

Modbus-KNX gateway M-WRG-KNX-GW



1.4 EU declaration of conformity

The Modbus-KNX gateway described below

Type: M-WRG-KNX-GW

Part number: 5048

manufactured by

Meltem Wärmerückgewinnung GmbH & Co. KG

Am Hartholz 4

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conforms to the regulations and standards listed in the EU Declaration of Conformity.

1.5 Technical data

Product characteristics	
Dimensions (W x H x D)	50 mm x 50 mm x 20 mm
Weight	approx. 310 g
Housing material	Makrolon 6265X V-0 (PC)
Product database	contained in the ETS
Ambient conditions	
Ambient temperature during operation	-20 °C to 55 °C
Ambient temperature for storage and shipping	-20 °C to 85 °C
IP code	IP20
Electrical connection	
Bus coupler	integrated
Auxiliary voltage for Modbus units	12 V DC
Auxiliary voltage current consumption	max. 100 mA
KNX operating voltage (bus voltage)	21 V DC to 32 V DC
KNX power consumption	approx. 240 mW at 24 V DC

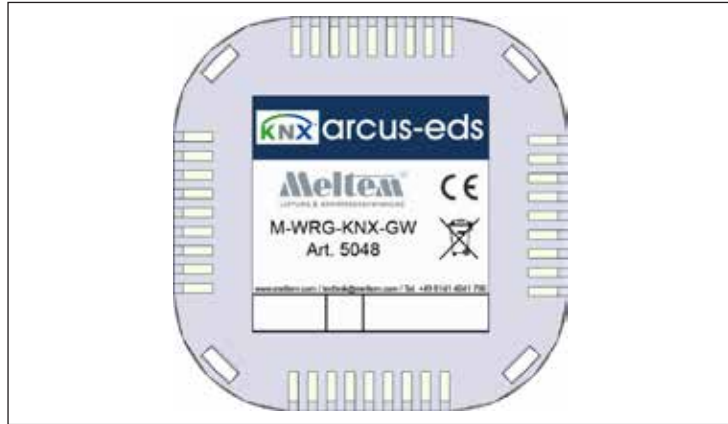


Fig. 1: Modbus-KNX gateway

1 Introduction

1.1 Notes on these instructions



These instructions contain important information that should be followed when installing and using the Modbus-KNX gateway.

- ▶ Read all the instructions carefully to avoid possible risks and mistakes.
- ▶ These instructions are part of the product. Keep the instructions in a safe place for future reference.

NOTICE

- ▶ When operating the ventilation unit, also follow the operating instructions that were supplied with your unit.

1.2 Description

The Modbus-KNX gateway is used to control a ventilation unit of the operation via Modbus type via KNX bus. It can only be used in conjunction with an M-WRG-II P/E-M (-F, -FC) or M-WRG-S M (-F, -FC) unit. The gateway is fitted inside the ventilation unit. The gateway is commissioned using the Engineering Tool Software (ETS) in combination with the associated application program. All functions are parameterised and programmed via the ETS.

NOTICE

- One gateway is needed for each ventilation unit.
- A 24 V auxiliary voltage and a KNX connection are to be provided by the customer.

1.3 Target group


These installation and operating instructions are aimed at two target groups:

The activities described in chapter „4 Installation in the M-WRG-II ventilation unit“, chapter „5 Installation in the M-WRG ventilation unit“ and chapter „6 Wiring“ must only be carried out by specialised personnel with the following qualifications:

- Training in the installation and commissioning of electrical devices
- Training in electrical hazards and the local safety requirements
- Knowledge of the relevant standards and directives
- Knowledge and observance of this document and all the safety instructions

The other chapters of this document are intended for users of the Modbus-KNX gateway. It assumes prior knowledge of the KNX bus and the Modbus protocol.

1.6 Environmentally-friendly disposal

 The components of the Modbus-KNX gateway must not be disposed of in the non-recyclable waste bin.

- ▶ In Germany, metal and plastic components should be disposed of at the local recycling centre. The national regulations in other EU states should also be followed.
- ▶ In Germany, electrical components should be disposed of in accordance with the Electrical and Electronic Equipment Act (ElektroG). In other EU states, the national implementation of the Waste Electrical and Electronic Equipment Directive 2012/19/EU (WEEE) should be followed.
- ▶ The regulations and statutory requirements in your own country concerning disposal should also be followed.

