



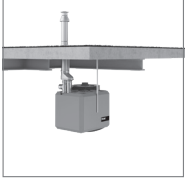




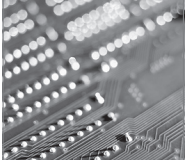
Hoval Indoor Climate Systems TopVent® gas

Recirculation units and supply air units with efficient air distribution
for heating with gas-fired heat exchanger
TopVent® TG | GV | MG

Design handbook



Hoval

	<p>Hoval Indoor Climate Systems 3</p> <p>Efficient. Flexible. Reliable.</p>	<p>A</p>
	<p>TopVent® TG 7</p> <p>Recirculation unit with efficient air distribution for heating spaces up to 25 m in height with gas-fired heat exchanger</p>	<p>B</p>
	<p>TopVent® GV 17</p> <p>Recirculation unit for heating spaces up to 6 m in height with gas-fired heat exchanger</p>	<p>C</p>
	<p>TopVent® MG 29</p> <p>Recirculation unit with efficient air distribution for ventilation and heating of spaces up to 25 m in height with gas-fired heat exchanger</p>	<p>D</p>
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Hoval Indoor Climate Systems

Efficient. Flexible. Reliable.

A





Efficient. Flexible. Reliable.

Hoval indoor climate systems are decentralised systems for heating, cooling and ventilating halls for industrial, commercial and leisure applications. The systems have a modular structure. One system comprises several ventilation units which are spread around the room. These units are equipped with reversible heat pumps and gas-fired appliances for decentralised heat and cold generation, or they heat and cool with a connection to a central energy supply. Tailored control systems complete the system and ensure the effective combination and optimal use of all resources.

Diverse range of units ensures flexibility

Different types of ventilation units can be combined to create the perfect system for the project in question:

- RoofVent® supply and extract air handling units
- TopVent® supply air units
- TopVent® recirculation units

The number of supply and extract air handling units depends on how much fresh air is required in order to create a comfortable atmosphere for people in the building. Recirculation units cover additional heat or cool demand as required. A broad range of unit types and sizes with heating and cooling coils in various output levels means that the overall output of the system can be scaled to whatever level is required.

Specially designed unit versions are also available for halls with particularly humid or oily extract air.

Furthermore, there is a range of units available which have been expressly developed for very specific purposes. ProcessVent units, for example, are coupled with extract air purification systems in industrial halls and recover heat from process air.

Draught-free air distribution

A key feature of Hoval indoor climate units is the patented vortex air distributor, known as the Air-Injector. It is controlled automatically and changes the blowing angle of the air continuously between vertical and horizontal. The highly efficient air supply system has many advantages:

- It provides a high level of comfort during heating and cooling. No draughts develop in the hall.
- The efficient and even air distribution ensures that the indoor climate units cover a large area.
- The Air-Injector keeps the temperature stratification in the room low, thus minimising heat loss through the roof.

Control with specialist expertise

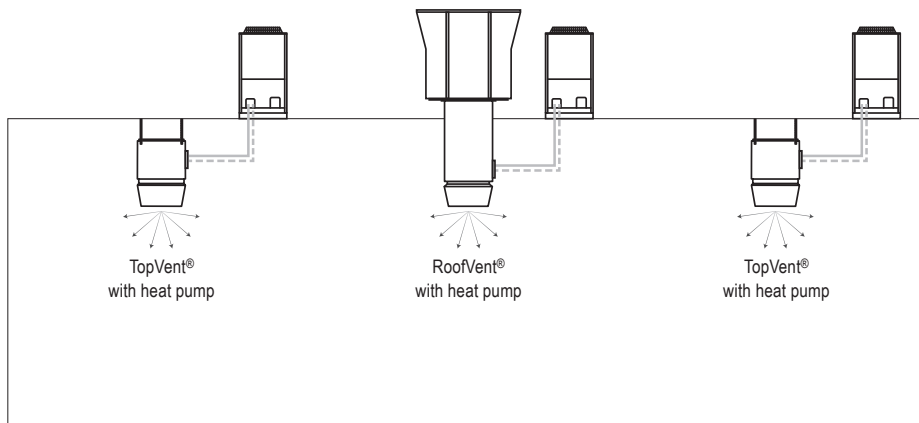
The TopTronic® C control system, which was specifically developed for Hoval indoor climate systems, regulates the separate units individually and controls them based on zones. This enables optimal adjustment to the local requirements of the different usage areas in the building. The patented control algorithm optimises energy use and ensures maximum comfort and hygiene levels. Clear interfaces make it easy to connect the system to the building management system.

Simpler control systems are also available for units that are only used for supply air or air recirculation.

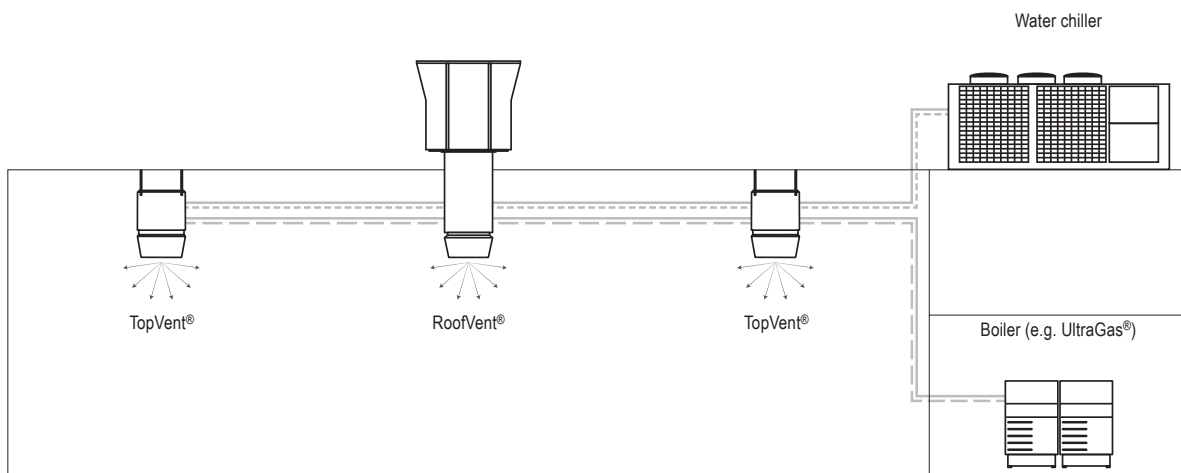
Competent and reliable

Hoval will support you and provide expert knowledge throughout all project phases. You can rely on comprehensive technical advice when it comes to planning Hoval indoor climate systems and on the skills of the Hoval technicians during the installation, commissioning and maintenance of the system.

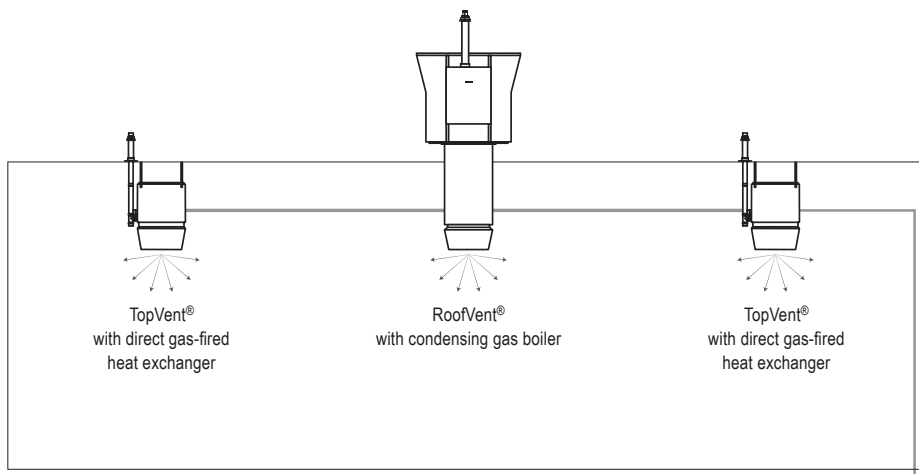
System with decentralised heat and cold generation with heat pump

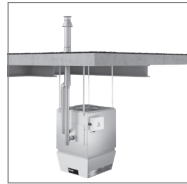


System with central heat and cold generation



System with decentralised, gas-fired heat generation





TopVent® TG

Recirculation unit with efficient air distribution
for heating spaces up to 25 m in height
with gas-fired heat exchanger

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B

1 Use

1.1 Intended use

TopVent® TG units are recirculation units for heating spaces up to 25 m in height with gas-fired heat exchanger. They have the following functions:

- Heating with gas-fired heat exchanger
- Recirculation operation
- Air distribution with adjustable Air-Injector
- Air filtration (option)

TopVent® TG units comply with all the requirements of the Ecodesign Directive 2009/125/EC relating to environmentally friendly design of energy-related products. They are systems of the 'warm air heater' type.

The Hoval TopTronic® C integrated control system ensures energy-efficient, demand-based operation of Hoval indoor climate systems.

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.

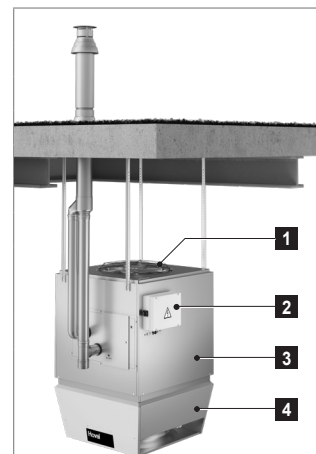
2 Construction and operation

2.1 Construction

The TopVent® TG unit consists of the following components:

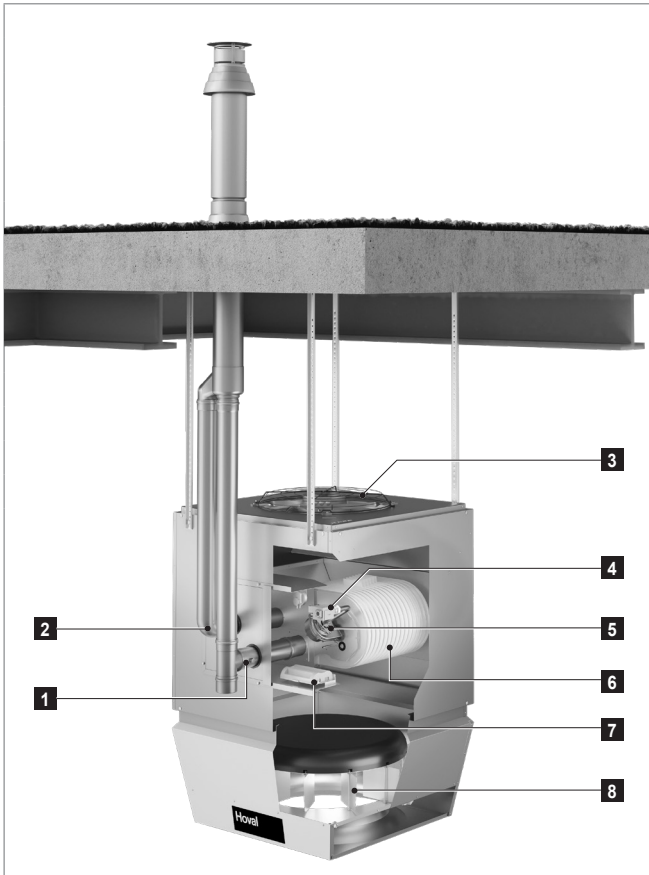
- Fan unit:
Axial fan with energy-saving EC motor, maintenance-free and infinitely variable
- Heating section:
The heating section contains the burner unit consisting of gas blower and modulating premix burner, the burner control and the heat exchanger for heating the supply air.
- Air-Injector:
The Air-Injector is a patented, infinitely variable vortex air distributor for the draught-free introduction of air into the hall under changing operating conditions.

As part of the TopTronic® C control system, the unit control box is an integral component.



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

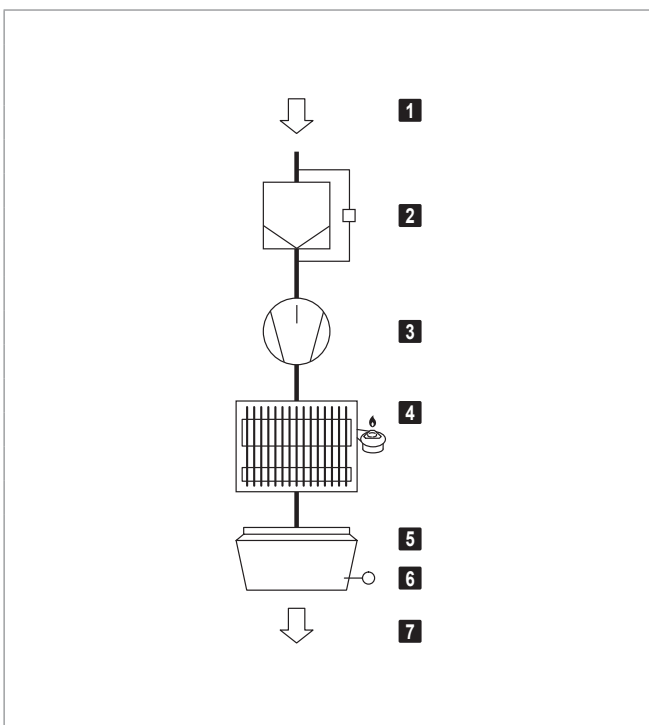
Fig. B1: TopVent® TG components



- 1** Flue gas connection
- 2** Combustion air connection
- 3** Fan
- 4** Gas control valve and gas connection
- 5** Burner unit consisting of gas blower and premix burner
- 6** Heat exchanger of stainless steel
- 7** Burner control
- 8** Air-Injector

Fig. B2: TopVent® TG structure

2.2 Function diagram



- 1** Extract air
- 2** Air filter with differential pressure switch (option)
- 3** Fan
- 4** Gas-fired heat exchanger
- 5** Air-Injector with actuator
- 6** Supply air temperature sensor
- 7** Supply air

Fig. B3: TopVent® TG function diagram

2.3 Operating modes

TopVent® TG operates in the following 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® TG unit can operate individually in a local operating mode: Off, Recirculation, Recirculation speed 1.

