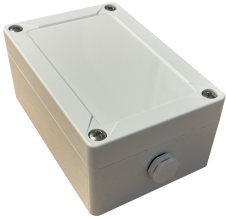
LOB-GW-HYB-WMBUS

Wireless M-Bus Gateway V3
Quick Start Guide (EN)



Manufacturer

Lobaro
Industrial IoT Solutions

Lobaro GmbH | Stadtdeich 7 | D-20097 Hamburg | Germany
support@lobaro.de | www.lobaro.de

Important notes

This document is a quick reference guide. A supplementary product description is available online at **https://doc.lobaro.com**.

The device is powered by an internal, replaceable 3.6V lithium battery (Li-SOCl2), which is subject to transport restrictions. Hazardous material class: 9A. The applicable transport regulations must be met when transporting the device incl. inserted battery. The battery must not be connected during transport! The test certificates for the approved batteries are available on request.

This product must be installed professionally and in accordance with the specified installation guidelines and may therefore only be installed by trained and qualified personnel. For installation in structures with increased fire protection requirements, e.g. staircases, escape routes, the installation company or the qualified personnel must ensure that the specific requirements according to local building regulations are fulfilled!

These instructions must be read carefully before initial operation, followed and kept for the entire service life of the device.

Intended use

NB-IoT M-Bus wireless LoRaWAN

The *Lobaro Wireless M-Bus Gateway V3* receives data telegrams from up to 500 utility meters with standardized 868 MHz wireless M-Bus interface and forwards them downstream via NB-IoT cellular radio or alternatively LoRaWAN to the Internet for further processing or evaluation.

In addition to the unidirectional wireless M-Bus modes *C1, T1 and S1*, the proprietary *Sensus RF* radio protocol is also supported by the radio receiver in the gateway.

The previously received meter data is transferred to the Lobaro IoT platform, optionally encrypted via DTLS, and can be viewed there or downloaded as a CSV file. Alternatively, the connection of other downstream third-party systems via standardized APIs from the Lobaro platform is easily possible.

The device is intended exclusively for the aforementioned purpose. An application other than previously described or a modification of the gateway are considered as non-intended use and must be requested in writing in advance as well as specifically approved.

Mode of operation

1. The gateway is in energy-saving mode for the majority of its operating time.
2. The device wakes up at freely configurable intervals ('CRON parameters').
3. Encrypted or unencrypted Wireless M-Bus (868 MHz) telegrams are received for the configured time duration (among others 'cmodeDurSec parameter') and buffered unchanged in the internal memory.
4. Meter reception can be restricted with filters to specific device IDs, types or 'CI fields'.
5. After the configured period of time, the collection of meter data by radio is stopped again.
6. The data is sent via NB-IoT cellular radio or LoRaWAN to the downstream IoT platform or LoRaWAN network server on the Internet.
7. The platform decrypts (on demand) the consumption data with stored keys.
8. The consumption values or meter telegrams are available in table view, as CSV download or via standardized APIs.

Device components

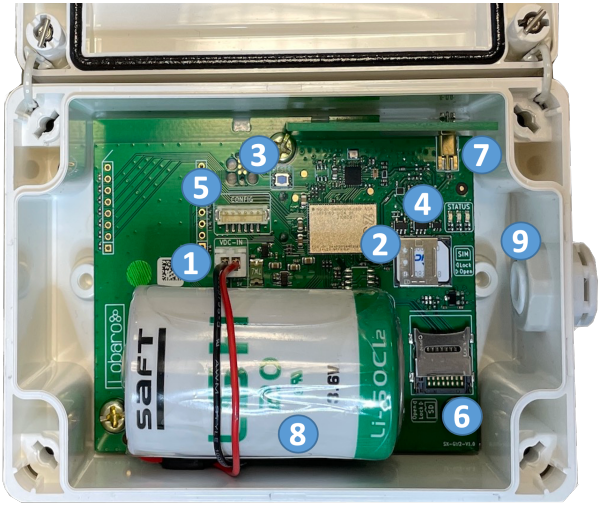


Figure 1: Device components

1. Battery connector (JST-XH 2Pin)
2. SIM card socket
3. Reset button
4. Status LED (RGB)
5. Connector for USB configuration adapter (Art.: #8000005)
6. MicroSD card socket
7. Connector for internal PCB antenna
8. Battery (3.6V | 13Ah) incl. velcro fluff (Art.: #3000581)
9. Pressure compensation element

