

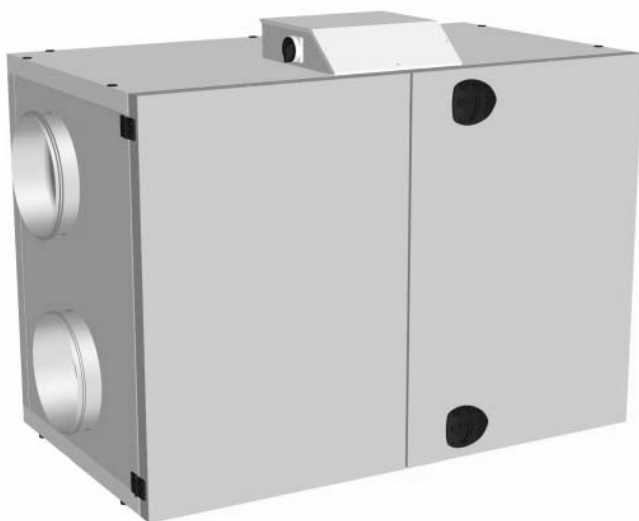


VEX250HX without control system

Mechanical installation instructions



VEX200
R A N G E
ROTARY
HEAT EXCHANGER



Unit supplied with (factory fitted):

- Rotor with standard temperature efficiency
- Rotor with high temperature efficiency
- Compact filters FP
- Bag filter FB
- Trim damper and blowout zone, TB250
- OD (roof for outdoor)





The following accessories are supplied separately:

- HCW heating coil
- HCE heating coil
- CCW cold water coil
- DX cooling/heating coil
- Mounting base, MSVEX250H
- Closing damper, LS400-24, (LSA exhaust)
- Closing damper, LS400-24, (LSF outdoor)
- Closing damper, LSR400-24, with spring-return (LSFR outdoor)
- _____

Serial no.: _____

Prod. order no.: _____

Sales order no.: _____

-  Product information..... Chapter 1 + 6
-  Mechanical assembly..... Chapter 2 + 3
-  Electrical installation..... Chapter 4
-  Maintenance..... Chapter 5

Original instructions



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Symbols, terms and warnings

Prohibition symbol  Failure to observe instructions marked with a prohibition symbol may result in serious or fatal injury.

Danger symbol  Failure to observe instructions marked with a danger symbol may result in personal injury and/or damage to the unit.

Scope

This instruction manual is for use with EXHAUSTO VEX-type air handling units. Please refer to the product instructions regarding accessories and extra equipment.

The instructions must be fully observed to ensure personal safety and to protect the equipment and ensure its correct operation. EXHAUSTO A/S accepts no liability for accidents caused by equipment not used in accordance with the manual's instructions and recommendations.

Supply air/extract air

These instructions use the following terms as given in DS447-2013:

- Supply air (air blown in)
- Extract air (air removed)
- Outdoor air
- Exhaust air

Left/Right

The term R for Right, indicates the supply air is to the right of the cooling unit, as seen from the operating side. The term L for Left, indicates the supply air is to the left.

Front page: Accessories

The front page of the instruction manual contains a checklist, detailing the accessories delivered with the VEX unit.

NB

When retrofitting EXHAUSTO accessories, please update the checklist on the front page.

Warnings

Opening the unit



Do not open the service doors before the supply voltage has been disconnected at the isolation switch and the ventilators have stopped.

Prohibited



The VEX unit must not be used to transport solid particles or in areas where there is a risk of explosive gases.

No duct connection

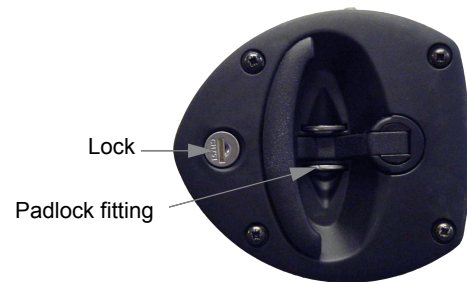


If one or more of the spigots is not connected to a duct: Fit a protective net to the spigots with a maximum mesh width of 20 mm (in accordance with EN 294).

Lock the air handling unit during operation

The VEX unit must always be locked during operation:

- Use the cylinder lock in the handle. **Remember** to remove the key from the lock.
- Or use a padlock. Use the handle's built-in padlock fixture.



Rating plate

The VEX unit rating plate shows:

- VEX unit, type (1)
- production number (2)

EXHAUSTO		CE	
<small>Østernøvej 76 · DK-5550 Langeskov · Danmark Telefax +45 6566 1110 · Telefon +45 6566 1234</small>			
Type	V280H2EA2	$I_{cu} = 10kA$	1
	No./Year 1234567/2016		2
Supply	Voltage: 3x400V+N+PE ~50Hz	Current: 34A	
ECO design	$\eta = 59,0\%$ (A) N62 (2015) N = 65,1 VSD integrated		

NB

Always have the production number ready when contacting EXHAUSTO A/S.



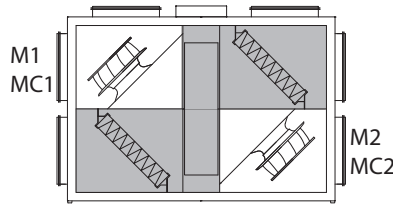
1. Product information

1.1 Model overview

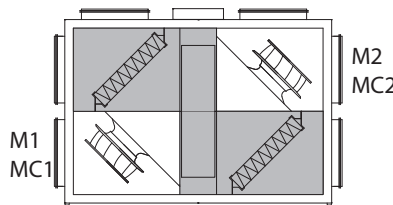
Model overview


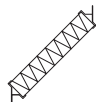

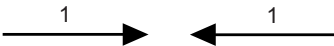
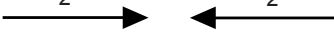
Positioning of fan, motor (M) and motor control (MC)

Fan placement 1 (V1)



Fan placement 2 (V2)

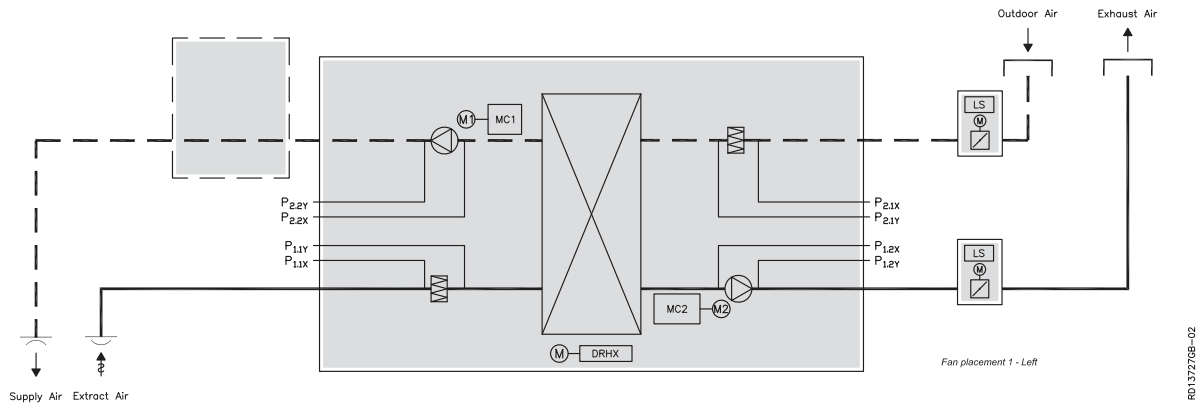


Elements	Description
	Fan
	Compact filter
	Bag filter
1,1,A or B	Extract air spigot
1,2,A or B	Exhaust air spigot
2,1,A or B	Outdoor air spigot
2,2,A or B	Supply air spigot
	Air direction, extract air
	Air direction, supply air

