MEINBERG

The Synchronization Experts.

microSync^{HR}

Compact Design Meets High-Performance

Meinberg's microSync^{HR} is a compact and feature-rich synchronization device and offers a high level of efficiency and flexibility. It can be deployed in a large range of different industries and applications. This innovative, multipurpose synchronization solution offers a variety of outstanding features, many of which are also found in Meinberg's IMS and LANTIME product families – all within a compact, space-efficient half-rack design.

Key features include four Gigabit Ethernet interfaces, multiple programmable output signals (two over Fiber Optical ST connectors) and several configurational output options like Programmable Pulses (TTL), Time Code AM (IRIG, AFNOR) and Frequency Synthesizer (0.1 Hz to 10 MHz) available via BNC. Furthermore, it allows the user to synchronize both NTP and PTP devices.

The microSync^{HR} is running meinbergOS, the all new firmware supporting most PTP profiles. This allows it to be used as NTP Server and PTP Grandmaster for different industry applications.

If it is required to synchronize devices which are not using a network-based synchronization solution, the microSync^{HR} provides a wide range of various electrical and optical connectors.

The available sync signals include PPS/PPM/PPH, Time Code and RS-232/RS-422 serial time strings and more, depending on your configuration.

The microSync^{HR} can be ordered with different GNSS receivers and oscillators. It offers optical or electrical network connections using SFP modules.

The device is backed by Meinberg's three-year manufacturer's warranty and unlimited technical support, including firmware updates. It can be managed using the Meinberg Device Manager software which is available for Windows and Linux platforms.

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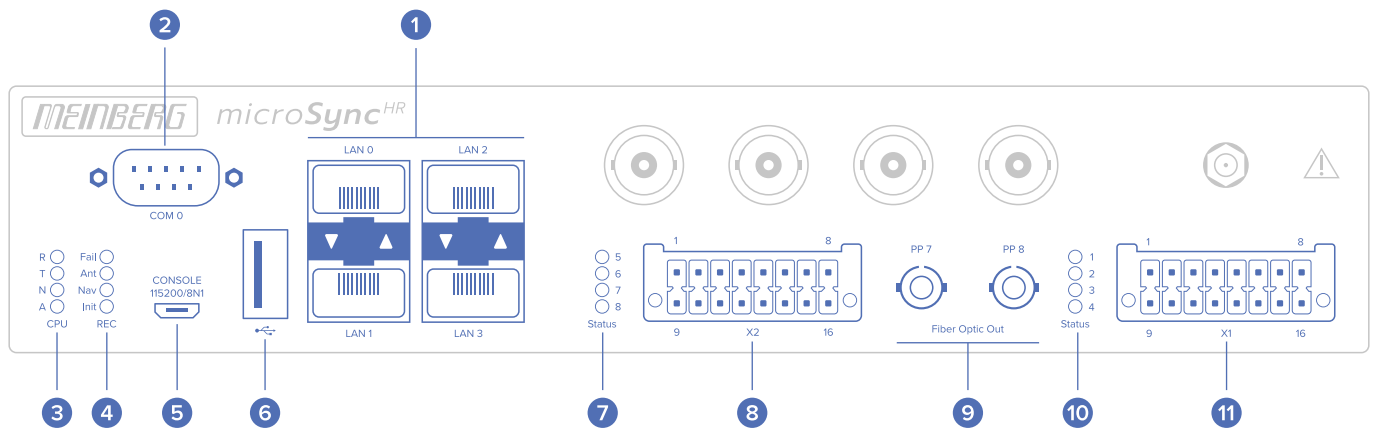
www.mbg.link/microsync-hr

Product Highlights

- Powerful IEEE 1588 PTP Time Server incl. IEC/IEEE 61850-9-3 & IEEE C37.238
- High-Performance NTP Server (NTP & SNTP v2, v3, v4)
- Half-Rack Solution for a Space Efficient Design
- Different Oscillator Options for Advanced Holdover Performance
- Meinberg Device Manager for Configuration and Status Monitoring
- Three-year Manufacturer's Warranty
- Unlimited Technical Support Including Firmware Updates

