



The Synchronization Experts.



MANUAL

IMS-GNM181 Setup Guide

Hot-Plug Module

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Meinberg Funkuhren GmbH & Co. KG

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1 Imprint

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2 Introduction

This Setup Guide is a systematically structured guideline which supports you during the set-up of your Meinberg product. The individual chapters describe the correct positioning and installation of the antenna as well as the installation of the coaxial cable. Furthermore, it describes the parameters that have to be configured in the web interface for a quick start of your product.

The LTOS7 manual provides a complete description of all configurations and status monitoring options of your Meinberg product.

Download link: https://www.meinbergglobal.com/download/docs/manuals/english/ltos_7-00.pdf

3 Safety Instructions for hot pluggable Modules



Check before every maintenance work on the system:

- If a data backup is required?
- Is a backup required, verify the data recovery which is done by this backup.
- Make sure to avoid any static discharge while working – use a grounding cable and/or antistatic gloves during installation and removal of hot pluggable components.
- If you are replacing a hot pluggable power supply, unplug the power cable prior to removing the module from the case.
- Never open a power supply. In power supplies dangerous voltages can still remain even after disconnection from the power supply. Always send power supplies back to the manufacturer for maintenance.

Exchange of hot-swap components

- Ensure that components which will be replaced during operation, always be treated with the utmost care. Avoid contact with live components.
- Electrostatic discharge can damage electronic components. For this reason, ensure protection against electrostatic discharges by wearing anti-static shoes while working with the system.
- Take care when removing and installing the hot-plug modules. Always work with the utmost caution. Touch the modules only at the edges.
- Place the module out of the box or after removal from the system with the component side to the top on a grounded and static-free surface.
- Storage of an IMS module must be done in a dry place.
- Installation or removal from hot-swap components only by authorized personnel!

3.1 Additional Safety Hints



This manual contains important information for the installation and operation of this device as well as for your safety. Make sure to read carefully before installing and commissioning the device.

Certain operating conditions may require the observance of additional safety regulations not covered by this manual. Nonobservance of this manual will lead to a significant abatement of the security provided by this device. Security of the facility where this product is integrated lies in the responsibility of the installer.

The device must be used only for purpose named in this manual, any other use especially operation above the limits specified in this document is considered as improper use.

Keep all documents provided with the device for later reference.

This manual is exclusively for qualified electricians or by a qualified electrician trained personnel who are familiar with the applicable national standards and specifications, in particular for the construction of high voltage devices.

3.2 Cabling



WARNING!

DANGER TO LIFE BY ELECTRICAL SHOCK! NO LIVE WORKING!

Wiring or any other work done the connectors particularly when connectors are opened may never be carried out when the installation is energized. All connectors must be covered to prevent from accidental contact to life parts.

ALWAYS ENSURE A PROPER INSTALLATION!

3.3 Prevention of ESD Damage



ATTENTION!

The designation ESD (Electrostatic Sensitive Devices) refers to measures which are used to protect electrostatically endangered components from electrostatic discharge and thus to prevent destruction. Systems and assemblies with electrostatically endangered components usually have the following characteristics:



Indicator for assemblies with electrostatic endangered components

The following measures protect electrostatically endangered components from destruction:

Prepare removal and installation of assemblies

Unload yourself (for example, by touching a grounded object) before touching assemblies.

Ensure that you wear a grounding strap on the wrist when working with such assemblies, which you attach to an unpainted, non-conductive metal part of the system.

Use only tools and devices that are free from static electricity.

Transporting Assemblies

Assemblies may only be touched at the edge. Do not touch any pins or conductors on assemblies.

Installing and Removing Assemblies

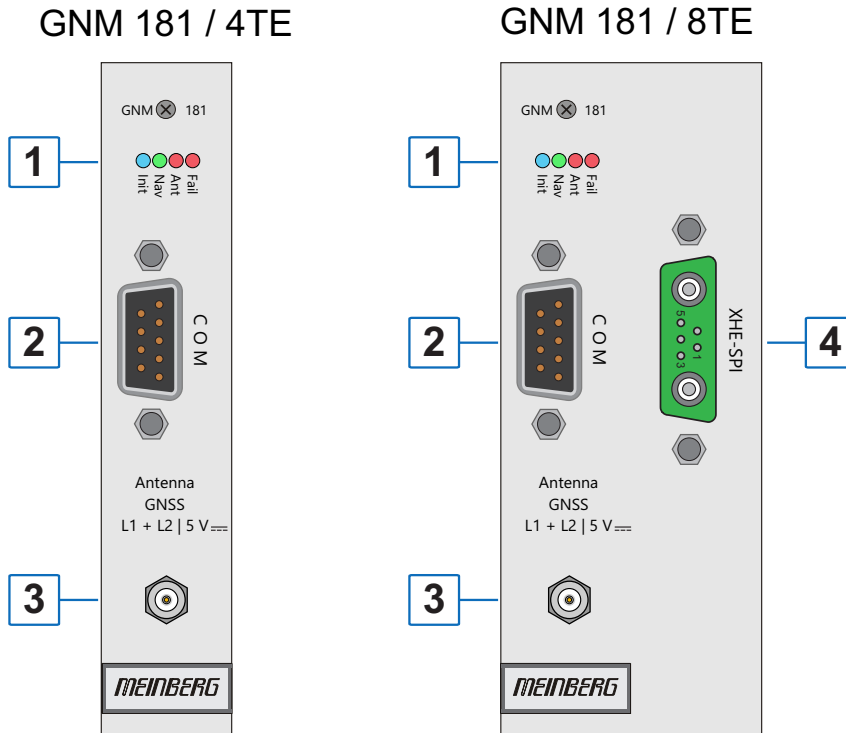
Do not touch persons who are not grounded while removing or installing components. This could result in a loss of grounding protection from your electrostatic discharge.

Storing Assemblies

Always keep assemblies in ESD protective covers. These protective covers must be undamaged. ESD protective covers, which are extremely wrinkled or even have holes, no longer protect against electrostatic discharge.

ESD protective covers must not be low-resistance and metallically conductive if a lithium battery is installed on the assembly.