Optional spigot positions in relation to fan placement and filter type		
Fan placement and airflows	Compact filters	Bag filters
<p>Fan placement 1, Right</p>		
<p>Fan placement 1, Left</p>		
<p>Fan placement 2, Right</p>		
<p>Fan placement 2, Left</p>		

1.2 Designations used in these instructions

1.2.1 Designations used in these instructions



The simplified diagram shows a VEX unit with fan location 1, Left

Component	Function
MC1	Motor control, motor 1 (extract air)
MC2	Motor control, motor 2 (supply air)
LS ¹⁾	Closing damper, outdoor air/exhaust air
M1	Fan motor 1
M2	Fan motor 2
DRHX	Control unit for the rotary heat exchanger
P1.1X	Measurement point, pressure drop across extract air filter
P1.1Y	Measurement point, pressure drop across extract air filter
P1.2X	Measurement point, airflow in exhaust air
P1.2Y	Measurement point, airflow in exhaust air
P2.1X	Measurement point, pressure drop across outdoor air filter
P2.1Y	Measurement point, pressure drop across outdoor air filter
P2.2X	Measurement point, airflow in supply air
P2.2Y	Measurement point, airflow in supply air

1.3 Application

Comfort ventilation EXHAUSTO VEX is used for comfort ventilation tasks. Operating temperature range for the unit – see section "Technical data".

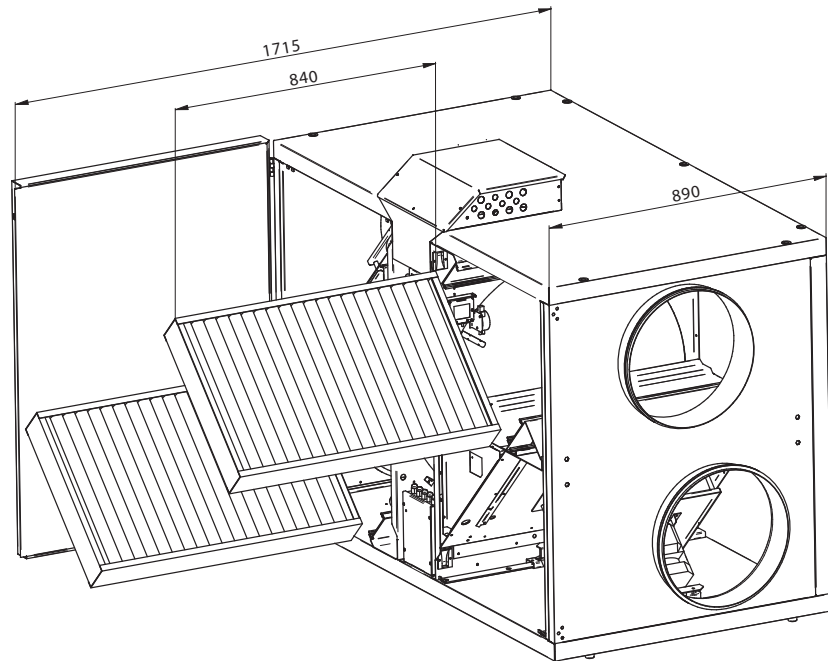
Prohibited uses The VEX unit is not to be used to transport solid particles or in areas where there is a risk of explosive gases.

1.4 Location requirements

Positioning The air handling unit is designed for indoor fitting. The air handling unit can be ordered for outdoor installation (accessory Outdoor, OD).

1.4.1 Spatial requirements

The drawing below indicates how much space is needed for servicing, replacing filters, cleaning, etc.



RD11538-01

NB: A free height of at least 200 mm is required above the unit's connection box.

1.4.2 Requirements for underlying surface

When fitting the unit directly to an existing surface - i.e. without using the mounting base (accessory) - the surface must be:

- level
- horizontal (± 3 mm per metre)
- hard
- vibration-resistant

1.4.3 Requirements for duct system

Silencers

The duct system must be fitted with silencers specified by the Project Manager, which meet the requirements of the operating area.

Bends

A duct bend may be fitted immediately after the unit, because the airflow in the spigot has a uniformly moderate speed profile, which results in negligible system pressure loss.

Insulation



The duct system must be insulated against:

- condensation
- sound leakage
- heating/cooling losses

Condensation

Condensation in the ducts may occur when the exhaust/outdoor air has high humidity. EXHAUSTO recommends a condensation outlet is also fitted at the lowest point in the ducts.

No duct connection



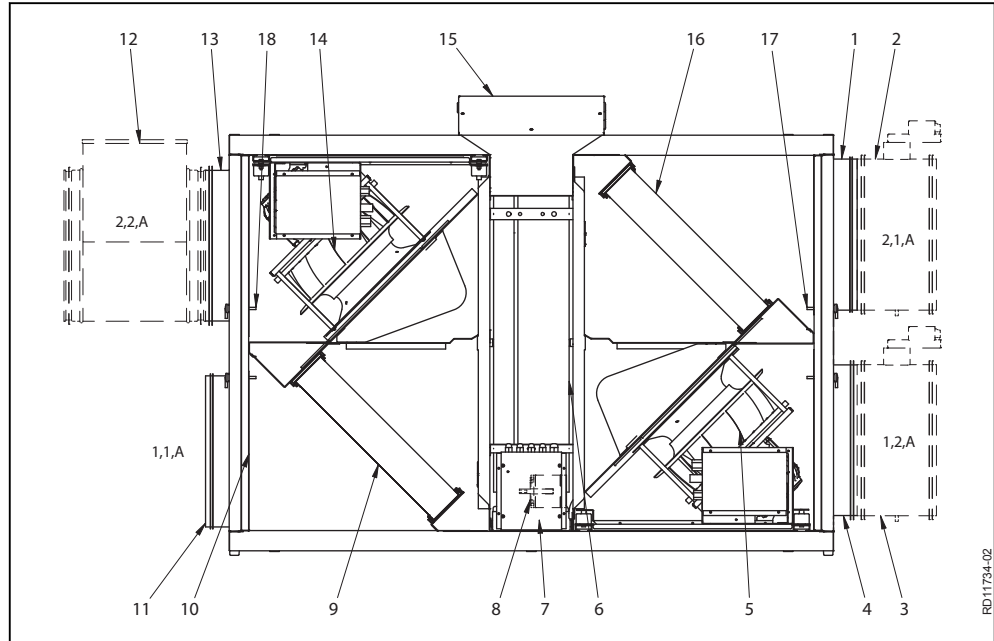
If one or more of the spigots is not connected to a duct: Fit a protective net to the spigots with a maximum mesh width of 20 mm.

