

BWH 001

WLAN HGW Base Station

Instruction Manual

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Translation of the Original Instructions

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WLAN HGW Base Station

BWH 001

The BWH 001 base station serves as the gateway of a connection between an HGW and a machine control. Safety data (via Black Channel), as well as Non-safety data can be redundantly transmitted, depending on the S-DIAS control used (e.g.: CP/SCP 111). The BWH 001 also serves as the docking and charging station for the HGW.

The signal light simplifies coupling between the HGW and the machine. States can be made visible via programmable pictogram LEDs. The base station can also communicate with other controls over an Ethernet interface.



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1 Introduction

1.1 Target Group/Purpose of this Operating Manual

This operating manual contains all information required for the operation of the product.

This operating manual is intended for:

- Project planners
- Technicians
- Commissioning engineers
- Machine operators
- Maintenance/test technicians

General knowledge of automation technology is required.

Further help and training information, as well as the appropriate accessories can be found on our website www.sigmatek-automation.com.

Our support team is happily available to answer your questions.
Please see our website for our hotline number and business hours.

1.2 Important Reference Documentation

- Safety System Handbook
- HGW_BWH_Configuration Manual
- Documentation Connection Cables for Operating Devices
- HW IP Address Settings

This and additional documents can be downloaded from our website or obtained through support.

1.3 Contents of Delivery

1x BWH 001

2 Basic Safety Directives

2.1 Symbols Used

The following symbols are used in the operator documentation for warning and danger messages, as well as informational notes.



DANGER

Danger indicates that death or serious injury **will occur**, if the specified measures are not taken.

→ To avoid death or serious injuries, observe all guidelines.

Danger indique une situation dangereuse qui, faute de prendre les mesures adéquates, **entraînera** des blessures graves, voire mortelles.

→ Respectez toutes les consignes pour éviter des blessures graves, voire mortelles.



WARNING

Warning indicates that death or serious injury **can** occur, if the specified measures are not taken.

→ To avoid death or serious injuries, observe all guidelines.

Avertissement d'une situation dangereuse qui, faute de prendre les mesures adéquates, **entraînera** des blessures graves, voire mortelles.

→ Respectez toutes les consignes pour éviter des blessures graves, voire mortelles.

CAUTION

Caution indicates that moderate to slight injury **can** occur, if the specified measures are not taken.

→ To avoid moderate to slight injuries, observe all guidelines.

Attention indique une situation dangereuse qui, faute de prendre les mesures adéquates, **peut** entraîner des blessures assez graves ou légères.

→ Respectez toutes les consignes pour éviter des blessures graves, voire mortelles.

DANGER

Danger for persons with pacemakers, implanted defibrillators or other active implants.

Danger pour les personnes portant un stimulateur cardiaque, un défibrillateur implanté ou d'autres implants actifs.

CAUTION

Danger for ESD-sensitive components.

Les signes de danger pour les composants sensibles aux décharges électrostatiques.

CAUTION

Non-ionizing radiation

Rayonnement non ionisant

INFORMATION**INFORMATION**

→ Provides important information on the product, handling or relevant sections of the documentation, which require particular attention.

2.2 Disclaimer



INFORMATION

The contents of this operating manual were prepared with the greatest care. However, deviations cannot be ruled out. This operating manual is regularly checked and required corrections are included in the subsequent versions. The machine manufacturer is responsible for the proper assembly, as well as device configuration. The machine operator is responsible for safe handling, as well as proper operation.

The current operating manual can be found on our website. If necessary, contact our support.

Subject to technical changes, which improve the performance of the devices. The following operating manual is purely a product description. It does not guarantee properties under the warranty.

Please thoroughly read the corresponding documents and this operating manual before handling a product.

SIGMATEK GmbH & Co KG is not liable for damages caused through, non-compliance with these instructions or applicable regulations.

2.3 General Safety Directives

The Safety Directives in the other sections of this operating manual must be observed. These instructions are visually emphasized by symbols.



INFORMATION

According to EU Directives, the operating manual is a component of a product.

This operating manual must therefore be accessible in the vicinity of the machine since it contains important instructions.

This operating manual should be included in the sale, rental or transfer of the product, or its online availability indicated.

Regarding the requirements for Safety and health connected to the use of machines, the manufacturer must perform a risk assessment in accordance with machine directives 2006/42/EG before introducing a machine to the market.

Operate the unit with devices and accessories approved by SIGMATEK only.

CAUTION

Handle the device with care and do not drop or let fall.
Prevent foreign bodies and fluids from entering the device.
The device must not be opened!

Manipulez l'appareil avec précaution et ne le laissez pas tomber.
Empêchez les corps étrangers et les liquides de pénétrer dans l'appareil.
L'appareil ne doit pas être ouvert!

If the device does not function as intended or has damage that could pose a danger, it must be replaced!

En cas de fonctionnement non conforme ou de dommages pouvant entraîner des risques, l'appareil doit être remplacé !

The module complies with EN 61131-2.
In combination with a facility, the system integrator must comply with EN 60204-1 standards.
For your own safety and that of others, compliance with the environmental conditions is essential.

Le module est conforme à la norme EN 61131-2.
En combinaison avec une équipement, l'intégrateur de système doit respecter la norme EN 60204-1.
Pour votre propre sécurité et celle des autres, le respect des conditions environnementales est essentiel.

2.4 Software/Training

The application is created with the software LASAL CLASS 2 and LASAL SCREEN Editor.

Training for the LASAL development environment, with which the product can be configured, is provided. Information on our training schedule can be found on our website.

3 Standards and Directives

3.1 Technical Guidelines

WARNING



The HGW and BWH form a communications unit, which must be configured by trained personnel. Among other things, careful allocation of the wireless channels must be ensured. Complete, seamless availability must be guaranteed over the entire area of operation to ensure that no dead spots exist at any location within.

Le HGW et le BWH constituent une unité de communication qui doit être configurée par un personnel qualifié. Entre autres, il faut s'assurer que l'attribution des canaux sans fil est faite avec soin. Une disponibilité complète et sans faille doit être garantie sur l'ensemble de la zone d'exploitation afin de s'assurer qu'il n'y a pas de zones mortes en tout point de la zone d'exploitation.

INFORMATION



The electrical connections cannot be removed while voltage is applied. Before removing connections, a controlled shutdown of the machine must be performed and the supply disconnected. After shutdown or disconnection of the voltage supply, a wait-time of 5 minutes is required before voltage conducting components can be touched or connectors removed.

The machine manufacturer is responsible for ensuring the correct handling of modules and if necessary, for taking organizational measures to secure access.

3.2 Directives

The product was constructed in compliance with the following European Union directives and tested for conformity.

3.2.1 EU Conformity Declaration



EU Declaration of Conformity

The product BWH 001 conforms to the following European directives:

- **2014/35/EU** Low-voltage Directive
- **2014/30/EU** Electromagnetic Compatibility (EMC Directive)
- **2014/53/EU** Wireless Device Directive
- **2011/65/EU** "Restricted use of certain hazardous substances in electrical and electronic equipment" (RoHS Directive)

The EU Conformity Declarations are provided on the SIGMATEK website. They can be found in the download area of the respective product.

3.3 Wireless System Operation

INFORMATION



Technical changes to the device (such as different antennae), as well as improper use can lead to the loss of the FCC license and generate interference, which can affect the function of nearby devices.

