



## MANUAL

### GOAL-S

#### GPS Optical Antenna Link Singlemode

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Meinberg Funkuhren GmbH & Co. KG



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# 1 Imprint

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## 2 Important Safety Information

### 2.1 Important Safety Instructions and Protective Measures

The following safety instructions must be respected in all operating and installation phases of the device. Non-observance of safety instructions, or rather special warnings and operating instructions in product manuals, violates safety standards, manufacturer instructions and proper usage of the device. Meinberg Funkuhren shall not be responsible for any damage arising due to non-observance of these regulations.



Depending on your device or the installed options some information is not valid for your device.



The device satisfies the requirements of the following EU regulations: EMC-Directive, Low Voltage Directive, RoHS Directive and - if applicable - the Radio Equipment Directive.

If a procedure is marked with the following signal words, you may only continue, if you have understood and fulfilled all requirements. In this documentation dangers and indications are classified and illustrated as follows:



#### **DANGER!**

The signal word indicates an imminently hazardous situation with a high risk level . This notice draws attention to an operating procedure or similar proceedings, of which a non-observance may result in serious personal injury or death .



#### **WARNING!**

The signal word indicates a hazard with a medium risk gradient . This notice draws attention to an operating procedure, a procedure or the like which, if not followed, can lead to serious injuries , possibly resulting in death .



#### **CAUTION!**

The signal word indicates a hazard with a low risk gradient . This notice draws attention to an operating procedure, a procedure or the like which, if not followed, can lead to minor injuries .
















#### **ATTENTION!**

This notice draws attention to an operating procedure, a procedure or the like which, if not followed, can cause damage to the product or loss of important data .

## 2.2 Used Symbols

The following symbols and pictograms are used in this manual. To illustrate the source of danger, pictograms are used, which can occur in all hazard classes.

Symbol	Beschreibung / Description
	IEC 60417-5031 Gleichstrom / <i>Direct current</i>
	IEC 60417-5032 Wechselstrom / <i>Alternating current</i>
	IEC 60417-5017 Erdungsanschluss / <i>Earth (ground) terminal</i>
	IEC 60417-5019 Schutzleiteranschluss / <i>Protective earth (ground) terminal</i>
	ISO 7000-0434A Vorsicht / <i>Caution</i>
	IEC 60417-6042 Vorsicht, Risiko eines elektrischen Schlages / <i>Caution, risk of electric shock</i>
	IEC 60417-5041 Vorsicht, heiße Oberfläche / <i>Caution, hot surface</i>
	IEC 60417-6056 Vorsicht, Gefährlich sich bewegende Teile / <i>Caution, moving fan blades</i>
	IEC 60417-6172 Trennen Sie alle Netzstecker / <i>Disconnection, all power plugs</i>
	IEC 60417-5134 Elektrostatisch gefährdete Bauteile / <i>Electrostatic Sensitive Devices</i>
	IEC 60417-6222 Information generell / <i>Information general</i>
	ISO 7000-1329 Laserstrahl / <i>Laser beam</i>
	2012/19/EU Dieses Produkt fällt unter die B2B Kategorie. Zur Entsorgung muss es an den Hersteller übergeben werden. <i>This product is handled as a B2B category product. In order to secure a WEEE compliant waste disposal it has to be returned to the manufacturer.</i>

The manuals for a product are included in the scope of delivery of the device on a USB stick. The manuals can also be obtained via the Internet. Enter [www.meinbergglobal.com](http://www.meinbergglobal.com) into your browser, then enter the corresponding device name in the search field at the top.



This manual contains important safety instructions for the installation and operation of the device. Please read this manual completely before using the unit.

This device may only be used for the purpose described in this manual. In particular, the given limits of the device must be observed. The safety of the installation in which the unit is integrated is the responsibility of the installer!

Non-observance of these instructions can lead to a reduction in the safety of this device!

Please keep this manual in a safe place.

This manual is intended exclusively for electricians or persons trained by an electrician who are familiar with the applicable national standards and safety rules. Installation, commissioning and operation of this device may only be carried out by qualified personnel.



Depending on your device or the installed options, some information for your device may be invalid.

## 2.3 Security during Installation



### WARNING!

#### Preparing for Commissioning

This built-in unit, has been designed and examined according to the requirements of the standard IEC 60950-1 „Information Technology Equipment - Safety“.

