

Product Manual

ise smart connect Modbus Vaillant

Order no. S-0002-007

Complete set for installation, consisting of the two system components:

- ise smart connect Modbus Vaillant and
- ise eBUS Adapter

Order no. 1-0009-000

- ise smart connect Modbus Vaillant

Order no. 2-0001-003

- ise eBUS Adapter

Valid for firmware version 1.0



An intelligent
solution
recommended
by Vaillant



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1 Product description

1.1 Functions

- Control of a Vaillant geoTHERM/3 VWS220/3 – 460/3 heat pump via Modbus TCP/IP.
- Additional control of up to three Vaillant VR60 mixer modules and up to six Vaillant VR90 remote control units.
- Together with the ise eBUS Adapter, the ise smart connect Modbus Vaillant establishes the connection between the Vaillant geoTHERM/3 heat pump and your building management system (BMS) via Modbus TCP/IP.

Important note:

To ensure functional control, the use of the both system components is required. The ise smart connect Modbus Vaillant can therefore only be used together with the ise eBUS Adapter. The system components can be ordered as a set or individually (for replacement purposes). A Vaillant geoTHERM VWS220/3 – 460/3 heat pump is necessary in the installation. No other heat pump is compatible.

Important!

The device must be supplied with voltage by a dedicated power supply unit. Do not use the auxiliary voltage output of a KNX power supply unit which is also supplying a KNX line.

1.2 Definitions and explanation of terms

- **ise eBUS Adapter**

The ise eBUS Adapter is a system component to connect the Vaillant bus modular control with the Modbus system. It connects:

- devices of the ise smart connect series for eBUS connection (in this case, ise smart connect Modbus Vaillant) and
- the Vaillant system together over a USB interface.

It is a specially designed system component for this use case.

Any other or extended use is considered improper.

- **Vaillant system**

All components of the Vaillant heating system are described as the Vaillant system. One of these components must be a geoTHERM VWS220/3 – 460/3 heat pump, which will be referred to as geoTHERM/3 from now on. Additionally, the heating system can contain up to three VR60 mixer modules and up to six VR90 remote control units:

Information on the operation, installation and any required accessories can be found in the corresponding documents issued by Vaillant.

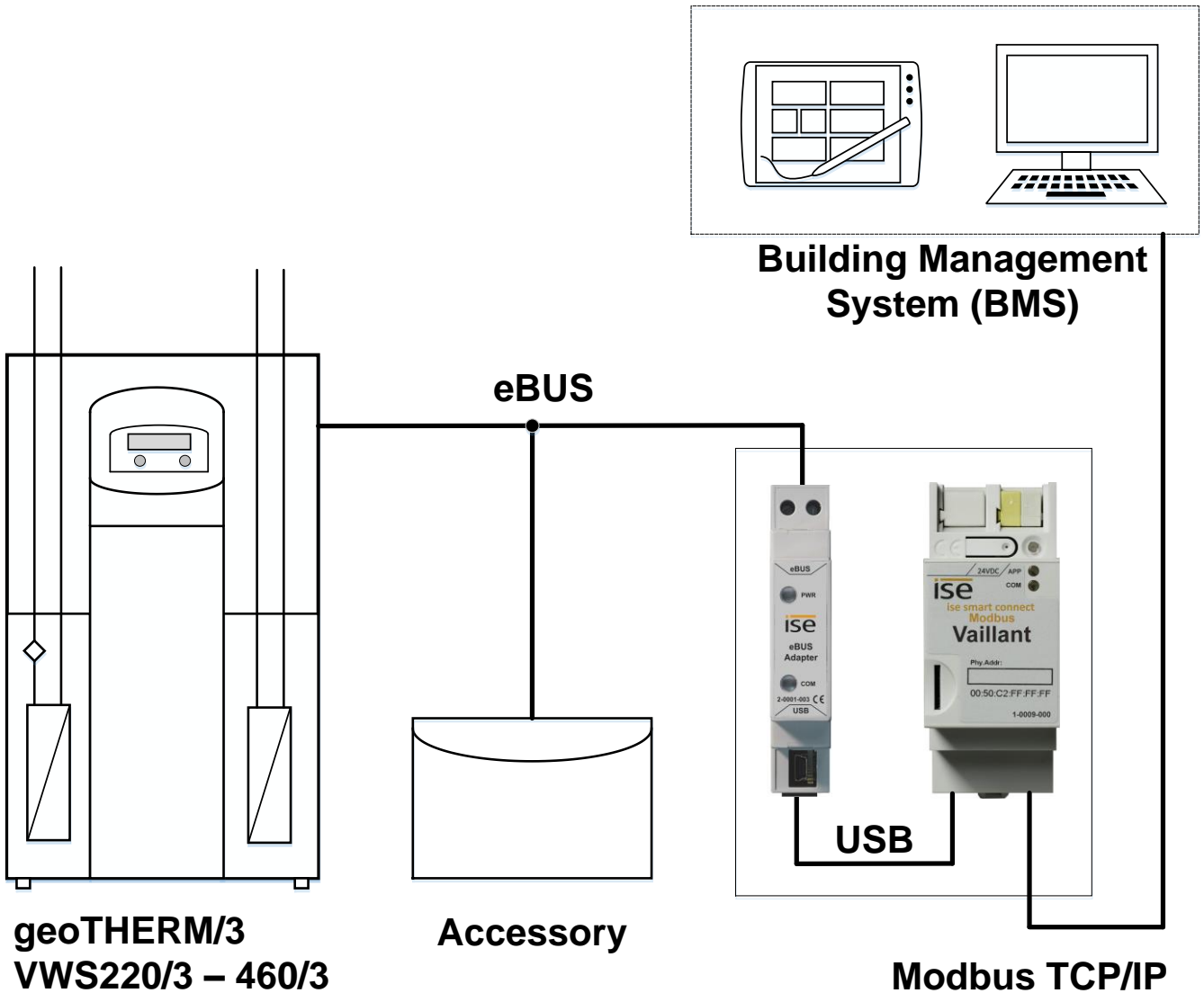
- **eBUS**

The commands sent via Modbus TCP/IP are prepared via the ise smart connect Modbus Vaillant and the ise eBUS Adapter to enable communication with the Vaillant system via the eBUS. **Separate addressing of ise system components for the eBUS is not necessary.**

The eBUS connection point is described in chapter 2.5 “Connection of the ise eBUS Adapter with the eBUS”.

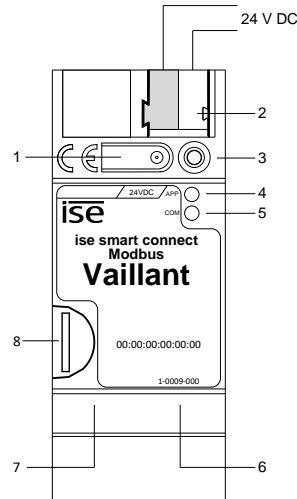
The relevant instructions for the installation on the eBUS provided by Vaillant (connection, procedures, cable selection, etc.) must be observed.

1.3 Function schematic



2 Installation, electrical connection and operation

2.1 Device design ise smart connect Modbus Vaillant



Dimensions:

Width (W):
36 mm (2 HP)

Height (H):
90 mm

Depth (D):
74 mm

Figure 1: ise smart connect Modbus Vaillant.

