

## TopVent® TP

Recirculation unit with reversible heat pump system  
for heating and cooling high spaces

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## 1 Use

### 1.1 Intended use

TopVent® TP units are recirculation units intended for heating and cooling high spaces. They have the following functions:

- Heating with heat pump
- Cooling with heat pump
- Recirculation operation
- Air distribution with adjustable Air-Injector
- Air filtration (optional)

TopVent® TP units are equipped with an air/air heat pump system which generates both heat and cold decentrally. In this way, they utilise the energy in the ambient air for environmentally friendly heating and cooling of the hall. The indoor climate system is designed to be completely decentralised, which offers key advantages:

- Quick and easy planning
- Low investment costs as a pipe network is not required for heating and cooling supply
- Reliable system operation due to redundancy in case of unit failure

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 and technicians as well as specialists in building, heating and ventilation technology.

## 2 Construction and operation

### 2.1 Construction

The TopVent® TP unit consists of the following components:

#### Heating/cooling section

with fan, condenser/evaporator and integrated condensate separator for the condensate generated

#### Air-Injector

automatically adjustable vortex air distributor for blowing in air without draughts

#### Heat pump system

The heat pump system consists of the following components:

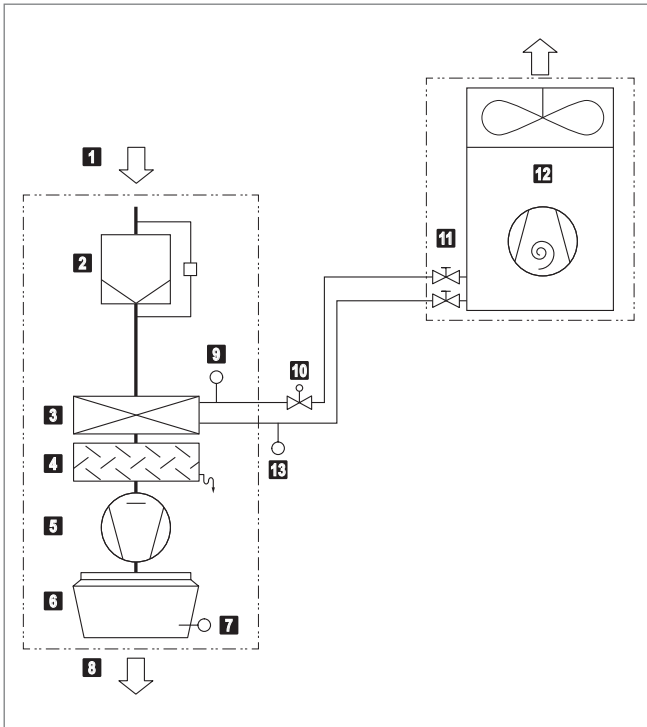
- Reversible condensing unit (1 or 2 pc.)
- Communication module
- Expansion valve



Fig. 1: TopVent® TP

2.2 Function diagram

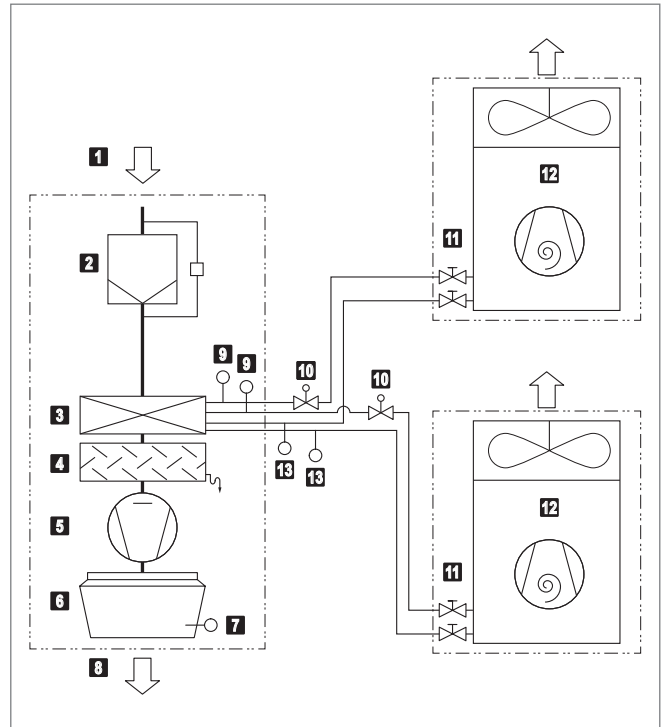
TopVent® TP with 1 heat pump system



- 1** Extract air
- 2** Air filter with differential pressure switch (optional)
- 3** Heating/cooling coil
- 4** Condensate separator
- 5** Fan
- 6** Air-Injector with actuator
- 7** Supply air sensor
- 8** Supply air
- 9** Liquid temperature sensor
- 10** Expansion valve (supplied loose)
- 11** Shut-off valves
- 12** Condensing unit
- 13** Gas temperature sensor (supplied loose)

Table 1: Function diagram TopVent® TP-6-K, TP-9-K (1 heat pump system)

TopVent® TP with 2 heat pump systems



- 1** Extract air
- 2** Air filter with differential pressure switch (optional)
- 3** Heating/cooling coil
- 4** Condensate separator
- 5** Fan
- 6** Air-Injector with actuator
- 7** Supply air sensor
- 8** Supply air
- 9** Liquid temperature sensor
- 10** Expansion valve (supplied loose)
- 11** Shut-off valves
- 12** Condensing unit
- 13** Gas temperature sensor (supplied loose)

Table 2: Function diagram TopVent® TP-9-M (2 heat pump systems)

## 2.3 Operating modes

The TopVent® TP has the following operating modes:

- 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, Recirculation, Recirculation speed 1.

Code	Operating mode	Description
<b>REC</b>	<b>Recirculation</b> 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 <sup>1)</sup> Heating/cooling ..... on  <sup>1)</sup> during heat or cool demand
<b>REC1</b>	<b>Recirculation speed 1</b> The same as REC, but the unit operates only at speed 1 (low air flow rate).	Fan ..... speed 1 <sup>1)</sup> Heating/cooling ..... on  <sup>1)</sup> during heat or cool demand
<b>ST</b>	<b>Standby</b> The unit is normally switched off. The following functions remain active:	
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 Heating ..... on
OPR	■ Overheating protection: If the room temperature rises above the set value for overheating protection, the unit cools down the room in recirculation operation.	Fan ..... speed 2 Cooling ..... on
<b>L_OFF</b>	<b>Off (local operating mode)</b> The unit is switched off.	Fan ..... off Heating ..... off

Table 3: TopVent® TP operating modes

### 3 Technical data

#### 3.1 Unit type reference

	TP - 6 A K ...
<b>Unit type</b> TopVent® TP	
<b>Unit size</b> 6 or 9	
<b>Heating section (option)</b> - without heating section A with coil type A (hot water) S with coil type S (electric)	
<b>Heating/cooling section</b> K with coil type K (1 heat pump) M with coil type M (2 heat pumps)	
<b>Further options</b>	

Table 4: Unit type reference

#### 3.2 Application limits

Fresh air temperature heating mode	min.	-20 °C	
	max.	15 °C	
Fresh air temperature cooling mode	min.	-5 °C	
	max.	43 °C	
Extract air temperature	max.	50 °C	
Extract air relative humidity <sup>1)</sup>	max.	60 %	
Moisture content of extract air <sup>1)</sup>	max.	12.5 g/kg	
Supply air temperature	max.	60 °C	
Air flow rate	Size 6:	min. 3100 m³/h	
	Size 9:	min. 5000 m³/h	
Condensate quantity	Size 6:	max. 90 kg/h	
	Size 9:	max. 150 kg/h	
The units cannot be used in:			
■ Damp locations			
■ Rooms with mineral oil vapours in the air			
■ Rooms with a high salt content in the air			
■ Rooms with acidic or alkaline vapours in the air			

1) Units for applications where the humidity in the room increases by more than 2 g/kg are available on request.