1.7 Explanation of the symbols used

- ▶ This symbol indicates an action to be taken.
- This symbol indicates a list.

2 Safety

The Modbus-KNX gateway is approved only for use in dry interior areas and must be protected against humidity and moisture to prevent short-circuits.

2.1 Hazard classification

DANGER

The signal word designates a hazard with a **high** degree of risk which, if it is not avoided, will result in death or severe injury.

WARNING

The signal word designates a hazard with a **medium** degree of risk which, if it is not avoided, will result in death or severe injury.

CAUTION

The signal word designates a hazard with a **low** degree of risk which, if it is not avoided, could result in minor or moderate injury.

NOTICE

A note as used in this manual contains important information about the product or about a part of the manual to which particular attention should be paid.

2.2 Intended use

The Modbus-KNX gateway must only be used to control Modbus units from the M-WRG-II and M-WRG series. Any different or more extensive usage will be regarded as contrary to the intended use. The intended use also includes compliance with all the notes in these instructions.

For any use contrary to the intended use, Meltem Wärmerückgewinnung GmbH & Co. KG shall accept no liability for any damage that may occur and offers no warranty that the components will work perfectly and correctly.

3 Items supplied

- Modbus-KNX gateway M-WRG-KNX-GW
- 4x terminal block (red/black/yellow/white)
- 5-pole terminal (green) with connecting wires
- Velcro strip and network connection cover with cable lead-through (only when ordering for a M-WRG-Modbus unit)

4 Installation in the M-WRG-II ventilation unit

4.1 Remove the cover from the ventilation unit

- ▶ Using both thumbs, press the two latches on the bottom of the ventilation unit. The unit cover will come away.

4.2 Remove the electronics compartment cover

⚠ DANGER

Potentially fatal voltages in the vicinity of the connection board

- The electrical installation work must only be carried out by a qualified electrician.
- The VDE regulations or any special safety regulations applicable in your country apply to the electrical installation work.
- ▶ Before starting installation or maintenance work, disconnect the mains cable for powering the ventilation unit on all poles from the mains supply.
- ▶ Observe the five safety rules (DIN VDE 0105-100, EN 50110-1) for working on electrical systems:
 - Disconnect from mains (all-pole disconnection of a system from live parts)
 - Secure against reconnection
 - Check that the system is voltage-free
 - Earth and short-circuit
 - Cover or block off access to adjacent live parts

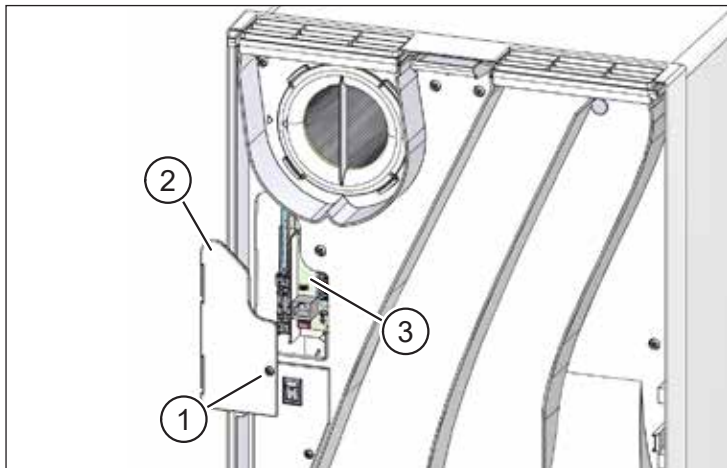


Fig. 2: Remove the electronics compartment cover

- ▶ Use the screwdriver to loosen the Torx screw (item 1 in Fig. 2) on the electronics compartment cover (item 2 in Fig. 2).
- ▶ Remove the electronics compartment cover to access the connection board (item 3 in Fig. 2).

4.3 Wire the gateway

- ▶ Wire the gateway to the connection board in the ventilation unit as shown in the wiring diagram (see Fig. 4).
- ▶ Wire the gateway to the to the KNX system as shown in the wiring diagram (see Fig. 5).

