TopVent® TH | TC | THC | MH | MC | MHC

Operating instructions

TopVent®
TH | TC | THC
MH | MC | MHC

Original operating manual
4 218 828-en-01

Hoval

1 Use

1.1 Intended use

TopVent® TH, TC, THC recirculation units

These TopVent® units are recirculation units for heating and cooling spaces up to 25 m in height with central heat and cold supply. They have the following functions:

- Heating (with connection to a hot water supply)
- Cooling (with connection to a water chiller) (only TC, THC)
- Recirculation operation
- Air distribution and destratification with adjustable Air-Injector
- Air filtration (option)

TopVent® MH, MC, MHC supply air units

These TopVent® units are supply air units for ventilating, heating and cooling spaces up to 25 m in height with central heat and cold supply. They have the following functions:

- Heating (with connection to a hot water supply)
- Cooling (with connection to a water chiller) (only MC, MHC)
- Fresh air supply
- Mixed air operation
- Recirculation operation
- Air distribution and destratification with adjustable Air-Injector
- Air filtration

The TopVent® units comply with all the requirements of the Ecodesign Directive 2009/125/EC relating to environmentally friendly design of ventilation systems. They are systems of the 'fan coil unit' type.

Intended use also includes compliance with the operating instructions. Any usage over and above this use is considered to be not as intended. The manufacturer can accept no liability for damage resulting from improper use.

1.2 User group

The units are only allowed to be installed, operated and maintained by authorised and instructed personnel who are well acquainted with the units and are informed about possible dangers.

The operating instructions are for operating engineers as well as specialists in building, heating and ventilation technology.

2 Safety

2.1 Symbols

Caution
This symbol warns against risk of injury. Please heed all instructions designated by this symbol to prevent injuries and/or death.

Attention
This symbol warns against property damage. Please heed the respective instructions to prevent risk of damage to the unit and its functions.

Notice
This symbol denotes information about the economic use of the equipment or special tips.

2.2 Operational safety

The unit is built to conform to the state-of-the-art and is operationally safe. Despite every precaution being taken, potential and not immediately obvious risks always remain, for example:

- Dangers when working with the electrical system
- Parts (e.g. tools) can fall down below when working on the ventilation unit.
- Dangers from working on the roof
- Damage to devices or components due to lightning
- Malfunctions as a result of defective parts
- Hazards from hot components when working on the electric heating coil
- Hazards from hot water when working on the hot water supply

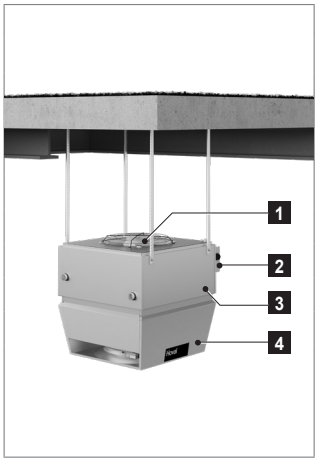
Therefore:

- Please read the operating instructions before unpacking, installing, commissioning and before maintaining the equipment.
- Store the operating instructions so that they are easily accessible.
- Observe any attached information and warning signs.
- Immediately replace damaged or removed informational and warning signs.
- Follow the local safety and accident prevention regulations at all times.
- When working in the unit, take precautions against unprotected, sharp metal edges.
- The unit may only be installed, operated and serviced by authorised, trained and instructed skilled personnel:
  - Specialists as defined by these operating instructions are those persons who, based on their training, knowledge and experience as well as their knowledge of the relevant regulations and guidelines, can carry out the work assigned to them and recognise potential hazards.
- Unauthorised reconfiguration or modification of the unit is not permitted.

3 Construction and operation

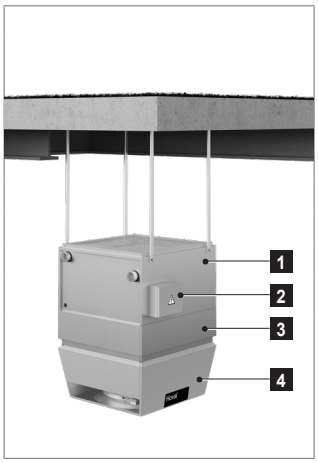
3.1 Components

TopVent® TH, TC, THC recirculation units



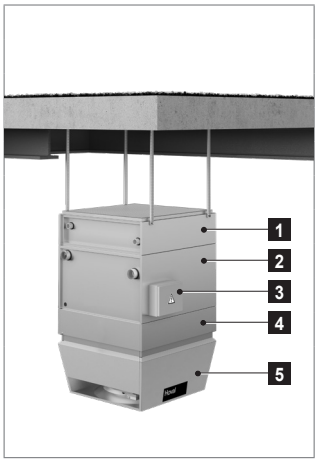
1 Fan unit
2 Unit control box
3 Heating section
4 Air-Injector

Fig. 1: TopVent® TH components



1 Heating/cooling section
2 Unit control box
3 Fan unit
4 Air-Injector

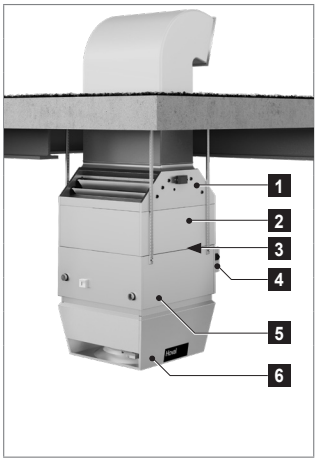
Fig. 2: TopVent® TC components



1 Heating section
2 Cooling section
3 Unit control box
4 Fan unit
5 Air-Injector

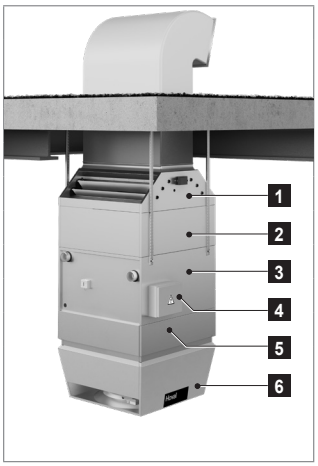
Fig. 3: TopVent® THC components

TopVent® MH, MC, MHC supply air units



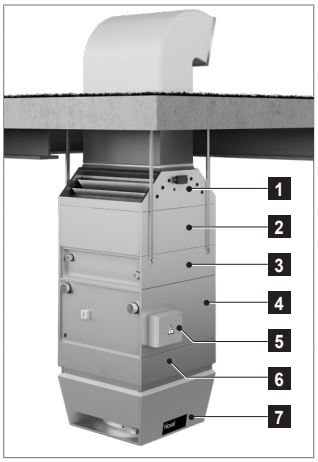
1 Mixed air box
2 Filter box
3 Fan unit
4 Unit control box
5 Heating section
6 Air-Injector

Fig. 4: TopVent® MH components



1 Mixed air box
2 Filter box
3 Heating/cooling section
4 Unit control box
5 Fan unit
6 Air-Injector

Fig. 5: TopVent® MC components

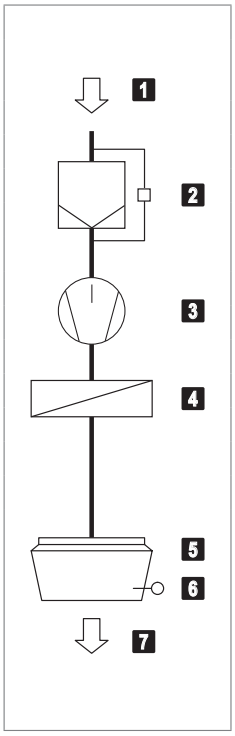


1 Mixed air box
2 Filter box
3 Heating section
4 Cooling section
5 Unit control box
6 Fan unit
7 Air-Injector

Fig. 6: TopVent® MHC components

3.2 Function diagrams

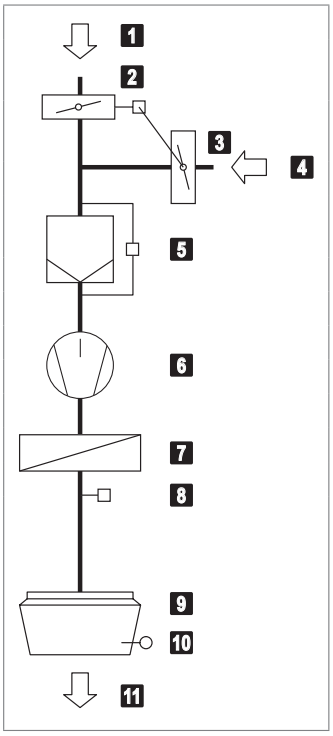
TopVent® TH recirculation units



1 Extract air
2 Air filter with differential pressure switch (option)
3 Fan
4 Heating coil
5 Air-Injector with actuator
6 Supply air temperature sensor
7 Supply air

Fig. 7: TopVent® TH function diagram

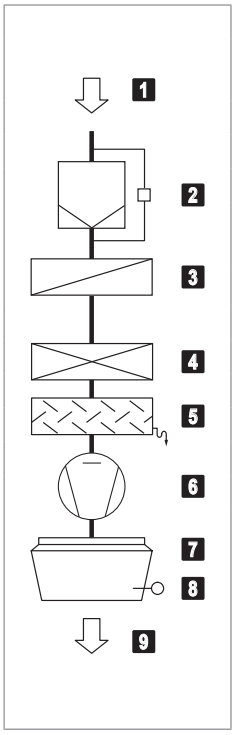
TopVent® MH supply air units



1 Fresh air
2 Fresh air damper with actuator
3 Recirculation damper (opposed to the fresh air damper)
4 Extract air
5 Air filter with differential pressure switch
6 Fan
7 Heating coil
8 Frost controller
9 Air-Injector with actuator
10 Supply air temperature sensor
11 Supply air