Table 5: Application limits

#### 3.3 Electrical connection

##### TopVent® TP

Unit type		TP-6-K TP-9-K TP-9-M
Supply voltage	V AC	3 x 400
Permitted voltage tolerance	%	± 5
Frequency	Hz	50
Connected load	kW	3.7
Current consumption max.	A	6.3
Series fuse	A	13.0

Table 6: TopVent® TP electrical connections

##### Heat pump ERQ250

Unit type		TP-6-K TP-9-K	TP-9-M
Supply voltage	V AC	3 x 400	3 x 400
Permitted voltage tolerance	%	± 10	± 10
Frequency	Hz	50	50
Series fuse	A	25	2 x 25
Power consumption max.	kW	7.7	15.4
Current consumption max.	A	11.3	22.6
Inrush current	A	74.0	85.0

Table 7: Daikin ERQ250 heat pump electrical connections

### 3.4 Flow rate, product parameters

Unit size		TP-6	TP-9	
Nominal air flow rate	m <sup>3</sup> /h	6000	9000	
Floor area reached	m <sup>2</sup>	537	946	
Static efficiency of the fans	%	63.6	63.6	
Coil type		K	K	M
Effective electric power input	kW	0.6	1.2	1.4

Table 8: TopVent® TP technical data

### 3.5 Technical data of the heat pump

Rated heat output <sup>1)</sup>	kW	31.5
Rated cooling capacity <sup>2)</sup>	kW	28.0
COP value	–	4.09
EER value	–	3.77
Condensation temperature	°C	46.0
Evaporation temperature	°C	6.0
Working medium	–	R410a
Fill volume working medium (prefilled)	kg	8.4

1) With fresh air temperature 7 °C / extract air temperature 20 °C

2) With fresh air temperature 35 °C / extract air temperature 27 °C / 45% rel. humidity

Table 9: Daikin ERQ250 heat pump technical data

### 3.6 Heat output

Unit type	$t_f$	$t_{room}$	Q	$H_{max}$	$t_s$	$P_{HP}$
	°C	°C				
TP-6-K	-5	16	27.4	13.5	31.6	8.7
		20	27.3	13.6	35.5	9.1
	-15	16	22.0	14.8	28.9	7.8
		20	21.9	14.9	32.8	8.3
TP-9-K	-5	16	27.4	17.0	27.0	8.7
		20	27.3	17.2	31.0	9.1
	-15	16	22.0	18.6	25.3	7.8
		20	21.9	18.8	29.2	8.3
TP-9-M	-5	16	54.8	12.6	36.1	17.4
		20	54.6	12.7	40.0	18.3
	-15	16	44.0	13.9	32.5	15.5
		20	43.8	14.0	36.5	16.6

Legend:  $t_f$  = Fresh air temperature  
 $t_{room}$  = Room air temperature  
Q = Heat output  
 $H_{max}$  = Maximum mounting height  
 $t_s$  = Supply air temperature  
 $P_{HP}$  = Power consumption of the heat pump(s)

Reference: ■ At room air temperature 16°C: extract air temperature 18°C  
■ At room air temperature 20°C: extract air temperature 22°C

Table 10: TopVent® TP heat outputs

### 3.8 Sound data

Unit size		TP-6	TP-9
Sound pressure level (at a distance of 5 m) <sup>1)</sup>	dB(A)	51	59
Total sound power level	dB(A)	73	81
Octave sound power level	63 Hz	dB	38
	125 Hz	dB	57
	250 Hz	dB	60
	500 Hz	dB	65
	1000 Hz	dB	69
	2000 Hz	dB	67
	4000 Hz	dB	64
	8000 Hz	dB	54

<sup>1)</sup> with a hemispherical radiation pattern in a low-reflection room

Table 12: TopVent® TP sound data

### 3.7 Cooling capacities

Unit type	$t_f$	$t_{room}$	$RH_{room}$	$Q_{sen}$	$Q_{tot}$	$t_s$	$m_c$	$P_{HP}$
	°C	°C	%					
TP-6-K	28	22	50	16.8	22.5	15.7	7.8	4.3
			70	15.4	26.2	16.4	14.5	5.4
	32	26	50	19.4	28.0	18.4	11.8	6.7
			70	14.8	29.7	20.7	20.5	7.1
TP-9-K	28	22	50	16.5	22.5	18.5	8.1	4.3
			70	15.3	26.2	19.0	15.1	5.4
	32	26	50	19.1	28.0	21.7	12.1	6.7
			70	14.6	29.7	23.2	20.8	7.1
TP-9-M	28	22	50	34.4	45.0	12.6	14.0	4.3
			70	29.9	52.4	14.1	27.8	5.4
	32	26	50	39.4	56.0	15.0	22.6	6.7
			70	30.3	59.4	18.0	40.2	7.1

Legend:  $t_f$  = Fresh air temperature  
 $t_{room}$  = Room air temperature  
 $RH_{room}$  = Relative humidity of the room air  
 $Q_{sen}$  = Sensible cooling capacity  
 $Q_{tot}$  = Total cooling capacity  
 $t_s$  = Supply air temperature  
 $m_c$  = Condensate quantity  
 $P_{HP}$  = Power consumption of the heat pump(s)

Reference: ■ At room air temperature 22 °C: extract air temperature 24 °C  
■ At room air temperature 26 °C: extract air temperature 28 °C

Table 11: TopVent® TP cooling capacities

Heat pump ERQ250			
Sound pressure level (at a distance of 5 m) <sup>1)</sup>	dB(A)	58	
Sound power level <sup>2)</sup>	dB(A)	78	
Octave sound power level	63 Hz	dB	79
	125 Hz	dB	84
	250 Hz	dB	80
	500 Hz	dB	77
	1000 Hz	dB	73
	2000 Hz	dB	66
	4000 Hz	dB	60
	8000 Hz	dB	53