4.4 Final tasks

- ▶ Position the gateway inside the ventilation unit in the vicinity of the connection board (item 3 in Fig. 2).
- ▶ Secure the electronics compartment cover (item 2 in Fig. 2).
- ▶ Attach the cover to the ventilation unit.

5 Installation in the M-WRG ventilation unit

- ▶ Using both thumbs, press the two latches on the bottom of the ventilation unit. The unit cover will come away.

5.1 Replace the network connection cover

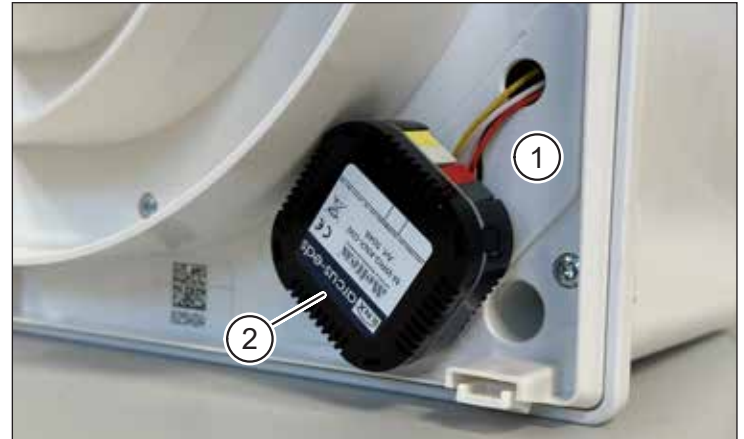


Fig. 3: Replace the network connection cover

- ▶ Replace the existing network connection cover with the version with the cable lead-through (item 1 in Fig. 3, supplied as standard).

5.2 Wire the gateway

- ▶ Wire the gateway to the connection board in the ventilation unit as shown in the wiring diagram (see Fig. 4).
- ▶ Wire the gateway to the to the KNX system as shown in the wiring diagram (see Fig. 5).

5.3 Final tasks

- ▶ Secure the gateway (item 2 in Fig. 3) to the network connection cover (item 1 in Fig. 3) using the Velcro strip provided.
- ▶ Attach the cover to the ventilation unit.

6 Wiring

6.1 Wiring diagram: gateway – connection board in the ventilation unit

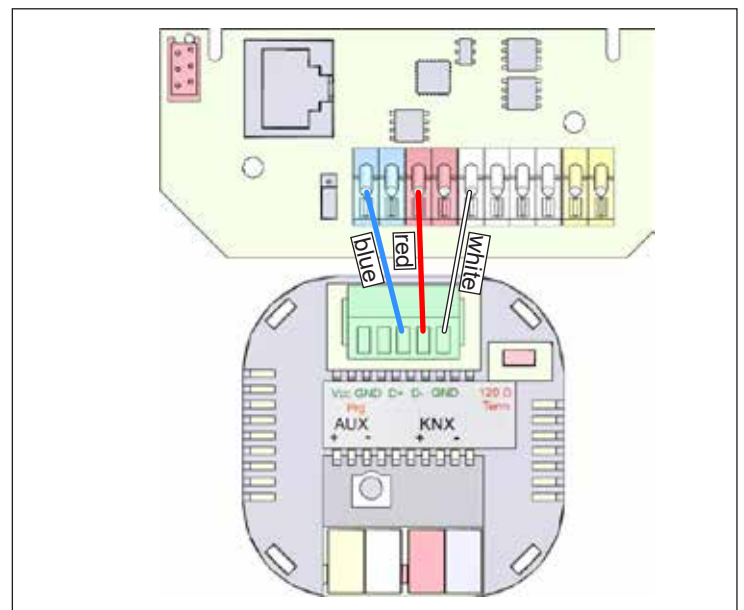


Fig. 4: Wiring diagram: gateway – connection board

6.2 Wiring diagram: gateway – KNX system

The gateway is connected to an existing KNX system using the KNX terminal blocks (red/black) provided. An additional 24 V DC power supply is also required on site (connected via yellow/white terminal blocks).

The programming button (item 1 in Fig. 5) is on the back of the gateway.