1	Button for factory reset	The button can be used to execute a factory reset of the device.	
2	Connection for power supply	DC 24–30 V, 2 W (at 24 V) On left: (+ / yellow) On right: (– / white)	
3	LED (red)	Red:	No function.
4	LED <i>APP</i> (green)	Green:	Normal operation
		Off/Flashing:	For diagnosis code, see 5.2.1 / 5.2.2
5	LED <i>COM</i> (yellow)	Yellow:	Normal operation, Modbus TCP/IP server running (brief dark phases indicate Modbus TCP/IP telegram traffic)
		Off/Flashing:	Error, Modbus TCP/IP server not running
6	Ethernet connection	LED 10/100 speed (green) On: 100 Mbit/s Off: 10 Mbit/s	LED link/ACT (orange) On: Connection to IP network Off: No connection Flashing: Data reception on IP
7	USB connection	USB connection type A, establishes the connection to the Vaillant system via the ise eBUS Adapter. Use the supplied USB cable as standard. Please note that the use of USB cables with a length of more than 3 m is generally not permitted.	
8	MicroSD card holder	No function.	

2.2 Safety notes

Electrical devices may only be installed and mounted by a qualified electrician. In doing so, the applicable accident prevention regulations must be observed. Failure to observe the installation instructions can result in damage to the device, fire or other dangers.

**DANGER!**

Electric shock if live parts are touched. Electric shock may lead to death. Isolate connection cables before working on the device. Cover up live parts in the vicinity!

**IMPORTANT!**

The device must be supplied with voltage by a dedicated power supply unit. Do not use the auxiliary voltage output of a KNX power supply unit which is also supplying a KNX line.

Please see the installation instructions enclosed with the device for more information.

2.3 Mounting and electrical connection

Mounting the device

- The device is intended for fixed installation in indoor spaces and dry rooms.
- Snap it on to the top-hat rail as per DIN EN 60715, vertical mounting; network connections must face downward.
- ▮ Observe temperature range (0 °C to +45 °C); do not install over heat-emitting devices and ensure sufficient ventilation/cooling if necessary.

Connecting the device

Connect the external power supply to the connection terminal (2). We recommend to use the white-yellow connection terminal.

Polarity: left/yellow: (+), white/right: (-).

- **Important:** The device must be supplied with voltage by a dedicated power supply unit. Do not use the auxiliary voltage output of a KNX power supply unit which is also supplying a KNX line.
- Connect the network connection to the RJ pin jack with the RJ45 plug (6) to enable Modbus TCP/IP access.
- Connect the ise eBUS adapter to the USB port (7) (use the supplied USB cable). **Please note that the use of USB cables with a length of more than 3 m is generally not permitted.** When connecting an active ise smart connect Modbus Vaillant with the ise eBUS Adapter, the initialisation may require up to three minutes. During this time, the ise smart connect Modbus Vaillant may restart.

Note: The use of the ise smart connect Modbus Vaillant requires the use of an ise eBUS Adapter. This can be ordered as a set or individually (for replacement purposes).

Mounting/removing a cover cap

A cover cap can be mounted for protection of the power supply connections from dangerous voltage, particularly in the connection area.

The cap is mounted with an attached power supply terminal and a connected power supply line to the rear.

- Mounting the cover cap: The cover cap is pushed over the supply terminal until it audibly engages (cf. Figure 2: *Mounting/removing a cover cap A*).
- Removing the cover cap: The cover cap is removed by pressing it in slightly on the side and pulling it off to the front (cf. Figure 2: *Mounting/removing a cover cap B*).

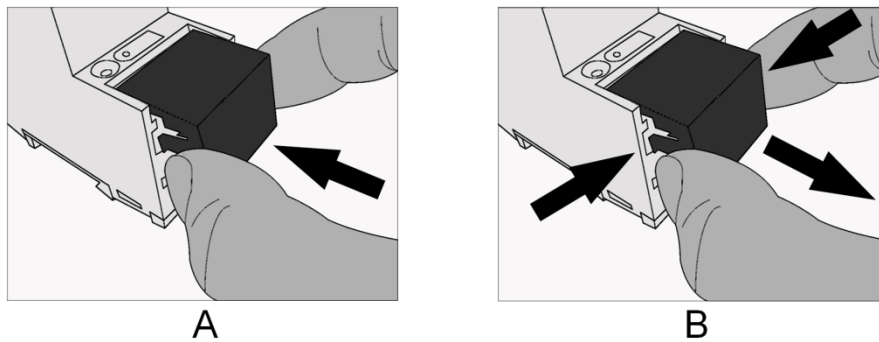


Figure 2: Mounting/removing a cover cap.

2.4 Device design ise eBUS Adapter

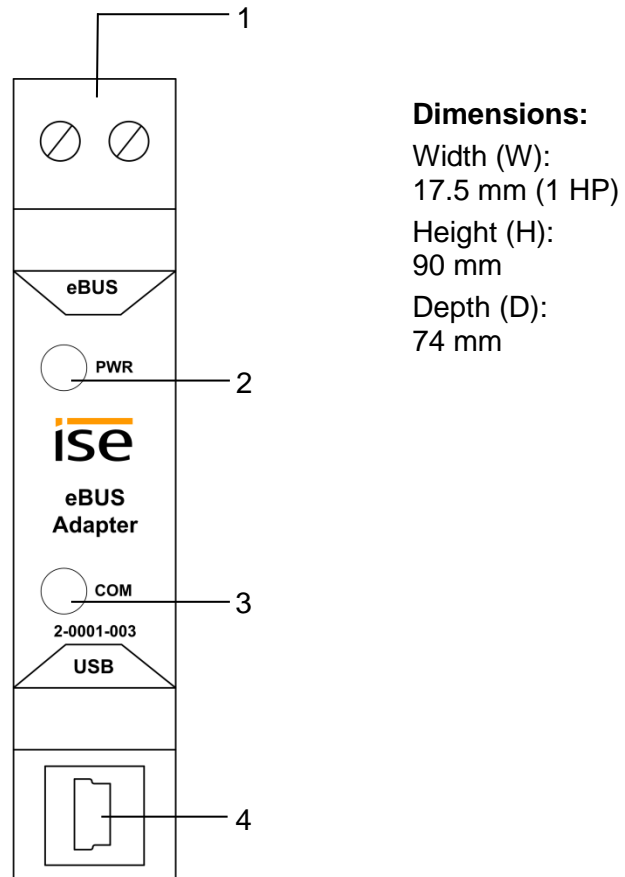


Figure 3: ise eBUS Adapter

1	eBUS connection	Important note: The maximum length of the eBUS connection cable is 125 m. Please see chapter 2.5 "Connection of the ise eBUS Adapter with the eBUS" for the position of the eBUS connection. The connection is protected against polarity reversal.
2	LED <i>PWR</i> (green)	Green: Minimum voltage from eBUS is connected
3	LED <i>COM</i> (green)	Green: Connection of ise smart connect Modbus Vaillant with eBUS established
4	USB connection	Important note: The adapter cable for the USB port is equipped with a mini USB-B angled plug. To prevent damage, the angled plug must always be pulled out the front. Use the supplied USB cable as standard. Please note that the use of USB cables with a length of more than 3 m is generally not permitted.

Please see the installation instructions enclosed with the device for more information.