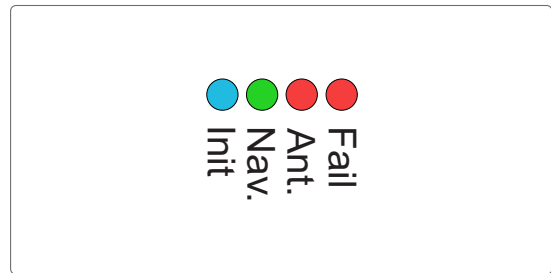
4 Front Connectors GNM181 GNSS Multi Band Receiver



4.1 Status LEDs GNM 181

LED Indicators

Init	blue:	while the receiver passes through the initialization phase
	green:	the oscillator has warmed up
Nav.	green:	positioning successfully
Ant	red:	antenna faulty or not connected
	yellow:	the clock is synchronized by an external Signal - MRS mode (PPS, IRIG ...)
Fail	red:	time has not synchronized



4.2 Multiref COM 0

The COM 0 interface of the GNM 181 is used for serial communication (RS-232 signal level). It can also be used as an optional "Multiref" interface for the reference signal PPS + String.

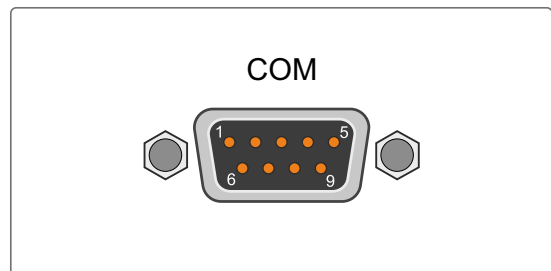
Assignment:

Pin 2: RxD (receive)
Pin 3: TxD (transmit)
Pin 5: GND (ground)

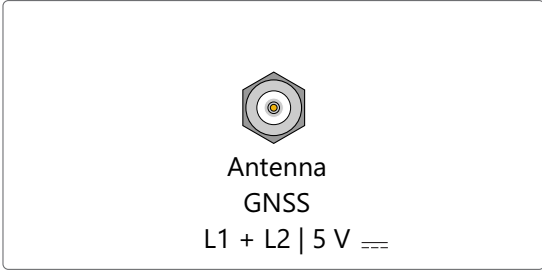
Reference signal via 9-pin DSUB connector
(PPS + String Mode)

Pin 1: PPS
Pin 2: String *

* The following timestrings (time telegrams) can be used:
NMEA RMC
NMEA ZDA
Meinberg Standard
Uni Erlangen



4.3 GNM181 Multi Band Receiver

Receiver Type	184-channel GPS, GLONASS, Galileo, Beidou	
Frequency Band:	GPS: L1C/A (1575.42 MHz) L2C (1227.60 MHz) GLONASS: L1OF (1602 MHz + k*562.5 kHz) L2OF (1246 MHz + k*437.5 kHz) k = -7,..., 5, 6 Galileo: E1-B/C (1575.42 MHz) E5b (1207.140 MHz) Beidou: B1I (1561.098 MHz) B2I (1207.140 MHz)	
Accuracy of Pulses:	Dependant on oscillator option: < +-100ns (TCXO, OCXO LQ) < +-50ns (OCXO-SQ, -MQ, -HQ, -DHQ)	
Synchronization Time:	<1 minute in normal operation mode, approx. 1 minutes after a cold start (12 minutes in GPS only mode)	
Signal Gain	40 dB	
Antenna Gain:	≥ 3.5 dBic / ≥ 3 dBic	
Power Supply	5 V DC (via antenna cable)	
Nominal Impedance:	50 Ohm	
Connection Type:	SMA female / Antenna	
Cable:	shielded coaxial line (Belden H155) Cable lenght: deductible up to max. 70m	
Backup Battery Type:	CR2032 – button cell lithium battery. The hardware clock and the RAM are battery buffered. When the main power supply fails, the hardware clock runs free on quartz basis and the almanac data is stored in the RAM. Life time of lithium battery: min. 10 years	



WARNING!

Working on the antenna system during thunderstorms



Danger to life due to electrical shock!

- Do not carry out any work on the antenna system or the antenna cable if there is a risk of a lightning strike.
- Do not carry out any work on the antenna system if the safety distance to free lines and sequential circuits is exceeded.

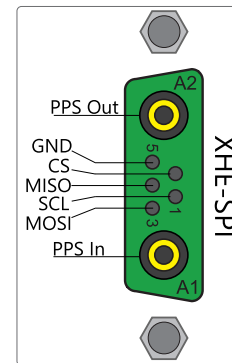
4.4 XHE-SPI

Pin Assignment of the optional XHE-SPI Connectors:

A1: PPS In
A2: PPS Out

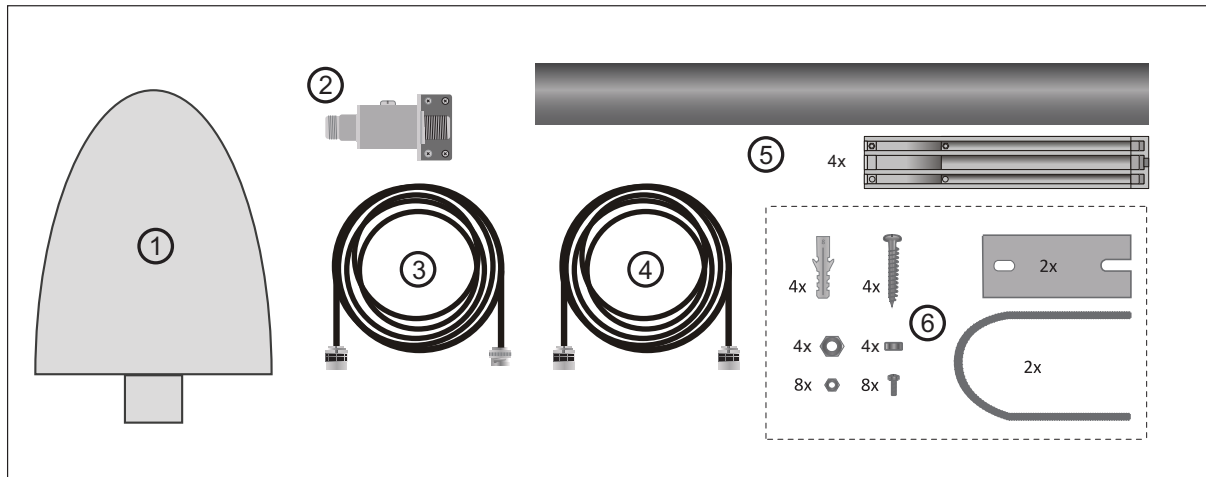
Pin 1: SCL_Out (SPI Clock)
Pin 2: CS (Chip Select)
Pin 3: MOSI (Master Out, Slave In)
Pin 4: MISO (Master In, Slave Out)
Pin 5: GND

Attention: Use this plug only to connect a Meinberg IMS-XHE^{Rb} Rubidium expansion chassis.