Code	Operating mode	Description
REC	Recirculation On/off-operation: if heating is required, the unit draws in room air, heats it and returns the warm air back into the room. The room temperature set value day is active.	Fan speed 1/2 ¹⁾ Heating on ¹⁾ Depending on heat 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).	Fan speed 2 Heating off
REC1	Recirculation speed 1 The same as REC, but the unit operates only at speed 1 (low air flow rate)	Fan speed 1 ¹⁾ Heating on ¹⁾ Depending on heat demand
DES	■ Destratification: The same as for REC, but the unit operates only at speed 1	Fan speed 1 Heating off
ST	Standby 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
L_OFF	Off (local operating mode) The unit is switched off.	Fan off Heating off

Table B1: TopVent® TG operating modes

3 Technical data

3.1 Type code

TG - 6 F - ...	
Unit type	TopVent® TG
Unit size	6 or 9
Heating section	F with coil type F (output 30 kW) H with coil type H (output 60 kW)
Further options	

Table B2: TopVent® TG type code

3.2 Application limits

Extract air temperature	max.	°C	50
Supply air temperature	max.	°C	60
Protection rating			IP 50
The units cannot be used in:			
<ul style="list-style-type: none"> ■ Damp locations ■ Places with a corrosive or aggressive environment ■ Spaces with a large amount of dust ■ Areas where there is danger of explosion 			

Table B3: TopVent® TG application limits

3.3 Electrical connection

Unit type		TG-6	TG-9
Supply voltage	V AC	3 x 400	3 x 400
Permitted voltage tolerance	%	± 5	± 5
Frequency	Hz	50	50
Power consumption max.	W	1360	1960
Current consumption max.	A	2.3	3.4
Series fuse	A	13	13
Protection rating of unit control box	–	IP 56	IP 56

Table B4: TopVent® TG electrical connection

3.4 Air flow rate, gas consumption

Unit type		TG-6	TG-9
Nominal air flow rate ¹⁾	m³/h	6000	9000
Minimum air flow rate	m³/h	4500	7000
Floor area reached ²⁾	m²	537	946
Nominal heat input	max. kW	32.0	66.0
Nominal heat output	max. kW	28.9	61.2
Gas consumption			
Natural gas: G20, G27 (H, E, Lw)	m³/h	3.4	7.0
Natural gas: G25, G25.3 (L, LL, K)	m³/h	3.8	7.9

1) at an air temperature of 20 °C
 2) Mounting height H_{max} = 11 m for a temperature difference between supply air and room air of up to 30 K
 3) in accordance with EN 1020

Table B5: TopVent® TG technical data

3.5 Gas connection

Unit type	TG-6	TG-9
Gas appliance type ¹⁾	B ₂₃ , C ₁₃ , C ₃₃	B ₂₃ , C ₁₃ , C ₃₃
Gas connection	G ½" (internal)	G ¾" (internal)
Combustion air connection	DN 80	DN 80
Flue gas connection	DN 80	DN 80
Max. length of flue gas duct ²⁾	6 m	8 m

1) According to method of flue gas evacuation and combustion air supply
 2) Equivalent length of formed parts:
 – 90° elbow 2 m
 – 45° elbow 1 m
 – 90° T-piece... 2 m

Table B6: TopVent® TG gas circuit connections

3.6 Sound levels

Unit type		TG-6	TG-9
Sound pressure level (at a distance of 5 m) ¹⁾	dB(A)	47	49
Total sound power level	dB(A)	69	71
Octave sound power level	63 Hz	45	44
	125 Hz	51	51
	250 Hz	57	59
	500 Hz	63	64
	1000 Hz	66	68
	2000 Hz	63	65
	4000 Hz	55	58
	8000 Hz	48	51

1) With a hemispherical radiation pattern in a low-reflection room

Table B7: TopVent® TG sound power levels

3.7 Heat output

Room air temperature	16 °C			20 °C		
Unit type	Q	t _s	H _{max}	Q	t _s	H _{max}
	kW	°C	m	kW	°C	m
TG-6	28.9	32.3	14.1	28.9	36.3	14.2
TG-9	61.2	38.2	13.0	61.2	42.2	13.1
Legend:	Q = Nominal heat output t _s = Maximum supply air temperature H _{max} = Maximum mounting height					
Reference:	■ At room air temperature 16 °C: extract air temperature 18 °C ■ At room air temperature 20 °C: extract air temperature 22 °C					

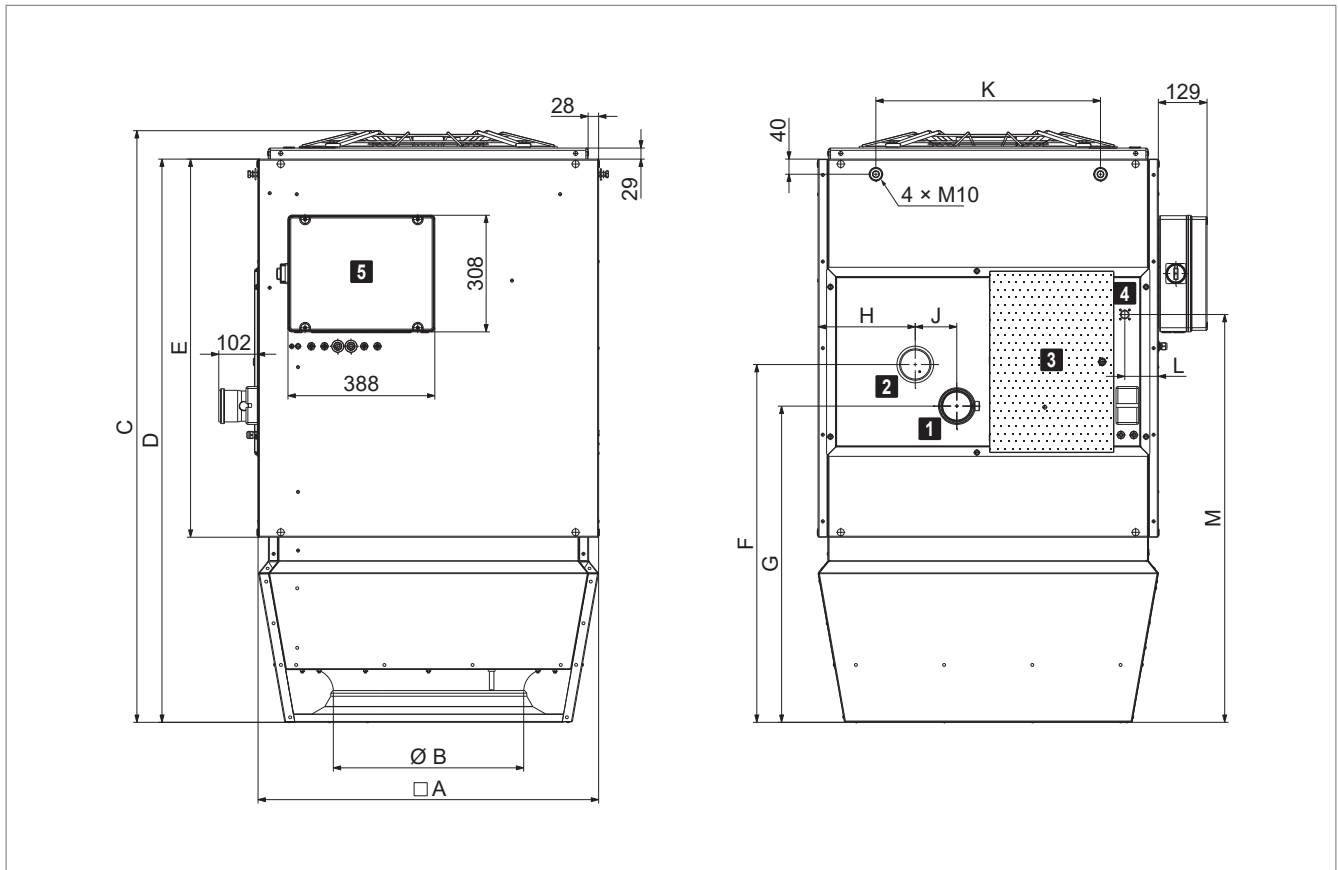
Table B8: TopVent® TG heat output, supply air temperatures and mounting heights

3.8 Product information according to ErP

Model	TopVent® TG		Unit	
	TG-6	TG-9		
B ₁ warm air heater	yes			
C ₂ warm air heater	no			
C ₄ warm air heater	no			
Type of fuel	gas			
Capacity	Rated heating capacity (P _{rated,h})	28.8	61.2	kW
	Minimum capacity (P _{min})	17.0	37.9	kW
Useful efficiency	At rated heating capacity (η _{nom})	90.4	92.7	%
	At minimum capacity (η _{pl})	94.6	95.6	%
Electric power consumption	At rated heating capacity (e _{l,max})	0.466	0.548	kW
	At minimum capacity (e _{l,min})	0.297	0.353	kW
	In standby mode (e _{l,sb})	0.034	0.034	kW
Other items	Envelope loss factor (F _{env})	–	–	%
	Ignition burner power consumption (P _{ign})	–	–	kW
	Emissions of nitrogen oxides (GCV) (NO _x)	45	45	mg/kWh
	Emission efficiency (η _{s,flow})	95.1	94.0	%
	Seasonal space heating energy efficiency (η _{s,h})	78.9	78.4	%
Contact details	Hoval Aktiengesellschaft, Austrasse 70, 9490 Vaduz, Liechtenstein www.hoval.com			

Table B9: Product information according to Commission Regulation (EU) 2016/2281, Table 9

4 Dimensions and weights



Unit type		TG-6	TG-9
A	mm	900	1100
B	mm	500	630
C	mm	1565	1672
D	mm	1490	1570
E	mm	1000	1000
F	mm	946	1019
G	mm	836	909
H	mm	257	461
J	mm	110	110
K	mm	594	846
L	mm	89	89
M	mm	1079	1094
Weight	kg	125	170

- 1** Flue gas connection with measuring opening (DN 80)
- 2** Combustion air connection (DN 80)
- 3** Inspection door with measuring opening for combustion air temperature
- 4** Gas connection (TG-6: G ½", TG-9: G ¾")
- 5** Unit control box

Fig. B4: TopVent® TG dimensions and weights

5 Specification texts

5.1 TopVent® TG

Recirculation unit for heating spaces up to 25 m in height with gas-fired heat exchanger; equipped with high-efficiency air distributor; maximum area covered per unit 537 m² (size 6) or 946 m² (size 9), protection rating IP 50.

The unit consists of the following components:

- Fan unit
- Heating section
- Air-Injector or outlet nozzle
- Unit control box
- Optional components

TopVent® TG units comply with all the requirements of the Ecodesign Directive 2009/125/EC relating to environmentally friendly design of energy-related products. They are systems of the 'warm air heater' type, provided for in Commission Regulation (EU) 2016/2281.

Fan unit

Consisting of maintenance-free, direct-drive axial fan with high-efficiency EC motor and balanced rotating wheel with aerodynamically shaped blades and serrated trailing edge (integrated in the heating section).

Heating section

Housing made of aluzinc sheet, air-tight, flame retardant, hygienic and easy to maintain because of ageing-resistant, silicone-free sealing materials, configured with: measuring opening for combustion air temperature and large inspection door for easy access to the burner unit and heat exchanger.

The heating section contains:

- the burner unit consisting of gas blower and modulating premix burner for low-emission combustion of natural gas
- the burner control for energy-optimised operation, function monitoring and alarm management
- the pull-out heat exchanger consisting of high-quality stainless steel

Air-Injector

Housing made of aluzinc sheet, air-tight, flame retardant, hygienic and easy to maintain because of ageing-resistant, silicone-free sealing materials, 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
 - for the rapid and large-area reduction of temperature stratification in the room through induction of secondary air and strong mixing of the room air with supply air
- Supply air temperature sensor

Outlet nozzle (variant)

Housing made of aluzinc sheet, air-tight, flame retardant, hygienic and easy to maintain because of ageing-resistant, silicone-free sealing materials. Concentric outlet nozzle with a supply air sensor.