2.5 Connection of the ise eBUS Adapter with the eBUS

The heating technology supplier has installed a junction box in which an eBUS cable is laid from the heating system. In this junction box, the company executing the building management system (BMS) will establish the connection to the ise eBUS Adapter.

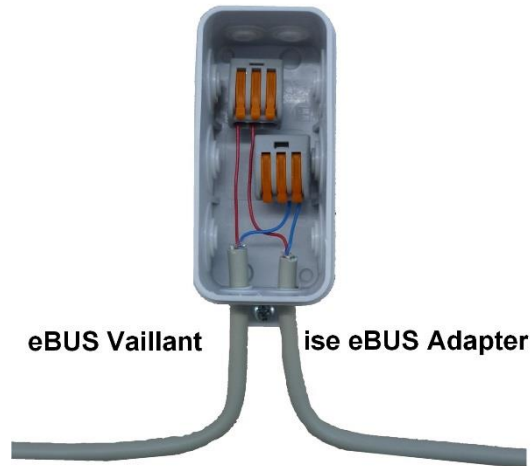


Figure 4: Junction box for the connection of the ise eBUS Adapter to the heating system.

The position of the junction box can be seen in the "Handover protocol from executing company for heating, air conditioning, ventilation technology to the building technology planner". The corresponding information can be found in Point 4 "Position of eBUS connection point between Vaillant heating system and Modbus Gateway" of the handover protocol.

3 Configuration

Configuration of the ise smart connect Modbus Vaillant system components is divided into the following steps:

Preparations:	For explanations, see
1 Installing ise eBUS Adapter. Connect the ise smart connect Modbus Vaillant with the ise eBUS Adapter via the USB interface. Use the supplied USB cable as standard. Please note that the use of USB cables with a length of more than 3 m is generally not permitted.	→ Chapter 2
2 Mount ise smart connect Modbus Vaillant; connect it to auxiliary voltage. Important note: Please ensure that the device is only supplied with voltage by a dedicated power supply unit. Do not use the auxiliary voltage output of a KNX power supply unit which is also supplying a KNX line.	→ Chapter 2.3
3 Connect the ise eBUS Adapter with the eBUS in the intended junction box. Important note: The maximum length of the eBUS connection cable is 125 m.	→ Chapter 2.5
4 Install the ise smart connect Modbus Vaillant on the IP network and make settings in the router of the IP network if necessary.	

Configuration via website:

After installing the device and connecting the power supply and Ethernet, the device can be configured via the website:

1 Set the IP address, the IP subnet mask and the default gateway address of the ise smart connect Modbus Vaillant or select "DHCP active" to obtain automatically an IP address from the router.	→ Chapter 3.1
2 Configuration of system dimensioning (additional data points and modules)	→ Chapter 3.2
3 Configuration of the Modbus TCP/IP port if necessary (default port is 502).	→ Chapter 3.3
4 Configuration of your building management system (BMS) to access the ise smart connect Modbus Vaillant with a Modbus TCP/IP client.	→ Chapter 4

3.1 Configuration step 1 – IP configuration of the ise smart connect Modbus Vaillant

By default, the ise smart connect Modbus Vaillant requests its IP configuration via DHCP. If the default setting is used, a DHCP server will assign a valid IP address to the ise smart connect Modbus Vaillant.

If a DHCP server is not available for this setting, the device starts up after a short time with an AutoIP address (address range from 169.254.1.0 to 169.254.254.255).

As soon as a DHCP server will be available, a new IP address will be automatically assigned to the device.

If it is necessary to use static IP setup, go to the “IP network settings” page of the device website. On this page, you can switch from DHCP to Static IP Setup in the “IPv4 settings”. You simply unselect the “DHCP active” check box to enable manual editing of the IP settings. The IP setup includes the following parameters:

- IP address,
- subnet mask,
- address of the default gateway,
- an optional name server (if it is available from a different IP address as your default gateway).

After changing the configuration, you will have to save the settings. The device will then apply the changes. Otherwise, the website will indicate and show you the incorrect parameter.

ise smart connect Modbus Vaillant

Device status Download logfile Reboot Factory reset Firmware update IP network settings Vaillant components English

Settings

IPv4 settings

DHCP active:

IP address:
192.168.0.2

Subnet mask:
255.255.255.0

Default gateway:
192.168.0.1

Name server (optional):
192.168.0.1

Save

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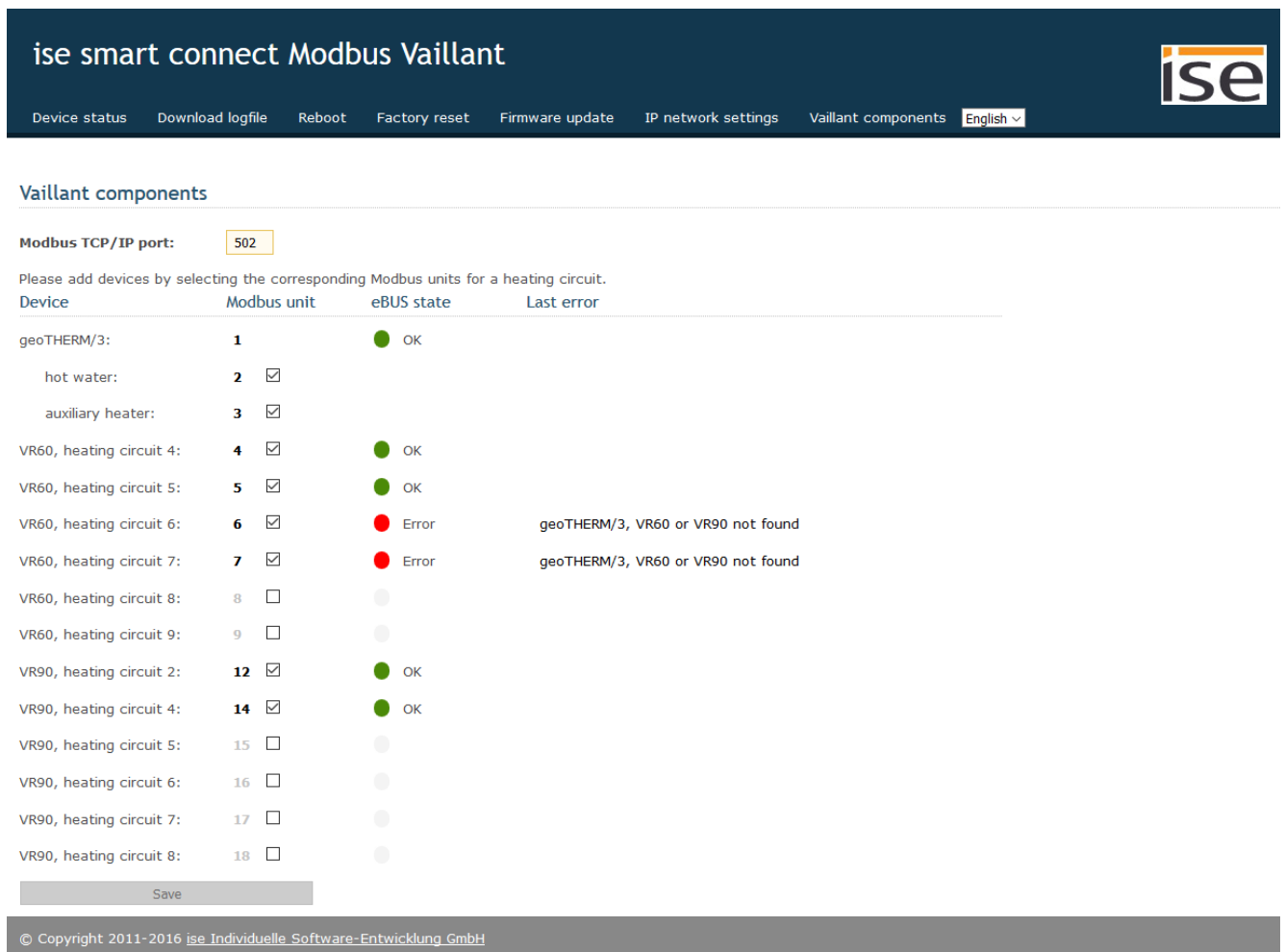
3.2 Configuration step 2 – Configuration of system dimensioning

The heating system dimensioning can easily be configured via the device website.