Initial operation

To commission the gateway, a suitable SIM card must be inserted in the socket at position (2) if mobile radio is to be used for data upload instead of LoRaWAN. To do this, first slide the cover lock of the socket to the right and then open it upwards. During insertion, it is essential to ensure that the battery (1) is not connected. After inserting the SIM card, the cover must be folded down and the lock must be closed again by sliding it to the left.

The associated battery is equipped with velcro fluff, which is to be attached to the velcro hooks of the device at position (8) when inserting it. Make sure that the connecting cable of the battery is routed around the battery body as shown in Fig.1. Then connect the plug connector of the battery to the reverse polarity protected socket at position (1).

The device starts with the pre-configured parameters and begins an initial collection of metering data, followed by an upload of the data via LoRaWAN or cellular radio. The initial device configuration can be viewed via the Lobaro platform or was transmitted in advance in the form of a digital delivery bill.

The reset button (3) can be used at any time to reproduce the same behavior as when the battery was first connected, e.g. to start an initial readout during installation.

By means of the status LEDs (4) different operating modes of the firmware can be read. The different blinking patterns are described in the online manual, available at `https://doc.lobaro.com`.

The socket for an SD card (6) is suitable for holding a corresponding memory card. The locking mechanism works analogously to the SIM card.

Only 3.6V batteries approved by Lobaro may be used with the gateway. The use of other batteries, especially without velcro fluff, is not permitted, as there would be no sufficient protection of the battery in the housing.

Only antennas approved by Lobaro may be connected to the MMCX antenna connector (7)!

The storage functionality for SD cards (6) may not be supported by all firmware versions.

The SIM card used must be activated for NB-IoT or LTE-M1 networks. The gateway configuration of the LTE connection (operator, APN, band) must match the SIM card used!

Gateway configuration

Reading and adjusting the gateway configuration is possible via the 6-pin configuration connector (5) and the separately available Lobaro USB configuration adapter in combination with the free PC-based 'Lobaro Maintenance Tool' for Windows, Linux and MacOS.

Alternatively, if the network parameters are configured correctly, the configuration changes can also be made 'over-the-air' via the Lobaro IoT platform.

Details of the gateway configuration and available parameters can be found in the online manual at `https://doc.lobaro.com`.

Proper mounting and housing dimensions

The cover of the gateway is secured via four quick-release screws. These screws are loosened or tightened via a 90° turn. In addition, the housing has a lid loss protection.

The gateway is securely fastened to a wall or ceiling with the cover open using the four fastening points marked in red in Figure 3 and M4 screws of suitable length. After successful wall mounting, the cover must be closed again.

When opening the housing lid, the quick release screws must not be turned more than a 1/4 turn. Otherwise the screws may break off!

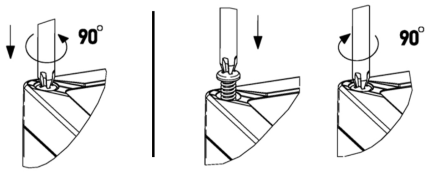


Figure 2: Quick-release screws lid (open | close)

The gateway must be securely screwed to a wall/ceiling using four suitable M4 screws and wall anchor, cf. red marking in figure 3.