Unit control box

Control box fitted at the side of the unit for connection of the power supply and housing the control components that facilitate energy-optimised operation, controlled by the control system TopTronic® C. Plastic casing, protection rating IP 56. The following components are installed:

- Main switch
- Circuit board with all necessary electrical components and unit controller (connected to the burner control via Modbus)

The circuit board is fitted with push-in terminals facilitating easy installation of the connection cables. All components in the unit control box as well as sensors and actuators in the unit are fully factory-wired.

Power supply and bus connection to be installed on site.

Options for the unit

Suspension set:

For ceiling installation of the unit consisting of 4 pairs U-profiles made of Aluzinc sheet steel, height-adjustable to 1300 mm.

Filter box:

Housing made of aluzinc sheet with 2 ISO coarse 60% bag filters (G4), with differential pressure switch for filter monitoring, factory-wired to the circuit board in the unit control box.

Flat filter box:

Housing made of aluzinc sheet with 4 pleated ISO coarse 60% cell filters (G4), with differential pressure switch for filter monitoring, factory-wired to the circuit board in the unit control box.

Standard paint finish:

Exterior painting in Hoval red (RAL 3000), including optional components and suspension set.

Paint finish as desired:

Exterior painting of the unit in choice of RAL colour, including optional components and suspension set.

Recirculation silencer:

As an attachment to the unit, made of aluzinc sheet metal, lined with sound insulation matting, insertion attenuation 3 dB.

Acoustic cowl:

Consisting of an absorber hood of large volume, insertion attenuation 4 dB.

Flue gas kit flat roof:

Supply air and flue gas duct system, painted grey RAL 7021, consisting of roof feed-through, flat roof flange, flue gas pipe, T-piece, condensate cap and 90° elbow.

Flue gas kit pitched roof:

Supply air and flue gas duct system, painted grey RAL 7021, consisting of roof feed-through, flat roof flange, lead pan with shell, flue gas pipe, T-piece, condensate cap and 90° elbow.

Flue gas kit wall:

Supply air and flue gas duct system, painted grey RAL 7021, consisting of wall feed-through, flue gas pipe, T-piece and condensate cap.

Individual components of flue gas accessories:

- Flue gas pipe (250 / 500 / 1000 mm)
- Elbow (90° / 45°)
- T-piece
- Length adjustment piece
- Condensate cap
- Pipe clamp

5.2 TopTronic® C – system control (for TopVent® gas)

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 10 supply and extract air handling units or supply air units and 10 recirculation units (TopVent® GV: max. 8).

The control system is customised and preconfigured ex works. Zone allocation:

- Zone 1: __ x Unit type _____
- Zone 2: __ x Unit type _____
- Zone 3: __ x Unit type _____
- ...

System structure:

- Unit controller: installed in the particular indoor climate unit, connected to the burner control via Modbus
- Zone bus: as serial connection of all unit controllers in one control zone with the zone controller; with robust bus protocol (bus cable 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

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 gas-fired heat exchanger
- Control of the unit including the air distribution according to the specifications of the zone controller
- Special destratification mode for rapid and large-area reduction of temperature stratification in the room by circulating the room air

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.
- 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:

- Alarm lamp
- Socket
- Additional room air temperature sensors (max. 3)
- 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
- Safety relay

5.3 TopTronic® C – system control for TopVent® C-SYS (for TopVent® gas)

System control for operation of decentralised Hoval indoor climate systems with optimised use of energy, suitable for demand-driven control of TopVent® plants comprising 1 control zone with up to 6 supply air units and 10 recirculation units (TopVent® GV: max. 8; power supply for the TopVent® units provided by the client).

System structure:

- Unit controller: installed in the particular indoor climate unit, connected to the burner control via Modbus
- Zone bus: as serial connection of all unit controllers with the zone controller; with robust bus protocol (bus cable provided by the client)
- Zone control panel, designed as compact cabinet for wall installation, made of coated sheet steel (light grey RAL 7035), with:
 - Zone controller with operating panel, making it simple to operate and monitor the system
 - Fresh air temperature sensor
 - Room temperature sensor
- Circuit board with external connections for:
 - Collective alarm
 - Forced off
 - Additional room air temperature sensors (max. 3)
 - External setpoint fresh air ratio (supply air units)
 - Operating selector switch on terminal (digital)
 - Operating selector button on terminal

Control functions:

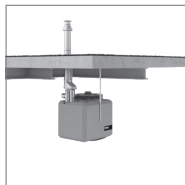
- Control of the supply air temperature using room supply air cascade control via gas-fired heat exchanger
- Control of the unit including the air distribution according to the specifications of the zone controller

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.
- 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.
- 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:

- Additional room air temperature sensors (max. 3)
- Operating of the units via building management system via standardised interfaces:
 - BACnet
 - Modbus IP
 - Modbus RTU



TopVent® GV

Recirculation unit for heating spaces up to 6 m in height
with gas-fired heat exchanger

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C

1 Use

1.1 Intended use

TopVent® GV units are recirculation units for heating spaces up to 6 m in height with gas-fired heat exchanger. They have the following functions:

- Heating with gas-fired heat exchanger
- Recirculation operation
- Air distribution via air outlet louvre

TopVent® GV units comply with all the requirements of the Ecodesign Directive 2009/125/EC relating to environmentally friendly design of energy-related products. They are systems of the 'warm air heater' type.

The energy-efficient, demand-oriented operation of TopVent® GV units is ensured either by the TempTronic MTC room temperature controller or the zone-based Hoval TopTronic® C control system, which also enables combination with other Hoval indoor climate units, control of several control zones as well as individual switching of the units.

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.

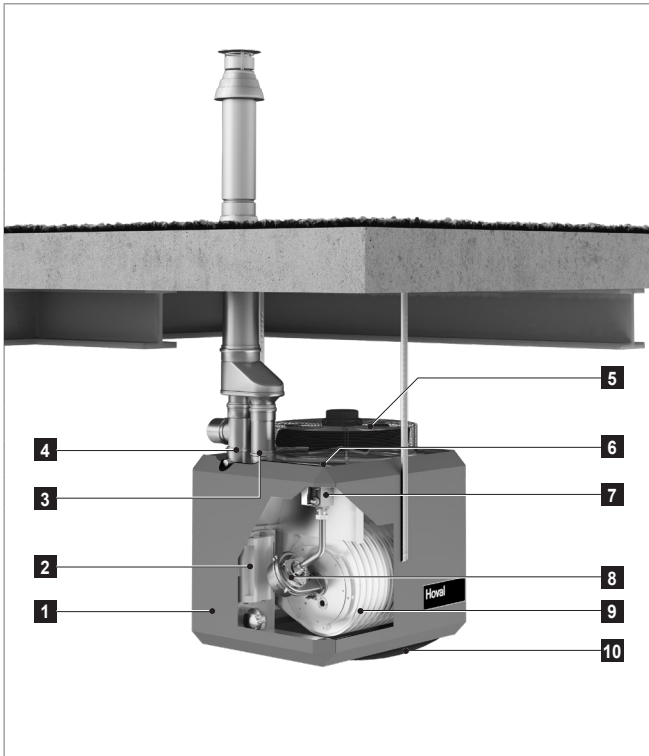
The operating instructions are for operating engineers as well as specialists in building, heating and ventilation technology.

2 Construction and operation

2.1 Construction

The TopVent® GV unit consists of the following components:

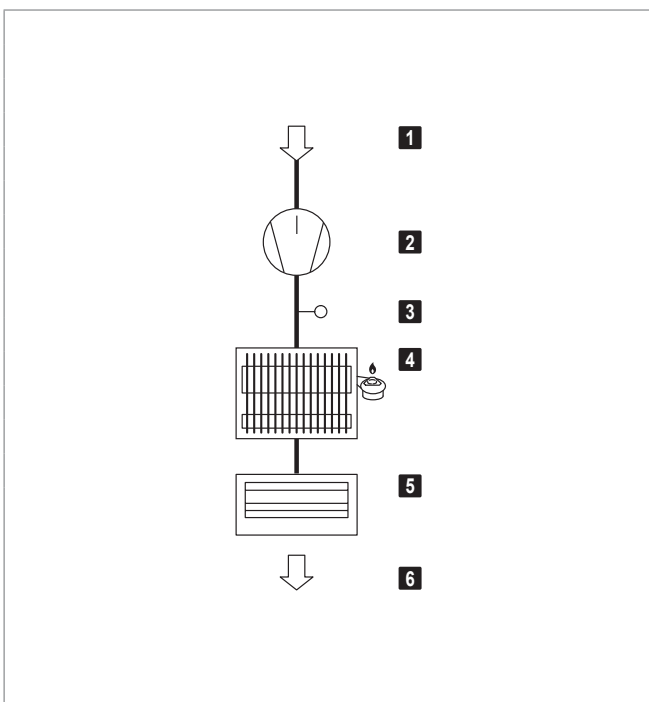
- Compact casing made of galvanised sheet steel painted in flame red (RAL 3000)
- Axial fan with capacitor motor, maintenance-free and infinitely variable
- Burner unit consisting of gas blower and modulating premix burner, burner control and heat exchanger for heating the supply air
- Air outlet louvre with vanes for manual adjustment of air distribution
- Integrated terminal box for connection to electricity supply



- 1 Access door
- 2 Burner control
- 3 Combustion air connection
- 4 Flue gas connection
- 5 Fan
- 6 Gas connection
- 7 Gas control valve
- 8 Burner unit consisting of gas blower and premix burner
- 9 Heat exchanger of stainless steel
- 10 Air outlet louvre

Fig. C1: TopVent® GV structure

2.2 Function diagram



- 1 Extract air
- 2 Fan
- 3 Stratification sensor
- 4 Gas-fired heat exchanger
- 5 Air outlet louvre
- 6 Supply air

Fig. C2: TopVent® GV function diagram

2.3 Operating modes

Operating modes with TopTronic® C

The TopTronic® C control system regulates the following operating modes automatically for each control zone in accordance with the specifications in the calendar:

- Recirculation
- Standby

The following points also apply:

- The operating mode of a control zone can be switched over manually.
- Each TopVent® GV unit can operate individually in a local operating mode: Off, Recirculation.

Code	Operating mode	Description
REC	Recirculation On/off-operation: if heating is required, the unit draws in room air, heats it and returns the warm air back into the room. The room temperature set value day is active.	Fan modulated ¹⁾ Heating modulated ¹⁾ ¹⁾ Depending on heat 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).	Fan on Heating off
ST	Standby 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 modulated ¹⁾ Heating modulated ¹⁾ ¹⁾ Depending on heat demand
L_OFF	Off (local operating mode) The unit is switched off.	Fan off Heating off

Table C1: TopVent® GV operating modes with TopTronic® C

Operating modes with TempTronic MTC

The TempTronic MTC controls the following operating modes per control zone:

Operating mode	Description
<p>Recirculation heating</p> <p>The unit draws in room air, warms it and blows it back into the room.</p> <p>3 setpoints can be set for regulation of the room temperature:</p> <ul style="list-style-type: none"> ■ Automatic mode with setpoint changeover according to clock programme ■ Continuous operation with the room temperature setpoint day ■ Continuous operation with the room temperature setpoint night ■ Continuous operation with the room temperature setpoint frost 	<p>Fan modulated ¹⁾</p> <p>Heating modulated ¹⁾</p> <p>¹⁾ Depending on heat demand</p>
<p>Destratification</p> <p>To avoid heat build-up under the ceiling, the fan can be switched on depending on the temperature stratification. The controller compares the air temperatures in the ceiling area and in the occupied area, and switches to destratification mode if the difference becomes too great.</p>	<p>Fan on</p> <p>Heating off</p>
<p>Summer ventilation</p> <p>The fan can be switched manually to 3 speeds.</p>	<p>Fan speed 1 / 2 / 3</p> <p>Heating off</p>

Table C2: TopVent® GV operating modes with TempTronic MTC

3 Technical data

3.1 Type code

GV - 5 G	
Unit type	TopVent® GV
Unit size	3 or 5
Heating section	F with coil type F (output 30 kW) G with coil type G (output 50 kW)

Table C3: TopVent® GV type code

3.2 Application limits

Extract air temperature	max.	°C	50
Supply air temperature	max.	°C	60
The units cannot be used in:			
<ul style="list-style-type: none"> ■ Damp locations ■ Places with a corrosive or aggressive environment ■ Spaces with a large amount of dust ■ Areas where there is danger of explosion 			

Table C4: TopVent® GV application limits

3.3 Electrical connection

Unit type		GV-3	GV-5
Supply voltage	V AC	230	230
Permitted voltage tolerance	%	+10 / -15	+10 / -15
Frequency	Hz	50	50
Power consumption	W	300	750
Current consumption max.	A	1.4	3.5
Series fuse	A	16	16
Protection rating	–	IP 00B	IP 00B