In addition to the Vaillant geoTHERM/3 heat pump, you can also control up to three Vaillant VR60 mixer modules and up to six Vaillant VR90 remote control units. The use of the geoTHERM/3 heat pump can be specified as well. You can activate additional data points for hot water usage and for an electrical auxiliary heater.

The default configuration has no additional data points and modules configured, which means that no checkbox is checked and the dots for the corresponding eBUS states are grey.

Please refer to the handover protocol of the executing company for heating, air conditioning, ventilation technology to the building technology planner to check, which units are available in the installation and need to be enabled.



ise smart connect Modbus Vaillant

Device status Download logfile Reboot Factory reset Firmware update IP network settings Vaillant components English

Vaillant components

Modbus TCP/IP port:

Please add devices by selecting the corresponding Modbus units for a heating circuit.

Device	Modbus unit	eBUS state	Last error
geoTHERM/3:	1	● OK	
hot water:	2 <input checked="" type="checkbox"/>		
auxiliary heater:	3 <input checked="" type="checkbox"/>		
VR60, heating circuit 4:	4 <input checked="" type="checkbox"/>	● OK	
VR60, heating circuit 5:	5 <input checked="" type="checkbox"/>	● OK	
VR60, heating circuit 6:	6 <input checked="" type="checkbox"/>	● Error	geoTHERM/3, VR60 or VR90 not found
VR60, heating circuit 7:	7 <input checked="" type="checkbox"/>	● Error	geoTHERM/3, VR60 or VR90 not found
VR60, heating circuit 8:	8 <input type="checkbox"/>	●	
VR60, heating circuit 9:	9 <input type="checkbox"/>	●	
VR90, heating circuit 2:	12 <input checked="" type="checkbox"/>	● OK	
VR90, heating circuit 4:	14 <input checked="" type="checkbox"/>	● OK	
VR90, heating circuit 5:	15 <input type="checkbox"/>	●	
VR90, heating circuit 6:	16 <input type="checkbox"/>	●	
VR90, heating circuit 7:	17 <input type="checkbox"/>	●	
VR90, heating circuit 8:	18 <input type="checkbox"/>	●	

Save

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To enable additional data points and modules you have to check the corresponding checkbox, press “Save” and confirm the reboot of the device. When the website is accessible again, you can observe the current eBUS state of your modules (including the geoTHERM/3 heat pump).

During the start-up, the eBUS state may be “unknown”. This means that the gateway has not checked yet, if the module is present in the eBUS network.

A green dot (“OK”) means that the module is accessible via eBUS and there are currently no communication errors.

A red dot (“Error”) means that the module is not accessible via eBUS or there is currently a communication error.

For the previous communication error (if any), the description of the last occurred error is displayed as well for diagnostic purposes.

3.3 Configuration step 3 – Configuration of the Modbus TCP/IP port

If needed, you can change the Modbus TCP/IP port of the device on the website. You can find this option on the *Vaillant components* subpage. By default, the port is 502. It is possible to configure a port in the range between 2,000 and 4,000.

After changing the port, press *Save* and confirm the reboot of the device. When the website is accessible again, the device uses the newly configured Modbus TCP/IP port.

4 Modbus TCP/IP

4.1 Modbus function codes

The following function codes are supported via Modbus TCP/IP:

Function code	Hex	Name
03	0x03	Read Holding Registers
04	0x04	Read Input Registers
06	0x06	Write Single Register
16	0x10	Write Multiple Registers

4.2 Modbus exception codes

The following exception codes can be generated by the gateway:

Exception code	Hex	Name	Description
01	0x01	Illegal Function Code	The function code is unknown to the server
02	0x02	Illegal Data Address	Data Address not accessible (dependant on the request)
03	0x03	Illegal Data Value	Data Value not supported (dependant on the request)
04	0x04	Server Failure	The server failed during the execution
11	0x0B	Gateway Target Device Failed To Respond	Indicates that no response was obtained from the target device (unit ID). Usually means that the device (unit ID) is not present on the network.

4.3 Modbus TCP/IP Gateway behaviour

- All addresses are one-based. If you request register 1, you get the value of register 1.
- For 32-bit data points, the first register contains the least significant word.
- 32-bit data points (two registers) can only be written contiguously with function code 0x10 (Write Multiple Registers). Write requests, which try to set only 16-bit (one register) of a 32-bit data point (two registers) are responded with exception code 0x02 (Illegal Data Address).
- Requests to non-existing/inactive unit IDs are responded with exception code 0x0B (Gateway Target Device Failed To Respond).

4.4 Modbus TCP/IP unit IDs

The Modbus TCP/IP gateway manages the following unit IDs:

Unit ID	Description
1	Vaillant geoTHERM/3
2	Vaillant geoTHERM/3 domestic hot water
3	Vaillant geoTHERM/3 auxiliary heater
4	Vaillant VR60 heating circuit 4
5	Vaillant VR60 heating circuit 5
6	Vaillant VR60 heating circuit 6
7	Vaillant VR60 heating circuit 7
8	Vaillant VR60 heating circuit 8
9	Vaillant VR60 heating circuit 9
12	Vaillant VR90 heating circuit 2
14	Vaillant VR90 heating circuit 4
15	Vaillant VR90 heating circuit 5
16	Vaillant VR90 heating circuit 6
17	Vaillant VR90 heating circuit 7
18	Vaillant VR90 heating circuit 8

4.5 Modbus Registers

4.5.1 Unit ID 1: Vaillant geoTHERM/3

4.5.1.1 Input Registers (R)

Addr.	Name	Datatype	Polling interval [min]	Range	Resolution	Unit
1	eBUS error	eBusErrorState	-			
2	eBUS last error	eBusError	-			
3	Air brine outlet temperature sensor state	sensorState	2			
4-5	Air brine outlet temperature sensor value	IEEE 754 single float	2	-2048.0 – 2047.9	0.1	°C
6	Brine inlet temperature sensor state	sensorState	2			
7-8	Brine inlet temperature sensor value	IEEE 754 single float	2	-2048.0 – 2047.9	0.1	°C
9	Environment circuit: Pressure sensor state	sensorState	2			
10-11	Environment circuit: Pressure sensor value	IEEE 754 single float	2	0 – 65.5	0.1	bar
12	Status fan / brine pump	status	2			
13-14	Compressor starts	uint32_t	60			
15-16	Compressor operating hours	uint32_t	60			h
17	Compressor is running	status	2			
18	Pressure compressor high sensor state	sensorState	2			
19-20	Pressure compressor high sensor value	IEEE 754 single float	2	0 – 65.5	0.1	bar