<sup>1)</sup> with hemispherical radiation in a low-reflection environment

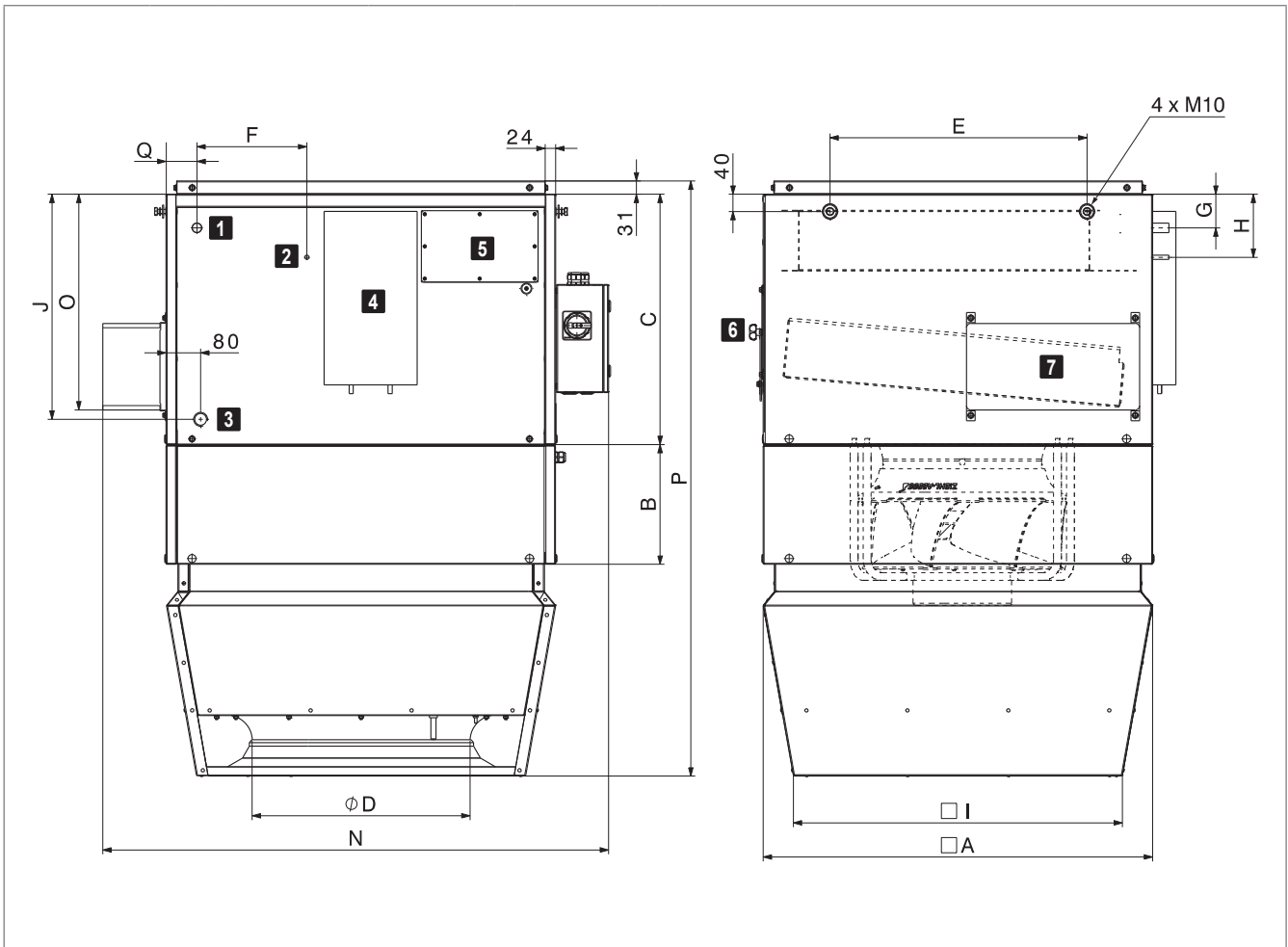
<sup>2)</sup> The values given are maximum values; the noise level is fluctuating due to scroll technology.

Table 13: Daikin ERQ250 heat pump sound data

**Note**  
The values are increased by 3 dB for 2 heat pumps.

### 3.9 Dimensions and weights

#### TopVent® TP with 1 heat pump system



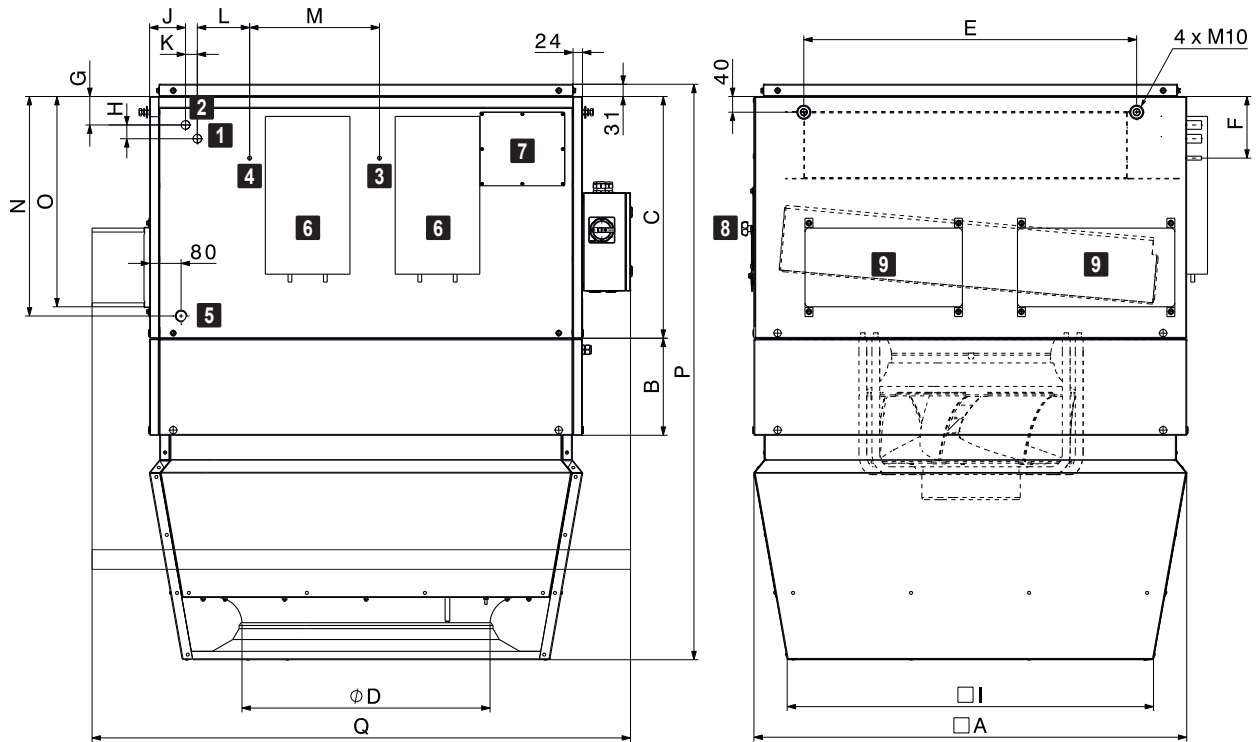
Unit size		TP-6-K	TP-9-K
A	mm	900	1100
B	mm	275	245
C	mm	579	615
Ø D	mm	500	630
E	mm	594	846
F	mm	254	360
G	mm	78	94
H	mm	146	182
I	mm	760	935
J	mm	521	558
N	mm	1169	1369
O	mm	499	535
P	mm	1375	1463
Q	mm	71	96
Weight	kg	237	281