When the built-in unit is used in a terminal (e.g., housing cabinet), additional requirements according to Standard IEC 60950-1 must be observed and complied with. In particular, the general requirements and the safety of electrical equipment (such as IEC, VDE, DIN, ANSI) as well as the applicable national standards are to be observed.

The device has been developed for use in the industrial sector as well as in residential areas and can only be used in such environments. For environments with higher levels of soiling, additional measures, e.g. Installation in an air-conditioned control cabinet required.

#### Transport, Unpacking, Installation

If the unit is brought into the operating room from a cold environment, condensation may occur, wait until the unit is temperature-controlled and absolutely dry before operating it.

When unpacking, setting up, and before operating the equipment, be sure to read the information on the hardware installation and the specifications of the equipment. These include, for example, dimensions, electrical characteristics, and necessary ambient and climatic conditions, etc.

The fire protection must be ensured in the installed state.

For mounting, the housing must not be damaged. No holes may be drilled in the housing.

For safety reasons, the device with the highest mass should be installed in the lowest position of the rack. Other devices must be placed from the bottom to the top.

The device must be protected against mechanical stress such as vibration or shock.





#### Connecting Data Cables

During a thunderstorm, data transmission lines must not be connected or disconnected (risk of lightning).

When wiring the devices, the cables must be connected or disconnected in the order of the arrangement described in the user documentation accompanying the device. Always attach all cables to the plug during connection and removal. Never pull the cable itself. Pulling the cable can cause the cables to disconnect from the plug.

Install the cables in way that they do not constitute a hazard (danger of tripping) and are not damaged, i.e. kinked.

#### Connecting Power Supply

This equipment is operated at a hazardous voltage. Non-observance of the safety instructions in this manual may result in serious personal injury or property damage.

Before connecting to the power supply, a grounding cable must be connected to the earth connection of the device.

Before operation, check that all cables and lines work properly and are undamaged. Pay particular attention to the facts that the cables do not have kinks or that they are not too short around corners, and no objects are placed on the cables. Also make sure that all connections are secure. Faulty shielding or cabling will endanger your health (electrical shock) and may destroy other equipment.

Ensure that all necessary safety precautions have been taken. Make all connections to a unit before turning on the power. Observe the safety instructions on the device (see safety symbols).

The metal housing of the device is grounded. It must be ensured that enough air and creepage distances to neighboring voltage-carrying parts are provided during assembly in the control cabinet and no short circuits are caused.

In the case of malfunctions or servicing (e.g. in the event of a damaged housing or power cable or when fluids or foreign objects enter), the current flow can be interrupted. Questions about the house installation, need to be clarified with your house administration.

The power supply should be connected with a short, low-inductance line.

AC Power Supply	DC Power Supply
<ul style="list-style-type: none"> <li>• The device is a device of protection class 1 and may only be connected to a grounded outlet (TN system).</li> <li>• For safe operation, the device must be protected by an installation fuse of max. 16 A and equipped with a residual current circuit breaker in accordance with the applicable national standards.</li> <li>• The unit must always be disconnected from the mains and not from the appliance.</li> <li>• Devices with mains plugs are equipped with a safety-tested mains cable of the country of use and may only be connected to a grounded shockproof socket, otherwise electric shock may occur.</li> <li>• Make sure that the mains socket on the appliance or the mains socket of the house installation is freely accessible to the user so that the mains cable can be pulled out of the socket in case of emergency.</li> </ul>	<ul style="list-style-type: none"> <li>• Outside the assembly group the device must be disconnectable from the power supply in accordance with the provisions of IEC 60950-1 (e.g. by the primary line protection).</li> <li>• Installation and disassembly of the power supply plug is only permitted if the assembly group is switched off (e.g. by the primary line protection).</li> <li>• The supply lines must be adequately secured and dimensioned.</li> </ul> <p style="text-align: center;"><i>Connection Cross Section:</i>  <math>1 \text{ mm}^2 - 2.5 \text{ mm}^2</math>  17 AWG – 13 AWG</p> <ul style="list-style-type: none"> <li>• The device must be supplied with a suitable disconnecter (switch). The separation device must be easily accessible, placed near the device and marked as a separation device for the unit.</li> </ul>

## 2.4 Protective Conductor- / Ground-Terminal



ATTENTION!



In order to ensure safe operation and to meet the requirements of IEC 62368-1, the device must be correctly connected to the protective earth conductor via the protective earth connection terminal.



If an external earth connection is provided on the housing, it must be connected to the equipotential bonding rail (grounding rail). The mounting parts (without cable) are included in the scope of delivery.