Addr.	Name	Datatype	Polling interval [min]	Range	Resolution	Unit
21	Pressure compressor low sensor state	sensorState	2			
22-23	Pressure compressor low sensor value	IEEE 754 single float	2	0 – 65.5	0.1	bar
24	Compressor outlet temperature sensor state	sensorState	2			
25	Compressor outlet temperature sensor value	int16_t	2	-2048 – 2048		°C
26	External top cylinder temperature sensor state	sensorState	2			
27	External top cylinder temperature sensor value	int16_t	2	-2048 – 2048		°C
28	External bottom cylinder temperature sensor state	sensorState	2			
29	External bottom cylinder temperature sensor value	int16_t	2	-2048 – 2048		°C
30	Error history 1	DTC_EHP	15			
31	Error history 2	DTC_EHP	15			
32	Error history 3	DTC_EHP	15			
33	Error history 4	DTC_EHP	15			
34	Error history 5	DTC_EHP	15			
35	Error history 6	DTC_EHP	15			
36	Error history 7	DTC_EHP	15			
37	Error history 8	DTC_EHP	15			
38	Error history 9	DTC_EHP	15			
39	Error history 10	DTC_EHP	15			
40	Status heat pump	statusMessageEHP	2			
41-42	Earned environment energy	uint32_t	60			kWh
43	Outside temperature sensor state	sensorState	15			
44	Outside temperature sensor value	int16_t	15	-2048 – 2048		°C
45	Flow temperature sensor state	sensorState	2			
46	Flow temperature sensor value	int16_t	2	-2048 – 2048		°C
47	Return temperature sensor state	sensorState	2			
48	Return temperature sensor value	int16_t	2	-2048 – 2048		°C
49	Heating circuit pressure sensor state	sensorState	2			
50-51	Heating circuit pressure sensor value	IEEE 754 single float	2	0 – 65.5	0.1	bar
52	Energy integral value	int16_t	2			°min
53	VF2 flow temperature sensor state	sensorState	2			
54	VF2 flow temperature sensor value	int16_t	2	-2048 – 2048		°C

Addr.	Name	Datatype	Polling interval [min]	Range	Resolution	Unit
55	Mixer activation	mixerDutyState	2			
56	Heating circuit pump status	status	2			

4.5.1.2 Holding Registers (R/W)

Addr.	Name	Datatype	Polling interval [min]	Range	Resolution	Unit
57	Brine pump speed control	uint16_t	2	7 – 100		%
58	Compressor hysteresis	uint16_t	2	3 – 15		K
59	Energy integral since compressor started	int16_t	2	-250 – -5		°min
60	CH pump speed control	uint16_t	2	30 – 100		%
61	Heating circuit operating mode	opModeHC	2			
62	Day target room temperature	uint16_t	2	5 – 50		°C
63	Set-back temperature	uint16_t	2	5 – 50		°C
64-65	Heating curve	IEEE 754 single float	2	0.1 – 4.0	0.05	
66	Maximum target flow temperature	uint16_t	2	15 – 80		°C
67	Minimum target flow temperature	uint16_t	2	15 – 80		°C
68	Outside temperature switch-off threshold	uint16_t	2	5 – 50		°C

4.5.2 Unit ID 2: Vaillant geoTHERM/3 domestic hot water

4.5.2.1 Input Registers (R)

Addr.	Name	Datatype	Polling interval [min]	Range	Resolution	Unit
1	Cylinder hot water temperature sensor state	sensorState	2			
2	Cylinder hot water temperature sensor value	int16_t	2	-2048 – 2048		°C
3	3-way valve setting	status	2			

4.5.2.2 Holding Registers (R/W)

Addr.	Name	Datatype	Polling interval [min]	Range	Resolution	Unit
4	Hot water circuit operating mode	opModeDHW	2			
5	Target hot water temperature	uint16_t	2	30 – 65		°C
6	Maximum hot water target value	uint16_t	2	40 – 75		°C

4.5.3 Unit ID 3: Vaillant geoTHERM/3 auxiliary heater

4.5.3.1 Input Registers (R)

Addr.	Name	Datatype	Polling interval [min]	Range	Resolution	Unit
1-2	Backup commutations	uint32_t	60			
3-4	Backup heater operating hours	uint32_t	60			h
5	Backup heater output	status	2			

4.5.3.2 Holding Registers (R/W)

Addr.	Name	Datatype	Polling interval [min]	Range	Resolution	Unit
6	Backup hysteresis	uint16_t	2	1 – 20		K
7	Energy integral since backup heater started	int16_t	2	-740 – -50		°min
8	Bivalent temperature	int16_t	2	-9 – 10		°C
9	Backup heater mode for CH	backup	2			
10	backup heater mode for DHW	backup	2			

4.5.4 Unit ID 4 – 9: Vaillant VR60 heating circuit 4 – 9

4.5.4.1 Input Registers (R)

Addr.	Name	Datatype	Polling interval [min]	Range	Resolution	Unit
1	eBUS error	eBusErrorState				
2	eBUS last error	eBusError				
3	VF2 flow temperature sensor state	sensorState	2			
4	VF2 flow temperature sensor value	int16_t	2	-2048 – 2048		°C
5	Mixer activation	mixerDutyState	2			
6	Heating circuit pump status	status	2			

4.5.4.2 Holding Registers (R/W)

Addr.	Name	Datatype	Polling interval [min]	Range	Resolution	Unit
7	Heating circuit operating mode	opModeHC	2			
8	Day target room temperature	uint16_t	2	5 – 50		°C
9	Set-back temperature	uint16_t	2	5 – 50		°C
10-11	Heating curve	IEEE 754 single float	2	0.1 – 4.0	0.05	
12	Maximum target flow temperature	uint16_t	2	15 – 80		°C
13	Minimum target flow temperature	uint16_t	2	15 – 80		°C
14	Outside temperature switch-off threshold	uint16_t	2	5 – 50		°C

4.5.5 Unit ID 12, 14 – 18: Vaillant VR90 heating circuit 2, 4 – 8

4.5.5.1 Input Registers (R)

Addr.	Name	Datatype	Polling interval [min]	Range	Resolution	Unit
1	eBUS error	eBusErrorState				
2	eBUS last error	eBusError				
3	Room temperature sensor state	sensorState	2			
4	Room temperature sensor value	int16_t	2	-2048 – 2048		°C

4.6 Datatypes

4.6.1 eBusErrorState

Value	Description
0	No error / device found
1	Error during eBUS communication / device not found

4.6.2 eBusError

Value	Description
0	No Error
1	geoTHERM/3, VR60 or VR90 not found
2	No compatible geoTHERM/3, VR60 or VR90 found
3	Error in communication with the ise eBUS Adapter
4	eBUS cable not connected
5	No answer from eBUS
7	Value not permitted

4.6.3 sensorState

Value	Description
0	No fault
85	Short-circuit
170	Interrupt

4.6.4 status

Value	Description
0	Off
1	On

4.6.5 DTC_EHP

The “error number geoTHERM/3” is the error number displayed on the geoTHERM/3 controller.