Les changements techniques apportés à l'appareil (comme les différentes antennes), ainsi qu'une utilisation incorrecte peuvent entraîner la perte de la licence FCC et générer des interférences, ce qui peut affecter le fonctionnement des appareils voisins.

Please note the national regulations and standards when operating the wireless device!

Veuillez respecter les prescriptions et normes nationales lors de l'utilisation de l'appareil radio !

4 Type Plate

	HW: X.XX	
	SW: XX.XX.XXX	
	Safety Version: SXX.XX.XX	
Serial No.	SIGMATEK GMBH & CO KG Sigmatekstrasse 1 A-5112 LAMPRECHTSHAUSEN	
Article Number	Product Name	Short Name

Exemplary nameplate (symbol image)

	HW: 1.00	
	SW: 01.00.000	
	Safety Version: S01.00.00	
12345678	SIGMATEK GMBH & CO KG Sigmatekstrasse 1 A-5112 LAMPRECHTSHAUSEN	
12-246-133-3	Handbediengerät Wireless HGW 1033-3	

HW: Hardware version

SW: Software version

5 Technical Data

5.1 Performance Data

Processor	EDGE2 Technology
Processor cores	1
Internal cache	32-kbyte L1 Instruction Cache 32-kbyte L1 Data Cache 512-kbyte L2 Cache
Internal program and data memory (RAM)	256-Mbyte (DDR3)
Internal remnant data memory	no
Internal storage device	4-Gbyte microSD card (3D-TLC pSLC technology), expandable ¹⁾
Optional memory expansion	no
Internal I/O	no
Interfaces	1x magnetic connector for charging the battery 1x M12 connector supply and Ethernet 1x M12 connector Ethernet 1x USB 2.0 Type-C (Dual Role Port) 1x WLAN dual-band (2.4 GHz, 5 GHz simultaneously)
Status LEDs	1x Power/1x HGW-Link (freely programmable) 2x Network (freely programmable) 1x application-/RUN-LED
Signal generator	no
Cooling	passive (fanless)
Input voltage measurement	no

5.2 Electrical Requirements

Supply voltage	+24 V DC $\pm 20\%$ (SELV/PELV) UL: NEC Class 2
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¹⁾ The 4 Gbyte microSD card is formatted to 1 Gbyte in order to achieve the lifetime of a standard SLC card. A format change to the full 4 Gbyte is not allowed and will result in a massive reduction of the microSD card's lifetime.

Protection class	III
Inrush current	16.1 A for 1 ns
Current consumption of (+24 V) power supply	ca. 200 mA in CLI maximum 2.5 A charging under full load at +24 V (without peripherals)
USB Host current load	maximum 0.5 A

INFORMATION



For USA and Canada:

The supply must be limited to:

- a) max. 5 A at voltages from 0-20 V DC, or
- b) 100 W at voltages from 20-60 V DC

The limiting component (e.g. transformer, power supply or fuse) must be certified by an NRTL (Nationally Recognized Testing Laboratory).

5.3 Environmental Conditions

Storage temperature	-5 ... +60 °C	
Environmental temperature	0 ... +50 °C	
Humidity	10-95 %, non-condensing	
Installation altitude above sea level	0-2000 m without derating > 2000 m up to a maximum of 5000 m with derating of the maximum environmental temperature by 0.5 °C per 100 m	
Operating conditions	pollution degree 2	
Noise emissions	≤ 70 dB	
EMC resistance	EN 61000-6-2 (industrial area)	
EMC noise generation	EN 61000-6-4 (industrial area)	
Vibration resistance	EN 60068-2-6	3.5 mm from 5-8.4 Hz 1 g from 8.4-150 Hz
Shock resistance	EN 60068-2-27	15 g (147.15 m/s²)
Protection type	EN 60529	IP54
Free fall (with packaging)	IEC 60068-2-32	1000 mm

5.4 Wireless

INFORMATION



The devices can only be used in the country designated or configured for this purpose, as the maximum permitted transmission power, as well as approved channels can greatly differ.

Please note that DFS/TPC is inactive on our devices and we therefore do not recommend the corresponding channels!

Non-compliance with these specifications can result in legal consequences, for which SIGMATEK accepts no liability!

Already during the planning stage, caution must be taken to ensure that the radio channels are configured so that interference with other products is prevented.

The document "HGW-BWH Configuration" must be used for the configuration. All channels currently supported by the software and hardware are described there.

CAUTION



The device transmits WLAN signals in the frequency range of 2.4 and 5 GHz.

L'appareil émet des signaux WLAN dans la gamme de fréquences de 2,4 et 5 GHz.

5.4.1 WLAN 2.4 GHz

Frequency range	2399.5-2484.5 MHz
Transmission power max.	20 dBm (100 mW) EIRP
Channels	1-13 (2412-2472 MHz)
Standards	IEEE 802.11 b/g/n

5.4.2 WLAN 5 GHz

Frequency range	5150-5350 MHz 5470-5725 MHz
Transmission power max.	23 dBm (200 mW) EIRP
Channels	36-48 (5180-5240 MHz) 149-165 (5745-5825 MHz)
Standards	IEEE 802.11 a/n/ac

5.4.3 Antennae

Number	2
Frequency range	2.4/5 GHz (Dual-Band)
Transmission power max.	25 W
Antenna gain	2,4 GHz-4 dBi Peak Gain 5 GHz-5,2 dBi Peak Gain
Impedance	50 Ω
Transmission angle/characteristic	transmission characteristic: omnidirectional polarization: linear

INFORMATION



Only antennae approved by SIGMATEK can be used.
See chapter 17.1 Antennae.

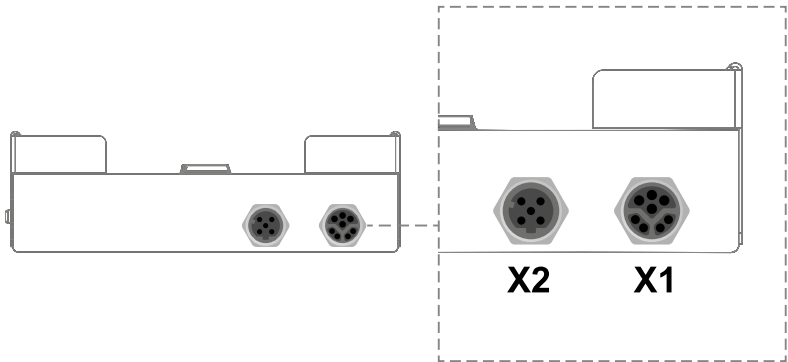
Regularly check the screw fitting for the antennae. If necessary, manually tighten them or use a torque wrench (1 Nm) for RP-SMA sockets.

5.5 Miscellaneous

Article number	12-246-001
Operating system	Salamander
Default IP address	10.10.150.1
Standard	UL
Approvals	CE, UKCA

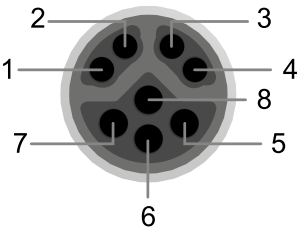
6 Interfaces

6.1 Connections Bottom



Appropriate connector cables are available as accessories. See documentation [Connection Cables for Operating Devices](#).