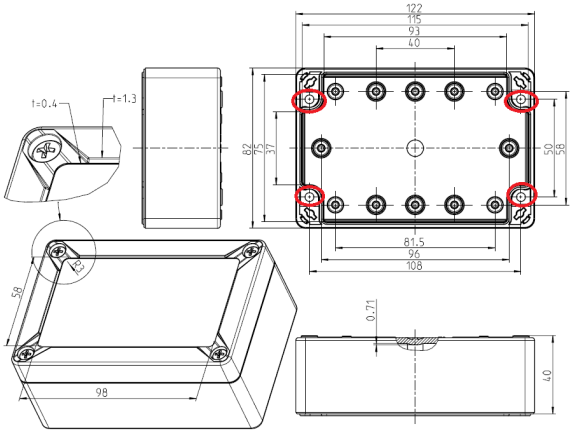


Figure 3: Housing measurements [mm]

When selecting the installation site, it is essential to ensure that the specified ambient conditions (see Technical data) can be maintained at all times.

The pressure compensation element (9) and the IP66 housing protection class allow the gateway to be operated outdoors.

Simplified CE declaration

Lobaro GmbH hereby declares that the LOB-GW-HYB-WMBUS is in compliance with Directives 2014/53/EU and 2011/65/EU. The full text of the EU Declaration of Conformity is available at the following Internet address:

`https://doc.lobaro.com`

Technical specifications

General		
	Type	LOB-GW-HYB-WMBUS
	Purchase name	Wireless M-Bus Gateway V3
	Item number	8000162
Metering		
	Wireless M-Bus	S1, C1/T1 Mode
	RX frequencies	868.3 MHz, 868.95 MHz
	Standard	DIN EN 13757-4
	Proprietary mode	Xylem SensusRF (BubbleUP)
	Typ. range	30 m (Indoor), 2-3 floors
	Typ. range	100 m (Outdoor), open space
	Memory capacity	500 telegrams, each 100 bytes
	Whitelist filter	ID, M-Field, CI-Field, Type
	Configuration	collection duration and intervals
Cellular		
	LTE networks	Cat-NB1, Cat-NB2, Cat-M1
	LTE bands	B3, B8, B20
	TX power	$\leq$ 23 dBm
	Typ. range	network-dependent
	SIM card	4FF (Nano-SIM)
	Data transfer	CoAP via UDP
	Encryption	DTLS (optional)
	Data format	CBOR bzw. JSON
LoRaWAN		
	Protocol	Class A LoRaWAN 1.0.2 EU868
	TX power	$\leq$ 14 dBm
	Activation	Over-the-air activation (OTAA)
	Typ. range	up to 2 km, urban
	Typ. range	up to 10 km, open space
Antenna		
	Internal type	multiband PCB monopoles
	Ext. connector	on request
Battery		
	Approved type	SAFT LSH20
	Other types	on request
	Chemistry	Li-SOCl2
	Voltage	3.6 V
	Capacity	$\leq$ 13 Ah
	Cont. current	$\leq$ 1.8 A
	Weight	$\leq$ 120 g
	Connector	JST-XH 2-Pin
	Mounting	3M industrial velcro | zip ties
Power		
	Normal / Idle	$\leq$ 11 mW
depends on operating mode	RX Metering	$\leq$ 33 mW
	RX LoRa	$\leq$ 33 mW
	TX LoRa	$\leq$ 110 mW
	RX NB-IoT	$\leq$ 162 mW
	TX NB-IoT	$\leq$ 1550 mW
	Sleep	$\leq$ 36 μW
Housing		
	Measurements	130 mm x 82 mm x 55 mm
	Material	Polycarbonate
	Screws	stainless steel V2A
	Weight	220 g (incl. electronics)
	Flammability class	960 °C V-2 (as per UL94)
	Protection class	IP66 (0.3 bar / 30 seconds)
	Color	white
	Resistance to impact	IK08
Environment		
Must be followed!	Rel. humidity	20...70 % (non-condensing)
	Operating temp.	-20 °C to 55 °C
	Storage temp.	0 °C to 30 °C
	Installation height	$\leq$ 2 m (above ground)
	Installation height	$\leq$ 2000 m (above sea level)

Radio frequencies and bands used

Harmonized radio bands used by the gateway, max. occupied bandwidths (BW) and transmission powers (TX power, EIRP). Unless otherwise indicated, the specified frequencies are used for both the transmit (TX, UL) and receive (RX, DL) directions.