Value	Error number geoTHERM/3	Description
514	30	Error comp inlet sensor
515	31	Error evaporator sensor
516	32	Error heat source outlet sensor
517	40	Error comp outlet sensor
518	41	Error heat source inlet sensor
519	42	Error HP return sensor
520	43	Error HP flow sensor
521	44	Error AF sensor
522	45	Error SP sensor
523	46	Error VF1 sensor
524	47	Error RF1 sensor
525	48	Error VF2 sensor
526	49	Sensor fault: TCoilLiquidOpen
527	50	Error heat source outlet sensor
528	51	Error condenser sensor
529	60	Error Heat source anti freezing protection : Delta T6-T7
530	61	Error Heat source anti freezing protection : T5<4°C
531	62	Error Heat source anti freezing protection : T6<-10°C
532	63	Error No water flow
533	70	Error Abnormal cooling of the C-H circuit
534	71	Building circuit: Floor protect. active
535	72	Error C-H flow temperature too high for floor heating
536	80	Error Compressor outlet overheat
537	81	Error Refrigerant pressure too high.
538	82	Error Refrigerant pressure too high. Check C-H pump
539	83	Error Refrigerant pressure too low
540	90	Error C-H pressure too low P14bar
541	91	Error Pressure brine too low
542	92	Error C-H return temperature too high
543	93	Error Fan overheat thermostat open
544	94	Error or two phase are missing
545	95	Error Wrong phase order
546	96	Error Refrigerant pressure sensors fault
547	20	Op Interlock: Heat source anti freezing protection : Delta T6-T7

Value	Error number geoTHERM/3	Description
548	21	Op Interlock: Heat source anti freezing protection : T5<4°C
549	22	Op Interlock: Heat source anti freezing protection : T6<-10°C
550	23	Op Interlock: No water flow
551	24	Op Interlock: C-H circuit anti freezing protection
552	25	Op Interlock: C-H flow temperature too high
553	26	Op Interlock: Compressor outlet overheat
554	84	Refrigerant pressure out of range
555	33	Error C-H circuit pressure sensor
556	34	Error Brine circuit pressure sensor
557	52	Hydraulic scheme / external sensors do not match
558	53	Appliance code / internal sensors do not match
561	97	no power for compressor
562	–	reserved EHP
563	–	MSG check refrigerant charge
564	–	Heat source temperature too high
565	–	High pressure cut-off during cooling operation
566	–	4WV did not switch
567	–	CH circuit freezing protection during cooling operation
568	–	Low pressure during cooling operation
569	–	Refrigerant temperature too low during cooling operation.
576	–	CH flow-return temperature difference too negative during cooling operation
577	27	Op Interlock: Refrigerant pressure too high
578	28	Op Interlock: Refrigerant pressure too low
579	29	Op Interlock: pressostates opened
580	36	Pressure brine low (<0.6bar for >1 minute)
1471	55	Exchanger temperature sensor error
1472	54	Air inlet temperature sensor error
1478	98	Too low evaporation temperature: retrying.
1480	35	Too high evaporation temperature: retrying.
1495	37	fluid flow reversed (warning)
1496	39	air flow blocked (warning)
1497	89	fan blocked or defective or air flow fully blocked
1498	64	lost communication with outdoor unit
1499	59	de-icing was incomplete (warning)
1500	56	STB ODU is open (error)
1501	85	CH pump failure
1502	86	brine pump failure
65535	–	No fault existing

4.6.6 statusMessageEHP

Value	Description
0	Standby
1	Cooling
2	De-icing
3	CH: Comp. only
4	CH: Comp & Aux
5	CH: Aux only
6	CH: Comp & aux off
7	DHW: Comp & aux off
8	DHW: Comp only
9	DHW: Aux only
10	Peak Rate: WW
11	Peak Rate: Stand-by
12	Acceleration mode
13	Frost protection Heating
14	Frost protection Cylinder
15	Legionella protect.
16	Automatic pump spin
17	Floor drying
18	Venting mode
19	Fault shutdown: Heating
20	Error shutdown: Heating
21	Fault shutdown: DHW
22	Error shutdown: DHW
23	Malfunction
24	Blocking error
25	Operation interlock
26	CH Comp overrun
27	WW Comp overrun
28	Cooling & WW
29	CH return too high

4.6.7 mixerDutyState

Value	Description
0	Stationary
1	Opening
2	Closing

4.6.8 backup

Value	Description
0	No backup
1	Comfort
2	Backup only

4.6.9 opModeDHW

Value	Description
1	On
2	Off
3	Auto

4.6.10 opModeHC

Value	Description
1	On
2	Off
3	Auto
4	Eco
5	Low

5 Commissioning

5.1 Operation

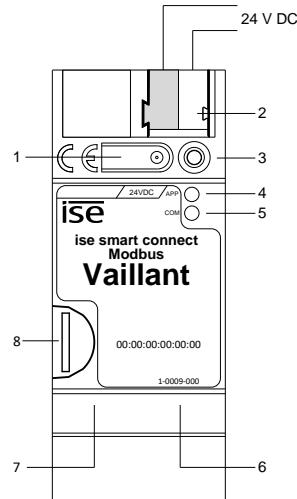


Figure 5: ise smart connect Modbus Vaillant.

1	Button for factory reset	The button can be used to execute a factory reset of the device.	
2	Connection for power supply	DC 24–30 V, 2 W (at 24 V) On left: (+ / yellow) On right: (– / white)	
3	LED (red)	Red:	No function.
4	LED APP (green)	Green:	Normal operation
		Off/Flashing:	For diagnosis code, see 5.2.1 / 5.2.2
5	LED COM (yellow)	Yellow:	Normal operation, Modbus TCP/IP server running (brief dark phases indicate Modbus TCP/IP telegram traffic)
		Off/Flashing:	Error, Modbus TCP/IP server not running
6	Ethernet connection	LED 10/100 speed (green) On: 100 Mbit/s Off: 10 Mbit/s	LED link/ACT (orange) On: Connection to IP network Off: No connection Flashing: Data reception on IP
7	USB connection	USB connection type A, establishes the connection to the Vaillant system via the ise eBUS Adapter. Use the supplied USB cable as standard. Please note that the use of USB cables with a length of more than 3 m is generally not permitted.	
8	MicroSD card holder	No function.	

5.2 LED status displays

The device features three status LEDs on the upper housing side and two status LEDs on the network connections.

The LED displays have **different meanings**

- while the device is starting and
- during operation.

