

Operating Instructions

Mechanical Ventilation Heat Recovery Unit FOCUS 250 Base



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0 Preface

0.1 Validity

This document applies to the following unit types:

- FOCUS 250 Base series (Zehnder Focus 250 Base series)

All the units in the FOCUS 250 Base series are referred to below using the generic product name FOCUS, except where it is necessary to distinguish between specific types.

This manual deals with the various design variants of the FOCUS heat recovery unit. Possible accessories are only described to the extent necessary for appropriate operation of the unit. Please refer to the respective instructions for further information on accessory parts.

0.2 Target group and standard operation

This manual is for users and qualified personnel. The activities are only allowed to be carried out by appropriately trained personnel who are sufficiently qualified for the respective work involved.

0.2.1 Qualification of target group

0.2.1.1 Users

Users must be instructed by qualified personnel as follows:

- Instruction in hazards when handling electrical devices
- Instruction in the system's operation
- Instruction in the maintenance of the FOCUS unit
- Knowledge of and compliance with this manual, including all safety instructions

0.2.1.2 Qualified personnel

Qualified personnel must have the following qualifications:

- Training in dealing with hazards and risks when installing and operating electrical devices
- Training for the installation and commissioning of electrical devices
- Knowledge of and compliance with the locally applicable building, safety and installation regulations of the relevant local authorities or municipalities, the regulations of the water and electric utilities and other official regulations and guidelines
- Knowledge of and compliance with this document, including all safety instructions

Unless otherwise stated in this manual, only a recognised qualified person is authorised to install, connect up, commission and to service the FOCUS unit.

0.2.2 Standard operation of the unit

This unit can be used by children aged 8 and over and also persons with reduced physical, sensory or mental abilities or a lack of experience and knowledge provided that they are under supervision or have been instructed on the safe use of the unit and understand the risks that result from it. Children must not play with the unit. Children must not carry out cleaning and user maintenance without supervision.

1 Introduction

The FOCUS unit is built to the current state of the art and the recognised safety regulations. The unit is subject to continuous improvement and development. This is why it is possible for your unit to deviate slightly from the description.

1.1 Proper use

1.1.1 Ventilation unit

The FOCUS unit can be used for forced ventilation in homes and offices (and also in industrial buildings subject to certain restrictions). Any other type of use is considered as misuse. Extreme conditions (e.g. salty air or air polluted with chlorine) can damage the unit. For reasons of safety, it is prohibited to modify the product or to install components that are not explicitly recommended or distributed by PAUL Wärmerückgewinnung GmbH for this product.

1.1.2 Control panel

The external control panel allows you to operate the system from a central location. The control panel is only suitable for use in indoor areas.

1.2 Safety

Always observe the safety regulations and installation conditions in the current operating manual. Failure to observe the safety regulations, installation conditions, instructions, warnings and comments in this document can result in personal injury or damage to the unit.

1.2.1 Safety regulations

- Do not make any changes to the unit or to the specifications listed in this document. Such changes can cause personal injury or lead to reduced performance in the ventilation system
- Always comply with the general locally applicable building, safety and installation regulations of the relevant local authorities, the regulations of the water and electric utilities and all other official regulations
- Installation, commissioning and maintenance must be carried out by an authorised person or company, unless otherwise stated in this document
- Always disconnect the unit from the power supply before you start working on the ventilation system
- To eliminate the risk of coming into contact with the running fans, the air ducts must be fastened to the unit before the power supply is connected, observing a minimum length of 900 mm
- If the mains supply cable of this unit becomes damaged, then it must be replaced by the manufacturer, its Customer Services department or by a similarly qualified specialist in order to avoid hazards
- Do not disconnect the unit from the power supply unless instructions to the contrary are listed in the manual
- The control unit can be damaged by static charge; which is why you must always take measures to prevent electrostatic discharge when handling the control unit (e.g. antistatic wrist strap)
- Replace the filters (at least) every six months. This ensures a pleasant and healthy air quality and the unit will be protected against contamination
- Only operate the unit with a closed housing
- Keep this document in the vicinity of the unit during the entire service life of the ventilation unit

1.2.2 Installation conditions

- Check that the installation area is frost-protected
- When choosing an installation location, PAUL recommends that you avoid areas with a high average level of humidity (ambient conditions for indoor climate control system must not continuously exceed 70% RH at 22°C)
- The acceptable temperature range for the air being moved is between -20°C and +40°C
- The unit must not be installed in rooms subject to explosion hazards
- Inside wet rooms, the unit may only be installed outside of protection zones 1 and 2 in accordance with DIN 57100/VDE 100 Part 701
- The unit must not be used for extracting combustible or explosive gases
- Check whether the electrical installation is suitable for the maximum power of the unit. The values for the electrical input power can be found in the "Technical specification" chapter
- Check that the installation area of the unit meets the requirements in the "Installation requirements" chapter

1.2.3 Symbols used

You will find the following symbols in this document:



Important note!



Caution: Risk of affecting the operation of the ventilation system or damaging the unit!



Caution: Risk of personal injury!

1.3 Warranty and liability

1.3.1 Warranty provisions

The manufacturer gives a warranty of 24 months starting from the installation date, or a maximum 30 months starting from the date of manufacture, for the unit. Warranty claims can only be asserted for material defects and/or design faults that have occurred during the warranty period. Repair work under the terms of the warranty is only allowed to be carried out with the prior written approval of PAUL. A warranty on spare parts is only then given if those parts have been delivered by the manufacturer and were installed by a specialist technician recognised by the manufacturer.

The warranty shall be null and void if:

- The warranty period has elapsed
- The unit is operated without filters approved by the manufacturer of the ventilation unit
- Parts are installed that are not supplied by the manufacturer
- The unit is used improperly

- The defects occur as a consequence of an incorrect connection, improper use, or from system contamination
- Unauthorised changes or modifications to the system are made

1.3.2 Liability

The FOCUS unit has been developed and produced for use in what are known as comfort ventilation systems. Every other form of use is deemed “improper use” and can result in damage to the FOCUS unit or in personal injury, for which the manufacturer cannot be held liable. The manufacturer shall not be liable for any kind of damage that can be attributed to the following causes:

- Failure to observe the instructions listed in this manual pertaining to safety, operation and maintenance
- Improper installation
- Installation of spare parts that were not delivered or stipulated by the manufacturer
- Defects as a consequence of an incorrect connection, improper use or from system contamination
- Normal wear

2 Instructions for the user and qualified personnel

2.1 Product description

The FOCUS unit is a ventilation unit with heat recovery for healthy, well-balanced and energy-saving comfort ventilation. A comfort ventilation system extracts foul-smelling waste air from areas such as kitchens, bathrooms and toilets and conveys an identical quantity of fresh air into living rooms, bedrooms and children's rooms.

For heat recovery, the unit types in the FOCUS 250 Base HRV series feature highly efficient cross-counterflow heat exchangers made from plastic. The unit types in the FOCUS 250 Base ERV series rely on membrane moisture heat exchangers (enthalpy exchangers), which are capable of transferring moisture as well as heat because of their physical properties. An optional summer box module can be used instead of the heat exchanger for thermal separation of the two airflows. The housing is made from sheet metal with an anthracite powder coating. The high-quality polypropylene inner lining ensures the necessary thermal insulation and unit soundproofing.

The FOCUS unit has two maintenance-free 230 VAC centrifugal fans with an integrated power supply unit and electronic commutation. The fans run at a constant volume flow to keep the air volume constant at any selected fan speed. The air volume is not affected even if the filters become soiled.

Inside the unit, there is one filter with filter class ISO coarse $\geq 70\%$ (G4) for the outdoor air and another one for the extract air. These consist of a synthetic non-woven filter medium with a polypropylene frame. As an option, filters with filter class ISO ePM1 $\geq 60\%$ (F7) can be used for the outdoor air. The filters are accessed via the front panel.

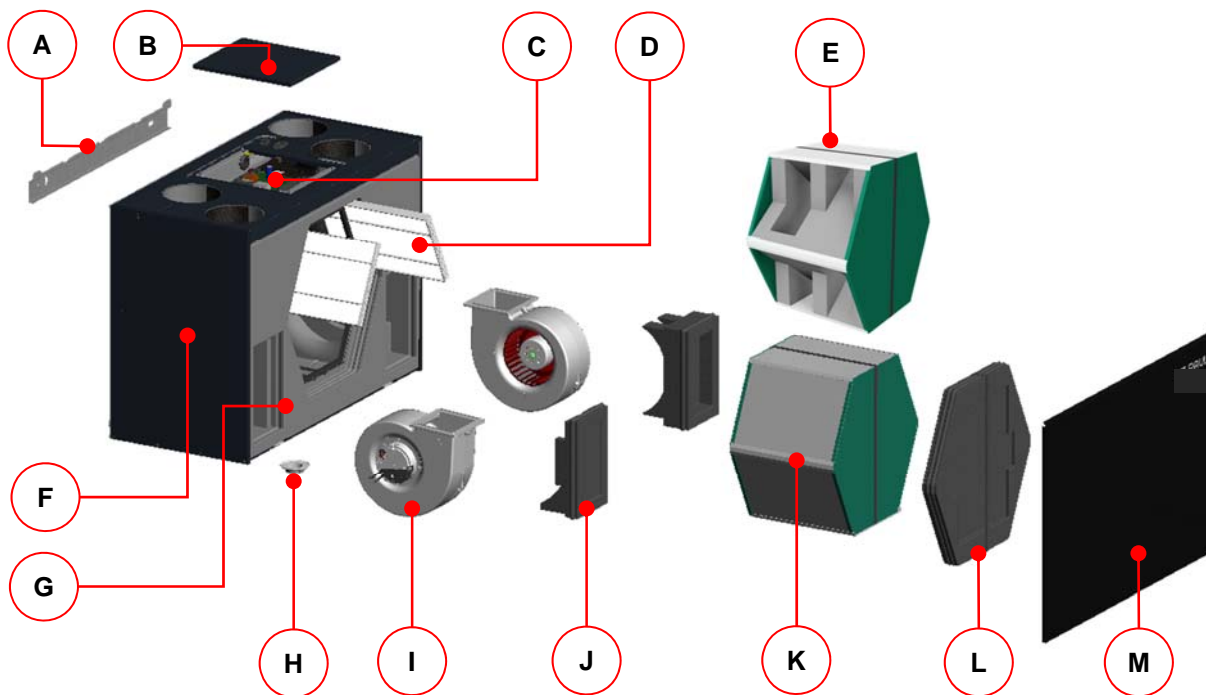


Fig. 1: Main components of the FOCUS heat recovery unit

Item	Description
A	Fastening sheet
B	Control cover plate
C	Control board
D	Filter (2x)
E	Summer box – Module that keeps the airflows thermally separate
F	Housing made from coated sheet steel
G	EPP moulded parts
H	Condensate drain screw connection
I	Fans (2x)
J	EPP foam cover for fan (2x)
K	Heat exchanger with strap and condensate tray
L	EPP foam cover with strap for filter and heat exchanger
M	Front panel made from coated sheet steel

Tab. 1: FOCUS main components

2.1.1 Type label

The type label identifies the product unequivocally. You will need the details on the type label for the safe use of the product and in case of questions for service. The type label is located on the same side of the unit as the air connections and must remain permanently attached to the product.

2.1.2 Frost protection

The FOCUS unit is equipped with automatic frost protection, which prevents the heat exchanger from freezing should the outside air temperature drop to a very low level. The temperature limit for the outdoor air on the unit side is -3°C . If the temperature drops below this threshold value, the fans are switched off temporarily, unless effective external frost protection is in place on the system side. If an external electric pre-heater (optional) is installed, it is activated by the unit control system if the temperature drops below the threshold value of 0°C . The only electric pre-heater that may be used for this purpose is the iso defroster heater DN 125 (Zehnder art. no 527003450) .



If an optional hydraulic heating register is installed downstream, please note that the supply air temperature is not monitored to protect it against freezing.

2.1.3 Joint operation with fireplaces

If the unit is to be operated at the same time as a fireplace (e.g. a fireplace with a chimney or flue), the qualified personnel must observe the relevant standards and regulations. In cases where fireplaces and ventilation systems are

reliant on indoor air and there is a risk of dangerous low pressure occurring during operation in the room where the fireplace is installed, the systems may only be operated together if there is a suitable safety feature (differential pressure sensor) installed or an alternative measure specific to the system.

2.2 Available control modules

The FOCUS unit can be operated with the following control modules:

- External control panel (W x H x D in mm: 71 x 71 x 25)
- External control signal (0–10 V)
- External boost ventilation button(s) (as many as required, potential-free)

2.2.1 External control panel

The control panel has a rotary knob for stepless fan control. The scale for the air volume flow is divided into nine sections.