NOTICE

Note the following when inserting the terminal blocks:

- Connect up the terminal blocks in pairs: tab of the white block in the groove of the yellow block, tab of the black block in the groove of the red block.
- The 4-way connections on the terminal blocks point upwards.

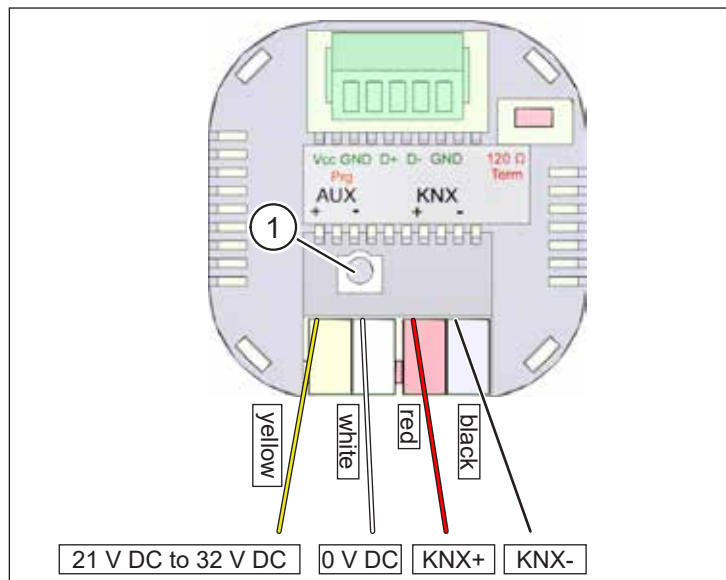


Fig. 5: Wiring diagram: gateway – KNX system

7 Data points

Communication object	Read/write	Function/description	Unit
1	W	Operation	
2	R	Error message	
3	R	Frost protection	
4	R	Exhaust air temperature	°C
5	R	Outdoor air temperature	°C
6	R	Extract air temperature	°C
7	R	Supply air temperature	°C
8	R	Humidity, extract air	%
9	R	Humidity, supply air	%
10	R	CO ₂ , extract air (deactivated by default)	ppm
11	R	VOC, supply air (deactivated by default)	ppm
12	R	Ventilation level for extract air	m ³ /h
13	R	Ventilation level for supply air	m ³ /h
14	R	Filter change	
15	R	Time until filter change	Days
16	R	Unit operating hours	h
17	R	Motor operating hours	h
			Min. Max. Step Default
18	R/W	Rel. humidity threshold value	40 80 1 60 %
19	R/W	Min. ventilation level, humidity control	0 100 1/10* 10 m ³ /h
20	R/W	Max. ventilation level, humidity control	10 100 1/10* 60 m ³ /h
21	R/W	CO ₂ starting point	500 1200 1 800/600* ppm
22	R/W	Min. ventilation level, CO ₂ control	0 100 1/10* 10 m ³ /h
23	R/W	Max. ventilation level, CO ₂ control	10 100 1/10* 60 m ³ /h
24	R/W	Ventilation level for external control input	10 100 1/10* 60 m ³ /h
25	R/W	Switch-on delay for ext. control input	0 240 1 1 min
26	R/W	Run-on time for ext. control input	0 240 1 15 min
27	W	Operation unbalanced (extract air motor)	

* Value applies to M-WRG

8 Sensors in the different ventilation unit types

Sensor type	Ventilation unit type			
	M-WRG-II P-M / M-WRG-II E-M	M-WRG-II P-M-F / M-WRG-II E-M-F	M-WRG-II P-M-FC / M-WRG-II E-M-FC	with option M-WRG-II O/VOC-AUL
	M-WRG-S M	M-WRG-S M-F	M-WRG-S M-FC	–
Exhaust air temperature	X	X	X	X
Outdoor air temperature		X	X	X
Extract air temperature		X	X	X
Supply air temperature		X	X	X
Rel. humidity, extract air		X	X	X
Rel. humidity, supply air		X	X	X
CO ₂ , extract air			X	X
VOC, supply air				X

9 Configuration

The KNX gateway M-WRG-KNX-GW is configured via the ETS. The associated application program can be obtained from the ETS catalogue.

The gateway is supplied unprogrammed. All functions are set and programmed via the ETS.