**Note:**

Please use a grounding cable  $\geq 1.5 \text{ mm}^2$   
Always pay attention to a correct crimp connection!

## 2.5 Fuse Replacement



### WARNING!

This equipment is operated at a hazardous voltage.  
**Danger to life due to electrical shock!**



- Disconnect the device from the mains! To do this, press the disconnecter (switch). Then, loosen the locking screws of the supply plug (if present) and pull it off.
- Disconnect all signal lines such as, antenna, fault message relay contact and serial interfaces from the device.
- Replace the fuse.
- Reconnect all cables in reverse order. If necessary, turn on the power again.

### Example of fuse marking: *T 2.5 A H 250 V*

Trigger Characteristic: T (slow)

Nominal Current A: 2.5 Ampere

Switching Capacity: H (high)

max. Voltage: 250 V

AC Power Supply	DC Power Supply
Have the spare fuse ready, pay attention to the correct rated current, characteristics and type.  <u>Important:</u> The fuse must be approved for operation at (AC) voltage!	Have the spare fuse ready, pay attention to the correct rated current, characteristics and type.  <u>Important:</u> The fuse must be approved for DC operation!
Fuse Type:  T <i>Current A / voltage V</i> in accordance with IEC 60127 with or without extinguishing agent T = Time-lag / SB = SlowBlow	Fuse Type:  T <i>Current A / voltage V</i> in accordance with IEC 60127 with extinguishing agent T = Time-lag / SB = SlowBlow
Dimensions:  5 x 20 mm	Dimensions:  5 x 20 mm

## 2.6 Fiber Optic



**WARNING!**  
Laser Class 1  
**Risk of injury from laser!**



The optical interface conforms to Laser Class 1 in accordance with IEC 60825-1. It is equipped with a light-emitting diode (LED) that may under certain circumstances generate a laser beam stronger than Laser Class 1. Do not look directly into this beam as this is hazardous to one's health. The connector for optical interfaces may not be removed while the device is in operation as this may result in damage to the eyes.

## 2.7 Safety during Operation



**WARNING!**

### Avoiding Short-Circuits

Make sure not to get any objects or liquids inside the unit. Electric shock or short circuit could result.

### Ventilation Slots

Make sure that the ventilation slots are not covered or dusty, as there is a danger of overheating during operation. Disturbances during operation can result.

### Normal Operation

The normal operation and the observance of the EMC limits (electromagnetic compatibility) are only ensured if the housing cover is properly installed and when the doors are closed (cooling, fire protection, shielding against electrical, magnetic and electromagnetic fields).



### Switch off in fault / service case

By switching off, the devices are not disconnected from the power supply. In the event of a fault or service case, the devices must be immediately disconnected from all power supplies.

### **Follow the steps below:**

- Switch off the device
- Disconnect all power plugs
- Inform the service
- Devices that are connected via one or more uninterruptible power supplies (UPS) remain operational even when the UPS power cord is disconnected. Therefore, you must put the UPS out of operation according to the documentation of the corresponding user documentation.

## 2.8 Safety during Maintenance



### WARNING!

When you are expanding the device, use only device parts that are approved for the system. Non-observance may result in injury to the EMC or safety standards and cause malfunction of the device.

If device parts, which are released for the system, are extended or removed there may be a risk of injury in the area of the hands, due to the pull-out forces (approx. 60 N).

The service informs you which device parts may be installed.

The device must not be opened, repairs to the device may only be carried out by the manufacturer or by authorized personnel. Improper repairs can result in considerable danger to the user (electric shock, fire hazard).

Unauthorized opening of the device or of individual parts of the device can also lead to considerable risks for the user and result in a loss of warranty as well as an exclusion of liability.



- Danger due to moving parts - keep away from moving parts.



- Device parts can become very hot during operation. Do not touch these surfaces! If necessary, switch off the unit before installing or removing any equipment, and allow it to cool down.

## 2.9 Cleaning and Care



### ATTENTION!

Do not wet clean the appliance! Penetrating water can cause considerable dangers to the user (e.g., electric shock).

Liquid can destroy the electronics of the device! Liquid penetrates into the housing of the device and can cause a short circuit of the electronics.

Only clean with a soft, dry cloth. Never use solvents or cleaners.

## 2.10 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.

## 2.11 Return of Electrical and Electronic Equipment



### ATTENTION!

**WEEE Directive on Waste Electrical and Electronic Equipment 2012/19 / EU**  
(WEEE Waste Electrical and Electronic Equipment)

#### Separate Collection

Product Category: According to the device types listed in the WEEE Directive, Appendix 1, this product is classified as an IT and communication device.



