

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 and monitored using the *meinbergOS* web interface.



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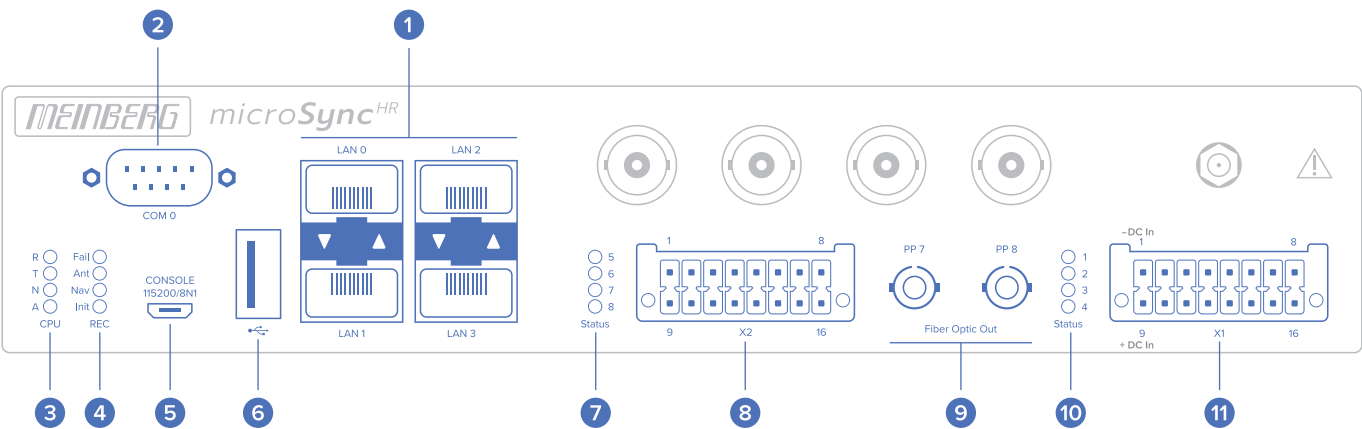
www.mbg.link/microsync-hr

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
- *meinberOS* Web Interface for Management and 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, Master or Slave Mode 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.