Table C5: TopVent® GV electrical connection

3.4 Air flow rate, gas consumption

Unit type		GV-3	GV-5	
Nominal air flow rate ¹⁾	m³/h	4200	8500	
Minimum air flow rate	m³/h	2900	6000	
Floor area reached ²⁾	m²	140	290	
Nominal heat input	min. kW	18.0	33.0	
	max. kW	32.0	55.0	
Nominal heat output	min. kW	17.0	31.5	
	max. kW	28.9	50.7	
Gas consumption				
Natural gas: G20, G27 (H, E, Lw)		m³/h	3.4	5.8
Natural gas: G25, G25.3 (L, LL, K)		m³/h	3.8	6.6

1) at an air temperature of 20 °C
2) with vertical air flow
3) in accordance with EN 1020

Table C6: TopVent® GV technical data

3.5 Gas connection

Unit type	GV-3	GV-5	
Gas appliance type ¹⁾	B ₂₃ , C ₁₃ , C ₃₃	B ₂₃ , C ₁₃ , C ₃₃	
Gas connection	G ½" (internal)	G ¾" (internal)	
Combustion air connection	DN 80	DN 80	
Flue gas connection	DN 80	DN 80	
Max. length of flue gas duct ²⁾			
	Ceiling installation	2 m	2 m
	Wall mounting	6 m	8 m

1) According to method of flue gas evacuation and combustion air supply
2) Equivalent length of formed parts:
– 90° elbow 2 m
– 45° elbow 1 m
– 90° T-piece ... 2 m

Table C7: TopVent® GV gas circuit connections

3.6 Sound levels

Unit type		GV-3	GV-5
Sound pressure level (at a distance of 5 m) ¹⁾	dB(A)	59	64
Total sound power level	dB(A)	84	89

1) With a hemispherical radiation pattern in a low-reflection room

Table C8: TopVent® GV sound power levels

3.7 Heat output

Air entry temperature	16 °C			20 °C		
	Q	t _s	H _{max}	Q	t _s	H _{max}
Unit type	kW	°C	m	kW	°C	m
GV-3	28.9	38.4	6.0	28.9	42.4	6.0
GV-5	50.7	35.7	8.0	50.7	39.7	8.0

Legend:
 Q = Nominal heat output
 t_s = Maximum supply air temperature
 H_{max} = Maximum mounting height

Table C9: TopVent® GV heat output, supply air temperatures and mounting heights

3.8 Product information according to ErP

Model	TopVent® GV		Unit	
	GV-3	GV-5		
B ₁ warm air heater	yes			
C ₂ warm air heater	no			
C ₄ warm air heater	no			
Type of fuel	gas			
Capacity	Rated heating capacity (P _{rated,h})	28.8	50.7	kW
	Minimum capacity (P _{min})	17.0	31.5	kW
Useful efficiency	At rated heating capacity (η _{nom})	90.4	92.2	%
	At minimum capacity (η _{pl})	94.6	95.6	%
Electric power consumption	At rated heating capacity (e _{l,max})	0.300	0.750	kW
	At minimum capacity (e _{l,min})	0.270	0.600	kW
	In standby mode (e _{l,sb})	0.004	0.004	kW
Other items	Envelope loss factor (F _{env})	–	–	%
	Ignition burner power consumption (P _{ign})	–	–	kW
	Emissions of nitrogen oxides (GCV) (NO _x)	45	49	mg/kWh
	Emission efficiency (η _{s,flow})	95.1	94.9	%
	Seasonal space heating energy efficiency (η _{s,h})	78.4	78.8	%
Contact details	Hoval Aktiengesellschaft, Austrasse 70, 9490 Vaduz, Liechtenstein www.hoval.com			

Table C10: Product information according to Commission Regulation (EU) 2016/2281, Table 9

4 Dimensions and weights

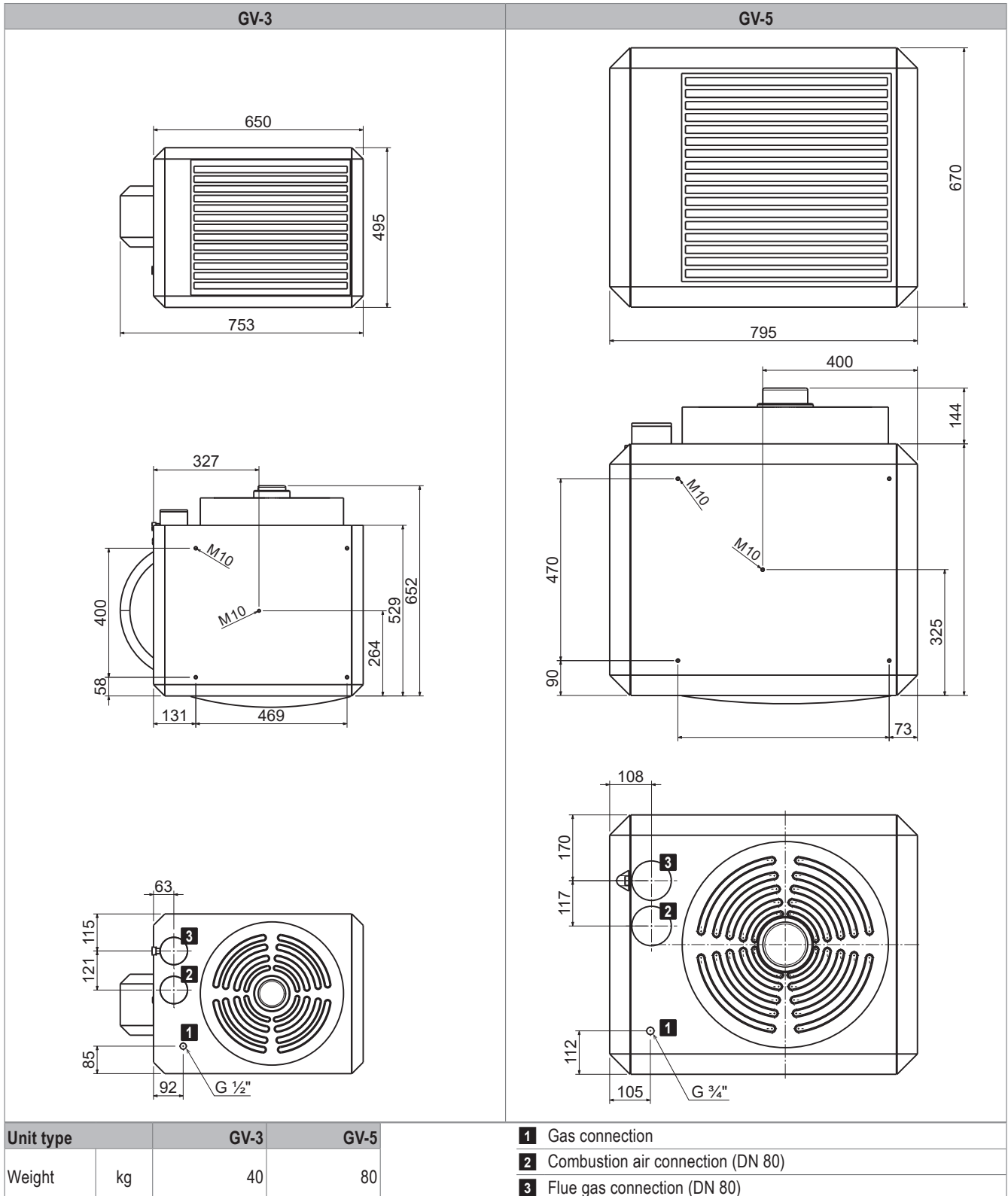


Fig. C3: TopVent® GV dimensions and weights

5 Specification texts

5.1 TopVent® GV

Recirculation unit for heating spaces up to 6 m in height with gas-fired heat exchanger; maximum area covered per unit 140 m² (size 3) or 290 m² (size 5).

The unit consists of the following components:

- Galvanised sheet steel housing, painted in flame red (RAL 3000), with inspection door and 2 x M10 blind rivet nuts for installation of the optional suspension set for ceiling or wall mounting.
- Burner unit consisting of gas blower and modulating premix burner for low-emission combustion of natural gas
- Burner control for energy-optimised operation, function monitoring and alarm management
- Pull-out heat exchanger made of high-quality stainless steel
- Fan unit consisting of a high-efficiency, infinitely variable axial-flow fan with a capacitor motor, maintenance-free and low-noise.
- Terminal box integrated in the housing for connection to electricity supply.
- Air outlet louvre with vanes for manual adjustment of air distribution

TopVent® GV units comply with all the requirements of the Ecodesign Directive 2009/125/EC relating to environmentally friendly design of energy-related products. They are systems of the 'warm air heater' type, provided for in Commission Regulation (EU) 2016/2281.

Options for the unit

Suspension set ceiling:

of galvanised sheet steel, height-adjustable up to 1650 mm.

Suspension set wall:

of galvanised sheet steel, adjustable to the wall separations of 400...640 mm (GV-3) or 420...560 mm (GV-5).

Flue gas kit flat roof:

Supply air and flue gas duct system, painted grey RAL 7021, consisting of roof feed-through, flat roof flange, flue gas pipe, T-piece, condensate cap and 90° elbow.

Flue gas kit pitched roof:

Supply air and flue gas duct system, painted grey RAL 7021, consisting of roof feed-through, flat roof flange, lead pan with shell, flue gas pipe, T-piece, condensate cap and 90° elbow.

Flue gas kit wall:

Supply air and flue gas duct system, painted grey RAL 7021, consisting of wall feed-through, flue gas pipe, T-piece and condensate cap.

Individual components of flue gas accessories:

- Flue gas pipe (250 / 500 / 1000 mm)
- Elbow (90° / 45°)
- T-piece
- Length adjustment piece
- Condensate cap
- Pipe clamp

5.2 TopTronic® C – system control (for TopVent® gas)

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 10 supply and extract air handling units or supply air units and 10 recirculation units (TopVent® GV: max. 8).

The control system is customised and preconfigured ex works. Zone allocation:

- Zone 1: __ x Unit type _____
- Zone 2: __ x Unit type _____
- Zone 3: __ x Unit type _____
- ...

System structure:

- Unit controller: installed in the particular indoor climate unit, connected to the burner control via Modbus
- Zone bus: as serial connection of all unit controllers in one control zone with the zone controller; with robust bus protocol (bus cable 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

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 gas-fired heat exchanger
- Control of the unit including the air distribution according to the specifications of the zone controller
- Special destratification mode for rapid and large-area reduction of temperature stratification in the room by circulating the room air

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.
- 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:

- Alarm lamp
- Socket
- Additional room air temperature sensors (max. 3)
- 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
- Safety relay

5.3 TopTronic® C – system control for TopVent® C-SYS (for TopVent® gas)

System control for operation of decentralised Hoval indoor climate systems with optimised use of energy, suitable for demand-driven control of TopVent® plants comprising 1 control zone with up to 6 supply air units and 10 recirculation units (TopVent® GV: max. 8; power supply for the TopVent® units provided by the client).

System structure:

- Unit controller: installed in the particular indoor climate unit, connected to the burner control via Modbus
- Zone bus: as serial connection of all unit controllers with the zone controller; with robust bus protocol (bus cable provided by the client)
- Zone control panel, designed as compact cabinet for wall installation, made of coated sheet steel (light grey RAL 7035), with:
 - Zone controller with operating panel, making it simple to operate and monitor the system
 - Fresh air temperature sensor
 - Room temperature sensor
- Circuit board with external connections for:
 - Collective alarm
 - Forced off
 - Additional room air temperature sensors (max. 3)
 - External setpoint fresh air ratio (supply air units)
 - Operating selector switch on terminal (digital)
 - Operating selector button on terminal

Control functions:

- Control of the supply air temperature using room supply air cascade control via gas-fired heat exchanger
- Control of the unit including the air distribution according to the specifications of the zone controller

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.
- 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.
- 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:

- Additional room air temperature sensors (max. 3)
- Operating of the units via building management system via standardised interfaces:
 - BACnet
 - Modbus IP
 - Modbus RTU

5.4 TempTronic MTC

Programmable room temperature controller with menu operation for up to 8 TopVent® GV units, protection rating IP 30, with the following functions:

- Regulation of the room temperature with setting option for 3 temperature setpoints
- Clock programme with 10 programmable time blocks
- Summer ventilation (in 3 speeds)
- Destratification mode
- Recording the room temperature with the integrated temperature sensor
- Connection option for external room temperature sensor (instead of the integrated sensor or for averaging)
- Alarm display and reset
- External switching (off/clock programme)
- Key locking
- Password protection

Options:

- Optional module for connection to the building management system via analogue and digital signals
- External room temperature sensor



TopVent® MG

Recirculation unit with efficient air distribution
for ventilation and heating of spaces up to 25 m in height
with gas-fired heat exchanger

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D

1 Use

1.1 Intended use

TopVent® MG units are supply air units for ventilation and heating of spaces up to 25 m in height with gas-fired heat exchanger. They have the following functions:

- Heating with gas-fired heat exchanger
- Fresh air supply
- Mixed air operation
- Recirculation operation
- Air distribution with adjustable Air-Injector
- Air filtration

TopVent® MG units comply with all the requirements of the Ecodesign Directive 2009/125/EC relating to environmentally friendly design of energy-related products. They are systems of the 'warm air heater' type.

The Hoval TopTronic® C integrated control system ensures energy-efficient, demand-based operation of Hoval indoor climate systems.