1.5 Description

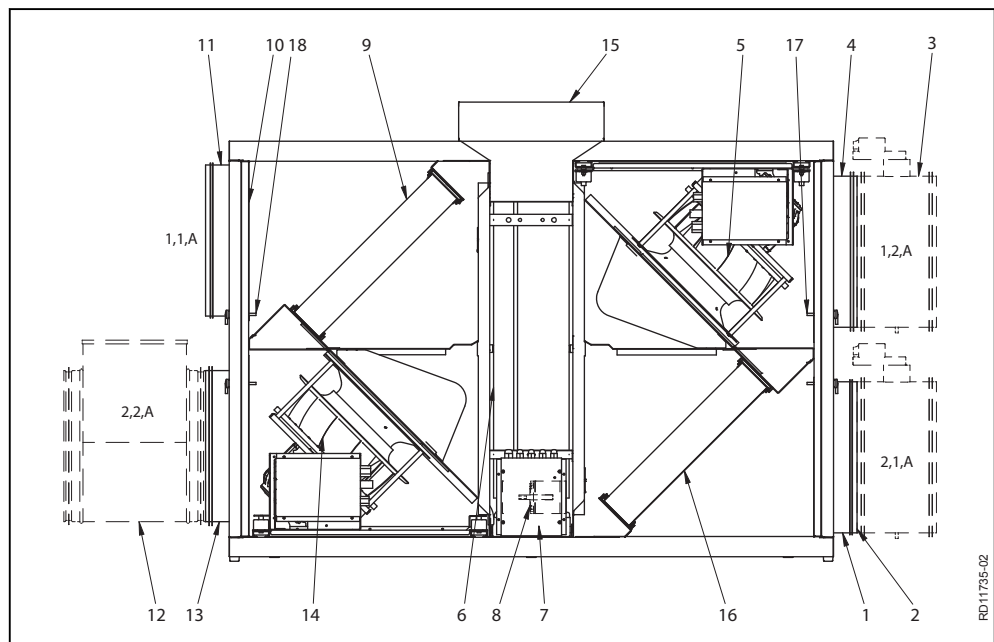
1.5.1 VEX unit construction

VEX200L-V1

The drawing below illustrates the construction of the unit (without service doors).

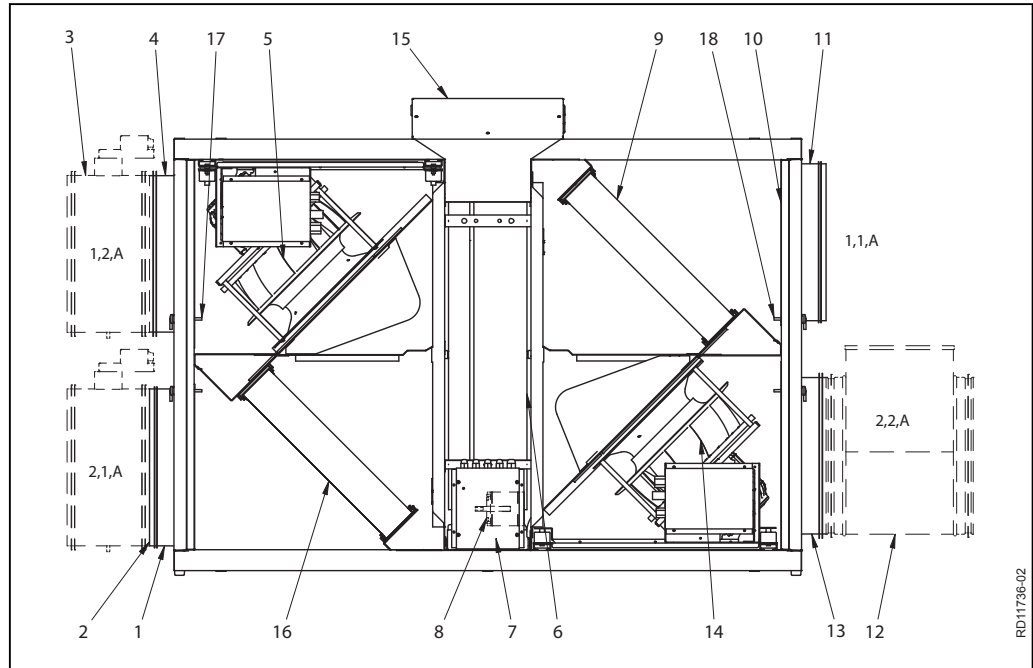


VEX200L-V2



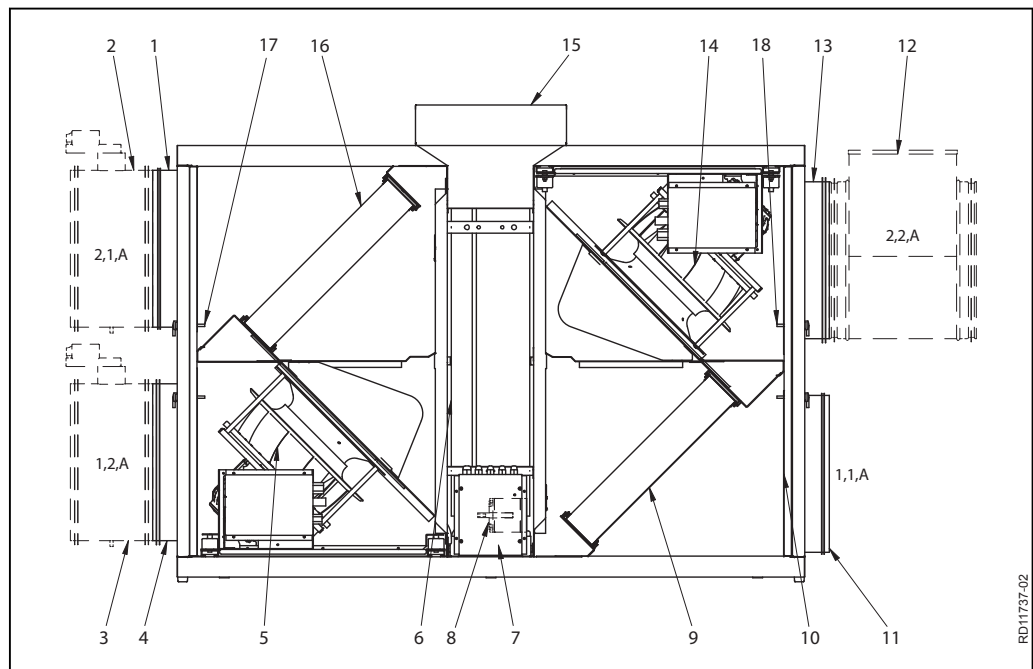
VEX200R-V1

The drawing below illustrates the construction of the unit (without service doors).