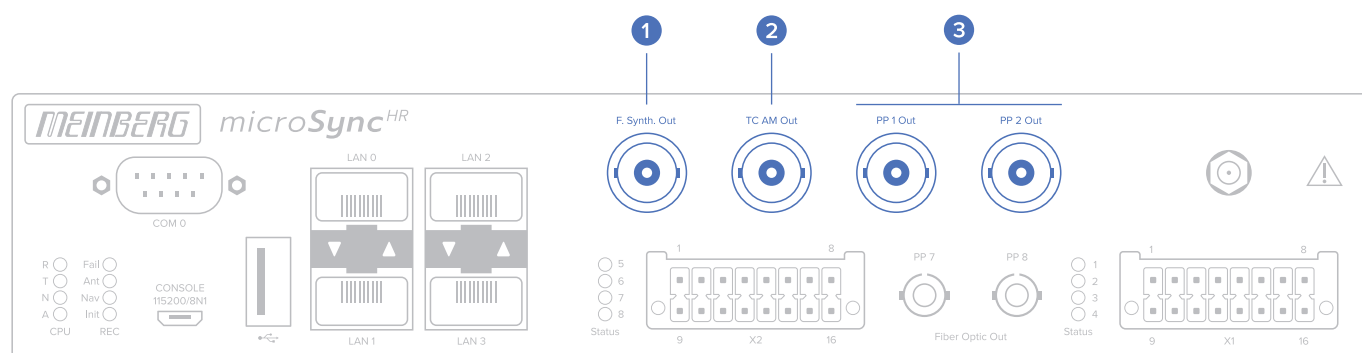
11 DMC X1 Terminal Connector

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

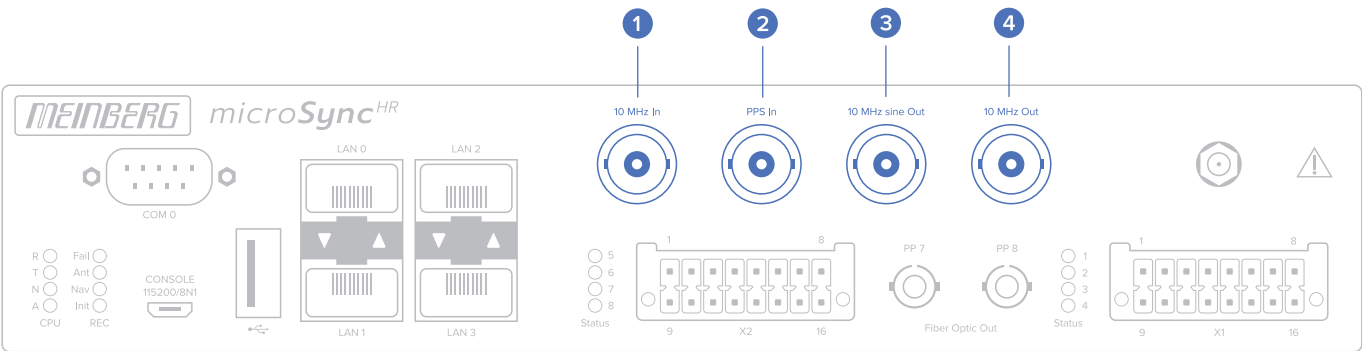
3 Programmable Pulse Outputs

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

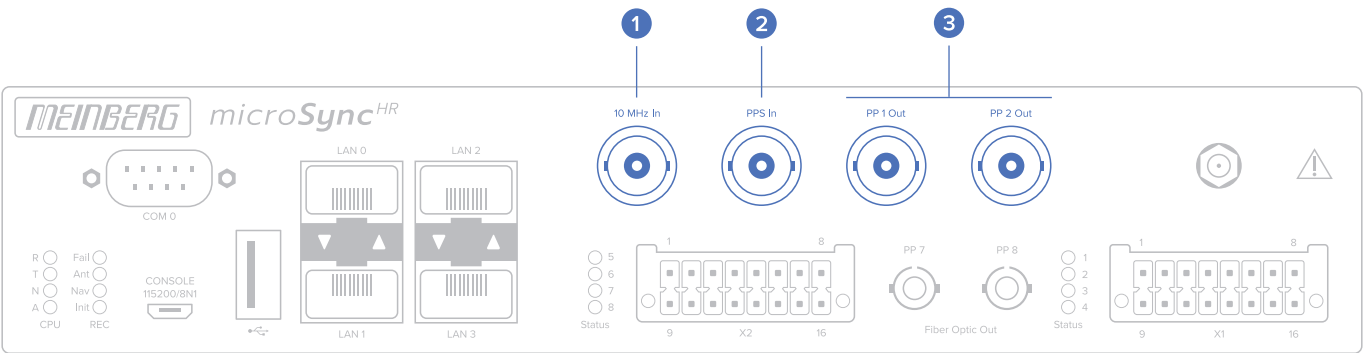
4 10 MHz Output

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	$\geq 5 \mu s$, active high	BNC, female