- 1** Gas line connection (Ø 22.2 mm)
- 2** Liquid line connection (Ø 9.5 mm)
- 3** Condensate connection (G1" external)
- 4** Expansion valve
- 5** Access panel, liquid temperature sensor
- 6** Access panel
- 7** Communication module

Table 14: Dimensions and weights of the TopVent® TP-6-K, TP-9-K



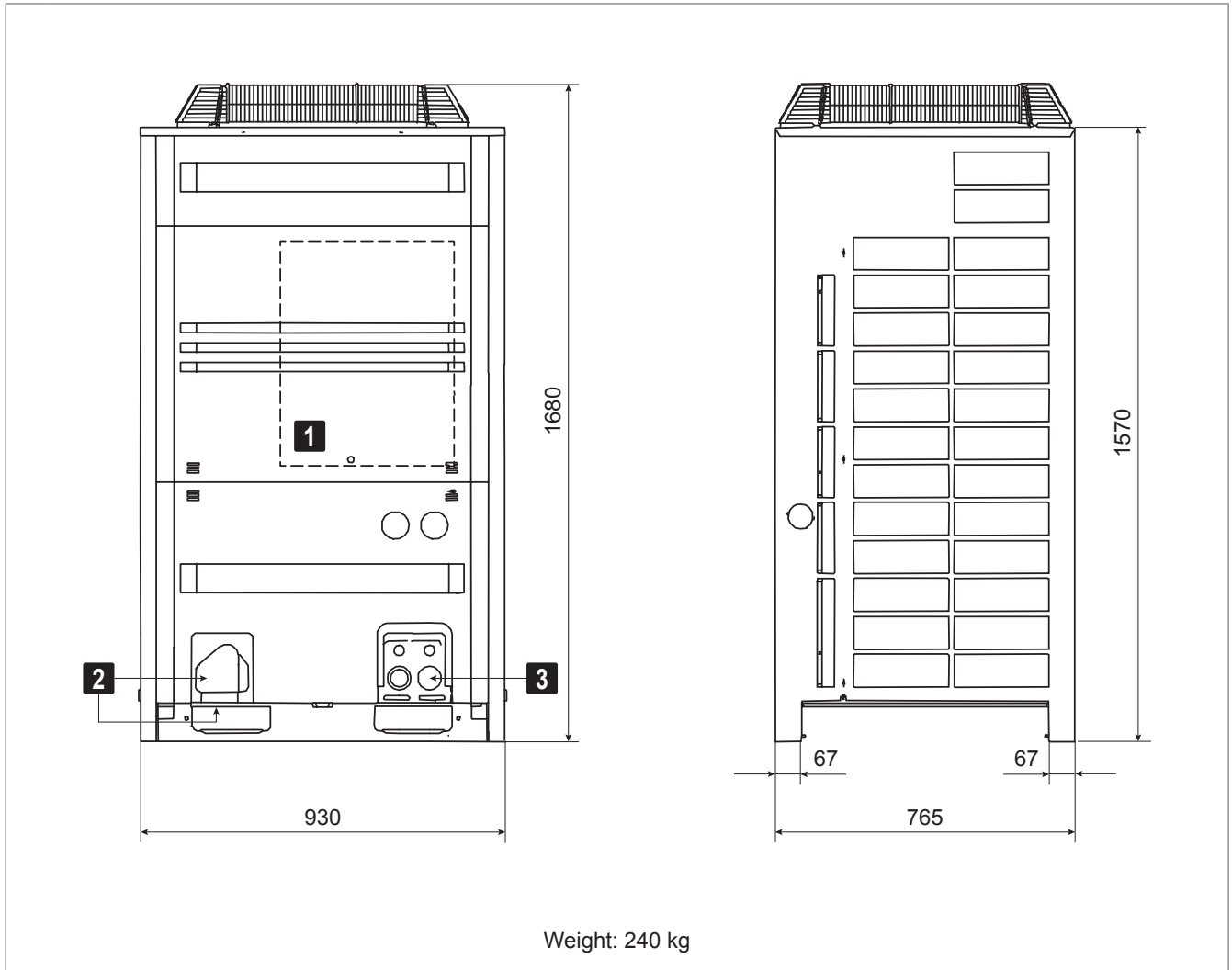
TopVent® TP with 2 heat pump systems



Unit size		TP-9-M
A	mm	1100
B	mm	245
C	mm	615
Ø D	mm	630
E	mm	846
F	mm	157
G	mm	72
H	mm	35
I	mm	935
J	mm	91
K	mm	30
L	mm	133
M	mm	330
N	mm	558
O	mm	535
P	mm	1463
Q	mm	1369
Weight	kg	304

- 1** Gas line connection – circuit 1 (Ø 22.2 mm)
- 2** Gas line connection – circuit 2 (Ø 22.2 mm)
- 3** Liquid line connection – circuit 1 (Ø 9.5 mm)
- 4** Liquid line connection – circuit 2 (Ø 9.5 mm)
- 5** Condensate connection (G1" external)
- 6** Expansion valve
- 7** Access panel, liquid temperature sensor
- 8** Access panel
- 9** Communication module

Table 15: Dimensions and weights of the TopVent® TP-9-M



- 1 Electrical connection box
- 2 Working medium circuit connection (front or bottom)
- 3 Cable feedthroughs

Table 16: Dimensions and weights of the Daikin ERQ250 heat pump

## 4 Specification texts

### 4.1 TopVent® TP

Recirculation unit with reversible heat pump system for heating and cooling high spaces.

The unit consists of the following components:

- Heating/cooling section
- Air-Injector
- Supplementary heating (option)
- Unit control box
- Optional components

The heat pump system consists of the following components:

- Reversible condensing unit (1 or 2 pc.)
- Communication module
- Expansion valve
- Optional components

The TopVent® TP unit complies with all the requirements of the Ecodesign Directive 2009/125/EC relating to environmentally friendly design of ventilation systems. It is a system of the 'fan coil unit' type.

