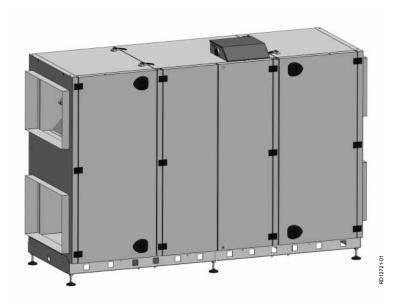
3004084-2017-12-20 **VEX350HX** 



# VEX350HX

# VEX300 R A N G E COUNTER FLOW HEAT EXCHANGER

# counter flow heat exchanger, for 3rd party control system



FB bag filter FP compact filter OD - roof for outdoor Mounting base (unassembled) Frequency converter MLON
The following accessories are supplied separately:
HCW external heating coil (water)
HCE external heating coil, kW
CCW cold water coil
Closing damper, LS500 (LSA exhaust air)
Closing damper, LS500, (LSF outdoor air)
Closing damper, LSR500, with
spring-return (LSAR exhaust air)
closing damper, LSR500, with spring-return ( LSFR outdoor air)
Serial no.:
Prod. order no.:
Sales order no.:

Unit supplied with (factory fitted):

$\mathring{\mathcal{U}}$	Product information	Chapter	1 + 6
	Mechanical assembly	Chapter	2 + 3
4	Electrical installation	Chapter	4
8	Maintenance	Chapter	5

**Original instructions** 





1. Product inform	ation	
	1.1. Designations used in these instructions	6
	1.1.1. Model overview	
	1.1.2. Terms used in these instructions	7
	1.2. Application	
	1.3. Location requirements	
	1.3.1. Space requirements	
	1.3.2. Requirements for underlying surface	
	1.3.3. Outlet	
	1.3.4. Requirements for duct system	
	1.4. Description	9
	1.4.1. VEX unit construction	
	1.5. Main aim	
	1.5.1. Dimensional drawing	11
<u> </u>		
{**}		
2. Handling		
z. Hallalling	2.1. Unpacking	14
	2.2. Transport	
	2.2.1. Passage through openings	
	2.2.2. Internal transport with reduced weight	
٠٨,	2.2.2. mornar a a nopore mar roddodd morg nammer a channar a channar a channar a channar a channar a channar a	
مريخ م		
200		
3. Mechanical ass		
	3.1. Installing the unit	18
	3.1.1. Assembly instructions	
	3.1.2. Step 1–4	
	3.2. Condensation drain	
	3.2.1. Condensation outlet	24
/Z		
7		
4. Electrical instal	llation	
4. Electrical ilistal	4.1. Electrical installation	26
	4. I. Electrical installation	20
<i>\$</i> 2		
U		
5. Maintenance		
	5.1. Maintenance Schedule	27
	5.2. Hygiene	
	5.3. Service	
	5.3.1. Filter change	28
	5.3.2. Removing the counter flow heat exchangers	28
	5.3.3. Servicing and cleaning	31
	5.4. Airflow measurement	31
	5.4.1. Determination of airflow	31
	Pressure curves	32
0		
U		
C Table last 197		
6. Technical data	O.4 Welshit segmenter of the first	
	6.1. Weight, corrosion class, temperature ranges, etc	
	6.2. Compact filters	
	6.3. Bag filters	
	6.4. Capacity diagramtiletian with heat recovery	
	6.4.1. Capacity diagram, ventilation with heat recovery	37

6.4.2. Capaci	ty diagram, ventilation	on with bypass opera	ation	38
6.5. Ordering s	pare parts			38

#### 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

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  $\underline{R}$  for Right, indicates the supply air is to the right of the cooling unit, as seen from the operating side. The term  $\underline{L}$  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

#### No duct connection

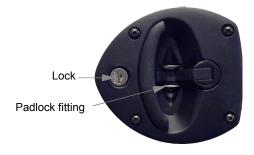


If one or more of the spigots is not connected to a duct: Fit a protective net to the spigots with a maximum mesh width of 20 mm (in accordance with EN294).

# Lock the air handling unit during operation

The VEX unit must always be locked during operation:

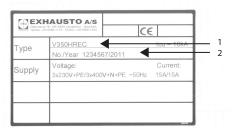
- Use the cylinder lock in the handle. <u>Remember</u> to remove the key from the lock.
- Or use a padlock. Use the handle's built-in padlock fixture.



Information plate

The VEX unit information plate shows:

- VEX model type (1)
- Unit production no. (2)



NB:

Have the production number ready at all times when contacting EXHAUSTO

A/S.



#### 1. Product information

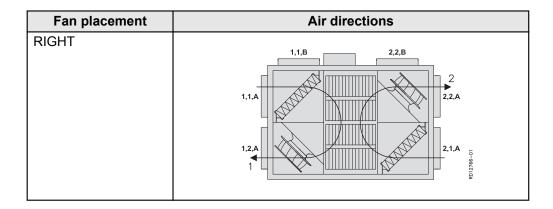
#### 1.1 Designations used in these instructions

#### 1.1.1 Model overview

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

#### **NB** The sketch shows compact filters

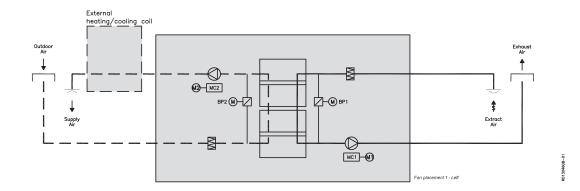
Fan placement	Air directions
LEFT	2,2,B 1,1,B 2,1,A 1,1,A



NB

Spigot location B option not available with outdoor models.