The two ON/OFF buttons can be used to set the mode. You can choose between normal mode (both fans switched on), extract air mode (only the exhaust air fan switched on) or supply air mode (only the supply fan switched on). The green LED above the respective symbol indicates which mode has been set. Use the boost ventilation mode/reset filter running time button to trigger the operating function associated with each one. The fan symbol with the red LED signals the working condition according to the selected function.

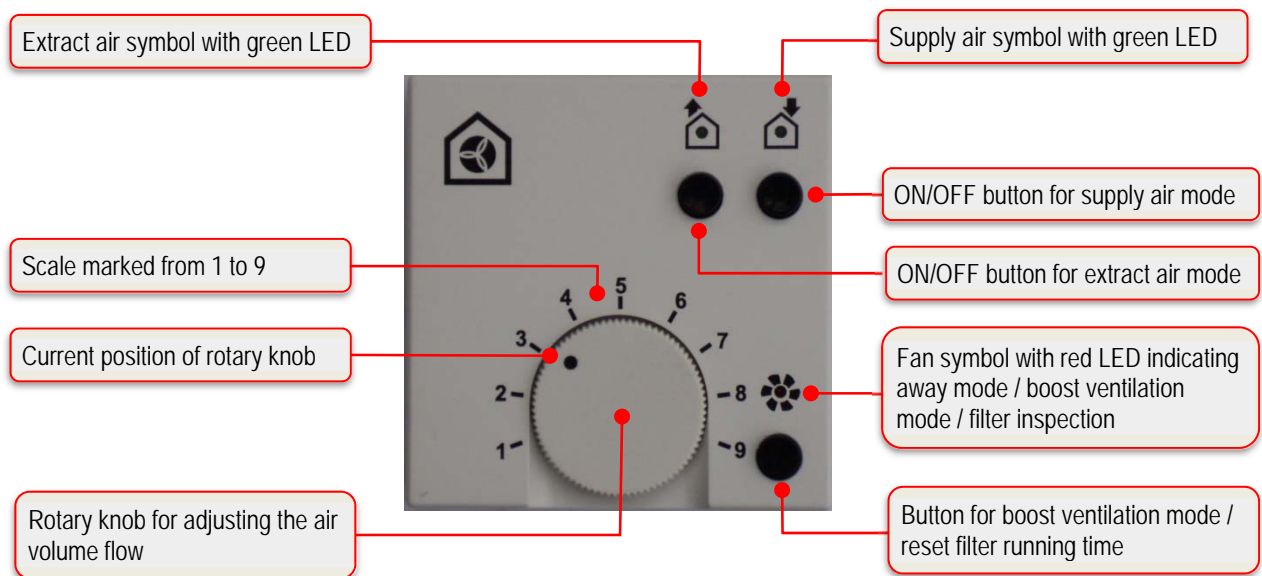




Fig. 2: Control panel operating controls and indicators










2.2.1.1 Control panel operating functions

Description	Explanation
Rotary knob positioning	<p>Away mode: intermittent operating mode with minimum possible air volume flow Min. position (turn knob anticlockwise as far as it will go) 5 min ON and 1 min OFF Position 1: 3 min ON and 3 min OFF Position below 2: 1 min ON and 5 min OFF Rotary knob positioned between min. and below 2: timing ratio proportional</p> <p>Operating mode: Position 2: lowest possible air volume flow Max. position: highest possible air volume flow (turn knob clockwise as far as it will go) Position between scale marks 2 and 9: air volume flow proportional</p>
Extract air mode button	<p>Pressing this button so that it clicks into place activates extract air mode and switches on the exhaust air fan. Pressing it again deactivates extract air mode.</p> <p> If the ventilation unit is being operated together with a fireplace, do <u>not</u> use this button unless supply air mode is activated at the same time! Simultaneous operation of a ventilation system and fireplace imposes more stringent safety requirements with regard to <u>low pressure monitoring</u> and a <u>switch-off function</u> is required for the ventilation unit.</p>
Supply air mode button	Pressing this button so that it clicks into place activates supply air mode and switches on the supply fan. Pressing it again deactivates supply air mode.
Normal mode	Pressing both buttons so that they click into place switches on both fans.

Boost ventilation mode/reset filter running time button	Function button for boost ventilation mode: Pressing this button activates boost ventilation for 15 minutes with an air volume flow corresponding to rotary knob position 9. At the end of the 15-minute boost ventilation time, the unit reverts to the previous air volume in the currently active mode. You can cancel boost ventilation mode at any time by pressing this button again for > 3 s.
	Function button for reset filter running time: To ensure cyclic filter inspection, the control has an integrated operating hours counter with a fixed running time of 180 d. The boost ventilation mode/reset filter running time button allows you to reset the filter running time. To restart the filter running time, press and hold this button for > 3 s. If the filter running time is reset before the end of 180 d by pressing this button for > 3 s, the LED fan symbol will flash rapidly four times in succession to confirm the reset operation.  No reset command can be issued while boost ventilation mode is active.

Tab. 2: External control panel operating functions


2.2.1.2 Signals used to indicate working/maintenance conditions

Symbol	LED signal	Function / Meaning / Action required
	Both LEDs light up	Normal mode (extract air and supply air)
	Extract air symbol LED lights up	Extract air mode is active (extract air only)
	Supply air symbol LED lights up	Supply air mode is active (supply air only)
	Fan symbol LED lights up	Ventilation boost mode is active  Ventilation boost mode can be selected while in any other mode.
	Fan symbol LED flashes	Away mode is active  Away mode can be selected while in any other mode.
	Fan symbol LED flashes rapidly	Filter running time has expired; inspect or replace filter  Boost ventilation mode cannot be activated until a reset command is issued.

Tab. 3: Functions assigned to LED signals

2.2.2 External control signal, 0–10 V

The ventilation unit can be operated with an external 0–10 V control signal. When a 0–10 V analogue signal is applied, it is interpreted as a control signal for the fan speed. The current position of the rotary knob on the scale marks the point at which the external control voltage becomes effective.

 **To make use of the entire external 0–10 V control range, the rotary knob must be in position 1.**

2.2.3 Boost ventilation mode with external boost ventilation button

Boost ventilation buttons are usually installed in rooms from which air is extracted, such as bathrooms, toilets or kitchens. In this way, maximum ventilation can be activated locally within these rooms for a brief period to enable rapid extraction of high humidity and odours. When this control module is activated, the functional features and displays described for boost ventilation mode apply. Boost ventilation mode is restarted each time it is activated and interrupts the currently set air volume flow. Afterwards, the unit reverts to the previously active working condition.

2.3 Maintenance by the user

For the user, maintenance of the ventilation unit and system is limited to changing the filters periodically and cleaning the supply and extract air valves. The filters should be inspected every three months. Filter replacement should be carried out as necessary, but no later than once every six months. As part of this process, please inspect the other

filters in the ventilation system and change them if necessary. The filter mats should be replaced or cleaned on the extract air valves (e.g. bathroom, kitchen, WC) every 2–3 months or when checking the degree of contamination at one's own discretion.



If the maintenance work is not carried out regularly, this will affect the functionality of the comfort ventilation system in the long run!

2.3.1 Replacing the unit filters



The system must not be operated without filters. During filter replacement and maintenance work, the ventilation unit must remain switched off!

Two high-quality original filters from the manufacturer are installed in the FOCUS unit. The filters inside the FOCUS unit must be inspected whenever the control panel signals that this is necessary. In doing so, proceed as follows:

1. Disconnect the unit from the mains power supply.
2. Press the two snap fasteners **A** on the bottom of the unit.

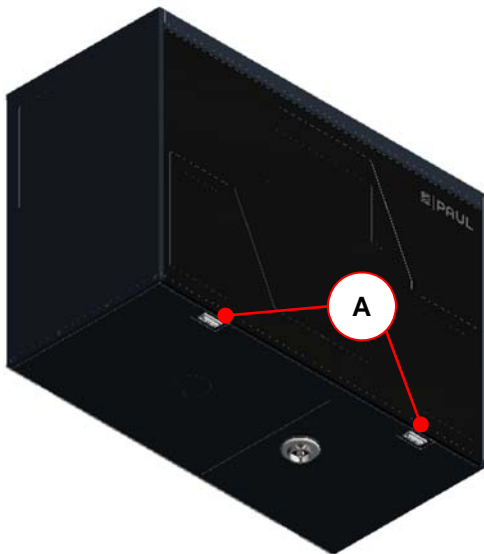


Fig. 3: Pressing the snap fasteners

3. Remove the front panel **B** gradually as indicated by the arrows. To do this, open the front panel in the snap fastener area at an angle of no more than 15° and unhook it from the lock seam of the housing.

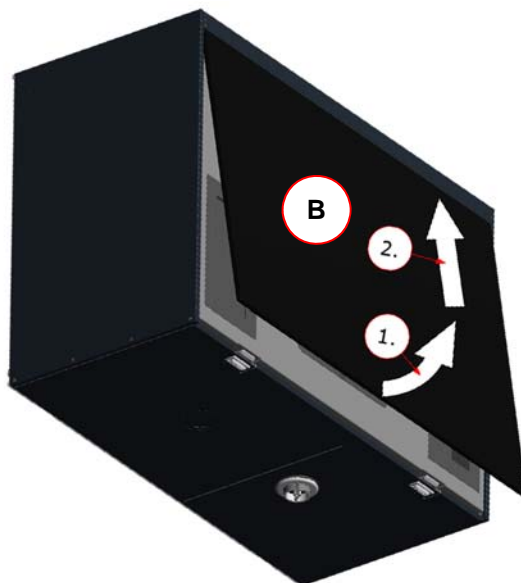


Fig. 4: Opening the front panel

4. Use strap **C** to pull the EPP foam cover **D** for the filters and heat exchanger out of the EPP housing. To do this, grip the strap at one end and pull while using your other hand to support the unit.

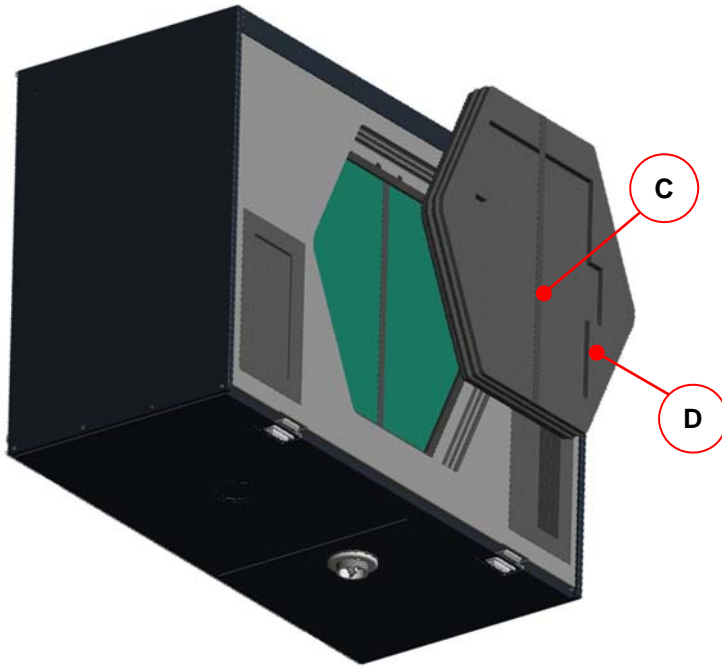


Fig. 5: Pulling out the EPP foam cover for the filters and heat exchanger

5. Holding them by the strap, pull the filters **E** out of the filter compartments.

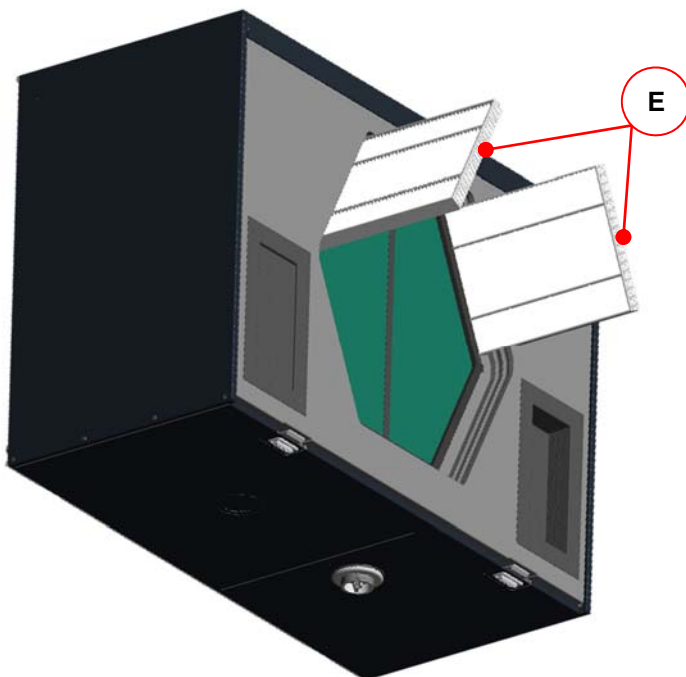


Fig. 6: Pulling out the filters

6. On the filter frame of each filter, there is an arrow to indicate the prescribed direction of flow. Insert the new filters according to their designated direction of flow **F**.

