTON-2

Dual antenna high performance GNSS Receiver with Heading

- GPS L1, L2/L5, GLONASS G1, G2, Galileo E1, E5a/E5b, BeiDou B1, B2, NavIC(IRNSS) L5, S-band, SBAS L1
- Autonomous, SBAS, PPP, RTK positioning
- Heading determination
- Access to raw GNSS measurements
- Rugged single enclosure solution (IP 67) or OEM boards
- Technical support and help with equipment setup

The Newton-2 products line is represented by the high performance multi-constellation multi-frequency GNSS Receivers that are capable of PPP, RTK Engines and Heading determination.

GNSS receivers provide 2D orientation of the antenna system (True North Heading + Pitch) along with the reliable and accurate positioning using multi-frequency multi-constellation GNSS technology. The performance of GNSS receivers is improved by regional Satellite Based Augmentation Systems (WAAS, EGNOS, GAGAN, MSAS, SDCM and other SBAS-compatible services). The RTK and PPP are the powerful technology that are used to provide highly accurate navigation data.
The access to raw GNSS measurements (Pseudoranges measured by code and carrier phase, SNR, Doppler) allows raw data collection for their post processing (PPK) providing more capabilities for the user.

GUI (available for free download) provides a software tool for easy setup, configuration, and data logging or viewing.

For integration into existing equipment, OEM version is available (without enclosure).

Our technical support team will help make using our products as easy and straightforward as possible.

PRODUCT UNDER DEVELOPMENT:

For applications requiring full orientation (heading, pitch and roll), the loosely-coupled GNSS+INS integration can be used. The GNSS+INS integration capability allows the real-time fuse of GNSS data (including Heading) and IMU data by Extended Kalman Filter to provide optimal estimates of Position, Velocity, and Attitude under static and dynamic conditions even in GNSS-denied environments.
In the case of dual antenna GNSS + INS Receiver, heading information (RTK technique) is used for rapid alignment. This allows to get Attitude without the vehicle accelerated motions.

If you would like more information about this product, please contact us by completing our GET QUOTE form at https://kosminis-vytis.lt/product/newton-2/

TECHNICAL SPECIFICATION

Supported GNSS constellations	GPS L1C/A, L2C / L5; GLONASS G1C/A, G2C/A; Galileo E1, E5b/E5a; BeiDou B1, B2; NavIC L5, S-band; SBAS L1
Position Accuracy (RMS), Horizontal / Vertical	
Autonomous	1.1 m / 1.8 m
SBAS	0.6 m / 0.9 m
PPP	0.05 m / 0.1 m
RTK	0.005 m + 0.5 ppm/ 0.008 m + 1.0 ppm
Velocity	0.02 m/s / 0.03 m/s
Angles Accuracy (RMS)[1]	
Pitch	0.15°
Heading	0.06°
Output Data Rate	
Autonomous (PVT)	up to 20 Hz
PPP (PVT)	up to 20 Hz
RTK (PVT)	up to 20 Hz
Heading	up to 20 Hz
Raw GNSS measurements	up to 20 Hz
Data output format	NMEA-0183 (ver. 2.3, ver. 4.11), NTL Binary, RTCM SC-104 (ver.3.4)
Data input format	RTCM SC-104 (ver.3.4 or 3.X)
Time-To-First-Fix (Cold start)	< 60 s
Re-acquisition[2]	< 3 s
Operation conditions[3]	
Altitude	up to 18000 m
Velocity	up to 515 m/s
Acceleration	up to 8 g
Interfaces:	
1 x GNSS PPS out	+/- 20 ns
2 x RS422	Nav. data, raw GNSS measurements
1 x Ethernet[4]	Nav. data, raw GNSS measurements
Mechanical/Electrical:	
Operating voltage	9 V ... 36 V DC (24 V typ.)
Power consumption	up to 5.0 W
Environmental protection	IP67
Dimensions	135 mm x 81 mm x 51 mm
Weight	450 g
Environmental:	
Operating temperature	-40 °C ... +85 °C
Storage temperature	-40 °C ... +85 °C

[1] Baseline length ~2 m.

[2] When the GNSS signals are interrupted for less than 10 s and then restored.

[3] Contact us for more information.

[4] For AX, BX Firmware Options.

NEWTON-3

Tri-antenna high performance GNSS Receiver

- GPS L1, L2/L5, GLONASS G1, G2, Galileo E1, E5a/E5b, BeiDou B1, B2, NavIC(IRNSS) L5, S-band
- High accurate 3D GNSS orientation
- Autonomous positioning
- High precision object's motion vector
- Rugged single enclosure solution (IP 67) or OEM boards
- Technical support and help with equipment setup

The Newton-3 is the standard accuracy GNSS Receiver with full orientation capability (heading, pitch and roll). The GNSS receiver provides reliable and accurate positioning using multi-frequency multi-constellation GNSS technology.
The tri-antenna GNSS receiver has the powerful RTK technology and can determine the object 3D orientation (heading, pitch and roll) by comparing the RTK positions of the three GNSS antennas.
This method is preferred for applications and tasks that require high precision and high accuracy full object orientation.

GUI (available for free download) provides a software tool for easy setup, configuration, and data logging or viewing.

For integration into existing equipment, OEM version is available (without enclosure).

Our technical support team will help make using our products as easy and straightforward as possible.