#### 1.1.2 Terms used in these instructions



#### The simplified diagram shows a VEX unit with LEFT fan placement.

Component	Function
MC1	Motor control, motor 1 (exhaust air)
MC2	Motor control, motor 2 (supply air)
M1	Exhaust motor
M2	Supply air motor
BP1 M	Bypass damper with motor (extract air - exhaust air)
BP2 M	Bypass damper with motor (outdoor air - supply air)

#### 1.2 Application

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

range for the unit – see section recrimical 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.

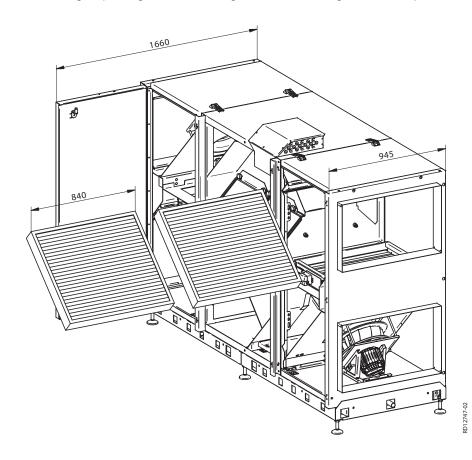
#### 1.3 Location requirements

#### **Positioning**

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

#### 1.3.1 Space requirements

The drawing below indicates how much space is required to open the side-mounted doors for servicing, replacing filters, cleaning, etc. The drawing shows compact fil-



ters.

NB

For servicing purposes, a free height of at least 200 mm is required above the unit's connection box.

#### 1.3.2 Requirements for underlying surface

When floor-mounting the unit, the surface must be:

- level (+/- 10 mm per metre)
- hard
- resistant to vibration

The VEX unit leg height can be adjusted: 55–110 mm.

#### **1.3.3 Outlet**

A condensation outlet must be installed in the immediate vicinity of the unit. See also "Mechanical fitting" section.

#### 1.3.4 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

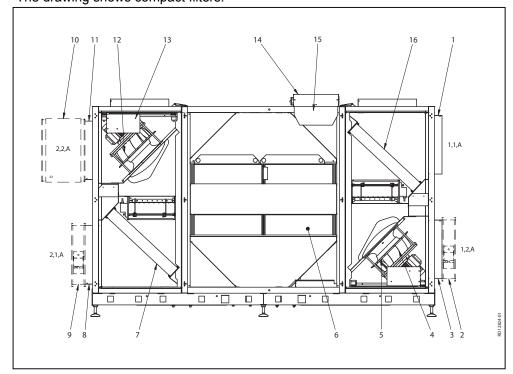


If one or more of the spigots is not connected to a duct: Fit a protective net to the spigots with a maximum mesh width of 20 mm.

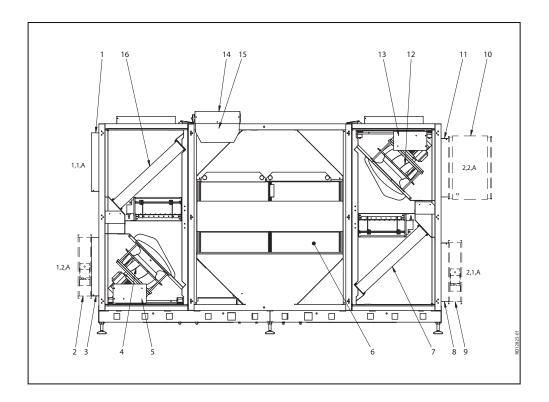
#### 1.4 Description

#### 1.4.1 VEX unit construction

Layout drawing, Left model The drawing below illustrates the construction of the unit, without doors: The drawing shows compact filters.



#### Layout drawing, Right model



Pos.	Part	Function
no.		
1	Spigot 1,1,A	Extract air spigot The spigot can also be positioned on the top of the unit (1,1,B). Does not apply to units designed for outdoor fitting
2	Closing damper LS	Closing damper, exhaust air, LSA (accessory).
3	Spigot 1,2,A	Exhaust air spigot
4	Fan unit, exhaust air	Removes "stale" air
5	Motor control, extract air fan	Variably adjusts fan
6	Counterflow heat ex- changer	Four aluminium counter flow heat exchangers
7	Outdoor air filter	Filters outdoor air
8	Spigot 2,1,A	Outdoor air spigot
9	Closing damper LS	Closing damper, outdoor air, LSF (accessory).
10	Heating coil	Heats supply air if heat recovery is insufficient (accessory).
11	Spigot 2,2,A	Supply air spigot. The spigot can also be positioned in the top of the unit (2,2,B). Does not apply to units designed for outdoor fitting
12	Fan unit, supply air	Blows air into the room
13	Motor control, extract air fan	Variably adjusts fan
14	Connection box	Connection terminal board
15	Connection box	Cover plate
16	Extract air filter	Filters extract air

Cabinet The inside and outside of the cabinet is made of Aluzinc® The cabinet is insulated

with 50 mm mineral wool.