Fig. 9: TopVent® MH function diagram

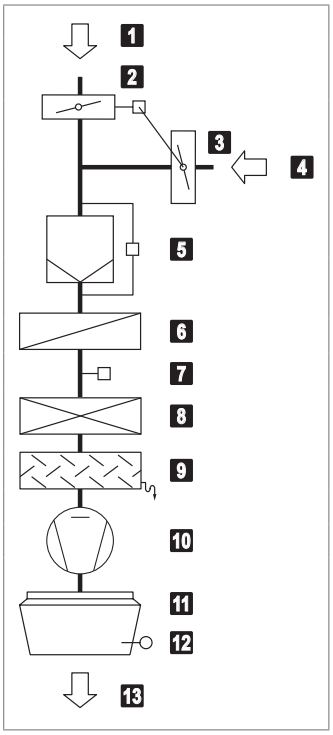
TopVent® TC, THC recirculation units



1 Extract air
2 Air filter with differential pressure switch (option)
3 Heating coil (only TopVent® THC)
4 Cooling coil
5 Condensate separator
6 Fan
7 Air-Injector with actuator
8 Supply air temperature sensor
9 Supply air

Fig. 8: TopVent® TC, THC function diagram

TopVent® MC, MHC supply air units



1 Fresh air
2 Fresh air damper with actuator
3 Recirculation damper (opposed to the fresh air damper)
4 Extract air
5 Air filter with differential pressure switch
6 Heating coil (only TopVent® MHC)
7 Frost controller
8 Cooling coil
9 Condensate separator
10 Fan
11 Air-Injector with actuator
12 Supply air temperature sensor
13 Supply air

Fig. 10: TopVent® MC, MHC function diagram

4 Operating modes

The units have the following operating modes:
- Supply air speed 2 (only TopVent® MH, MC, MHC)
- Supply air speed 1 (only TopVent® MH, MC, MHC)
- Recirculation
- Recirculation speed 1
- Standby

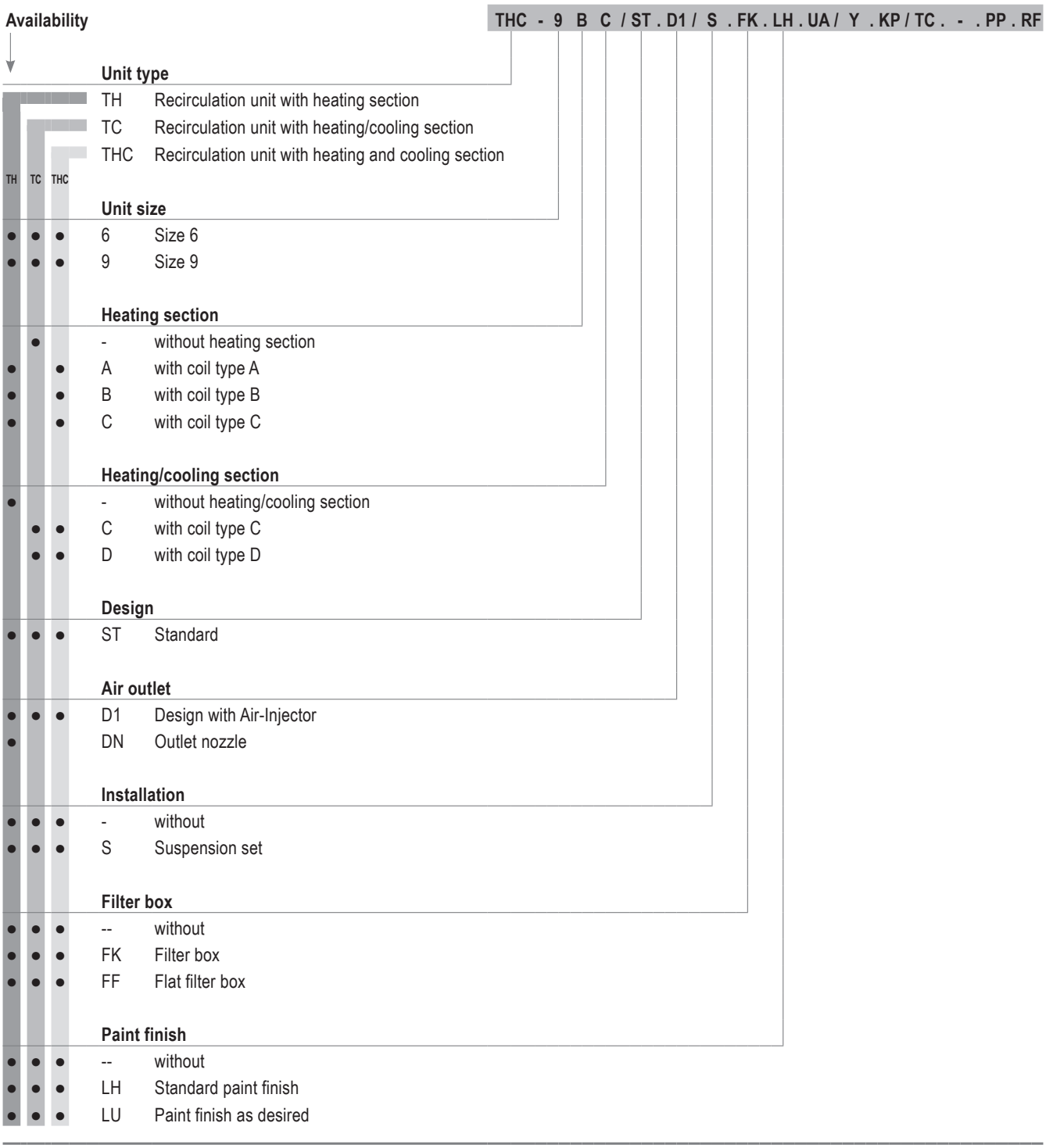
The TopTronic® C control system regulates these operating modes automatically for each control zone in accordance with the specifications in the calendar. The following points also apply:
- The operating mode of a control zone can be switched over manually.
- Each TopVent® unit can operate individually in a local operating mode: Off, Supply air speed 2, Supply air speed 1, Recirculation, Recirculation speed 1 (depending on the unit type)

Code	Operating mode	Description
SA2	**Supply air speed 2** The unit blows fresh air into the room. The fresh air ratio is adjustable. Heating/cooling is controlled according to the heat/cool demand. The room temperature set value day is active. The unit operates at speed 2 (high air flow rate).	Fan ..... speed 2 Fresh air damper..... 10 % open [1] Heating/cooling ..... on [2] [1] Percentage is adjustable [2] Depending on heat or cool demand
SA1	**Supply air speed 1** The same as SA2, but the unit operates at speed 1 (low air flow rate)	Fan ..... speed 1 Fresh air damper..... 10 % open [1] Heating/cooling ..... on [2] [1] Percentage is adjustable [2] Depending on heat or cool demand
REC	**Recirculation** On/Off operation: During heat or cool demand, the unit draws in room air, heats or cools it and blows it back into the room. The room temperature set value day is active.	Fan ..... speed 1 / 2 [1] Fresh air damper..... closed Heating/cooling ..... on [1] [1] Depending on heat or cool demand
DES	■ Destratification: To avoid heat build-up under the ceiling, it may be appropriate to switch on the fan when there is no heat demand (either in permanent operation or in on/off operation depending on the temperature stratification, as desired).	Fan ..... speed 2 Fresh air damper..... closed Heating/cooling ..... off
REC1	**Recirculation speed 1** The same as REC, but the unit operates only at speed 1 (low air flow rate)	Fan ..... speed 1 Fresh air damper..... closed Heating/cooling ..... on [1] [1] Depending on heat or cool demand
DES	■ Destratification: The same as for REC, but the unit operates only at speed 1	Fan ..... speed 1 Fresh air damper..... closed Heating/cooling ..... off
ST	**Standby** The unit is ready for operation. The following operating modes are activated if required:	
CPR	■ Cooling protection: If the room temperature drops below the set value for cooling protection, the unit heats up the room in recirculation operation.	Fan ..... speed 2 Fresh air damper..... closed Heating ..... on
OPR	■ Overheating protection: (only cooling units) If the room temperature rises above the set value for overheating protection, the unit cools down the room in recirculation operation.	Fan ..... speed 2 Fresh air damper..... closed Cooling..... on
NCS	■ Night cooling: (only TopVent® MH, MC, MHC supply air units) If the room temperature exceeds the set value for night cooling and the current fresh air temperature permits it, the unit blows cool fresh air into the room and extracts warmer room air.	Fan ..... speed 2 Fresh air damper..... open Heating/cooling ..... off
L_OFF	**Off** (local operating mode) The unit is switched off. Frost protection for the unit remains active.	Fan ..... off Fresh air damper..... closed Heating/cooling ..... off
–	**Forced heating** (only TopVent® MH, MC, MHC supply air units) The unit draws in room air, warms it and blows it back into the room. Forced heating can be activated and set as required by the Hoval service technician. For example, it is suitable for heating the hall before taking the control system into operation or if the controller fails during the heating period.	Fan ..... speed 2 [1] Fresh air damper..... closed [1] Heating ..... on [1] [1] Adjustable by the Hoval service technician

Table 1: Operating modes

5 Type code

TopVent® TH, TC, THC recirculation units



THC - 9 B C / ST . D1 / S . FK . LH . UA / Y . KP / TC . - . PP . RF

Availability TH	TC	THC		
			Silencer	
●	●	●	--	without
●	●	●	U-	Recirculation silencer
●	●	●	-A	Acoustic cowl
●	●	●	UA	Recirculation silencer and acoustic cowl
			Hydraulics	
●	●	●	-	without
●	●	●	Y	Hydraulic assembly diverting system
●	●	●	M	Mixing valve
			Condensate pump	
●	●	●	--	without
	●	●	KP	Condensate pump
			Control system	
●	●	●	TC	TopTronic® C
●	●		KK	Terminal box design
			Reserve	
			Pump control	
●	●	●	--	without
●		●	PH	Heating pump
	●	●	PK	Heating or cooling pump
		●	PP	Heating pump and cooling pump
			Return temperature sensor	
●	●	●	--	without
●	●		RF	Return temperature sensor

Table 2: Type codes of recirculation units

TopVent® MH, MC, MHC supply air units

Availability

MHC - 9 B C / ST . D1 / S . -- . LH . A / Y . KP / TC . PP . RF

Unit type

MH		Supply air unit with heating section
MC		Supply air unit with heating/cooling section
MHC		Supply air unit with heating and cooling section

Unit size

MH	MC	MHC		
●	●	●	6	Size 6
●	●	●	9	Size 9

Heating section

MH	MC	MHC		
	●		-	without heating section
●		●	A	with coil type A
●		●	B	with coil type B
●		●	C	with coil type C

Heating/cooling section

MH	MC	MHC		
●			-	without heating/cooling section
	●	●	C	with coil type C
	●	●	D	with coil type D