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 Construction and operation

2.1 Construction

The TopVent® MG unit consists of the following components:

- Fan unit:
Axial fan with energy-saving EC motor, maintenance-free and infinitely variable
- Heating section:
The heating section contains the burner unit consisting of gas blower and modulating premix burner, the burner control and the heat exchanger for heating the supply air.
- Air-Injector:
The Air-Injector is a patented, infinitely variable vortex air distributor for the draught-free introduction of air into the hall under changing operating conditions.
- Filter box:
The filter box contains 2 ISO Coarse 60% bag filters (G4), easily accessible behind the sliding door.
- Mixed air box:
The mixed air box contains fresh air damper and recirculation damper linked to move in opposite directions and actuator with spring return.

As part of the TopTronic® C control system, the unit control box is an integral component.

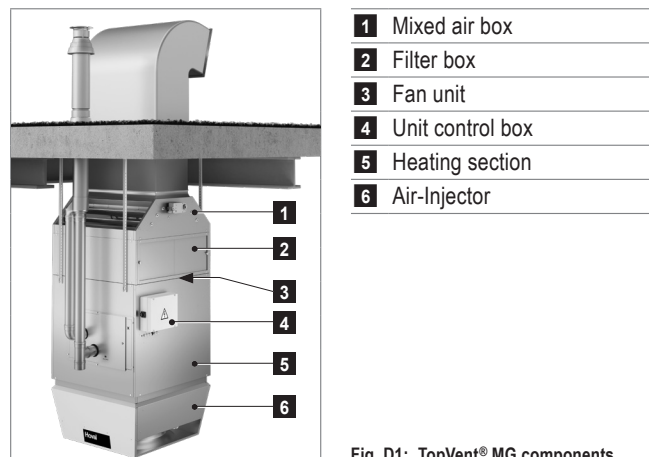
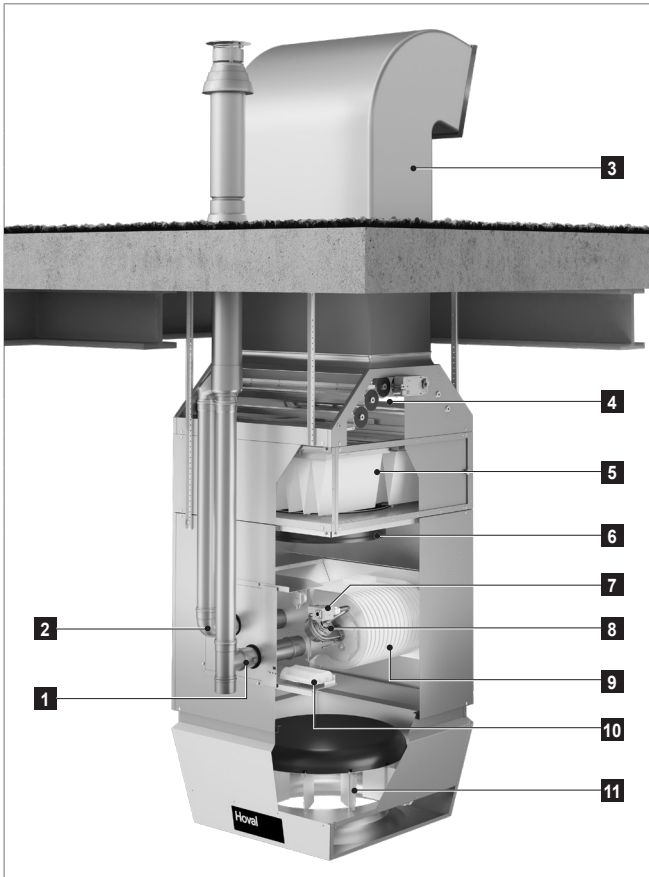


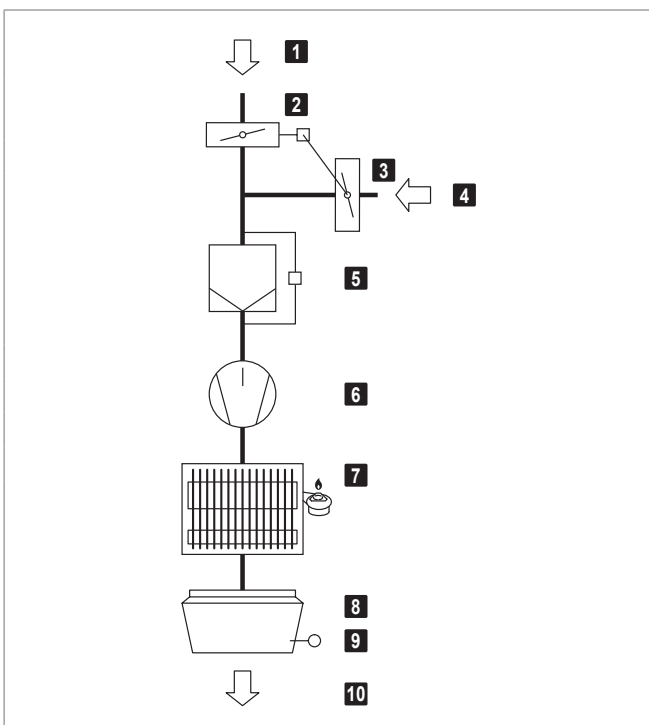
Fig. D1: TopVent® MG components



- 1 Flue gas connection
- 2 Combustion air connection
- 3 Fresh air duct (not included in the Hoval scope of supply)
- 4 Mixed air box
- 5 Filter box
- 6 Fan
- 7 Gas control valve and gas connection
- 8 Burner unit consisting of gas blower and premix burner
- 9 Heat exchanger of stainless steel
- 10 Burner control
- 11 Air-Injector

Fig. D2: TopVent® MG structure

2.2 Function diagram



- 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 Gas-fired heat exchanger
- 8 Air-Injector with actuator
- 9 Supply air temperature sensor
- 10 Supply air

Fig. D3: TopVent® MG function diagram

2.3 Operating modes

TopVent® MG operates in the following modes:

- Supply air speed 2
- Supply air speed 1
- 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® MG unit can operate individually in a local operating mode: Off, Supply air speed 2, Supply air speed 1, Recirculation, Recirculation speed 1.

Code	Operating mode	Description
SA2	Supply air speed 2 The unit blows fresh air into the room. The fresh air ratio is adjustable. The heating is regulated according to the heat 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 on ²⁾ ¹⁾ Percentage is adjustable ²⁾ Depending on heat 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 on ²⁾ ¹⁾ Percentage is adjustable ²⁾ Depending on heat demand
REC	Recirculation On/off-operation: if heating is required, the unit draws in room air, heats it and returns the warm air back into the room. The room temperature set value day is active.	Fan speed 1/2 ¹⁾ Fresh air damper..... closed Heating on ¹⁾ ¹⁾ Depending on heat 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 air temperature under the ceiling, as desired).	Fan speed 2 Fresh air damper..... closed Heating 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 on ¹⁾ ¹⁾ Depending on heat demand
DES	■ Destratification: The same as for REC, but the unit operates only at speed 1	Fan speed 1 Fresh air damper..... closed Heating off
ST	Standby 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 Fresh air damper..... closed Heating on
NCS	■ Night cooling: 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 off
L_OFF	Off (local operating mode) The unit is switched off.	Fan off Fresh air damper..... closed Heating off

Table D1: TopVent® MG operating modes

3 Technical data

3.1 Type code

MG - 6 F - ...	
Unit type	TopVent® MG
Unit size	6 or 9
Heating section	F with coil type F (output 30 kW) H with coil type H (output 60 kW)
Options	

Table D2: TopVent® MG type code

3.2 Application limits

Extract air temperature	max.	°C	50
Fresh air temperature	min.	°C	-15
Supply air temperature	max.	°C	60
Protection rating			IP 50
The units cannot be used in:			
<ul style="list-style-type: none"> ■ Damp locations ■ Places with a corrosive or aggressive environment ■ Spaces with a large amount of dust ■ Areas where there is danger of explosion 			

Table D3: TopVent® MG application limits

3.3 Electrical connection

Unit type		MG-6	MG-9
Supply voltage	V AC	3 x 400	3 x 400
Permitted voltage tolerance	%	± 5	± 5
Frequency	Hz	50	50
Power consumption	W	1360	1960
Current consumption max.	A	2.3	3.4
Series fuse	A	13	13
Protection rating of unit control box	-	IP 56	IP 56

Table D4: TopVent® MG electrical connection

3.4 Air flow rate, gas consumption

Unit type		MG-6	MG-9
Nominal air flow rate ¹⁾	m³/h	6000	9000
Minimum air flow rate	m³/h	4500	7000
Floor area reached ²⁾	m²	537	946
Nominal heat input	max. kW	32.0	66.0
Nominal heat output	max. kW	28.9	61.2
Gas consumption			
Natural gas: G20, G27 (H, E, Lw)	m³/h	3.4	7.0
Natural gas: G25, G25.3 (L, LL, K)	m³/h	3.8	7.9

1) at an air temperature of 20 °C
 2) Mounting height H_{max} = 11 m for a temperature difference between supply air and room air of up to 30 K
 3) in accordance with EN 1020

Table D5: TopVent® MG technical data

3.5 Gas connection

Unit type	MG-6	MG-9
Gas appliance type ¹⁾	B ₂₃ , C ₁₃ , C ₃₃	B ₂₃ , C ₁₃ , C ₃₃
Gas connection	G ½" (internal)	G ¾" (internal)
Combustion air connection	DN 80	DN 80
Flue gas connection	DN 80	DN 80
Max. length of flue gas duct ²⁾	6 m	8 m

1) According to method of flue gas evacuation and combustion air supply
 2) Equivalent length of formed parts:
 - 90° elbow 2 m
 - 45° elbow 1 m
 - 90° T-piece... 2 m

Table D6: TopVent® MG gas circuit connections

3.6 Sound levels

Unit type		MG-6	MG-9
Sound pressure level (at a distance of 5 m) ¹⁾	dB(A)	55	57
Total sound power level	dB(A)	77	79
Octave sound power level	63 Hz	dB	55
	125 Hz	dB	59
	250 Hz	dB	65
	500 Hz	dB	69
	1000 Hz	dB	74
	2000 Hz	dB	70
	4000 Hz	dB	64
8000 Hz	dB	56	

1) With a hemispherical radiation pattern in a low-reflection room

Table D7: TopVent® MG sound power levels

3.7 Heat output

Unit type	- 5 °C			- 15 °C		
	Q kW	t _s °C	H _{max} m	Q kW	t _s °C	H _{max} m
MG-6	28.8	31.7	15.4	28.8	30.7	15.9
MG-9	61.2	37.7	13.8	61.2	36.7	14.1
Legend:	Q = Nominal heat output t _s = Maximum supply air temperature H _{max} = Maximum mounting height					
Reference:	■ Room air 18 °C, extract air 20 °C / 20 % rel. humidity ■ Fresh air ratio 10 %					

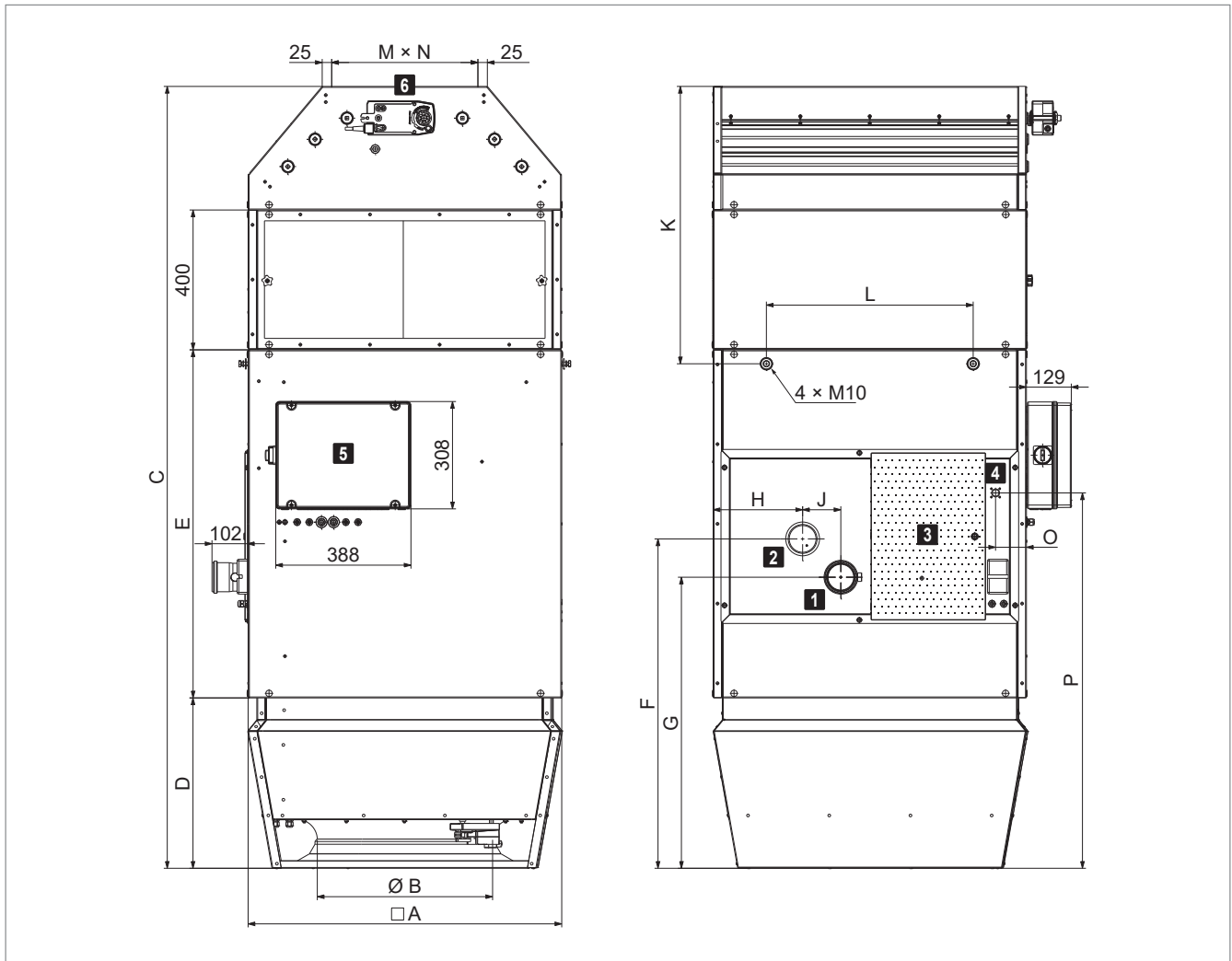
Table D8: TopVent® TG heat output, supply air temperatures and mounting heights