If you would like more information about this product, please contact us by completing our GET QUOTE form at https://kosminis-vytis.lt/product/newton-3/

TECHNICAL SPECIFICATION

Supported GNSS constellations	GPS L1C/A, L2C / L5; GLONASS G1C/A, G2C/A; Galileo E1, E5b/E5a; BeiDou B1, B2; NavIC L5, S-band
Position Accuracy (RMS), Horizontal / Vertical	
Autonomous	1.1 m / 1.8 m
Velocity	0.02 m/s / 0.03 m/s
Angles Accuracy (RMS)[1]	
Roll	0.15°
Pitch	0.15°
Heading	0.06°
Output Data Rate	
Autonomous (PVT)	up to 20 Hz
Roll, pitch, heading,	up to 20 Hz
Data output format	Binary
Time-To-First-Fix (Cold start)	< 60 s
Re-acquisition [2]	< 3 s
Operation conditions[3]	
Altitude	up to 18000 m
Velocity	up to 515 m/s
Acceleration	up to 8 g
Interfaces:	
1 x GNSS PPS out	+/- 20 ns
1 x RS422	Nav. data
1 x Ethernet[4]	Nav. data
Mechanical/Electrical:	
Operating voltage	9 V ... 36 V DC (24 V typ.)
Power consumption	up to 8.0 W
Environmental protection	IP67
Dimensions	141 mm x 81 mm x 51 mm
Weight	500 g
Environmental:	
Operating temperature	-40 °C ... +85 °C
Storage temperature	-40 °C ... +85 °C

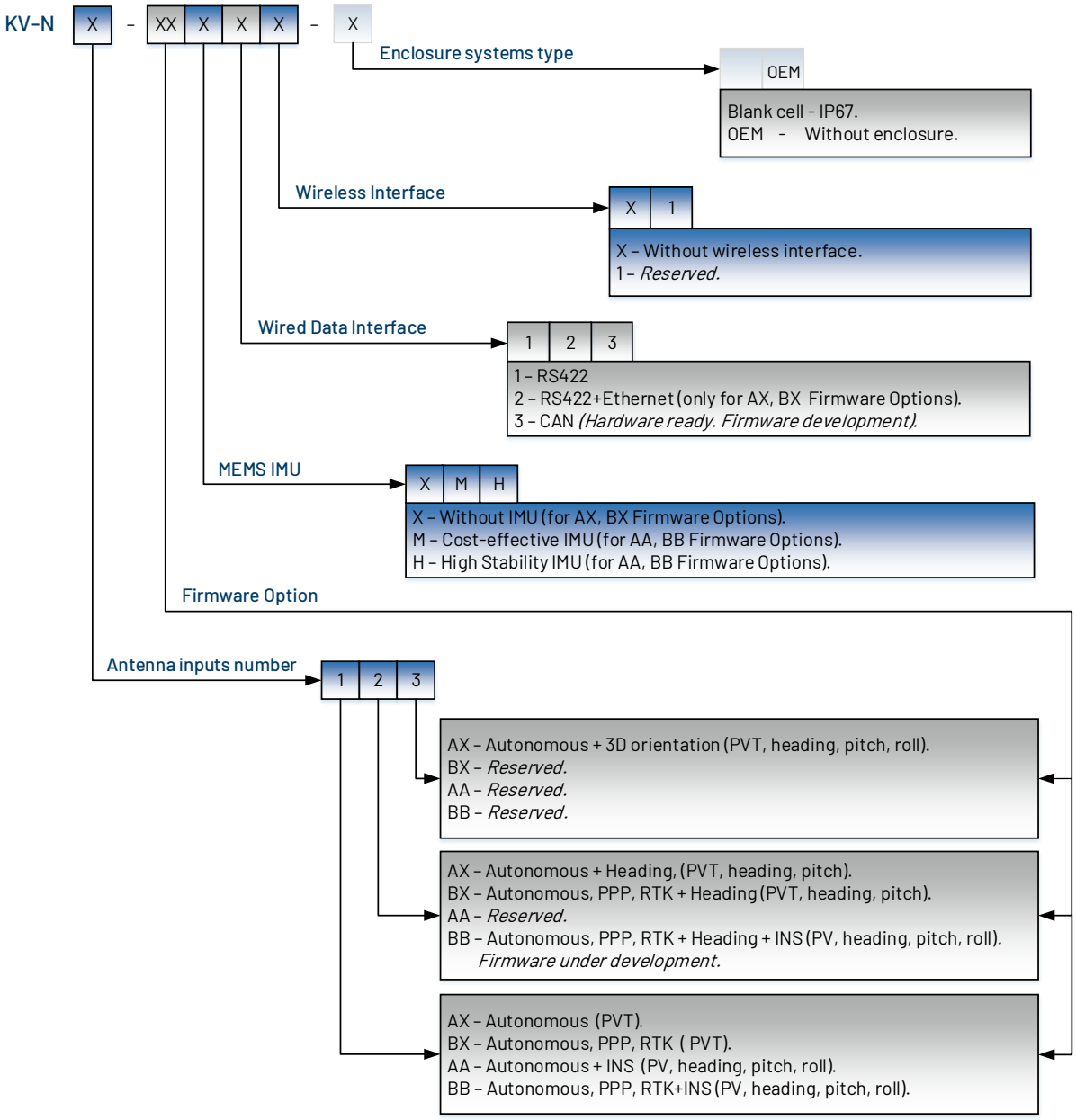
[1] Baseline length ~2 m.

[2] When the GNSS signals are interrupted for less than 10 s and then restored.

[3] Contact us for more information.

[4] For AX, BX Firmware Options.

NEWTON-X Part Number Ordering Guide



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