**Fans** The unit contains two centrifugal fans for exhaust air and supply air.

Counter flow heat

exchangers

The unit's counterflow heat exchangers are made of aluminium and are highly efficient. The counterflow heat exchangers can be taken out and cleaned. See sec-

tion "Servicing".

**Filters** There are integral panel filters on both the extract air and outdoor air sides.

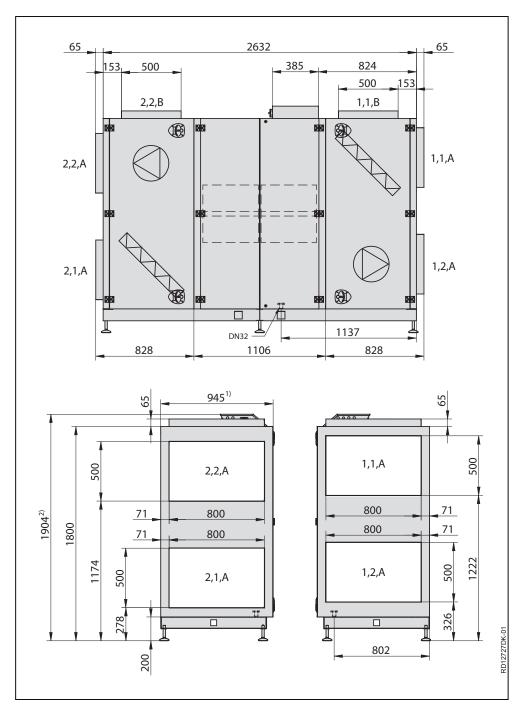
Bypass design The unit has a built-in double modulating bypass.

#### 1.5 Main aim

#### 1.5.1 Dimensional drawing

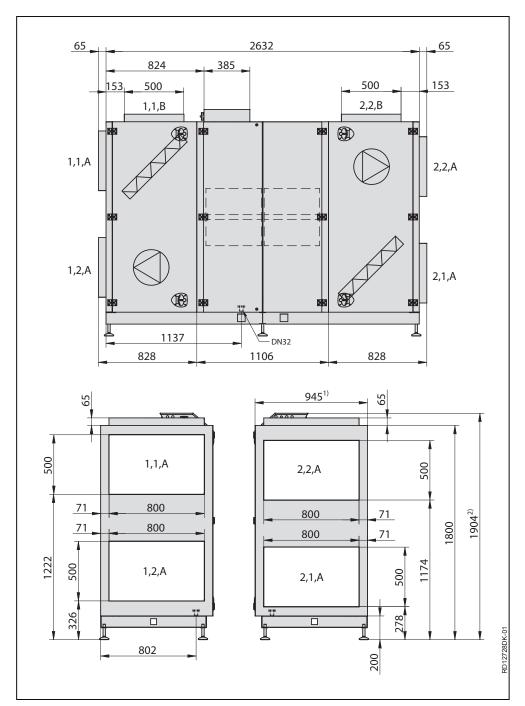
The sketches show compact filters.

#### VEX350H, Left



- 1) Allow for space in front of the VEX unit, so the doors can be opened
- 2) Allow for free height over the VEX unit, so the connection box can be serviced See the section on "Space requirements".

#### VEX350H, Right



- 1) Allow for space in front of the VEX unit, so the doors can be opened
- 2) Allow for free height over the VEX unit, so the connection box can be serviced See the section on "Space requirements".

3004084-2017-12-20 **Handling** 



#### 2. Handling

#### 2.1 Unpacking

# Supplied components

The following components are supplied:

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

#### **Packaging**

The unit is delivered in three sections on separate disposable pallets; packed in cardboard and clear plastic. The base is packed in a wooden box.

#### Unpacking

Depending on the installation site's spatial limitations, unpacking can be done in the following manner:

- Unpack and assemble the base and sections and subsequently transport the VEX unit to the site or
- set up the base at the installation side and mount the sections on the base afterwards.

Base assembly is described in section 3.1.

#### 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

#### Transport equipment

Move the VEX unit using a lifting or fork-lift truck or crane, as described in the instructions "Transport of VEX350-360-370".

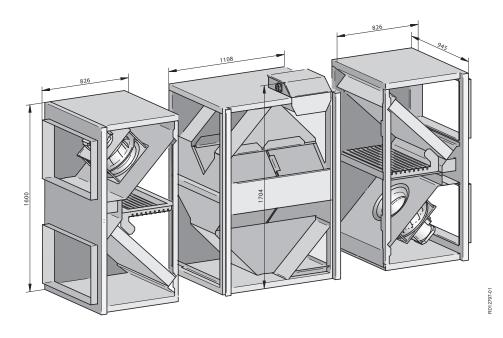
#### 2.2.1 Passage through openings

The sections' principal dimensions

Measurements are based on the exact dimensions of the VEX unit.

3004084-2017-12-20 **Handling** 

The VEX unit is shown with compact filters.