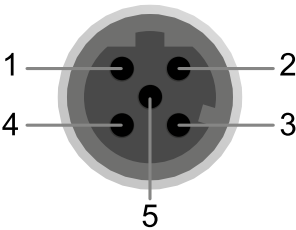
6.1.1 X1: M12 Y-coded (supply, Ethernet)



Pin	Function
1	Tx+
2	Tx-
3	Rx+
4	Rx-
5	VCC
6	n.c.
7	n.c.
8	GND

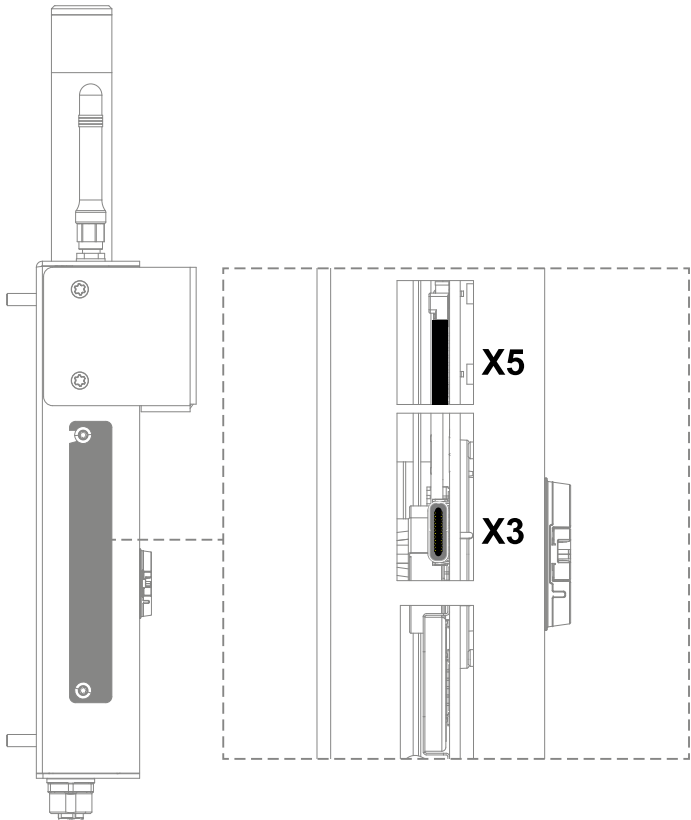
n.c. = do not use

6.1.2 X2: M12 D-coded (Ethernet)

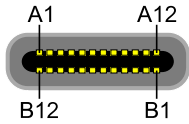


Pin	Function
1	Tx+
2	Rx+
3	Tx-
4	Rx-
5	n.c.

6.2 Side Connections



6.2.1 X3: USB 2.0 DualRole (Type C)



Pin	Function
A1, B1	GND
A2, B2	SSTx+
A3, B3	SSTx-
A4, B4	VBUS
A5, B5	CC1, CC2
A6, B6	USB2.0 D+
A7, B7	USB2.0 D-
A8, B8	SBU1, SBU2
A9, B9	VBUS
A10, B10	SSRx-
A11, B11	SSRx+
A12, B12	GND

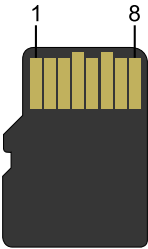
The USB Type-C interface serves as the online interface between the device and the programming software.

INFORMATION



It should be noted that many of the USB devices on the market do not comply with USB specifications; this can lead to device malfunctions. This may cause the device to malfunction. It is also possible that these devices will not be detected at the USB port or function correctly. It is therefore recommended that every USB stick or USB supply be tested before actual use.

6.2.2 X5: microSD Card



Pin	Function
1	DAT2
2	CD/DAT3
3	CMD
4	+3V3
5	CLK
6	GND
7	DAT0
8	DAT1

INFORMATION

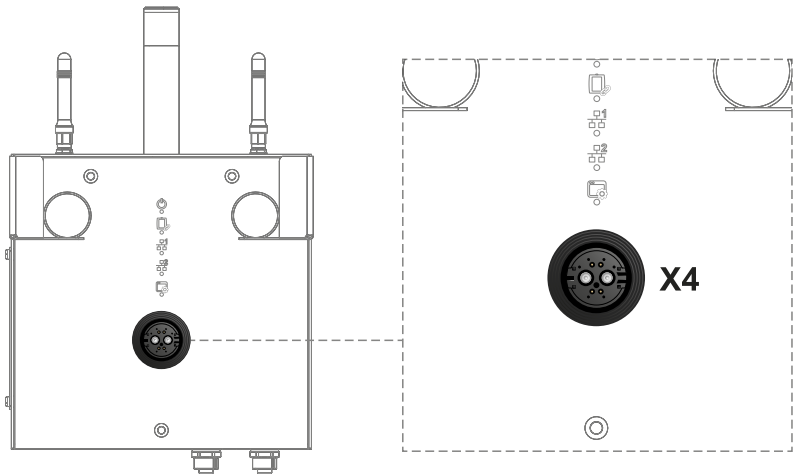


It is recommended that only storage media provided by SIGMATEK be used.

The number of read and write actions have a significant influence on the lifespan of the storage media.

The microSD card is not intended as an exchangeable medium and should therefore be removed from the card holder for maintenance purposed only.

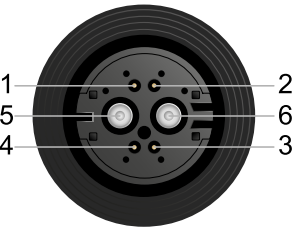
6.3 Front Connectors



6.3.1 X4: Power/Data

Installed connectors: Rosenberger M4K105-16C003B5-Y

mating connectors: Rosenberger M4S102-16C003A5-Y



Pin	Function
1	HGW COM H
2	HGW COM L
3	Plugin detection
4	n.c.
5	Charging voltage
6	GND

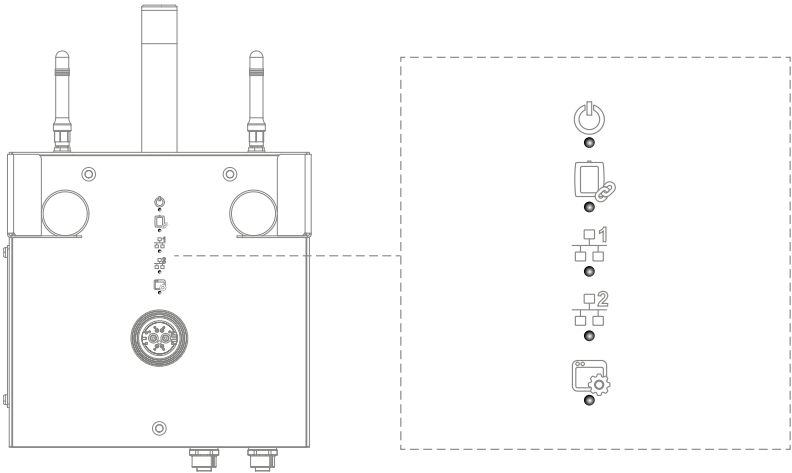
CAUTION



Ensure that the connector and its pins are always clean, since contamination (e.g. in environment with iron dust) can lead to leakage current while charging. This results in short circuits and unexpected heating of the connector.