5.2.1 LED status display upon device start-up

After the power supply (DC 24 V on the yellow-white connection terminal) is switched on or after a return in voltage occurs, the device indicates its status through the following LED combinations:

LED "APP" (green)	LED "COM" (yellow)	Meaning	
○ Off	○ Off	No power supply: Please check connections and power supply.	✘
○ Off	● Yellow	Device starting up.	✓
○.....● Green Flash slowly	● Yellow	Device starting up.	✓
● Green	● Yellow	Device booted up and ready for operation.	✓
○.....● Green Flash quickly	○ Off	Error – Please contact support. The firmware cannot be started.	✘
●...○...●...○...●... Green ○...●...○...●...○... Yellow Flash slowly in an alternating fashion		Error – Please contact support. The newly loaded firmware cannot be started. The system is trying to activate the previous firmware (invalid firmware).	✘

5.2.2 LED status display in operation

Once device start-up is complete, the meaning of the LEDs is as follows:

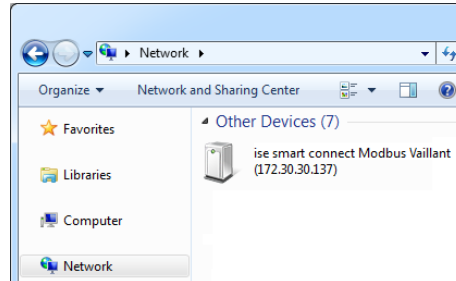
LED "APP" (green)	Meaning
● Green	<u>Normal operation:</u> All configured modules (see chapter 3.2 "Configuration step 2 – Configuration of system dimensioning") found and currently no eBUS communication errors.
○ Off	<u>Device in start-up procedure or out of operation:</u> Wait until the start-up procedure is complete or check the power supply.
●...○...●...○...●...○... Three slow flashes followed by a 2 s pause	<u>eBUS Error:</u> Error in communication with the ise eBUS Adapter. Communication between the ise smart connect Modbus Vaillant and the ise eBUS Adapter is not possible via USB or eBUS cable is not connected, eBUS connection not recognised.
●...○...●...○...●...○... ●...○...●...○... Five slow flashes followed by a 2 s pause	<u>eBUS Error:</u> At least one of the configured modules (see chapter 3.2 "Configuration step 2 – Configuration of system dimensioning") is not found or has currently an eBUS communication error.

LED "COM" (yellow)	Meaning
● Yellow	<u>Normal operation:</u> No Modbus TCP/IP telegram traffic.
○...●...○...●...○... Yellow with brief dark phases	<u>Normal operation:</u> Modbus TCP/IP telegram traffic.
○ Off	<u>Error:</u> Modbus TCP/IP server not running.

5.3 Accessing the website of the device

To access the website of the device, you can use one of the following steps:

- Double-click the icon of the device in the *Other Devices* area in the network environment.



- Alternatively, you can also enter the IP address of the device in your browser.

5.4 Factory reset

Following the factory reset, the device behaves as in the state of delivery. The device uses DHCP, the Modbus TCP/IP port is 502 and no additional data points and modules are configured.

5.4.1 Factory reset using the factory reset button on the device

The device can be reset to the factory settings through a sequence during start-up.

- Make sure that the device is switched off.
- Press and hold button (1) and switch on the device.
- Press and hold button (1) until the LED (3), the APP LED (4) and the COM LED (5) flash slowly simultaneously.
- Briefly release the button (1), then press and hold it again until the LED (3), the APP LED (4) and the COM LED (5) flash quickly simultaneously.
- The factory reset is being carried out; release button (1).
- The device need not be restarted following a factory reset.

The factory reset can be cancelled at any time by interrupting the sequence.

5.4.2 Factory reset using the website of the device

The factory reset can also be triggered from the website of the device.

- Call up the website of the device (see chapter 5.3 “Accessing the website of the device”).
- Select *Factory Reset* in the upper menu bar on the website.
- Confirm the factory reset when the security prompt appears.
- The next displayed page, *Factory Reset*, indicates that the factory reset is being carried out. As soon as this is complete, the start page is loaded again.

5.5 Firmware Update

5.5.1 Firmware Update using the Website of the Device

The ise smart connect Modbus Vaillant provides a way to install a firmware update via the device website. To do this, please choose *Firmware update* from the menu on the device website. The ise smart connect Modbus Vaillant will automatically check for a new version with our update server. The update page will display the current version as well as the version of an update if available. If an update can be installed, a brief description of the update is provided.

If the new firmware is not compatible with the old unit ID and/or register layout, a corresponding message is displayed. Between following cases can be distinguished:

1. The new version provides new functionality. The device will work with the same functionality after the update. However, to use any new functionality, a reconfiguration of the Modbus TCP/IP client (which is in general part of the BMS) and/or a factory reset is required.
2. The new version has a unit ID and/or register layout which is completely incompatible with the layout of the currently used version. A reconfiguration of the Modbus TCP/IP client (which is in general part of the BMS) is mandatory. If a factory reset of the device is necessary, there will be a hint in the message.

The update can be started with the button *Perform update*. In case of an incompatibility, the start of the update has to be confirmed once more.

5.5.2 Local Update without Internet Access

In addition to the online update, a local update without need of an active internet connection can be used. This is intended for devices, which are only accessible over the local area network. The firmware file can be selected locally using the *Select file* button and then started using the *Update firmware* button. In this case, the user is responsible to assure that the update is compatible (see chapter 5.5.3 "Firmware Version Numbers"). A downgrade to an older version is not possible.

5.5.3 Firmware Version Numbers

The version number of the firmware is structured according to the pattern X.Y. The major number X of the corresponding version specifies the compatibility. If the major number of a new firmware is equal to the current firmware, the unit ID and/or register layout is fully compatible. The second part Y of the version number is not relevant to compatibility issues. It signals only an update within the version.

If the major number of a new firmware is higher, it is not guaranteed that this version is compatible with the unit ID and/or register layout. Therefore, it is recommended to check the configuration of the Modbus TCP/IP client.

If the major numbers are equal, it may be necessary to reconfigure the Modbus TCP/IP client and/or perform a factory reset to have access to all features. This is not mandatory in case the new functions are not used.

6 Technical data

6.1 ise smart connect Modbus Vaillant

Modbus protocol	Modbus TCP/IP
External supply	
Voltage	DC 24 to 30 V \pm 10%
Connection	Bus connection terminal, preferably yellow (+)/white (-)
Power consumption	typ. 1.2 W (with DC 24 V and connected ise eBUS Adapter) The device must be supplied with voltage by a dedicated power supply unit. Do not use the auxiliary voltage output of a KNX power supply unit which is also supplying a KNX line.
IP communication	Ethernet 10/100 BaseT (10/100 Mbit/s)
IP connection	1 x RJ45
USB connection	1 x USB type A Use the supplied USB cable as standard. Please note that the use of USB cables with a length of more than 3 m is generally not permitted.
Supported protocols	ARP, ICMP, IGMP, UDP/IP, DHCP, AutoIP, Modbus TCP/IP as per Modbus system specification
microSD card	No function
Ambient temperature	0 °C to +45 °C
Storage temperature	-25 °C to +70 °C
Installation width	36 mm (2 HP)
Installation height	90 mm
Installation depth	74 mm
Protection type	IP20 (compliant with EN60529)
Protection class	III (compliant with IEC 61140)
Test marks	CE

6.2 ise eBUS Adapter

Operating voltage	Supply via eBUS
eBUS connection	Connection terminal
USB connection	1 x mini USB B
eBUS power consumption:	0.1 W at 24 V
USB power consumption:	0.05 W
Ambient temperature	0 °C to +45 °C
Storage temperature	-25 °C to +70 °C
Installation width	17.5 mm (1 HP)
Installation height	90 mm
Installation depth	74 mm
Test marks	CE

7 Frequently asked questions (FAQ)

- **How do I find out the IP address of my ise smart connect Modbus Vaillant?**
Please read about this in chapter 8.2 “Device status page of the ise smart connect Modbus Vaillant”.
- **Are there software updates for my ise smart connect Modbus Vaillant device?**
Please read about this in chapter 5.5 “Firmware Update”. Please also visit www.ise.de for more information.
- **Why does my ise smart connect Modbus Vaillant perform a restart?**
After connecting the ise smart connect Modbus Vaillant with the ise eBUS Adapter, a restart may be necessary to initialise the eBUS connection.