Design

MH	MC	MHC		
●	●	●	ST	Standard

Air outlet

MH	MC	MHC		
●	●	●	D1	Design with Air-Injector

Installation

MH	MC	MHC		
●	●	●	-	without
●	●	●	S	Suspension set

Reserve

Paint finish

MH	MC	MHC		
●	●	●	--	without
●	●	●	LH	Standard paint finish
●	●	●	LU	Paint finish as desired

Silencer

MH	MC	MHC		
●	●	●	--	without
●	●	●	A	Acoustic cowl

Hydraulics

MH	MC	MHC		
●	●	●	-	without
●	●	●	Y	Hydraulic assembly diverting system
●	●	●	M	Mixing valve

Availability

MHC - 9 B C / ST . D1 / S . -- . LH . A / Y . KP / TC . PP . RF

MH	MC	MHC		
			Condensate pump	
●	●	●	--	without
	●	●	KP	Condensate pump
			Control system	
●	●	●	TC	TopTronic® C
			Pump control	
●	●	●	--	without
●		●	PH	Heating pump
	●	●	PK	Heating or cooling pump
		●	PP	Heating pump and cooling pump
			Return temperature sensor	
●	●	●	--	without
●	●	●	RF	Return temperature sensor

Table 3: Type codes of supply air units

6 Technical data

6.1 Application limits

Extract air temperature		max.	°C	50
Supply air temperature		max.	°C	60
Temperature of the heating medium [1)]		max.	°C	90
Pressure of the heating medium		max.	kPa	800
Air flow rate	Size 6: Size 9:	min. min.	m³/h m³/h	3100 5000
Condensate quantity	Size 6: Size 9:	max. max.	kg/h kg/h	90 150
The units cannot be used in: ■ Damp locations ■ Places with a corrosive or aggressive environment ■ Spaces with a large amount of dust ■ Areas where there is danger of explosion				
[1)] Design for higher temperatures on request				

Table 4: Application limits

6.2 Electrical connection

Unit type		TH-6 MH-6	TH-9 MH-9	TC, THC, MC, MHC
Supply voltage	V AC	3 × 400	3 × 400	3 × 400
Permitted voltage tolerance	%	± 5	± 5	± 5
Frequency	Hz	50	50	50
Connected load	kW	1.5	2.1	3.6
Current consumption max.	A	2.9	4.0	5.9
Series fuse	A	13	13	13
Protection rating	-	IP 54	IP 54	IP 54

Table 5: Electrical connection

6.3 Air flow rate

Unit size		6	9
Nominal air flow rate	m³/h	6000	9000
Floor area covered	m²	537	946

Table 6: Air flow rate

6.4 Heat output

TopVent® TH, TC, THC recirculation units

Unit size	Coil type	Heat performance $P_{rated,h}$ (in kW)
6	A	13.2
	B	18.9
	C	29.8
9	A	22.6
	B	28.5
	C	46.2
	D	54.2
Reference:	Standard rating conditions for fan coil units according to Commission Regulation (EU) 2016/2281 ■ Room air temperature.....20 °C ■ Extract air temperature .....22 °C ■ Fan .....speed 2 ■ Heating medium temperature.....45/40 °C	

Table 7: TopVent® TH, TC, THC heat output

TopVent® MH, MC, MHC supply air units

Unit size	Coil type	Heat performance $P_{rated,h}$ (in kW)
6	A	13.2
	B	18.9
	C	29.8
9	A	22.6
	B	28.5
	C	46.2
	D	54.2
Reference:	Standard rating conditions for fan coil units according to Commission Regulation (EU) 2016/2281 ■ Room air temperature.....20 °C ■ Extract air temperature .....22 °C ■ Fresh air temperature .....12 °C ■ Fresh air ratio .....10% ■ Fan .....speed 2 ■ Heating medium temperature.....45/40 °C	

Table 8: TopVent® MH, MC, MHC heat output

6.5 Cooling capacity

TopVent® TC, THC recirculation units

Unit size	Coil type	Cooling capacity (sensible) ($P_{rated,c}$) (in kW)	Cooling capacity (latent) ($P_{rated,c}$) (in kW)
6	C	26.5	5.6
9	C	41.0	7.3
	D	48.6	15.2
Reference:	Standard rating conditions for fan coil units according to Commission Regulation (EU) 2016/2281 ■ Room air temperature.....27 °C (dry bulb) 19 °C (wet bulb) ■ Room air humidity.....46.26 % rH ■ Extract air temperature .....29 °C ■ Fan .....speed 2 ■ Cooling medium temperature.....7/12 °C		

Table 9: TopVent® TC, THC cooling capacity

TopVent® MC, MHC supply air units

Unit size	Coil type	Cooling capacity (sensible) ($P_{rated,c}$) (in kW)	Cooling capacity (latent) ($P_{rated,c}$) (in kW)
6	C	26.5	5.6
9	C	41.0	7.3
	D	48.6	15.2
Reference:	Standard rating conditions for fan coil units according to Commission Regulation (EU) 2016/2281 ■ Room air temperature.....27 °C (dry bulb) 19 °C (wet bulb) ■ Room air humidity.....46.26 % rH ■ Extract air temperature .....29 °C ■ Fresh air temperature .....32 °C ■ Fan .....speed 2 ■ Cooling medium temperature.....7/12 °C		

Table 10: TopVent® MC, MHC cooling capacity

6.6 Sound level

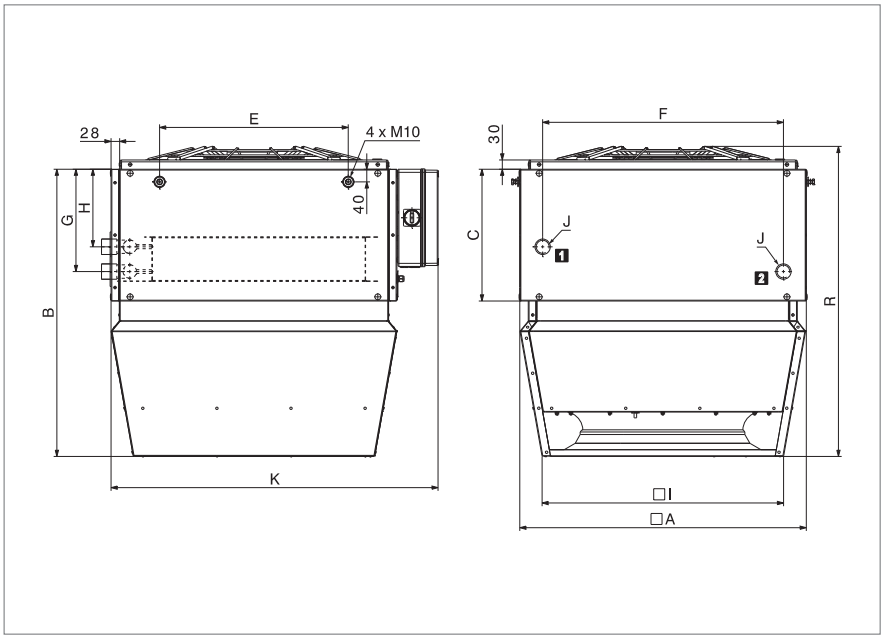
Unit type			TH-6C	TH-9C	TC-6-C	TC-9-C	THC-6CC	THC-9CC	MH-6C	MH-9C	MC-6-C	MC-9-C	MHC-6CC	MHC-9CC
Sound pressure level (at a distance of 5 m) [1]		dB(A)	55	58	51	59	54	60	58	60	52	59	56	60
Total sound power level		dB(A)	77	80	73	81	76	82	80	82	74	81	77	82
Octave sound power level	63 Hz	dB	55	61	41	49	41	47	57	62	42	49	43	47
	125 Hz	dB	60	65	59	67	59	66	61	66	60	67	61	67
	250 Hz	dB	65	69	62	70	62	69	67	71	63	70	64	70
	500 Hz	dB	70	73	65	73	68	74	72	74	66	73	69	74
	1000 Hz	dB	74	75	67	75	71	77	76	77	68	75	73	78
	2000 Hz	dB	70	75	67	75	71	76	73	76	68	75	72	76
	4000 Hz	dB	64	70	66	74	67	74	67	71	67	74	69	74
	8000 Hz	dB	56	63	61	68	58	67	59	64	62	68	60	67

[1] with a hemispherical radiation pattern in a low-reflection room

Table 11: Sound level

6.7 Dimensions and weights

TopVent® TH



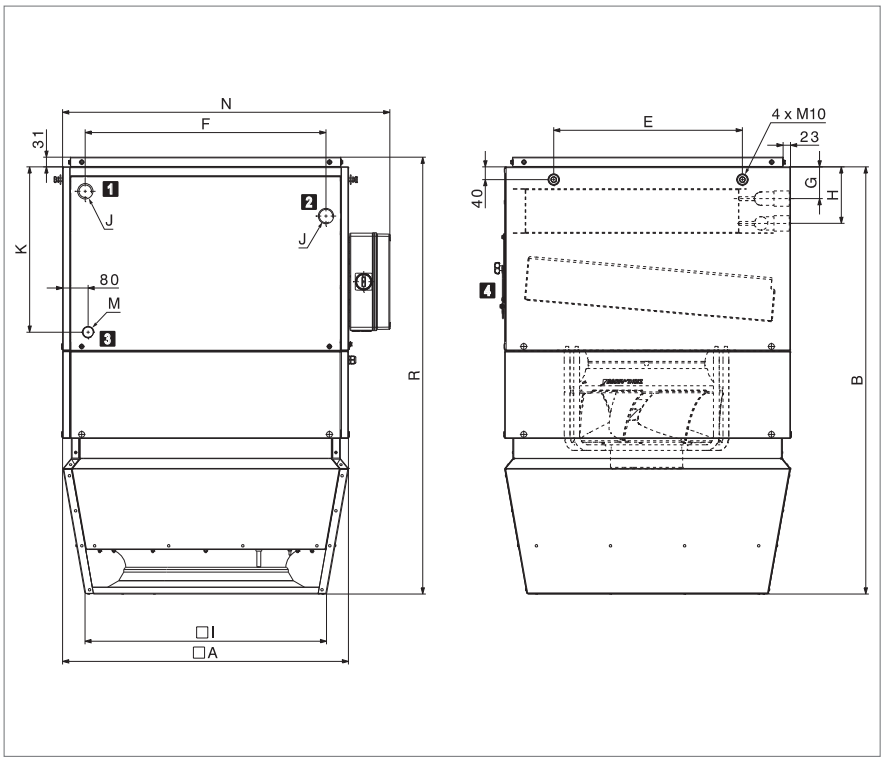
1 Return heating
2 Flow heating

Fig. 11: TopVent® TH dimensional drawing

Unit size		TH-6			TH-9		
Coil type		A	B	C	A	B	C
A	mm			900			1100
B	mm			905			1050
C	mm			415			480
E	mm			594			846
F	mm			758			882
G	mm			322			367
H	mm			244			289
I	mm			760			935
K	mm			1030			1230
R	mm			977			1152
J	"			Rp 1¼ (internal)			Rp 1½ (internal)
Water content of heating coil	l	4.6	4.6	7.9	7.4	7.4	12.4
Weight	kg	104	104	111	155	155	166