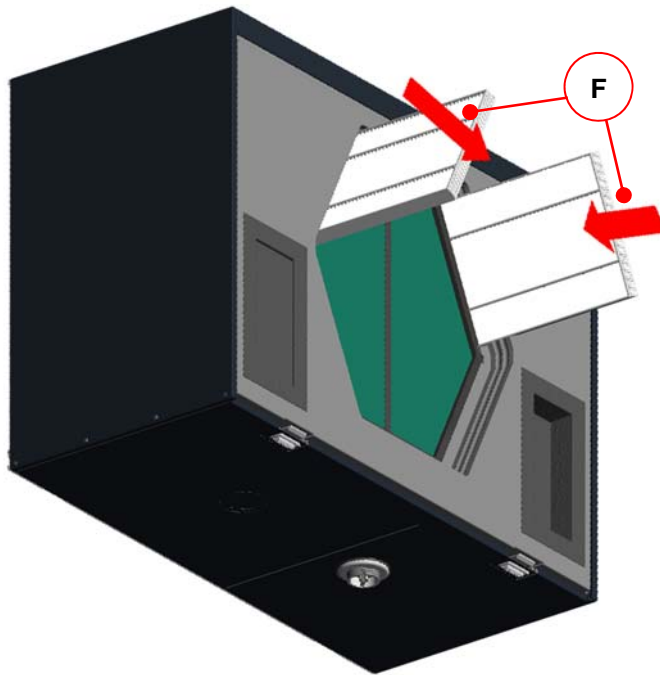


Fig. 7: Inserting the new filters according to their direction of flow



Depending on the unit type, filters with filter class ISO ePM1 \geq 60% (F7) must be inserted into the filter compartment for the outdoor air connector in accordance with the type label. The outdoor air connector is indicated by the symbol



7. Attach the EPP foam cover to enclose the slide-in filter compartments and heat exchanger.
8. Hook the front panel into the lock seam of the housing. Then press it down on the housing in the snap fastener area until it engages in the snap fasteners.
9. Reconnect the unit to the mains.

2.3.2 Resetting the filter running time

After completing the filter replacement, the counter for the filter running time must be reset. To reset the filter running time, press and hold the boost ventilation mode/reset filter running time button for > 3 s. The LED on the fan symbol stops flashing rapidly.



Use checklist A to document the maintenance work completed.

2.3.3 What should I do in case of a fault?

Contact the installation technician in case of a fault. Note down the type of your FOCUS unit; for more on this, see the type label on the side of the unit where the air connections are located.

The mains connection must always be present, unless the FOCUS unit has to be shut down due to a serious fault, for maintenance work or for some other urgent reason.



As soon as the unit is disconnected from the mains, the apartment will no longer be mechanically ventilated. This may result in moisture and mould problems in the apartment. Therefore, you should avoid switching off the FOCUS unit for long periods.

2.4 Disposal

Discuss with your supplier what you should do with your FOCUS unit at the end of its life cycle. If you cannot return your FOCUS unit, do not deposit it in the normal household waste, but rather contact your local authority for options to recycle components or to process materials in an environmentally friendly way.

3 Instructions for the qualified personnel

3.1 Installation requirements

The following requirements must be assured for the correct installation:

- Installation in accordance with the general and locally applicable safety and installation regulations of the electric and water utilities etc. and in accordance with the regulations stipulated in this manual
- Frost-free indoor area
- Power supply 230 VAC, 50–60 Hz
- Sufficient space for connecting the ventilation tubes and for maintenance work

3.1.1 Transport and packaging

Proceed with care when transporting and unpacking the FOCUS unit.



Do not remove the unit packaging until right before installation! Before and during interruptions to installation, the ventilation tube connections must be closed with the air connector sealing caps to prevent construction site dust and moisture from entering.

3.1.2 Checking the scope of delivery

If the delivered product is found to be damaged or incomplete, please contact the supplier immediately. Included in the scope of delivery are:

- HRU FOCUS with power cable;
Check the type label to make sure that the unit is the right one (type, version as per type label)
- Fastening sheet with two self-adhesive spacers (rubber buffers)
- Control panel
- Translation of the original manual
- Product labels showing energy efficiency
- Floor stand (optional)

3.2 Installation

The distances from adjacent surfaces shown in Fig. 8 must be observed. Please note that these clearances are not shown to scale. The surfaces are allowed to be made from flammable materials.

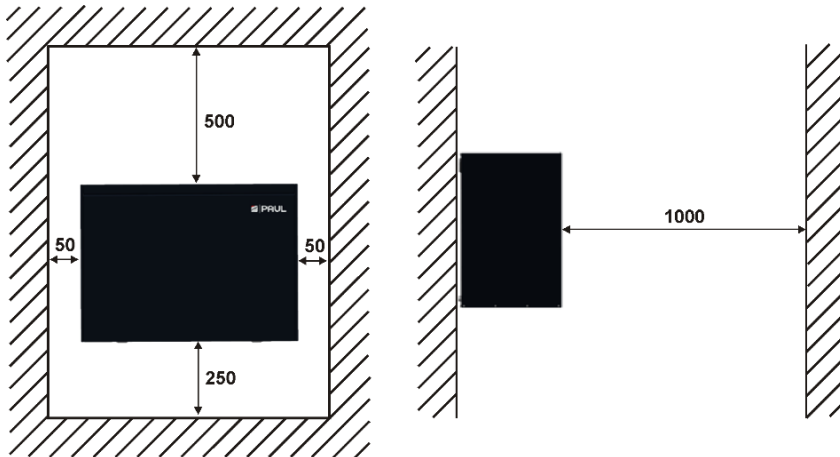


Fig. 8: Distances from adjacent surfaces in mm



Make sure you leave at least 1 m clear in front of the FOCUS unit for subsequent maintenance work.

The FOCUS unit must be installed horizontally. Before mounting the unit on a wall, check that the wall construction has the necessary load-bearing capacity (net weight of the FOCUS unit is 25 kg) and that the fastening sheet can be mounted securely. With inappropriate walls, we recommend using the floor bracket (available as an option) to mount the unit on the floor. This will keep any structure-borne noise transfer to an absolute minimum.

3.2.1 Wall mounting

Proceed as follows for wall mounting:

1. Mount the supplied fastening sheet **A** horizontally on the wall with the lugs **B** pointing upwards. Use the slotted holes **C** to fix it in place with suitable fixing materials.

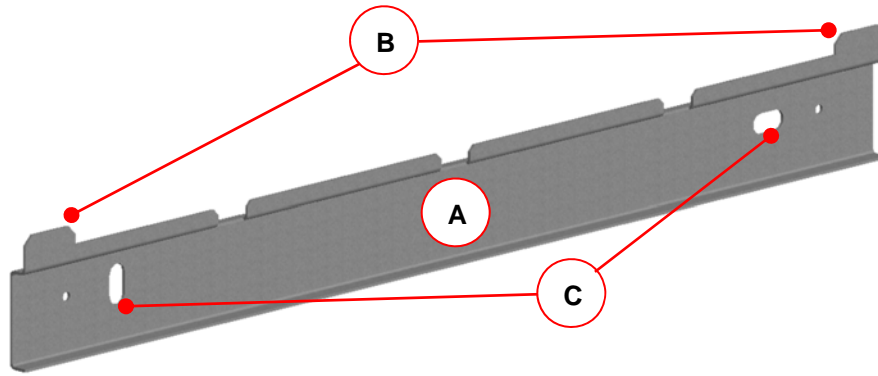


Fig. 9: Fastening sheet for wall mounting



Observe the minimum distance required in relation to the finished floor!

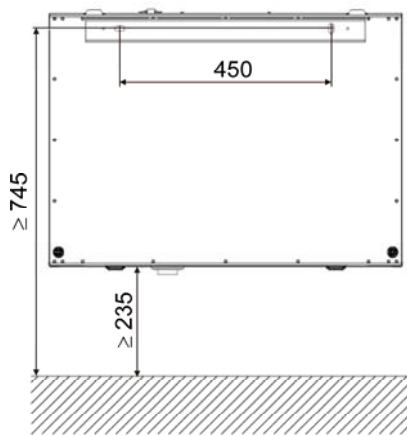


Fig. 10: Distance from upper edge of finished floor for wall mounting (LEFT-hand version)

2. Stick one of the self-adhesive spacers supplied **D** in each corner on the rear of the unit.

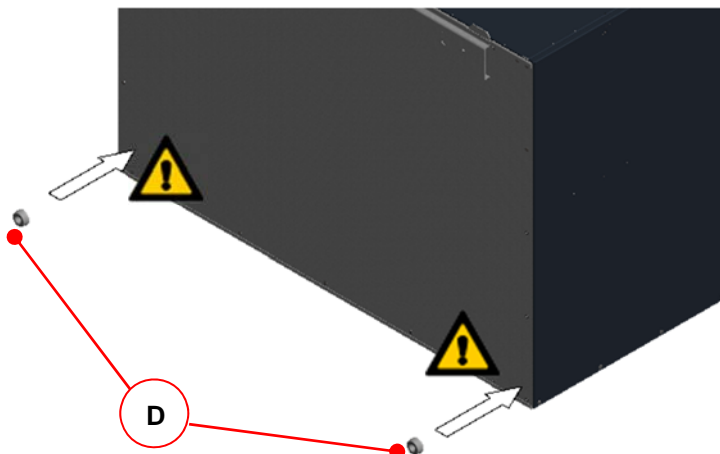


Fig. 11: Mounting the spacers

3. Hook the FOCUS unit onto the fastening sheet by inserting the lugs **B** into the slots **E** in the lock seam at the top of the rear cover.

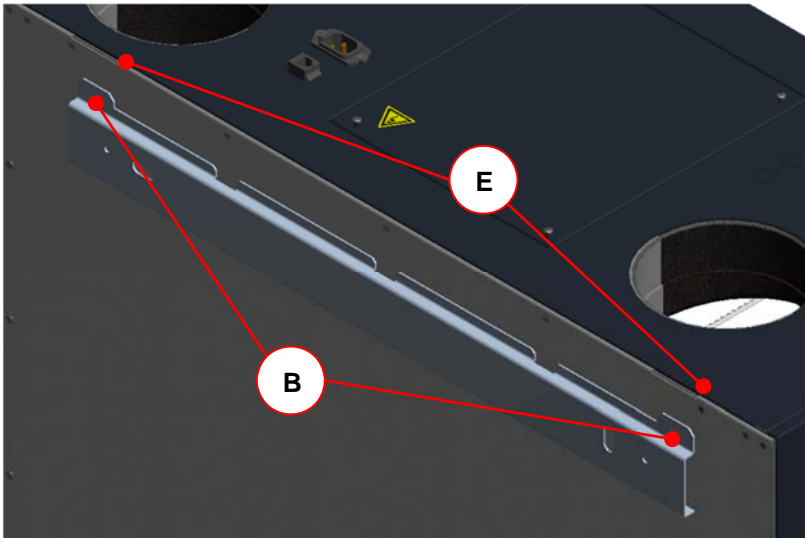


Fig. 12: Hooking the unit into the fastening sheet

3.2.2 Mounting the unit on the floor stand

The dimensions of the floor stand are as follows: footprint = 620 x 292 mm; variable height adjustment = between 280 mm and 320 mm using adjustable feet. The floor stand consists of two long base parts (each with two adjustable feet) and two short base parts.