Band	Modulation	BW kHz	Frequencies MHz	TX power dBm
L	LoRa	125	867.1, 867.3, 867.5, 867.7, 867.9	14
M	LoRa	125	868.1, 868.3, 868.5	14
M	LoRa	250	868.3	14
P	LoRa	125	869.525	14
M	FSK	200	868.3	Only RX
M	FSK	200	868.42	Only RX
N	FSK	200	868.95	Only RX
B8	Cat-NB1|2	200	UL:880...915, DL:925...960	23
B20	Cat-NB1|2	200	UL:832...862, DL:791...821	23
B3	Cat-NB1|2	200	UL:1710...1785, DL:1805...1880	23
B8	Cat-M1	1800	UL:880...915, DL:925...960	23
B20	Cat-M1	1800	UL:832...862, DL:791...821	23
B3	Cat-M1	1800	UL:1710...1785, DL:1805...1880	23

Proper disposal of this product

In Germany and for products delivered directly from Germany:

Due to the applicable regulations, the electrical and electronic devices of Lobaro GmbH may not be disposed of via the public collection points for electrical devices!

In order to create possibilities for the return of old devices, we cooperate with several qualified recycling companies. If a device manufactured by us has become an old device and you would like to return it, please contact:

`https://www.take-e-way.de/leistungen/elektrogesetz-weee-elektrog/b2b-altgeraete-ruecknahme-entsorgung`

and fill out the questionnaire.

In countries of the European Union outside Germany:

Information on correct disposal can be obtained from your dealer or the responsible distributor.

Safety instructions Lithium batteries

- Store protected from moisture
- Keep out of reach of children
- Do not heat above 85 °C
- Do not short circuit
- Do not open or damage
- Do not recharge

Batteries may only be replaced by qualified personnel. The connector plug only fits in one position to ensure correct polarity installation. Therefore, do not apply excessive force when plugging in.

The battery may only be connected during regular operation. Deep discharge due to persistent error conditions, e.g. if the device cannot establish a connection or send data for long periods, must be avoided.

Warranty and guarantee

Warranty and guarantee claims can only be asserted if the device has been used as intended and the technical specifications and applicable technical rules have been observed.

Last updated: 24.01.2022

Technical specifications

General		
	Type	LOB-GW-HYB-WMBUS
	Purchase name	Wireless M-Bus Gateway V3
	Item number	8000162
Metering		
	Wireless M-Bus	S1, C1/T1 Mode
	RX frequencies	868.3 MHz, 868.95 MHz
	Standard	DIN EN 13757-4
	Proprietary mode	Xylem SensusRF (BubbleUP)
	Typ. range	30 m (Indoor), 2-3 floors
	Typ. range	100 m (Outdoor), open space
	Memory capacity	500 telegrams, each 100 bytes
	Whitelist filter	ID, M-Field, CI-Field, Type
	Configuration	collection duration and intervals
Cellular		
	LTE networks	Cat-NB1, Cat-NB2, Cat-M1
	LTE bands	B3, B8, B20
	TX power	≤ 23 dBm
	Typ. range	network-dependent
	SIM card	4FF (Nano-SIM)
	Data transfer	CoAP via UDP
	Encryption	DTLS (optional)
	Data format	CBOR bzw. JSON
LoRaWAN		
	Protocol	Class A LoRaWAN 1.0.2 EU868
	TX power	≤ 14 dBm
	Activation	Over-the-air activation (OTAA)
	Typ. range	up to 2 km, urban
	Typ. range	up to 10 km, open space
Antenna		
	Internal type	multiband PCB monopoles
	Ext. connector	on request
Battery		
	Approved type	SAFT LSH20
	Other types	on request
	Chemistry	Li-SOCl2
	Voltage	3.6 V
	Capacity	≤ 13 Ah
	Cont. current	≤ 1.8 A
	Weight	≤ 120 g
	Connector	JST-XH 2-Pin
	Mounting	3M industrial velcro | zip ties
Power		
depends on operating mode	Normal / Idle	≤ 11 mW
	RX Metering	≤ 33 mW
	RX LoRa	≤ 33 mW
	TX LoRa	≤ 110 mW
	RX NB-IoT	≤ 162 mW
	TX NB-IoT	≤ 1550 mW
	Sleep	≤ 36 μW
Housing		
	Measurements	130 mm x 82 mm x 55 mm
	Material	Polycarbonate
	Screws	stainless steel V2A
	Weight	220 g (incl. electronics)
	Flammability class	960 °C V-2 (as per UL94)
	Protection class	IP66 (0.3 bar / 30 seconds)
	Color	white
	Resistance to impact	IK08
Environment		
Must be followed!	Rel. humidity	20...70 % (non-condensing)
	Operating temp.	-20 °C to 55 °C
	Storage temp.	0 °C to 30 °C
	Installation height	≤ 2 m (above ground)
	Installation height	≤ 2000 m (above sea level)