5 Before you start

5.1 Scope of delivery



Included in delivery of a Meinberg GNM181 receiver module:

1. GNSS Multi Band antenna
2. Surge voltage protector (optional)
3. 20 m Antenna cable (Belden H155)
4. Coax cable for surge voltage protector (optional)
5. Retaining tube and clips for Meinberg GNSS-Multi Band antenna
6. Mounting kit for Meinberg GNSS-Multi Band antenna

Carefully unpack the system and all accessories and put them aside. Check the scope of delivery with the packing list to ensure that no parts are missing. If any of the listed contents are missing, please contact Meinberg Funkuhren.

Check the system for shipping damage. If the system is damaged or cannot be put into operation, contact Meinberg Funkuhren immediately. Only the recipient (the person or company receiving the system) can assert a claim against Freight Forwarder for shipping damage.

Meinberg recommends that you keep the original packaging materials for possible future transport.

5.2 Disposal of Packaging Materials



The packaging materials we use are fully recyclable:

Material	Use for	Disposal
Cardboard	shipping packaging, accessories packaging	Paper recycling
Foil	shipping packaging, accessories packaging	Household waste or recycling depot

6 System Installation

6.1 Important Hints for hot-pluggable IMS Modules

The following points should be strictly observed when replacing IMS modules during operation. Not all IMS modules are fully hot-pluggable. Of course, it is not possible to replace a power supply unit of a non-redundant system without first having installed a second power source in operational mode.

The following applies to the individual IMS slots:

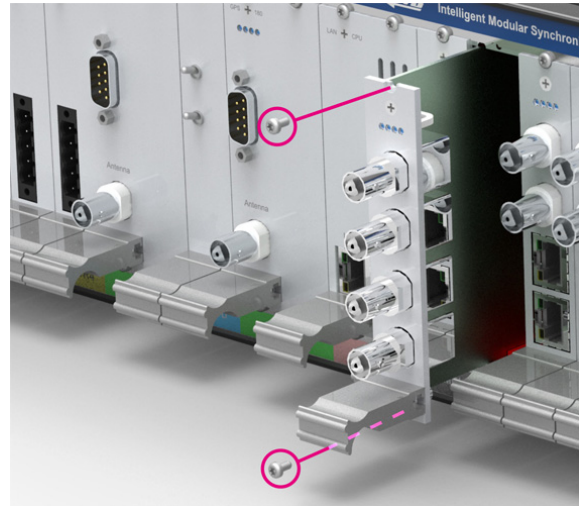
PWR:	"hot swappable"	If you operate your system with only one power supply, a second power supply must be installed before removing/replacing it to keep your system functioning.
I/O, ESI and MRI Slots:	"hot swappable".	
CLK1, CLK2:	"hot swappable"	Afer the exchange or the installation of a clock module a rescan of the reference clocks (Rescan Refclocks) must be executed in the web interface menu "System".
CPU	<u>not</u> "hot swappable"	The central management unit must be disconnected from mains before replacement.
RSC/SPT	<u>not</u> "hot swappable"	The RSC switching card must be disconnected from the mains before the replacement.

6.2 Replacement or Installation of a Hot-pluggable IMS Module

If the system is supplied with an antenna and antenna cable, it is advisable to first mount the antenna in a suitable location (see chapter Antenna Mounting) and lay the antenna cable.

Please use a Torx screwdriver (T8 x 60) for removal and installation of the module.

1. Follow the safety instructions at the beginning of this manual!
2. Remove the two marked Torx screws from the module holder plate or the cover plate of the empty slot.
3. **Note when removing!**
Pull the module carefully out of the guide rail. Note that the module is firmly anchored in the connector block of the housing. You need a certain amount of force to release the module from this link. Once the connection to the connector block of the system's backplane is loosened, the module can be easily pulled out.



4. **Note during installation!**
Please ensure that the module is correctly inserted into the two guide rails of the system housing as otherwise damage to the module and the housing could be caused. Make sure that the module is securely locked into the connector block before you fasten the two screws.
5. Now you can put the installed module into operation.



Attachment points of an 1U IMS system

6.3 Installation GNSS Multiband Antenna

**WARNING!**

Antenna mounting without effective anti-fall protection

Danger to life due to fall!

- Pay attention to effective working safety when installing antennas!
- Never work without an effective anti-fall equipment!

**WARNING!**

Working on the antenna system during thunderstorms

Danger to life due to electrical shock!

- Do not carry out any work on the antenna system or the antenna cable if there is a risk of a lightning strike.
- Do not carry out any work on the antenna system if the safety distance to free lines and sequential circuits is exceeded.



1. Selection of the Antenna location

To receive enough satellites, select a location that allows an unobstructed view of the sky, otherwise there may be problems with the synchronization of the system. There should be no obstacle in the line of sight between the antenna and the satellites. In addition, the antenna must not be installed under high-voltage lines or other electrical light or electric circuits.

Installation conditions for optimal operation:

- Free view from 8° above the horizon or
- free view towards equator (if free view of 8° not possible) or
- clear view between 55th southern and 55th northern latitude (satellite orbits).

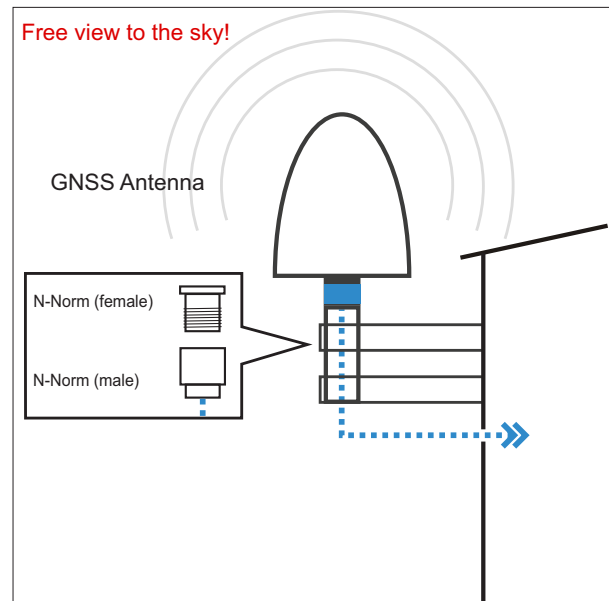
If this view is also restricted, there may be complications in case four satellites have to be found for a calculation of a new position.

Antenna Mounting

1.

Mount the antenna at a minimum distance of 50 cm from other antennas to an vertical pole up to 60 mm outer diameter or on a wall with the mounting kit included in the scope of delivery.

Then connect the antenna cable (Belden H155) to the N-Norm connector of the antenna. Lead the other end of the cable through the wall into the building.