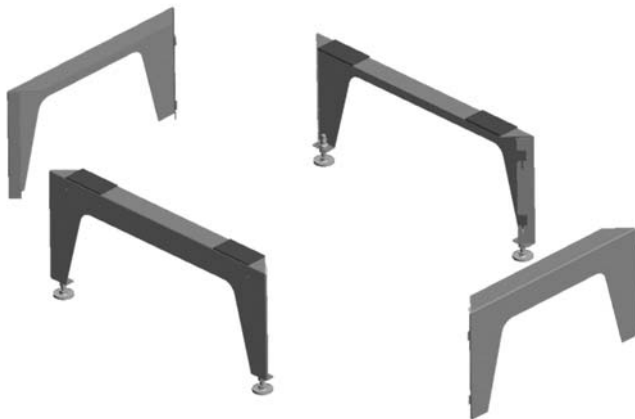


Fig. 13: Individual parts of the floor bracket

Assemble the individual parts of the floor stand as shown in the illustrations. In doing so, proceed as follows:

1. Working in the direction of the arrow, place the short base part at right angles to the long base part at a staggered height.

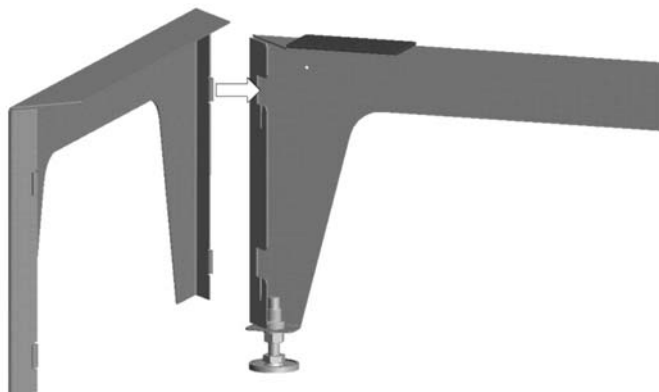


Fig. 14: Attaching the base parts

2. Working in the direction of the arrow, push the lugs **A** of the short base part into the guide slots **B** of the long base part so that they engage and fix the two base parts together.

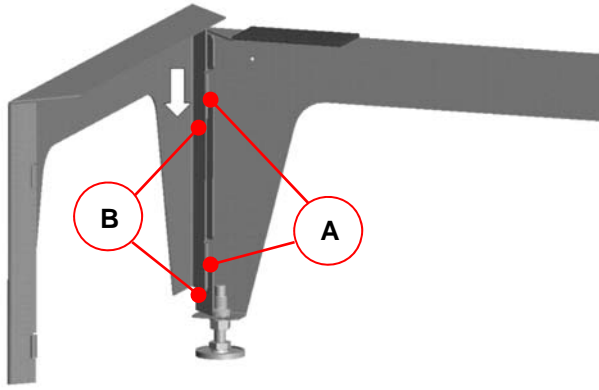


Fig. 15: Fixing the two base parts

3. Now connect the other two base parts in the same way.

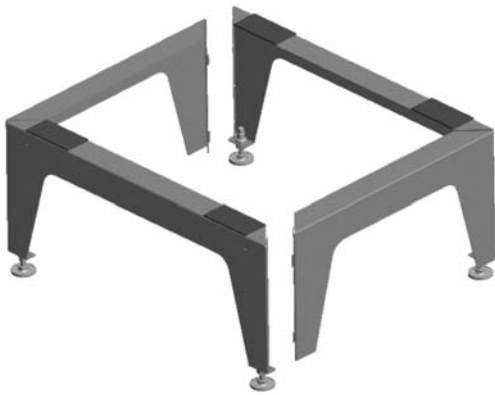


Fig. 16: Two sets of base parts fixed together

4. Mount the fastening sheet **C** on the long base part with the lugs pointing upwards. To do this, screw the two Parker screws **D** into the holes provided **E** on the base part so that they go through the fastening sheet.

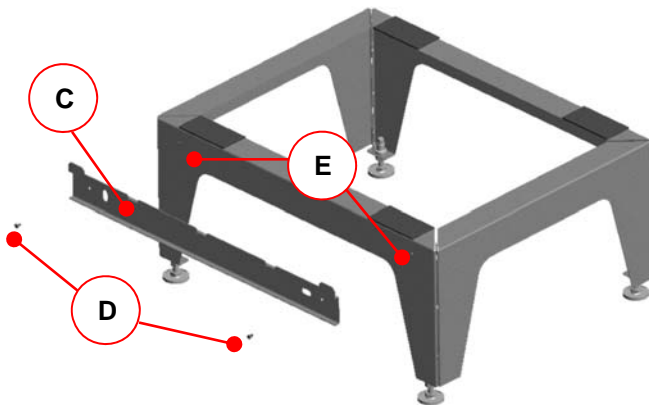


Fig. 17: Mounting the fastening sheet on the base part

5. Now use the height-adjustable feet **F** to adjust the fully assembled floor stand on the designated set-up area so that it is plumb vertical and stable. Then fix it in this height position with the lock nuts of the adjustable feet.

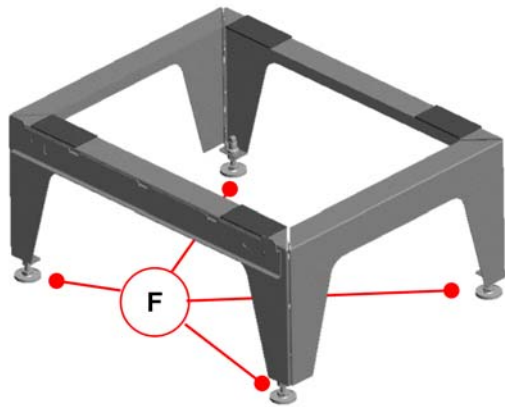


Fig. 18: Adjusting the floor bracket

- Place the FOCUS unit on the floor stand so that the lugs of the fastening sheet hook into the slots in the lock seam at the bottom of the unit's rear cover. See Fig. 12.

3.2.3 Connecting the ventilation tubes

The following points must be observed when installing the ventilation tubes:

- Attach the different types of ventilation tube provided with the ventilation system to the relevant connectors according to whether the unit is the LEFT- or RIGHT-hand version (see air connections sticker on control cover plate)

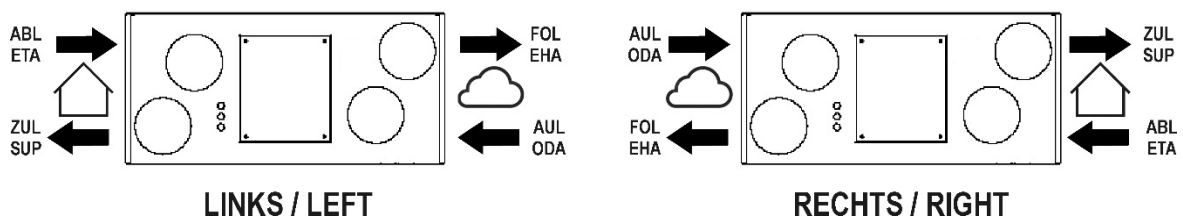


Fig. 19: How the air connections are arranged on the LEFT- and RIGHT-hand unit versions

- Remove the sealing caps from the air connectors
- Using ventilation tube materials with the lowest possible air resistance, connect the ventilation technology components to one another so that they are air-tight
- The unit connectors are made from EPP and have a sleeve size of DN 125.
- The outdoor air and exhaust air tubes must be insulated in such a way that they are sealed against vapour diffusion. This prevents condensate from forming on the outside of the ventilation tubes
- If – when installing the exhaust air tube – it is not possible to avoid a low point between the exhaust air connector on the unit and the exhaust air outlet, a connection to the condensate drain must be provided at this point. This is because the exhaust air is saturated with steam at cold outside temperatures and droplets may be deposited on the inner wall of the tube
- The exhaust air pipework that runs from the unit connector to the roof terminal must not be straight. Otherwise, any ice that forms could drop onto the blades of the exhaust air fan when it thaws, causing damage to the blades.

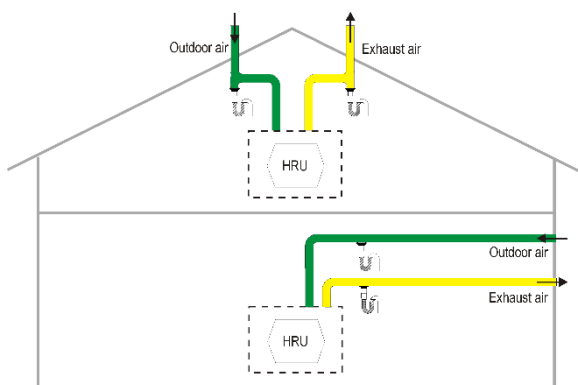


Fig. 20: Drainage arrangement for outdoor and exhaust air tubes

- If a silencer is fitted at the exhaust air connector, it must be routed upwards with a bend to prevent it being drenched by condensate running back from the exhaust air tube
- If the exhaust air is routed above the roof, a double-walled or insulated roof passage must be installed. This prevents condensate from forming between the roof boards
- For the supply and extract air ducts, we recommend using thermal and vapour-tight insulation to prevent unnecessary temperature losses in both the summer and winter

3.2.4 Connecting the condensate drain hose

In the heat exchanger, the warm extract air is cooled by the outdoor air. This causes the moisture in the room air to condense inside the heat exchanger. The condensate that forms in the heat exchanger is routed to the sink valve. The sink valve screw connection **A** has a 1¼" male thread for the siphon. This is located on the bottom of the FOCUS unit, with the exact position varying according to the unit version and design.



Fig. 21: Sink valve screw connection on LEFT-hand unit version

A siphon must be attached to the screw connection so that the upper edge of the surge tank is at least 60 mm below the screw connection and the minimum liquid level is 60 mm.

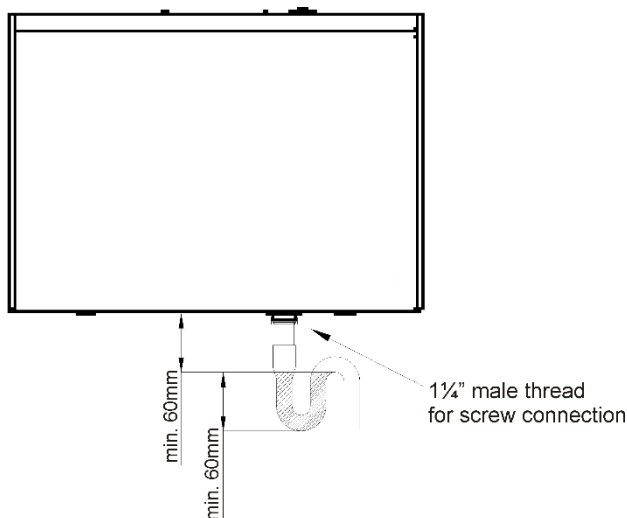


Fig. 22: Condensate drain (LEFT-hand version)



The siphon must not be connected directly to the sewer tunnel network (e.g. whereby the condensate flows freely into a funnel with a siphon connected to the sewer pipe)

Siphons can dry out. The siphon must always be topped up with water when:

- The unit is commissioned
- The siphon starts making (slurping/gurgling) noises



We generally recommend using a waterless siphon. (No functional restrictions if it dries out, no need for a 2nd siphon)

3.3 Electrical connections



Electrical connections are to be implemented in accordance with the standards specific to the relevant country and by qualified personnel only!

The FOCUS unit must be electrically connected to the mains power supply via the mains unit lead with a CEE 7/4 plug. This is to be plugged into a 230 VAC CEE 7/4 socket. The control panel cable and cable for the optional pre-heater should be connected directly to control board **A**. To do this, release the 4 screws **B** in the cover plate and connect the wires of the cables to the relevant clamping points on the control board. This involves feeding the cables through M16 cable glands after pushing out the required quantity of pre-punched cable guides **C**.

