![Meltem logo]
Meltem®
VENTILATION & HEAT RECOVERY

HOME VENTILATION WITH HEAT RECOVERY

Ventilation units
M-WRG-II P-M (-F, -FC)
M-WRG-II E-M (-F, -FC)

Modbus RTU
Master
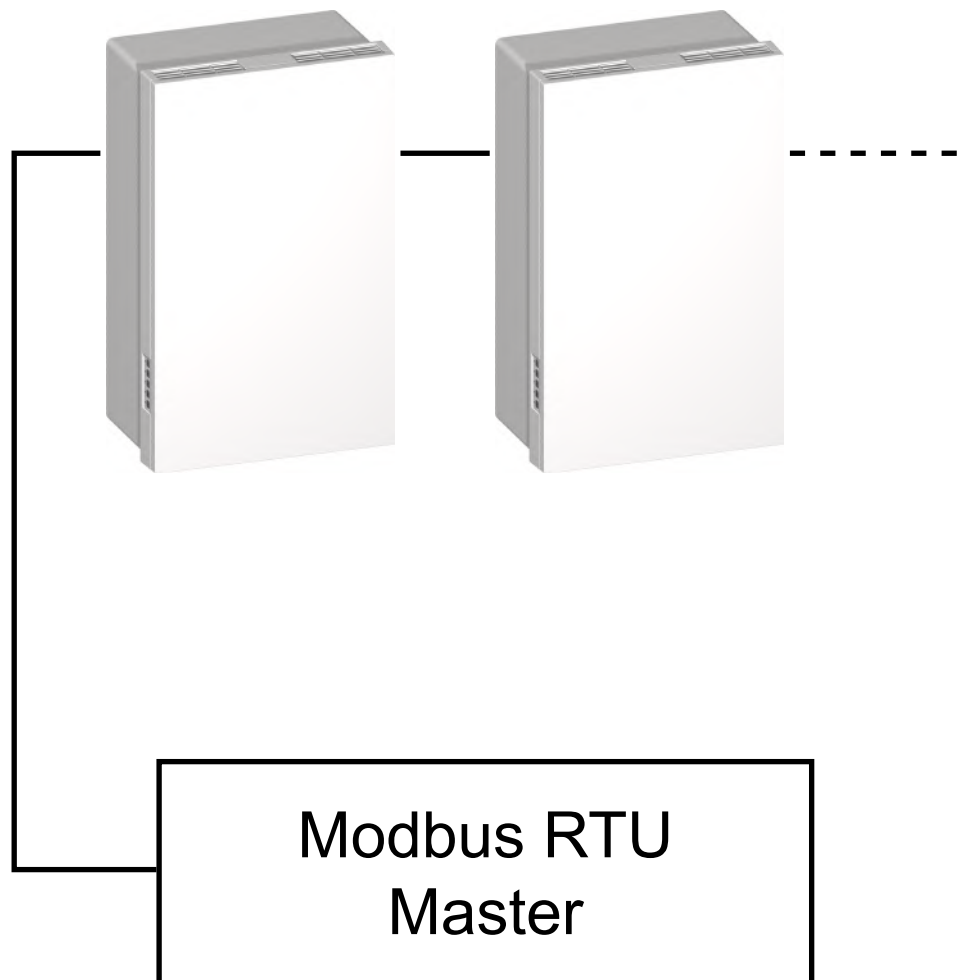
Part no. 744009EN Week 07/2024 EN

VENTILATION THE RIGHT WAY

Contents

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1 Introduction

1.1 Notes on these operating and installation instructions

These original operating and installation instructions contain important information that should be followed when setting up and using the M-WRG-II P-M (-F, -FC) and M-WRG-II E-M (-F, -FC) ventilation units.

► Read all the instructions carefully before starting up the ventilation unit to avoid possible risks and mistakes.

► When assembly is complete, give these instructions to the home owner, caretaker or property manager.

► These instructions are part of the product. Keep the instructions in a safe place for future reference.

> ⚠ **WARNING**
>
> ► Follow ALL danger and warning instructions and notes on precautionary measures.
> ► Read section "2 Safety instructions" on page 12 carefully.

1.2 Description

These instructions describe how to set up and operate the decentralised ventilation units M-WRG-II P-M (-F, -FC) and M-WRG-II E-M (-F, -FC) (see Fig. 1). They also explain how to connect the ventilation unit electrically to the Modbus and how to control it using the Modbus protocol.

M-WRG stands for Meltem heat recovery. Home ventilation expertise extending back over 40 years has been incorporated into this product from Meltem Wärmerückgewinnung.

Using windows for ventilation, particularly during periods of cold weather, is now a thing of the past. This ventilation unit brings in outdoor air fully automatically, and heats it by recovering heat from the air that is extracted. Outdoor air and extract air are routed in separate ducts through a cross-counterflow plate heat exchanger (see section 5.2.2 on page 20). You save on heating costs, increase your living comfort and are kind to the environment by reducing CO_2 emissions. An air filter also removes respirable particulates such as pollen, soot and bacteria from dust class PM1 from the outdoor air. It is also

Fig. 1:   M-WRG-II P-M / M-WRG-II E-M ventilation unit

possible to monitor the outdoor air quality with a VOC sensor; if the air load is high (e.g. due to biological decay and decomposition processes, motor traffic exhaust fumes or volatile by-products from industrial and commercial operations) the proportion of supply air can be reduced temporarily until the available outdoor air quality has improved (only for units with a CO_2 sensor, specifically M-WRG-II...-FC units).

The ventilation units are designed to run continuously and can be equipped with sensors for demand-controlled ventilation. They can be surface-mounted, flush-mounted or integrated into the wall (U^2). The ventilation units are low-maintenance, but **regular air filter changes** are important.

The 5 buttons on the membrane touch pad on the side of the unit are used to set different ventilation levels / programs and a time-limited intensive ventilation program. It therefore allows you to adapt the air flow to your needs.

Beside each button is an LED that displays the active ventilation program and further information about the unit's status (air filter change, fault, etc.).

The ventilation unit also has a Modbus board that allows it to be controlled centrally using the Modbus RTU protocol. The customer must have a Modbus RTU master in order to do this. Additional interfaces allow the units to be connected to other bus systems, such as KNX or Loxone.

The ventilation units from the M-WRG-II P and M-WRG-II E series are equipped with heat exchangers that work on the cross-counterflow principle. M-WRG-II E also has a function for recovering moisture from the extract air (enthalpy heat exchanger).

The M-WRG-II P-F and M-WRG-II E-F ventilation units have various ventilation levels / programs, including a humidity control. The M-WRG-II P-FC and M-WRG-II E-FC units have an automatic mode (humidity and CO_2 control). The CO_2 value is the most important measurement for assessing the air quality. A microprocessor integrated into the unit calculates the optimum air renewal from the values measured by the relative humidity and CO_2 sensors and sets the correct ventilation level fully automatically.

1.2.1 Optional accessories

Part no.	Type	Description
5478-10	M-WRG-FBH	The wireless remote control is used to control, program and extend the range of functions of the M-WRG-II P-M (-F, -FC) and M-WRG-II E-M (-F, -FC) ventilation units. It can also be used to read the number of operating hours.
5478-20	M-WRG-FT	The 4-way wireless pushbutton switch with LED feedback allows the M-WRG-II P-M (-F, -FC) and M-WRG-II E-M (-F, -FC) ventilation units to be operated wirelessly.
5048	M-WRG-KNX-GW	Modbus-KNX gateway for controlling a ventilation unit of the operation via Modbus type via KNX bus. Please note: one gateway is needed for each ventilation unit.

Table 1: Optional accessories

1.3 Target group

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

— Chapters "1 Introduction" to "14 Troubleshooting" are intended for users of the ventilation unit. No special prior knowledge is needed.

— The activities described in chapter "15 Connecting the ventilation unit to the Modbus RTU", chapter "16 Modbus configuration" and chapter "17 Integrating into other bus systems" 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

1.4 EU declaration of conformity

The ventilation units from the M-WRG-II P and M-WRG-II E series manufactured by

Meltem Wärmerückgewinnung GmbH & Co. KG
Am Hartholz 4
82239 Alling

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

1.5 National technical approval (for Germany)

A valid national technical approval from the Deutsches Institut für Bautechnik (DIBt) must be obtained for the ventilation unit before it is installed in Germany. This approval can be provided upon request or can be downloaded from our website at www.meltem.com/service/downloads/ (see also the QR code on the back page of these instructions). The approval number is Z-51.3-431 (see item 1 in Fig. 3)

► For installation outside Germany, the national regulations applicable in your country should be followed.

1.6 Nameplate

Meltem Wärmerückgewinnung GmbH & Co. KG Am Hartholz 4 82239 Alling www.meltem.com Tel.: 08141-40 41 79-0	
Device no.:	Type: M-WRG-II P-M
	Part no.: 700020
	max. 53 W
	230 V 50 Hz IPX4
	CE □ Iso-Kl. B

Fig. 2: Nameplate

You will find the nameplate on the intermediate plate on the inside of the housing (see item 2 in Fig. 3).

Fig. 3: Position of the nameplate

1.7 Technical data

1.7.1 Electrical connection

Unit types	M-WRG-II P-M / M-WRG-II E-M	M-WRG-II P-M (-F, -FC) / M-WRG-II E-M (-F, -FC)
Operating voltage	230 V AC (working voltage range: 85 V AC to 265 V AC)	
Mains frequency	50 to 60 Hz	
Power consumption	4.6 to 52.4 W / 4.5 to 51.2 W	
Standby power consumption	0.8 W	
Maximum current consumption	0.42 A	
IP code	IPX4 IPX5 with Integrated into wall U² installation version	
Energy efficiency class (ErP)	B	A

1.7.2 Dimensions and weight

Unit dimensions excluding air connectors, see also section 4 on page 16	364 x 590 x 218 mm (W x H x D)
Visible unit depth when surface-mounted	218 mm
Visible unit depth when flush-mounted	58 mm
Visible unit depth when integrated into wall	-
Outdoor air/exhaust air connectors	DN 100
Weight	Approx. 8.4 / 9.4 kg

1.7.3 Noise emission

Sound pressure level $L_{P,A}$ surface-mount	11.6 to 48.1 dB(A)/A_{eq} 10 m²
Sound pressure level $L_{P,A}$ flush-mount or with ductwork connection on extract air side	12.3 to 47.5 dB(A)/A_{eq} 10 m² or 12.3 to 46.4 dB(A)/A_{eq} 10 m²
Sound pressure level $L_{P,A}$ integrated into wall U² with ductwork connection on extract air side	8.4 to 42.6 dB(A)/A_{eq} 10 m²
Sound insulation $D_{n,e,w}$ unit in use depending on installation version	51 to 70 dB

1.7.4 Ambient conditions

Storage temperature range (in the original packaging in a dry place)	0 °C to +40 °C
Permitted temperature range of outdoor air during operation at a room temperature of at least 20 °C	-18 °C to +40 °C
Permitted ambient air humidity during operation	up to approx. 70 % RH

1.7.5   Unit properties

Unit types	M-WRG-II P-M / M-WRG-II E-M	M-WRG-II P-M (-F, -FC) / M-WRG-II E-M (-F, -FC)
Type of system	Decentralised, heat recuperation	
Air flow	10 to 100 m^3/h	
Heat recovery efficiency (max.), η_0, DIN EN 13141-8	94 % / 87 %	
Colour	White similar to RAL 9010	
TÜV-tested	Yes	
Hygiene tested for conformity with VDI 6022 sheet 1	W-377517-23-Zd	
Passivhaus certificate (PHI)	1327vs03 / 1328vs03	
National technical approval (DIBt)	Z-51.3-431	