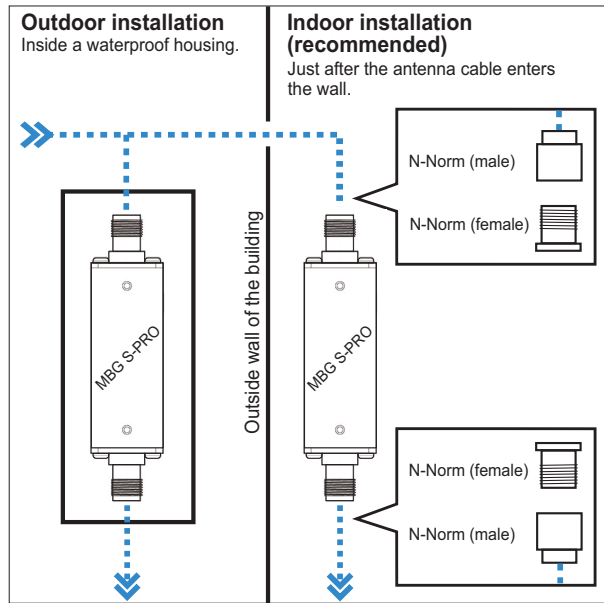


Make sure that the maximum cable length is kept when installing the antenna cable between the antenna and receiver. This depends on the type of cable used (H155, RG58) and its damping factor.

2.

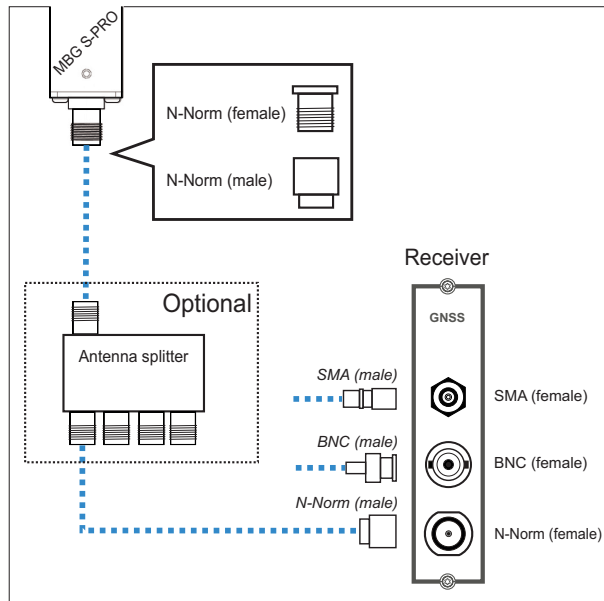
The optional overvoltage protection MBG S-PRO can be mounted now. This is also suitable for outdoor installation (protection class: IP55). However, Meinberg recommends an installation in closed rooms, just after the antenna cable has entered the wall, in order to reduce the risk of overvoltage damage, e.g. due to lightning strikes.

Connect the other side of the antenna cable to the surge protection socket.



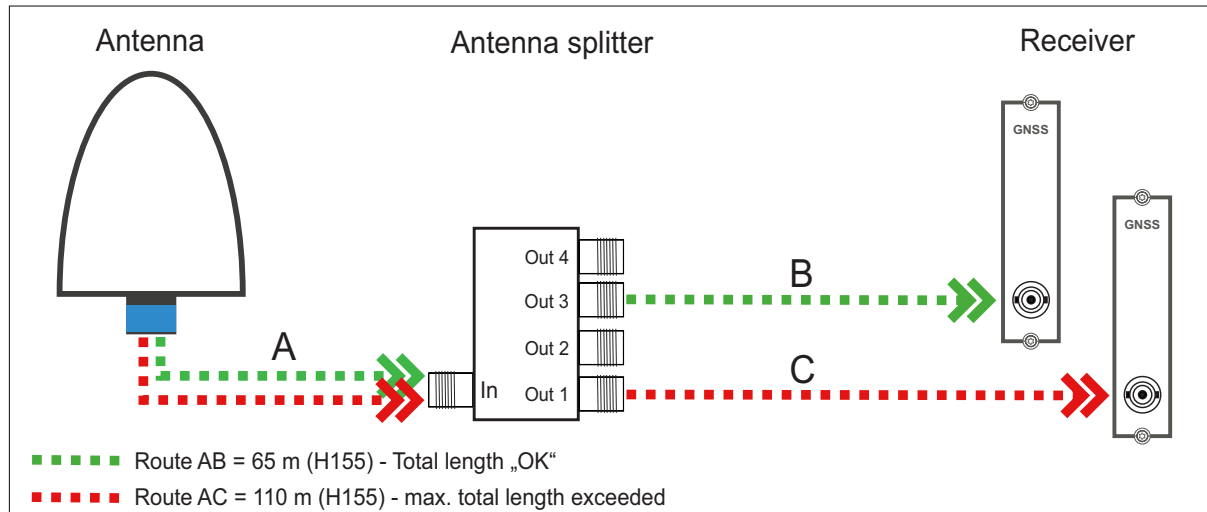
3.

The next step is to connect the supplied coaxial cable between the surge protector and receiver.



Antenna splitter option

Several receivers can be connected to one antenna via the antenna splitter. Make sure, that the total length of a route going from the antenna via the splitter to the receiver, does not exceed the maximum cable length. The splitter can be installed at any position between antenna or, if used, the surge protector and receiver.



Compensation the signal propagation time of the antenna cable

The receiving satellite signal is delayed by the used coaxial cable. The connected receiver must compensate the signal propagation time of the antenna cable, therefore you need to enter the length of the antenna cable in meters or the compensation time in nanoseconds into the settings of your receiver.

Antenna Cable Length (m):

Cable	Delay	Usage
RG58U	5 ns/m	for GPS180 and GNS-UC
H155	4 ns/m	for GNS180 and GNM

By entering the cable length (from antenna to receiver), the system calculates the delay time and compensates it automatically. The default value of 20 m is preconfigured at delivery.

For other coaxial cable types please use the option "**by delay**". The delay must be calculated by yourself by using the information in the data sheet of the respective coaxial cable.

6.4 Connecting the System

Make sure that all required interfaces of the module are connected. If your PC/laptop only provides USB ports, a serial/USB adapter is required when establishing a serial connection between COM 0 (clock) and serial port (laptop).