8 Troubleshooting and support

If you have a problem with your ise smart connect Modbus Vaillant and require support, please send an e-mail with a detailed error description, the log file created after the error occurred and the configuration of the system dimensioning (see chapter 3.2 “Configuration step 2 – Configuration of system dimensioning”) to support@ise.de. For information on how to download the log files from your ise smart connect Modbus Vaillant, please refer to chapter 8.1 “Downloading log files if a problem occurs”.

8.1 Downloading log files if a problem occurs

If a problem occurs, the log files are required for providing support. They can be downloaded via the website of the device. To do so, proceed as follows:

- Call up the website of the device (see chapter 5.3 “Accessing the website of the device”).
- Select *Download Log File* in the upper menu bar on the status page.
- The page, which opens, begins downloading the log files. If this does not occur, the provided link can be used.

8.2 Device status page of the ise smart connect Modbus Vaillant

You can call up the device status on the website of the ise smart connect Modbus Vaillant (see chapter 5.3 “Accessing the website of the device”). It is divided into three sections.

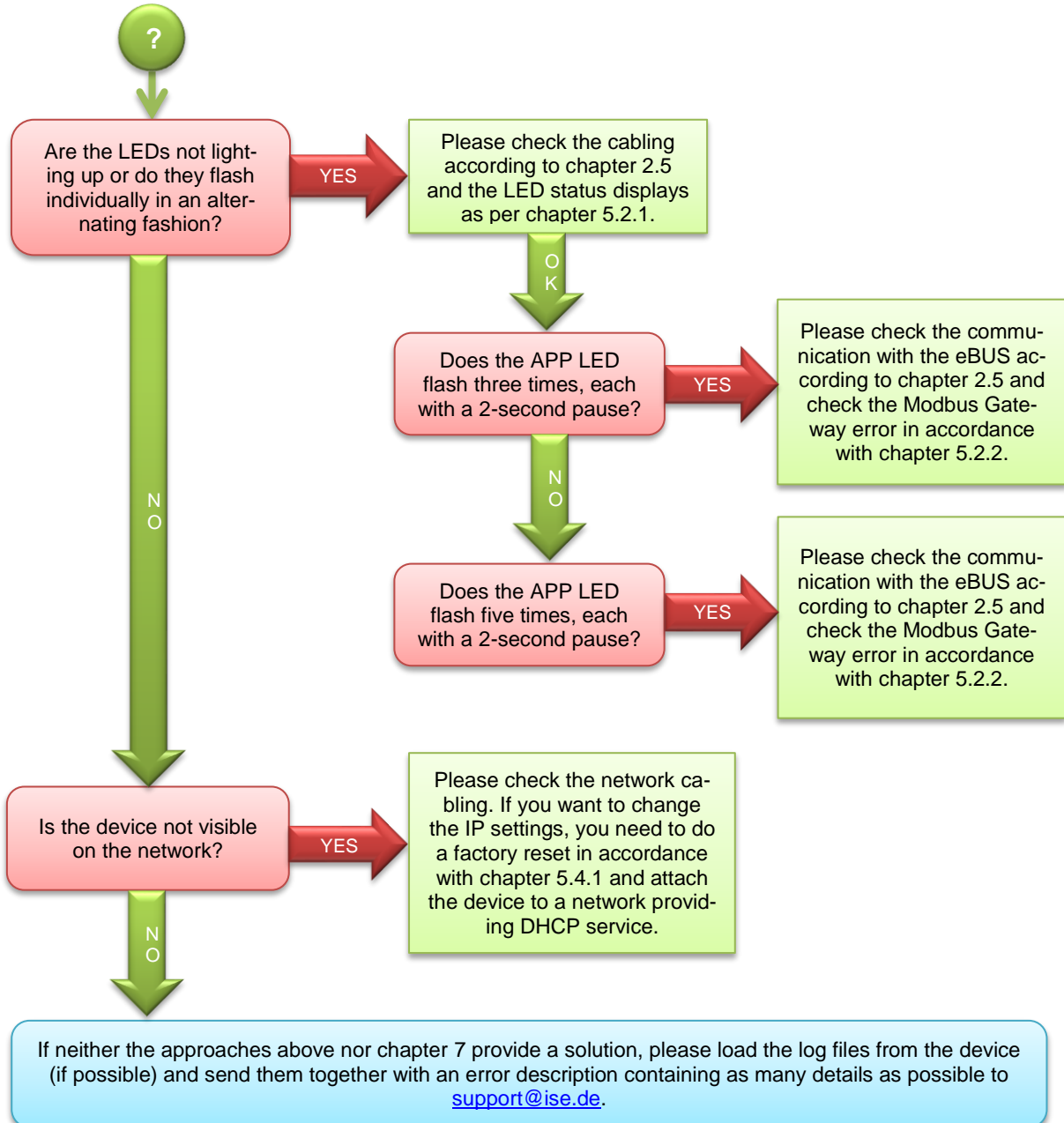
The *System information* section includes the MAC address, the current IP settings and the installed software version.

The *System configuration* section allows activating extended logging which could be necessary for diagnostic purposes.

The *Modbus application information* section shows the status of the ise smart connect Modbus Vaillant. In case of an error, please send us a screen shot of the *Device status* as well as the *Vaillant components* page.

8.3 The ise smart connect Modbus Vaillant does not work

The following error tree is intended to solve the most common problems. Should this be unsuccessful, please contact us at support@ise.de.



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Licensee: The legal recipient of the ise smart connect Modbus Vaillant software.

Firmware: Software which is embedded on the ise smart connect Modbus Vaillant hardware and enables operation of the ise smart connect Modbus Vaillant.

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- The software shall be free of material and manufacturing defects when turned over to the customer.
- The software shall function in accordance with the documentation included with it in the respective valid version.
- The software shall be executable on the computer stations specified by the Licensor.

The warranty shall be fulfilled with the supply of spare parts.

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9.12 Exception

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The software packages used in this product which are licensed within the scope stated here are described in the following.

Software package	U-Boot
Version of the software	2012.07
Source	http://www.denx.de/wiki/U-Boot/WebHome
License	GNU GPL, Version 2, June 1991
Copyright notice	Copyright © 2000-2012 by Wolfgang Denk et al.

Software package	GNU/Linux
Version of the software	3.2.20
Source	http://kernel.org
License	GNU GPL, Version 2, June 1991
Copyright notice	Copyright © 1992-2013 by Linus Torvalds et al.

Software package	Buildroot
Version of the software	2012.11
Source	http://buildroot.org
License	GNU GPL, Version 2, June 1991
Copyright notice	Copyright © 1999-2005 Erik Andersen, 2006-2012 The Buildroot developers

Software package	GNU C Library (GLIBC)
Version of the software	2.30.3
Source	http://www.gnu.org/s/libc/
License	GNU LGPL, Version 2.1, February 1999
Copyright notice	Copyright © 1996-2012 by Roland McGrath et al.

Software package	Boost C++ Libraries
Version of the software	1.49.0
Source	http://www.boost.org
License	Boost Software Licence, version 1.0
Copyright notice	Copyright 2012 Boost.org

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