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#### Heating/cooling section

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Housing made of aluzinc sheet, air-tight, flame retardant, hygienic and easy to maintain because of smooth internal surfaces and ageing-resistant, silicone-free sealing materials, internally isolated with close-pored polyurethane. The heating/cooling section contains:

- The highly efficient condenser/evaporator consisting of seamless copper pipes with pressed-on, optimised and profiled aluminium fins, manifold made of copper and injection distributor
- The pull-out condensate separator with collecting channel, made of high-quality corrosion-resistant material, with a downslope in all directions for rapid draining
- The condensate trap for connecting to a condensate drain (supplied)
- The radial fan with high-efficiency EC motor, backwards-curved, 3D contoured blades and free-running rotor made of a high-performance composite material, aerodynamically optimised inflow nozzle, low-noise, with integrated overload protection

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#### Air-Injector

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1 AIR-INJECTOR

Housing made of aluzinc sheet, air-tight, flame retardant, hygienic and easy to maintain because of ageing-resistant, silicone-free sealing materials, internally isolated with close-pored polyethylene, with:

- Vortex air distributor with concentric outlet nozzle, adjustable vanes and integrated absorber hood
- Actuator for infinitely variable adjustment of the air distribution from vertical to horizontal for draught-free air distribution in the hall under changing operating conditions
- Supply air sensor

AIR OUTLET BOX

Housing made of aluzinc sheet, air-tight, flame retardant, hygienic and easy to maintain because of ageing-resistant, silicone-free sealing materials, with integrated acoustic insulating mat, internally isolated with close-pored polyethylene, with:

- 4 adjustable outlet grilles
- Supply air sensor

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#### Unit control box

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Control box mounted on the side of the casing, casing made of aluzinc sheet metal, protection class IP54. The following components are installed:

- Main switch (can be operated from the outside)
- Unit controller as part of the TopTronic® C control system
- Fuse for the electronics
- Transformer
- Connection terminals
  - Power supply
  - Zone bus
  - Peripheral components

The components of the unit are fully wired up.

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#### Heat pump system

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Highly efficient modulating air/air heat pump system for heating and cooling as a split system, comprising the following components:

- Reversible condensing unit
- Communication module
- Expansion valve (cooling)

#### Reversible condensing unit (Daikin ERQ250)

- Compact unit for outdoor installation
- Painted casing RAL 7044 (silk grey) made from galvanised sheet steel
- Speed-controlled scroll compressor
- Speed-controlled fan
- Coated Al/Cu finned-tube evaporator or condenser

- Electronic expansion valve (heating)
- 4-way valve for defrosting
- Shut-off valves on the working-medium side
- Working medium R 410A
- Terminal box

#### Communication module

Control box for communication between the condenser unit, expansion valve and ventilation unit and for measuring the temperatures of the gas and liquid upstream or downstream of the heating/cooling section. Mounted on the side of the heating/cooling section.

#### Expansion valve

Kit with electronic expansion valve (cooling), thermally insulated and protected against mechanical damage. Mounted on the side of the heating/cooling section.

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#### Condensing unit options

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#### Protection hood (side)

Hood made of painted steel for protection against wind and snow, to be mounted on the side of the condenser unit on site.

#### Protection hood (front)

Hood made of painted steel for protection against wind and snow, to be mounted on the front of the condenser unit on site.

#### Condensate drain pan

Pan made of painted steel for collecting and discharging the condensate, to be mounted on the bottom of the condenser unit on site.

#### Heating for condensate drain pan

Heating tape for protection against icing of the condensate in the condensate drain pan, for installation on site in the condenser unit.

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#### Options for the unit

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#### Supplementary heater with electric coil

Housing made of aluzinc sheet, air-tight, flame retardant, hygienic and easy to maintain. The heating section contains:

- Electric coil, protected by safety temperature limiter, temperature monitoring and air flow monitoring, consisting of steel heating sections in a galvanized steel frame
- Terminal box for connecting the electrical supply
- Continuous regulation of the heating power via thyristor controller

#### Supplementary heater with hot water

Housing made of aluzinc sheet, air-tight, flame retardant, hygienic and easy to maintain because of ageing-resistant, silicone-free sealing materials. The heating section contains:

- The highly efficient heating coil consisting of seamless copper pipes with pressed-on, optimised and profiled aluminium fins and manifolds made of copper; for connection to the hot water supply

#### Suspension set

for ceiling installation of the unit consisting of 4 pairs U-profiles made of aluzinc sheet steel, height-adjustable to 1300 mm. Paint according to unit.

#### Kit for roof installation

consisting of:

- Recirculation roof hood made of aluzinc sheet, with access panel, insulated, easy to remove.
- Roof frame made of sheet steel (insulation on site).

#### Filter box

with 2 class G4 bag filters (ISO coarse 60%), with differential pressure switch for filter monitoring

#### Flat filter box

with 4 pleated class G4 cell filters (ISO coarse 60%) with differential pressure switch for filter monitoring

#### Standard paint finish

External paint finish in Hoval red (RAL 3000)

#### Paint finish as desired

Choice of external paint finish in RAL colour

#### Recirculation silencer

as an attachment to the unit, made of aluzinc sheet metal, lined with sound insulation matting, insertion attenuation 3 dB(A)

#### Hydraulic assembly diverting system

(only for option of supplementary heater with hot water)  
Prefabricated assembly for hydraulic diverting system, consisting of mixing valve, regulating valve, ball valve, automatic air vent and screw connections for connection to the unit and to the distributor circuit; mixing valve with plug-in connection, sized for the coil in the unit and the Hoval TopTronic® C control system.

#### Mixing valve

(only for option of supplementary heater with hot water)  
Mixing valve with modulating rotary actuator and plug-in connection, sized for the coil in the unit.

#### Condensate pump

Consisting of a centrifugal pump and a drip tray, max. delivery rate of 150 l/h with a delivery head of 3 m.

**Pump control for mixing or injection system**

(only for option of supplementary heater with hot water)  
Electrical components for controlling a mixing or injection circuit in the load circuit.

**Return temperature sensor**

(only for option of supplementary heater with hot water)  
Temperature sensor for monitoring the heating medium.

**4.2 TopTronic® C control systems**

Freely configurable, zone-based control system ex-works for operation of decentralised Hoval indoor climate systems with optimised use of energy, suitable for demand-driven control of overall systems comprising up to 64 control zones each with up to 15 supply and extract air handling units or supply air units and 10 recirculation units.

**System structure:**

- Unit controller: installed in the particular indoor climate unit
- Zone bus: as serial connection of all unit controllers in one control zone with the zone controller; with robust bus protocol via shielded and twisted-pair bus line (bus cables provided by the client)
- Zone control panel with:
  - System operator terminal
  - Fresh air temperature sensor
  - Zone controllers and room air temperature sensors
  - All components for the electrical power supply and protection
- System bus (Ethernet): for connecting all zone controllers to one another and to the system operator terminal (bus cables provided by the client)

**Operation:**

- TopTronic® C-ST as system operator terminal: touch panel for visualisation and control by web browser via HTML interface, including software for LAN access
- TopTronic® C-ZT as zone operator terminal: for simple on-site operation of a control zone (optional)
- Manual operating selector switch (optional)
- Manual operating selector button (optional)
- Operating of the units via building management system via standardised interfaces (optional):
  - BACnet
  - Modbus IP
  - Modbus RTU

**Control functions:**

- Control of the supply air temperature using room supply air cascade control via sequential control of the energy recovery of the heating/cooling section and if necessary of the supplementary heater (depending on the unit type)
- Demand-driven control of the supply air and exhaust air volumetric flows with minimum and maximum limit depending on the room temperature or, optionally, the room air quality (for supply and extract air handling units)
- Control of the unit including the air distribution according to the specifications of the zone controller
- Control of the condenser unit in heating or cooling mode as specified by the room control unit

**Alarms, protection:**

- Central alarm management with registration of all alarms (timestamp, priority, status) in an alarm list and alarm memory of the last 50 alarms; forwarding via e-mail can be set in the parameters.
- If there is a failure of communication, bus stations, sensor systems or supply media, each part of the system transitions to a protection mode which safeguards operation.
- Frost protection control of the units with constrained control of protection functions to prevent coil icing (only for option of supplementary heater with hot water)
- A maintenance mode implemented in the control algorithm for testing all physical data points and alarms guarantees high reliability.