Table 12: TopVent® TH dimensions and weights

TopVent® TC



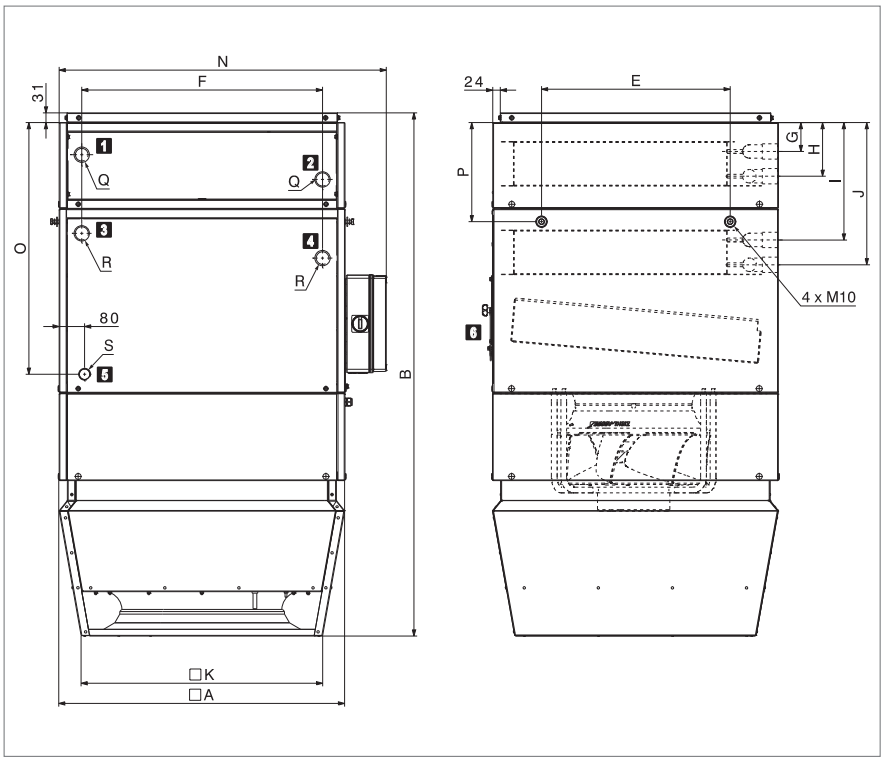
1 Return heating/cooling	3 Condensate connection
2 Flow heating/cooling	4 Access panel

Fig. 12: TopVent® TC dimensional drawing

Unit size		TC-6	TC-9	TC-9
Coil type		C	C	D
A	mm	900	1100	1100
B	mm	1344	1430	1430
E	mm	594	846	846
F	mm	758	882	882
G	mm	77	93	85
H	mm	155	171	180
I	mm	760	935	935
K	mm	521	558	558
N	mm	1030	1230	1230
R	mm	1375	1463	1463
J	"	Rp 1¼ (internal)	Rp 1½ (internal)	Rp 2 (internal)
M	"	G 1 (external)	G 1 (external)	G 1 (external)
Water content of heating/ cooling coil	l	7.9	12.4	19.2
Weight	kg	216	265	276

Table 13: TopVent® TC dimensions and weights

TopVent® THC



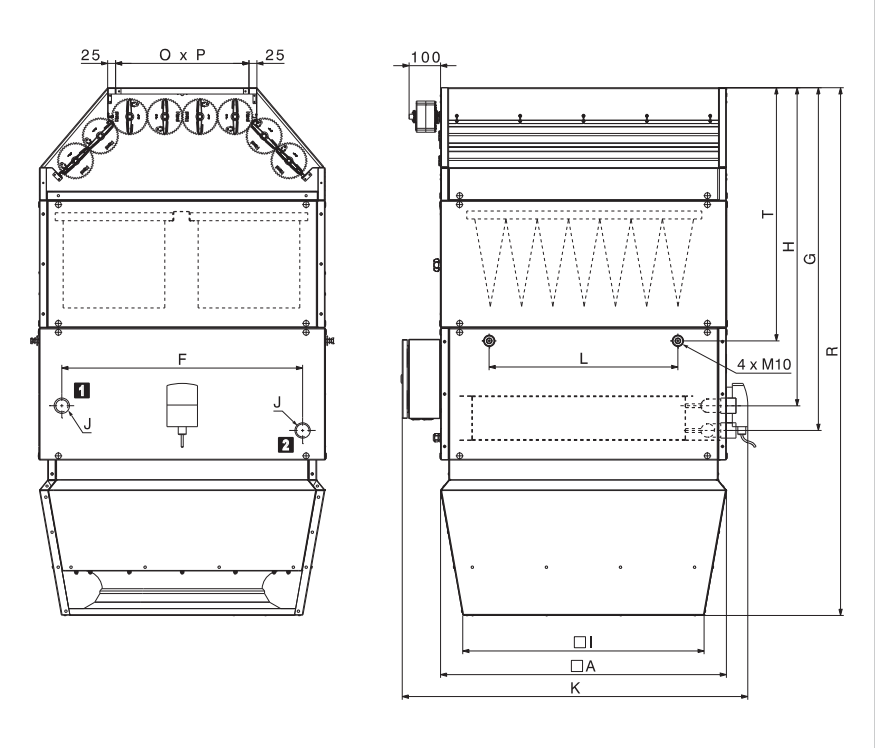
1 Return heating	3 Return cooling	5 Condensate connection
2 Flow heating	4 Flow cooling	6 Access panel

Fig. 13: TopVent® THC dimensional drawing

Unit size		THC-6			THC-9			THC-9		
Coil type		AC	BC	CC	AC	BC	CC	AD	BD	CD
A	mm	900			1100			1100		
B	mm	1647			1765			1765		
E	mm	594			846			846		
F	mm	758			882			882		
G	mm	101			111			111		
H	mm	179			189			189		
I	mm	349			395			386		
J	mm	427			473			481		
K	mm	760			935			935		
N	mm	1030			1230			1230		
O	mm	792			860			860		
P	mm	312			342			342		
Q	"	Rp 1¼ (internal)			Rp 1½ (internal)			Rp 1½ (internal)		
R	"	Rp 1¼ (internal)			Rp 1½ (internal)			Rp 2 (internal)		
S	"	G 1 (external)			G 1 (external)			G 1 (external)		
Water content of heating coil	l	4.6	4.6	7.9	7.4	7.4	12.4	7.4	7.4	12.4
Water content of cooling coil	l	7.9	7.9	7.9	12.4	12.4	12.4	19.2	19.2	19.2
Weight	kg	248	248	255	318	318	329	329	329	340

Table 14: TopVent® THC dimensions and weights

TopVent® MH



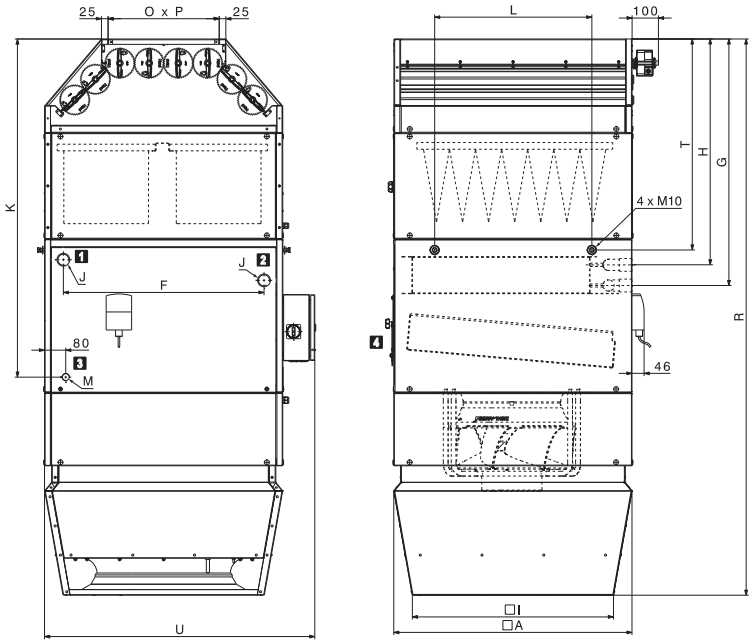
1	Return heating
2	Flow heating

Fig. 14: TopVent® MH dimensional drawing

Unit size		MH-6			MH-9		
Coil type		A	B	C	A	B	C
A	mm			900			1100
F	mm			758			882
G	mm			1077			1127
H	mm			999			1049
I	mm			760			935
K	mm			1089			1289
L	mm			594			846
O × P	mm			420 × 850			500 × 1050
R	mm			1660			1810
T	mm			795			800
J	"			Rp 1¼ (internal)			Rp 1½ (internal)
Water content of heating coil	l	4.6	4.6	7.9	7.4	7.4	12.4
Weight	kg	165	165	172	217	217	228