1.7.6   Unit features

Unit types	M-WRG-II P-M / M-WRG-II E-M	M-WRG-II P-M (-F, -FC) / M-WRG-II E-M (-F, -FC)
Output control	Centrally via Modbus (10 levels), locally using the unit's membrane touch pad (5 levels)	
Interface for connecting to the Modbus	Yes, Modbus RTU	
Supply air / exhaust air fan	EC direct current radial fan	
Heat exchanger	Cross-counterflow plate heat exchanger, on M-WRG-II E-M (-F, -FC) with enthalpy	
Filter monitoring with filter change indicator	Runtime-controlled, visual	
Condensate drain	Via condensate connection / not required*	
Fully automatic cover flap control when switching On / Off, in Standby mode and if the power fails	Yes	
Frost protection function	Yes	
"Unit OFF" input (smoke detector, window contact)	Optional	
Fault indicator output	Optional	
Operating hours display	Via Modbus and using optional accessories	
Humidity control	No	Yes
CO_2 control / automatic mode (humidity and CO_2 control)	No	With -M-FC units
Filter type	Round filter cartridges for outdoor air and extract air	

* Intended usage as described in operating instructions, not exposed to excessive humidity

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1.7.7 Air filters

Designation	Filter class
Outdoor air filter	ISO ePM1 60% (F7)
Activated charcoal filter for outdoor air (optional)	ISO ePM2,5 55% (F7)
Extract air filter	ISO Coarse 60% (G4)

1.8 Environmentally-friendly disposal

Avoiding waste from electrical and electronic devices makes a significant contribution to environmental protection and the better use of resources. Recycling and other ways of reusing such waste also reduce the amount of waste that needs to be taken away.
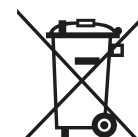
► You should dispose of the product in accordance with your applicable national regulations.

1.9 Revision index

Edition	Manual	Date
7th edition	Operating and installation instructions for M-WRG-II P-M (-F, -FC) and M-WRG-II E-M (-F, -FC) ventilation units	Week 07/2024 EN

1.10 Explanation of the symbols used

► This symbol indicates an action to be taken.

— This symbol indicates a list.

1.11 Supplementary documents

Manual	Part no.
Installation manual for M-WRG-II ventilation units	744004EN
Maintenance instructions for M-WRG-II P... / M-WRG-II E... ventilation units	744015EN
User guide for M-WRG-FBH wireless remote control	5302-25-01
Installation instructions and user guide for 4-way wireless pushbutton switch	5301-14-01
Installation instructions and user guide for gateway M-WRG-KNX-GW	744018EN

Table 2:   Supplementary documents

You will find further manuals and instructions on our website at www.meltem.com/service/downloads/ (or using the QR code on this page).

Go to
Meltem download area

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2 Safety instructions

These instructions contain notes that you must follow for your own personal safety and to avoid injury and damage to property. They are highlighted by warning triangles and are shown as follows according to the level of danger.

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 Notes on using the ventilation units safely

2.2.1 Fire protection

Follow the generally applicable fire safety requirements when planning and installing the unit.

2.2.2 Operation with fireplaces

— When M-WRG-II ventilation units are used in conjunction with fireplaces, an additional safety device (underpressure or differential pressure monitor) is needed to monitor operation and to switch off the (230 V) power supply to the units when necessary.

— Follow the requirements of the German Fire Code (FeuVo) when planning and installing the unit.

— Contact the local chimney sweep before the end of the planning phase.

— Have the chimney sweep approve the operation of the ventilation unit.

— Correct use of a ventilation system set up with the decentralised ventilation unit requires the possibility of shutting off combustion air pipes and flue systems for solid fuel fireplaces during periods in which the fireplaces are not in use.

2.2.3 Installation in wet areas

The following rules from DIN VDE 0100-701/702 (IEC 60364-7-701) apply to installation of M-WRG-II ventilation units in wet areas:

— Protection zone 0: The unit must NOT be installed in this area.

— Protection zone 1: The unit must only be installed with the "integrated into wall" U^2 variant. The extract and supply air valves must be installed in the top part of the wall or in the ceiling.

— Protection zone 2 and other zone: The unit may be installed in this area.

Country-specific standards/regulations on observing the protection zones for installation in rooms with bathtub or shower must also be followed.

2.2.4 Condensate drain

The heat recovery process in our ventilation units causes condensation. This condensation is dissipated via the exhaust air pipe.

— If M-WRG-II P ventilation units are used, a condensate connection should be provided (see installation manuals for installation kits and ventilation units in section 1.11 on page 11).

— With M-WRG-II E ventilation units (with enthalpy heat exchanger) there is no condensation if the following requirements are fulfilled:

  — The ventilation unit is operated as described in "Intended use" (see section 2.5 on page 14) and chapter "6 Rules for correct usage" on page 21.

  — There is no exceptional loading due to very high atmospheric humidity.

2.2.5 Starting and using the ventilation unit

— Do not start up the ventilation unit until it is fully installed.

— Always operate the ventilation unit with the air filters fitted.

— Always make sure that the cover is closed and locked in place before using the ventilation unit.

— Please note that the ventilation unit must not be used without the outer wall terminal for safety reasons.

2.3 Notes on using the ventilation units

— This unit may be used by children from 8 years old and by persons of restricted physical, sensory or mental abilities or persons lacking experience and knowledge if they are supervised or have been instructed in how to use the unit safely and understand the associated hazards. Do not allow children to play with the unit. Cleaning and user maintenance must not be carried out by children unless they are supervised.

  ► Follow the regulations applicable in your country concerning the age from which people may be permitted to operate the ventilation unit.

— The ventilation unit must always be freely accessible for operation and maintenance.

▶ Make sure that the ventilation unit is not covered or obstructed when the room is subsequently decorated and furnished, otherwise it cannot be operated and it will not be possible to replace the air filters. You should therefore maintain a clearance of at least 15 cm in front of the ventilation unit cover.

▶ Make sure that the supply and extract air openings are not covered when the room is subsequently decorated and furnished, otherwise the ventilation unit's functions may be impaired.

2.4 Note on use in conjunction with room air conditioners

Condensation may form in the ventilation unit if the outdoor air temperature and humidity are high, but the room temperature is cool.

For these conditions, we recommend using the M-WRG-II E ventilation unit with enthalpy heat exchanger. This has the advantage of removing both sensible and latent heat from the supply air. As a result, the air is dehumidified as well as being precooled. The room air conditioner needs to do less work, so the user saves money on the reduced power consumption.

2.5 Intended use

— The ventilation unit is designed to ventilate living spaces and rooms used for quasi-residential purposes. It can also be installed in offices, surgeries, etc. The ventilation unit is installed in a perpendicular position in the external wall. 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 the operating instructions.

— The ventilation unit must not be operated without air filters or outer wall terminal.

— The ventilation unit is intended for use in rooms with normal room air humidity levels of approx. 40 % to 70 % RH. It must not be installed in rooms in which the relative humidity during operation constantly exceeds 80 %.

— The ventilation unit's functions may be impaired or the unit may be damaged in rooms with a lot of dust (e.g. model-making) or corrosive gas emissions (e.g. blueprint shop, cleaning).

— 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 ventilation unit will work perfectly and correctly.

3 Warranty and liability

3.1 Warranty

The following cases shall invalidate the warranty:

— The installation kit was not installed as described in the installation manual.

— The ventilation unit was not installed as described in the installation manual.

— The ventilation unit was flush-mounted without using a flush-mount installation kit.

— Genuine parts/genuine air filters were not replaced with genuine parts.

— Unapproved changes were made to the installation kit or ventilation unit.

— Repairs were not carried out by Meltem or by an authorised specialist company.

— The ventilation unit was operated without air filters and outer wall terminals.

— The warranty does not cover wearing parts such as air filters.

3.2 Liability

The manufacturer's liability shall not apply in the following cases:

— The installation kit was not installed as described in the installation manual.

— The ventilation unit was not installed as described in the installation manual.

— The ventilation unit was flush-mounted without using a flush-mount installation kit.

— Genuine parts/genuine air filters were not replaced with genuine parts.

— Unapproved changes were made to the installation kit or ventilation unit.

— Repairs were not carried out by Meltem or by an authorised specialist company.

— The ventilation unit was operated without air filters and outer wall terminals.

4 Dimensions

4.1 Ventilation unit without duct adapters
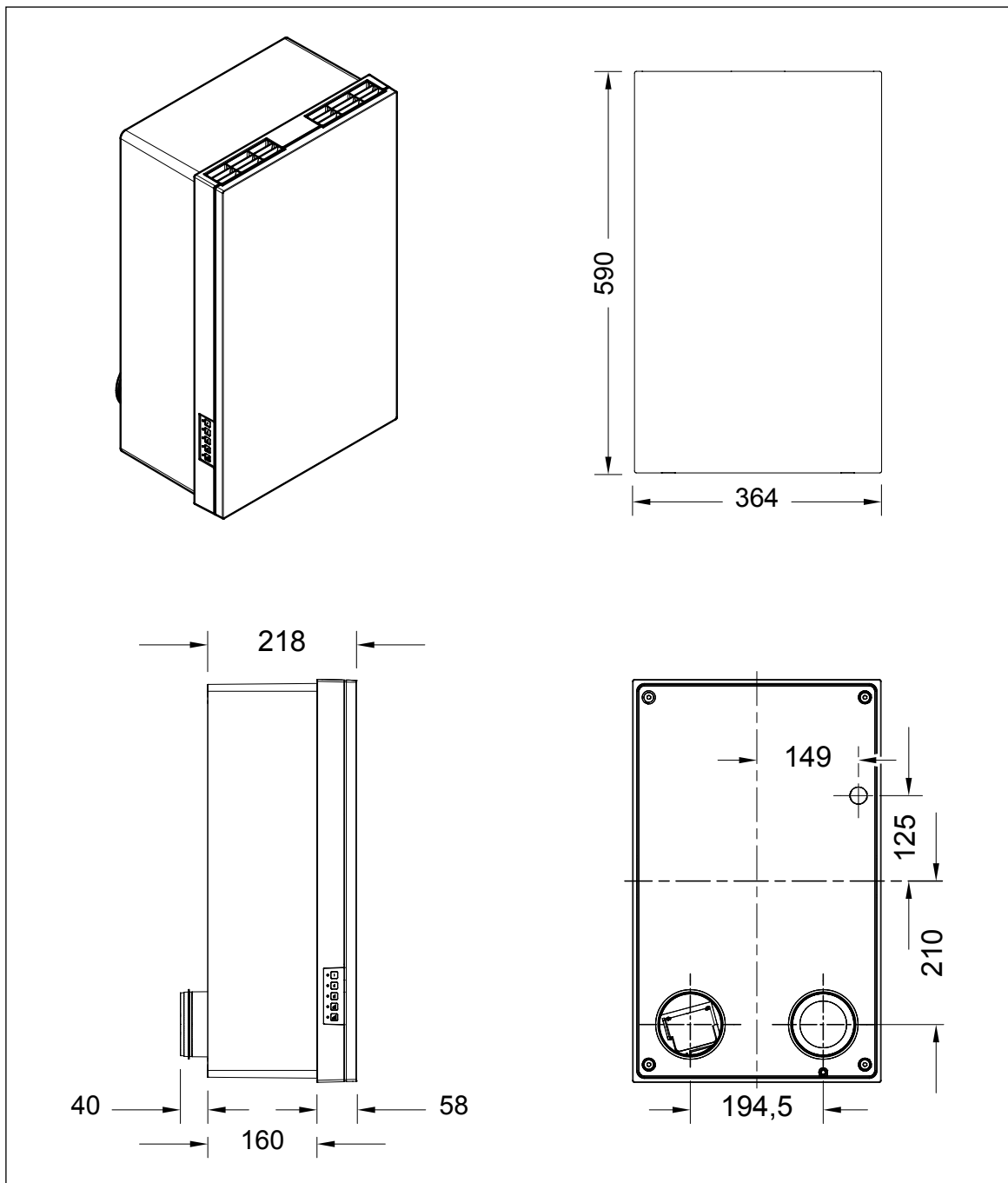
Fig. 4: M-WRG-II ventilation unit without duct adapters, dimensions in millimetres