6.4 Display

6.4.1 Front LEDs



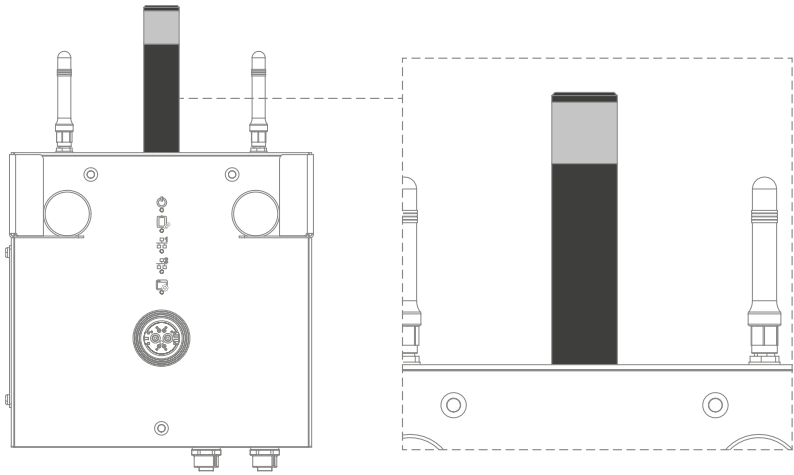
The HGW-Link display LEDs, as well as Ethernet 1/2, are controlled via the customer application. The following example is used as orientation for the application technician and serves as a recommendation.

Symbol	LED Status	Definition
 Power	OFF	No current
	RED	Under voltage
	GREEN	Supply OK
 HGW-Link	RED	Application-specific, e.g.: no connection
	YELLOW	WLAN HGW connected
	GREEN	FSoE connection active

Symbol	LED Status	Definition
 Ethernet 1	RED	Application-specific, e.g.: no connection
	YELLOW	Connected with control (CP/SCP)
	GREEN	FSoE connection active
 Ethernet 2	RED	Application-specific like Ethernet 1
	YELLOW	Connection to "external control" and for non-safety relevant data
	GREEN	
 Application-specific	RED	Blinks in CLI
	GREEN	Run
	YELLOW	(can be changed via application)

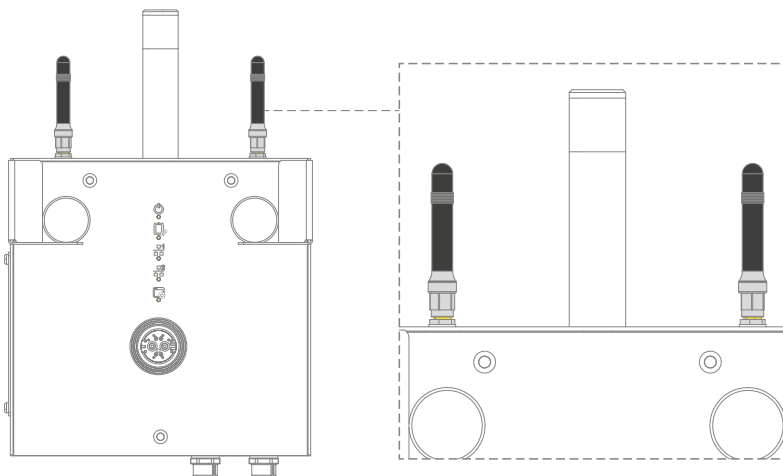
6.4.2 Signal Light

The signal light is used to visually assist with the coupling of an HGW.



Status	Function
OFF	Coupling process inactive
Blinks blue	Coupling process active

6.5 WLAN



CAUTION



This device has sensitive antennae. These must be handled carefully and kept free from sources of interference (metal, hand). Otherwise, the error free function of the WLAN connection cannot be guaranteed.

Cet appareil est équipé des antennes sensibles. Elles doivent être manipulées avec précaution et maintenues à l'abri de toute source d'interférence (métal, main). Dans le cas contraire, la fonction sans erreur de la connexion WLAN ne peut pas être garantie.

DANGER



This device contains wireless technologies, which can pose a danger to people with implants such as pacemakers! These individuals must comply with their implant's specifications.

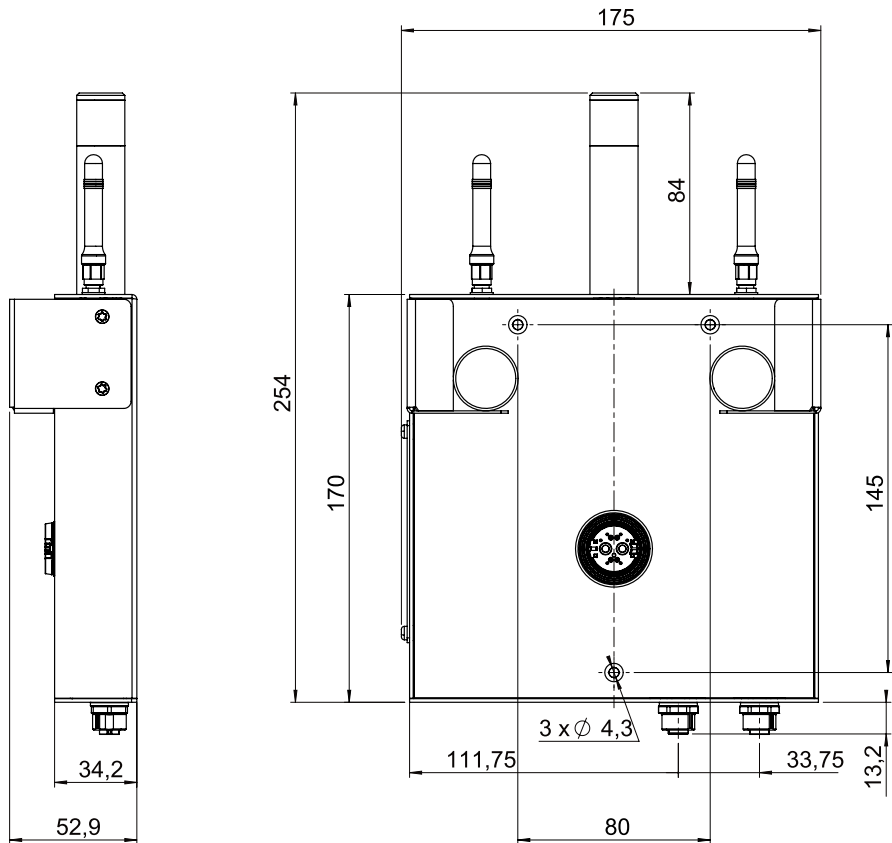
Cet appareil est doté de technologies sans fil, ce qui peut présenter le danger pour les personnes portant un stimulateur cardiaque! Ces personnes doivent se conformer aux spécifications du stimulateur cardiaque.

INFORMATION



Only antennae approved by SIGMATEK can be used. Other antennae can damage the device, as well as invalidate the radio permits.

7 Mechanical Dimensions



Dimensions	175 x 267.4 x 52.9 mm (W x H x D)
Material	Housing: steel Color: RAL7024 (powder coated) Front: plexiglass
Weight	1.55 kg

8 Assembly/Installation

8.1 Check Contents of Delivery

Ensure that the contents of the delivery are complete and intact. See chapter 1.3 Contents of Delivery.

INFORMATION



On receipt and before initial use, check the device for damage. If the device is damaged, contact our customer service and do not install the device in your system.

Damaged components can disrupt or damage the system.

8.2 Preparing the Hardware

Before the HGW and BWH can be started, the following factors must be ensured:

- ☐ The BWH is securely mounted.
- ☐ The BWH and the machine are connected with the proper cables and the connection was checked.