Table 15: TopVent® MH dimensions and weights

TopVent® MC



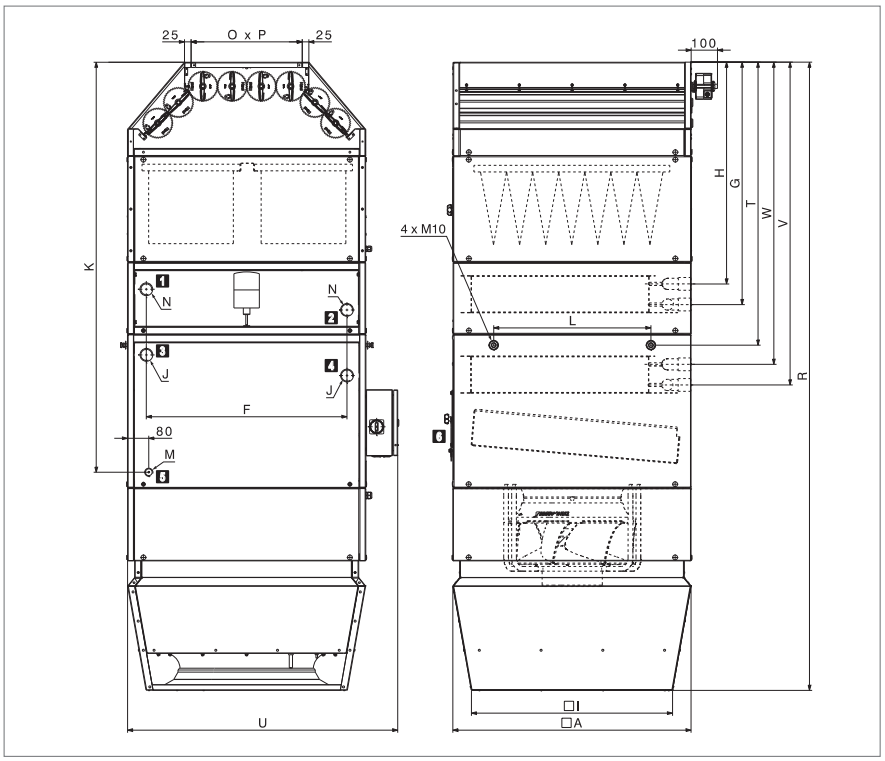
1 Return heating/cooling	**3** Condensate connection
2 Flow heating/cooling	**4** Access panel

Fig. 15: TopVent® MC dimensional drawing

Unit size		MC-6	MC-9	MC-9
Coil type		C	C	D
A	mm	900	1100	1100
F	mm	758	882	882
G	mm	910	931	940
H	mm	832	853	845
I	mm	760	935	935
K	mm	1276	1318	1318
L	mm	594	846	846
O × P	mm	420 × 850	500 × 1050	500 × 1050
R	mm	2100	2190	2190
T	mm	795	900	900
U	mm	1020	1220	1220
J	"	Rp 1¼ (internal)	Rp 1½ (internal)	Rp 2 (internal)
M	"	G 1 (external)	G 1 (external)	G 1 (external)
Water content of heating/ cooling coil	l	7.9	12.4	19.2
Weight	kg	266	323	334

Table 16: TopVent® MC dimensions and weights

TopVent® MHC



1 Return heating	3 Return cooling	5 Condensate connection
2 Flow heating	4 Flow cooling	6 Access panel

Fig. 16: TopVent® MHC dimensional drawing

Unit size		MHC-6			MHC-9			MHC-9		
Coil type		AC	BC	CC	AC	BC	CC	AD	BD	CD
A	mm	900			1100			1100		
F	mm	758			882			882		
G	mm	936			951			951		
H	mm	858			873			873		
I	mm	760			935			935		
K	mm	1550			1622			1622		
L	mm	594			846			846		
O × P	mm	420 × 850			500 × 1050			500 × 1050		
R	mm	2374			2496			2496		
T	mm	1069			1104			1104		
U	mm	1020			1220			1220		
V	mm	1184			1235			1244		
W	mm	1106			1157			1149		
N	"	Rp 1¼ (internal)			Rp 1½ (internal)			Rp 1½ (internal)		
J	"	Rp 1¼ (internal)			Rp 1½ (internal)			Rp 2 (internal)		
M	"	G 1 (external)			G 1 (external)			G 1 (external)		
Water content of heating coil	l	4.6	4.6	7.9	7.4	7.4	12.4	7.4	7.4	12.4
Water content of cooling coil	l	7.9	7.9	7.9	12.4	12.4	12.4	19.2	19.2	19.2
Weight	kg	295	299	305	377	377	388	388	388	399

Table 17: TopVent® MHC dimensions and weights

7 Options

7.1 Outlet nozzle

The outlet nozzle replaces the Air-Injector. The external dimensions of the unit remain the same. The weight is reduced:

- Size 6: –15 kg
- Size 9: –21 kg

The air discharge angle cannot be adjusted. Units with outlet nozzle are well-suited for applications with lower comfort requirements and for large mounting heights (e.g. in high-bay warehouses).

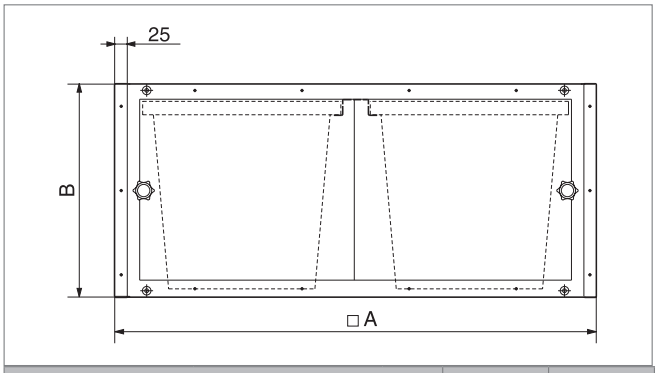
7.2 Suspension set

A suspension set is available to make it easy to install the units on the ceiling. The set consists of 4 pairs of U-profiles made of Aluzinc sheet metal and is height-adjustable up to 1300 mm.

7.3 Air filtration

For hygiene reasons, Hoval recommends always fitting TopVent® units with a filter.

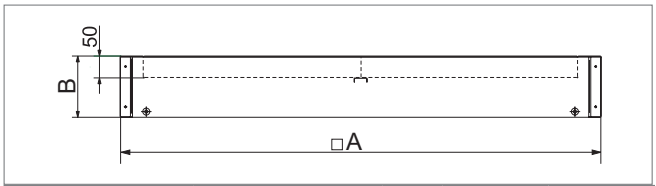
Filter box
A filter box with 2 bag filters can be installed for the purpose of filtering the recirculation air. The modular construction made of Aluzinc sheet metal with 2 sliding doors makes it easy to replace the filters.
A pressure difference control device is installed for automatic monitoring of the filter. It shows when the filters have to be changed.



Size			6	9
A		mm	900	1100
B		mm	400	400
Filter class		ISO coarse 60 % (G4)		
Weight		kg	20	24
Factory setting of differential pressure switches	TH, MH	Pa	120	120
	TC, THC, MC, MHC	Pa	180	180

Table 18: Filter box technical data

Flat filter box
A flat filter box with 4 pleated cell filters can be installed for the purpose of filtering the recirculation air.
A pressure difference control device is installed for automatic monitoring of the filter. It shows when the filters have to be changed.



Size			6	9
A		mm	900	1100
B		mm	140	165
Filter class		ISO coarse 60 % (G4)		
Weight		kg	10	12.5
Factory setting of differential pressure switches	TH	Pa	50	50
	TC, THC	Pa	100	100

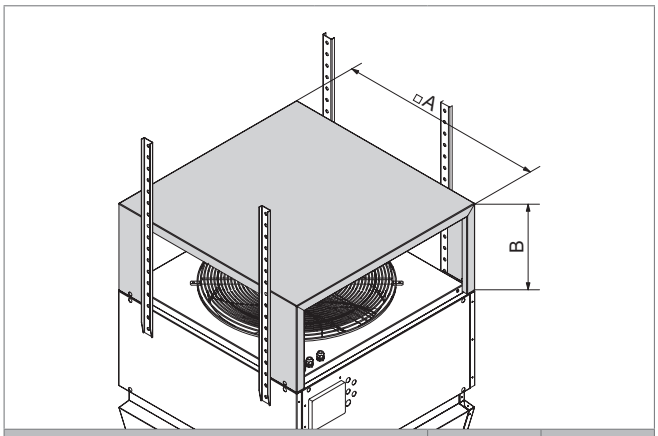
Table 19: Flat filter box technical data

7.4 Paint finish

If the customer wishes, the units can be provided with an exterior paint finish.

7.5 Recirculation silencer

The recirculation silencer is mounted on the appliance and thus reduces the sound reflection from the ceiling. Insertion attenuation is 3 dB compared with the total sound power level of each TopVent® unit.



Size		6	9
A	mm	900	1100
B	mm	380	485
Weight	kg	15	20

Table 20: Recirculation silencer dimensions and weights

7.6 Acoustic cowl

The acoustic cowl reduces the noise level in the room; it is installed in the Air-Injector. This does not change the outside dimensions of the Air-Injector. Insertion attenuation is 4 dB compared with the total sound power level of each TopVent® unit.

7.7 Hydraulic assembly diverting system

An assembly for the hydraulic diverting system is included in the delivery. It consists of the following components:

- Automatic air vent
- Coil screw joint
- Control valve
- Distributor circuit screw joint
- Flow
- Mixing valve
- Ball valve
- Return

Mixing valves electrical data	
Nominal voltage	24 V AC/DC
Nominal voltage frequency	50/60 Hz
Power consumption for wire sizing	23 VA
Control signal Y	0…10 V DC
Operating range Y	2…10 V DC
Position response U	2…10 V DC
Actuator run time	9 s / 90°

Table 21: Electrical data of mixing valves (for 'Hydraulic assembly diverting system' and 'Mixing valves')

7.8 Mixing valve

Mixing valves, which are optimally matched to the units, are available for easy installation of TopVent® units. They have the following specifications:

- 3-way mixing valve with modulating rotary actuator (run time 9 s)
- Flow characteristic:
  - Equal percentage control path
  - Linear bypass
- Integrated position control and response

7.9 Condensate pump

The condensate pump is installed directly under the condensate drain connection; the supplied container is prepared for installation on the unit. It pumps the condensate through a flexible hose to a delivery head of 3 m, thus enabling discharge of the condensate

- through waste water pipes directly below the ceiling,
- onto the roof.

7.10 Return temperature sensor

The return temperature sensor monitors the return temperature of the heating medium.

7.11 Pump control for mixing or injection system

Instead of the diverting system, a mixing or injection circuit can also be installed in the load circuit.

Please note the following:
- Not only the mixing valves but also the pumps in the load circuit are controlled directly by the control block.
- Terminals for wiring the mixing valves and the pumps in the load circuit are located in the connection box.
- Make sure that valves and pumps which meet the following requirements are provided on site.