Radio frequencies and bands used

Harmonized radio bands used by the gateway, max. occupied bandwidths (BW) and transmission powers (TX power, EIRP). Unless otherwise indicated, the specified frequencies are used for both the transmit (TX, UL) and receive (RX, DL) directions.

Band	Modulation	BW kHz	Frequencies MHz	TX power dBm
L	LoRa	125	867.1, 867.3, 867.5, 867.7, 867.9	14
M	LoRa	125	868.1, 868.3, 868.5	14
M	LoRa	250	868.3	14
P	LoRa	125	869.525	14
M	FSK	200	868.3	Only RX
M	FSK	200	868.42	Only RX
N	FSK	200	868.95	Only RX
B8	Cat-NB1|2	200	UL:880...915, DL:925...960	23
B20	Cat-NB1|2	200	UL:832...862, DL:791...821	23
B3	Cat-NB1|2	200	UL:1710...1785, DL:1805...1880	23
B8	Cat-M1	1800	UL:880...915, DL:925...960	23
B20	Cat-M1	1800	UL:832...862, DL:791...821	23
B3	Cat-M1	1800	UL:1710...1785, DL:1805...1880	23

Proper disposal of this product

In Germany and for products delivered directly from Germany:

Due to the applicable regulations, the electrical and electronic devices of Lobaro GmbH may not be disposed of via the public collection points for electrical devices!

In order to create possibilities for the return of old devices, we cooperate with several qualified recycling companies. If a device manufactured by us has become an old device and you would like to return it, please contact:

`https://www.take-e-way.de/leistungen/elektrogesetz-weee-elektrog/b2b-altgeraete-ruecknahme-entsorgung`

and fill out the questionnaire.

In countries of the European Union outside Germany:

Information on correct disposal can be obtained from your dealer or the responsible distributor.

Safety instructions Lithium batteries

- Store protected from moisture
- Keep out of reach of children
- Do not heat above 85 °C
- Do not short circuit
- Do not open or damage
- Do not recharge

Batteries may only be replaced by qualified personnel. The connector plug only fits in one position to ensure correct polarity installation. Therefore, do not apply excessive force when plugging in.

The battery may only be connected during regular operation. Deep discharge due to persistent error conditions, e.g. if the device cannot establish a connection or send data for long periods, must be avoided.

Warranty and guarantee

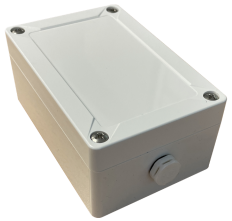
Warranty and guarantee claims can only be asserted if the device has been used as intended and the technical specifications and applicable technical rules have been observed.

Last updated: 24.01.2022

LOB-GW-HYB-WMBUS

Wireless M-Bus Gateway V3

Quick Start Guide (EN)



Manufacturer

Lobaro
Industrial IoT Solutions

Lobaro GmbH | Stadtdeich 7 | D-20097 Hamburg | Germany
support@lobaro.de | www.lobaro.de

Important notes

This document is a quick reference guide. A supplementary product description is available online at **https://doc.lobaro.com**.

The device is powered by an internal, replaceable 3.6V lithium battery (Li-SOCl2), which is subject to transport restrictions. Hazardous material class: 9A. The applicable transport regulations must be met when transporting the device incl. inserted battery. The battery must not be connected during transport! The test certificates for the approved batteries are available on request.