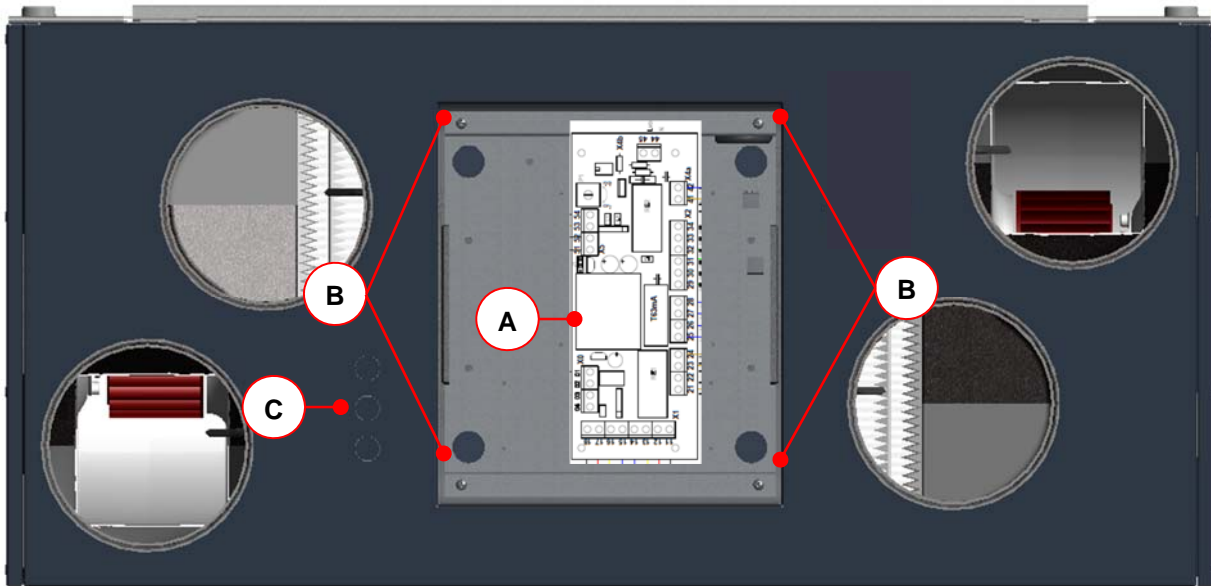


Fig. 23: Side of the housing for the electrical connections

Item	Description
A	Control board
B	Cover plate screws (4x)
C	Pre-punched cable guide (2x) for M16 cable gland
3.7.4	FOCUS 250 Base terminal scheme

Tab. 4: Overview of the electrical connections

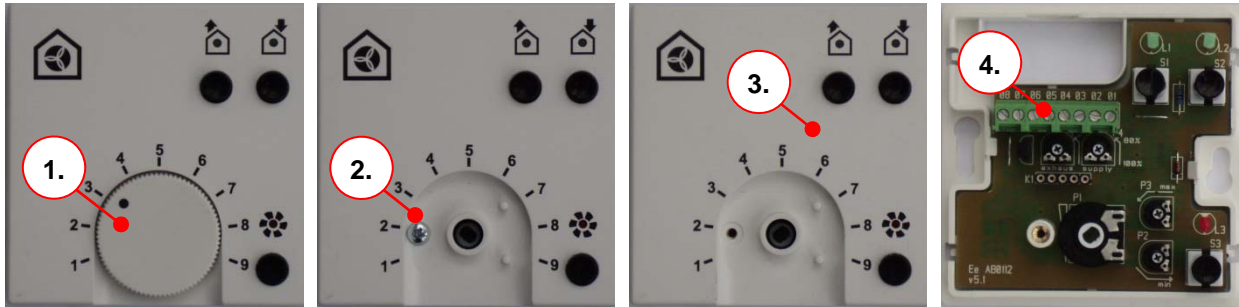
3.3.1 Connecting the control panel

3.3.1.1 Connecting the connecting cable to the control panel

The external control panel must be installed inside a standardised switchbox.

To serve as a connecting cable between the control panel and unit control board, we recommend using an 8-core 2x4 UTP data cable. 4 of the wires should be connected to clamping points X.01 to X.04 in accordance with Tab. 5. The maximum cable length is 25 m.

To open the control panel, proceed as follows:



1. Remove rotary knob
2. Fully unscrew and remove fixing screw
3. Remove top section of control panel
4. Access control panel connecting terminal

Control panel connecting terminal	Signal
X.01	+12 V
X.02	U _s (supply fan control voltage)
X.03	U _s (extract air fan control voltage)
X.04	GND
X.05	Analogue input 0–10 V
X.06	Analogue input GND
X.07	Input for external boost ventilation button
X.08	GND input for external boost ventilation button

Tab. 5: Control panel connecting terminal assignment

3.3.1.2 Connecting the connecting cable to the control board

Connect the connecting cable to the X0 4-pin screw-type terminal on the control board in accordance with Tab. 6.

X0 terminal on control board	Signal
X0.01	+12 V
X0.02	U _s (supply fan control voltage)
X0.03	U _s (extract air fan control voltage)
X0.04	GND

Tab. 6: X0 terminal assignment on control board

3.3.2 Connecting external boost ventilation buttons

Boost ventilation mode can be activated by operating one or more boost ventilation buttons (connected in parallel). The buttons that are usually installed as part of the switch range design are triggered when boost ventilation mode is selected. To establish the potential-free connection between the button and control panel connecting terminal, use a 2-core cable as a minimum (recommended cable type: J-Y(ST)Y 2x2x0,6).

Control panel connecting terminal	Wire of boost ventilation button cable
X.07	Wire 1
X.08	Wire 2 (GND)

Tab. 7: Terminal assignment of boost ventilation button connection

3.3.3 Connecting external sensors

A sensor-controlled automatic mode is supported. This is controlled by an analogue 0–10 V sensor signal generated by one or more sensors. To establish the connection between the sensor module and control panel connecting terminal, use the type of cable stipulated for transmitting the sensor signal.

Control panel connecting terminal	Wire of sensor module cable
X.05	Wire 1 (0–10 V sensor signal)
X.06	Wire 2 (GND)

Tab. 8: Terminal assignment of analogue sensor signal connection

3.3.4 Connecting an external pre-heater

If there is an optional electric pre-heater, this must be connected to terminals X2/X4b of the control board. Feed the pre-heater power cable through a cable guide and fix it in place using a cable gland for strain relief.



The optional electric pre-heater must take the form of the iso defroster heater DN 125 (Zehnder art. no. 527003450) with a thermal output of 700 W.

X2 / X4b terminal on control board	Wire of pre-heater cable
X2.33	Wire 1 PE
X4b.45	Wire 2 lvo
X4b.46	Wire 3 N

Tab. 9: Terminal assignment of external pre-heater connection

3.4 Commissioning the FOCUS unit

3.4.1 Readiness for operation



The unit is ready for operation once all the requirements of the safety regulations and installation conditions have been met. In particular, this means ensuring that the ventilation tube material is clean and that all the ventilation technology components required to operate the system are present, properly installed and ready for operation.



Check all the safety-related components and carry out a function test.

3.4.2 Adjusting the air volume flow

Once you have checked that the FOCUS unit is ready for operation, you can commission it as described below. Diagram 1 shows the scale for the available air volume flow to enable rotary knob positioning. As per the system design rules, the nominal ventilation must equal the total outdoor air volume flow. In accordance with diagram 2, this nominal air volume flow should correspond to a rotary knob position of 5 to 7.

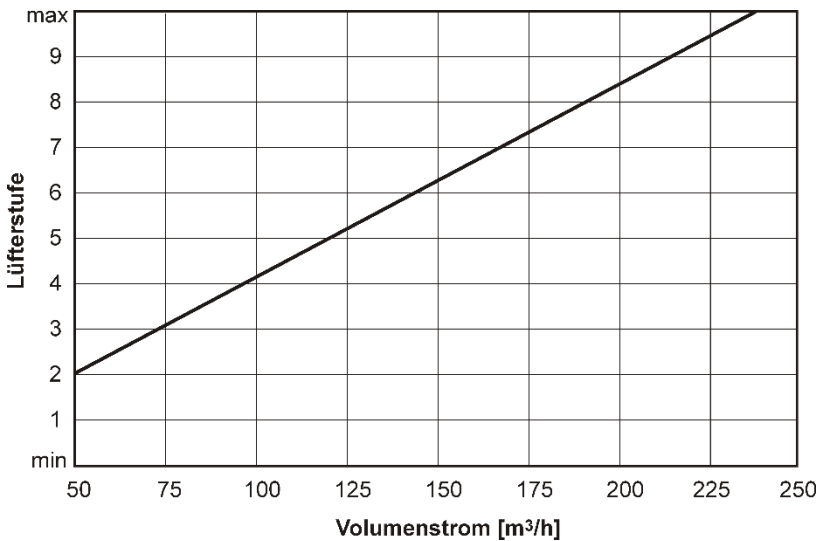


Fig. 24: Diagram 1, fan speed parametrisation

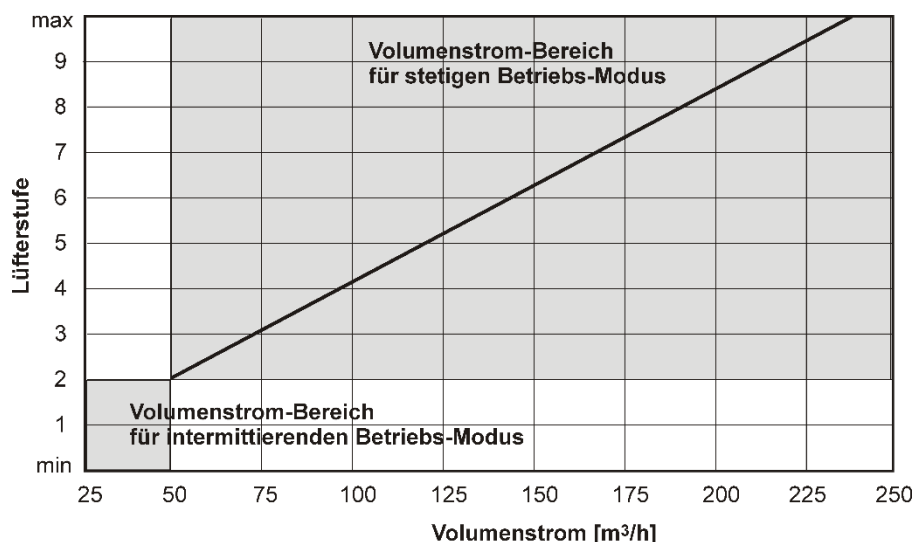


Fig. 25: Diagram 2, assignment of volume flow ranges

3.4.3 Adjusting the valves



At the start of volume flow measurement, make sure that the supply air and extract air valves are open as wide as possible.

- Set the fans to the nominal air volume flow
- Adjust the valve orifices, throttle valves or throttle foam inserts
- Measure the volume flows at the outlets using a volume flow hood and flow meter (see air volume protocol)
- Readjust the valves
- Lock the valves, shutters and throttles in their adjusted positions
- Record the set air volumes and all other settings in the documentation intended for this purpose

3.5 Maintenance and repair by the qualified personnel



If regular maintenance work is not carried out on the FOCUS unit, this will affect the functionality of the comfort ventilation.

Maintenance and repair by qualified personnel should be carried out by a maintenance service team on the basis of a maintenance contract. Maintenance and repair of the FOCUS unit includes inspecting and cleaning the fans and heat exchanger. The heat exchanger should be cleaned based on how dirty it gets but the maintenance interval must not exceed two years.



Use checklist B to document the maintenance work completed.

3.5.1 Inspection and cleaning of heat exchanger

In doing so, proceed as follows:

1. Disconnect the FOCUS unit from the mains power supply.
2. Press the two snap fasteners **A** on the bottom of the unit.

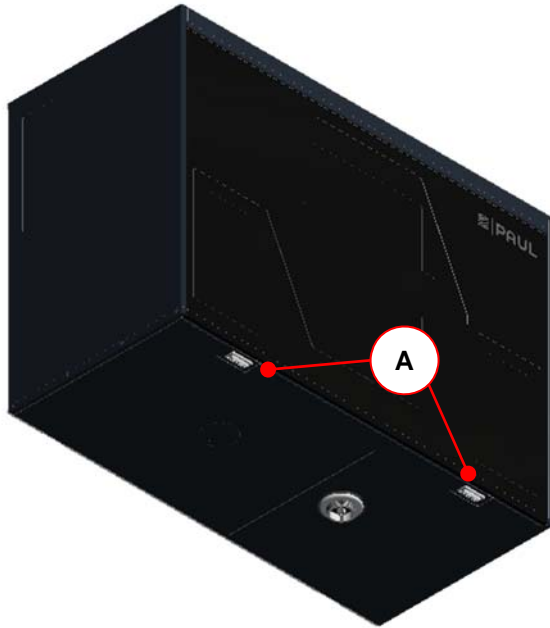


Fig. 26: Pressing the snap fasteners

3. Remove the front panel **B** gradually as indicated by the arrows. To do this, open the front panel at an angle of no more than 15° and unhook it from the lock seam of the housing.