Requirements for mixing valves
- Use 3-way mixing valves with the following flow characteristics:
  – Equal percentage control path
  – Linear bypass
- The valve authority must be ≥ 0.5.
- The maximum run time of the valve actuator is 45 s.
- The valve actuator must be continuous, i.e. the stroke changes in proportion to the control voltage (0…10 VDC or 2…10 VDC).
- The valve actuator must be designed with a position response (0...10 VDC or 2…10 VDC).
- The maximum power consumption is 20 VA.
- Install the valve close to the unit (max. distance 2 m).

Requirements for pumps
- Voltage.....230 VAC
- Current.....up to 4.0 A

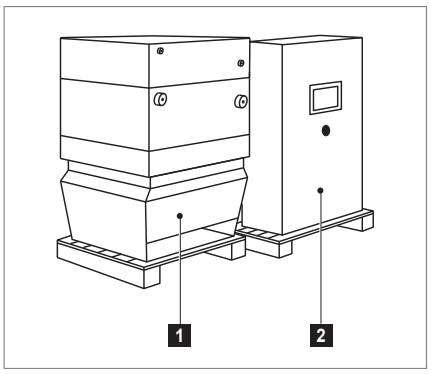
Requirements on changeover valves
- Use changeover valves conforming to the following specification:
- 3-way changeover valves
- Supply voltage 24 V AC
- 1-wire control (0/24 V AC)
- Position response via limit switches (0°/90°)
- Power consumption max. 44 VA

8 Transport and installation

Caution
Risk of injury from incorrect handling. Transport, assembly and installation work may only be performed by specialists. Observe safety and accident prevention regulations.

8.1 Scope of delivery

The scope of delivery includes:
- TopVent® unit
- Accessories (installation material, temperature sensor)
- Optional components



1 TopVent® unit
2 Zone control panel

Fig. 17: Delivery of the components on pallets

Accessories
The following accessories are supplied separately:
- Fresh air temperature sensor and room air temperature sensor (in the zone control panel)
- Installation material (in the Air-Injector)
- Trap (only for TopVent® TC, THC, MC, MHC; in separate cardboard box)

Options
The following optional components are supplied separately:
- Condensate pump (in separate cardboard box)
- Mixing valve (in separate cardboard box)
- Return temperature sensor (in separate cardboard box)
- Hydraulic assembly (on separate pallet)
- Additional room temperature sensors, combination sensor room air quality, temperature and humidity (in zone control panel)

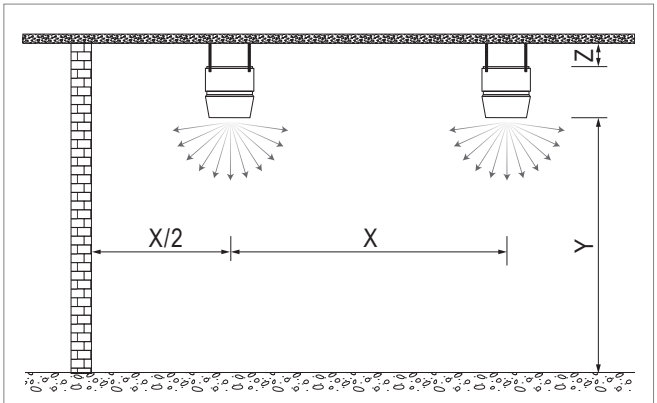
Preparation
- Use a forklift with a sufficiently long fork to unload (at least 1.8 m).
- Check the consignment against the delivery documents and the order confirmation to ensure that it is complete. Report missing parts and any damage immediately in writing.

8.2 Storage

If you do not install the unit immediately:
- Remove the packaging film to avoid water vapour condensation.
- Store the unit in a dry, dust-free room.
- Keep the storage temperature between –30 °C and +50 °C.
- Avoid too long storage periods. After a storage period of more than 1 year:
  – Check that the bearings of the fans move smoothly before installing the unit.

8.3 Requirements for the installation site

- Comply with the minimum and maximum distances.
- Only secure the unit to ceilings with sufficient load-bearing capacity.
- All air inlet and air outlet openings must be freely accessible. The supply air jet must be free to spread out unhindered.
- The access panels in the unit must be freely accessible.
- Clearance of at least 0.9 m is required for maintenance work around the heating/cooling section.
- Make sure that supply air units draw in fresh air via the fresh air duct:
  – intake opening at approx. 1.5 m height above the roof
  – not impaired by exhaust air openings, flues or the like



Size			6	9
Unit clearance X	min.	m	12	14
	max.	m	23	31
Distance from ceiling Z	min.	m	0.3	0.4
Mounting height Y	min.	m	4	5
	max. [1)]	m	Approx. 9…25	

1) The maximum mounting height varies depending on the boundary conditions (for values, see table of heat outputs or calculation with the 'HK-Select' selection program)

Table 22: Minimum and maximum distances

8.4 Installation

Caution
Risk of injury caused by falling load and improper handling. During installation:
– Wear personal protective equipment.
– Do not stand under suspended loads.
– Use cranes or forklifts with sufficient load-bearing capacity.

Preparation
- Make sure that a lifting platform is available.
- Remove the packaging film.
- For mounting, use the enclosed rivet nuts and
  – the optionally available suspension set or
  – flat irons, perforated irons, angle profiles, steel cables or similar.

Installation
- Transport the unit to the installation site.
- Mount the suspension set on the designated suspension points.

Caution
Risk of injury from falling parts. Only fasten the unit at the designated suspension points. Do not place any suspension points on the filter box, mixed air box or recirculation silencer.

- Rotate the unit to the correct position (position of the coil connections).
- Attach the unit to the ceiling.
- Install the device horizontally.
- Do not attach any additional loads.
- Do not use eyebolts.
- Non-vertical suspensions are permissible up to a maximum angle of 45°.
- TopVent® MH, MC, MHC:
  – Connect supply air units to the fresh air duct via a canvas connection and connect both flanges with an earth wire.

Fig. 18: TopVent® THC installation

Fig. 19: TopVent® MHC installation

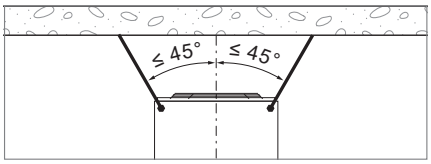


Fig. 20: Non-vertical suspension

8.5 Hydraulic installation

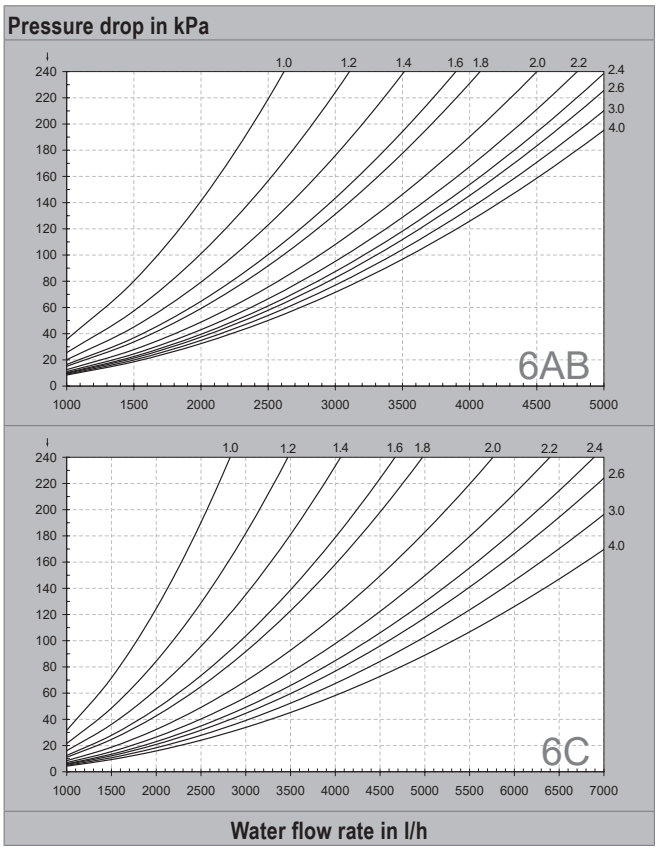
- Connect the heating or cooling coil in accordance with the hydraulic diagram.
- Depending on local conditions, check whether compensators for linear expansion are required for the supply and return lines and/or articulated connections are required for the units.
- Insulate the hydraulic lines.
- Hydraulically balance the pipework for the the individual units within a control zone to ensure even distribution.

Attention
Danger of damaging the units. Do not fasten any loads to the coil, e.g. by means of the flow or return lines.

Attention
Danger of malfunctions. The condensate separator in cooling units only functions while the fan is running. No coolant must be allowed to circulate in the cooling coil when the unit is switched off.

Hydraulic installation of units with hydraulic assembly for diverting system (option)

- Connect the heating coil to the on-site hydraulic network using the hydraulic assembly:
  - Install the assembly horizontally.
  - Mount the assembly so that its weight does not need to be absorbed by the coil.
  - Insulate the assembly.
- Read off the default settings for the hydraulic alignment from Fig. 21. The curves 1.0 to 4.0 correspond to the revolutions of the valve spindles of the balancing valve; they are shown on the turning knob:
  0.0 ..... Valve closed
  4.0 ..... Valve completely open
- The coil and the hydraulic assembly are already included in the specified pressure drops. Thus, only consider the pressure drops of the distributor circuit up to the screw connections.