**Options for the zone control panel:**

- Design for heat pump
- Cooling lock switch
- Alarm lamp
- Socket
- Additional room air temperature sensors
- Combination sensor room air quality, temperature and humidity
- External sensor values
- External set values
- Load shedding input
- Operating selector switch on terminal
- Operating selector button on terminal
- Power supply for air handling unit
- Power supply for heat pump system
- Power supply for electric coil (only for option of supplementary heater with electric coil)
- Safety relay
- Design for heating (only for option of supplementary heater with hot water)
- Control and power supply for distributor pump (only for option of supplementary heater with hot water)

## 5 System design

### Transport of the heat pump:

- Lifting the unit with a crane:
  - Use 2 straps at least 8 m in length.
- Lifting the unit with a forklift:
  - Transport to the installation site: Lift the unit under the pallet.
  - Unloading from the pallet: Guide the forklift tines into the large rectangular openings under the device.

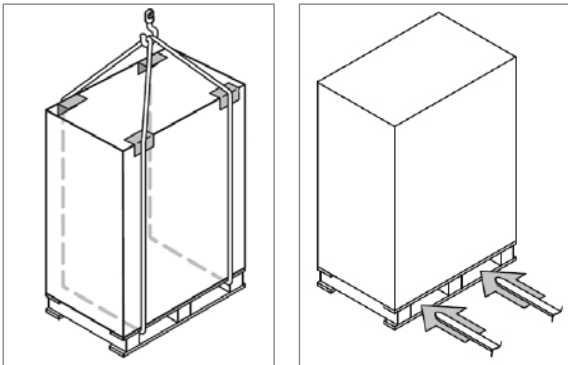


Fig. 2: Lifting the heat pump

### Installation of the heat pump:

- Make sure that the air inlet and outlet are not in the direction of the prevailing wind. If necessary, use a wind shield to protect the heat pump (option).
- Protect the heat pump against heavy snow fall.
- Install the heat pump on a level base with an adequate load bearing capacity so as to avoid vibration and noise.
- Install the heat pump on a solid base at least 150 mm tall (steel frame or concrete).

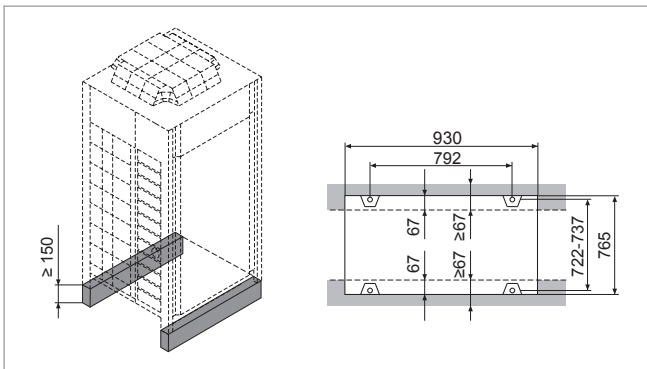


Fig. 3: Base for heat pump

- If the heat pump is mounted on a frame: attach a waterproof plate about 150 mm underneath the unit to prevent water penetrating the unit from below.
- Make sure that the heat pump is not damaged by pooling water or ice formation:
  - Create a condensate drain.
  - Provide heating for the condensate drain.

### Refrigerant pipes

- Connections on the heat pump
  - Left, front or right
- Diameter:
  - Liquid line .....9.5 mm
  - Gas line (suction gas).....22.2 mm
- Material:
  - Liquid line: annealed copper
  - Gas line (suction gas): semi-hard copper

The refrigerant pipes must be installed by a qualified refrigeration technician in line with the local regulations.

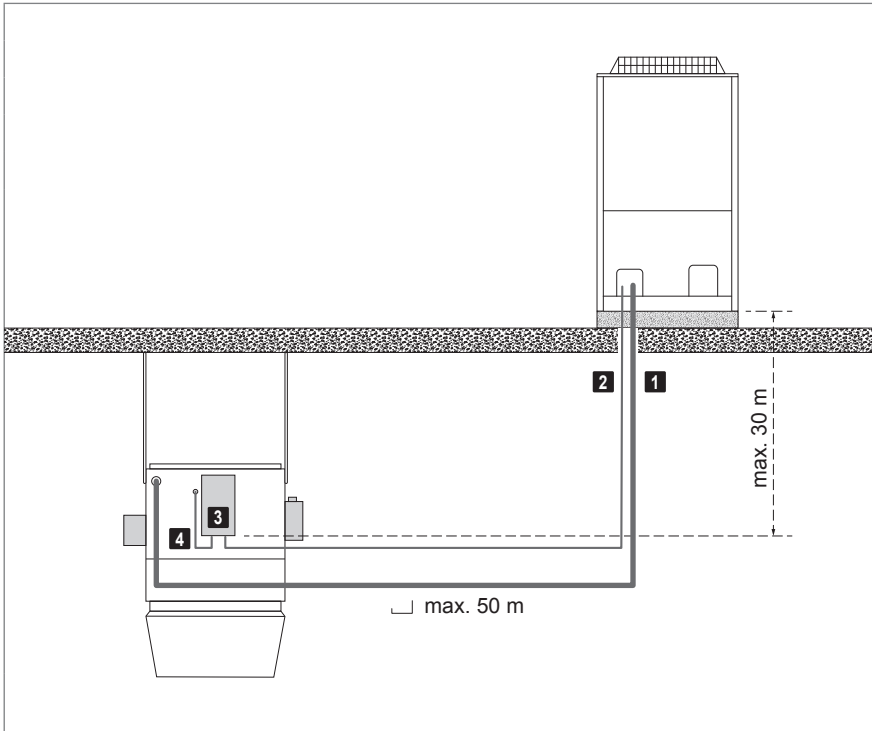
To avoid damaging the unit:

- Do not use any flux.
- Ensure there is a nitrogen supply when soldering.
- Insulate the refrigerant pipes.
- Carry out an air-tightness test and vacuum drying.

### Filling with refrigerant

- The heat pump is filled with refrigerant at the factory:
  - Refrigerant R410A
  - Fill volume: 8.4 kg
- The additional amount of refrigerant depends on the total length of the liquid line (300 g – 3 kg).
- Refrigerant R410A is a mixture. As a result, it is essential to fill it in the liquid state. The composition can vary in the gaseous state.