3.8 Product information according to ErP

Model	TopVent® MG		Unit	
	MG-6	MG-9		
B ₁ warm air heater	yes			
C ₂ warm air heater	no			
C ₄ warm air heater	no			
Type of fuel	gas			
Capacity	Rated heating capacity (P _{rated,h})	28.8	61.2	kW
	Minimum capacity (P _{min})	17.0	37.9	kW
Useful efficiency	At rated heating capacity (η _{nom})	90.4	92.7	%
	At minimum capacity (η _{pl})	94.6	95.6	%
Electric power consumption	At rated heating capacity (e _{l,max})	0.824	0.968	kW
	At minimum capacity (e _{l,min})	0.444	0.605	kW
	In standby mode (e _{l,sb})	0.034	0.034	kW
Other items	Envelope loss factor (F _{env})	–	–	%
	Ignition burner power consumption (P _{ign})	–	–	kW
	Emissions of nitrogen oxides (GCV) (NO _x)	45	45	mg/kWh
	Emission efficiency (η _{s,flow})	95.1	94.0	%
	Seasonal space heating energy efficiency (η _{s,h})	78.9	78.4	%
Contact details	Hoval Aktiengesellschaft, Austrasse 70, 9490 Vaduz, Liechtenstein www.hoval.com			

Table D9: Product information according to Commission Regulation (EU) 2016/2281, Table 9

4 Dimensions and weights



Unit type		MG-6	MG-9
A	mm	900	1100
B	mm	500	630
C	mm	2246	2333
D	mm	490	570
E	mm	1000	1000
F	mm	946	1019
G	mm	836	909
H	mm	257	461
J	mm	110	110
K	mm	797	803
L	mm	594	846
M x N	mm	420 x 850	500 x 1050
O	mm	89	89
P	mm	1079	1094
Weight	kg	175	230

- 1** Flue gas connection with measuring opening (DN 80)
- 2** Combustion air connection (DN 80)
- 3** Inspection door with measuring opening for combustion air temperature
- 4** Gas connection (MG-6: G 1/2", MG-9: G 3/4")
- 5** Unit control box
- 6** Fresh air duct connection

Fig. D4: TopVent® MG dimensions and weights

5 Specification texts

5.1 TopVent® MG

Supply air unit for ventilation and heating of spaces up to 25 m in height with gas-fired heat exchanger; equipped with high-efficiency air distributor; maximum area covered per unit 537 m² (size 6) or 946 m² (size 9), protection class IP 50.

The unit consists of the following components:

- Fan unit
- Heating section
- Air-Injector
- Filter box
- Mixed air box
- Unit control box
- Optional components

TopVent® MG units comply with all the requirements of the Ecodesign Directive 2009/125/EC relating to environmentally friendly design of energy-related products. They are systems of the 'warm air heater' type, provided for in Commission Regulation (EU) 2016/2281.

Fan unit

Consisting of maintenance-free, direct-drive axial fan with high-efficiency EC motor and balanced rotating wheel with aerodynamically shaped blades and serrated trailing edge (integrated in the heating section).

Heating section

Housing made of aluzinc sheet, air-tight, flame retardant, hygienic and easy to maintain because of ageing-resistant, silicone-free sealing materials, configured with: measuring opening for combustion air temperature and large inspection door for easy access to the burner unit and heat exchanger. The heating section contains:

- the burner unit consisting of gas blower and modulating premix burner for low-emission combustion of natural gas
- the burner control for energy-optimised operation, function monitoring and alarm management
- the pull-out heat exchanger consisting of high-quality stainless steel

Air-Injector

Housing made of aluzinc sheet, air-tight, flame retardant, hygienic and easy to maintain because of ageing-resistant, silicone-free sealing materials, 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
 - for the rapid and large-area reduction of temperature stratification in the room through induction of secondary air and strong mixing of the room air with supply air
- Supply air temperature sensor

Filter box

Housing made of aluzinc sheet, internally insulated in EPDM, with 2 ISO coarse 60% bag filters (G4), with differential pressure switch for filter monitoring, factory-wired to the circuit board in the unit control box.

Mixed air box

Housing made of aluzinc sheet, internally insulated in EPDM, with fresh air damper and recirculation damper linked to move in opposite directions; including actuator with spring return, factory-wired to the circuit board in the unit control box.

Unit control box

Control box fitted at the side of the unit for connection of the power supply and housing the control components that facilitate energy-optimised operation, controlled by the control system TopTronic® C. Plastic casing, protection rating IP 56. The following components are installed:

- Main switch
- Circuit board with all necessary electrical components and unit controller (connected to the burner control via Modbus)

The circuit board is fitted with push-in terminals facilitating easy installation of the connection cables. All components in the unit control box as well as sensors and actuators in the unit are fully factory-wired.

Power supply and bus connection to be installed on site.

Options for the unit

Suspension set:

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

Standard paint finish:

Exterior painting in Hoval red (RAL 3000), including optional components and suspension set.

Paint finish as desired:

Exterior painting of the unit in choice of RAL colour, including optional components and suspension set.

Acoustic cowl:

Consisting of an absorber hood of large volume, insertion attenuation 4 dB.

Flue gas kit flat roof:

Supply air and flue gas duct system, painted grey RAL 7021, consisting of roof feed-through, flat roof flange, flue gas pipe, T-piece, condensate cap and 90° elbow.

Flue gas kit pitched roof:

Supply air and flue gas duct system, painted grey RAL 7021, consisting of roof feed-through, flat roof flange, lead pan with shell, flue gas pipe, T-piece, condensate cap and 90° elbow.

Flue gas kit wall:

Supply air and flue gas duct system, painted grey RAL 7021, consisting of wall feed-through, flue gas pipe, T-piece and condensate cap.

Individual components of flue gas accessories:

- Flue gas pipe (250 / 500 / 1000 mm)
- Elbow (90° / 45°)
- T-piece
- Length adjustment piece
- Condensate cap
- Pipe clamp

5.2 TopTronic® C – system control (for TopVent® gas)

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 10 supply and extract air handling units or supply air units and 10 recirculation units (TopVent® GV: max. 8).

The control system is customised and preconfigured ex works. Zone allocation:

- Zone 1: __ x Unit type _____
- Zone 2: __ x Unit type _____
- Zone 3: __ x Unit type _____
- ...

System structure:

- Unit controller: installed in the particular indoor climate unit, connected to the burner control via Modbus
- Zone bus: as serial connection of all unit controllers in one control zone with the zone controller; with robust bus protocol (bus cable 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

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 gas-fired heat exchanger
- Control of the unit including the air distribution according to the specifications of the zone controller
- Special destratification mode for rapid and large-area reduction of temperature stratification in the room by circulating the room air

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.
- 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:

- Alarm lamp
- Socket
- Additional room air temperature sensors (max. 3)
- 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
- Safety relay

5.3 TopTronic® C – system control for TopVent® C-SYS (for TopVent® gas)

System control for operation of decentralised Hoval indoor climate systems with optimised use of energy, suitable for demand-driven control of TopVent® plants comprising 1 control zone with up to 6 supply air units and 10 recirculation units (TopVent® GV: max. 8; power supply for the TopVent® units provided by the client).

System structure:

- Unit controller: installed in the particular indoor climate unit, connected to the burner control via Modbus
- Zone bus: as serial connection of all unit controllers with the zone controller; with robust bus protocol (bus cable provided by the client)
- Zone control panel, designed as compact cabinet for wall installation, made of coated sheet steel (light grey RAL 7035), with:
 - Zone controller with operating panel, making it simple to operate and monitor the system
 - Fresh air temperature sensor
 - Room temperature sensor
- Circuit board with external connections for:
 - Collective alarm
 - Forced off
 - Additional room air temperature sensors (max. 3)
 - External setpoint fresh air ratio (supply air units)
 - Operating selector switch on terminal (digital)
 - Operating selector button on terminal

Control functions:

- Control of the supply air temperature using room supply air cascade control via gas-fired heat exchanger
- Control of the unit including the air distribution according to the specifications of the zone controller

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.
- 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.
- 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:

- Additional room air temperature sensors (max. 3)
- Operating of the units via building management system via standardised interfaces:
 - BACnet
 - Modbus IP
 - Modbus RTU



Options

1	Type code	40
2	Outlet nozzle	42
3	Suspension set	42
4	Air filtration	42
5	Paint finish	43
6	Recirculation silencer	43
7	Acoustic cowl	43
8	Flue gas accessories	44

1 Type code

1.1 TopVent® TG

TG - 9 H / ST . D1 / S . FK . LH . UA . P / TC	
Unit type TG	TG
Unit size 6 or 9	9
Heating section F Capacity 30 kW H Capacity 60 kW	H
Design ST Standard	ST
Air outlet D1 Design with 1 Air-Injector DN Outlet nozzle	D1
Installation - without S Suspension set	S
Filter box FK Filter box FF Flat filter box	FK
Paint finish -- without LH Standard paint finish LU Paint finish as desired	LH
Silencer -- without U- Recirculation silencer -A Acoustic cowl UA Recirculation silencer and acoustic cowl	UA
Flue gas kit - without F Flue gas kit flat roof P Flue gas kit pitched roof W Flue gas kit wall	P
Control system TC TopTronic® C	TC

Table E1: TopVent® TG type code

1.2 TopVent® GV

GV - 5 G	
Unit type GV	GV
Unit size 3 or 5	5
Heating section F Capacity 30 kW G Capacity 50 kW	G

Table E2: TopVent® GV type code

1.3 TopVent® MG

	MG	9	H	/	ST	.	D1	/	S	.	--	.	LH	.	A	.	P	/	TC
Unit type MG																			
Unit size 6 or 9																			
Heating section F Capacity 30 kW H Capacity 60 kW																			
Design ST Standard																			
Air outlet D1 Design with 1 Air-Injector																			
Installation - without S Suspension set																			
Paint finish -- without LH Standard paint finish LU Paint finish as desired																			
Silencer - without A Acoustic cowl																			
Flue gas kit - without F Flue gas kit flat roof P Flue gas kit pitched roof W Flue gas kit wall																			
Control system TC TopTronic® C																			

Table E3: TopVent® MG type code

2 Outlet nozzle

For low-cost recirculation heating in spaces where comfort requirements are relatively low the TopVent® TG unit is available with a simple outlet nozzle. The air discharge angle cannot be adjusted. For example, the unit is well-suited for use in high-bay warehouses.

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

- Size 6: –15 kg
- Size 9: –21 kg

3 Suspension set

For ease of installation of the units, there are suspension sets available (complete with nuts and bolts).