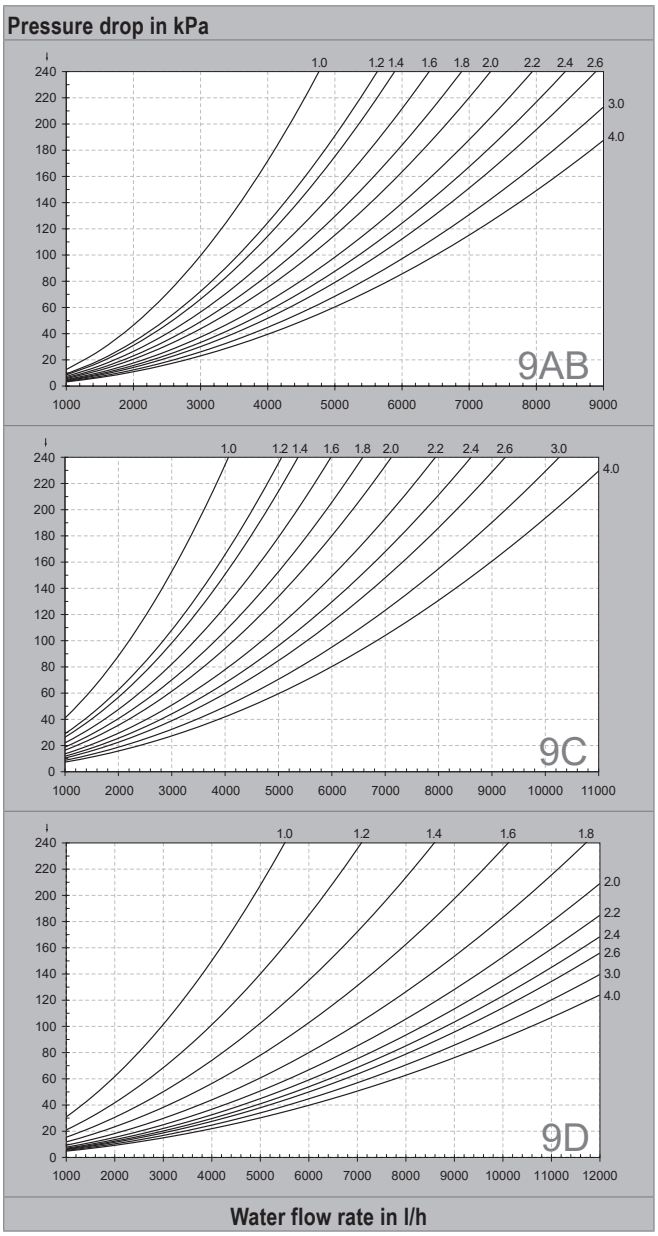


Fig. 21: Default settings for the balancing valves

Return temperature sensor (option)

- Install the return temperature sensor on the return line, directly after the screw connection.
- Attach the sensor with the clamping band.
- Insulate the sensor.

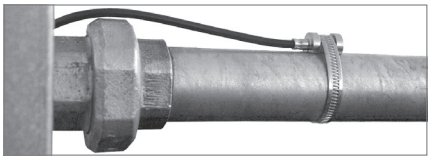


Fig. 22: Return temperature sensor

8.6 Condensate connection

Condensate arising in cooling units must be removed via a condensate-proof line.

- Install and insulate the supplied trap on the condensate connection of the unit.
- Dimension the slope and cross-section of the condensate line so that no condensate backflow takes place.
- Make sure that the condensate produced is drained in compliance with local regulations.

Condensate pump (option)

- Remove the transport locking device from the condensate pump.
- Install the condensate pump directly under the condensate drain connection; the supplied container is prepared for installation on the unit.
- Connect the condensate pump to a condensate-resistant waste water pipe. To do this, use a hose and attach it using a hose clamp or use a pipe with an inner diameter of 9 mm.
- Route the condensate line from the pump directly upwards.

Notice
This line must not exceed the delivery head of the pump:
– head of 3 m up to a condensate quantity of max. 150 l/h
– head of 4 m up to a condensate quantity of max. 70 l/h
Consider the condensate quantity expected in your application. (It can be calculated with the selection program HK-Select).

- Install an odour trap at the highest point.
- Route the line with a constant incline downwards and then vertically downwards, and if possible down to below the condensate pump. This will create a siphon effect and thus improve the effectiveness of the condensate pump.
- Make sure that the condensate produced is drained in compliance with local regulations.

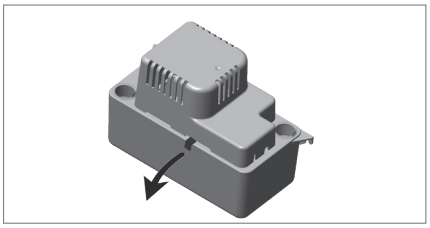


Fig. 23: Removal of the transport locking device

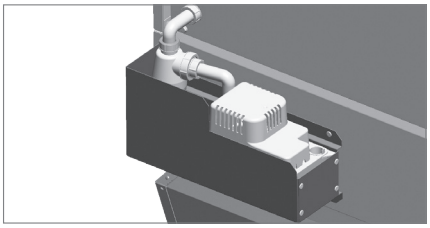


Fig. 24: Installation on the unit

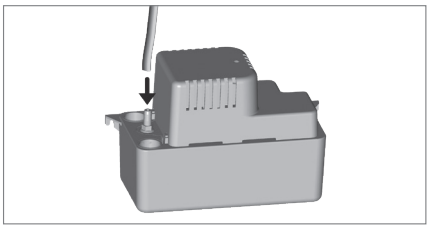


Fig. 25: Connection of the condensate pump

8.7 Electrical installation

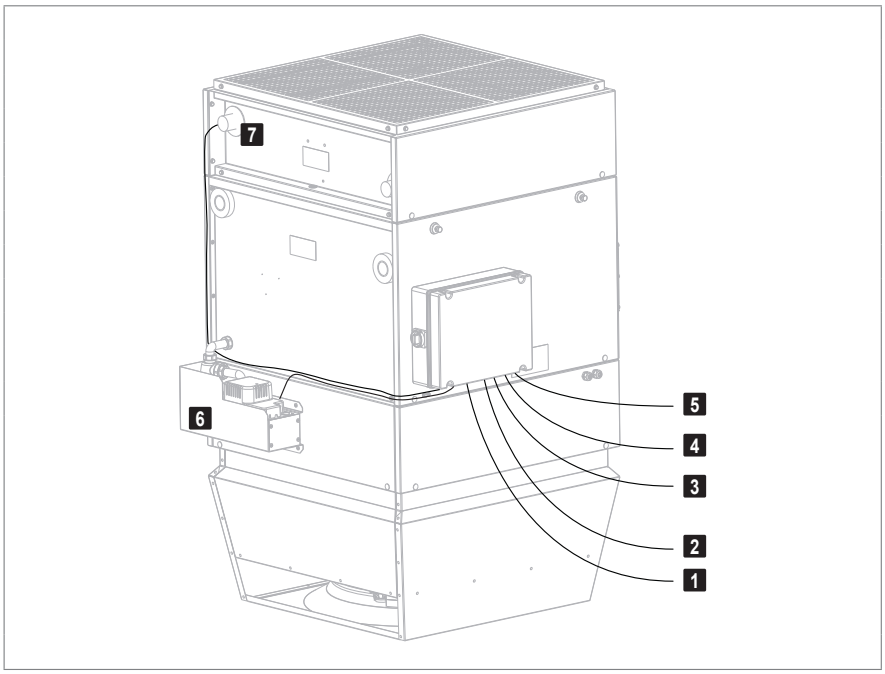
Caution
Danger of electric shocks. The electrical installation must only be carried out by a qualified electrician.

Please note the following:
- Observe the relevant regulations (e.g. EN 60204-1).
- Choose the dimensions of the cable cross sections in line with the applicable regulations.
- Route signal and bus lines separately from mains cables.
- Make sure the lightning protection system for the units or for the entire building is planned and carried out by professionals.
- Provide overload protection equipment on site in the mains connection line of the zone control panel.
- Carry out the electrical installation according to the wiring diagram.
- Secure all connections against working loose.
- When installing cables, observe the following points:
  - Fasten the cables in place with cable mounts and cable ties or with cable conduits/ducts.
  - Use blind rivets.
  - Drill holes with a maximum diameter of 5 mm Ø.
  - The maximum drilling depth is 10 mm. Use a drill bit with a depth stop.
  - The maximum load resulting from cable holders and cable guides is 10 kg.
  - All access panels must be easily removable.

TopVent® unit with TopTronic® C
- Connect the power supply to the unit control box.
- Connect the zone bus to the unit control box.
- TopVent® MH, MC, MHC:
  - Make sure that the ground cable is installed in the flange of the fresh air duct.

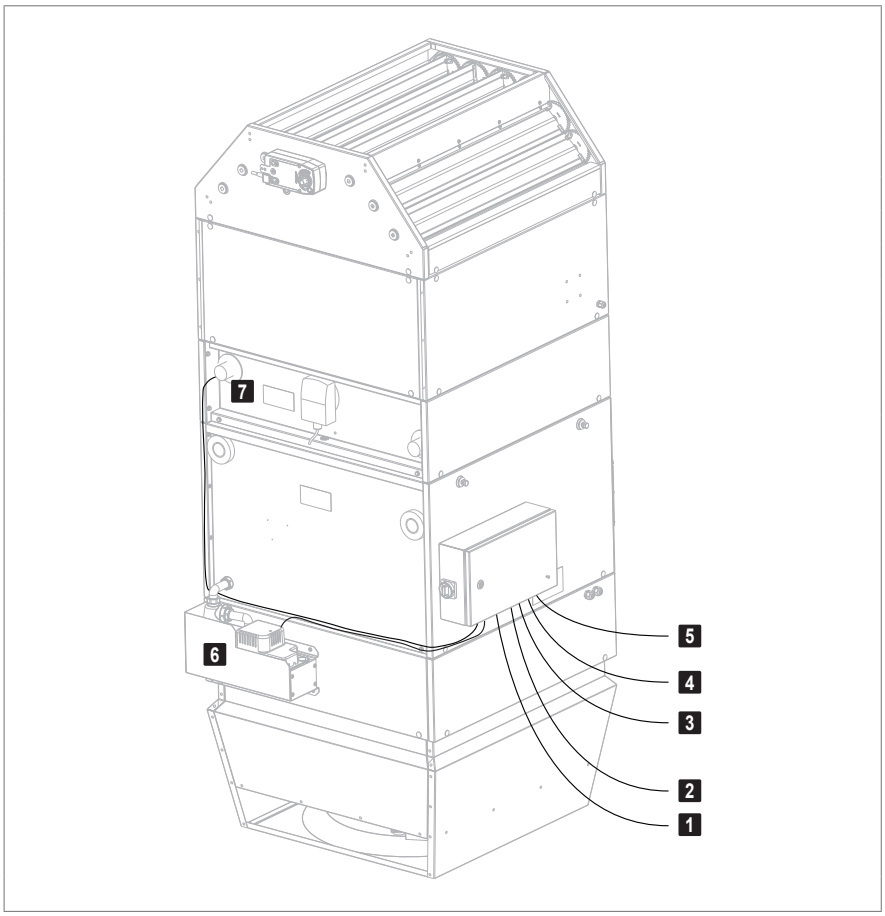
Temperature sensors
The room air sensor and the fresh air temperature sensor are supplied loose in the control panel:
- Install the room air temperature sensor at a representative position in the occupied area at a height of about 1.5 m. The measured values must not be distorted by the presence of sources of heat or cold (machines, direct sunlight, windows, doors, etc.).
- Install the fresh air temperature sensor at least 3 m above the ground on a north-facing wall, so that it is protected from direct sunlight. Provide cover for the sensor and thermally insulate it from the building.