4.2 Ventilation unit with duct adapters
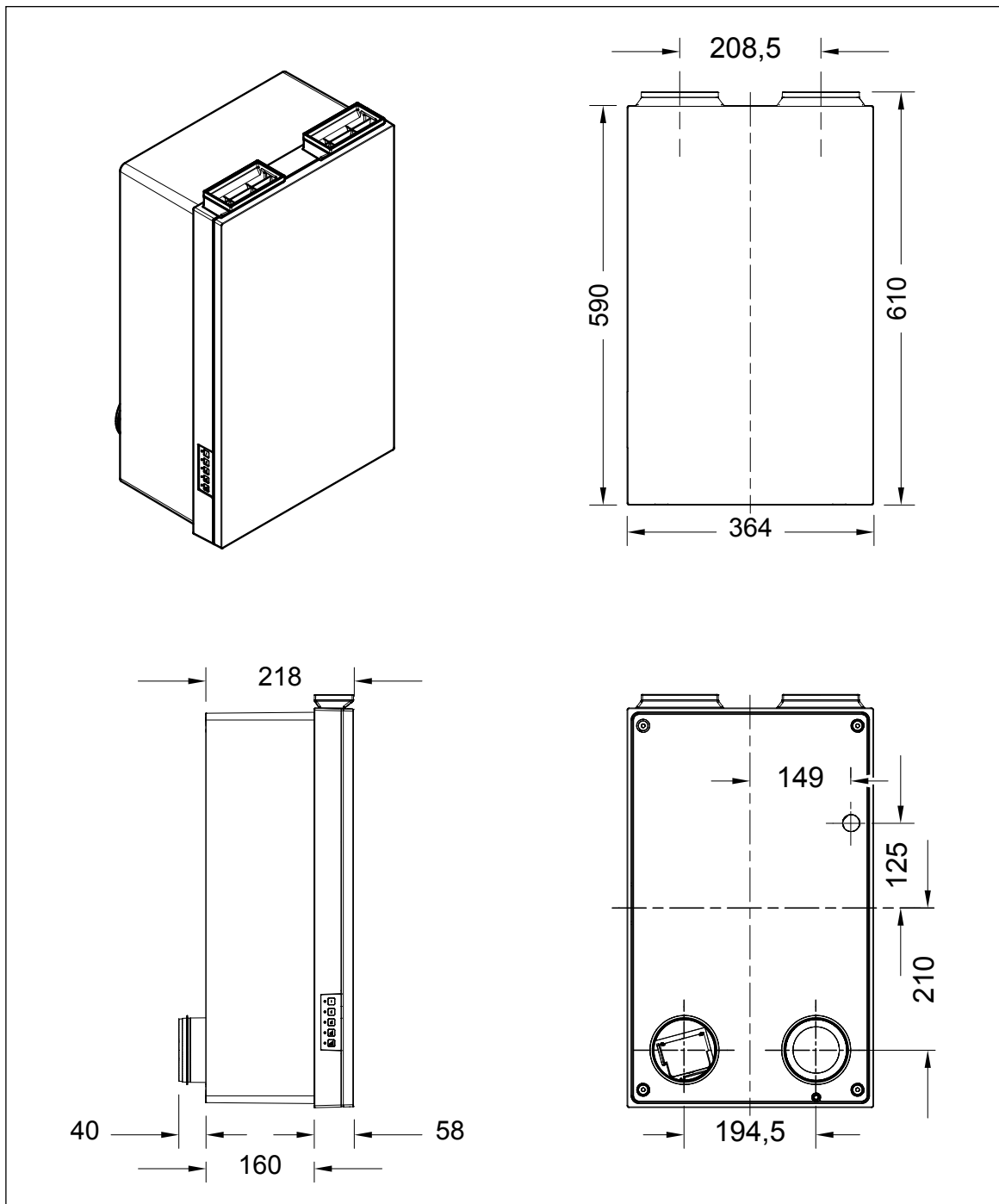
Fig. 5:   M-WRG-II ventilation unit with duct adapters, dimensions in millimetres

5 Structure and function

5.1 Overview of the modules

5.1.1 Ventilation unit – unit cover attached

Item in Fig. 6	Designation
1	Housing
2	Unit cover
3	Membrane touch pad with 5 buttons for selecting the ventilation levels / programs and 5 status indicator LEDs

5.1.2 Ventilation unit – unit cover removed

Item in Fig. 7	Designation
1	Supply air grille
2	Outdoor air filter with filter cover
3	Mains switch "On / Off"
4	Extract air filter with filter ring
5	Extract air grille

Fig. 6:   Ventilation unit – unit cover attached
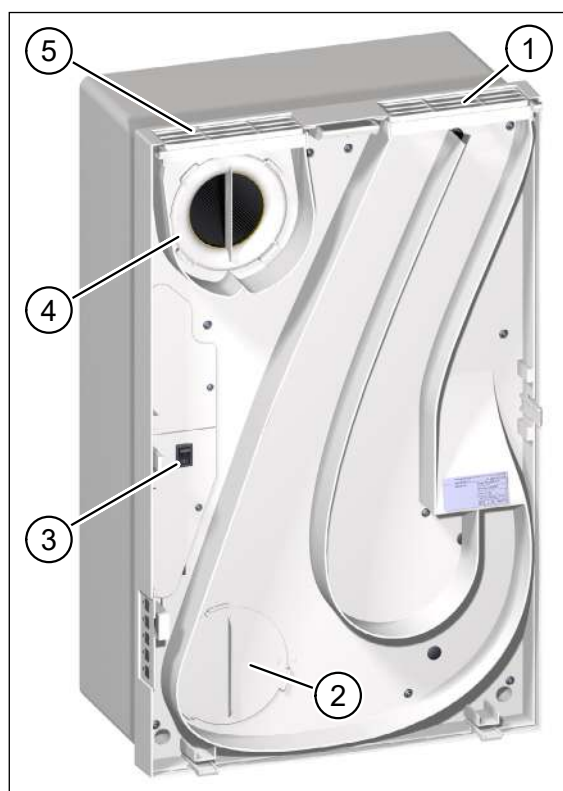
Fig. 7:   Ventilation unit – unit cover removed

5.2 Description of the functions

5.2.1 How the M-WRG-II ventilation unit works
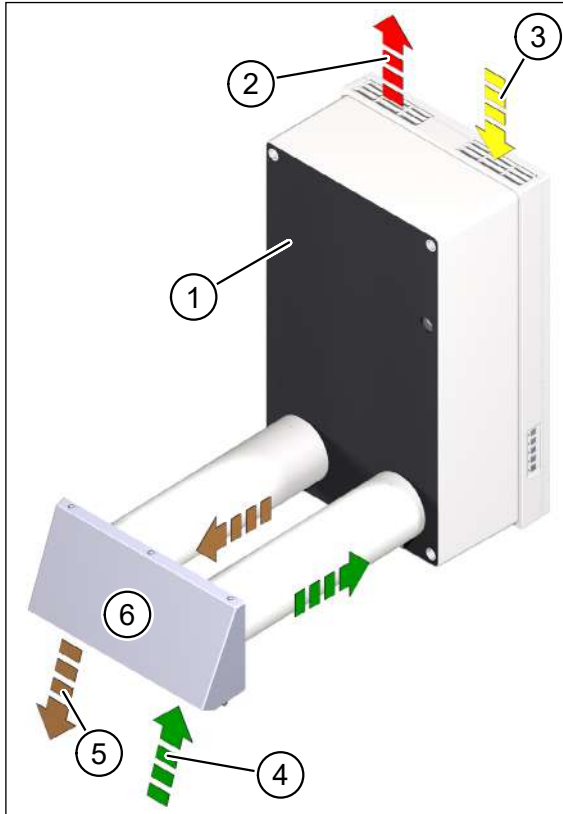
Fig. 8: How the ventilation unit works
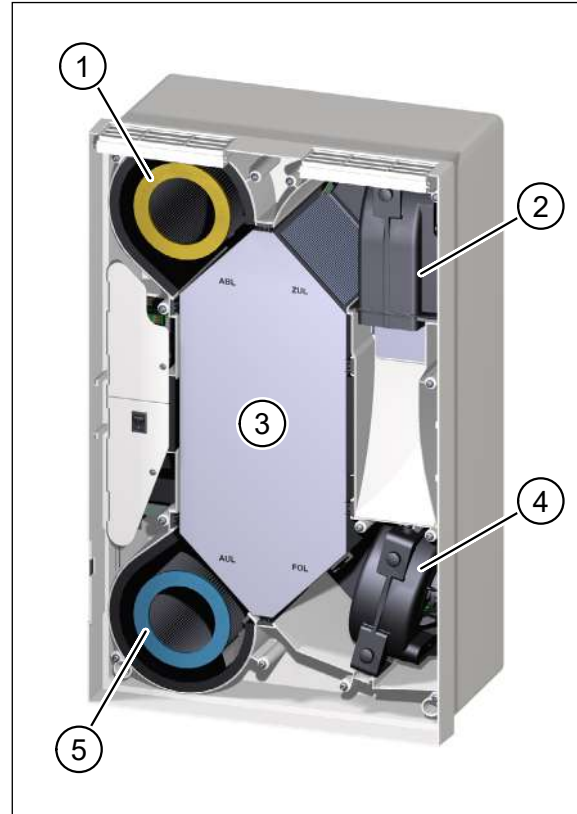
Fig. 9: Components for air exchange

Item in Fig. 8	Designation
1	M-WRG-II ventilation unit
2	Supply air
3	Extract air
4	Outdoor air
5	Exhaust air
6	Outer wall terminal

Item in Fig. 9	Designation
1	Extract air filter
2	Supply air fan
3	Cross-counterflow plate heat exchanger
4	Exhaust air fan
5	Outdoor air filter

The ventilation unit operates continuously, transports outdoor air and extract air at the same time and guides and filters the outdoor air and extract air separately. The self-regulating fans (which ensure a constant volumetric flow rate) are arranged on the supply air and exhaust air sides. The supply air fan (item 2 in Fig. 9) transports outdoor air (item 4 in Fig. 8) through the outdoor air filter (item 5 in Fig. 9) and cross-counterflow plate heat exchanger (item 3 in Fig. 9) into the interior as supply air (item 2 in Fig. 8). The exhaust air fan (item 4 in Fig. 9) extracts the extract air (item 3 in Fig. 8) from the interior. In the extract air filter (item 1 in Fig. 9), the extract air is cleaned, guided through the cross-counterflow plate heat exchanger and carried outside as exhaust air (item 5 in Fig. 8). The supply air and exhaust air fans each transport the same volume of air. The pressure in the interior remains practically constant.