Width

The list below shows the unit's dimensions, and is intended to indicate how large 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 945 mm	Remove doors and the support bars which the central doors are fixed to – as described in section "Internal transport with reduced weight".
Greater than 945 mm	The unit can pass through

#### 2.2.2 Internal transport with reduced weight

#### Weight reduction

The weight can be reduced during transport by removing the service doors, fan units and counter flow heat exchanger. The table below shows the how much weight is reduced when the subcomponents are removed.

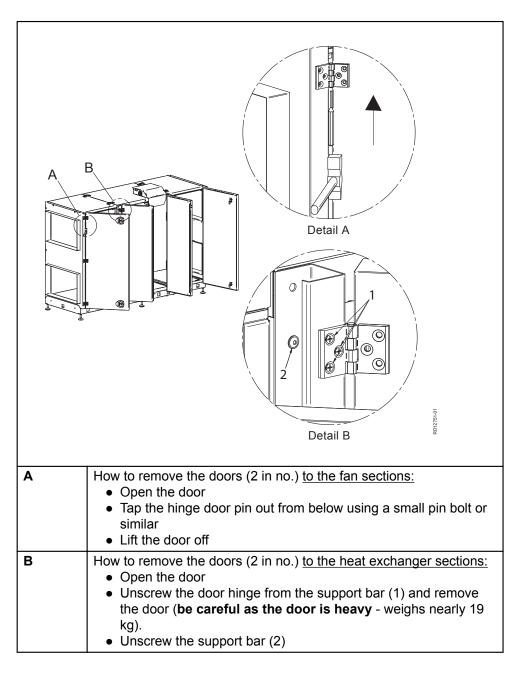
Section	Subcomponents	Weight
Fan section, 2 x 150 kg		
	Fan section, empty cabinet	101 kg
	Door	19 kg
	Fan unit	26 kg
	Compact or bag filters, 2 items of 2 kg weight	4 kg
Exchanger section, 1 x 260 kg		
	Exchanger section, empty cabinet	179 kg
	Counter flow heat exchangers, 4 x 13.5 kg	54 kg
	Doors, 2 x 13.5 kg	27 kg

3004084-2017-12-20 **Handling** 

Section	Subcomponents	Weight
Base, 1 x 75 kg		
Total weight VEX350 unit		635 kg

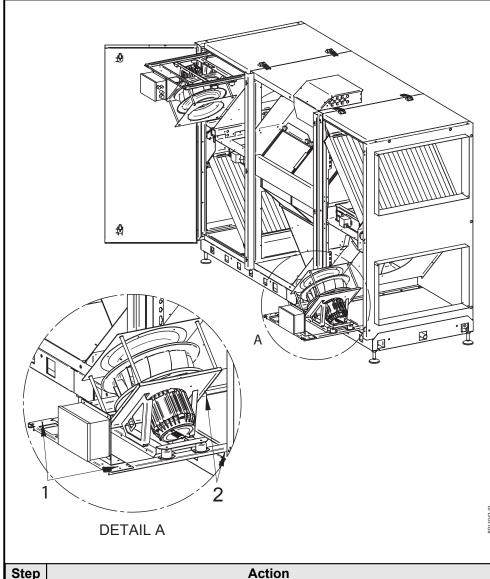
# Removing the service doors

To remove the service doors:



Handling 3004084-2017-12-20

#### To remove the fan unit



Step	Action
1	Remove the fixing screws (1) on the sliding rail (out towards the operating side)
2	Cut the cable ties holding the motor cable and the cable ties holding 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 the control cable in the motor control.
5	Remove the two end-stops (screws one on the sliding rail (2)). The fan unit can now be lifted off.
	NB: A single fan unit weighs 26 kg.

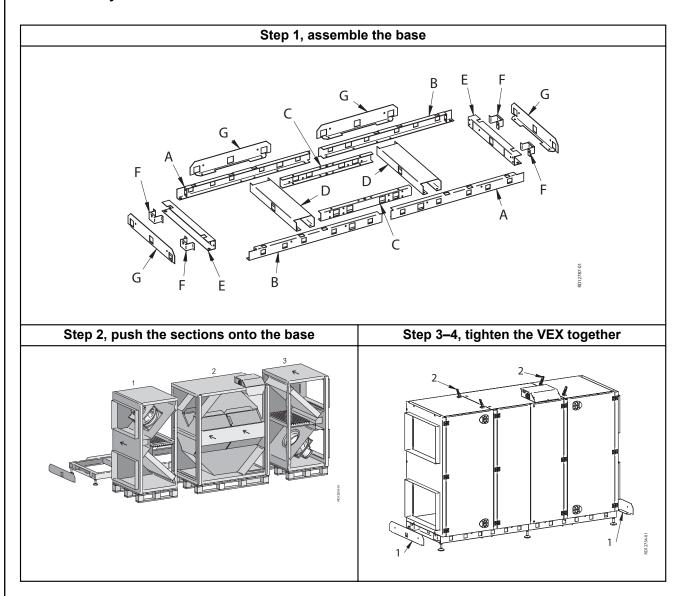
Removing the counter flow heat ex
See section "Servicing" changers