TopVent® options
- Wire up the condensate pump to the unit control box.
- Wire up the mixing valve to the unit control box.
- For injection system: Wire up the pump and valve to the unit connection box.
- Wire up the return temperature sensor to the unit control box.
- TopVent® TH, TC: Wire up the door contact to the unit control box.
- TopVent MH, MC, MHC: Wire up the signal for emergency shut-off (Forced off) to the unit control box.



1	Power supply for TopVent®
2	Zone bus
3	Mixing valve
4	Pump (option)
5	Door contact (option TH, TC)
6	Condensate pump (option TC, THC)
7	Return temperature sensor (option)

Fig. 26: TopVent® recirculation units on-site electrical connection

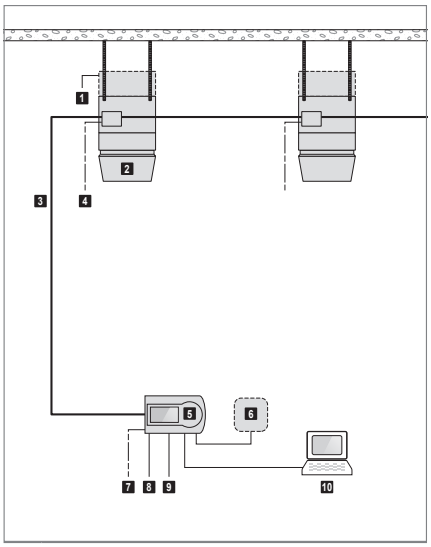


1	Power supply for TopVent®
2	Zone bus
3	Mixing valve
4	Pump (option)
5	Forced off (option)
6	Condensate pump (option MC, MHC)
7	Return temperature sensor (option)

Fig. 27: TopVent® supply air units on-site electrical connection

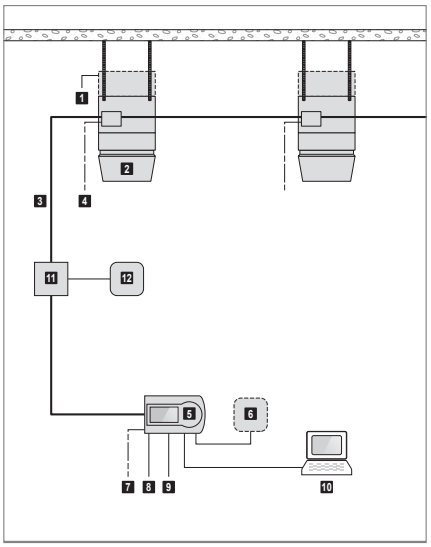
TopVent® TH, TC with EasyTronic EC

- Connect the power supply to the terminal box in the unit and to the EasyTronic EC.
- Lay the system bus according to the system layout.
- Wire up optional components according to the connection diagram (see Fig. 28 and Fig. 29).
- TopVent® TC:
  - Lay the signal line for heating/cooling changeover to the EasyTronic EC.
- TopVent® units with the option filter box or flat filter box:
  - Lay the signal line for the differential pressure switch of the air filter to an on-site lamp or controller.



1	Differential pressure switch air filter
2	TopVent® TH, TC (max. 10)
3	System bus
4	Power supply for TopVent® TH, TC
5	EasyTronic EC
6	External room temperature sensor
7	Power supply for EasyTronic EC
8	Door contact
9	Heating/cooling changeover (TopVent® TC)
10	BMS connection via Modbus

Fig. 28: EasyTronic EC connection diagram without pump/valve control



1	Differential pressure switch air filter
2	TopVent® TH, TC (max. 10)
3	System bus
4	Power supply for TopVent® TH, TC
5	EasyTronic EC
6	External room temperature sensor
7	Power supply for EasyTronic EC
8	Door contact
9	Heating/cooling changeover (TopVent® TC)
10	BMS connection via Modbus
11	Relay (field-supplied)
12	Pump/valve

Fig. 29: EasyTronic EC connection diagram with pump/valve control

Terminal box design (TopVent® TH, TC)

The following components are installed in the terminal box:

- Isolation switch
- Circuit board with all required electrical components as well as connection terminals for the following signals:
  - Input Enable fan
  - Input Control signal fan
  - Output Control signal next fan
  - Input Control signal actuator Air-Injector
  - Output Control signal next actuator Air-Injector
  - Output Feedback control signal Air-Injector
  - Output Error
- The following sensors and actuators in the unit are factory-wired:
  - Fan
  - Supply air temperature sensor
  - Actuator Air-Injector
- Options:
  - Wire up the condensate pump directly (not to the circuit board).
  - Lay the signal line for the differential pressure switch of the air filter to an on-site lamp or controller.

9 Operation

9.1 Initial commissioning

Attention
Risk of damage to property as a result of performing initial commissioning on your own authority. Initial commissioning must be performed by the manufacturer's customer service technicians.

Checklist to prepare for commissioning:

- Mechanical installation
  - Indoor climate units
  - Zone control panels
  - Operator terminals
- Hydraulic installation
  - Indoor climate units (heating/cooling coil, condensate connection)
  - Complete heating/cooling circuit
  - Hydraulic balancing
  - Provision of the heating/cooling medium during commissioning
- Electrical installation
  - Power supply for indoor climate units, zone control panels, hydraulic pumps and valves
  - Wiring of mixing valve, pump, condensate pump, return temperature sensor, door contact, forced off to the unit control box
  - Laying of bus cables conforming to wiring diagram
  - Installation and wiring of all sensors (room temperature sensor, fresh air sensor, ...)
  - Wiring of external operator terminals
  - Wiring of external inputs and outputs
- Organisational matters
  - Access to all system components during commissioning (indoor climate units, operator terminals, valves, ...)
  - Provision of a suitable working platform
  - Organisation of commissioning and training (date, presence of all of the respective trade groups and of the operating personnel)

9.2 Operation

The system runs fully automatically depending on the programmed operating times and temperature conditions.

- Observe the operating instructions for the control system.
- Check alarm displays daily.
- Correct changes to operating times in the programming accordingly.
- Ensure free air outlet and unhindered dispersion of the supply air.

10 Maintenance and repair

Caution
Risk of injury from incorrect work. Maintenance work must be carried out by trained personnel.

10.1 Safety

Before performing any work on the unit:

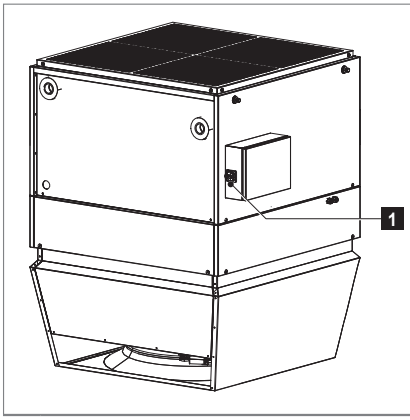
- Turn the isolation switch on the unit to the 'Off' position and secure it against being switched back on.

  Caution
  Danger of electric shocks. The unit controller and the service socket are still live.

- After switching off:
  – Always wait at least 3 minutes.

  Caution
  The use of condensers can pose a danger of fatal injury from directly touching live parts even after the unit is switched off. Only open the unit after waiting 3 minutes.

- Observe the accident prevention regulations.
- Observe the particular dangers involved when working on electrical systems.
- When working in the unit, take precautions against unprotected, sharp metal edges.
- Immediately replace damaged or removed informational and warning signs.
- Following maintenance work, professionally reassemble all dismantled protective devices.
- Replacement parts must comply with the technical requirements of the unit manufacturer. Hoval recommends the use of original spare parts.



1 TopVent® isolation switch

Fig. 30: Position of the isolation switch

10.2 Maintenance

Maintenance schedule

Activity	Interval
Renew air filter	When the filter alarm is displayed, at least annually
Comprehensively checking function; cleaning and possibly repairing the unit	Annually by Hoval customer service

Maintenance schedule

Filter sets

Filter set	Design	Filter class	Mat. no.
TopVent® 6 FK	Filter box	ISO coarse 60 %	6049725
TopVent® 6 FF	Flat filter box	ISO coarse 60 %	6049726
TopVent® 9 FK	Filter box	ISO coarse 60 %	6049727
TopVent® 9 FF	Flat filter box	ISO coarse 60 %	6049728

Table 23: Material numbers for filter sets

Changing the filter

- Changing the air filter in the filter box:
  - Open the sliding door of the filter box.
  - Loosen the adjusting screw.
  - Remove the filter elements.
  - Insert the new filter elements.
  - Tighten the adjusting screw.
  - Close the sliding door of the filter box.
- Changing the air filter in the flat filter box:
  - Remove the filter elements from above.
  - Insert the new filter elements.
- Dispose of the filters in accordance with local regulations.
  - The disposal of used filters depends on the contents.

10.3 Repair

If repairs are necessary, contact the manufacturer's customer service department.

Product service life

Component	Service life
EC motor of the fan	approx. 30'000 to 40'000 hours depending on the application and environmental conditions

Table 24: Product service life

11 Dismantling

Caution
Risk of injury caused by falling load and improper handling.
– Wear protective equipment (fall protection, helmet, safety shoes)
– Do not stand under suspended loads.
– Use cranes or helicopters with sufficient load-bearing capacity.

- Disconnect the power supply to the unit.
- Wait at least 3 minutes after switching the unit off.

Caution
The use of condensers can pose a danger of fatal injury from directly touching live parts even after the unit is switched off. Only open the unit after waiting 3 minutes.

- Drain the heating or cooling circuit.
- Dismantle all media connections.
- Support the unit.
- Disconnect the unit from the ceiling.
- Remove the unit.

12 Disposal

- Recycle metal components.
- Recycle plastic parts.
- Dispose of electric and electronic parts via hazardous waste.
- Dispose of the filters in accordance with local regulations.
  – The filters are fully incinerable; the disposal of used filters depends on the contents.

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