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5.2.2 How the cross-counterflow plate heat exchanger works / moisture recovery with enthalpy heat exchanger
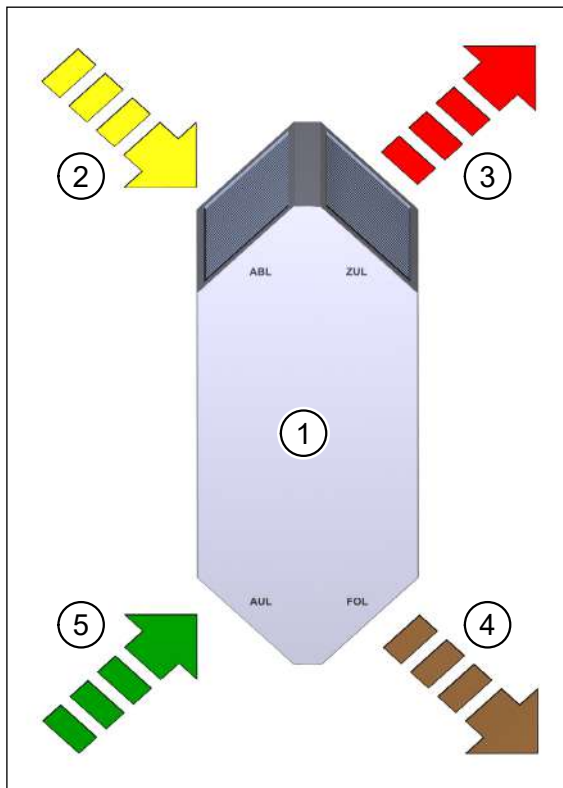
Fig. 10: How the cross-counterflow plate exchanger works
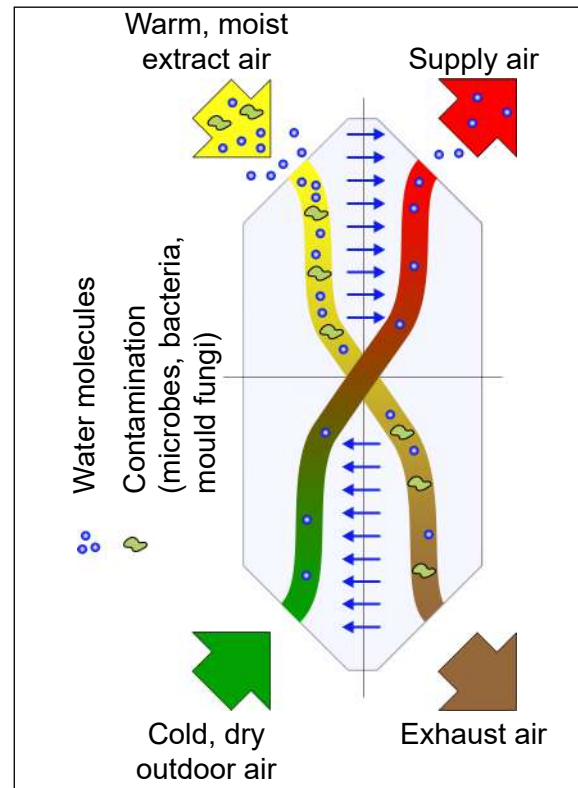
Fig. 11: Moisture recovery with enthalpy heat exchanger

The channels on the cross-counterflow plate heat exchanger (item 1 in Fig. 10) are designed so that the air flows move in opposite directions. This guarantees the greatest possible exchange of thermal energy.

In the winter, the highly thermally conductive plates transfer the heat from the extract air flow (item 2 in Fig. 10) to the supply air flow (item 3 in Fig. 10). The cooled extract air is carried to the outside as exhaust air (item 4 in Fig. 10). In the summer, this is reversed; the warmer, incoming air is cooled.

Ventilation units from the M-WRG-II E series also incorporate a moisture recovery (enthalpy) function (see Fig. 11). An enthalpy exchanger works on the principle of osmosis; the water molecules pass through the pore structure of an antimicrobial polymer membrane, driven by the moisture's concentration gradient from the warm air to the cold air side. The membrane film acts as a separating layer for the air flows and guarantees that only water vapour from the two air flows adjacent to the membrane is transferred. Microbes, mould fungi and bacteria are unable to penetrate and settle in the membrane due to their relatively large size compared to water molecules. The innovative polymer membrane that makes this possible is hygiene-certified to VDI 6022. The enthalpy heat exchanger effectively prevents the air we breathe being too dry in the winter and prevents excessive atmospheric humidity in the summer. This combination of heat and hygienic moisture recovery saves on heating costs and protects the respiratory tract.

6 Rules for correct usage

6.1 General

► Always operate the ventilation unit with the unit cover attached.

► Run the ventilation unit in continuous mode or demand-controlled with humidity and/or CO_2 control (only possible if the unit contains the appropriate sensors).
While continuous mode constantly ensures a good and healthy atmosphere in the room, on-demand ventilation uses sensors to provide particularly energy-efficient ventilation that is tailored precisely to requirements.

► Adapt the air flow through the ventilation unit to take account of the air load created by cooking, washing, ironing, visitors, showers, sauna, etc.

► Set the ventilation unit so that the relative humidity ranges between 40 % and 65 %. People feel most comfortable within this range.

6.2 Seasonal operation

6.2.1 Operation at cold times of year

► During cold times of year, run the ventilation unit either in continuous mode or demand-controlled via the humidity or CO_2 sensors (only if the unit has the appropriate sensors).

— Energy-saving motors and an innovative controller ensure a very low power consumption, even in continuous mode.

— Continuous removal of moisture from the interior is only guaranteed while the unit is in operation.

► Run the intensive ventilation program in the following cases:

— regularly if there is high atmospheric humidity in the interior

— if you need to switch off the ventilation unit.

This will remove any condensate that is present in the ventilation unit.

► Maintain the temperature in bedrooms at 16 °C to 18 °C or more. This temperature is also more healthy for the people in the bedrooms. Do not run the ventilation unit at room temperatures below 15 °C, and particularly not at low external temperatures below 0 °C. Otherwise the ventilation unit will constantly activate the frost protection function or switch off altogether. The higher the interior temperature, the bigger the buffer for operating the ventilation unit and for heat recovery.

NOTICE
Supply air or exhaust air operation alone is not recommended. Firstly because the unit is often in the unbalanced frost protection mode and secondly because the incoming flow of cold outdoor air causes the rooms to cool down.

6.2.2 Summer mode

On hot summer days, the heat recovery effect can be utilized the opposite way around during the day by correcting the temperature of the supplied hot outdoor air with the removed cooler extract air.

At night, when the outdoor air temperature is lower than the interior temperature, the ventilation unit can be set to allow supply air or extract air operation alone, with the effect that there is no heat recovery.

In addition, a cross-ventilation effect can be created by setting one ventilation unit to supply air operation and the other to extract air operation.

In supply air mode, the exhaust air fan switches off, i.e. only supply air is transported. The necessary extract air flow rate must be guaranteed by arrangements in the building (e.g. tilted window) or a second unit.

NOTICE
► In the summer months, ventilate cellars and similar rooms only during the night. Otherwise condensation from the atmospheric humidity can cause damage due to damp on the cold walls.

6.3 Air filters

— Never run the ventilation unit without air filters.

— Always use genuine Meltem filters. These are precisely matched to your M-WRG-II ventilation units, ensure minimal pressure losses and will ensure a long service life from your ventilation units.

— DIN 1946-6 "Ventilation for residential buildings" recommends changing air filters every six months. The air filters for outdoor air and extract air should be replaced at least once a year on hygiene grounds, ideally before the cold weather starts.

— In high levels of air pollution (e.g. from road traffic or industry, rooms with high dust levels) change the filters **every six months**.

— Always replace air filters in pairs. The permeability of both air filters affects the efficiency and power consumption of the ventilation unit.

— Observe the filter change indicator (see chapter 12 on page 32) and replace the air filters as necessary.

NOTICE
An outdoor air filter from filter class ISO ePM1 ≥50% (F7) is needed to fulfil the hygiene requirements defined in VDI 6022 and DIN 1946-6 (category H). Every M-WRG-II ventilation unit is equipped with such an air filter as standard.

7 Central and local operation of the ventilation unit

7.1 Operation via the Modbus RTU master

Ventilation units of the M-WRG-II P-M and M-WRG-II E-M type are controlled centrally via Modbus (Modbus RTU master using the Modbus RTU protocol). The way they are operated via a Modbus RTU master will vary according to the system in use, and the master is to be supplied by the customer.

7.2 Controls and indicators on the ventilation unit

For local operation there is a membrane touch pad with 5 buttons (items 1 to 5 in Fig. 12) on the left of the ventilation unit. These buttons are used to set the ventilation levels / programs. The 5 LEDs (LEDs 1 to 5 in Fig. 12) indicate the status of the ventilation unit. They also display any fault messages or whether an air filter needs to be changed.

The mains switch (item 1 in Fig. 13) is located behind the unit cover. The unit cover must be removed in order to access it.
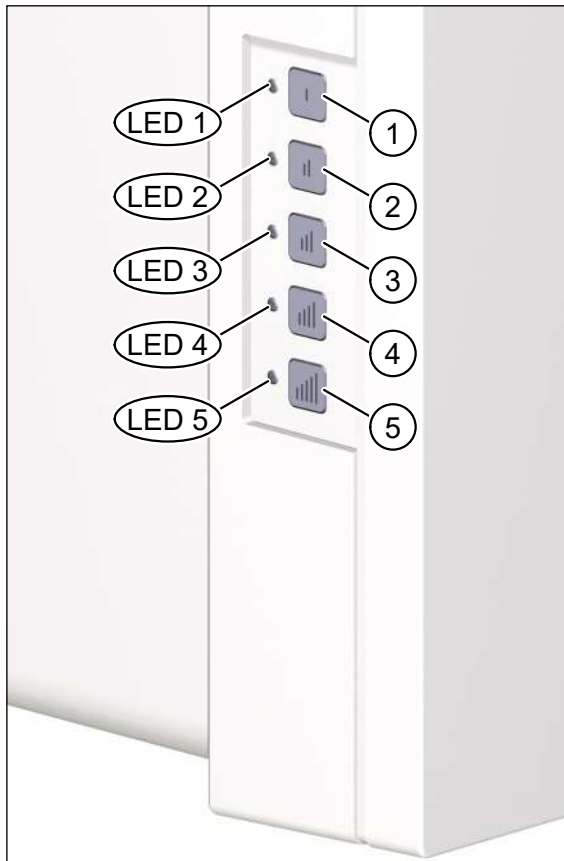
Fig. 12:   Membrane touch pad and LEDs on the left of the unit

Fig. 13:   Mains switch, visible when unit cover is removed

7.3 Default assignment of the membrane touch pad

This section illustrates the default assignment of the individual buttons on the membrane touch pad for the different types of unit. How the individual ventilation programs work is described in section 10 on page 27.

7.3.1 M-WRG-II P-M / M-WRG-II E-M

Button in Fig. 12	Ventilation program	Air flow
1	Reduced ventilation (people absent)	10 m³/h
2	Normal ventilation (people present)	30 m³/h
3	Increased ventilation	50 m³/h
4		70 m³/h
5	Intensive ventilation (15 min)	100 m³/h

7.3.2 M-WRG-II P-M-F / M-WRG-II E-M-F

Button in Fig. 12	Ventilation program	Air flow
1	Reduced ventilation (people absent)	10 m³/h
2	Normal ventilation (people present)	30 m³/h
3	Increased ventilation	50 m³/h
4	Humidity control	10 - 60 m³/h, infinitely-variable
5	Intensive ventilation (15 min)	100 m³/h

7.3.3 M-WRG-II P-M-FC / M-WRG-II E-M-FC

Button in Fig. 12	Ventilation program	Air flow
1	Reduced ventilation (people absent)	10 m³/h
2	Normal ventilation (people present)	30 m³/h
3	Increased ventilation	50 m³/h
4	Automatic mode (humidity and CO_2 control)	10 - 60 m³/h, infinitely-variable
5	Intensive ventilation (15 min)	100 m³/h

7.4 LED indicators

7.4.1 Selected ventilation program indicator

When a ventilation program is activated on the membrane touch pad, the corresponding LED lights up (see Fig. 12 on page 23) for 10 seconds and then goes out again.