#### 3. Mechanical assembly

#### 3.1 Installing the unit

#### 3.1.1 Assembly instructions



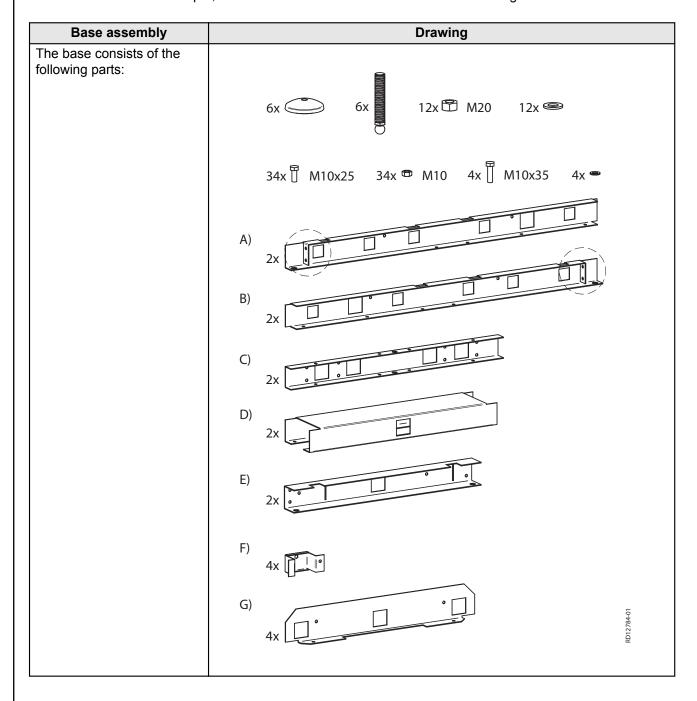
Base

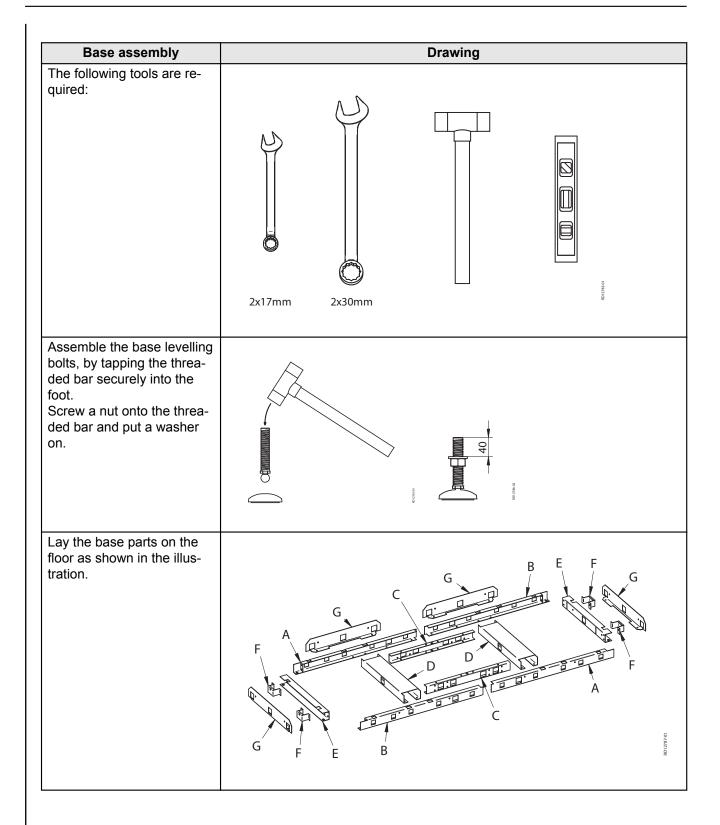


The unit must be assembled on the base – to ensure it is tightened correctly.

#### 3.1.2 Step 1-4

Step 1, Base: Assemble the base as shown in the drawing below.





Base assembly	Drawing
Assemble the long pieces:  • Front long piece: Join A, B and C with nuts and bolts.  • Rear long piece: Join A, B, C and G with bolts and nuts.	M10 B B A
Fit the two small tension fit- tings (F) on each side of the short members (G) and se- cure firmly using nuts and bolts.	M10 M10 M10x25
Firmly screw the two short members (G) to one of the long pieces using nuts and bolts.	M10x25 M10
Turn the base top-side-down and screw the spacers on using nuts and bolts (M10).	M10x25 M10

Base assembly	Drawing
Screw the last long piece on using nuts and bolts.	M10x25 M10
Screw the levelling bolts on the base with M20 nuts and washers	
Turn the base with legs down and place it so that the tension fittings face away from the operating side	



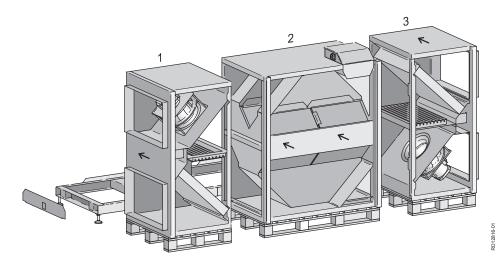
It is important that the base is levelled before the VEX unit is placed on the base. Adjust the levelling bolts, so that the base is horizontal.

NB

It is best to fit a condensation pipe to the base before the sections are pushed into position. See section "Condensation outlet".