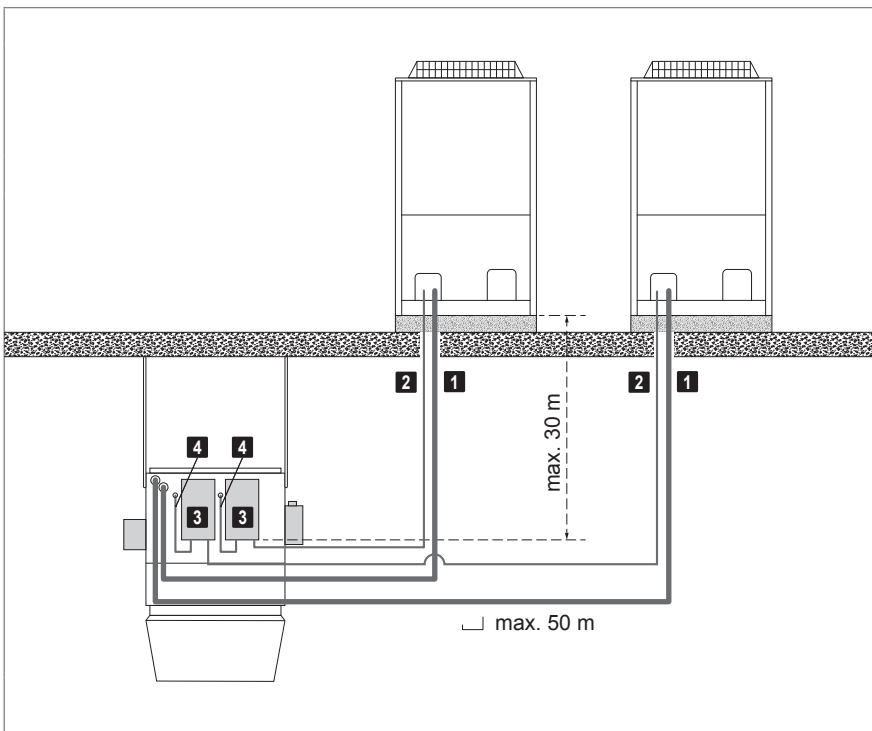
Refrigerant pipes for TopVent® TP with 1 heat pump system



- 1** Gas line (∅ 22.2 mm)
- 2** Liquid line (∅ 9.5 mm)
- 3** Expansion valve (fitted at the factory)
- 4** Connection pipe (fitted at the factory)

Table 17: TopVent® TP-6-K, TP-9-K refrigerant pipes to be installed on site

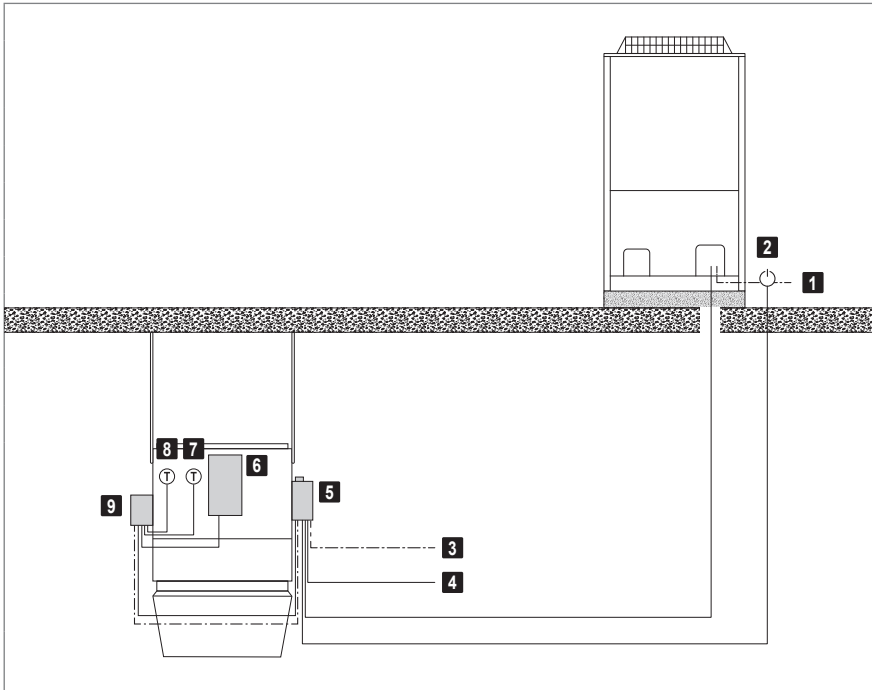
Refrigerant pipes for TopVent® TP with 2 heat pump systems



- 1** Gas line (∅ 22.2 mm)
- 2** Liquid line (∅ 9.5 mm)
- 3** Expansion valve (fitted at the factory)
- 4** Connection pipe (fitted at the factory)

Table 18: TopVent® TP-9-M refrigerant pipes to be installed on site

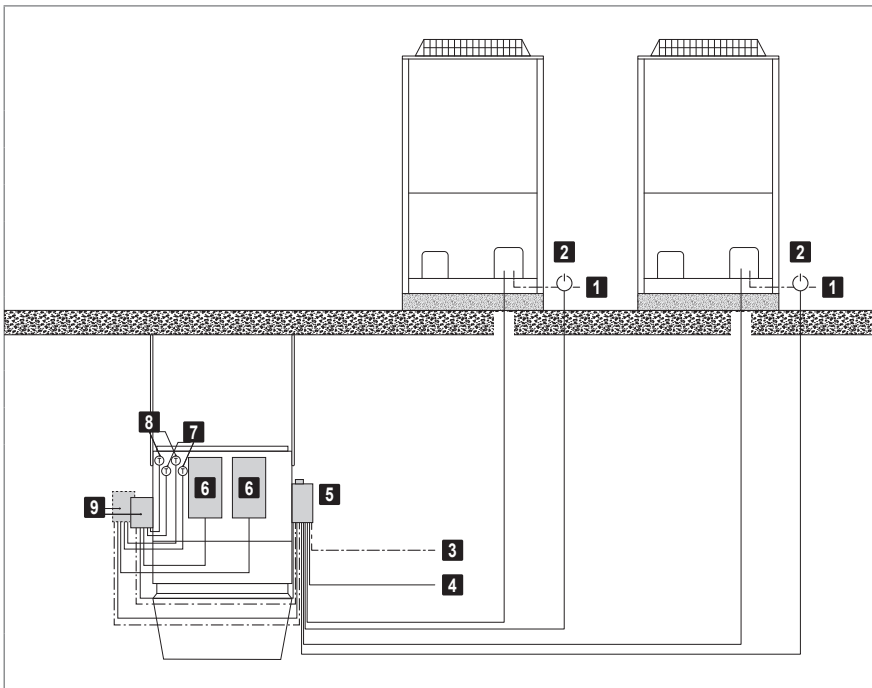
Electrical installation for TopVent® TP with 1 heat pump system