Connectors

Basic Configuration

1 LAN Network Interfaces

SIGNAL TYPE	LAN 0, 1	LAN 2, 3	CONNECTION TYPE
Gigabit Ethernet (GbE), 10/100/1000 Mbit	Management / NTP 10/100/1000 Mbit, RJ45 or 1000FX,	Management / NTP 10/100/1000 Mbit, RJ45 or 1000FX, PTP capable Synchronous Ethernet: ■ Master and Slave Capability ■ Compliant to ITU-T G.8261, G.8262 and G.8264 ■ Ethernet Synchronization Messaging Channel (ESMC)	SFP

2 COM 0 Timestring

SIGNAL OUTPUT	ASSIGNMENT	CONNECTION TYPE
RS-232	■ Pin 2: RxD (Receive) ■ Pin 3: TxD (Transmit) ■ Pin 5: GND (Ground)	9 pin D-SUB, male

3 Status Indicators CPU

R (RECEIVER)	T (TIME SERVICE)	N (NETWORK)	A (ALARM)
■ **Blue:** Initialisation phase ■ **Green:** The reference clock provides a valid time ■ **Red:** The reference clock does not provide a valid time	■ **Green:** NTP is synchronized to the reference clock, e.g. GNS ■ **Red:** NTP is not synchronized or switched to the "local clock"	■ **Green:** All monitored network interfaces are connected ■ **Red:** At least one of the monitored network interfaces is faulty	■ **Off:** No error ■ **Red:** General error

4   Status Indicators REC

FAIL	ANT	NAV	INIT
▪ **Red:** No synchronization	▪ **Green:** Antenna connected and clock is synchronized ▪ **Red:** No synchronization resp. no antenna connected or short circuit on the antenna line	▪ **Green:** Positioning complete	▪ **Blue:** Initialisation phase ▪ **Green:** "Warmed up" - oscillator is adjusted

5   USB Terminal

SIGNAL TYPE	CONNECTION TYPE
USB-to-serial console	Micro-USB Type B

6   USB Host

SIGNAL TYPE	CONNECTION TYPE
USB connector management CPU	USB Type A

7   Status Indicators PP 5 – PP 8

Status indicators of the Programmable Pulses Out PP 5 to PP 8.

8   DMC X2 Terminal Connector

PIN	INPUT / OUTPUT	DESCRIPTION
1	PP 5+	Programmable Pulse (Optocoupler Output, Collector)
2	PP 5	Programmable Pulse (RS-422A)
3	PP 5	Programmable Pulse (RS-422B)
4	PP 6	Programmable Pulse (RS-422A)
5	PP 6	Programmable Pulse (RS-422B)
6	+TC DCLS In	Time Code DCLS (TTL, Isolated)
7	+TCA DCLS Out	Time Code Amplified DCLS (TTL, Isolated), TTL active high 250 mA, short-circuit-proof
8	−TCA DCLS Out	Time Code Amplified DCLS (TTL, Isolated), TTL active high 250 mA, short-circuit-proof
9	PP 5−	Programmable Pulse (Optocoupler Output, Emitter)
10	GND	Ground
11	GND	Ground
12	GND	Ground
13	GND	Ground
14	−TC DCLS In	Time Code DCLS (TTL, Isolated)
15	—	Not Used
16	—	Not Used

9 Programmable Pulse Outputs – Fiber Optic

SIGNAL OUTPUT	PULSE OUTPUTS	CONNECTION TYPE
Programmable Pulses, Fiber Optic, Multi Mode, 820 nm	- Pulse Per Second - Pulse Per Minute - Pulse Per Hour - Cyclic Pulse - Single Shot - Timer - Idle - All Sync - Time Sync - Position OK - DCF77 Marks - Time Code DCLS - Serial Time String - Synthesizer Frequency - PTTI 1PPS	ST

10 Status Indicators PP 1 – PP 4

Status indicators of the Programmable Pulses Out PP 1 to PP 4.