# Step 2, VEX sections

Manoeuvre the sections onto the base by pushing them directly from the pallet onto the base.

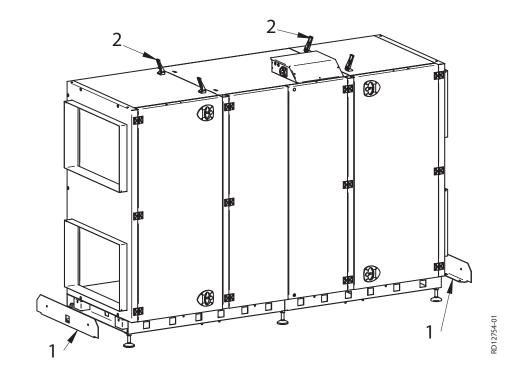


- 1. Firstly, push a fan section onto the base.
- 2. Secondly, push the exchanger section onto the base
- 3. Lastly, push the last fan section onto the base.

# Step 3, Assembly panels and fittings

When all three sections are on the base:

- 1. Tighten the two assembly panels against the VEX unit using the four bolts (M10 x 35)
- 2. Close the four fittings on the top of the VEX unit (2).



Step 4, Smooth joints at the condensation tray

To ensure joints are sealed at the condensation tray, the transition between the bottom motor and the condensation tray must be sealed:

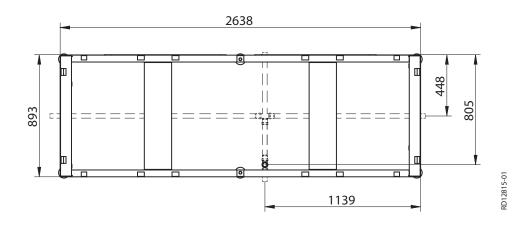
# Action Smooth the two joints (front and rear on the transition) with a finger. (The arrow shows the rear joint)

#### 3.2 Condensation drain

#### 3.2.1 Condensation outlet

#### Connection

The condensation from the unit is collected and directed under the VEX. The condensation outlet can run out from the base as shown in the drawing below.



 $\triangle$ 

Drain the condensation outlet into a floor gully or similar. The condensation outlet must be fitted with a water trap.

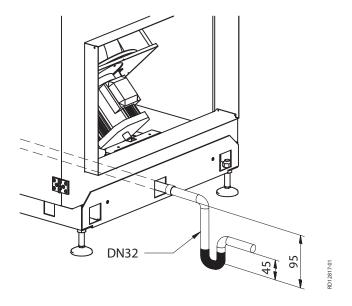
Risk of frost



Where there is a risk of frost: Insulate the condensation outlet and protect it against frost - if necessary, using a heating cable. Both the condensation pipe under the VEX unit and the condensation outlet need insulating.

Water trap

See the correct dimensions for the water trap on the drawing below.



3004084-2017-12-20 Electrical installation



#### 4. Electrical installation

#### 4.1 Electrical installation

See the attached instructions "Electrical Installation Guide VEX350HX-VEX360HX-370HX for third-party control system".





#### 5. Maintenance

#### 5.1 Maintenance Schedule

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
Compact/bag filters*	The filter should be changed at least Recommended that both filters are replaced at the same time.		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.	Х	
Fans and heating coil (accessories)	Check Dismantling of fan unit, see section "Internal transport with reduced weight" Cleaning, see following sections	Х	
Counter flow heat exchanger	Check	Х	
Closing damper	Function check	Х	
Motor valve and circulation pump (accessories)	Function check	Х	

# As and when required

Following parts are cleaned as and when required

Component	As and when required	
Condensation tray	Cleaning and inspection of outlet and water trap	
Counterflow heat exchanger	Cleaning. See next sections.	

#### \*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 Hygiene

# VDI6022 air hygiene standard

To ensure that the VEX300 meets the requirements of the VDI 6022 hygiene standard, its design ensures that:

- bacterial growth and dirt accumulation are minimal
- conditions for cleaning are optimum

Filter F7

The outdoor air side of the unit must be fitted with a F7 filter to meet VDI 6022 requirements.

#### 5.3 Service

#### 5.3.1 Filter change



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

Redundant filters must be stored immediately in sealed plastic bags and disposed of responsibly.

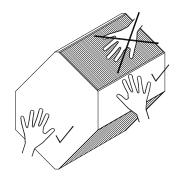
#### 5.3.2 Removing the counter flow heat exchangers



Disconnect power at the isolation switch before opening the door.

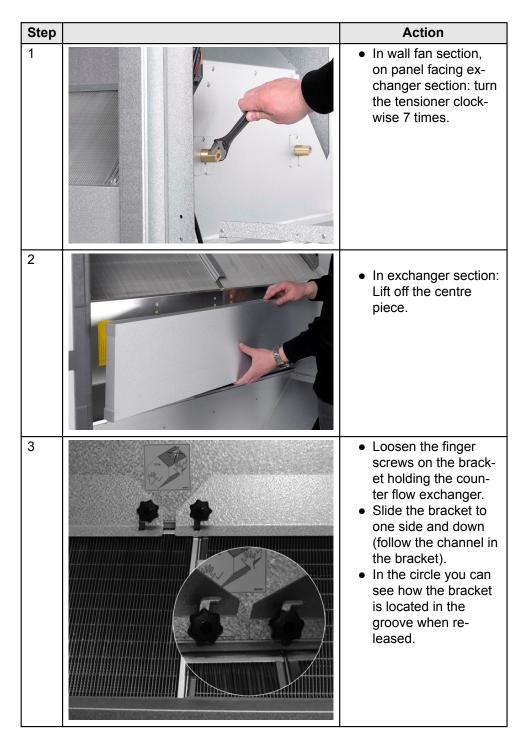


The counter flow heat exchanger fins can be easily damaged - avoid contact with the fins.