7.4.2 Status indicators

An LED that lights up continuously or flashes indicates one of the following ventilation unit states:

LED in Fig. 12	Status
LED 1 lights up continuously	Air filter change required
LED 2 lights up continuously	Unit fault (e.g. faulty sensor or motor)
LED 3 flashes for 10 s	The absolute atmospheric humidity of the supply air is greater than the absolute atmospheric humidity of the extract air
LED 4 flashes for 10 s	The VOC value of the supply air is greater than 1500 ppm for 10 minutes (factory setting, only for units with the M-WRG-II O/VOC-AUL option)
LED 5 flashes for 10 s	Ventilation unit in frost protection mode

8 Starting up

8.1 Checking the ventilation unit before switching on for the first time

► Check the ventilation unit for damage.

► Check that the air grilles for extract air and supply air (item 1 and 5 in Fig. 7 on page 18) are unobstructed.

8.2 Switching on the ventilation unit

► Remove the cover from the ventilation unit (see section 12.3.1 on page 33).

► Switch the ventilation unit on at the mains switch (item 1 in Fig. 14).

After roughly 1 second, the electromechanically-operated vent flaps on the supply air and exhaust air sides open.

► Reattach the cover to the ventilation unit (see section 12.3.6 on page 35).

Fig. 14:   Mains switch, visible when unit cover is removed

VENTILATION THE RIGHT WAY

9   Operating the ventilation unit

There are two options for operating the ventilation unit:

— Centrally via Modbus using the Modbus RTU master
— Locally using the buttons of the membrane touch pad on the ventilation unit

9.1   Central operation

All the units in the building are interconnected via Modbus and are controlled by the Modbus RTU master. This solution allows you to control the M-WRG-II units individually, room-by-room, floor-by-floor or all together. They can also be demand-controlled via humidity or CO_2 sensors. Units with the appropriate sensors are needed to record the measured values (type: M-WRG-II P-M-F / M-WRG-II E-M-F or M-WRG-II P-M-FC / M-WRG-II E-M-FC).

9.2   Local operation

M-WRG-II units can be controlled simply and straightforwardly using the buttons on the membrane touch pad (items 1 to 5 in Fig. 12 on page 23). Again they can be automatically demand-controlled via humidity or CO_2 sensors.

9.3   Frost protection function

The ventilation unit is equipped with a frost protection function. In low outdoor temperatures, the ventilation unit automatically switches to frost protection mode.

► Do not switch the ventilation unit off in the winter. Note section "6 Rules for correct usage" on page 21.

How it works:

The temperature on the exhaust air side is constantly monitored to prevent the heat exchanger freezing. If the exhaust air temperature drops below -1.5 °C (A1: -2.2 °C, A2: -2.7 °C with M-WRG-II E), the motor controller gradually changes the supply air and/or extract air volume flow according to the set ventilation level so that the proportion of extract air is increased. This causes the temperature to rise on the exhaust air side.

When an exhaust air temperature >5.5 °C (>7.0 °C with M-WRG-II E) is maintained for a period of 3 minutes (2 minutes with M-WRG-II E), the unit gradually switches back to the previous operating state.

If a value of >5.5 °C (>7.0 °C with M-WRG-II E) is not reached on the exhaust air side, despite increasing the proportion of extract air within the unit's control range (e.g. because the room has cooled down), both the supply air fan and the exhaust air fan are switched off.

After one hour, the unit resumes operation for 6 minutes and checks the exhaust air temperature. If the measured exhaust air temperature exceeds a value of 5.5 °C (7.0 °C with M-WRG-II E), ventilation mode starts with the previously set operating state.

If the measured exhaust air temperature is below a value of 5.5 °C (7.0 °C with M-WRG-II E), the sequence described above is repeated.

Frost protection mode is ended when the exhaust air temperature is constantly above 5.5 °C (7.0 °C with M-WRG-II E) and the two fans are balanced.

In addition to monitoring of the exhaust air temperature, the speed of the exhaust air fan is monitored continuously. When the exhaust air temperature has dropped to <2 °C, if the speed increases significantly within a period of 2 hours, frost protection mode is activated by the motor controller.

Any condensate is removed via the exhaust air pipe and condensate connection and with M-WRG-II E units (with enthalpy) there is practically no condensation at all (if used for the intended use, see section 2.5 on page 14, and in accordance with the rules for correct usage, see section 6 on page 21, and if not exposed to excessive humidity).

10 Ventilation levels/programs

There are different ventilation programs/levels available for selection, depending on the type of ventilation unit (see section 7.3.1 to section 7.3.3). These can be activated using the membrane touch pad on the ventilation unit (see Fig. 8 on page 19) or via the Modbus configuration (see section 16.7 on page 46).

10.1 "Reduced ventilation (people absent)"

The ventilation unit runs at the lowest ventilation level (10 m^3/h). This operating mode can be selected when the occupier is absent (e.g. on holiday) to ensure a minimum level of air renewal. This includes ventilation for moisture protection.

10.2 "Normal ventilation (people present)"

The ventilation unit runs at the middle ventilation level (30 m^3/h). This is the normal mode used to achieve the ventilation needed to meet hygiene and health requirements when the users are present.

10.3 "Increased ventilation"

The ventilation unit runs at a higher ventilation level (50 or 70 m^3/h) in order to dissipate load peaks, e.g. when there are multiple people present or increased odour nuisance.

10.4 "Intensive ventilation (temporary 15 min)"

The ventilation unit runs at maximum ventilation level (100 m^3/h). After roughly 15 minutes or when another button is pressed, the intensive ventilation is ended and the previously set ventilation program is resumed.

10.5 "Humidity control"

The ventilation unit runs constantly at the lowest ventilation level (10 m^3/h[(1)]). If the relative room air humidity exceeds 60 % RH, the ventilation level is increased continuously up to max. 60 m^3/h until the humidity in the room drops back below 60 % RH.

NOTICE
To ensure dehumidification, the ventilation unit compares the calculated absolute humidity of the supply air and extract air. LED 3 (see Fig. 12 on page 23) flashes when the humidity of the outdoor air is greater than that of the extract air, which means that dehumidification is not possible.

10.6 "Automatic mode"

The ventilation unit runs constantly at the lowest ventilation level (10 m^3/h[(1)]). A CO_2 sensor monitors the air quality in the room. If the limit of 800 ppm is exceeded, the ventilation unit calculates the optimum air renewal and sets the required ventilation level in the range from 10 - 60 m^3/h.

The relative room air humidity is monitored in addition to the CO_2 concentration (see section 10.5). The CO_2 sensor and the humidity sensor both send feedback to the ventilation unit, indicating the ventilation level at which it should work. The ventilation unit automatically assumes the higher of the two suggested ventilation levels and thus ensures the priority.

The M-WRG-II O/VOC-AUL option allows volatile organic compounds in the outdoor air to be detected as well using a VOC sensor.

NOTICE
— When it is started up for the first time, the ventilation unit must remain switched on for at least 15 minutes without interruption so that the VOC sensor can be calibrated.   ► Make sure that the air is not severely contaminated during the calibration phase by solvents, for example. — When you switch on again, it will take roughly 5 minutes for the sensor to recalibrate.

(1) The ventilation level can be reduced from 10 to 0 m^3/h via Modbus or at the factory. The ventilation unit switches to sniffing mode and interrupts its operation for the set pause time (set to 60 minutes at the factory). The relative humidity or CO_2 concentration is then checked for a 5-minute period. If the corresponding limit is exceeded, the ventilation unit switches back to ventilation mode.

11 Options for ventilation mode

11.1 External control input

11.1.1 Description

With the external control input supplied as standard, the M-WRG-II unit has an additional input terminal for 230 V AC (working voltage range: 85 V AC to 265 V AC / 50 - 60 Hz) to which a switch, time switch, motion detector or similar may be connected.

NOTICE
Commands that the ventilation unit receives via the external control input have higher priority than commands that are received via Modbus.

The external control input is equipped with a time-delay relay that can be used to set a switch-on delay and a run-on time:

— Switch-on delay:
  the M-WRG-II unit does not start until the set time has elapsed.
— Run-on time:
  the M-WRG-II unit does not switch to the previously active ventilation program until the set time has elapsed.

Windowless rooms can be ventilated in accordance with DIN 18017-3 in combination with the M-WRG-II O/NOF option, part no. 721004.

11.1.2 Factory defaults and possible adjustment ranges

Parameter	Factory defaults	Possible adjustment ranges
Air flow	60 m³/h	10 to 100 m³/h
Switch-on delay	1 min	0 to 240 min
Run-on time	15 min	0 to 240 min

NOTICE
The above parameters can be changed either at the factory or using the optional wireless remote control M-WRG-FBH.

11.1.3 M-WRG-II O/EST-1, part no. 721005, and M-WRG-II O/EST-2, part no. 721006

The following options may be selected in addition to the external control input which is supplied as standard:

— M-WRG-II O/EST-1: without switch-on delay, needs to be fitted at the factory
— M-WRG-II O/EST-2: without run-on time, needs to be fitted at the factory

11.2 Minimum ventilation to DIN 18017-3, M-WRG-II O/MVS, part no. 721001

This option guarantees a minimum ventilation level to DIN 18017-3. Between 08:00 and 20:00, the unit ventilates at 40 m³/h, dropping to 20 m³/h between 20:00 and 08:00. The function is activated at the factory, cannot be switched off by the user and has priority over all other settings. It includes the mains switch without function so that the user cannot easily switch the unit off (it can be switched off via the building's fuse box, for example).
This option changes the button assignment on the ventilation unit control panels:
Button 1, 2, 3, (4): 20, 40, 60, (80) m³/h.
The option cannot be used in conjunction with M-WRG-II O/VOC-AUL.

11.3 VOC sensor for monitoring the outdoor air quality, M-WRG-II O/VOC-AUL, part no. 721002

The ventilation unit is equipped with a VOC sensor for monitoring the outdoor air quality. In conjunction with the "Automatic mode" ventilation program, the unit temporarily reduces the supply air if the threshold for contamination with volatile organic compounds (from biological decay and decomposition processes, motor traffic exhaust fumes or volatile by-products from industrial and commercial operations) is exceeded (1,500 ppm). This option is only available for units with a CO_2 sensor (M-WRG-II ...-FC). It needs to be fitted at the factory. The option cannot be used in conjunction with M-WRG-II O/MVS.

11.4 "Unit OFF" input, M-WRG-II O/EGG-AUS, part no. 721003

With this option, the unit is equipped with a "Unit OFF" input and a potential-free fault indicator output.

A smoke detector or a window contact may be connected to the input, for example, allowing the unit to be switched off if smoke is detected or a window is opened.

The fault indicator output allows the ventilation unit's operating state to be signalled to a central point, for example. This option needs to be fitted at the factory.

11.5 Mains switch without function, M-WRG-II O/NOF, part no. 721004

The mains switch on the ventilation unit is deactivated with this option. The user can only change the unit's ventilation levels / programs. However it must be ensured that the ventilation unit(s) can be switched off by other means (e.g. via the fuse box in the apartment or house). This option must be fitted at the factory.