11 DMC X1 Terminal Connector

PIN	INPUT / OUTPUT	DESCRIPTION
1	–DC In	Negative Potential of Operating Voltage
2	—	Not Used
3	PP 1–	Programmable Pulse (Optocoupler Output, Emitter)
4	PP 2–	Programmable Pulse (Optocoupler Output, Emitter)
5	PP 3–	Programmable Pulse (Optocoupler Output, Emitter)
6	PP 4–	Programmable Pulse (Optocoupler Output, Emitter)
7	REL-NO	Error/Relay (Normally Open)
8	REL-CO	Error/Relay (Common)
9	+DC In	Positive Potential of Operating Voltage
10	—	Not Used
11	PP 1+	Programmable Pulse (Optocoupler Output, Collector)
12	PP 2+	Programmable Pulse (Optocoupler Output, Collector)
13	PP 3+	Programmable Pulse (Optocoupler Output, Collector)
14	PP 4+	Programmable Pulse (Optocoupler Output, Collector)
15	—	Not Used
16	REL-NC	Error/Relay (Normally Closed)

BNC Connectors
10-Series Configuration

In addition to the basic configuration, the 10-series offers the following connection types via BNC.
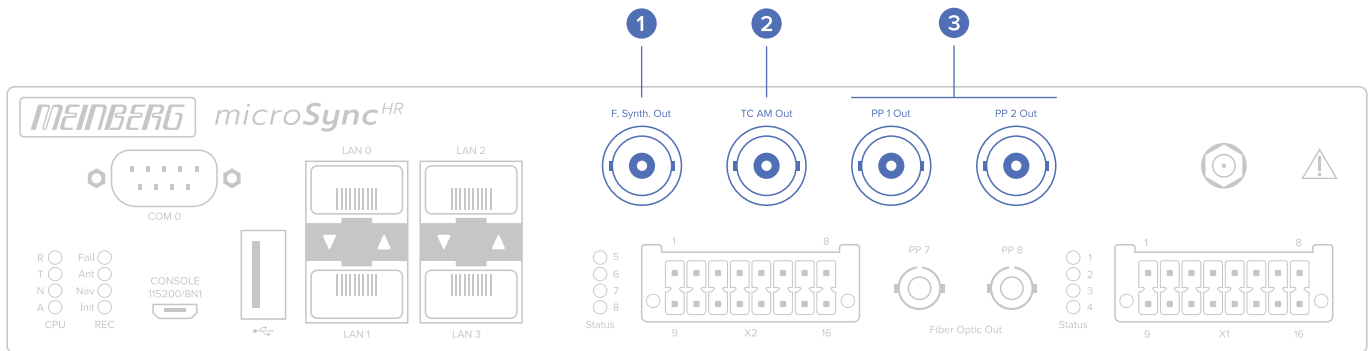
1   Frequency Synthesizer Output

SIGNAL OUTPUT	SIGNAL LEVEL	FREQUENCY OUTPUT	CONNECTION TYPE
Unbalanced Sinusoidal Signal	3 V_{PP} into 50 Ω	0.1 Hz to 10 MHz	BNC, female

2   Time Code AM (Modulated) Output

| SIGNAL OUTPUT	SIGNAL LEVEL	GENERATED TIME CODES	CONNECTION TYPE
Unbalanced Sinusoidal Signal	3 V_{pp} / 1 V_{pp} (MARK/SPACE) into 50 Ω	- IRIG B122 - IRIG B123 - IRIG B126 - IRIG B127 - IEEE 1344 - IEEE C37.118 - AFNOR	BNC, female

3   Programmable Pulse Outputs

SIGNAL OUTPUT	SIGNAL LEVEL	PULSE OUTPUTS	CONNECTION TYPE
Programmable Pulses	TTL into 50 Ω	- Pulse Per Second - Pulse Per Minute - Pulse Per Hour - Cyclic Pulse - Single Shot - Timer - Idle - All Sync - Time Sync - Position OK - DCF77 Marks - Time Code DCLS - Serial Time String - Synthesizer Frequency - PTTI 1PPS	BNC, female