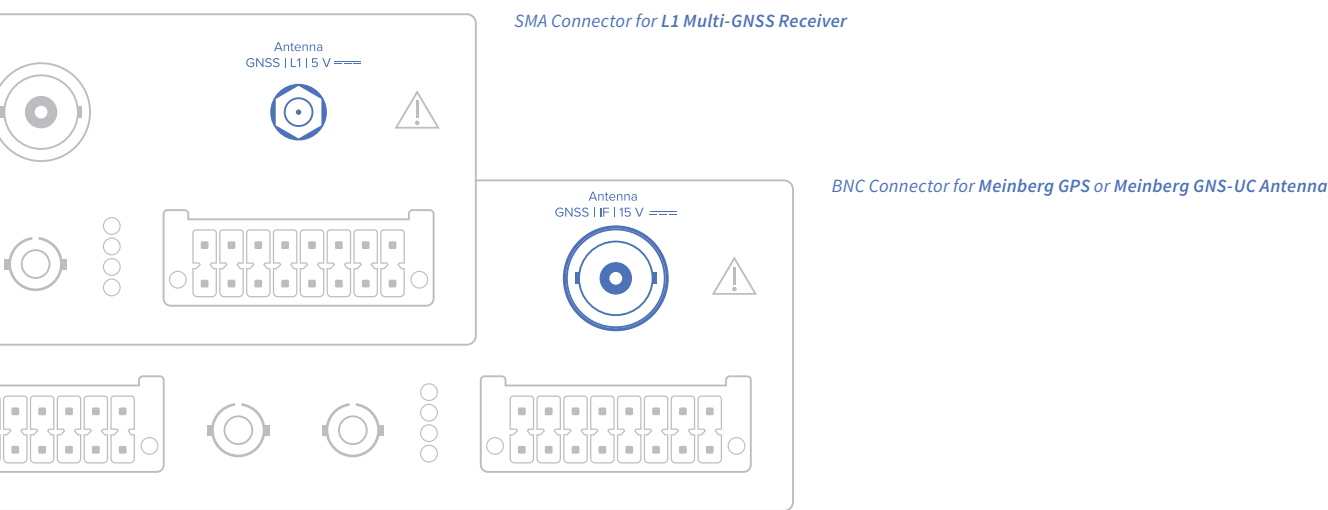
3 Programmable Pulse Outputs

SIGNAL OUTPUT	SIGNAL LEVEL	PULSE OUTPUTS	CONNECTION TYPE
Programmable Pulses	TTL into 50Ω	- 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



Oscillator Options

TYPE	HOLDOVER PERFORMANCE (1 DAY)	HOLDOVER PERFORMANCE (1 YEAR)
OCXO SQ	$\pm 65 \mu\text{s}$	$\pm 4.7 \text{ s}$
OCXO HQ	$\pm 10 \mu\text{s}$	$\pm 788 \text{ ms}$
OCXO DHQ	$\pm 4.5 \mu\text{s}$	$\pm 158 \text{ ms}$

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



microSync^{HR} with Mounting Brackets



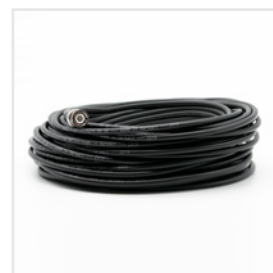
L1 Multi-GNSS Antenna or ...



... Meinberg GPS/GNS-UC Antenna



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.

TYPE	MODE	CONNECTOR TYPE	MAX. CONNECTION LENGTH
FS SFP-GE-T	10/100/1000BASE-T, SFP Copper	RJ45	100 m
BlueOptics	1000BASE-SX SFP, 850 nm multi mode	Duplex LC	100 m
BlueOptics BO05C13610D	1000 BASE-LX SFP 1310 nm single mode	Duplex LC	10,000 m



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

Software Specifications

Protocols & Profiles

NETWORK PROTOCOLS	IEEE 1588 PROFILES
▪ IPv4, IPv6 ▪ NTPv3, NTPv4 ▪ PTPv2 ▪ PTPv1 (Performance Level C only - more details on page 11) ▪ 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 ▪ AUTOSAR - Automotive Profile

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 GNSS receiver part) can be updated with the latest firmware if required.

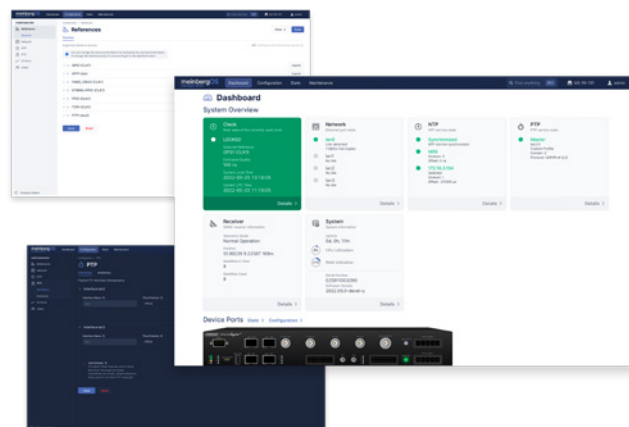
meinbergOS WebUI

From meinbergOS version 2022.05.1, a microSync system provides you with a comprehensive web interface with which you can carry out most configurations and status monitoring on your device.

- **Access to the most important configuration options of the microSync system and monitoring of the system status**
- **The microSync system allows you to install firmware versions and archive old versions**
- **Automated updates of the web interface via a firmware update of the meinbergOS device**

Self-Diagnosis

The system continuously carries out background checks of various parameters such as system resources, port and receiver states. The user is notified when an incident occurs.