# How to remove the counter flow heat exchangers

The following text describes how to remove the four counter flow heat exchangers.



Step	Action
4	Remove the panel by pulling on the handle.
5	<ul> <li>Lift out the right-hand heat exchanger.</li> <li>Lift out the left-hand heat exchanger.</li> <li>NB: A single counter flow heat exchanger weighs 13.5 kg.</li> </ul>
6	The rear exchangers can now be removed.  • Turn the tensioner clockwise 7 times (See step 1)
7	<ul> <li>Lift out the centre piece</li> <li>Repeat points 3-4-5</li> </ul>

# Refitting the counter flow heat exchangers

The following describes how to refit the counter flow heat exchangers and it refers directly to the above instructions for removing the heat exchangers.

Step	Action
1	<ul> <li>Set the rear exchangers in place.</li> <li>Push the handle into place (step 4).</li> <li>Release the finger screws, insert the bracket and screw in the finger screws without tightening them (step 3).</li> </ul>
2	<ul> <li>Turn the rear tensioner anticlockwise 7 times (step 1).</li> <li>Tighten the finger screws.</li> <li>Refit the front panel (step 7).</li> </ul>
3	Repeat steps 1 and 2 for the front exchangers.

#### 5.3.3 Servicing and cleaning

Cleaning the counter flow heat exchanger:

- · Clean the exchanger by flushing with hot water
- Water temperature max. 90°C.

# How to clean the 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
2	Clean the fan impellers with a vacuum cleaner and by wiping with a damp cloth  NB: Clean the impellers carefully to avoid disturbing the balance
3	Once re-fitted, check the unit operates without vibrating

# Cleaning cold water coil/heating coil

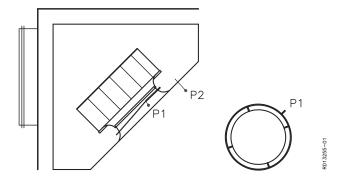
Step	Action	
1	Switch off the power supply to the unit at the isolation switch	
2	Vacuum clean the heating coil	
3	Cold water coil: clean the condensation tray	

#### 5.4 Airflow measurement

#### 5.4.1 Determination of airflow

Airflow in the unit can be determined by pressure measurements. In each ventilator inlet there are measurement spigots for use in pressure measurements, see drawing below:

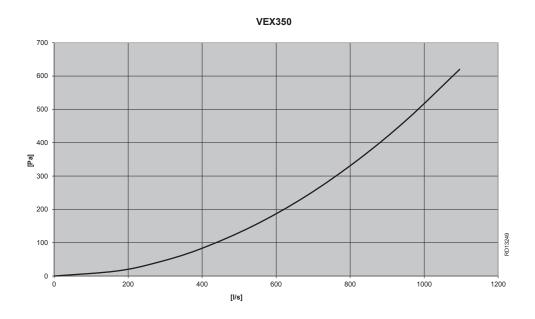
- Connect the inlet spigots to a measurement point P1
- Measure reference pressure P2
- Calculate Δp: P1 P2 = Δp



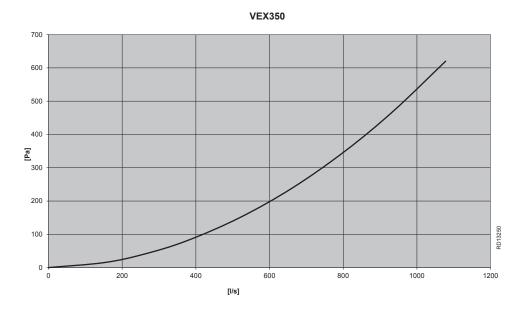
By using the value for  $\Delta p$  in the relevant diagram (either supply air or extract air), the airflow can be read off.

#### **Pressure curves**

#### Supply air:



#### Extract air:





#### 6. Technical data

#### 6.1 Weight, corrosion class, temperature ranges, etc.

#### Weight

Weight	635 kg
1 3 -	]

#### **Corrosion class**

#### **Temperature ranges**

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 damper**

Motor damper type	LS500x80024	LSR500x80024
Designation	LSA/LSF	LSFR
Motor type	NM24-F	AF-24
Rotation time	75–150 s	open: 150 s close: 16 s
Ingress protection	IP42	IP42
Ambient temperature	-20°C to +50°C	-30°C to +50°C
Damper depth (LS rail system) Damper depth (METU rail system)	115 mm 150 mm	115 mm 150 mm