11.6 Ventilation for moisture protection, M-WRG-II O/LFS, part no. 721007

11.6.1 Description

The "ventilation for moisture protection" option is used to set fixed, minimum ventilation levels for day and night. The function is activated at the factory and cannot be switched off by the user (who can only set higher ventilation levels). A humidity program which increases the air flow as required runs continuously in background mode. This option includes the mains switch without function so that the user cannot easily switch the unit off (it can be switched off via the building's fuse box, for example).
This option changes the button assignment on the ventilation unit control panels:
Button 1, 2, 3, (4): 20, 40, 60, (80) m³/h.

NOTICE
— This option can only be selected in conjunction with M-WRG-II units with humidity and/or CO_2 control (excluding types -S 485, -TF, -TFC).
— It needs to be fitted at the factory.

11.6.2 Factory defaults

Time	Air flow
08:00 - 20:00	20 m³/h
20:00 - 08:00	20 m³/h

12   Filter maintenance

The ventilation unit has a runtime-controlled filter monitoring function with visual display. It monitors the time since the last air filter change. If the last air filter change was more than one year ago, the filter change display is activated and a pending air filter change is signalled by LED 1, which lights up constantly (see Fig. 12 on page 23).

No tools are needed to change the air filters.

NOTICE
► Follow the instructions for changing the air filters in section 6.3 on page 22.

12.1   Choice of filter

The following air filters may be used or are available for selection for the M-WRG-II ventilation units:

Part no.	Type	Filter type	Filter class	Application
750010	M-WRG-II FA	Outdoor air filter	ISO ePM1 60% (F7)	Effectively filters out respirable particulates such as pollen, soot and bacteria from dust class PM1
750020	M-WRG-II FK	Activated charcoal filter (optional for outdoor air)	ISO ePM2,5 55% (F7)	Effectively retains respirable particulates such as pollen, soot and bacteria from dust class PM2.5, and the activated charcoal layer absorbs odours and harmful gases such as propellants, nitrogen oxides, ozone and solvents
750000	M-WRG-II FS	Extract air filter	ISO Coarse 60% (G4)	Effectively retains coarse particulates such as household dust >PM10

Table 3:   Choice of filter

12.2   Ordering filters

Please contact your local or regional dealer for information on ordering filters. You will find the contact details on our website at www.meltem.com (or using the QR code on this page).
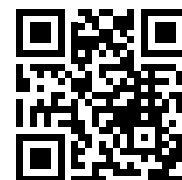
Go to
www.meltem.com

12.3 Changing the air filters

12.3.1 Removing the unit cover from the ventilation unit

► Using both thumbs, press the two latches (item 1 in Fig. 15) on the bottom of the ventilation unit. The unit cover will come away.

► At the same time, push your index fingers into the gap between the unit cover and housing, and lift the unit cover up and away from the housing.

► Switch the ventilation unit off at the mains switch (see Fig. 13 on page 23). On ventilation units with the M-WRG-II O/NOF option, power to the unit must be switched off using the building's miniature circuit breaker.
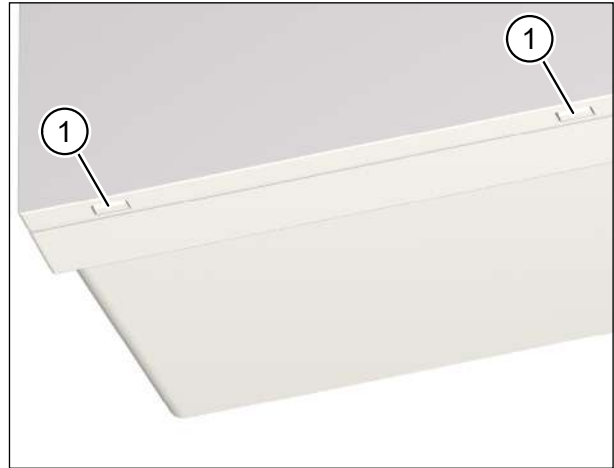
Fig. 15:   Removing the unit cover from the ventilation unit

12.3.2 Removing the extract air filter

► Turn the filter ring (item 1 in Fig. 16) using the hand grip (item 2 in Fig. 16) anti-clockwise until the filter ring is released from the retainers.

► Pull the filter ring together with the extract air filter (item 3 in Fig. 16) out of the ventilation unit.

► Detach the extract air filter from the filter ring.

► Clean the filter ring with a damp cloth if it is dirty (see section 13).

► Dispose of the used air filter in the non-recyclable waste or as required by your country's disposal regulations.

Fig. 16:   Removing the extract air filter

12.3.3 Removing the outdoor air filter

► Turn the filter cover (item 1 in Fig. 17) using the hand grip (item 2 in Fig. 17) anti-clockwise until the filter cover is released from the retainers.

► Pull the filter cover together with the outdoor air filter out of the ventilation unit.

► Detach the outdoor air filter from the filter cover.

► Clean the filter cover with a damp cloth if it is dirty (see section 13).

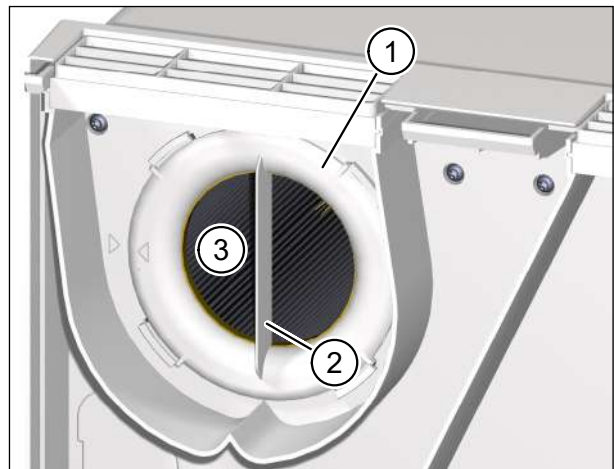► Dispose of the used air filter in the non-recyclable waste or as required by your country's disposal regulations.
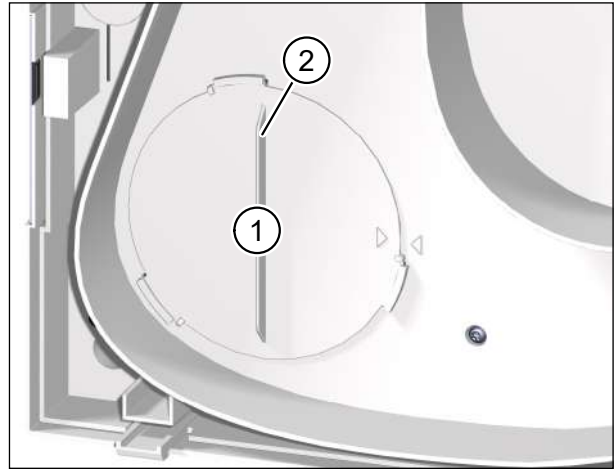
Fig. 17:   Removing the outdoor air filter

12.3.4 Inserting the new extract air filter

► Carefully guide the new extract air filter (item 1 in Fig. 18) into the ventilation unit.

► Make sure that the air filter slides into the 3 retaining tabs (item 2 in Fig. 18) on the back wall of the ventilation unit.

► Place the filter ring (item 3 in Fig. 18) on the extract air filter. Make sure that the filter ring lies flat on the intermediate plate (item 4 in Fig. 18).

► Turn the filter ring clockwise until the arrow on the filter ring (item 5 in Fig. 18) lines up with the arrow for the locking position (item 6 in Fig. 18). Make sure that the 4 tabs (item 7 in Fig. 18) on the filter ring engage in the retainers (item 8 in Fig. 18) on the intermediate plate.

Fig. 18:   Inserting the new extract air filter

► Check the position of the filter ring. The hand grip must be vertical and the arrow on the filter ring must line up with the arrow for the locking position (see Fig. 16 on page 33).

NOTICE

— The ventilation unit will not work as well if the filter ring is not inserted correctly.

— Only M-WRG-II FS, part no. 750000, may be used as the extract air filter.
The part no. and air filter class are imprinted on the yellow end plate of the air filter (item 9 in Fig. 18).

12.3.5   Inserting the new outdoor air filter

► Carefully guide the new outdoor air filter (item 1 in Fig. 19) into the ventilation unit.

► Make sure that the air filter slides into the 3 retaining tabs (item 2 in Fig. 19) on the back wall of the ventilation unit.

► Place the filter cover (item 3 in Fig. 19) on the outdoor air filter. Make sure that the filter cover lies flat on the intermediate plate (item 4 in Fig. 19).

► Turn the filter cover clockwise until the arrow on the filter cover (item 5 in Fig. 19) lines up with the arrow for the locking position (item 6 in Fig. 19). Make sure that the 3 tabs (item 7 in Fig. 19) on the filter cover engage in the retainers (item 8 in Fig. 19) on the intermediate plate.

Fig. 19:   Inserting the new outdoor air filter

► Check the position of the filter cover. The hand grip must be vertical and the arrow on the filter cover must line up with the arrow for the locking position (see Fig. 17 on page 34).
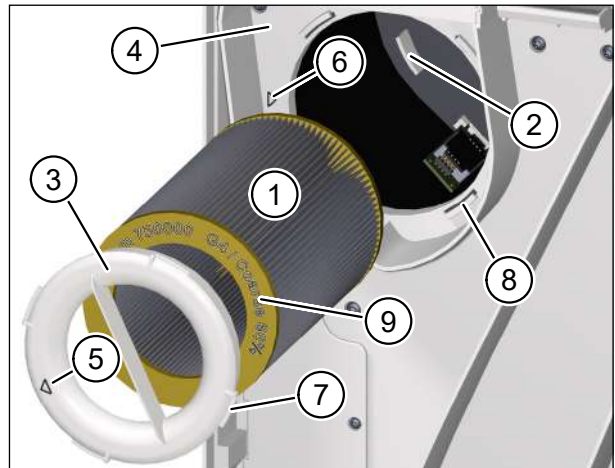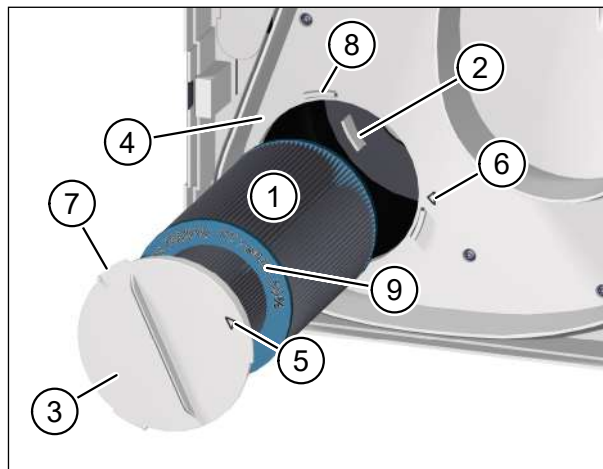
> **NOTICE**
> — The ventilation unit will not work as well if the filter cover is not inserted correctly.
> — Only M-WRG-II FA, part no. 750010, and M-WRG-II FK (activated charcoal filter), part no. 750020, may be used as the outdoor air filter. The part no. and air filter class are imprinted on the turquoise end plate of the air filter (item 9 in Fig. 19).

12.3.6   Switching on the ventilation unit and attaching the unit cover to the ventilation unit

► Switch the ventilation unit on at the mains switch (item 1 in Fig. 14 on page 25).

► Hold the cover (item 1 in Fig. 20) of the ventilation unit with both hands and tilt the top edge of the cover towards the ventilation unit.

► Insert the tabs (item 2 in Fig. 20) of the unit cover into the retainers (item 3 in Fig. 20) on the top of the ventilation unit.