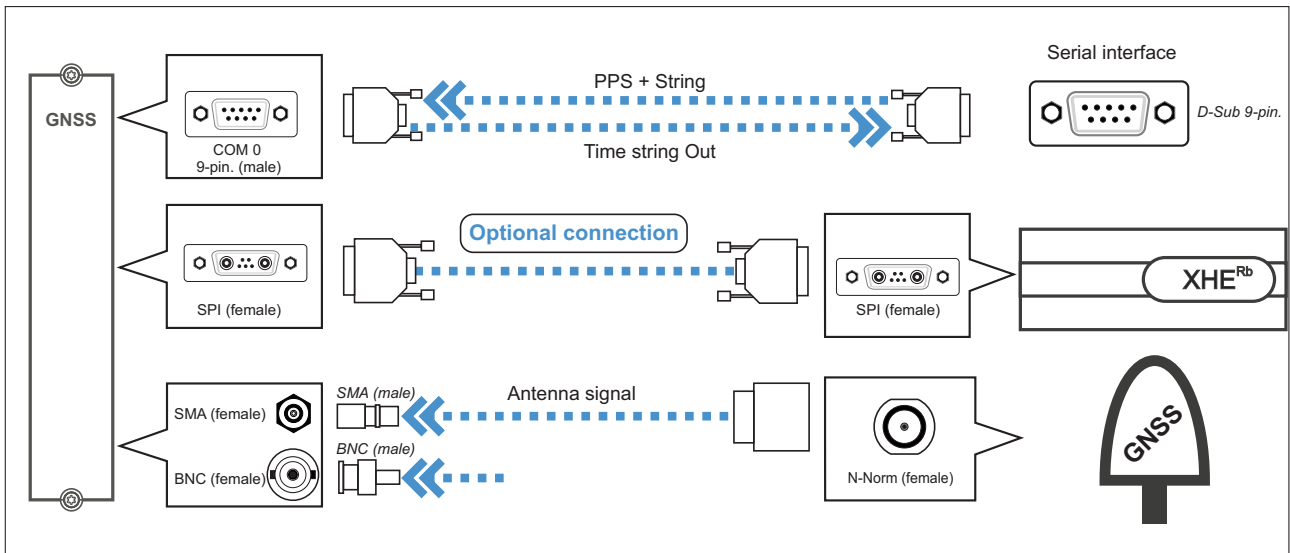


Figure: Connection scheme of the module

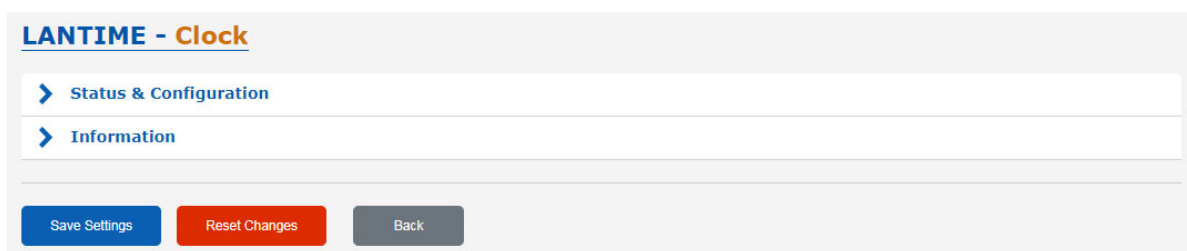
The following section describes how you can initially put a clock module into operation by using the Web Interface.

7 Configuration of GNSS Receiver

This chapter explains how to put an IMS-GNSS receiver into operation via the web interface and also via the front panel (if available).

7.1 Clock

On this page of the web interface, configurations can be made on the respective installed reference clocks or the changeover card.

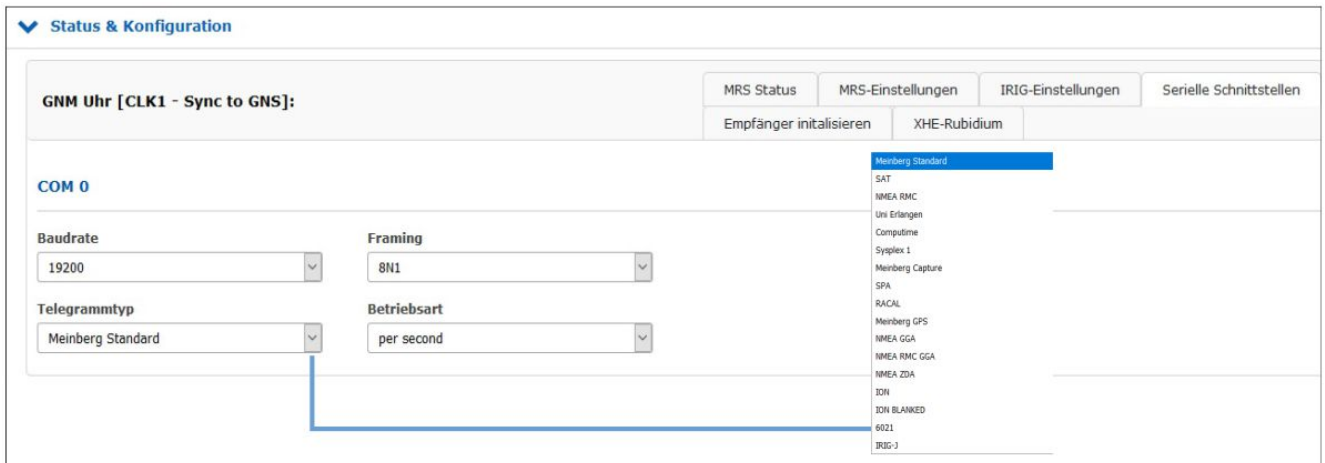


Depending on the design of the system, which means whether it is a single reference clock or a system with two installed remote clocks and a changeover card, the web interface builds up accordingly. This also applies to the type of reference clock and its options. In case of a redundant receiver configuration the common settings for "IRIG In/Out", "Serial Ports", "Time Zone", "Enable Outputs", "Programmable Pulses" and "Synthesizers" appears into the "Switch Card" menu.

Figure: Menu "Clock" in case of a single receiver

7.1.1 Serial Interfaces

Depending on the number and version of the system, the parameters for the serial interfaces can be configured in this menu.



- Baudrate:** The speed with which the serial telegram is to be transmitted:
300, 600, 1200, 2400, 4800, 9600, 19200
- Framing:** Structure of the telegram:
7E1, 7E2, 7N2, 7O1, 7O2, 8E1, 8E2, 8N1, 8N2, 8O1
- String Type:** Meinberg Standard, SAT, NMEA RMC, Uni Erlangen, Computime, Sysplex 1, Meinberg Capture, SPA, RACAL, Meinberg GPS, NMEA GGA, NMEA RMC GGA, NMEA ZDA, ION, 6021, IRIG-J
- Mode:** You can configure an interval (per second, per minute, on request "?" Only) for the outgoing time string. If the operating mode is set on "Request", a connected client must send a "?" to receive the time telegram in response.