BNC Connectors
30-Series Configuration

In addition to the basic configuration, the 30-series offers the following connection types via BNC.
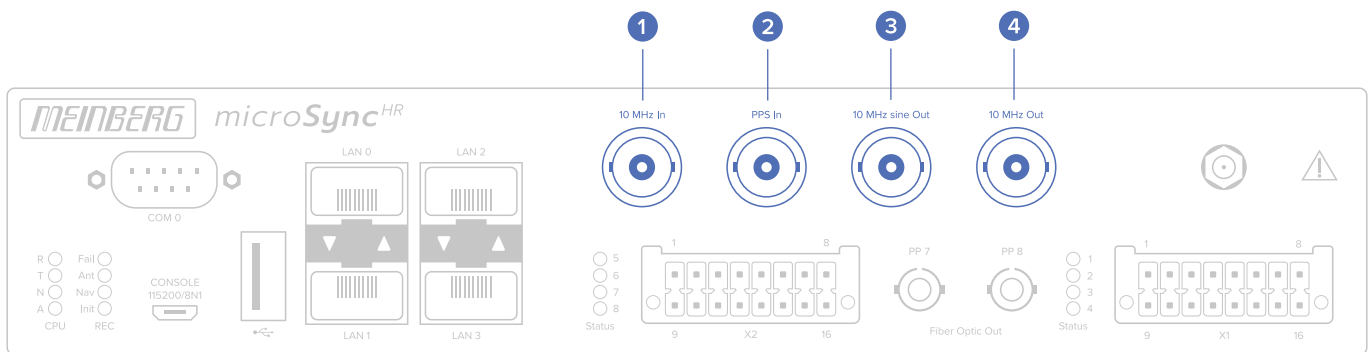
1 10 MHz Input

SIGNAL INPUT	SIGNAL LEVEL	CONNECTION TYPE
10 MHz Sinusoidal Signal / TTL	$1.5\ V_{PP} - 5\ V_{PP}$	BNC, female

2 PPS Input

SIGNAL INPUT	PULSE LENGTH	CONNECTION TYPE
Pulse per Second, TTL	≥ 5µs, active high	BNC, female

3 10 MHz sine Output

SIGNAL OUTPUT	SIGNAL LEVEL	CONNECTION TYPE
10 MHz Sinusoidal Signal	5 dBm +/– 1 dBm into 50 Ω	BNC, female

4 10 MHz Output

SIGNAL OUTPUT	SIGNAL LEVEL	CONNECTION TYPE
10 MHz, TTL	TTL into 50 Ω	BNC, female

BNC Connectors
31-Series Configuration

In addition to the basic configuration, the 31-series offers the following connection types via BNC.

1   10 MHz Input

SIGNAL INPUT	SIGNAL LEVEL	CONNECTION TYPE
10 MHz Sinusoidal Signal / TTL	$1.5\,V_{PP} - 5\,V_{PP}$	BNC, female

2   PPS Input

SIGNAL INPUT	PULSE LENGTH	CONNECTION TYPE
Pulse per Second, TTL	≥ 5µs, active high	BNC, female

3   Programmable Pulse Outputs

SIGNAL OUTPUT	SIGNAL LEVEL	PULSE OUTPUTS	CONNECTION TYPE
Programmable Pulses	TTL into 50 Ω	- Pulse Per Second - Pulse Per Minute - Pulse Per Hour - Cyclic Pulse - Single Shot - Timer - Idle - All Sync - Time Sync - Position OK - DCF77 Marks - Time Code DCLS - Serial Time String - Synthesizer Frequency - PTTI 1PPS	BNC, female

Configuration Options

Receiver Options

RECEIVER TYPE	SIGNAL TYPE	SUPPLY VOLTAGE	CONNECTION TYPE
GNS: L1 Multi-GNSS (GPS, GLONASS, Galileo, BeiDou), 72-Channel	L1/E1/B1 band	5 V DC	SMA
GPS: Meinberg GPS, 12-Channel	IF (Meinberg Antenna)	15 V DC	BNC
GNS-UC: Meinberg Multi-GNSS (GPS, Galileo)	IF (Meinberg Antenna)	15 V DC	BNC