► Lightly press the bottom edge of the cover against the ventilation unit until you hear the cover snap in place.

Fig. 20:   Attaching the unit cover to the ventilation unit

VENTILATION THE RIGHT WAY
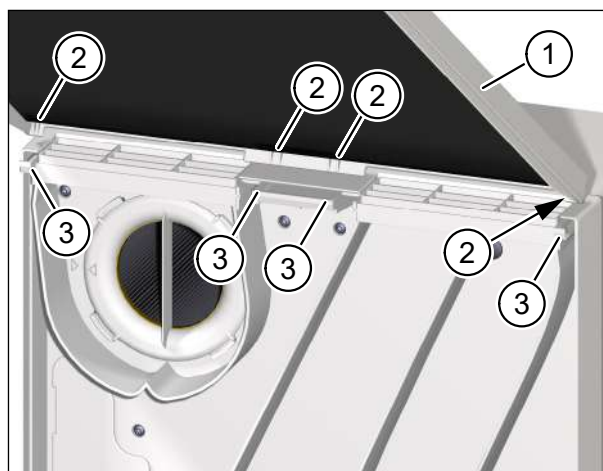
12.3.7 Resetting the filter change indicator

After every air filter change, the filter change indicator must be reset in order to restart monitoring of the period since the last air filter change. The procedure is as follows:

► Press button 1 (item 1 in Fig. 12 on page 23) for roughly 5 seconds.
The ventilation unit will beep three times as confirmation. Monitoring of the period since the last air filter change is now restarted.

13 Cleaning and maintenance

⚠ WARNING
► Switch off the power to the ventilation unit before cleaning.
► When cleaning, make sure that no moisture penetrates into the inside of the housing.
► Never use a high pressure cleaner, steam cleaner or steam jet.

The ventilation unit is made of high quality plastic and requires little care.

► Wipe the outer surfaces from time to time with a soft, damp cloth. Use mild soapy water. A commercially available plastic cleaner can be used for particularly stubborn dirt.

NOTICE
► Never use acidic, corrosive or abrasive cleaning agents.

Maintenance of the M-WRG-II series of units is described in separate maintenance instructions (see section "1.11 Supplementary documents" on page 11).

14 Troubleshooting

Error	Cause	Remedy
Ventilation unit is not running	Ventilation unit is in safe mode after an EMC fault	Switch the ventilation unit off, wait 15 seconds, then switch on
	Installation error	Have the wiring checked by a qualified electrician
	Faulty switch, motor or controller	Check by a qualified electrician
LED 2 (see Fig. 12 on page 23) lights up continuously	Unit fault	— Note the message from Modbus register 41016 — Contact Meltem
The ventilation unit frequently activates the frost protection function	— Filter change interval exceeded — The air filter is very dirty (in areas with highly polluted outdoor air this can occur even before the filter change interval has elapsed)	Change air filters (see "12.3 Changing the air filters" on page 33)
Operating noise of the ventilation unit increases in volume		

Table 4: Troubleshooting

VENTILATION THE RIGHT WAY

15 Connecting the ventilation unit to the Modbus RTU

This section describes how to connect the ventilation units electrically to the Modbus and the settings and registers for the Modbus protocol. A Modbus master (provided by the customer) is also needed to control the units.

> ⚠ **WARNING**
>
> The activities described in this chapter must only be carried out by technicians 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 (see chapter "2 Safety instructions" from page 12)

15.1 Overview of the modules

15.1.1 Modbus board in the ventilation unit

The board has a 10-pole terminal block (item 1 in Fig. 21) for connecting the bus cable and the 3-pole pin header (item 2 in Fig. 21) for attaching the jumper. The jumper acts as a terminating resistor and must be set to suit the wiring topology (serial or star, see section 15.5.1 on page 41).
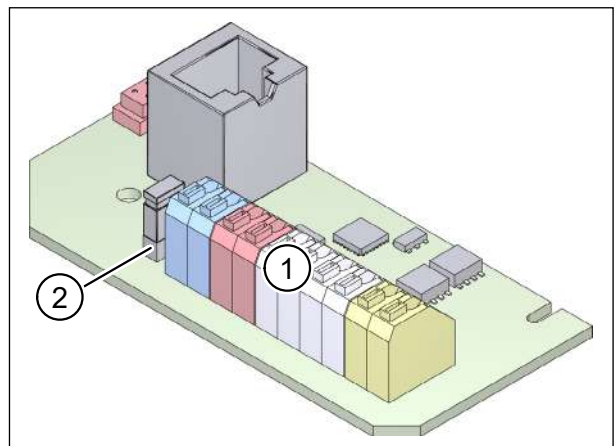
Fig. 21: Modbus board in the ventilation unit

15.1.2   Bus cable

The bus cable is connected at the connection on the Modbus master and on the 10-pole terminal block (see item 1 in Fig. 21 on page 38) on the board of the first ventilation unit. The bus cable then runs from here from one ventilation unit to the next (see section 15.5 on page 41).

We recommend the following types of bus cable:

Bus cable type	Core	Stripping length
J-Y (St) Y 2 x 2 x 0.6 mm	Wire	8 mm
J-Y (St) Y 2 x 2 x 0.8 mm	Wire	8 mm

Table 5:   Recommended bus cable types

15.2   Tools and equipment required

— Torx screwdriver TX10

15.3   Codes for designation of wire colours

Colour	Code as per IEC 60757
Black	BK
Brown	BN
Red	RD
Orange	OG
Yellow	YE
Green	GN
Blue	BU
Violet	VT
Grey	GY
White	WH

Table 6:   Codes for designation of wire colours

15.4 Accessing the Modbus board in the ventilation unit

15.4.1 Switching off power to the ventilation unit

⚠ DANGER
Potentially fatal voltages
— 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 connecting to 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

15.4.2 Removing the unit cover from the ventilation unit

► Using both thumbs, press the two latches (item 1 in Fig. 22) on the bottom of the ventilation unit. The unit cover will come away.

► At the same time, push your index fingers into the gap between the unit cover and housing, and lift the unit cover up and away from the housing.

Fig. 22: Removing the unit cover from the ventilation unit

15.4.3 Removing the electronics compartment cover plate

► Use the screwdriver to loosen the Torx screw (item 1 in Fig. 23) on the electronics compartment cover plate (item 2 in Fig. 23).

► Remove the electronics compartment cover plate to access the connection board (item 3 in Fig. 23).
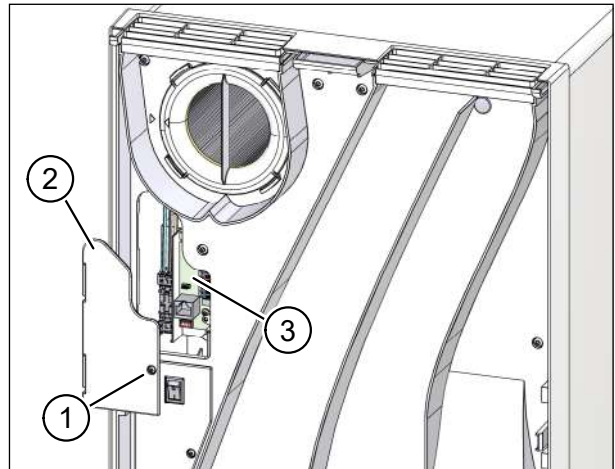
Fig. 23: Removing the electronics compartment cover plate

15.5 Overview drawings

15.5.1 Modbus wiring diagram
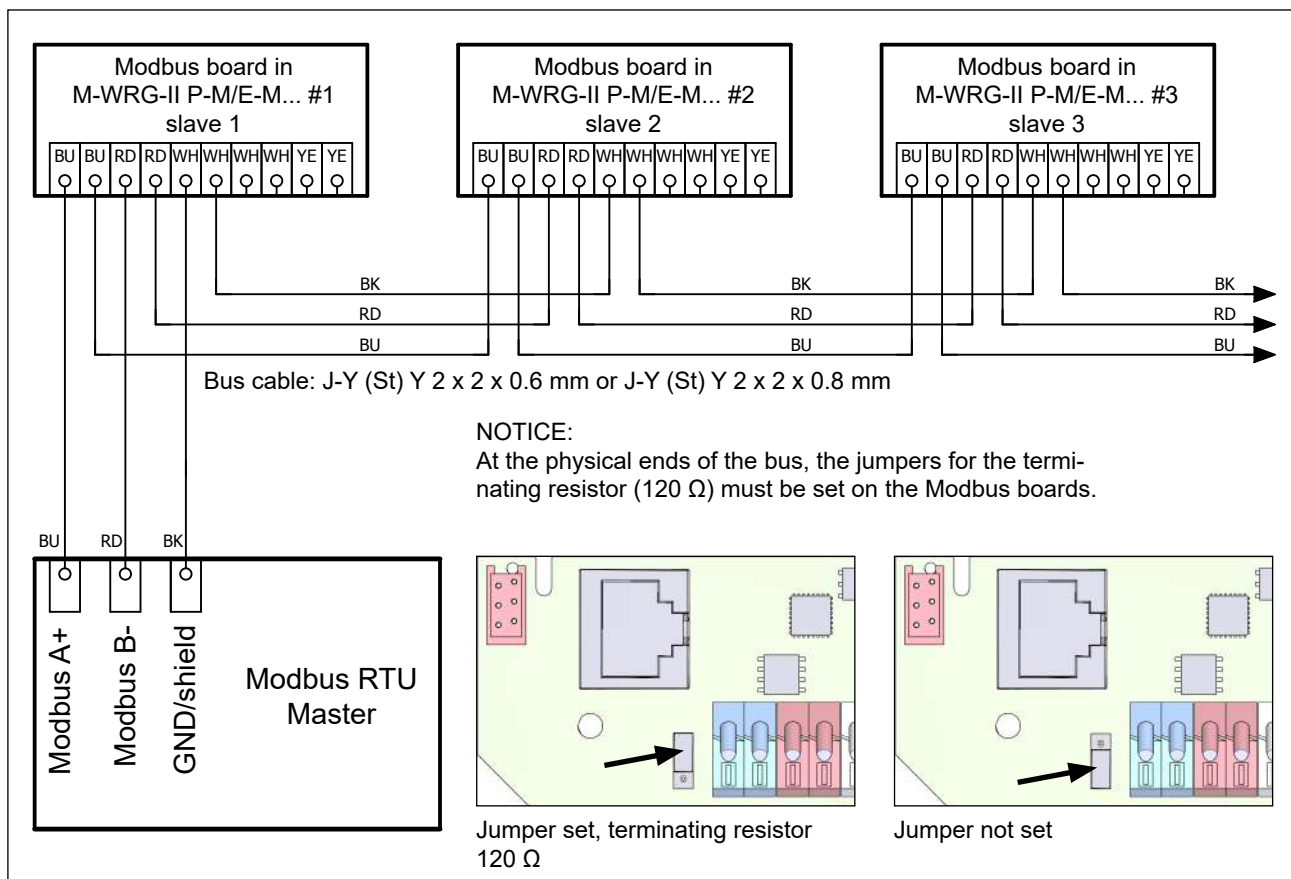
Fig. 24: Modbus wiring diagram

NOTICE

The wiring can also be configured as a star topology. In this case, a terminating resistor may only be connected to the ventilation unit that is furthest from the Modbus RTU master.