The gateway is configured with the following settings at the factory:



Fig. 6: Factory settings for the KNX gateway

10 Read communication objects

The channels of the gateway are predefined with the possible data points. Communication objects which are read only can be linked directly to a group address and displayed.

11 Write communication objects

Settings can be changed on the unit using communication objects 17-25. To do this, the value for the communication object is changed accordingly.

Number	Name	Object function	Emulation	Group Address	Length	C	R	W	T	U	Product	Program	Data Type	Priority
0	Operation	1-Byte Unassigned int.		1 byte	C	R	W	T	U		KNX-GW-Modbus	Modbus-Interface Metem	1 byte	0/0/1
1	Output: Error message	1-Byte Unassigned int.		1 byte	C	R							1 byte	Low
2	Output: Frost protection	1-Byte Unassigned int.		1 byte	C	R							1 byte	Low
3	Output: Exhaust air temperature	4-Byte float value		4 bytes	C	R							4 bytes	Low
4	Output: Outdoor air temperature	4-Byte float value		4 bytes	C	R							4 bytes	Low
5	Output: Extract air temperature	4-Byte float value		4 bytes	C	R							4 bytes	Low
6	Output: Supply air temperature	4-Byte float value		4 bytes	C	R							4 bytes	Low
7	Output: Extract humidity	2-Byte Unassigned int.		2 bytes	C	R							2 bytes	Low
8	Output: Supply humidity	2-Byte Unassigned int.		2 bytes	C	R							2 bytes	Low
9	Output: Ventilation level extract	1-Byte Unassigned int.		1 byte	C	R							1 byte	Low
10	Output: Ventilation level supply	1-Byte Unassigned int.		1 byte	C	R							1 byte	Low
11	Output: Extract air temperature	4-Byte float value		4 bytes	C	R							4 bytes	Low
12	Output: Supply air temperature	4-Byte float value		4 bytes	C	R							4 bytes	Low
13	Output: Air flow change	2-Byte Unassigned int.		2 bytes	C	R							2 bytes	Low
14	Output: Operating hours extract	4-Byte Unassigned int.		4 bytes	C	R							4 bytes	Low
15	Output: Operating hours supply	4-Byte Unassigned int.		4 bytes	C	R							4 bytes	Low
16	IO: Air humidity sensor	1-Byte Unassigned int.		1 byte	C	R	W	T	U				1 byte	Low
17	IO: Max. V. humidity control	1-Byte Unassigned int.		1 byte	C	R	W	T	U				1 byte	Low
18	IO: Min. V. humidity control	1-Byte Unassigned int.		1 byte	C	R	W	T	U				1 byte	Low
19	IO: CO2 sensor	2-Byte Unassigned int.		2 bytes	C	R	W	T	U				2 bytes	Low
20	IO: Min. V. CO2 control	1-Byte Unassigned int.		1 byte	C	R	W	T	U				1 byte	Low
21	IO: Max. V. CO2 control	1-Byte Unassigned int.		1 byte	C	R	W	T	U				1 byte	Low
22	IO: Ventilation level extract control	1-Byte Unassigned int.		1 byte	C	R	W	T	U				1 byte	Low
23	IO: 24hrs extract control input	1-Byte Unassigned int.		1 byte	C	R	W	T	U				1 byte	Low
24	IO: Air flow sensor control input	1-Byte Unassigned int.		1 byte	C	R	W	T	U				1 byte	Low
25	IO: Operation confirmation extract fan	1-Byte Unassigned int.		1 byte	C	R	W	T	U				1 byte	Low
26	Output: Extract flow	3-Byte float		3 bytes	C	R							3 bytes	Low

Fig. 7: Communication objects

12 Ventilation levels setting

Use the following table for communication objects 0 and 26 in order to change the ventilation level (VL) of the unit:

Communication object 0			
Value	Mode		
0	OFF	OFF	
1 - 99	Volume flow rate	VL % SUP / ETA	
100 - 200*	Supply air volume unbalanced	VL % SUP	Only in conjunction with communication object 26
202	Automatic mode	SUP / ETA	
203	Humidity mode	SUP / ETA	
204	CO ₂ mode	SUP / ETA	
205	Intensive ventilation	SUP / ETA	