This product must be installed professionally and in accordance with the specified installation guidelines and may therefore only be installed by trained and qualified personnel. For installation in structures with increased fire protection requirements, e.g. staircases, escape routes, the installation company or the qualified personnel must ensure that the specific requirements according to local building regulations are fulfilled!

These instructions must be read carefully before initial operation, followed and kept for the entire service life of the device.

Intended use

The *Lobaro Wireless M-Bus Gateway V3* receives data telegrams from up to 500 utility meters with standardized 868 MHz wireless M-Bus interface and forwards them downstream via NB-IoT cellular radio or alternatively LoRaWAN to the Internet for further processing or evaluation.

In addition to the unidirectional wireless M-Bus modes *C1, T1 and S1*, the proprietary *Sensus RF* radio protocol is also supported by the radio receiver in the gateway.

The previously received meter data is transferred to the Lobaro IoT platform, optionally encrypted via DTLS, and can be viewed there or downloaded as a CSV file. Alternatively, the connection of other downstream third-party systems via standardized APIs from the Lobaro platform is easily possible.

The device is intended exclusively for the aforementioned purpose. An application other than previously described or a modification of the gateway are considered as non-intended use and must be requested in writing in advance as well as specifically approved.

Mode of operation

1. The gateway is in energy-saving mode for the majority of its operating time.
2. The device wakes up at freely configurable intervals ('CRON parameters').
3. Encrypted or unencrypted Wireless M-Bus (868 MHz) telegrams are received for the configured time duration (among others 'cmodeDurSec parameter') and buffered unchanged in the internal memory.
4. Meter reception can be restricted with filters to specific device IDs, types or 'CI fields'.
5. After the configured period of time, the collection of meter data by radio is stopped again.
6. The data is sent via NB-IoT cellular radio or LoRaWAN to the downstream IoT platform or LoRaWAN network server on the Internet.
7. The platform decrypts (on demand) the consumption data with stored keys.
8. The consumption values or meter telegrams are available in table view, as CSV download or via standardized APIs.

Device components

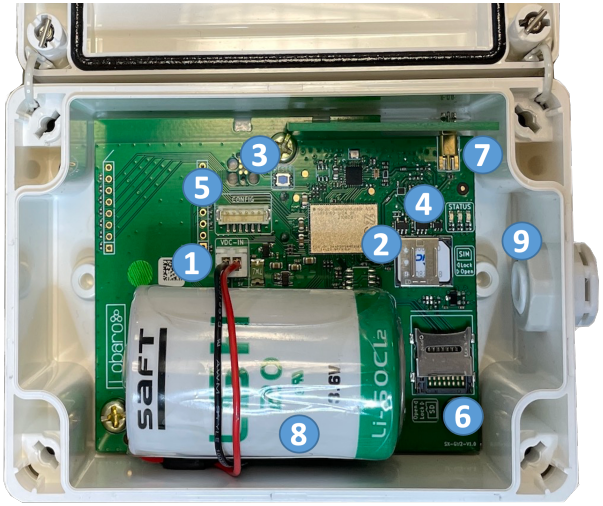


Figure 1: Device components

1. Battery connector (JST-XH 2Pin)
2. SIM card socket
3. Reset button
4. Status LED (RGB)
5. Connector for USB configuration adapter (Art.: #8000005)
6. MicroSD card socket
7. Connector for internal PCB antenna
8. Battery (3.6V | 13Ah) incl. velcro fluff (Art.: #3000581)
9. Pressure compensation element

Initial operation

To commission the gateway, a suitable SIM card must be inserted in the socket at position (2) if mobile radio is to be used for data upload instead of LoRaWAN. To do this, first slide the cover lock of the socket to the right and then open it upwards. During insertion, it is essential to ensure that the battery (1) is not connected. After inserting the SIM card, the cover must be folded down and the lock must be closed again by sliding it to the left.