8.3 Conditions

The following conditions must be met during assembly/installation:

- Do not install the base station/ handheld operating panel in a damp environment.
- The base station must be mounted near the equipment to control.
- If several units are placed in the immediate vicinity, the base station must be mounted in such a way that a clear optical assignment to the respective unit is visible.
- When mounting the base station on uneven surfaces, ensure that the base station is not subjected to torsion. Ensure that the base station is level.

It is also important to note that ...

- the base station is mounted so that it is possible to operate the HGW when properly hung.

- the base station is connected with the function ground via the cable shielding.
- removal of the HGW should not be restricted.
- the signal range should be configured so that the handheld operating panel functions error-free throughout the entire operation area.
- the emergency stop should also be easily accessible when the panel is mounted.
- the HGW is placed, so that reflections on the display are largely avoided.
- the base station should be mounted at a height that ensures the user has an optimal view of the HGW display and ergonomic operation of the device when mounted on a vertical surface.
- to secure the base station, use 3 M4x40 oval head screws with a maximum head diameter of 7.8 mm. the torque cannot exceed 2 Nm.
- the antennae are not covered or damaged.

The handheld operating panel can be mounted in the base station, as well as used wirelessly within the signal range. See chapter 10.4 Operation.

INFORMATION



Do not expose the BWH to extreme environmental conditions such as heat, humidity, strong magnetic fields, vibration or dust.

The base station should be mounted vertically or slightly inclined to the rear in order to prevent the HGW from falling out of the base station.

Ensure that the base station antennas are not shielded by metallic objects, as this can restrict the functional range.

INFORMATION



When mounting the base station, ensure that the requirements for the antenna positions (dead spots), as well as operability (accessibility of the emergency stop) are met.

The base station should be mounted vertically or slightly inclined to the rear in order to prevent the HGW from falling out of the base station.

CAUTION

Mount the base station so that neither the display, emergency stop switch, nor the signal light is exposed to direct sunlight. The display may otherwise be unreadable, or the status of the emergency stop switch could be falsely interpreted.

Montez la base de telle sorte que ni l'écran, ni l'interrupteur d'arrêt d'urgence, ni la lampe témoin ne soient exposés à la lumière directe du soleil. Sinon l'affichage peut être illisible ou l'état de l'interrupteur d'arrêt d'urgence peut être mal interprété.

8.4 Check List

8.4.1 Checking Space Requirement

Using the drill template, check the required space. The HGW and the BWH are marked on the template in a 1:1 ratio. The drill template is available for download on our website.

8.4.2 Determining Antennae Positions

CAUTION

To ensure signal range, the position of the base station must be measured and defined by trained personnel.

Pour garantir la portée du signal, la position de la station de base doit être mesurée et définie par un personnel qualifié.

8.4.3 Mounting the Base Station

Use the drill template, which can be attached to the desired position, to simplify determining the location of the drill holes. See chapter Mounting help. Punch bore holes through the template, remove the template and drill the holes at the resulting markings. Mount the base station.

8.4.4 Placing the Installation Number

Place a unique, 2-digit number on the installation over which the handheld operating panel should be coupled with the machine. This number can only occur once in the machine park. Otherwise, the operating panel could be unintentionally coupled with a non-participating machine and lead to confusion. Ensure the number is placed visibly.

INFORMATION



Note the unique number assignment in the system plan.

8.5 Mounting Help

For mounting, a drill template is available for download. In addition to the boreholes, it also contains the necessary space for the mounted HGW around the base station.

8.6 Wiring

The base station BWH 001 is connected via the M12 connector. The connector socket is documented in chapter 6.1 Connections Bottom

1. Turn off the current supply.
2. Install the wiring. Ensure the strands are equipped with ferrules and the shielding is connected.
3. Turn the supply on again.

INFORMATION

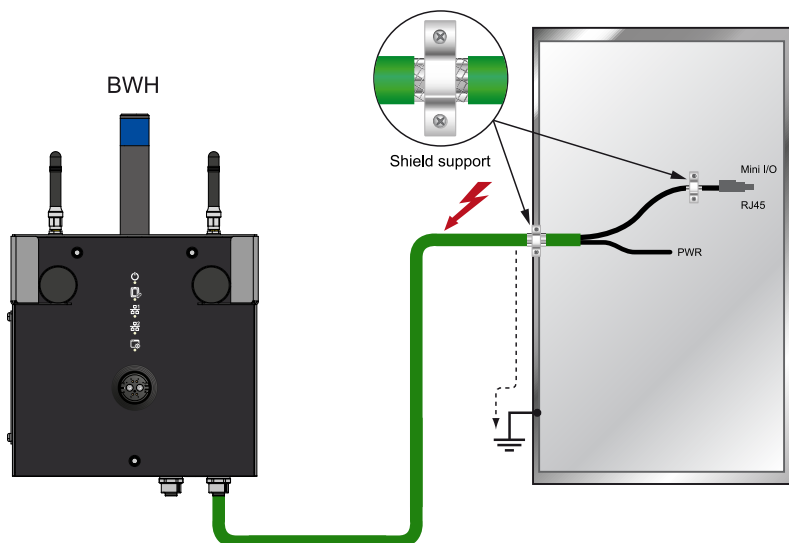


For the dimensions of the wiring, the power loss/voltage drop in the supply lines must be taken into consideration. The voltage to the base station must be within the specified limits.

8.6.1 Ground/Shielding

The base station is grounded via the cable shielding. It is important to create a low-ohm ground connection, only then can error-free operation be guaranteed.

It is recommended that the shielding be mounted at the entry point of the control cabinet housing. Noise can then be deflected from the electronic components before reaching the module.



8.6.2 ESD Protection

CAUTION



Before any device is connected to, or disconnected from the product, the potential should be equalized (by touching the control cabinet or ground terminal). Electrostatic loads (through clothing and shoes, etc.) can thereby be dissipated.

Avant de connecter ou de déconnecter un appareil à la borne, le potentiel doit être égalisé (en touchant l'armoire électrique ou la borne de terre). Les charges électrostatiques (à travers les vêtements et les chaussures) peuvent ainsi être éliminées.

9 Status and Error Messages

Status and error messages are shown in the status test of the LASAL CLASS software. POINTER or CHKSUM messages can also be shown on the screen.