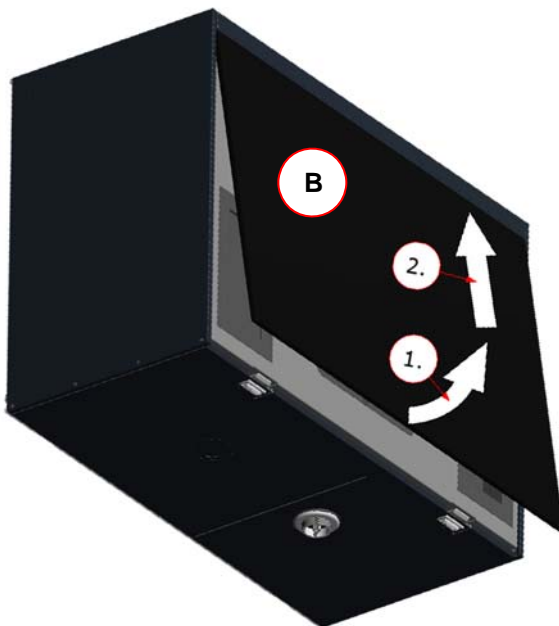


Fig. 27: Opening the front panel

4. Use strap **C** to pull the EPP foam cover **D** for the filters and heat exchanger out of the EPP housing. To do this, grip the strap at one end and pull while using your other hand to support the unit.

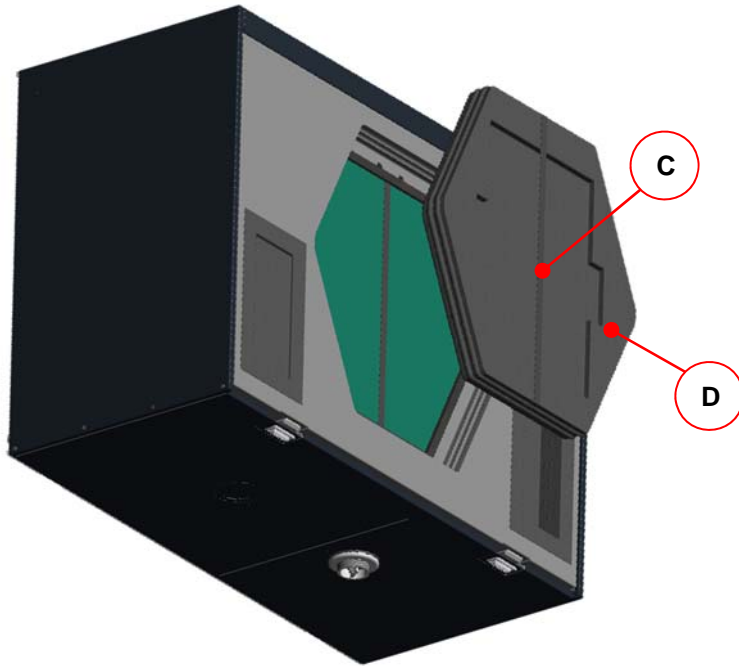


Fig. 28: Pulling out the EPP foam cover

5. Holding them by the strap, pull the filters **E** out of the filter compartments.

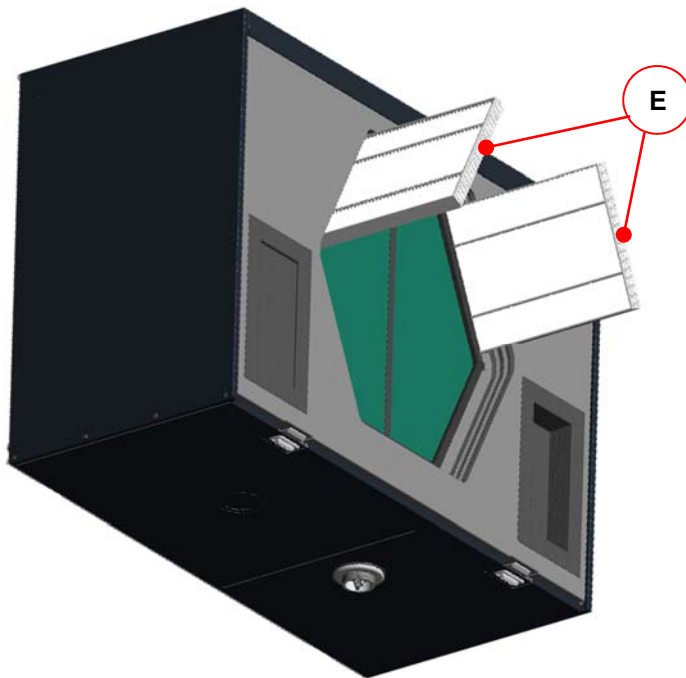


Fig. 29: Pulling out the filters

6. Holding it by the strap **F**, pull the heat exchanger **G** out of the EPP housing.

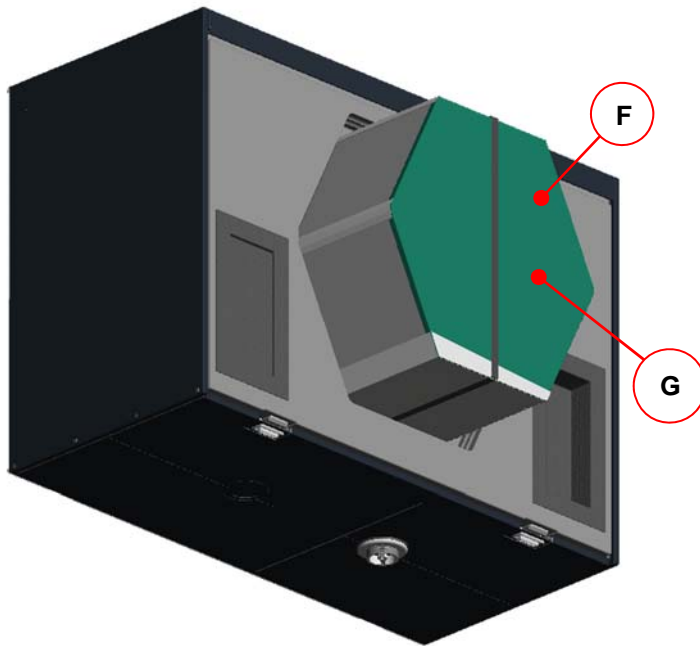


Fig. 30: Removing the heat exchanger

7. Clean the heat exchanger. In doing so, proceed as follows:

- Dip the heat exchanger several times in warm water (max. 40°C).
- Then rinse off the heat exchanger thoroughly with warm tap water (max. 40°C).



Do not use aggressive or dissolving cleaning agents!

- In order to dry it, position the heat exchanger such that residual water can run out of the openings.
- Leave the heat exchanger to dry fully before reinstalling it.



Instructions on correct cleaning methods can also be found on the manufacturer's website.

8. Install the heat exchanger.



Take care when installing the heat exchanger!

On the bottom of the heat exchanger, there is a condensate tray with two cut-outs **H**. When sliding the heat exchanger into the unit, take care to ensure that both cut-outs in the condensate tray are pointing towards the condensate drain hose!

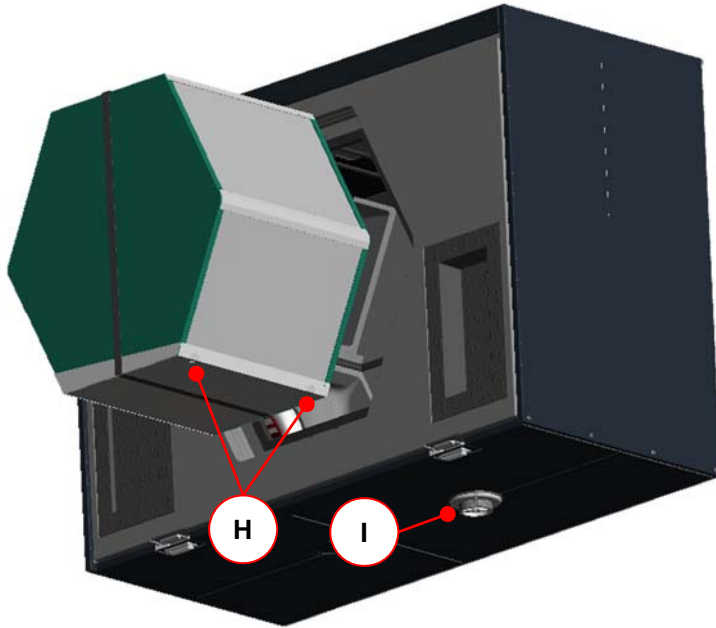


Fig. 31: Position of condensate tray when sliding in the heat exchanger

9. Following the inspection, install all parts in the reverse order.
10. Reconnect the unit to the mains.

3.5.2 Swapping the heat exchanger type

Focus 250 can be equipped and operated with two different types of heat exchanger:

- Cross-counterflow heat exchanger made from plastic (HRV)
- Cross-counterflow enthalpy exchanger (ERV)

1. Perform work steps 1 to 6 as described in 0.
2. Insert the relevant heat exchanger type while following the instructions for Fig. 31 and then perform work steps 9 to 10 as described in 0.

3.5.3 Swapping the heat exchanger for the summer box



The summer box is not capable of transferring heat or moisture. Instead, this module can be used to replace the heat exchanger for summer ventilation while maintaining a supply air and extract air mode!

In doing so, proceed as follows:

1. Perform work steps 1 to 6 as described in 0.
2. Insert the summer box module and perform work steps 9 to 10 as described in 0.

3.6 Visualisation of working conditions on the control board

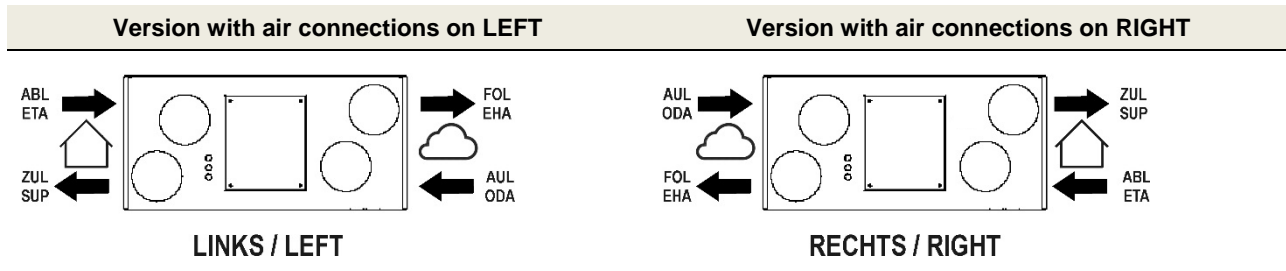
The control board is equipped with three LEDs for signalling working conditions. The following working conditions are signalled via the LEDs:

LED	Signal	Condition / Cause
LED 1	Lights up	Unit ready for operation / operating voltage present
LED 2	Lights up dully	Normal operating mode
	Flashes	Temperature too low downstream of pre-heater; fans to be switched off
	Flashes 2x per second	Temperature downstream of pre-heater < 1K below threshold value
	Flashes 3x per second	Temperature downstream of pre-heater < 2K below threshold value
	Flashes 4x per second	Temperature downstream of pre-heater < 3K below threshold value
LED 3	Lights up	Pre-heater heating up

Tab. 10: Overview of how working conditions are visualised

3.7 Technical description

3.7.1 Air connection design versions



Tab. 11: Overview of air connection design versions

3.7.2 Technical specification

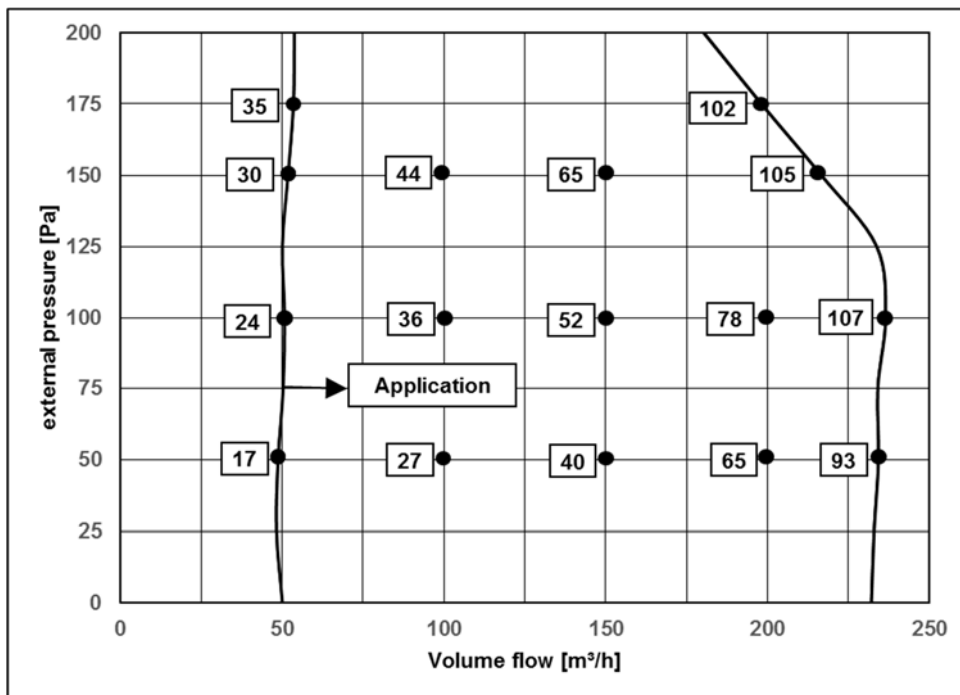
General specifications	Description / Value
Heat exchanger type	Cross-counterflow heat exchanger made from plastic
Housing / Interior lining	Galvanised sheet steel, powder-coated, free of thermal bridges; interior lining is made of expanded polypropylene (EPP) to provide thermal and sound insulation
Pipe connections	DN 125 (sleeve size)
Weight	25 kg
Electrical connection	230 VAC, 50–60 Hz; 2 m mains cable with CEE 7/4 plug
Connection power	140 W / 840 W (without/with iso defroster heater DN 125)
Protection class	I
Degree of protection	IP 30
Temperature ranges	-20 to 40 °C
Installation location	Frost-free indoor area Ambient conditions: < 70 % RH at 22°C
Mounting position	Horizontal wall mounting or mounting on a floor stand (optional)