The associated battery is equipped with velcro fluff, which is to be attached to the velcro hooks of the device at position (8) when inserting it. Make sure that the connecting cable of the battery is routed around the battery body as shown in Fig.1. Then connect the plug connector of the battery to the reverse polarity protected socket at position (1).

The device starts with the pre-configured parameters and begins an initial collection of metering data, followed by an upload of the data via LoRaWAN or cellular radio. The initial device configuration can be viewed via the Lobaro platform or was transmitted in advance in the form of a digital delivery bill.

The reset button (3) can be used at any time to reproduce the same behavior as when the battery was first connected, e.g. to start an initial readout during installation.

By means of the status LEDs (4) different operating modes of the firmware can be read. The different blinking patterns are described in the online manual, available at `https://doc.lobaro.com`.

The socket for an SD card (6) is suitable for holding a corresponding memory card. The locking mechanism works analogously to the SIM card.

Only 3.6V batteries approved by Lobaro may be used with the gateway. The use of other batteries, especially without velcro fluff, is not permitted, as there would be no sufficient protection of the battery in the housing.

Only antennas approved by Lobaro may be connected to the MMCX antenna connector (7)!

The storage functionality for SD cards (6) may not be supported by all firmware versions.

The SIM card used must be activated for NB-IoT or LTE-M1 networks. The gateway configuration of the LTE connection (operator, APN, band) must match the SIM card used!

Gateway configuration

Reading and adjusting the gateway configuration is possible via the 6-pin configuration connector (5) and the separately available Lobaro USB configuration adapter in combination with the free PC-based 'Lobaro Maintenance Tool' for Windows, Linux and MacOS.

Alternatively, if the network parameters are configured correctly, the configuration changes can also be made 'over-the-air' via the Lobaro IoT platform.

Details of the gateway configuration and available parameters can be found in the online manual at `https://doc.lobaro.com`.

Proper mounting and housing dimensions

The cover of the gateway is secured via four quick-release screws. These screws are loosened or tightened via a 90° turn. In addition, the housing has a lid loss protection.

The gateway is securely fastened to a wall or ceiling with the cover open using the four fastening points marked in red in Figure 3 and M4 screws of suitable length. After successful wall mounting, the cover must be closed again.

When opening the housing lid, the quick release screws must not be turned more than a 1/4 turn. Otherwise the screws may break off!

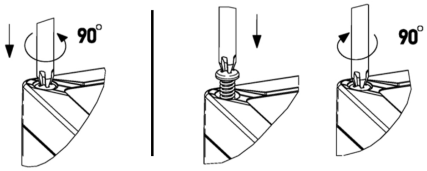


Figure 2: Quick-release screws lid (open | close)

The gateway must be securely screwed to a wall/ceiling using four suitable M4 screws and wall anchor, cf. red marking in figure 3.

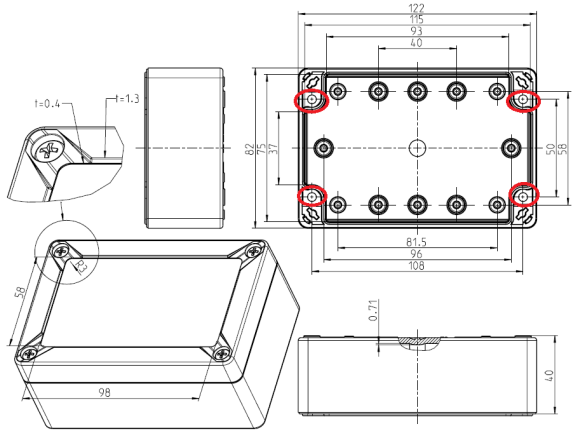


Figure 3: Housing measurements [mm]

When selecting the installation site, it is essential to ensure that the specified ambient conditions (see Technical data) can be maintained at all times.

The pressure compensation element (9) and the IP66 housing protection class allow the gateway to be operated outdoors.

Simplified CE declaration

CE

Lobaro GmbH hereby declares that the LOB-GW-HYB-WMBUS is in compliance with Directives 2014/53/EU and 2011/65/EU. The full text of the EU Declaration of Conformity is available at the following Internet address:

`https://doc.lobaro.com`