*SMA Connector for **L1 Multi-GNSS Receiver***

*BNC Connector for **Meinberg GPS** or **Meinberg GNS-UC Antenna***
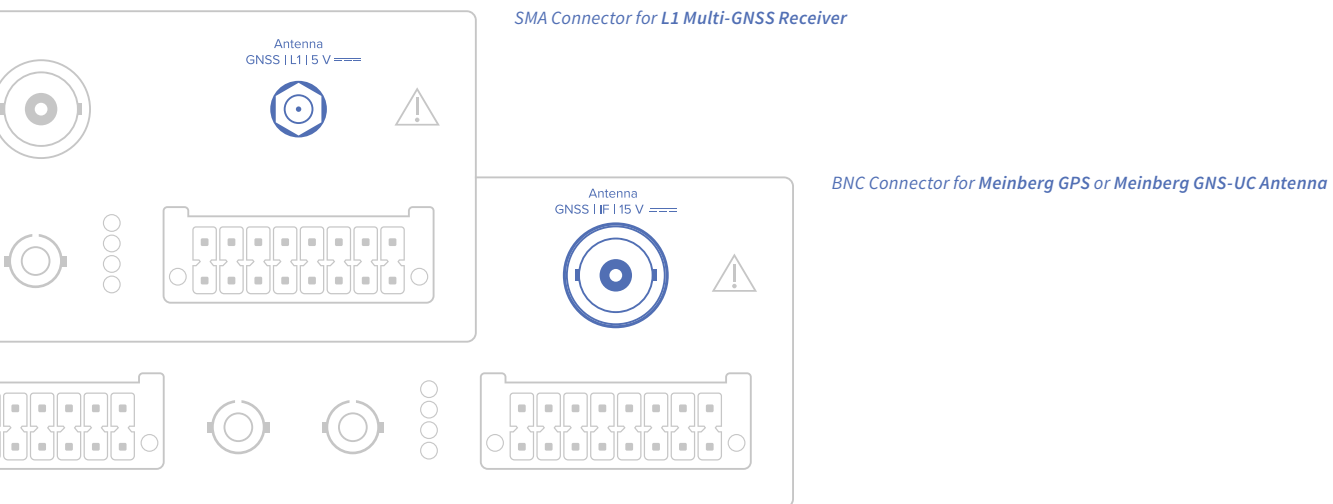
Oscillator Options

TYPE	HOLDOVER PERFORMANCE (1 DAY)	HOLDOVER PERFORMANCE (1 YEAR)
OCXO SQ	± 220 µs	± 4.7 s
OCXO HQ	± 22 µs	± 788 ms
OCXO DHQ	± 4.5 µs	± 158 ms

For detailed oscillator specifications, please visit: www.mbg.link/osc

Power Supply

TYPE	NOMINAL VOLTAGE RANGE	MAXIMUM VOLTAGE RANGE	POWER CONSUMPTION (TYPICAL)
DC	24–48 V DC	20–60 V DC	20 W

Scope of Delivery

QUANTITY	ITEM
1x	microSync[HR] (incl. Mounting Brackets [1])
1x	Antenna, L1 Multi-GNSS or Meinberg GPS/GNS-UC [2]
1x	Antenna Cable, 20 m (65.62 ft), SMA or BNC connector [2]
1x	Antenna Mounting Kit [2]
2x	16 pin DFMC Connector

[1] In order to withstand the environmental tests for vibration, shock and seismic, special mounting brackets are optionally available.
[2] depending on configuration

L1 Multi-GNSS Antenna or ...

... Meinberg GPS/GNS-UC Antenna

microSync[HR] with Mouting Brackets

Antenna Cable, SMA Connector or ...