Tab. 12: General specifications

Operation data	Value
Volume flow	50 to 240 m ³ /h
Efficiency criterion	0.36 Wh/m ³ (at 170 m ³ /h / 100 Pa)
Waste heat recovery according to PHI	Up to 92 %
Sound pressure level, distance of 3 m (unit emission according to DIN EN ISO 3743-1)	30 dB(A) (at 155 m ³ /h / 100 Pa) 24 dB(A) (at 200 m ³ /h / 100 Pa)

Tab. 13: Operation data

$p\dot{V}$ characteristic curve



Note:

The numerical values shown in the $p\dot{V}$ characteristic curve diagram indicate the power consumption in [W] (without active iso defroster heater DN 125) for the respective operating points.

Tab. 14: Diagram 3, $p\dot{V}$ characteristic curve

3.7.3 Dimensions

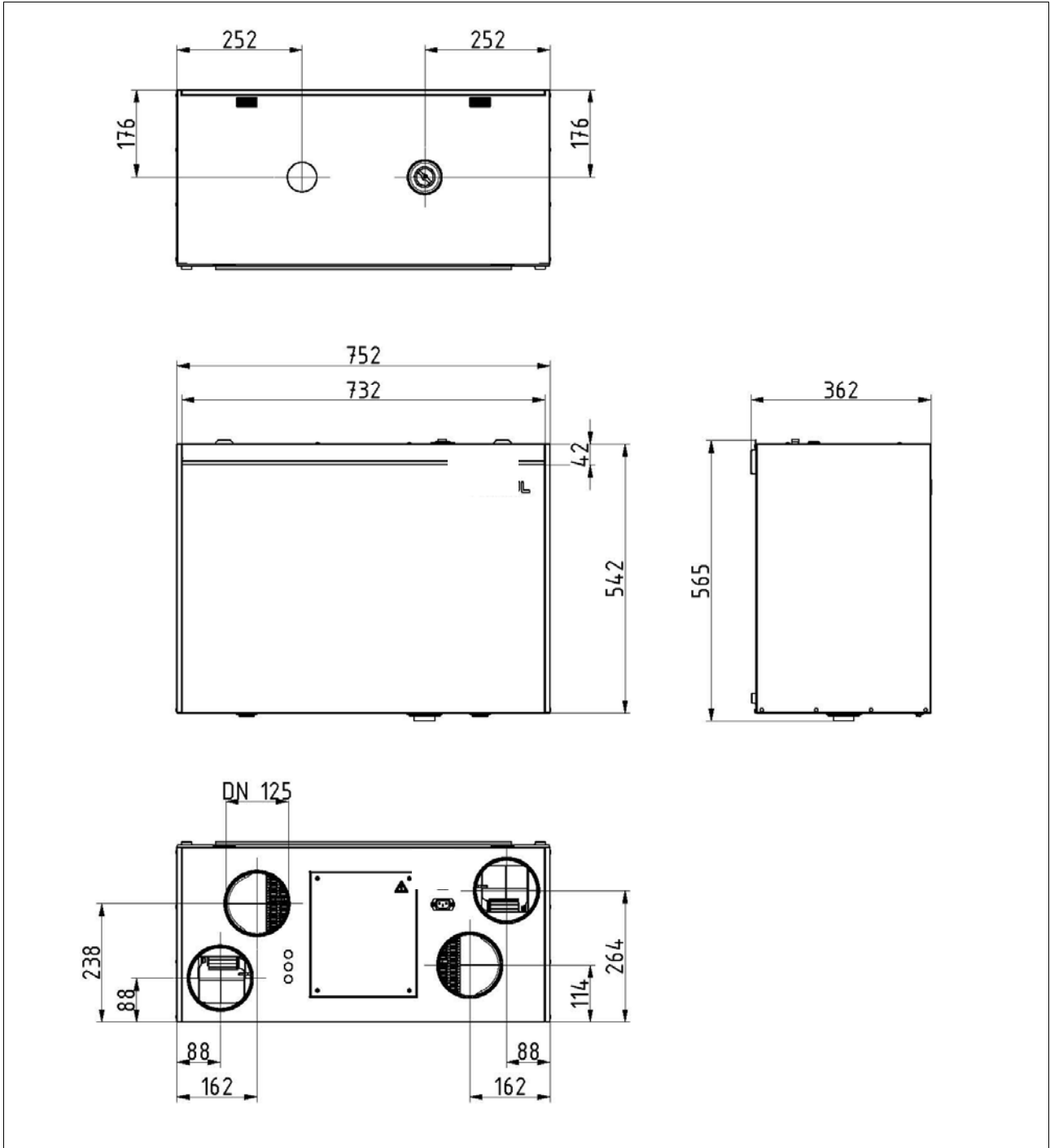


Fig. 32: Dimensional drawing

3.7.4 FOCUS 200 Base terminal scheme

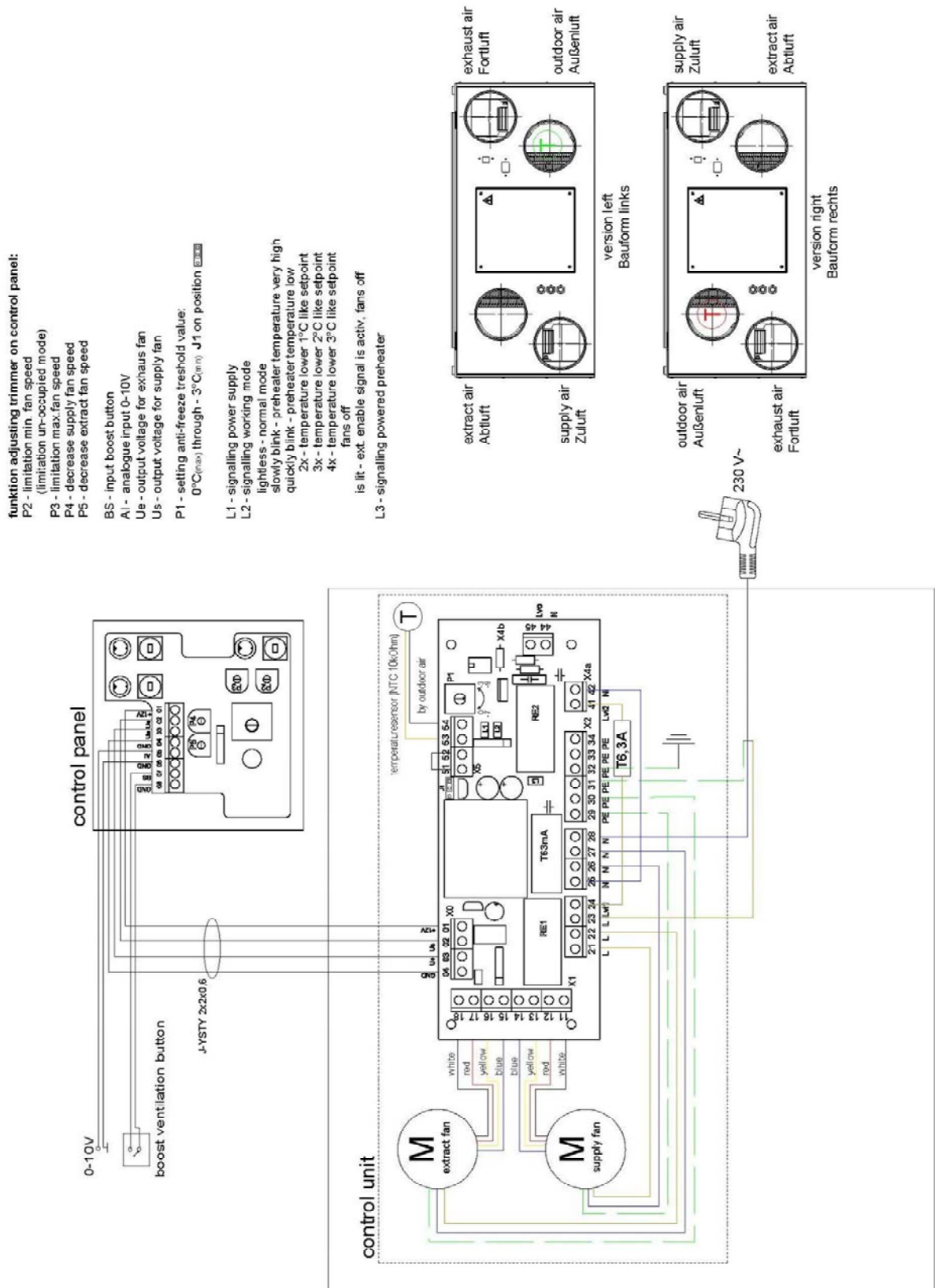


Fig. 33: FOCUS 250 Base terminal assignment

4 Appendices

4.1 Checklist A Maintenance work for users

Maintenance work					Enter date in quarter
1. Change both filters in the HRU (filter replacement cycle 90 days)					
Year \ Quarter	I	II	III	IV	
20...					
20...					
20...					
20...					
20...					
20...					
20...					
20...					
20...					
20...					
20...					
2. Extract air supplementary filter / clean the filters in extract air valves (filter replacement cycle approx. 2 months)					
Year \ Quarter	I	II	III	IV	
20...					
20...					
20...					
20...					
20...					
20...					
20...					
20...					
20...					
20...					
20...					
3. Change other filters in the ventilation tube system					
Year \ Quarter	I	II	III	IV	
20...					
20...					
20...					
20...					
20...					
20...					
20...					
20...					
20...					
20...					