Features:

MRS PPS Plus String

If the system has the MRS "PPS plus string" option, the baudrate and framing for the incoming time string must be configured via this submenu.

Meinberg Capture *only for specific units*

This option is for systems that have a cap input. The event is triggered by a negative edge.

Two operating modes are available for the output of the capture time stamps, "on request ? Only" and "automatically".

on request "?" only

The triggered events are stored in a buffer of the reference clock. As soon as a "?" is sent to the reference clock via a serial connection, the stored events are transferred from the buffer.

automatically

In this mode, the capture events are output directly on the serial interface.

7.1.2 Time Zone

In this menu, you can configure the time zones (offsets) for the output signals (IRIG, serial interface, programmable pulses) of the reference clock.

The screenshot shows the 'Switch Card' menu with the 'Time Zone' tab selected. Below the menu, there is a dropdown menu for 'Time Zone for External Outputs' currently set to '(UTC+1) - CET/CEST'. Below the dropdown, there is a red link that says 'Edit the time zone table in the display section of the system page. (Link)'.

The data of the time zone are used from the time zone table (see chapter ?? System → Display).

7.1.3 Enabling the Outputs

The screenshot shows the 'Switch Card' menu with the 'Time Zone' tab selected. Below the menu, there are three dropdown menus: 'Pulses', 'Serial Outputs', and 'Synthesizer'. The 'Pulses' dropdown is open, showing options 'Always', 'If Sync', and 'Always' (highlighted). The 'Serial Outputs' dropdown is set to 'Always'. The 'Synthesizer' dropdown is set to 'Always'.

Optionally, the outputs of the reference clock can be set to always supply a signal when the device is switched on, or only when the internal clock is running synchronously.

7.1.4 Miscellaneous

This menu item displays specific options of the reference clock.

▼ Status & Konfiguration

GNM Uhr [CLK1 - Sync to GNS]:

MRS Status	MRS-Einstellungen	IRIG-Einstellungen	Serielle Schnittstellen
Verschiedenes	Empfänger initialisieren	XHE-Rubidium	

Satellitennavigationssystemmodus

GPS

GLONASS

BEIDOU

GALILEO

Kompensationsmethode

Nach Länge Nach Laufzeit

Länge Antennenkabel

m

Ausgleichszeit

ns

Simulationsmodus

Antenna Cable Length (m):

The receiving satellite signal is delayed by the used coaxial cable.

Cable	Delay	Usage
RG58U	5ns/m	for GPS180 and GNS-UC
H155	4ns/m	for GNS180 and GNM

By entering the cable length (from antenna to receiver), the system calculates the delay time and compensates it automatically. The default value is 20m and the maximum input value is 500m, which must not be exceeded.

For other coaxial cable types please use the option "**by delay**". The delay must be calculated by yourself by using the information in the data sheet of the respective coaxial cable.

Simulation Mode:

This menu allows the user to operate the time server without an antenna. Normally, the NTPD loses synchronization when the antenna or the external reference source is disconnected (red FAIL LED is turned on). By activating the simulation mode, the corresponding status information for the NTPD is permanently set to SYNC. This also makes it possible to transmit other times, which have been entered via the menu item "Initialize the receiver", to the NTPD. In normal cases, the checkbox should remain empty. If this box is activated, the status "Simulation mode" is displayed under "Info of the receiver" in the main menu.

GPS Time Scale:

UTC Coordinated Universal Time (including leap seconds which are continuously updated)

GPS since 1st of January 1980 - GPS System Time: monotonous time scale without leap seconds. Includes the leap seconds from 1970-1980.

TAI since the 1st of January 1970 - International Atomic Time: monotonous time scale without leap seconds. Difference to GPS Time: 19 seconds.

If you change the timescale in the drop-down menu a warning message will appear in the browser window.

Please Note:

If the GPS receiver is configured to output GPS or TAI timescale instead of UTC, the distributed time via NTP isn't based on UTC then. This is a protocol violation and this time server can't be used to synchronize standard NTP clients which expect UTC time.

Log Satellite Visibility (GPS Receiver):

If this item is activated, a graphic is generated on which the constellation of the visible satellites are displayed.

SSM Quality Level in GPS Lock Mode:

If the system has E1 / T1 outputs, the quality level of the SSM can be configured here.

SNS Mode - Satellite Navigation System Mode (GNS Receiver):

If you are using a GNS receiver (GNS or GNS-UC with Up Converter), this drop-down menu allows you to select one or more satellite systems to be used simultaneously.

The following combinations can be selected and received simultaneously:

GNS Receiver	GNS-UC Receiver	GNM-Receiver
GPS only	GPS only	GPS
GLONASS only	Galileo only	GLONASS
Galileo only	GPS/Galileo	Galileo
BeiDou only		BeiDou
GPS/GLONASS		(All available satellite systems can be received simultaneously)
GPS/Galileo		
GPS/BeiDou		
Galileo/GLONASS		
Galileo/BeiDou		
GLONASS/BeiDou		
GPS/Galileo/GLONASS		
GPS/Galileo/BeiDou		

7.1.5 Initialize Receiver

▼ Status & Konfiguration

GNM Uhr [CLK1 - Sync to GNS]:

MRS Status
MRS-Einstellungen
IRIG-Einstellungen
Serielle Schnittstellen

Verschiedenes
Empfänger initialisieren
XHE-Rubidium

Breitengrad

°
 '
 "

N ▼

Längengrad

°
 '
 "

E ▼

Höhe

Warm Boot Mode only for GNSS receiver:

This menu allows the user to switch the receiver to WARMBOOT MODE. This may be necessary if the satellite data in the battery-buffered memory is too old, or if the device is operated at a location that is several hundred kilometers away from the last operating location, since the calculation of the visibility of the satellites yields incorrect results.

Cold Boot Modus only for GNSS receiver:

This menu allows the user to reinitialize all GPS system values, this means that all stored satellite data will be deleted. Please note that the receiver takes about 15 minutes to read-in the information of the satellites again, to complete the cold boot!

Coordinates (latitude, longitude, and altitude) *only GNSS receiver:

The absolute position of the GPS antenna can be entered here and can be sent to the GPS reference clock with "initialize Position". This option is useful when the system is operated at a different location and if started with the previously battery-buffered satellite data.

Time/Date:

With this function, the reference clock can manually be set to a specific date and time.