RD11736-02

VEX200R-V2



RD11737-02

Pos. no.	Part	Function
1	Spigot 2.1.A	Outdoor air spigot The spigot can also be positioned on the top or in the bottom of the unit (2.1.B) – however, only on units with compact filters.
2	Closing damper LS	Closing damper, outdoor air, LSF (accessory).
3	Closing damper LS	Closing damper, exhaust air, LSA (accessory).
4	Spigot 1.2.A	Exhaust air spigot The spigot can also be positioned on the top of the unit (1.2.B).
5	Fan unit	For extract air/exhaust air

Pos. no.	Part	Function
6	Rotary heat exchanger	Conducts heat from extract air to supply air.
7	Step motor	Drives the rotary heat exchanger via the drive belt.
8	Rotor control	Controls and monitors the step motor.
9	Extract air filter	Filters extract air.
10	Trim damper	The trim damper (accessory) ensures there is pressure balance across the rotor and seals to prevent extract air from entering the supply air. Used with purging sector (accessory).
11	Spigot 1.1.A	Extract air spigot. The spigot can also be positioned in the bottom of the unit (1.1.B) – however, only on units with compact filters.
12	Heating coil	Heats supply air if heat recovery is insufficient (accessory).
13	Spigot 2.2.A	Supply air spigot. The spigot can also be positioned at the bottom of the air handling unit (2.2.B).
14	Fan unit	For outdoor air/supply air.
15	Connection box	Connection box to fan motor and rotor control.
16	Outdoor air filter	Filters outdoor air.
17	Measurement socket	Measurement socket for pressure loss across the filters.
18	Measurement socket	Measurement socket for airflow calculation.

Cabinet

The inside and outside of the cabinet is made of Aluzinc® and insulated with 50 mm mineral wool.

Ventilators

The unit has a centrifugal fan for extract air and a centrifugal fan for supply air

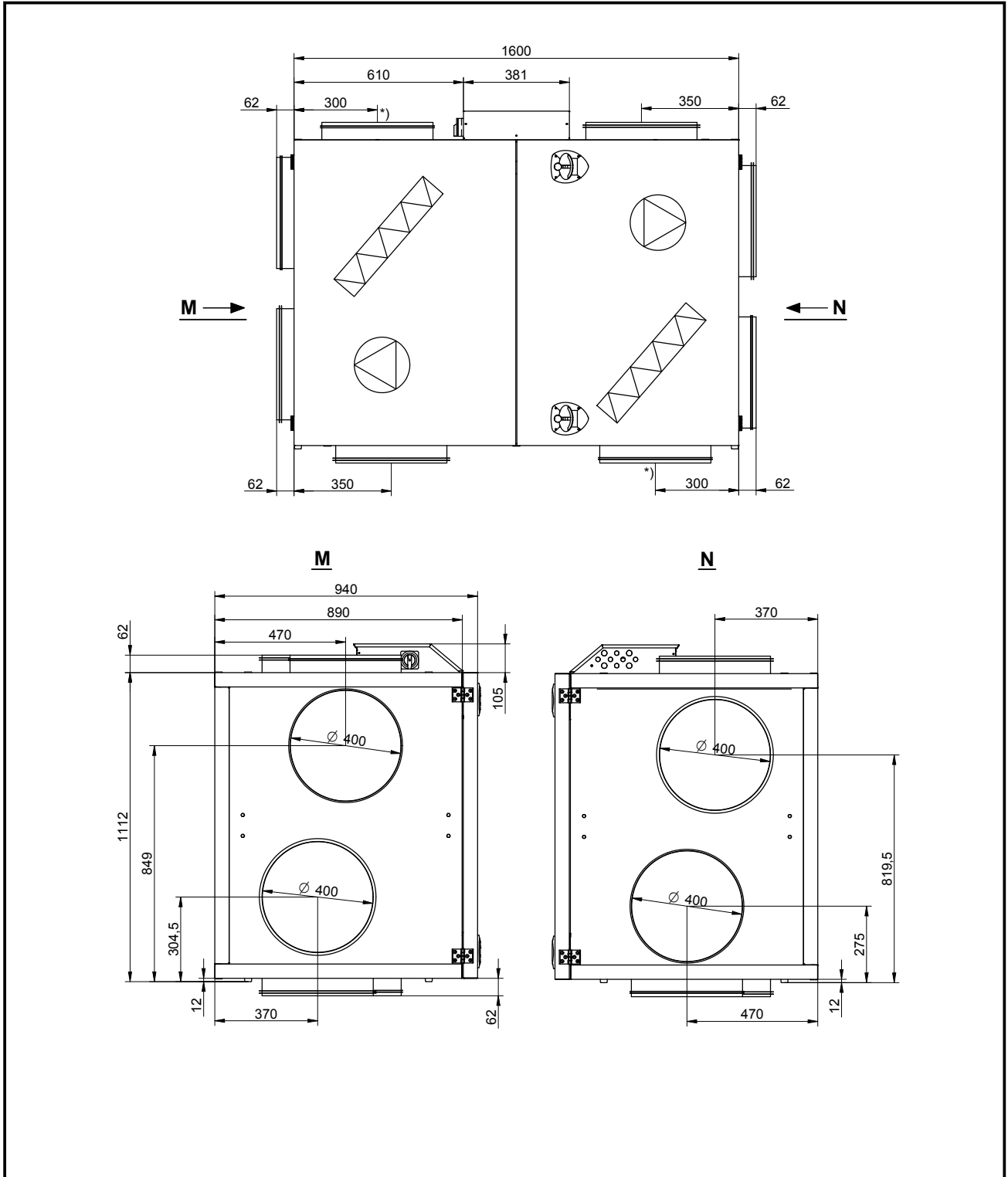
Rotary heat exchanger

The rotary heat exchanger is driven by a step motor with rotor control, which controls the rotor's speed.

Filters

There are built-in compact filters (as shown on the drawings on the previous pages) or bag filters on both the extract air and supply air side.

VEX250, V2



NB

The drawing shows all of the spigot positioning options. Spigot positioning marked with * is not available for VEX units with a bag filter.



2. Handling

2.1 Unpacking

Supplied components

The following components are supplied:

- VEX unit
- Supplied with accessories (as indicated in the checklist on the front page of the instructions)

Packaging

The unit is delivered attached to a disposable pallet and packed in clear plastic.

NB

Once the plastic has been removed, the unit must be protected against dirt and dust:

- **The covers on the spigots must not be removed until the spigots are connected to the ventilation ducts.**
- **Whenever possible, keep the unit closed during fitting.**

The unit should be cleaned before it is used.

Once the VEX unit is fitted, it must be checked and thoroughly cleaned. All dust, debris and metal shavings must be vacuumed up.

2.2 Transport

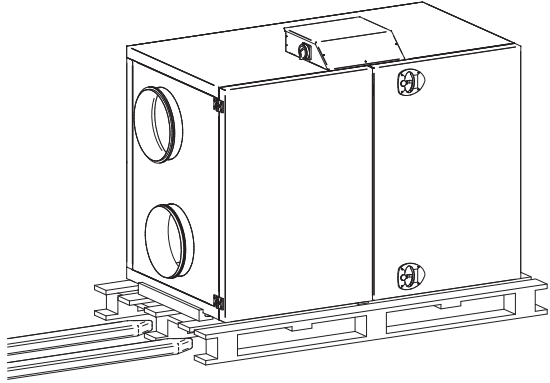

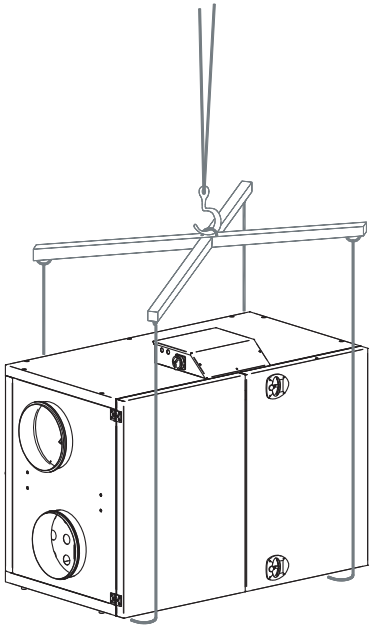
2.2.1 Weight

The unit weighs 277 kg

Transport equipment

Transport the VEX unit in one of the following ways:

Method	Drawing
<p>Manual transport: Lifting brackets for manual transport can be fitted as shown on the drawing:</p>	

Method	Drawing
<p>Using pallet truck or fork-lift truck: Lift the VEX unit on the disposable pallet. IMPORTANT: If the disposable pallet cannot be used, the forks on the lifting equipment must be long enough to prevent damage to the bottom of the unit.</p>	
<p>Crane:</p> <p> Never lift the VEX unit with the lifting brackets by using a crane.</p> <p>Use straps and lifting yokes to prevent damage to the unit.</p>	

2.2.2 Passage through openings

Height The unit's height is 1,217 mm.

Width The list (below) shows how wide an opening has to be for the unit to pass through:

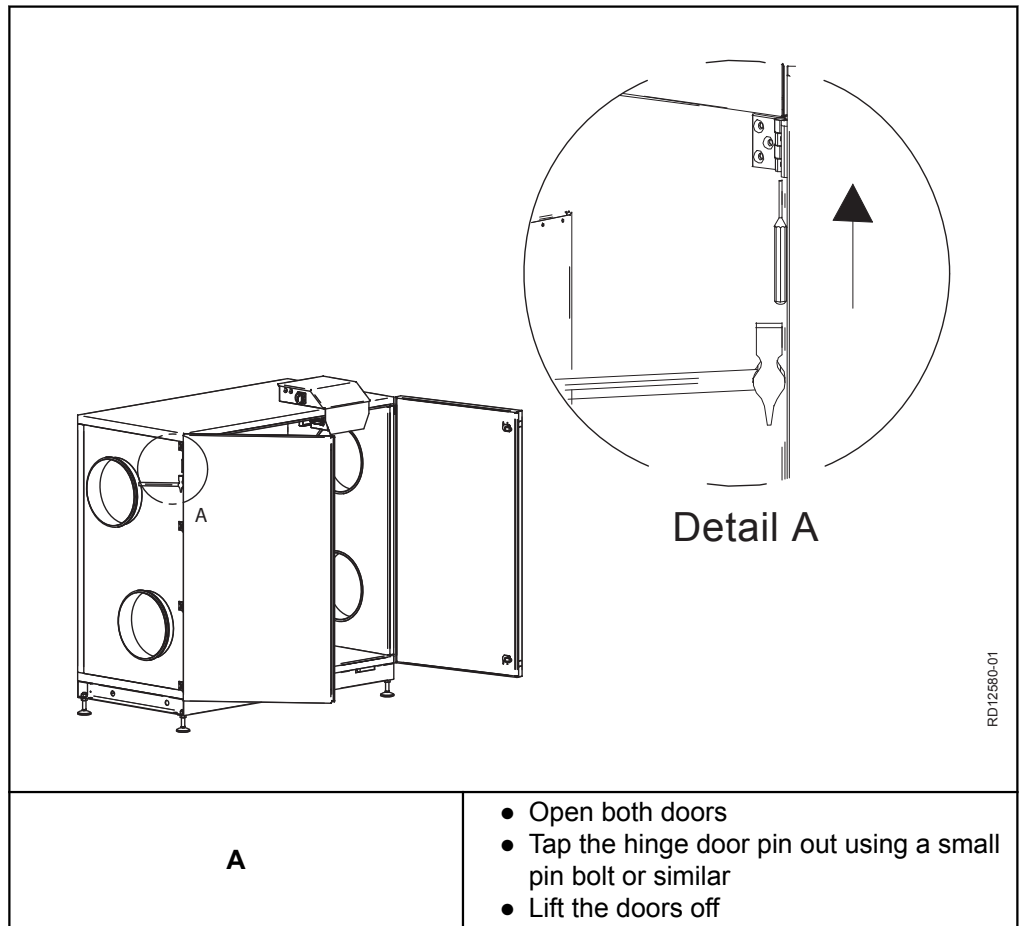
If the opening width is*	Then
Less than 900 mm	The unit will not pass through
Between 900 and 948 mm	remove doors, see relevant section
Greater than 948 mm	The unit can pass through

* Measurements are based on the exact dimensions of the air handling unit

2.2.3 Internal transport with reduced weight

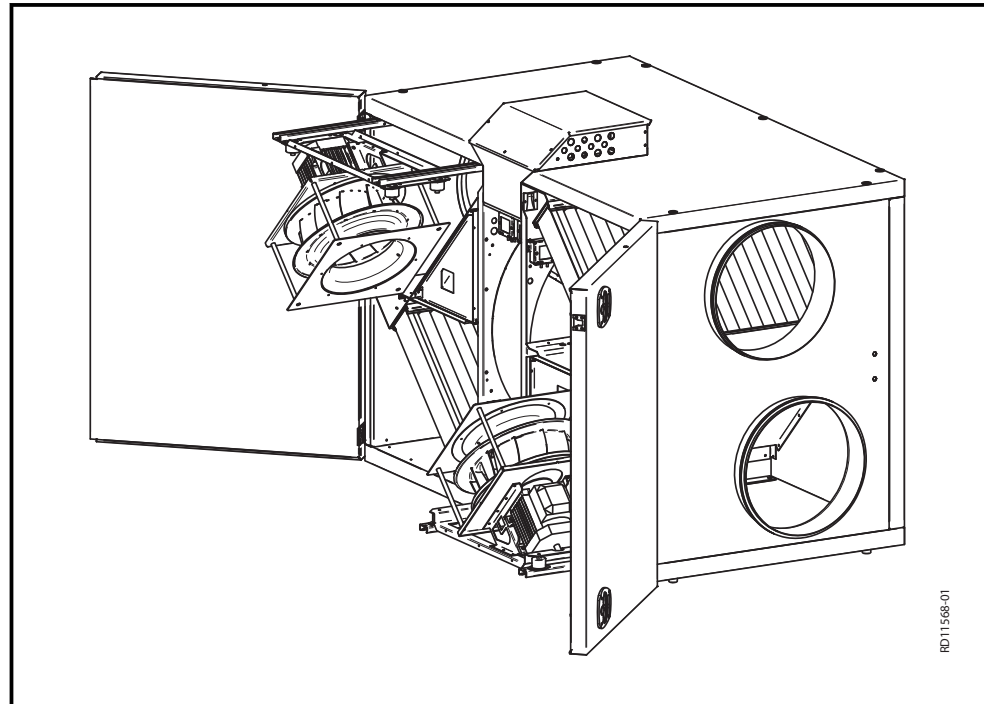
Weight reduction The weight can be reduced during transport by removing the service doors and fan units.