- |   |   |
|---|---|
| 1 | Power supply heat pump  |
| 2 | Heat pump main switch with auxiliary contact (NO contact, provided by the client) |
| 3 | Power supply TopVent®   |
| 4 | Zone bus  |
| 5 | Unit control box  |
| 6 | Expansion valve   |
| 7 | Liquid temperature sensor   |
| 8 | Gas temperature sensor (supplied loose)   |
| 9 | Communication module  |

Table 19: Electrical connection of the heat pump system for TopVent TP-6-K, TP-9-K

Electrical installation for TopVent® TP with 2 heat pump systems



- |   |   |
|---|---|
| 1 | Power supply heat pump  |
| 2 | Heat pump main switch with auxiliary contact (NO contact, provided by the client) |
| 3 | Power supply TopVent®   |
| 4 | Zone bus  |
| 5 | Unit control box  |
| 6 | Expansion valve   |
| 7 | Liquid temperature sensor   |
| 8 | Gas temperature sensor (supplied loose)   |
| 9 | Communication module  |

Table 20: Electrical connection of the heat pump systems for TopVent® TP-9-M

Plug connections prepared at the factory:

- Communication module (power supply and communication TopVent®)
- Condensate pump (option)



Component	Designation	Voltage	Cable	Comments	
Zone control panel	Power supply	3 × 400 V AC	NYM-J 5 × ... mm <sup>2</sup>	3-phase	
		1 × 230 V AC	NYM-J 3 × ... mm <sup>2</sup>	1-phase	
	Zone bus		J-Y(ST)Y 2 × 2 × 0.8 mm	max. 1000 m length	
	System bus		Ethernet ≥ CAT 5	for connecting several zone control panels	
	Integration into the building management system		Ethernet ≥ CAT 5		BACnet, Modbus IP
			J-Y(ST)Y 2 × 2 × 0.8 mm		Modbus RTU
	Room temperature sensor		J-Y(ST)Y 2 × 2 × 0.8 mm	max. 250 m	
	Fresh air temperature sensor		J-Y(ST)Y 2 × 2 × 0.8 mm	max. 250 m	
	Additional room air temperature sensor		J-Y(ST)Y 2 × 2 × 0.8 mm	max. 250 m	
	Combination sensor room air quality, temperature and humidity		J-Y(ST)Y 4 × 2 × 0.8 mm	max. 250 m	
	Collective alarm	Volt-free max. 230 V AC max. 24 VDC	NYM-O 2 × 1.5 mm <sup>2</sup>	max. 3 A	
	Power supply for units	3 × 400 V AC	NYM-J 5 × 1.5 mm <sup>2</sup> (min.)	RoofVent® units size 6	
			NYM-J 5 × 4.0 mm <sup>2</sup> (min.)	RoofVent® units size 9	
			NYM-J 5 × 1.5 mm <sup>2</sup> (min.)	TopVent® units	
	Power supply for heat pump	3 × 400 V AC	NYM-J 5 × 4.0 mm <sup>2</sup> (min.)		
	Power supply for electric coils	3 × 400 V AC	NYM-J 4 × 4.0 mm <sup>2</sup> (min.)	S type size 6, R type size 9	
			NYM-J 4 × 10.0 mm <sup>2</sup> (min.)	S type size 9	
	System operator terminal (if external)	24 V AC	NYM-J 3 × 1.5 mm <sup>2</sup>	Power supply, 1 A fusing	
			Ethernet ≥ CAT 5	Communication	
	Zone operator terminal (if external)	24 V AC	J-Y(ST)Y 4 × 2 × 0.8 mm	Power supply, 1 A fusing, max. 250 m length	
	External sensor values	0-10 VDC	J-Y(ST)Y 2 × 2 × 0.8 mm		
	External set values	0-10 VDC	J-Y(ST)Y 2 × 2 × 0.8 mm		
	Load shedding input	24 V AC	NYM-O 2 × 1.5 mm <sup>2</sup>	max. 1 A	
	Operating selector switch on terminal (analogue)	0-10 VDC	J-Y(ST)Y 2 × 2 × 0.8 mm		
	Operating selector switch on terminal (digital)	0-10 VDC	J-Y(ST)Y 5 × 2 × 0.8 mm		
	Operating selector button on terminal	24 V AC	J-Y(ST)Y 5 × 2 × 0.8 mm		
	Forced off	24 V AC	NYM-O 2 × 1.5 mm <sup>2</sup>	max. 1 A	
TopVent®	Power supply	3 × 400 V AC	NYM-J 5 × 1.5 mm <sup>2</sup> (min.)		
			J-Y(ST)Y 2 × 2 × 0.8 mm	max. 1000 m length	
	Forced off	24 V AC	NYM-O 2 × 1.5 mm <sup>2</sup>	max. 1 A	
Communication module (2 × for TP-9-M)	Power supply	1 × 230 V AC	NYM-J 3 × 1.5 mm <sup>2</sup>	From the TopVent® unit control box Cable supplied	
			J-Y(ST)Y 6 × 2 × 0.8 mm	Cable supplied	
			J-Y(ST)Y 6 × 0.75 mm <sup>2</sup>	Cable supplied	
			H05VV-F 2 × 0.75 mm <sup>2</sup>	Cable sensor supplied	
			H05VV-F 2 × 0.75 mm <sup>2</sup>	Cable sensor supplied	
Heat pump (2 × for TP-9-M)	Power supply	3 × 400 V AC	NYM-J 5 × 4.0 mm <sup>2</sup> (min.)		
			J-Y(ST)Y 4 × 2 × 0.8 mm		
Heat pump main switch (2 × for TP-9-M)	Communication TopVent®		J-Y(ST)Y 1 × 2 × 0.8 mm	Auxiliary contact signal (NO contact, provided by the client)	

Table 21: Cable list for on-site connections

## 6 Unit type reference TopVent® TP

TP - 9 A K / ST . D1 / S . FK . LH . U- / Y . KP / TC . - . PH . RF

### Unit type

TP TopVent® TP

### Unit size

6 or 9

### Heating section

- without heating section
- A with coil type A (hot water)
- S with coil type S (electric)

### Heating/cooling section

- K with coil type K (heat pump)
- M with coil type M (heat pump)

### Design

ST Standard

### Air outlet

- D1 Design with 1 Air-Injector
- DK Air outlet box

### Installation

- without
- S Suspension set
- R Kit for roof installation

### Filter box

- without
- FK Filter box
- FF Flat filter box

### Paint finish

- without
- LH Standard paint finish
- LU Paint finish as desired

### Silencer

- without
- U- Recirculation silencer

### Hydraulics

- without
- Y Hydraulic assembly diverting system
- M Mixing valve

TP - 9 A K / ST . D1 / S . FK . LH . U- / Y . KP / TC . - . PH . RF

**Condensate pump**

- without
- KP Condensate pump

**Control system**

- TC TopTronic® C

**Reserve**

**Pump control**

- without
- PH Heating pump

**Return temperature sensor**

- without
- RF Return temperature sensor