This product meets the labeling requirements of the WEEE Directive. The product symbol on the left indicates that this electronic product must not be disposed of in domestic waste.

#### Return and Collection Systems

For returning your old equipment, please use the country-specific return and collection systems available to you or contact Meinberg.

The withdrawal may be refused in the case of waste equipment which presents a risk to human health or safety due to contamination during use.

#### Return of used Batteries

Batteries marked with one of the following symbols may not be disposed of together with the household waste according to the EU Directive.



## 3 GOAL-S Features

GOAL-S is a GPS Optical Antenna Link - Set for connecting a Meinberg GPS antenna/converter (GNSS | IF | 15 V DC) with a Meinberg GPS receiver via a Single-Mode fiber.

The GOAL-S-R module is connected to the GPS antenna input of the receiver via a coaxial cable at receiver side and can be mounted directly or close to the receiver. The GOAL-S-A module is mounted inside the building and is connected to the Meinberg GPS antenna/converter unit via a coaxial cable.

The two modules are interconnected via E9/125 $\mu$ m single-mode fiber. This type of antenna connection has the following advantages:

- long antenna cable runs possible (up to 20km)
- no danger caused by overvoltage damage via the antenna cable
- tap-proof security communication through fiber optic connection

The GOAL-S/R module installed at receiver side is powered by the Meinberg GPS-IF receiver via the coaxial cable. The GOAL-S/A module, installed on the antenna side, requires an external power source for its own power supply for operation, as well as for powering the connected antenna. An unconnected antenna and a short circuit on the antenna line are indicated by a status LED.

An additional LED indicates that the 10MHz reference is being received by the GPS-IF receiver with sufficient signal strength and that the fiber optic link is working properly. Only when these two status LEDs are green the built-in FP laser is switched on. The switching-on of the laser is indicated by another status LED.

The system is suitable for the subsequent extension of existing Meinberg GPS systems. The following GPS receivers are suitable for use with a GOAL-S Antenna Link:

- GPS180
- GPS180SV
- GPS180PEX
- GPS180AMC
- GPS180XHS
- GNS181-UC

and older receivers of the series GPS163, GPS164, GPS165, GPS167, GPS168, GPS169 and GPS170 (but not GPS166!).

When using the GOAL-S Antenna link in combination with the GPS signal converter GPSTGEN1575, please note, that the function of connected GPS (L1) receivers from other manufacturers can not be guaranteed!

## 4 Connection

The maximum possible length of the SMF fiber optic connection (C) is 20km. However, this distance can only be achieved by using a continuous connection with a fiber type of category OS2 (0.4dB/km) without additional attenuating plug connections and with the shortest possible copper cable connection to the antenna (A) and the receiver (B). In particular, the copper cable between the GOAL-S-R and the GPS receiver should not be longer than 50m.

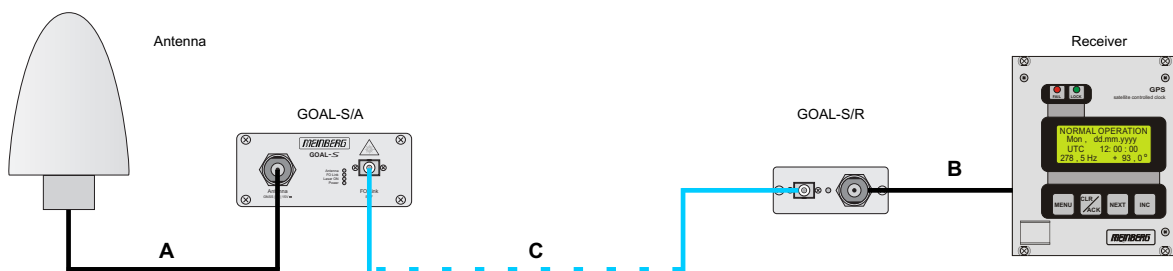


Figure: Connection Scheme GOAL-S

The signal propagation time of the antenna cable can be compensated via the GPS receiver (see manual of the receiver). The received time frame is delayed by approx. 5ns per meter antenna cable. This information applies to the copper cable as well as to the fiber optic cable. By entering the total cable length, this time error is compensated. When using the GOAL system, an additional value of 20m must be added to compensate for the constant signal delay caused by the electronics of the GOAL-S.