Removing the service doors To remove the service doors:



RD12560-01

To remove the fan unit



Step	Action
1	Remove the fixing screws on the sliding rail (out towards the operating side)
2	Loosen the bindings on the motor cable and the measuring hose
3	Pull the fan unit out to the end-stop (a screw on each rail acts as a stop)
4	Remove the supply cable and modbus cable in the motor control box
5	Remove the measuring hose which is fixed to the intake
6	Remove the two end-stop screws (one on each rail). The fan unit can now be lifted off.
<p>NB: A single fan unit weighs 26 kg.</p>	



3. Mechanical assembly

3.1 Installing the unit

Description The VEX unit is installed so that it is horizontal.

3.1.1 Installed directly onto the floor

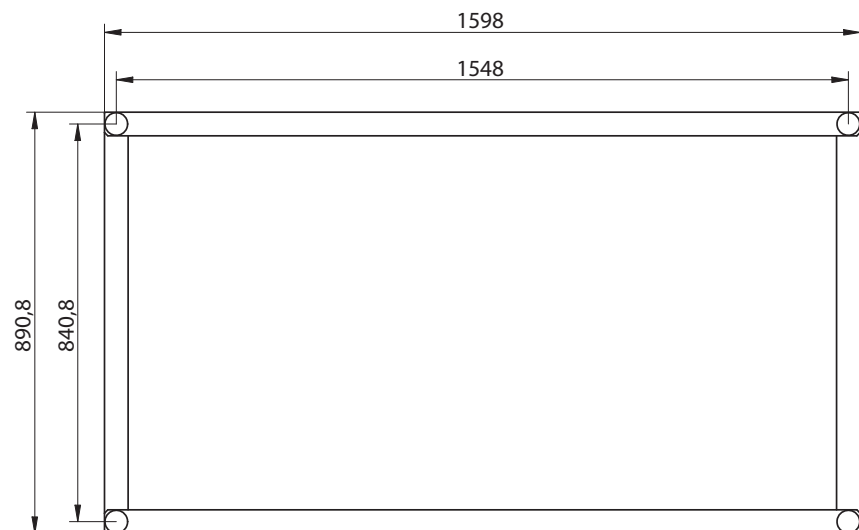
The requirements for the floor surface must be met, see the section entitled "Requirements for underlying surface", chapter 1.

NB After installation, check the VEX unit is completely level.

3.1.2 Installing on mounting base

The EXHAUSTO mounting base enables the air handling unit to be installed correctly. The base is equipped with adjustable levelling screws, so that the air handling unit can be fitted horizontally on a surface that is not level (± 20 mm per metre). See diagram no. 3002646 for installing on the mounting base.

Diagram showing levelling screw positions



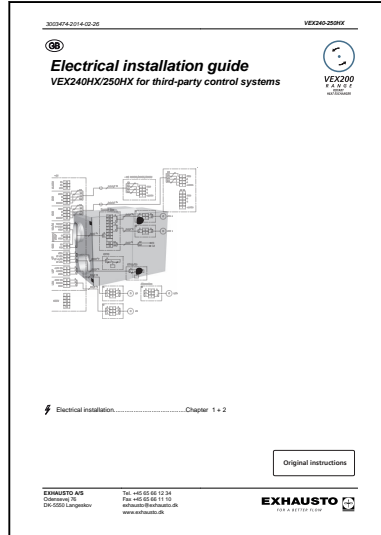
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4. Electrical installation

4.1 Electrical installation

See the attached instructions "Guide to Electrical Installation of VEX240HX/250HX for third party control systems":





5. Maintenance

5.1 Maintenance chart

Recommended intervals The following chart details the recommended maintenance intervals, under normal operating conditions. EXHAUSTO recommends maintenance is adjusted to suit the actual operating requirements.

Component	Procedure	Once a year	Twice a year
Filters*	Recommended that both filters are replaced at the same time. Filters should be replaced at least:		X
Filter monitor	Check that all the seals in the filter monitor are tight.	X	
Seals and sealing strips	Check that all the seals are tight.	X	
Fans and heating coil (accessories)	Check Removal of fan unit. See section "Internal transport with reduced weight" Cleaning. See next section	X	
Rotary heat exchanger	Check Clean when required. See next section.	X	

*Filters



Only use original filters

- The provided filter data and pressure loss graphs (section "Technical data") are based on the use of original filters
- EUROVENT certification is only valid if original filters are used
- Use of non-original filters may cause leakage in the VEX and impair filter function
- EXHAUSTO recommends that you register the filter replacement date to ensure filters are replaced at the correct intervals

5.2 Service

5.2.1 Filter change

Use original filters



Only use original filters. See section "Maintenance chart".



Disconnect power at the isolation switch before opening the door.


Pull the filters out. Remember to check the flow direction - see the arrows on the filter.
Discarded filters must be stored immediately in sealed plastic bags and disposed of responsibly.

5.2.2 Servicing and cleaning



Cleaning motor/fan See section "Internal transport with reduced weight" for details on how to remove the fan units.

Step	Action
1	Switch off the power supply to the unit at the isolation switch before opening the doors
2	Clean the fan impellers with a vacuum cleaner and wipe down with a damp cloth if necessary
3	Clean the impeller blades carefully, so as not to disturb the balance
4	Once re-fitted, check the unit operates without vibrating
Inspection of measuring points hoses	
5	Remove the hoses at the connection box
6	Blow air through the hoses to remove any impurities

Cleaning cold water coil/heating coil

Step	Action
1	Switch off the power supply to the unit at the isolation switch
2	Vacuum clean the cold water coil/heating coil
3	Cold water coil: clean the condensation tray
4	Check the fins on the exchanger are not deformed.  The fins are sharp.

Cleaning rotary exchanger

Step	Action
1	Switch off the power supply to the unit at the isolation switch before opening the doors
2	Vacuum clean the exchanger with caution, ideally using a soft brush vacuum nozzle.  Avoid touching the fins in the exchanger with sharp or hard objects – the fins are very soft and can easily be deformed, which will diminish the performance of the VEX.
3	Check the fins on the exchanger are not deformed.  The fins are sharp.

5.3 Airflow measurement

5.3.1 Determining airflow and pressure

Use the formulae in the table to calculate airflow and pressure drop over the filters.

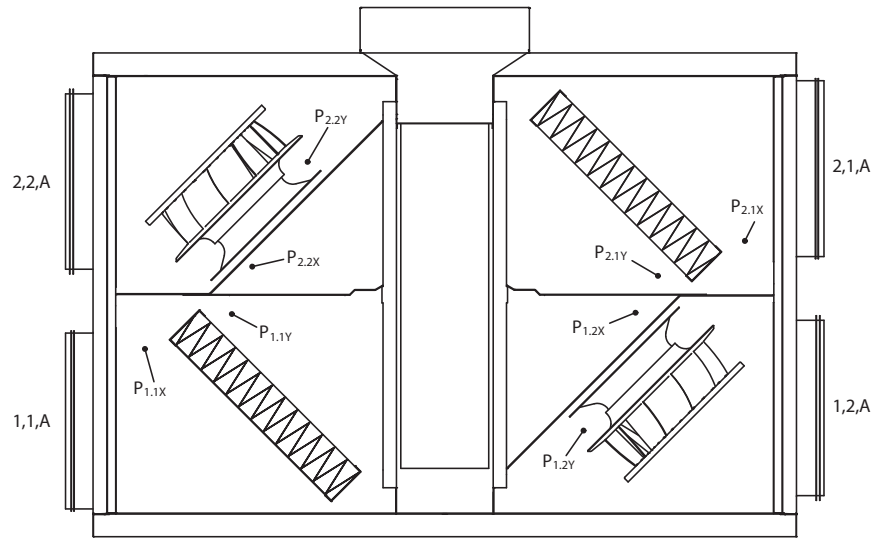
Airflow:	Airflow q_V (l/s, m ³ /h) can be read from the differential pressure Δp_M [Pa]
Extract air	$\Delta p_{M1.2} = P_{1.2X} - P_{1.2Y}$ [Pa]