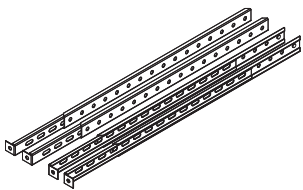
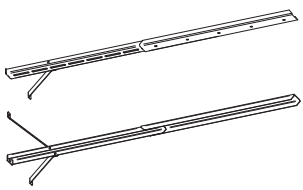
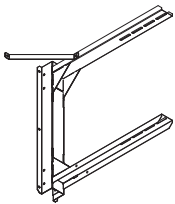
Use	Description
 <p>Ceiling installation TopVent® TG / MG</p>	<ul style="list-style-type: none"> ■ of aluzinc sheet steel ■ height adjustable to a maximum of 1300 mm
 <p>Ceiling installation TopVent® GV</p>	<ul style="list-style-type: none"> ■ of galvanised sheet steel ■ height adjustable to a maximum of 1650 mm
 <p>Wall mounting TopVent® GV</p>	<ul style="list-style-type: none"> ■ of galvanised sheet steel ■ painted black ■ adjustable to the wall separation 400...640 mm (GV-3) 420...560 mm (GV-5)

Fig. E1: Suspension sets

4 Air filtration

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

4.1 Filter box

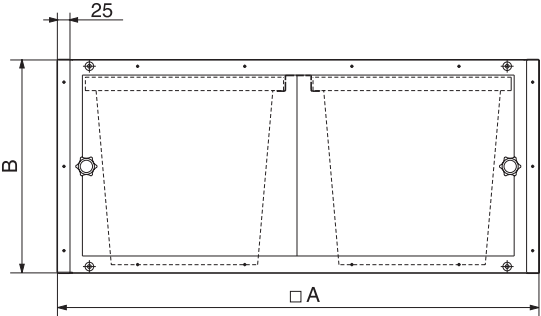
A filter box with 2 bag filters can be installed for the purpose of filtering the recirculation air. The modular construction made of Aluzinc sheet metal with 2 sliding doors makes it easy to replace the filters.



Notice

In the planning phase make sure there is enough space in front of the sliding doors so that the filters can be replaced with ease.

A pressure difference control device is installed for automatic monitoring of the filter. It shows when the filters have to be cleaned or 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	Pa	180	180

Table E4: Filter box technical data



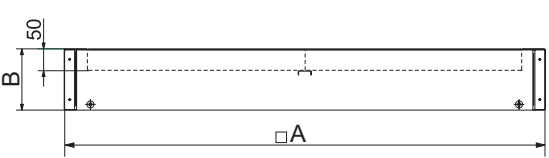
Notice

TopVent® MG supply air units are equipped with a filter box as standard.

4.2 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 cleaned or 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	Pa	50	50

Table E5: Flat filter box technical data

5 Paint finish

If the customer wishes, the units can be provided with an exterior paint finish. There are 2 possibilities:

- Standard paint finish in Hoval red (RAL 3000)
- Paint finish in desired RAL colour

6 Recirculation silencer

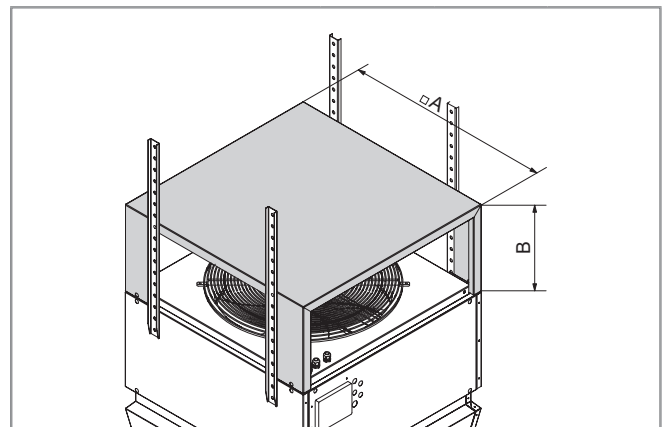
The use of a recirculation silencer for noise reduction is recommended mainly if the TopVent® units are installed under flat, hard ceilings (e.g. made of concrete or sheet steel). The recirculation silencer is mounted on the appliance and thus reduces the sound reflection from the ceiling. Insertion attenuation is 3 dB compared with the total sound power level of each TopVent® unit.

Mount the recirculation units as usual via the 4 fastening points in the heating section (for example, using the optional suspension set).



Caution

Risk of injury from falling parts. The silencer cannot bear the weight of the appliance. Do not locate any suspension points on the silencer.



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

Table E6: Dimensions and weights of the recirculation silencers

7 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.

8 Flue gas accessories

8.1 Flue gas kits

For simple, room air independent installation of TopVent® gas units flue gas kits are available. These consist of die-cast aluminium. Components visible from outside are painted in grey (RAL 7021).

There are different versions according to the following criteria:

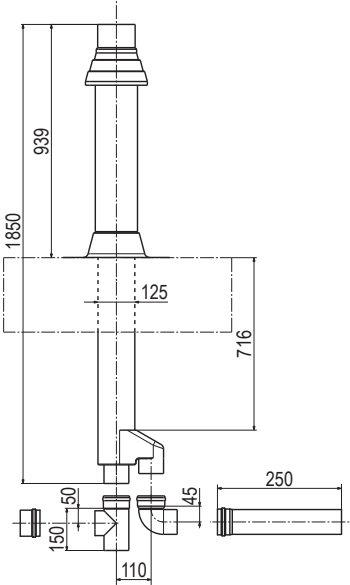
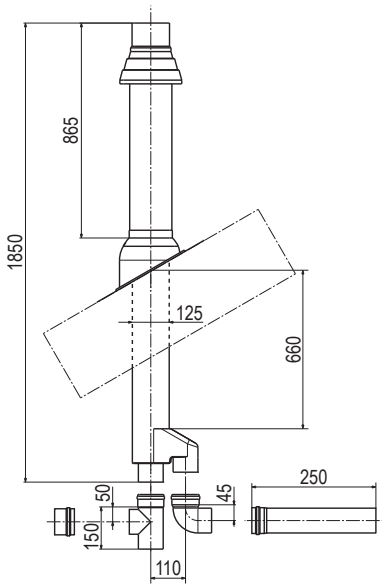
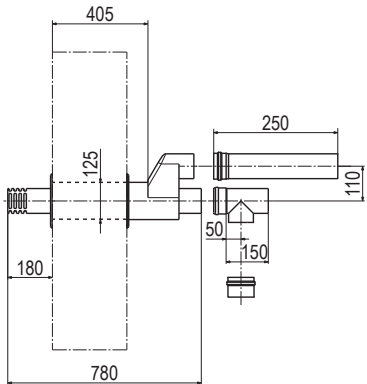
Flue gas kit flat roof DN 80	Flue gas kit pitched roof DN 80	Flue gas kit wall DN 80
	 <p data-bbox="612 1417 986 1440">Appropriate for roof inclinations between 25° and 45°</p>	
<p>Components:</p> <ul style="list-style-type: none"> ■ Roof feed-through ■ Flat roof flange ■ Flue gas pipe ■ T-piece ■ Condensate cap ■ Elbow bend 90° 	<p>Components:</p> <ul style="list-style-type: none"> ■ Roof feed-through ■ Lead pan with shell ■ Flue gas pipe ■ T-piece ■ Condensate cap ■ Elbow bend 90° 	<p>Components:</p> <ul style="list-style-type: none"> ■ Wall feed-through ■ Flue gas pipe ■ T-piece ■ Condensate cap

Table E7: Flue gas kit dimensions and components (dimensions in mm)

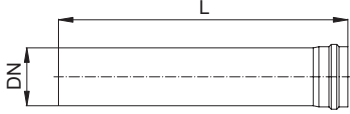
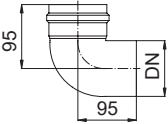
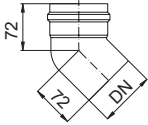
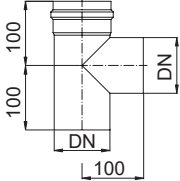
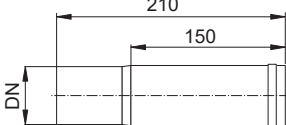
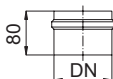
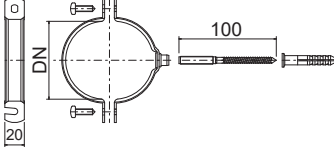


Notice

The installer can shorten the roof feed-through or the wall feed-through (concentric pipe) as appropriate in order to adapt it to the particular conditions required.

8.2 Individual parts

The following individual parts are also available for the adaptation of the flue gas kit to the particular situation:

Flue gas pipe ¹⁾	<p>L = 250 / 500 / 1000</p> 
Elbow bend 90° ¹⁾	
Elbow bend 45° ¹⁾	
T-piece ¹⁾	
Length adjustment piece	
Condensate cap	
Pipe clamp	

¹⁾ Insertion depth of pipe collar = 50 mm

Table E8: Individual components of flue gas accessories (dimensions in mm, DN 80)



Transport and installation

1 Installation	48
2 Flue gas evacuation.....	49
3 Gas connection.....	50
4 Electrical installation	50

1 Installation

1.1 Preparation

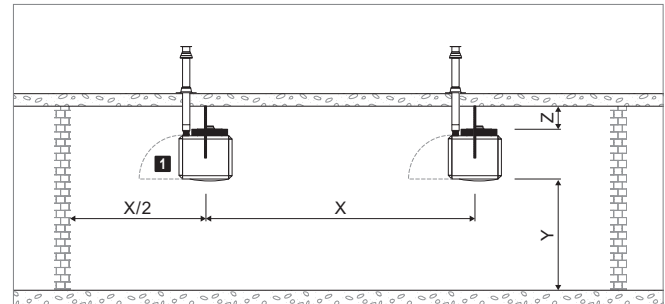
The following guidelines are important when preparing for installation:

- The scope of delivery includes:
 - TopVent® unit, delivered on a pallet
 - Accessories (flue gas duct, installation material, temperature sensor)
 - Optional components
- Make sure that a lifting platform is available.
- Secure the unit only to ceilings of fireproof materials and with sufficient load-bearing capacity.
- Use the optionally available suspension set or flat irons, perforated irons, angle profiles, steel cables or similar for mounting.

1.2 Positioning

- Comply with the minimum and maximum distances.
- Position the unit in such a way that no one is endangered by flue gas and radiant heat and no fires can break out.
- 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.
- The unit must be accessible for maintenance work.

TopVent® GV – vertical air flow

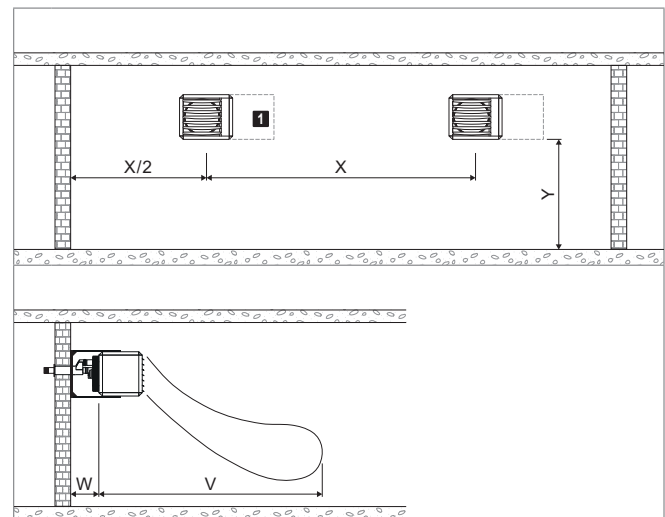


1 Free space to open inspection door

Size			3	5
Unit clearance X	min.	m	7.0	10.0
	max.	m	12.0	16.0
Distance from ceiling Z	min.	m	0.2	0.2
Mounting height Y	min.	m	4.0	4.0
	max.	m	5.0	6.0

Table F1: TopVent® GV minimum and maximum distances for vertical air flow (ceiling mounting)

TopVent® GV – horizontal air flow



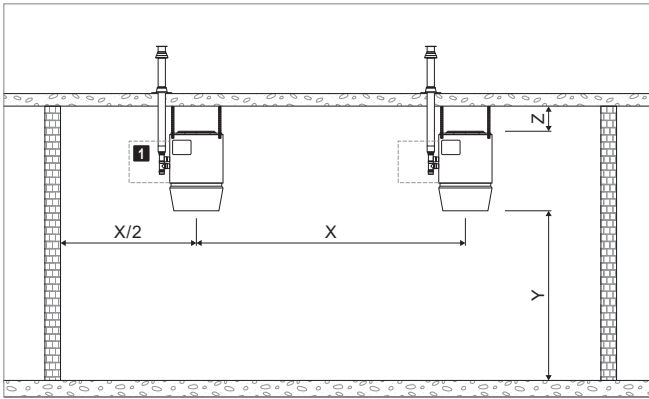
1 Free space to open inspection door

Size			3	5
Unit clearance X	min.	m	7.0	10.0
	max.	m	12.0	16.0
Mounting height Y	min.	m	1.7	1.7
	max.	m	5.0	6.0
Distance from wall W ¹⁾	min.	mm	0.3	0.3
Reach V		m	23.0	28.8

¹⁾ The effective distance from wall depends on the method of flue gas evacuation chosen.

Table F2: TopVent® GV minimum and maximum distances for horizontal air flow (wall mounting)

TopVent® TG / MG



1 Clearance of approx. 1.5 m for maintenance work

Size			6	9
Unit clearance X	min.	m	12.0	14.0
	max.	m	23.0	31.0
Distance from ceiling Z	min.	m	0.3	0.4
	min.	m	4.0	5.0
Mounting height Y	min.	m	approx. 9...25 ¹⁾	
	max.	m		

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 F3: TopVent® TG / MG minimum and maximum distances

1.3 Unit installation

Proceed as follows to position the unit:

- Transport the unit to the installation site and rotate it to the correct position.
- Fasten the unit to the designated suspension points.
- Connect supply air units to a fresh air duct via a canvas connection and connect both flanges with an earth wire.