... Antenna Cable, BNC Connector

Antenna Mounting Kit

DFMC Connectors

Optional Expansions

SFP Modules

Recommended and tested transceivers from other vendors which are available at additional costs.

RJ-45 TRIPLE SPEED 10/100/1000 BASE-T	SINGLE MODE 1000BASE-LX, 10KM, LC SFP, 1310 NM	MULTI MODE 1000BASE-SX, LC SFP, 850 NM
AVAGO ABCU-5740RZ	**AVAGO** AFCT-5710PZ	**AVAGO** AFBR-5710PZ
FINISAR FCLF8521P2BTL	**FINISAR** FTLF1318P3BTL	**FINISAR** FTLF8524P3BNL

Avago SFP Modules (RJ-45, Single Mode, Multi Mode)

Software Specifications

Protocols & Profiles

NETWORK PROTOCOLS	IEEE 1588 PROFILES
▪ IPv4, IPv6 ▪ NTPv3, NTPv4 ▪ PTPv2 ▪ IEC 62439-3 (PRP) ▪ DHCP, DHCPv6 ▪ DSCP ▪ IEEE 802.1q VLAN filtering/tagging ▪ IEEE 802.1p QOS ▪ SNMPv1/v2/v3 ▪ Remote Syslog Support (UDP)	▪ IEEE 1588v2 Default Profile ▪ IEEE C37.238-2011 Power Profile ▪ IEEE C37.238-2017 Power Profile ▪ IEC/IEEE 61850-9-3 Power Utility Profile ▪ Enterprise Profile ▪ ITU-T G.8265.1, ITU-T G.8275.1, ITU-T G.8275.2 Telecom Profiles ▪ SMPTE ST 2059-2 Broadcast Profile ▪ IEEE 802.1AS TSN/AVB Profile ▪ AES67 Media Profile ▪ DOCSIS 3.1

Management

User Management

The user management allows to create, manage and delete individual users. Thereby, each user can be given, or withdrawn individual write and read access for all configuration options, as well as read-only rights for status displays. Furthermore, users can be deactivated or added for a limited time. Password changes are also possible, as well as the option of periodically prompting the user to renew its password.

In addition, there are three available predefined role templates (admin, info, status) included that offer the user a preselection of access levels. Based on this, individual rights can be added or deleted. Moreover, management protocols like SNMP, Shell or mbgdevman can be enabled for each user account to limit access to the device.

Firmware Management

The integrated firmware management of meinbergOS allows to install multiple firmware versions in parallel and choose which one to run. All integrated components and modules (e.g. the GPS receiver part) can be updated with the latest firmware if required.

Meinberg Device Manager

The Meinberg Device Manager utility is a graphical desktop application that allows to configure Meinberg Devices over an encrypted network connection or a local USB or serial connection. A great advantage of the Meinberg Device Manager is that various devices can be configured and monitored simultaneously.

The Meinberg Device Manager for Windows can be used under Windows 7 and all newer versions. Supported Linux distributions include Ubuntu, Mint Linux, Debian, SUSE Linux, CentOS, and others.

The software is delivered on the USB stick included in the scope of delivery and does not have to be installed or copied on the PC. The Meinberg Device Manager can be started directly from the USB data carrier. The computer must be connected to the network in which the microSync system is connected.

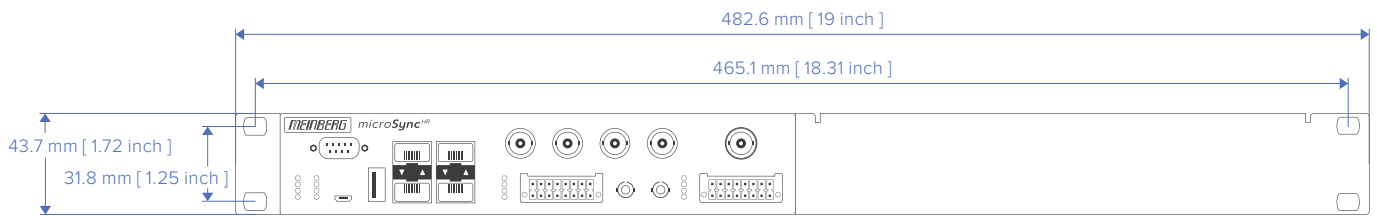Otherwise the software is available for download on our website:

https://www.meinbergglobal.com/english/sw/mbg-devman.htm

Meinberg Device Manager: Configuration Interface

Performance Level Options

PERFORMANCE LEVEL	UNICAST CLIENTS	DELAY REQ./S IN MULTICAST / HYBRID MODE
PL-A	8	1024
PL-B	256	32768
PL-C	512	65536

Technical Specifications

Physical Dimensions

Front view with mounting brackets
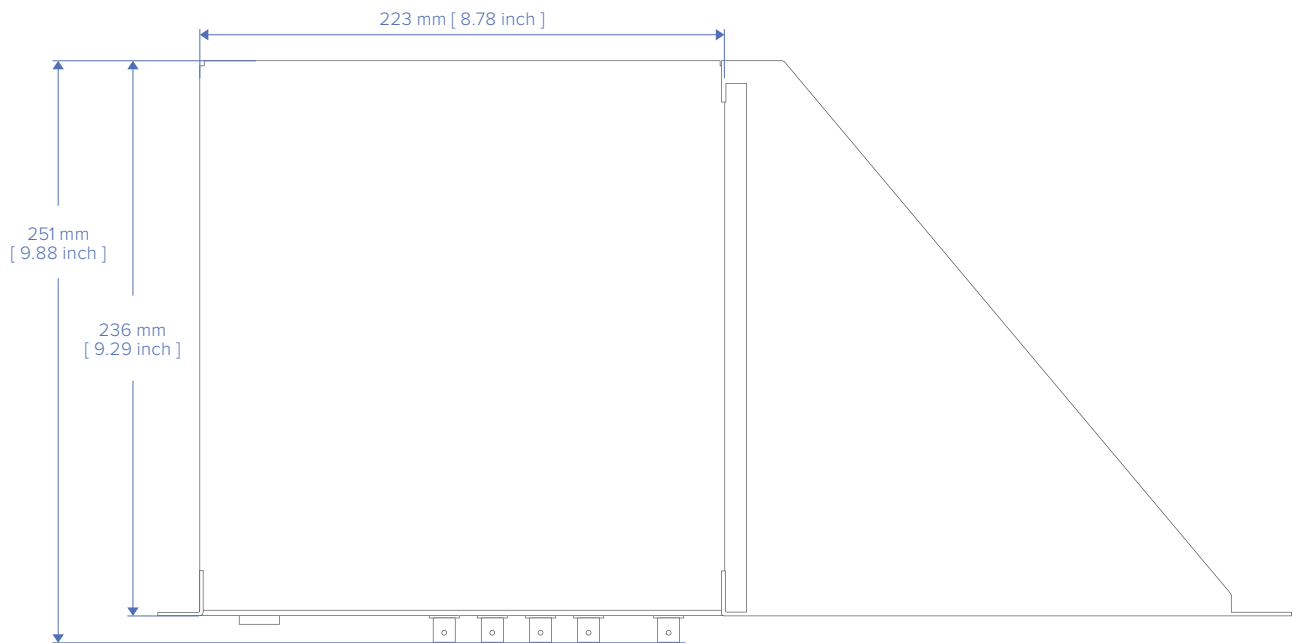
Top view with mounting brackets

Mechanical Data

Housing Type	9.5" (Half-Rack), 1U
Housing Material	Steel
Weight (incl. Mounting Brackets)	2.2 kg (4.85 lbs)

Environment

Operating Temperature Range	–20 to 55 °C (–4 to 131 °F)
Storage Temperature Range	–30 to 70 °C (–22 to 158 °F)
Relative Humidity	5 to 95 % (non-condensing) at 40 °C (104 ° F)
Operating Altitude	up to 4,000 m (13,123 ft) above sea level
Atmospheric Pressure	615 to 1600 hPa