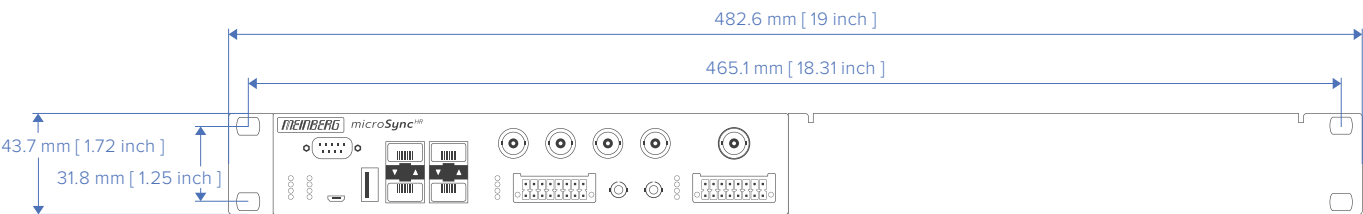
meinbergOS WebUI - Configuration and Monitoring Interface

Performance Level Options

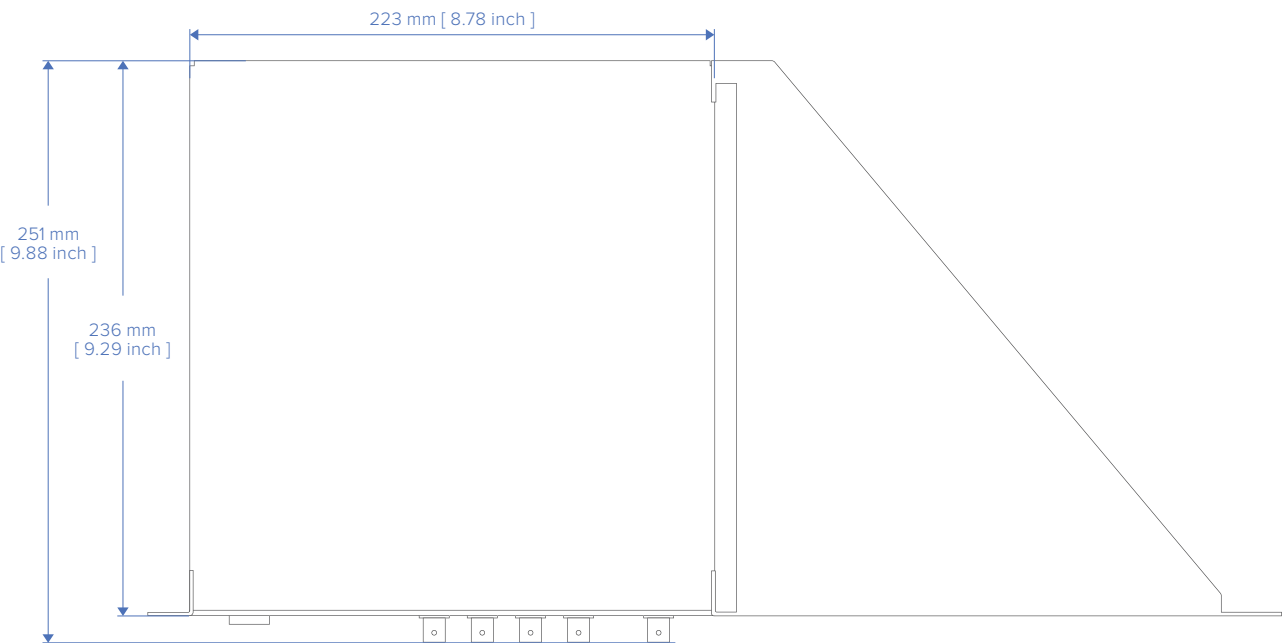
PERFORMANCE LEVEL	UNICAST CLIENTS	DELAY REQ./S IN MULTICAST / HYBRID MODE
PL-A	8	1024
PL-B	256	32768
PL-C	512	65536

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	✓
CE	✓
FCC	✓
UL	✓

CSA	✓
WEEE	✓
RoHS	✓
REACH	✓