7.1.6 Receiver Information

Information

GNM Uhr [CLK1]:

Allgemeine Informationen Empfänger-Informationen

Name	Wert
Modell:	GNM181
Seriennummer:	035911006590
Software Revision:	v2.53 (Standard)
Oszillator Typ:	OCXO MQ
Unterstützte Funktionen:	Pulse Per Second, Programmable Synth., IRIG Out, IRIG In, Ignore Lock, Ext. Multiple Ref. Src. Cfg., Configurable Time Scale, Multiple XMRS Instances, Event Logging, IMS data, Extended Features
Anzahl programmierbarer Impulsausgänge:	4
Anzahl serieller Schnittstellen:	3

This menu item lists all the important information and options of the reference clock.

Explanation of GPS Satellite Status "Satellites in View" and "Number of Good Satellites"

Satellites of the GPS and other GNSS systems are usually not stationary, but circle around the globe on well-known tracks, so each individual satellite may be above or below the horizon at a given location and time. Satellites that are below the horizon can't be tracked anyway, so the receiver uses its last known position and almanac data from the satellites to determine which satellites are currently expected to be above the horizon at its geographic position, and can potentially be tracked. All these satellites are called to be **in view**.

However, even some the satellites that are in view may be shielded by buildings, mountains, etc., so the receiver may be unable to track these satellites. Also, individual satellites may be temporarily in maintenance mode, so they must not be used even if they can be tracked. Only satellites that can be tracked and are not in maintenance mode are considered **good** and used to determine the current position and time.

So the number of **good** satellites can never exceed the number of satellites in view, but it can be significantly less if the antenna has been installed in a location with limited view to the sky. In worst case this can lead to limited accuracy, or only temporary synchronization.

7.1.7 Switch Card

The RSC (SCU) switch card is an automatic multiplexer for redundant systems with two Meinberg radio clocks. The card is used for the automatic switching of the pulse and frequency outputs as well as the serial interfaces of the connected clocks. The selection of the respectively active system is made, based on the state of the clock's generated TIME_SYNC signals, which show the synchronous state of the clocks.

In order to avoid unnecessary switching operations, for example during periodic free running of a system, the order of the active and the reserve system is exchanged at every change-over. For example, if the active system switches to the free running mode while the reserve system is operating synchronously, it is switched over to the synchronous reserve system. A reset to the old state occurs only if the now active system (formerly the reserve system) loses synchronization, while the reserve system (previously active system) operates synchronously. If both systems operate in the free-running mode, no changeover is made and the current state is retained.

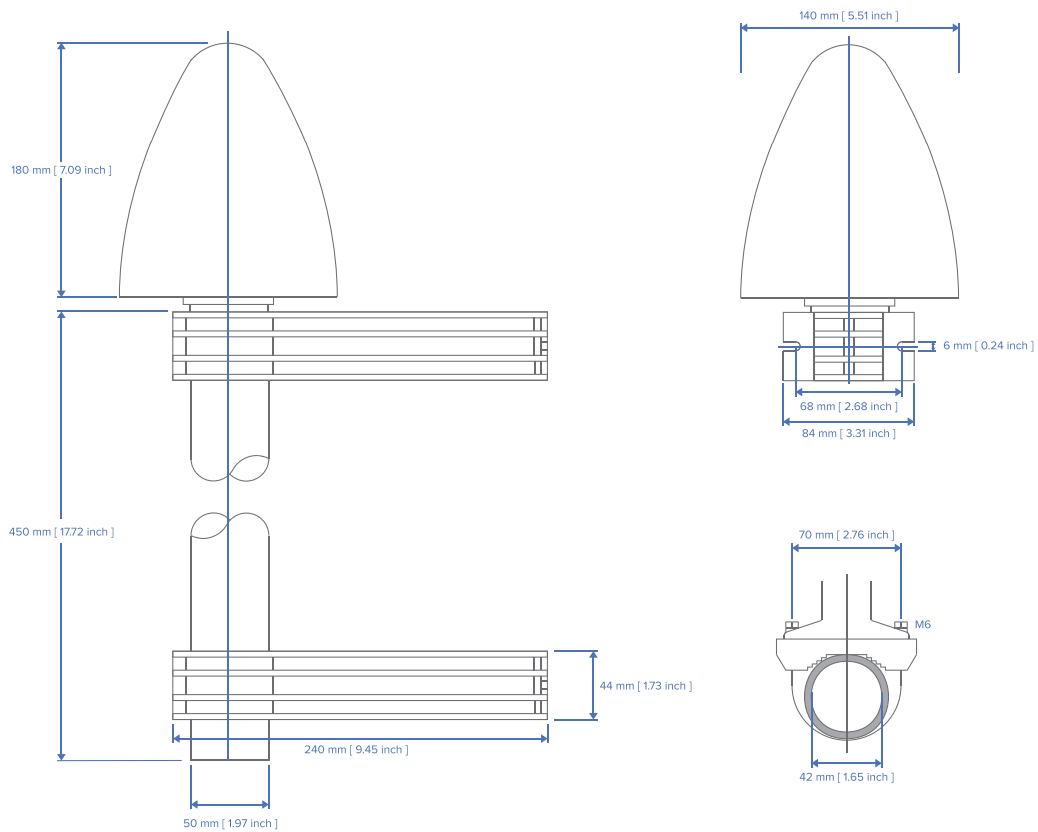
7.1.8 Receiver Information Switch Card

Switch Card:	
Common Information	
Name	Value
Model:	RSC180
Serial Number:	053211002280
Software Revision:	v1.22 (Standard)
Oscillator Type:	[unknown]
Supported Features:	
Number of Programmable Pulse Outputs:	3
Number of Serial Ports:	3

This menu item lists all the important information and options of the switch card.

8 Technical Specifications GNSS Multiband Antenna

Physical Dimensions:



Specifications:

Power supply:	5 V - 16 V, 24 mA (via antenna cable)
Antenna-input GNSS:	Antenna circuit insulated, dielectric strenght 1000V
Frequency ranges:	1164 MHz to 1254 MHz and 1525 MHz to 1606 MHz
Overall LNA gain:	37 dB typ, 35 dB min
LNA noise figure:	2.5 dB typ at 25 °C

Supported frequency bands:

GPS	L1/L2/L5
GLONASS	G1/G2/G3
Beidou	B1/B2
Galileo	E1/E5a+b plus L-band

Out-of-band rejection:

Freq. Band L5/E5/L2/G2	Frequency	Gain
	< 1050 MHz	> 45 dB
	< 1125 MHz	> 30 dB
	< 1350 MHz	> 45 dB

Freq. Band L1/E1/B1/G1	Frequency	Gain
	< 1450 MHz	> 30 dB
	< 1690 MHz	> 30 dB
	< 1730 MHz	> 40 dB

Connector:	N-Norm, female
Form factor:	ABS plastic case for outdoor installation
Protection class:	IP66
Humidity:	95%
Temperature range:	-40 °C to +85 °C (-40 to 185 °F)
Weight:	1.6 kg (3.53 lbs) incl. mounting kit

8.1 MBG S-PRO - Technical Specifications

Attachment plug with replaceable gas discharge tube for coaxial signal interfaces. Connection: N connector female/female. The MBG S-PRO set includes a surge voltage protector (Phoenix CN-UB-280DC-BB), a pre-assembled coax cable and a mounting bracket.