Type Tests

ELECTROMAGNETIC COMPATIBILITY – EMISSION

CISPR 16-1-2 and **CISPR 16-2-1**	Conducted disturbance voltage measurements
CISPR 16-2-3	Radiated radio disturbance
CISPR 32	Conducted disturbance current measurements
FCC 47 CFR Part 15 **section 15.107 (b) [3]** **RSS-Gen Issue 4 section 8.8 [4]**	Conducted emission
FCC 47 CFR Part 15 **section 15.109 (b) [3]** **RSS-Gen Issue 4 section 8.9 [4]**	Radiated emission
ETSI EN 303 413	Standard for GNSS receiver

ELECTROMAGNETIC COMPATIBILITY – IMMUNITY

The tests were performed according to IEC 61000-6-5 and IEC 61850-3 referring to the following standards:

IEC 61000-4-2	Immunity test to electrostatic discharges	±6 kV contact discharge ±8 kV air discharge
IEC 61000-4-3	Immunity test to radiated, radio-frequency, electromagnetic fields	10 V/m
IEC 61000-4-4	Immunity test to electrical fast transients (Burst)	±4 kV, 100 kHz
IEC 61000-4-5	Immunity test to surges	up to ±1 kV line to line up to ±2 kV line to earth
IEC 61000-4-6	Immunity test to conducted disturbances, induced by radio-frequency fields	10 V
IEC 61000-4-8	Immunity test to power frequency magnetic fields	100 A/m continuous 1000 A/m at 1 s
IEC 61000-4-16	Immunity test to conducted, common mode disturbances	30 V continuous 300 V at 1 s
IEC 61000-4-17	Immunity test to ripple on d.c. input power ports	10 % of U_n
IEC 61000-4-18	Immunity test to damped oscillatory waves	±1 kV line to line ±2.5 kV line to earth
IEC 61000-4-29	Immunity test to voltage dips, short interruptions and voltage variations	ΔU 30 % for 100 ms ΔU 60 % for 100 ms ΔU 100 % for 50 ms

SAFETY TESTS

IEC 62368-1 Safety Requirements	Overvoltage Category	II
	Protection Class	1
	Degree of Pollution	2
IEC 60529	Protection Rating / IP Code	IP30

ENVIRONMENTAL TESTS

The tests were performed according to IEC 61850-3 referring to the following standards:

IEC 60068-2-1	Cold	–25 °C (–13 °F), 96 h –40 °C (–40 °F), 16 h
IEC 60068-2-2	Dry heat	60 °C (140 °F), 96 h 85 °C (185 °F), 16 h
IEC 60068-2-14	Change of temperature	–20 to 55 °C (–4 to 131 °F), 5 cycles, 1 °C (34 °F)/min
IEC 60068-2-30	Damp heat, cyclic (12 h + 12 h)	55 °C (131 °F), 97 % RH, 6 cycles
IEC 60068-2-78	Damp heat, steady state	40 °C (104 °F), 93 % RH, 240 h
IEC 60255-21-1	Vibration (sinusoidal) [1] Class 2	10–150 Hz, 1 g_n, 2 sweeps, 3 axes 10–150 Hz, 2 g_n, 40 sweeps, 3 axes
IEC 60255-21-2	Shock [1] Class 2	10 g_n, 11 ms, ±3 shocks, 3 axes 30 g_n, 11 ms, ±3 shocks, 3 axes 20 g_n, 16 ms, ±1000 shocks, 3 axes
IEC 60255-21-3	Seismic [1,2] Class 2	4-35 Hz, 1 g_n, 1 sweep, hor. axes 4-35 Hz, 2 g_n, 1 sweep, ver. axis

[1] In order to withstand the tests for vibration, shock and seismic, special mounting brackets are optionally available.

[2] The frequency range deviates from the values required by the standard. In this test, a frequency range of 4-35 Hz instead of 1-35 Hz was used.

Compliance

CB Scheme	✔	CSA	✔
CE	✔	WEEE	✔
FCC	✔	RoHS	✔
UL	✔	REACH	✔