Communication object 26			
Value	Mode		
100 - 200*	Extract air volume unbalanced	VL % ETA	Only in conjunction with communication object 0, value 100-200

* Value corresponds to m³/h minus 100 (example: 130 = 30 m³/h)

13 Typical application

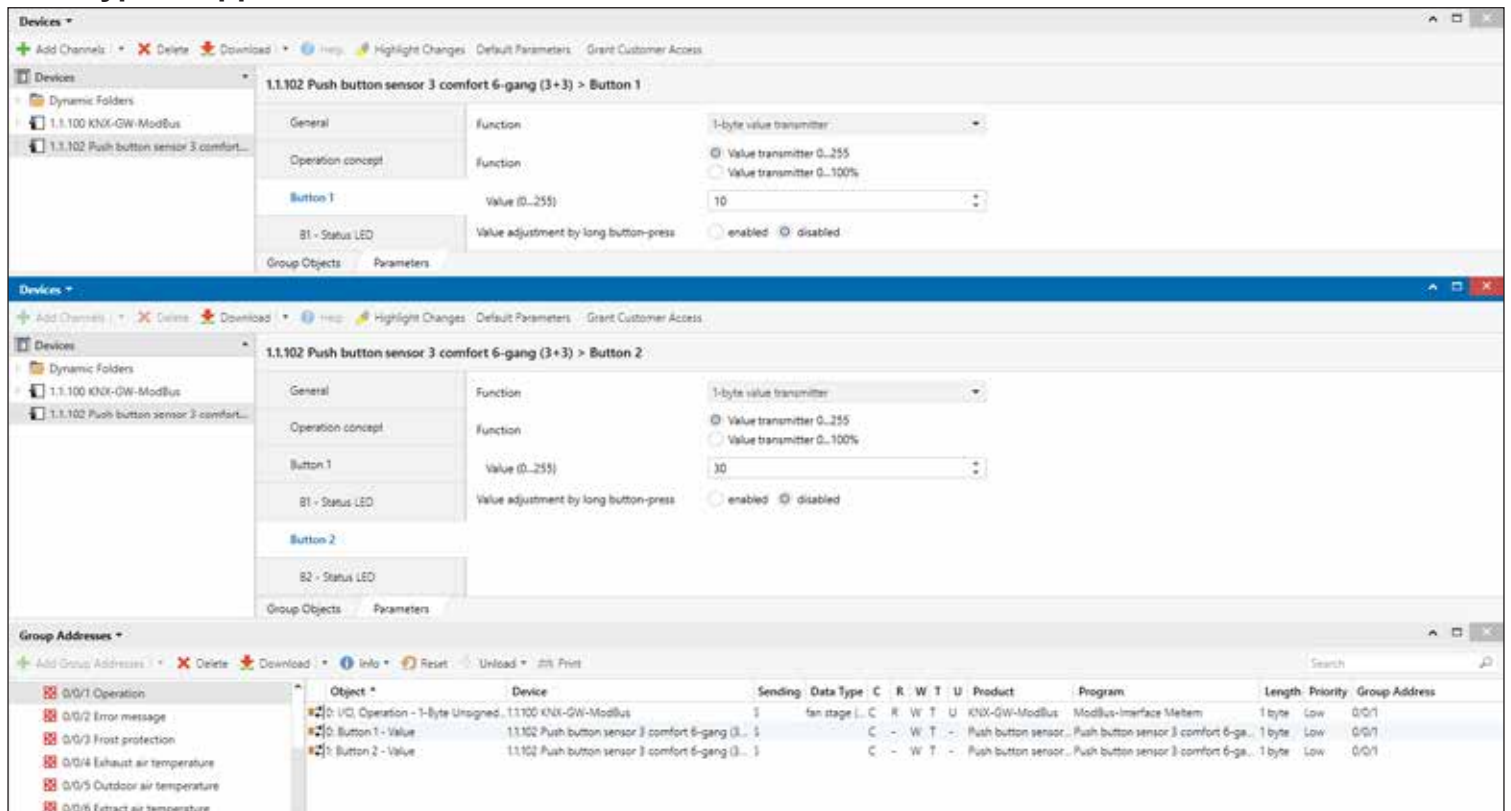


Fig. 8: Typical application