The surge voltage protector for coaxial lines has to be installed in the antenna line. The shield has to be connected to earth as short as possible. CN-UB-280DC-BB is equipped with two type-N female connectors. It has no dedicated input/output polarity or preferred mounting orientation.



Phoenix CN-UB-280DC-BB

Features:

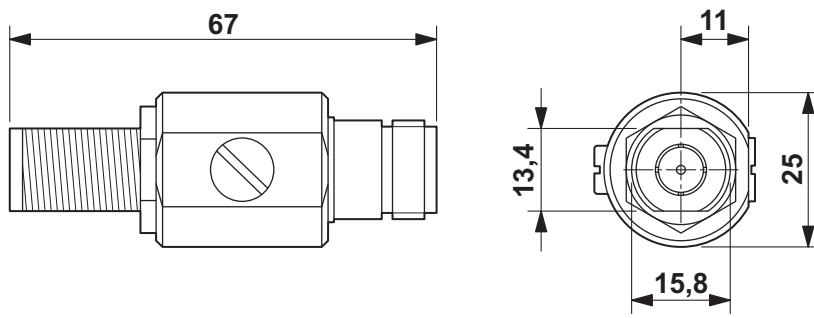
- High RF Performance
- Multiple Strike Capability
- 20 kA Surge Protection
- Bi-directional Protection

Mounting type	Connection-specific intermediate plugging	
Type	Attachment plug	
Direction of action	Line-Shield/Earth Ground	
Maximum continuous operating voltage	UC (wire-ground) 195 V AC	280 V DC
Nominal current	I_N	5 A (25 °C)
Operating effective current	I_C at UC	$\leq 1 \mu\text{A}$
Nominal discharge current	I_n (8/20) μs (Core-Earth) I_n (8/20) μs (Core-Shield)	20 kA 20 kA
Total surge current	(8/20) μs (10/350) μs	20 kA 2,5 kA

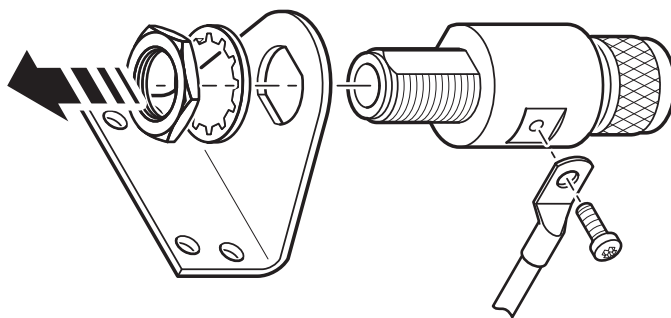
Max. discharge current	I_{\max} (8/20) μ s maximum (Core-Shield)	20 kA
Nominal pulse current	I_{an} (10/1000) μ s (Core-Shield)	100 A
Impulse discharge current	(10/350) μ s, peak value I_{imp}	2,5 kA
Output voltage limitation	at 1 kV/ μ s (Core-Earth) spike at 1 kV/ μ s (Core-Earth) spike	≤ 900 V ≤ 900 V
Response time	tA (Core-Earth) tA (Core-GND)	≤ 100 ns ≤ 100 ns
Input attenuation	aE, asym.	typ. 0.1 dB (≤ 1.2 GHz) typ. 0.2 dB (≤ 2.2 GHz)
Cut-off frequency	f_g (3 dB), asym. (shield) in 50 Ohm system	> 3 GHz
Standing wave ratio	SWR in a 50 Ω system	typ. 1.1 (≤ 2 GHz)
Permissible HF power	P_{\max} at VSWR = xx (50 ohm system)	700 W (VSWR = 1.1) 200 W (VSWR = ∞)
Capacity	(Core-Earth) asymmetrical (shield)	typ. 1,5 pF typ. 1,5 pF
Surge current resistance	(conductor-ground)	C1 - 1 kV/500 A C2 - 10 kV/5 kA C3 - 100 A D1 - 2,5 kA
Ambient temperature	(operation)	-40 °C ... 80 °C
Altitude		≤ 2000 m (above sea level)
Degree of protection		IP55
Housing material		Nickel-plated brass Color nickel
Dimensions		Height 25 mm, Width 25 mm, Depth 67 mm
Connection data	IN OUT	N-Connector 50 Ohm N-Connector Buchse N-Connector Buchse
Standards/regulations		IEC 61643-21 2000 + A1:2008 EN 61643-21 2001 + A1:2009

Source: PHOENIXCONTACT.COM Surge Voltage Protector - CN-UB-280DC-BB

8.1.1 MBG S-PRO - Physical Dimensions



8.1.2 Installation and Grounding



9 RoHS and WEEE

Compliance with EU Directive 2011/65/EU (RoHS)

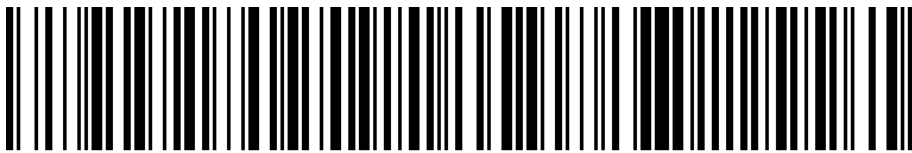
We hereby declare that this product is conform to the European Directive 2011/65/EU and its delegated directive 2015/863/EU "Restrictions of Hazardous Substances in Electrical and Electronic Equipment". We ensure that electrical and electronic products sold in the EU do not contain lead, cadmium, mercury, hexavalent chromium, polybrominated biphenyls (PBBs), and polybrominated diphenyl ethers (PBDEs), Bis (2-ethylhexyl)phthalat (DEHP), Benzylbutylphthalat (BBP), Dibutylphthalat (DBP), Diisobutylphthalat (DIBP), above the legal threshold.



WEEE status of the product

This product is handled as a B2B (Business to Business) category product. In order to secure a WEEE compliant waste disposal it has to be returned to the manufacturer. Any transportation expenses for returning this product (at its end of life) have to be incurred by the end user, whereas Meinberg will bear the costs for the waste disposal itself.





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