The "Antenna Faulty" and "Antenna Short-Circuit" warnings, generated by the GPS receiver, will only work if there is interference on the copper cable between the GOAL-S-R and the GPS receiver. Disturbances on the optical fiber link or the copper cable to the antenna can only be detected by loss of the received satellites, the GPS receiver changes to the "Warm Boot" operating mode.



### 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.

## 5 Technical Specifications

### 5.1 GOAL-S/A (Antenna Side)

<b>Antenna Input:</b>	Antenna circuit galvanically isolated, dielectric strength 1000 V IF frequency from converter: 35.4MHz mixed frequency to the converter: 10MHz supply voltage to the converter: 15 V DC, max. 100 mA
<b>FO Link:</b>	SC-APC connector for connecting an E9/125 $\mu$ m SMF Wavelength: 1550nm (transmit), 1310nm (receive)  coupling optical power:           max 1mW (0dBm) typ. 500 $\mu$ W (-3dBm)  optical input power:   min. 1 $\mu$ W (-30dBm)
<b>Status LEDs:</b>	Antenna:                   green:        antenna is connected red:         not connected or short circuit FO Link:                 green:       GOAL-S-R is connected red:         no successful connection to the GOAL-S-R Laser ON:               green:       laser is in operation off:         laser is off (antenna or FO-Link error) Power:                   green:       power OK off:         no power supply
<b>Connectors:</b>	SC-APC connector (FO Link) N-Norm socket (Meinberg GPS antenna/converter) power supply via 5pol. DFK connector
<b>Power Supply:</b>	100-240 V AC, (50/60Hz) optional: 20-60 V DC Power consumption: max. 5W
<b>Fuse:</b>	T 1A H 250 V
<b>Ambient Temperature:</b>	-25 ... 65° C
<b>Humidity:</b>	max 85%
<b>Chassis:</b>	black anodized aluminum housing with aluminum front and back wall
<b>Protection Class:</b>	IP30
<b>Phys. Dimensions:</b>	44mm x 105mm x 165mm (H x B x T)
<b>Classification according to IEC 60825-1:</b>	Laser class 1 the accessible laser radiation is safe under reasonably foreseeable conditions of operation.

## 5.2 GOAL-S/R (receiver side)

<b>FO Link:</b>	SC-APC connector for connecting an E9/125 $\mu$ m SMF Wavelength: 1310nm (transmit), 1550nm (receive)  coupling optical power: max 1mW (0dBm) typ. 500 $\mu$ W (-3dBm)  optical input power: min 1 $\mu$ W (-30dBm)
<b>Connectors:</b>	SC-APC connector (FO Link) N-Norm socket (Meinberg GPS-IF Receiver) ground terminal via 6.3mm flat plug
<b>Ambient Temperature:</b>	0 ... 50° C
<b>Humidity:</b>	max 85%
<b>Chassis:</b>	anodized aluminum housing with aluminum front and back wall with clamp for 35mm DIN-railmount
<b>Protection Class:</b>	IP30
<b>Phys. Dimension:</b>	28mm x 69mm x 85mm (H x B x T)
<b>Classification according to IEC 60825-1:</b>	Laser class 1 the accessible laser radiation is safe under reasonably foreseeable conditions of operation.

Doc.-ID: DoC-183705-01

**Hersteller**  
*Manufacturer*

**Meinberg Funkuhren GmbH & Co. KG**  
**Lange Wand 9, D-31812 Bad Pyrmont**

erklärt in alleiniger Verantwortung, dass das Produkt  
*declares under its sole responsibility, that the product*

**Produktbezeichnung**  
*Product Designation*

**GOAL-S**

auf das sich diese Erklärung bezieht, mit den folgenden Normen und Richtlinien übereinstimmt:  
*to which this declaration relates is in conformity with the following standards and provisions of the directives:*

EMV – Richtlinie <i>EMC – Directive</i>  2014/30/EU	DIN EN 61000-6-2:2005 DIN EN 61000-6-3:2007 + A1:2011 DIN EN 55032:2012 DIN EN 55024:2010
Niederspannungsrichtlinie <i>Low-voltage Directive</i>  2014/35/EU	DIN EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011 + AC:2011 + A2:2013 DIN EN 60825-1:2014 (Class 1 Laser Product)
RoHS – Richtlinie <i>RoHS – Directive</i>  2011/65/EU	DIN EN 50581:2012

Bad Pyrmont, 14 September 2018



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