15.5.2 Example of floor-by-floor wiring
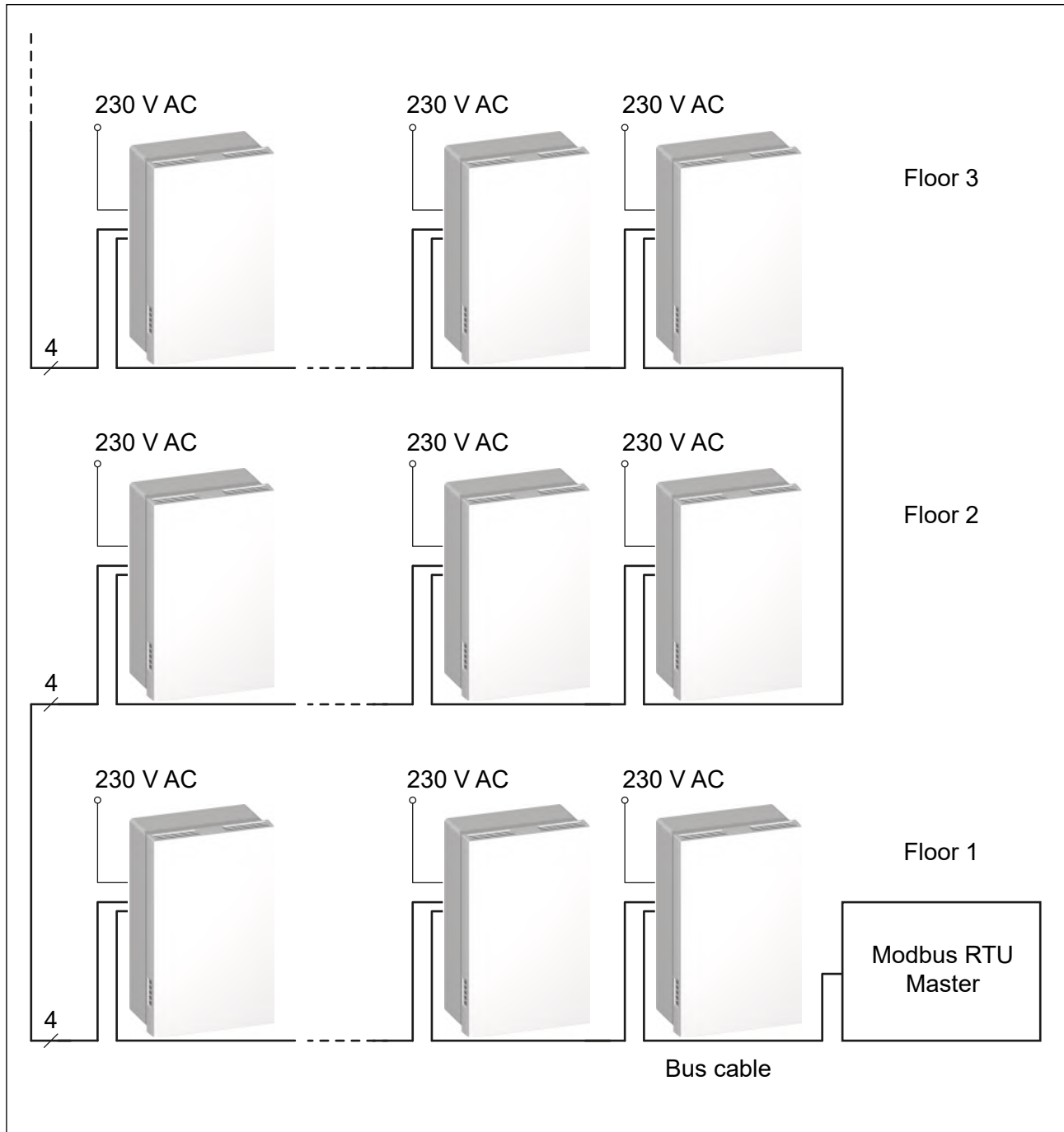
Fig. 25:   Example of floor-by-floor wiring

NOTICE
The wiring can also be configured as a star topology. In this case, a terminating resistor may only be connected to the ventilation unit that is furthest from the Modbus RTU master.

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15.6 Electrical installation

NOTICE
— The ventilation unit may be damaged if the bus cable is connected incorrectly. This will also invalidate the warranty.
— The installation must be carried out in accordance with the generally acknowledged rules of technology.
— Always run data and mains cables separately or in separate electrical conduits. Refer to EN 50174-2.
— The jumpers for the terminating resistor (120 Ω) must be set to suit the wiring topology (serial or star, see section 15.5.1 on page 41).

► Connect up the wiring as shown in Fig. 24 on page 41.

► Note the following points:

— Access to the Modbus board in the ventilation unit is described in section 15.4 on page 40.

— The recommended cable types for the Modbus are described in section 15.1.2 on page 39.

— Connection of the 230 V mains cable to the ventilation units with or without external control input is described in the installation manual for the M-WRG-II ventilation unit (see section 1.11 on page 11).

15.7 Addressing the Modbus boards

The addressing of the ventilation units may be carried out at the factory. If this is the case, the required slave address must be specified with the purchase order. The default slave address on every Modbus board is 1.

You will find the registers for addressing in section 16.4 on page 44.

15.8 Final tasks

► Insert the electronics compartment cover plate once more and fix it in position with the Torx screw (see Fig. 23 on page 41).

► Close the ventilation unit with the unit cover (see section 12.3.6 on page 35).

16 Modbus configuration

16.1 Default settings

— Start bits: 8
— Parity: E
— Stop bits: 1
— Baud rate: 19200 bps
— Slave address: 1, the required slave address should be specified in the purchase order

16.2 Function codes

Following function codes are supported:
— 0x03 Read Holding Register
— 0x04 Read Input Register
— 0x06 Write Single Holding Register
— 0x08 Diagnostics
— 0x11 Report ID

16.3 Frame requirements

— RTU encoded
— CRC16-ANSI Checksum, Polynomial 0x8005 / Reversed 0xA001, Initialized 0xFFFF
— Character Pauses Max 1.5 * Character Time
— Frame Delimiter: 3.5 * Character Time Idle

16.4 Setting and addressing

Register number	Function/name	Data type	Description
30000	Baud rate	UINT8	0 = 9600 bps 1 = 19200 bps
30002	Slave address	UINT8	Modbus slave address: 1 to 247

16.5   Registers

Register number	Read/write	Function/name	Min.	Max.	Step	Default	Data type	Unit
41016	R	Error message: 0 = device OK; 1 = error					UINT8	
41018	R	Frost protection function: 0 = not active; 1 = active					UINT8	
41000 41001	R	Exhaust air temperature					Float 32 bit	°C
41002 41003	R	Outdoor air temperature					Float 32 bit	°C
41004 41005	R	Extract air temperature					Float 32 bit	°C
41009 41010	R	Supply air temperature					Float 32 bit	°C
41006	R	Humidity, extract air					UINT16	%
41011	R	Humidity, supply air					UINT16	%
41007	R	CO_2, extract air					UINT16	ppm
41013	R	VOC, supply air					UINT16	ppm
41020	R	Ventilation level for extract air					UINT8	m^3/h
41021	R	Ventilation level for supply air					UINT8	m^3/h
41017	R	Air filter change indicator: 0 = air filter change time not elapsed; 1 = air filter change time elapsed					UINT8	
41027	R	Time until air filter change					UINT16	Days
41030 41031	R	Ventilation unit operating hours					UINT32	h
41032 41033	R	Fan motors operating hours					UINT32	h
42000	R/W	Rel. humidity starting point	40	80	1	60	UINT8	%
42001	R/W	Min. ventilation level for humidity control	0	100	10	10	UINT8	%
42002	R/W	Max. ventilation level for humidity control	10	100	10	60	UINT8	%
42003	R/W	CO_2 starting point	500	1200	1	800	UINT16	ppm
42004	R/W	Min. ventilation level for CO_2 control	0	100	10	10	UINT8	%
42005	R/W	Max. ventilation level for CO_2 control	10	100	10	60	UINT8	%
42007	R/W	Ventilation level for external control input	10	100	10	60	UINT8	%
42008	R/W	Switch-on delay for external control input	0	240	1	1	UINT8	min
42009	R/W	Run-on time for external control input	0	240	1	15	UINT8	min

16.6 Sensors in the different ventilation unit types

	Ventilation unit type			
Sensor 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
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

16.7 Setting the ventilation level

16.7.1 Balanced

> **NOTICE**
>
> — Registers 41120, 41121 and 41132 must be written in succession.
>
> — Register 41132 must always be written last. Once register 41132 has been written, the unit accepts registers 41120 to 41132.

Mode	Register 41120 (UINT8)	Register 41121 (UINT8), supply air and exhaust air fan	Register 41132 (UINT8)
Off	1	Not used	0
Ventilation level	3	The range from 0 to 200 corresponds to an air flow of 0 to 100 m³/h Example: A value of 70 corresponds to 35 m³/h A value of 100 corresponds to 50 m³/h	0
Humidity control (*)	2	112	0
CO_2 control (**)	2	144	0
Automatic mode (**)	2	16	0

(*)   On F and FC unit variants
(**)   On FC unit variant

16.7.2 Unbalanced

NOTICE
— Registers 41120, 41121, 41122 and 41132 must be written in succession.
— Register 41132 must always be written last. Once register 41132 has been written, the unit accepts registers 41120 to 41132.

Mode	Register 41120 (UINT8)	Register 41121 (UINT8), supply air fan	Register 41122 (UINT8), exhaust air fan	Register 41132 (UINT8)
Ventilation level	4	The range from 0 to 200 corresponds to an air flow of 0 to 100 m³/h Example: 70 corresponds to 35 m³/h 100 corresponds to 50 m³/h	The range from 0 to 200 corresponds to an air flow of 0 to 100 m³/h Example: 70 corresponds to 35 m³/h 100 corresponds to 50 m³/h	0

17 Integrating into other bus systems

17.1 KNX

The M-WRG-KNX-GW gateway (part no. 5048) is needed for incorporation into a KNX system. The gateway acts as the Modbus master for the ventilation unit. One gateway is needed for each ventilation unit. The gateway can be installed in the unit. There is an app for programming in the ETS catalogue. No other software is needed apart from the ETS software.
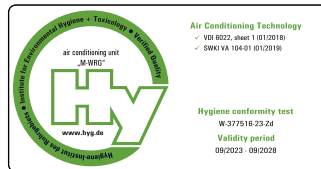
You will find more information on installing and operating the gateway in the associated manual (see section "1.11 Supplementary documents" on page 11).

17.2 Loxone

To integrate the Modbus units into the Loxone bus system, the units must be wired and connected as for Modbus units. The Loxone Modbus extension acts as both master and interface. The units must be ordered with addressing (see section 15.7 on page 43).

17.3 Other bus systems

For integration into other bus systems, the system concerned must have a Modbus RTU interface. The customer will need to clarify with the system manufacturer whether Modbus ventilation units from Meltem will work in their system.

CERTIFICATION MARKS:
- TÜV SÜD (Safety tested, Production monitored) — tuvsud.com/ps-cert
- CE
- cool, temperate climate — CERTIFIED COMPONENT — Passive House Institute
- Meltem Wärmerückgewinnung GmbH & Co. KG, D-82239 Alling · Am Hartholz 4 — M-WRG-II — Z-51.3-431
- Hygiene-Institut des Ruhrgebiets Hygiene + Toxicology + Building Hygiene — air conditioning unit "M-WRG" — www.hyg.de — Air Conditioning Technology — VDI 6022, sheet 1 (01/2018) — SWKI VA 104-01 (01/2018) — Hygiene conformity test W-377516-23-Zd — Validity period 09/2023 - 09/2028
- GREEN INTELLIGENCE

We have checked the content of this publication for conformity with the product described in it. There may nevertheless still be differences, so we cannot guarantee complete accuracy.

The information in this publication is regularly checked and any necessary corrections are made in subsequent editions.

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