Airflow:	Airflow q_v (l/s, m³/h) can be read from the differential pressure Δp_M [Pa]
Supply air	$\Delta p_{M2.2} = P_{2.2X} - P_{2.2Y}$ [Pa]

Pressure drop across:	
Extract air filter	$\Delta p_{1.1} = P_{1.1X} - P_{1.1Y}$ [Pa]
Supply air filter	$\Delta p_{2.1} = P_{2.1X} - P_{2.1Y}$ [Pa]

Location of measurement points

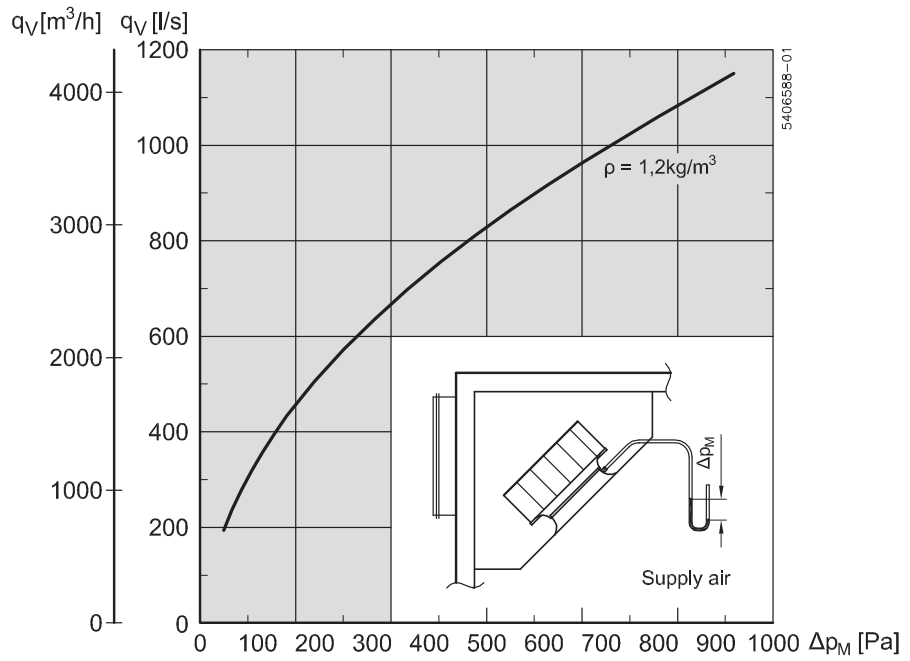
The location of measurement points is shown on the drawing. The exterior measuring points positions on the VEX are shown in the drawings in the section "Description".



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Supply air

Supply airflow diagram:

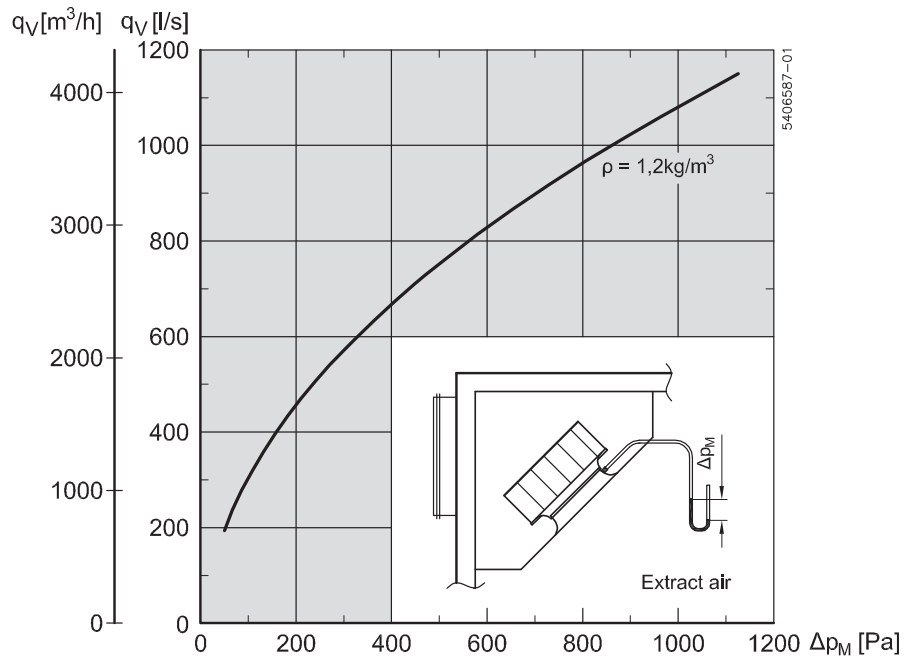


— Airflow (q_V) according to pressure difference (Δp_M)

$$\left. \begin{aligned} q_V &= 94,68 \cdot \sqrt{\frac{2 \cdot \Delta p_M}{\rho}} \text{ [m}^3/\text{h]} \\ q_V &= 26,3 \cdot \sqrt{\frac{2 \cdot \Delta p_M}{\rho}} \text{ [l/s]} \end{aligned} \right\} \pm 10\% \text{ for } \Delta p_M > 40 \text{ Pa}$$

Extract air

Extract airflow diagram:



— Airflow (q_V) according to pressure difference (Δp_M)

$$\left. \begin{aligned} q_V &= 84,96 \cdot \sqrt{\frac{2 \cdot \Delta p_M}{\rho}} \text{ [m}^3/\text{h]} \\ q_V &= 26,3 \cdot \sqrt{\frac{2 \cdot \Delta p_M}{\rho}} \text{ [l/s]} \end{aligned} \right\} \pm 10\% \text{ for } \Delta p_M > 40 \text{ Pa}$$



6. Technical specifications

6.1 Weight, corrosion class, temperature ranges, etc.

Weight

Doors	2 x 15 kg
Fan section	2 x 26 kg
Unit without doors and fan section (for internal transport)	195 kg
The total weight of the unit	277 kg

Corrosion class

Corrosion class	Corrosion class C4 in accordance with EN ISO 12944-2
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Temperature range