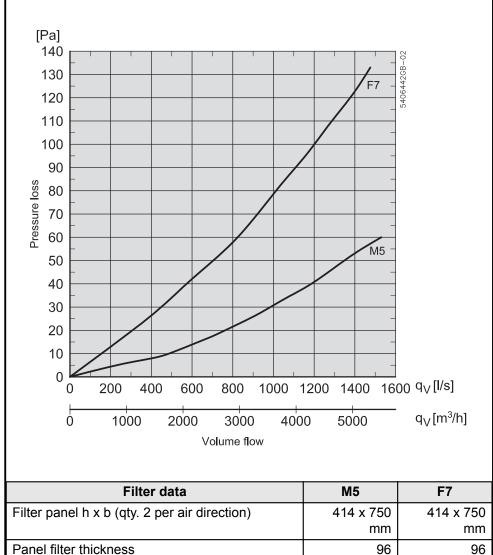
A maximum of two LSFR dampers or four LSA/LSF dampers may be connected.

#### **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



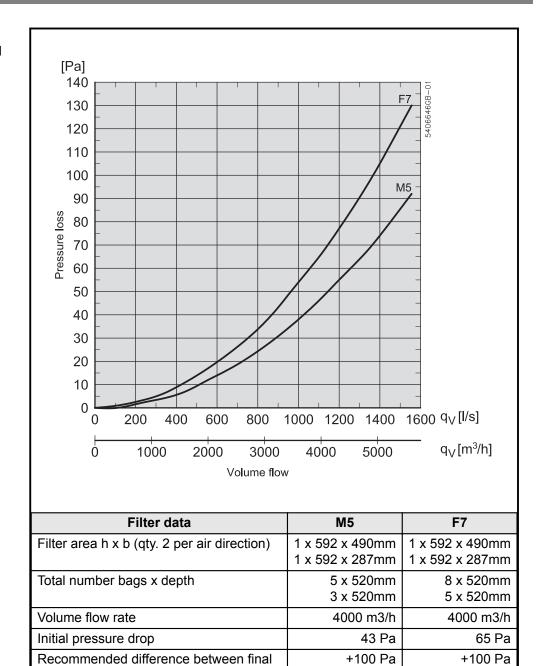
Filter data	IVI5	F/
Filter panel h x b (qty. 2 per air direction)	414 x 750	414 x 750
	mm	mm
Panel filter thickness	96	96
Efficiency	45 %	85 %
Recommended difference between final pressure drop and initial pressure drop	+100 Pa	+100 Pa



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



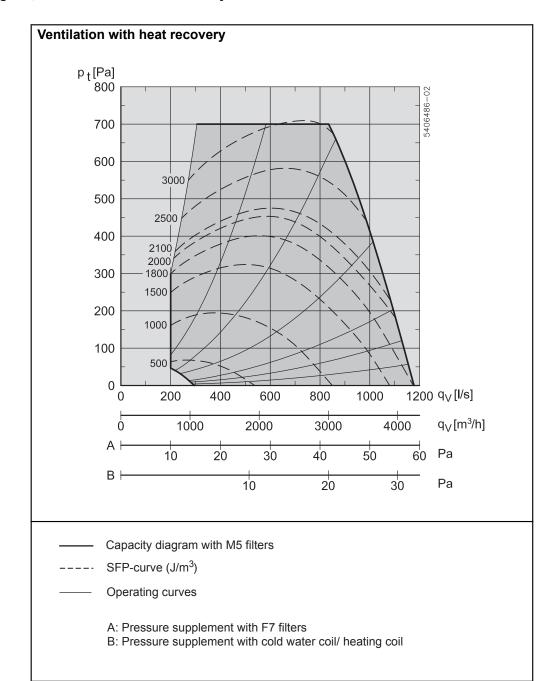


EUROVENT certification is only valid if original filters are used. For more details about original filters, see section "Maintenance".

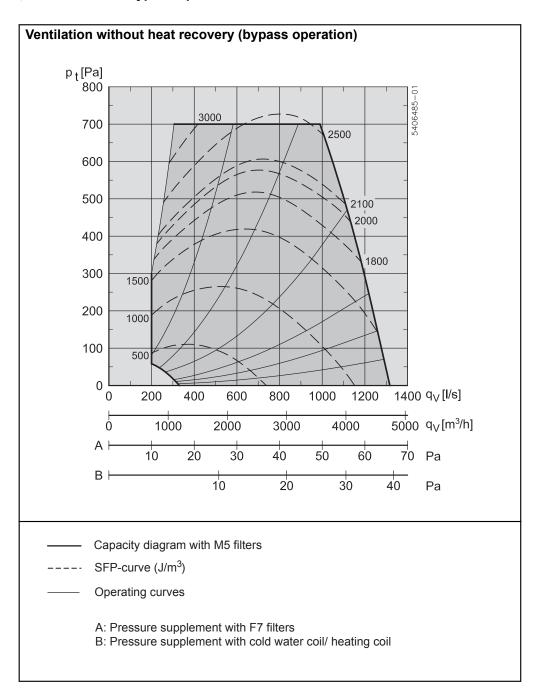
pressure drop and initial pressure drop

#### 6.4 Capacity diagram

#### 6.4.1 Capacity diagram, ventilation with heat recovery



#### 6.4.2 Capacity diagram, ventilation with bypass operation



#### 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.



Scan code and go to addresses at www.exhausto.com

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