Number	Message	Definition	Cause/Solution
00	RUN RAM	The user program is currently running in RAM. The display is not affected.	Info
01	RUN ROM	The user program stored in the program memory module was loaded into the RAM and is currently running. The display is not affected.	Info
02	RUNTIME	The total time for all cyclic objects exceeds the maximum time; the time can be configured using 2 system variables: ■ Runtime: Remaining time ■ SWRuntime: Preset value for runtime counter	Optimize the application's cyclic task. Use higher capacity CPU. Configure preset value
03	POINTER	Incorrect program pointers were detected before running the user program	Possible Causes: ■ The program memory module is missing, not programmed or defective. ■ The program in the user program memory (RAM) is not executable. ■ The buffer battery has failed. ■ The user program has overwritten a software error. Solution: ■ Reprogram the memory module, if the error reoccurs exchange the module. ■ Exchange the buffering battery ■ Correct programming error

Number	Message	Definition	Cause/Solution
04	CHKSUM	An invalid checksum was detected before running the user program.	Cause/Solution: s. POINTER
05	WATCHDOG	The program was interrupted via the watchdog logic.	Possible Causes: ■ User program interrupts blocked over a longer period of time (STI command forgotten). ■ Programming error in a hardware interrupt. ■ INB, OUTB, INW, OUTW instructions used incorrectly. ■ The processor is defective. Solution: ■ Correct programming error. ■ Exchange CPU
06	GENERAL ERROR	General error An error has occurred while stopping the application via the online interface.	This error occurs only during the development of the operating system.
07	PROM DEFECT	An error has occurred while programming the memory module.	Causes: ■ The program memory module is defective. ■ The user program is too large. ■ The program memory module is missing. Solution: ■ Exchange the program memory module
08	RESET	The CPU has received the reset signal and is waiting for further instructions. The user program is not processed.	Info

Number	Message	Definition	Cause/Solution
09	WD DEFECT	The hardware monitoring circuit (watchdog logic) is defective. After power-up, the CPU checks the watchdog logic function. If an error occurs during this test, the CPU deliberately enters an infinite loop from which no further instructions are accepted.	Solution: Exchange CPU
10	STOP	The program was stopped by the programming system.	
11	PROG BUSY	Reserved	
12	PROGRAM LENGTH	Reserved	
13	PROG END	A memory module was successfully programmed.	Info
14	PROG MEMO	The CPU is currently programming the memory module.	Info
15	STOP BRKPT	The CPU was stopped by a breakpoint in the program.	Info
16	CPU STOP	The CPU was stopped by the programming software.	Info
17	INT ERROR	The CPU has triggered a false interrupt and stopped the user program or has encountered an unknown instruction while running the program.	Causes: - A nonexistent operating system was used. - Stack error (uneven number of PUSH and POP instructions). - The user program was interrupted by a software error. Solution: - Correct programming error.

Number	Message	Definition	Cause/Solution
18	SINGLE STEP	The CPU is in single step mode and is waiting for further instructions.	Info
19	READY:	A module or project has been sent to the CPU and it is ready to run the program.	Info
20	LOAD	The program is stopped and the CPU is currently receiving a new module or project.	Info
21	INVALID MODULE	The CPU has received a module that does not belong to the project.	Solution: Recompile and download the entire project
22	MEMORY FULL	The operating system memory (heap) is too small. No memory could be reserved while calling an internal function or an interface function is called from the application.	Causes: - Memory is only allocated but not released. Solution: - Clear memory
23	NOT LINKED	When starting the CPU, a missing module or a module that does not belong to the project was detected.	Solution: Recompile and download the entire project
24	DIV BY 0	A division error has occurred.	Possible Causes: - Division by 0. - The result of a division does not fit in the result register. Solution: - Correct programming error.
25	DIV BY 0	A division error has occurred.	Possible Causes: - Division by 0. - The result of a division does not fit in the result register. Solution: Correct programming error.

Number	Message	Definition	Cause/Solution
25	DIAS ERROR	While accessing a DIAS module, an error has occurred.	Hardware problem
26	WAIT	The CPU is busy.	Info
27	OP PROG	The operating system is currently being reprogrammed.	Info
28	OP INSTALLED	The operating system has been reinstalled.	Info
29	OS TOO LONG	The operating system cannot be loaded; too little memory.	Restart, report error to SIGMATEK.
30	NO OPERATING SYSTEM	Boot loader message, no operating system found in RAM.	Restart, report error to SIGMATEK.
31	SEARCH FOR OS	The boot loader is searching for the operating system in RAM.	Restart, report error to SIGMATEK.
32	NO DEVICE	Reserved	
33	UNUSED CODE	Reserved	
34	MEM ERROR	The operating system loaded does not match the hardware configuration.	Solution: ■ Use the correct operating system version
35	MAX IO	Reserved	
36	MODULE LOAD ERROR	The LASAL Module or project cannot be loaded.	Solution: ■ Recompile and download the entire project
37	BOOTIMAGE FAILURE	A general error has occurred while loading the operating system.	Contact SIGMATEK
38	APPLMEM ERROR	An error has occurred in the application memory (user heap).	Solution: ■ Correct allocated memory access error

Number	Message	Definition	Cause/Solution
39	OFFLINE	This error does not occur in the control.	This error code is used in the programming system to show that there is no connection to the control.
40	APPL LOAD	Reserved	
41	APPL SAVE	Reserved	
44	VARAN MANAGER ERROR	An error number was entered in the VARAN manager and stopped the program.	Solution: Read LogFile
45	VARAN ERROR	A required VARAN client was disconnected or a communication error has occurred.	Solution: Read LogFile error tree
46	APPL-LOAD-ERROR	An error has occurred while loading the application.	Cause: - Application was deleted. Solution: - Reload the application into the control.
47	APPL-SAVE-ERROR	An error has occurred while attempting to save the application.	
50	ACCESS-EXCEPTION-ERROR	Read or write access of a restricted memory area. (I.e. writing to the NULL pointer).	Solution: Correct application errors
51	BOUND EXCEEDED	An exception error has occurred while accessing arrays. The memory area was overwritten by accessing an invalid element.	Solution: Correct application errors
52	PRIVILEGED INSTRUCTION	An unauthorized instruction for the current CPU level was given. For example, setting the segment register.	Cause: - The application has overwritten the application program code. Solution: - Correct application errors

Number	Message	Definition	Cause/Solution
53	FLOATING POINT ERROR	An error has occurred during a floating-point operation.	
60	DIAS-RISC-ERROR	Error from the Intelligent DIAS Master.	Restart, report error to SIGMA TEK.
64	INTERNAL ERROR	An internal error has occurred, all applications are stopped.	Restart, report error to SIGMA TEK.
65	FILE ERROR	An error has occurred during a file operation.	
66	DEBUG ASSERTION FAILED	Internal error	Restart, report error to SIGMA TEK.
67	REALTIME RUNTIME	The total duration of all real-time objects exceeds the maximum time; the time cannot be configured. 2 ms for 386 CPUs, 1 ms for all other CPUs	Solution: - Optimize the application's real-time task (RtWork). - Reduce the clock time for the real-time task of all objects. - Correct application errors - CPU is overloaded in real-time => use a higher capacity CPU.
68	BACKGROUND RUNTIME	The total time for all background objects exceeds the maximum time; the time can be configured using 2 system variables: - BTRuntime: - SWBTRuntime: pre-selected value for the runtime counter	Solution: - Optimize the application's background task (background) - Use higher capacity CPU - Set SWBTRuntime correctly
70	C-DIAS ERROR	A connection error with a C-DIAS module has occurred.	Cause: - The cause of the error is documented in the log file Solution: - This depends on the cause

Number	Message	Definition	Cause/Solution
72	S-DIAS ERROR	A connection error with an S-DIAS module has occurred.	Possible Causes: - Real network does not match the project, S-DIAS client is defective Solution: - Analyze log file
75	SRAM ERROR	An error occurred while initializing, reading or writing SRAM data.	Possible Causes: - SRAM configured incorrectly - Battery for powering the internal program memory is empty Solution: - Analyze log file (Event00.log, Event19.log) - Check configuration - Exchange battery for powering the internal program memory
95	USER DEFINED 0	User-definable code.	
96	USER DEFINED 1	User-definable code.	
97	USER DEFINED 2	User-definable code.	
98	USER DEFINED 3	User-definable code.	
99	USER DEFINED 4	User-definable code.	
100	C_INIT	Initialization start; the configuration is run.	
101	C_RUNRAM	The LASAL project was successfully started from RAM.	
102	C_RUNROM	The LASAL project was successfully started from ROM.	
103	C_RUNTIME		
104	C_READY	The CPU is ready for operation.	
105	C_OK	The CPU is ready for operation.	