Outdoor air temperature	-40°C to +35°C
Ambient temperature	-30°C to +50°C

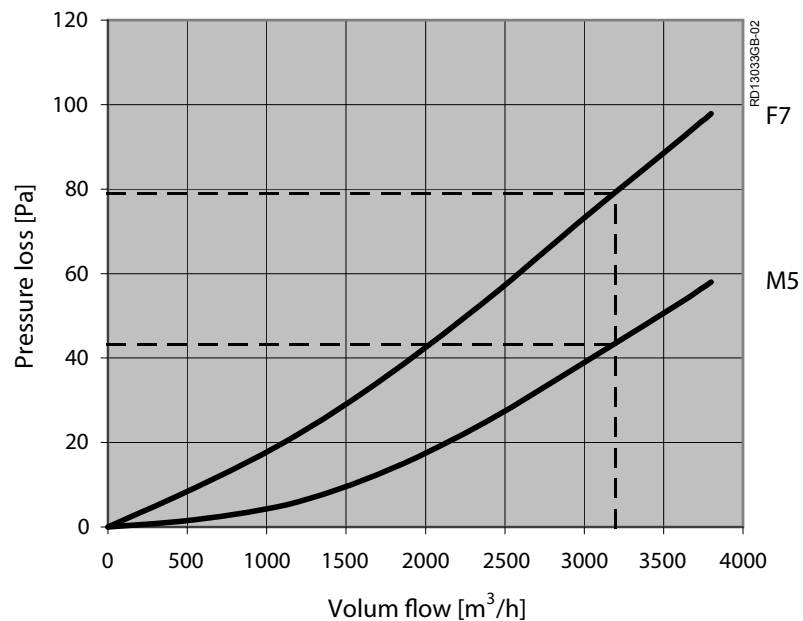
At temperatures below -25°C (with outdoor installation), use of a thermostatically controlled heater in automated control box is recommended.

Motor data

Voltage	3 x 400 V/ 3 x 230V
Max. rpm	2900
Moment	3.6 Nm
Motor class in accordance with IEC TS 60034-30-2	IE5 (Ultra Premium efficiency)

6.2 Compact filters

Pressure loss curves for M5 and F7 filters



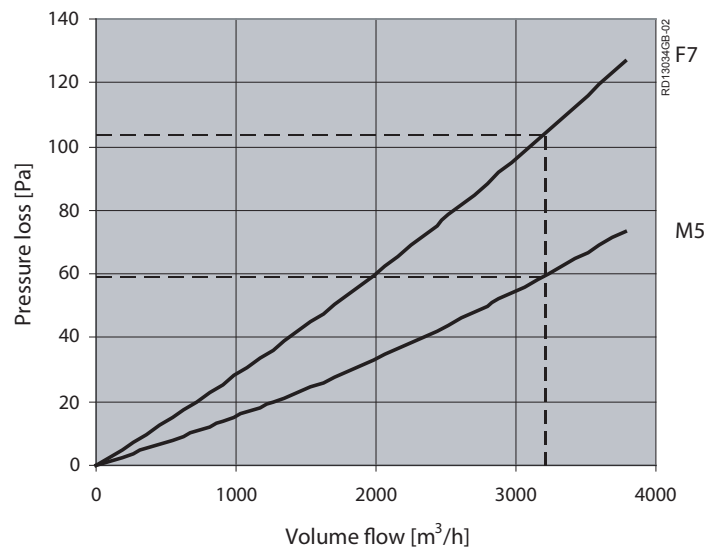
Filter data	FP250M5	FP250F7
Panel filter h x w	520 x 835 mm	520 x 835 mm
Panel filter thickness	96	96
Filter area	5 m ²	15.7 m ²
Filter class	M5	F7
Retention efficiency in accordance with EN779	96 %	> 99 %
Efficiency	45 %	85 %
Volume flow rate	3,200 m ³ /h	3,200 m ³ /h
Initial pressure drop	43 Pa	79 Pa
Recommended final pressure drop at normal volume flow rate	143 Pa	179 Pa
Temperature resistant to	70°C	70°C



EUROVENT certification is only valid if original filters are used. For more details about original filters, see section "Maintenance".

6.3 Bag filters

Pressure loss curves for M5 and F7 filters

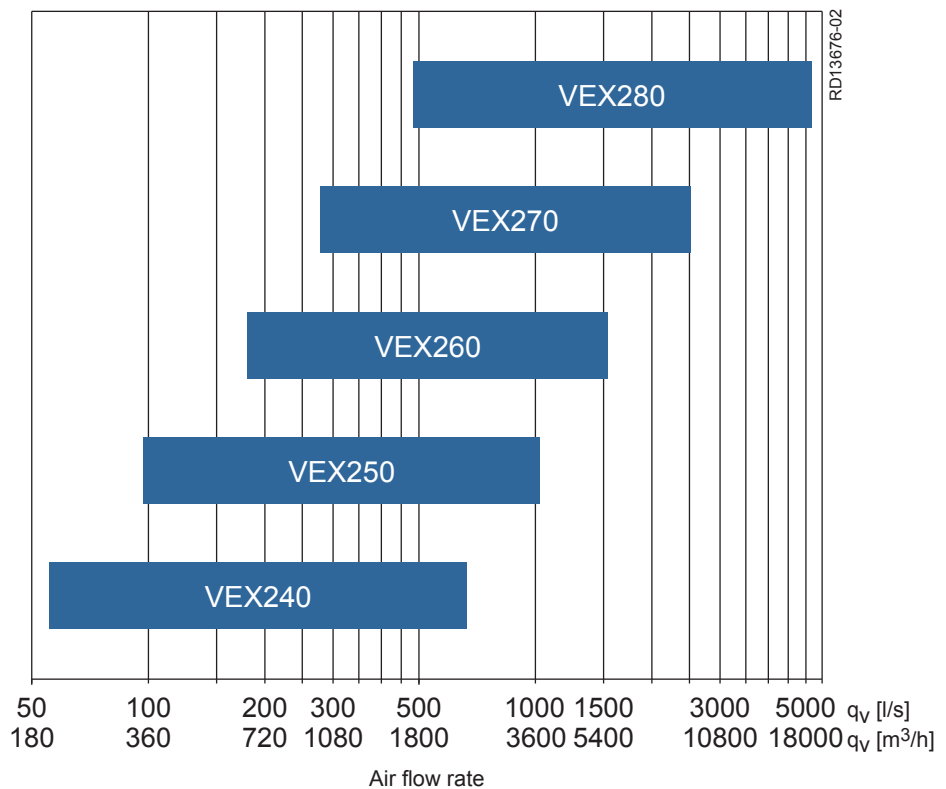


Filter data	FB250M5	FB250F7
Filter area	4.84 m ²	5.96 m ²
Face area h x b	490 x 835 mm	490 x 835 mm
Total number bags x depth	13 x 380 mm	16 x 380 mm
Filter class	M5	F7
Retention efficiency in accordance with EN779	96 %	> 99 %
Efficiency	45 %	85 %
Volume flow rate	3,200 m ³ /h	3,200 m ³ /h
Initial pressure drop	59 Pa	104 Pa
Recommended final pressure drop at normal volume flow rate	159 Pa	200 Pa
Temperature resistant to	70°C	70°C



EUROVENT certification is only valid if original filters are used. For more details about original filters, see section "Maintenance".

6.4 Capacity diagrams



Recommendation



You are recommended to make a more precise calculation of the unit's capacity with the EXselect calculation program, available on the EXHAUSTO website.

6.5 Ordering spare parts

Find production number

When ordering spares, please state the relevant production part number. This will ensure that the correct parts are delivered. The production number is given on the front of the VEX guidelines and on the VEX rating plate.

Contact:

Contact your local EXHAUSTO office service department to order a spare part. Contact information is given on the back cover of these instructions. See also the "Layout" section for an overview of the position and designation of parts in the VEX.



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