4.2 Checklist B Maintenance work for qualified personnel

Maintenance work			Enter result					
<ul style="list-style-type: none"> - The listed maintenance work must be carried out in accordance with the components actually present. - Inspection of ventilation system in accordance with DIN 1946-6 Appendix E (normative) and Appendix F (informative) - Comments on status using informal protocol - Further annual tranches on separate sheet 								
No.	Components	Annually	Result	20...	20...	20...	20...	20...
1	Fan / ventilation unit	Cleaning of components carried out? - Fan - Enthalpy exchanger - Air-contacting surfaces on unit	yes / no					
		Frost protection / dew device operational?	yes / no					
		Structure-borne sound transmission, are fasteners avoided?	yes / no					
		Are status displays operational?	yes / no					
2	Electrical engineering / control	Cable connections and clamping assemblies secure?	yes / no					
		Are the regulating and control units functional?	yes / no					
3	Ventilation tube / heat insulation	Has cleaning (if necessary) been carried out? Testing OK? For cleaning when needed, see VDI 6022	yes / no					
		Heat insulation and moisture barrier OK?	yes / no					
		Are the flexible connections between the unit and ventilation tube functional?	yes / no					
4	Fan, ventilation unit, filter, filter status	Stipulated filter class adhered to?	yes / no					
5	Fan / ventilation unit and fireplace if available	Safety feature with fireplace operational?	yes / no					
6	Extract air / supply air passage	Seat and locking provided?	yes / no					
		Stipulated filter class adhered to?	yes / no					
		Filter, filter status OK?	yes / no					
		Air volumes acc. to protocol OK?	yes / no					
7	Overflow air vents	Open cross section provided?	yes / no					
		No structure-borne and airborne sound transmission?	yes / no					

4.3 Commissioning and handover protocol

Customer data		
Name:	First name:	Tel.:
Street:	Postcode:	Town/city:
Construction project:		
Unit type:	Serial no.:	Year of construction:

Completeness			
No.	Components	Implementation	Result
1	Supply air duct	- Design as planned - Cleaning option provided	yes / no yes / no
2	Supply air vents	- Arrangement as planned - Design as planned - Cleaning option provided	yes / no yes / no yes / no
3	Overflow air vents	- Arrangement as planned - Design as planned	yes / no yes / no
4	Extract air vents	- Arrangement as planned - Design as planned - Cleaning option provided	yes / no yes / no yes / no
5	Extract air duct	- Cleaning option provided	yes / no
6	Extract air fan	- Cleaning option provided	yes / no
7	Control / regulation system	- Operational	yes / no
8	Filter, optional	- Replacement or cleaning option provided	yes / no
9	Heat exchanger for waste heat recovery	- Cleaning option provided	yes / no
10	Documentation	- Available	yes / no

Function			
1	Operational with rated ventilation, as planned	Result OK Action required	yes / no yes / no
2	Switching steps possible, as planned	Result OK Action required	yes / no yes / no
3	Electrical power consumption	Result OK Action required	yes / no yes / no

Record of confirmation	
<p>Date: Signature/stamp:.....</p> <p style="text-align: right;">Commissioning personnel / installation technician</p>	

4.4 Air volume protocol

Customer data					
Name:		First name:		Tel.:	
Street:		Postcode:		Town/city:	
Construction project:					
Unit type:		Serial no.:		Year of construction:	
Measurement data					
Measuring instrument used:		Faults during measurement:		Indoor temperature:	
				Outdoor temperature:	
Filter status when measuring	Outdoor	Extract	Building moisture status:	Fan speed ratio	
clean				Extract air / supply air:	
approx. ... days used			 % r.humidity	
very dirty				
Supply air				Fan speed: %	
No.	Room name	Project data		Measurement data	
		m ³ /h	m ³ /s	m ³ /h	m ³ /s
Extract air				Fan speed: %	
No.	Room name	Project data		Measurement data	
		m ³ /h	m ³ /s	m ³ /h	m ³ /s
P _{el} = W					
<p>⇒ The listed measurement data must be determined in accordance with the components actually present. ⇒ Reference has been made to the hygienic requirements for operating the ventilation system. ⇒ Reference has been made to the influence of room air humidity for winter and summer operation. ⇒ To safeguard warranty claims, only original parts (e.g. filters) are allowed to be used.</p>					
Date:Signatures:					
				Commissioning personnel / installation technician	
				User	

4.5 Product data sheet

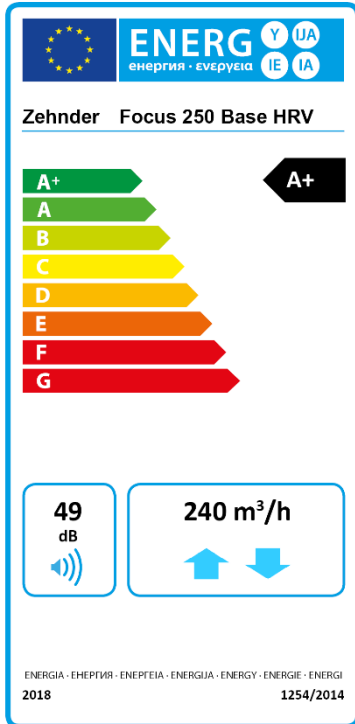
Product fiche for RVU per EU Regulation No. 1254/2014 Contains information requirement for RVUs as per EU Regulation No. 1253/2014 Heat recovery unit Zehnder Focus 250 Base											
Supplier's name or trade mark	Zehnder Group			Zehnder Group			Zehnder Group				
Supplier's model identifier	Focus 250 Base HRV			Focus 250 Base HRV			Focus 250 Base HRV				
SEC [kWh/(m ² a)] specific energy consumption (cold, average, warm)	-74,9	-36,7	-12,1	-78,2	-39,5	-14,7	-82,1	-42,7	-17,6		
SEC Class	A+	A	E	A+	A	E	A+	A+	E		
Type of ventilation unit	Bidirectional RVU			Bidirectional RVU			Bidirectional RVU				
Type of drive installed	Multi-speed drive			Variable speed drive			Variable speed drive				
Type of heat recovery system	Recuperative			Recuperative			Recuperative				
Thermal efficiency [%]	89			89			89				
Maximum flow rate [m ³ /h]	240			240			240				
Electric power input [W]	89			89			89				
Sound power level [dB(A)]	49			49			49				
Reference flow rate [m ³ /h]	168			168			168				
Reference pressure difference [Pa]	50			50			50				
SPI [W/(m ³ /h)]	0,27			0,27			0,27				
Control factor and typology	1 Manual control			0,85 Central demand control			0,65 Local demand control				
Declared maximum internal and external leakage rates [%]	Internal: 0,8			Internal: 0,8			Internal: 0,8				
	External: 1,6			External: 1,6			External: 1,6				
Mixing rate	-			-			-				
Position and description of visual filter warning	Warning on the display of the control panel			Warning on the display of the control panel			Warning on the display of the control panel				
Internet address for assembly and disassembly instructions	www.international.zehnder-systems.com			www.international.zehnder-systems.com			www.international.zehnder-systems.com				
Airflow sensitivity to pressure variations [%]	-			-			-				
Indoor/outdoor air tightness [m ³ /h]	-			-			-				
AEC [kWh/a] annual electricity consumption (cold, average, warm)	920	383	338	826	289	244	725	188	143		
AHS [kWh/a] annual heating energy saved (cold, average, warm)	8914	4556	2060	9015	4608	2084	9149	4677	2115		

Product fiche for RVU per EU Regulation No. 1254/2014 Contains information requirement for RVUs as per EU Regulation No. 1253/2014 Heat recovery unit Zehnder Focus 250 Base Enthalpie												
Supplier's name or trade mark	Zehnder Group			Zehnder Group			Zehnder Group					
Supplier's model identifier	Focus 250 Base ERV			Focus 250 Base ERV			Focus 250 Base ERV					
SEC [kWh/(m ² a)] specific energy consumption (cold, average, warm)	-68,2	-34,2	-12,1	-72,3	-37,2	-14,4	-77,3	-40,7	-17,1			
SEC Class	A+	A	E	A+	A	E	A+	A	E			
Type of ventilation unit	Bidirectional RVU			Bidirectional RVU			Bidirectional RVU					
Type of drive installed	Multi-speed drive			Variable speed drive			Variable speed drive					
Type of heat recovery system	Recuperative			Recuperative			Recuperative					
Thermal efficiency [%]	76			76			76					
Maximum flow rate [m ³ /h]	240			240			240					
Electric power input [W]	89			89			89					
Sound power level [dB(A)]	49			49			49					
Reference flow rate [m ³ /h]	168			168			168					
Reference pressure difference [Pa]	50			50			50					
SPI [W/(m ³ /h)]	0,21			0,21			0,21					
Control factor and typology	1 Manual control			0,85 Central demand control			0,65 Local demand control					
Declared maximum internal and external leakage rates [%]	Internal: 0,8			Internal: 0,8			Internal: 0,8					
	External: 1,6			External: 1,6			External: 1,6					
Mixing rate	-			-			-					
Position and description of visual filter warning	Warning on the display of the control panel			Warning on the display of the control panel			Warning on the display of the control panel					
Internet address for assembly and disassembly instructions	www.international.zehnder-systems.com			www.international.zehnder-systems.com			www.international.zehnder-systems.com					
Airflow sensitivity to pressure variations [%]	-			-			-					
Indoor/outdoor air tightness [m ³ /h]	-			-			-					
AEC [kWh/a] annual electricity consumption (cold, average, warm)	845	308	263	772	235	190	693	156	111			
AHS [kWh/a] annual heating energy saved (cold, average, warm)	8060	4120	1863	8289	4237	1916	8594	4393	1987			

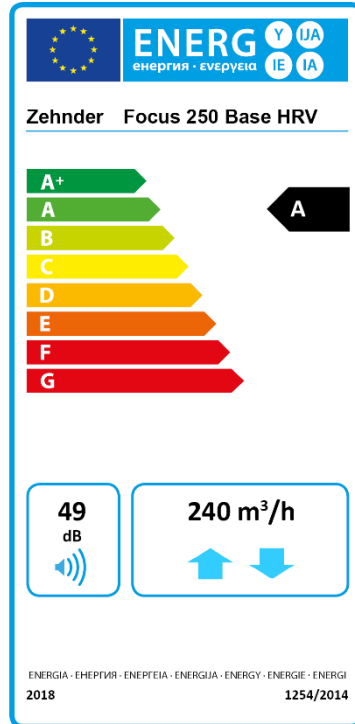
4.6 Product labels

Depending on the application, there are various product labels for the FOCUS unit. The product label applicable for the ventilation system is based on the installation of the system and the model identifier from the product data sheet. The product label shows the following details from the product data sheet:

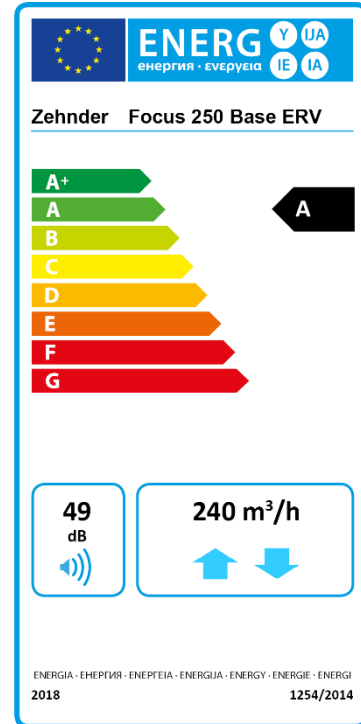
- Energy efficiency class for “average” climate zone
- Sound power level L_{WA} in internal spaces
- Maximum air volume flow



- With local demand control



- With manual control
- With central demand control



- With manual control
- With central demand control
- With local demand control

4.7 Declaration of Conformity

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EU DECLARATION OF CONFORMITY

We hereby declare that the product/series described below conforms to the relevant fundamental health and safety requirements of the applicable European Union Directives as outlined herein – both in its basic design and construction as well as in the version marketed by us – and that sole responsibility lies with the manufacturer.

Description of machinery: Heat recovery unit FOCUS 250 Base series

Directive 2014/35/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits

Applied standards:

EN 60335-1:2012 + AC:2014 + A11:2014 Household and similar electrical appliances – Safety – General requirements
EN 60335-2-40:2003 + A11:2004 + A12:2005 + A1:2006 + A13:2012/AC:2013 + A13:2012 + A2:2009 + AC:2006 + AC:2010 Household and similar electrical appliances – Safety / Particular requirements for electrical heat pumps, air-conditioners and dehumidifiers

Directive 2014/30/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to electromagnetic compatibility

Applied standards:

EN 61000-6-1:2007 Electromagnetic compatibility (EMC) – Part 6-1: Generic standards – Immunity for residential, commercial and light-industrial environments
EN 61000-6-3:2007 + A1:2011/AC2012 + A1:2011 Electromagnetic compatibility (EMC) – Part 6-3: Generic standards – Emission standard for residential, commercial and light-industrial environments
EN 55011:2009 + A1:2010 Industrial, scientific and medical equipment – Radio-frequency disturbance characteristics – Limits and methods of measurement

Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 concerning the ecodesign requirements for energy-related products

Applied regulations:

Ecodesign Regulation (1253/2014/EU)

Directive 2010/30/EU of the European Parliament and of the Council of 19 May 2010 on the indication by labelling and standard product information of the consumption of energy and other resources by energy-related products

Applied regulations:

Labelling Regulation (1254/2014/EU)

Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment

Applied standards:

DIN EN 50581:2013-02 Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

Further applied standards:

EN ISO 12100:2010 Safety of machinery – General principles for design – Risk assessment and risk reduction
EN ISO 3743-1:2010 Acoustics – Determination of sound power levels and sound energy levels of noise sources using sound pressure – Engineering methods for small movable sources in reverberant fields – Part 1: Comparison method for a hard-walled test room
EN ISO 5136:2009 Acoustics – Determination of sound power radiated into a duct by fans and other air-moving devices – In-duct method
DIN EN 13141-7:2010 Performance testing of components/products for residential ventilation – Part 7: Performance testing of mechanical supply and exhaust ventilation units (including heat recovery) for mechanical ventilation systems intended for single family dwellings

Signed for and on behalf of:

Reinsdorf, 5 March 2019



Michael Pitsch
Managing Director



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