Number	Message	Definition	Cause/Solution
106	C_UNKNOWN_CID	An unknown object from a stand-alone or embedded object, or an unknown base class was detected.	
107	C_UNKNOWN_CONSTR	The operating system class cannot be created; the operating system is probably wrong.	
108	C_UNKNOWN_OBJECT	Indicates an unknown object in an interpreter program; more the one DCC080 object.	
109	C_UNKNOWN_CHNL	The hardware module number is greater than 60.	
110	C_WRONG_CONNECT	No connection to the required channels.	
111	C_WRONG_ATTR	Wrong server attributes.	
112	C_SYNTAX_ERROR	Non-specific error. Recompile and download all project sections.	
113	C_NO_FILE_OPEN	An attempt was made to open an unknown table.	
114	C_OUTOF_NEAR	Memory allocation failed	
115	C_OUT OF_FAR	Memory allocation failed	
116	C_INCOMAPTIBLE	An object with the same name already exists but has a different class.	
117	C_COMPATIBLE	An object with the same name and class exists but must be updated.	
224	LINKING	The application is currently linking.	
225	LINKING ERROR	An error has occurred while linking.	

Number	Message	Definition	Cause/Solution
226	LINKING DONE	Linking is complete.	
230	OP BURN	The operating system is currently being burned into the Flash memory.	
231	OP BURN FAIL	An error has occurred while burning the operating system.	
232	OP INSTALL	The operating system is currently being installed.	
240	USV-WAIT	The power supply was disconnected; the UPS is active. The system is shutdown.	
241	REBOOT	The operating system is restarted.	
242	LSL SAVE		
243	LSL LOAD		
252	CONTINUE		
253	PRERUN	The application is started.	
254	PRERESET	The application is ended.	
255	CONNECTION BREAK		

10 Operation/Start-up

10.1 Configuration

The base station can be configured in LASAL via the USB-C interface, Ethernet or WLAN.

INFORMATION



Never operate the panel without antennae, this could damage the device.

The actual time-out configured in the SCP must be included in your risk assessment!

CAUTION



If the panel goes into safe mode, the application must deactivate the emergency stop light.

Si le panneau passe en mode de sécurité, l'application doit désactiver le signal lumineux d'arrêt d'urgence.

INFORMATION



For safety reasons, the HGW is set to a special “delivery mode” when transported. This mode is automatically deactivated with the initial charging process.

The operating system for the base station is stored on the microSD Card, which during operation, cannot be removed.

10.1.1 Default Configuration

10.1.1.1 Ethernet

Ethernet X1 IP: 10.10.150.1 / Subnet-Mask: 255.0.0.0

10.1.1.2 WLAN

At the time of delivery, the panel is configured as an access point and the network is accessible with the following parameters.

The serial number is contained in the network name (SSID). This can be found on the reverse side of the panel on the product label.

Example:

Serial number BWH 001:	12345678
SSID 2.4 GHz network	SN12345678_SIG_11
SSID 5 GHz network	SN12345678_SIG_10

Parameters	Default value
SSID 2.4 GHz network	SN<serial number>_SIG_11
SSID 5 GHz network	SN<serial number>_SIG_10
Password for both networks	12345678
IP address / mask 2.4 GHz network	192.168.2.1 / 255.255.255.0
IP address / mask 5 GHz network	192.168.1.1 / 255.255.255.0

INFORMATION



Problems can arise if a control is connected to an IP network, which contains modules that are not running with a SIGMATEK operating system. With such devices, Ethernet packets could be sent to the control with such a high frequency (i.e. broadcasts), that the high interrupt load could cause a real-time runtime error or runtime error. By configuring the packet filter (Firewall or Router) accordingly however, it is possible to connect a network with SIGMATEK hardware to a third party network without triggering the error mentioned above.

10.1.2 Default Application

In delivery condition, a minimum application is installed in the base station that allows loading into an HGW 1033-3.

10.2 WLAN Channels and Settings

The WLAN channels and settings supported by the hardware and software can be found in the "WLAN Configuration" document. Only the channels and settings released there may be used.

INFORMATION



The information contained in the document "WLAN Configuration" does not release the user from the obligation to observe national standards and laws as well as special regional regulations.

10.3 Testing the Operating Area

CAUTION



Test the function in the operating area. Ensure the operating panel can control the machine throughout the entire operating area. Perform this test using an HGW.

Tester la fonction dans la zone d'utilisation. S'assurer que le panneau de commande peut commander la machine dans toute la zone de travail. Effectuer ce test à l'aide d'une HGW.

10.4 Operation

The BWH 001 base station needs no special handling. It is ready for operation as soon as power is supplied and the application is started.

The process for coupling the operating panel can be found in chapter 10.4 .

The meaning of the LED displays is described in chapter 6.4 .

The IP addresses are configured using LASAL.

The BWH is coupled via the operating panel.

Please note that if in a handheld operating panel mounted in the BWH, certain functions may be limited or it may have no function at all (e.g. key switch, confirmation switch...).

10.4.1 Coupling the Operating Panel

To couple the operating panel, a functioning WLAN connection is required.

As soon as the operator is located in the operating area of the base station or machine with the HGW, the operating panel can be coupled with the machine. For this purpose, see the documentation for the corresponding class.

If the operating panel has Safety functions and the base station is coupled with a safety-related control, it is indicated via the activated 7-segment display which shows the machine number.

WARNING



To avoid faulty operation, an active operating panel can only be mounted in the corresponding base station.

Pour éviter un fonctionnement défectueux, un panneau de commande actif ne peut être monté que sur la station de base correspondante.

10.4.2 Decoupling the Operating Panel

The operating device can be separated from the machine in several ways.

1. Separating the Safety functions only: In this case, the operating panel can be further used as a control unit without Safety.
2. Decoupling the operating panel from the machine: The panel has no operating function and is therewith not a part of the system control unit.
3. Deactivating the WLAN connection: In this case, the panel is used offline only and has no connection to the machine.

To avoid an emergency stop, perform a controlled decoupling of the HGW.

11 Help with Disruptions/Troubleshooting

Problem	Cause	Solution
BWH not working	Current supply unavailable	Check whether the base station is powered correctly.
HGW functional range limited	HGW link not available (see LED on BWH)	Couple the operating panel to the machine
Signal disruption displayed	No wireless connection	Check the signal range and if necessary, have it restored by a technician.
The HGW is not charging	Device in RUN mode	Start the application and check if errors have occurred.
	No application	Load an application with the BWH hardware class into the device.
	Contact problems	Check the charging connector on both sides and clean if necessary

12 Transport/Storage



INFORMATION

This device contains sensitive electronics. During transport and storage, high mechanical stress must therefore be avoided.

For storage and transport, the same values for humidity and vibration as for operation must be maintained!

Temperature and humidity fluctuations may occur during transport. Ensure that no moisture condenses in or on the device, by allowing the device to acclimate to the room temperature while turned off.

When sent, the device should be transported in the original packaging if possible. Otherwise, packaging should be selected that sufficiently protects the product from external mechanical influences. Such as cardboard filled with air cushioning.

13 Storage

INFORMATION



When not in use, store the device according to the storage conditions. See chapter 12 Transport/Storage.

During storage, ensure that all protective covers (if available) are placed correctly, so that no contamination, foreign bodies or fluids enter the device.

14 Maintenance

INFORMATION



During maintenance as well as servicing, observe the safety instructions from chapter 2 Basic Safety Directives.

Lors de l'entretien et de la maintenance, respectez les consignes de sécurité du chapitre 2 Basic Safety Directives.

14.1 Cleaning and Disinfecting the Device Surface

The surface of the BWH 001 can only be cleaned with a soft, damp cloth. To dampen the cloth, a mild cleaning solution such as antistatic foam cleaner is recommended. To avoid fluids/cleaning solutions from getting into the sockets or housing, the device must not be directly sprayed. To clean, no erosive cleaning solutions, chemicals, abrasive cleansers or hard objects that can scratch or damage the base station may be used. The use of steam jets or compressed air is prohibited.

For disinfection, surface disinfectants on alcohol basis, which do not contain re-fattening agents, can be used.

WARNING



If the device is contaminated with toxic or erosive chemicals, it must be carefully cleaned as quickly as possible to prevent personal injury and machine damage!

Si l'appareil est contaminé par des produits chimiques toxiques ou érosifs, il doit être soigneusement nettoyé le plus rapidement possible afin d'éviter des dommages corporels et matériels!

INFORMATION



After cleaning, ensure the base station is dry. Moisture can lead to leakage currents and impair the device's function or destroy it.

14.2 Service

This product was constructed for low-maintenance operation.

14.3 Repair

INFORMATION



In the event of a defect/repair, send the device with a detailed error description to the address listed at the beginning of this document. For transport conditions, see chapter 12 Transport/Storage.

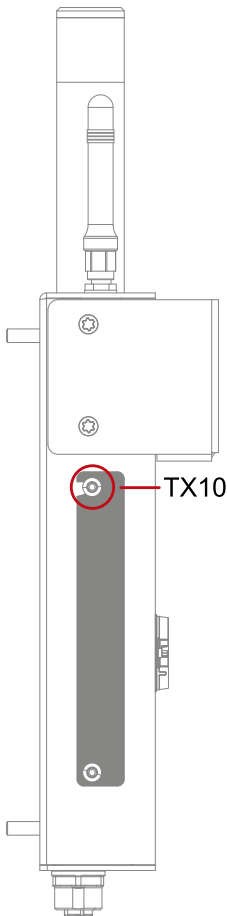
15 Exchanging the microSD Card

CAUTION

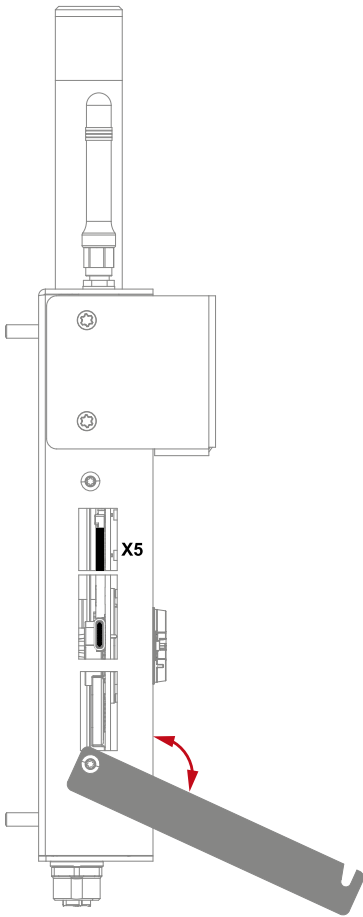


This product is a sensitive electronic device. When mounting, as well as dismantling, note that you come into contact with ESD-sensitive areas of the device.

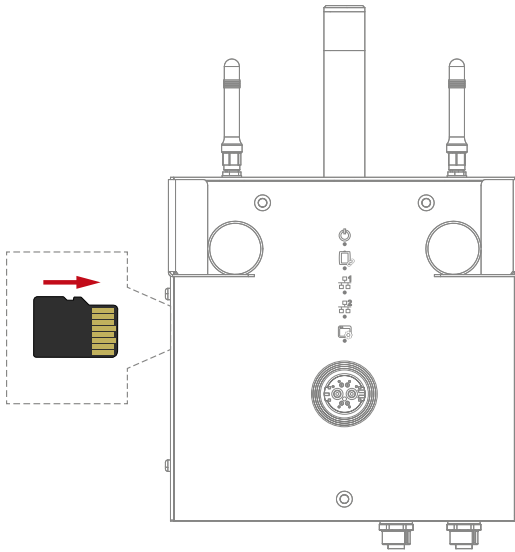
→ The applicable ESD measures must be taken!



1. Ensure that an ESD-compliant working method is followed (ESD armband, ESD clothing).
2. Remove the operating panel from the base station.
3. Disconnect the base station from the supply and wait 15 minutes.
4. Loosen the upper screw located on the side of the base station cover.



5. Rotate the cover as shown.
6. If a microSD card is installed, press it approximately 2 mm into the device and release it. The card latch thereby disengages and the microSD card is ejected approximately 5 mm outward from the cardholder.



7. Using the fingernails, pull the microSD card from the cardholder. Do not use and pointed or electrically conductive objects to remove the card.
8. Insert the new microSD card with the correct polarity.
9. Press the card into the holder and release it. The card is now mounted.
10. Turn the BWH on.
11. Mount the operating panel back into the base station.

The microSD card can be ordered as an accessory, see chapter 17.2 microSD Card.

16 Disposal



INFORMATION

Should you need to dispose of the device, the national regulations for disposal must be followed.

The device appliance must not be disposed of as household waste.



17 Accessories

17.1 Antennae



Description	Order Number
HGW 1033-E2	12-246-1033-E2

17.2 microSD Card



Description	Order Number
1 Gbyte	12-630-105

Changes Chart

Change date	Affected page(s)	Chapter	Note
02.10.2018	1	Introduction	Introduction text expanded
14.12.2018	Document		Revision
25.01.2019	35	9 Status and Error Messages	added
06.02.2019	57	Disposal	Chapter changed
19.08.2019	20	6 Interfaces	Ethernet available
05.03.2020	16	5.3 Environmental Conditions	Humidity changed to 95% and fall height (with packaging) to 1000 mm free fall (with rough handling) removed.
16.07.2020	47	10.2 WLAN Channels and Settings	Chapter added
04.08.2020	Document		Safety passages removed
28.08.2020	25	6.4 Display	LEDs front: Graphic modified
08.09.2020	14	5.2 Electrical Requirements	Protection class added
	17	5.4.1 WLAN 2.4 GHz	Defaults added
	18	5.4.2 WLAN 5 GHz	Defaults added
27.11.2020	17	5.4.1 WLAN 2.4 GHz	Channels changed
	18	5.4.2 WLAN 5 GHz	Channels changed
	18	5.4.3 Antennae	Info text changed
18.08.2022	20	6.1 Connections Bottom	X4 Power/Data: Pinning corrected, supplemental information added
29.08.2022	Document		Design and supplemental information added from HGW
06.12.2022	19	5.5 Miscellaneous	UKCA conformity
13.03.2024	14	5.1 Performance Data	microSD card updated