2 Flue gas evacuation

- In all cases, use only the original flue gas accessories approved for use with the units for the installation. Do not combine systems from different manufacturers.
- Observe national and local regulations when planning the flue gas evacuation and the combustion air supply. From an early stage, coordinate the installation with the responsible district chimney sweep authorities and obtain the necessary authorisation from the local building authority.
- Provide suitable openings for the roof and wall feed-through of the flue gas ducts (for the dimensions of the flue gas accessories, see Part G 'Options').
- Use flue pipes with the same diameter as the combustion air and flue gas connections on the unit.

- Observe the maximum length of the flue gas duct:
 - 9 m in horizontal or vertical direction
 - A 90° elbow or a T-piece reduces the maximum length by 2 m.
 - A 45° elbow reduces the maximum length by 1 m.
- Condensation may form in horizontal flue gas ducts > 4 m long or in ducts through cool rooms:
- Insulate the pipes using temperature-resistant, non-flammable material.
- Insert a condensate cap.
- Install horizontal flue gas ducts with at least 3° inclination (50 mm/m) towards the unit so that condensate can flow to the air heater.
- The surface temperature of the flue gas pipes amounts to 200 °C. During the planning process, please observe the regulations of the responsible fire protection authorities.
- For the flue gas path test, Hoval recommends installing an inspection T-piece (included in the flue gas kit).
- For all diversions, install an inspection T-piece in the flue gas pipe as well.
- In some countries, an annual inspection and emission measured by the responsible authorities is legally required. For this purpose, measurement openings have been provided in the exhaust spout and the access panel.
- In some countries (e.g. in Germany), an emission measurement from the roof is also permissible. For this purpose, provide measurement openings in the flue gas pipe and in the combustion air pipe directly above the roof (on-site installation in 3-shell pipe).

Room air-dependent installation

- The units can be installed as room air dependent (Type B23) or room air independent (Type C13, C33) appliances.
- For room air dependent operation the combustion air is taken directly from the room in which the unit is installed. Ensure the room is sufficiently ventilated and that the combustion air is free from pollutants and aggressive substances (halogens such as chlorides, fluorides, etc.).
- In case of room air dependent installation (Type B23), close off the combustion air connection using a protective screen.

3 Gas connection

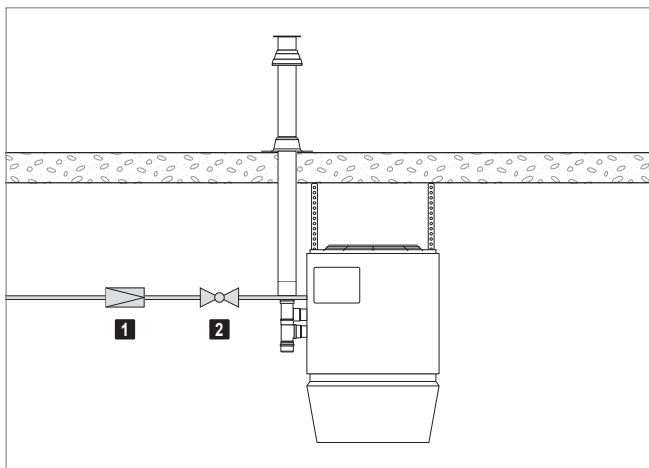


Caution

Risk of injury from incorrect handling. The gas connection may only be carried out by specialists authorised by the gas supply company!

Please note the following:

- The fuel used is natural gas. Check the type of gas the unit is set to work with and, if necessary, have Hoval Customer Service reset the unit to the type of gas supplied locally.
- During operation of the unit, the required quantity of gas and the necessary pressure of gas must be present constantly.
- Connect the gas supply line with appropriate bolted joints which can be loosened, tension-free and vibration-free.
- The connection of the unit to the gas supply line must be gas-tight.
- Ensure that a gas pressure regulator and a cut-off-valve (not part of the scope of supply) are installed directly before the unit.



- 1** Gas pressure regulator (20...50 mbar)

Recommended settings:

- Natural gas G20 20 mbar
- Natural gas G25 25 mbar

- 2** Cut-off-valve

Fig. F1: Gas pressure regulator and cut-off valve in the gas supply line

4 Electrical installation

- The electrical installation must only be carried out by a qualified electrician.
- 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.

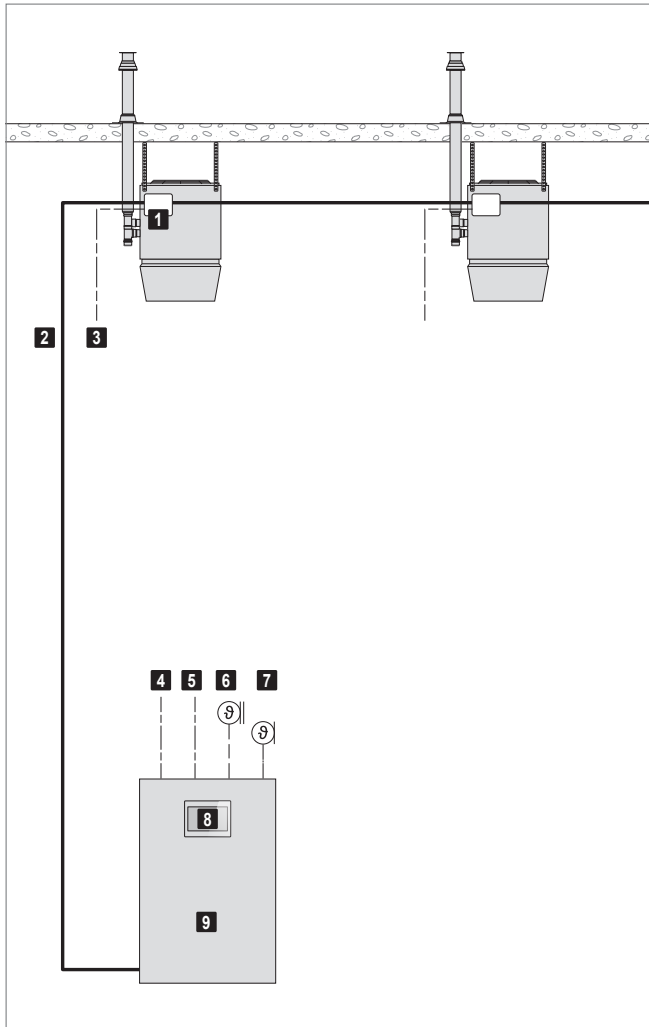


Attention

Use an all-pole sensitive residual current circuit breaker for a leakage current protective circuit.

- Carry out the electrical installation according to the wiring diagram:
 - Power supply for TopVent®
 - Zone bus based on system layout
 - Signal lines

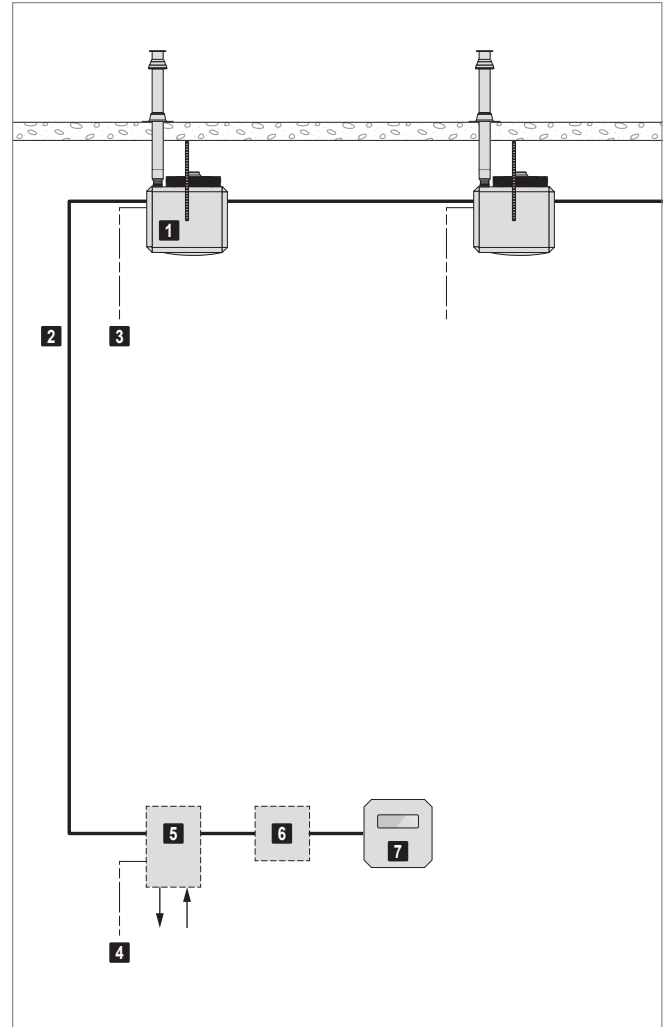
TopVent® TG / GV / MG with TopTronic® C



- 1** Unit control box
- 2** Zone bus
- 3** Power supply for TopVent®
- 4** Power supply for control panel
- 5** Collective alarm
- 6** Fresh air temperature sensor
- 7** Room temperature sensor
- 8** System operator terminal
- 9** Zone control panel

Fig. F2: TopTronic® C connection diagram

TopVent® GV with TempTronic MTC



- 1** TopVent® GV (max. 8)
- 2** System bus
- 3** Power supply for TopVent® GV
- 4** Power supply for option module
- 5** Option module
- 6** External room temperature sensor
- 7** TempTronic MTC

Fig. F3: TempTronic MTC connection diagram

Component	Designation	Voltage	Cable	Comments	
TopTronic® C System control	Power supply	3 × 400 VAC	NYM-J 5 × ... mm ²	3-phase	
		1 × 230 VAC	NYM-J 3 × ... mm ²	1-phase	
Zone control panel	Zone bus		J-Y(St)Y 2 × 2 × 0.8 mm	max. 500 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 sensors		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	
	Combination sensor fresh air temperature and humidity		J-Y(St)Y 2 × 2 × 0.8 mm	Max. 250 m	
	Collective alarm	Volt-free max. 230 VAC max. 24 VDC	NYM-O 2 × 1.5 mm ²		max. 8 A
	Power supply for units	3 × 400 VAC	NYM-J 5 × 4.0 mm ² (min.)		RoofVent® units
		3 × 400 VAC	NYM-J 5 × 1.5 mm ² (min.)		TopVent® units
	System operator terminal (if external)	24 VAC	NYM-J 3 × 1.5 mm ²		Power supply, 1 A fusing
			Ethernet ≥ CAT 5		Communication
	Zone operator terminal (if external)	24 VAC	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 VAC	NYM-O 2 × 1.5 mm ²		max. 1 A
Operating selector switch on terminal (analogue)	0-10 VDC	J-Y(St)Y 2 × 2 × 0.8 mm		max. 1 A	
Operating selector switch on terminal (digital)	0-10 VDC	J-Y(St)Y 5 × 2 × 0.8 mm		max. 1 A	
Operating selector button on terminal	24 VAC	J-Y(St)Y 5 × 2 × 0.8 mm		max. 1 A	
Forced off	24 VAC	NYM-O 2 × 1.5 mm ²		max. 1 A	
TopTronic® C System control for TopVent® (C-SYS)	Power supply	1 × 230 VAC	NYM-J 3 × 1.5 mm ²	1-phase	
Zone control panel	Zone bus		J-Y(St)Y 2 × 2 × 0.8 mm	max. 500 m length	
	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 sensors		J-Y(St)Y 2 × 2 × 0.8 mm	Max. 250 m	
	Collective alarm	Volt-free max. 230 VAC max. 24 VDC	NYM-O 2 × 1.5 mm ²		max. 8 A
	External setpoint fresh air ratio	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		max. 1 A
	Operating selector button on terminal	24 VAC	J-Y(St)Y 5 × 2 × 0.8 mm		max. 1 A
	Forced off	24 VAC	NYM-O 2 × 1.5 mm ²		max. 1 A

Component	Designation	Voltage	Cable	Comments
TopVent® TG / MG Ventilation unit	Power supply	3 × 400 VAC	NYM-J 5 × 1.5 mm ² (min.)	min. 7 m length
	Zone bus		J-Y(St)Y 2 × 2 × 0.8 mm	max. 500 m length
	Forced off	24 VAC	NYM-O 2 × 1.5 mm ²	max. 1 A (for MG)
TopVent® GV Ventilation unit	Power supply	1 × 230 VAC	NYM 2 × 1.5 mm ² (min.)	max. 200 m length
	Zone bus		J-Y(St)Y 2 × 2 × 0.8 mm	max. 500 m length

Table F4: Cable list for on-site connections – TopTronic® C

Component	Designation	Voltage	Cable	Comments
TempTronic MTC Controller	System bus		J-Y(St)Y 1 × 2 × 0.8 mm	shielded, twisted, max. 200 m length
TempTronic MTC Option module	Power supply	1 × 230 VAC	NYM 3 × 1.5 mm ² (min.)	
	Collective alarm	1 × 230 VAC	NYM-O 2 × 1.5 mm ²	
	Operating signal display	24 VAC	NYM-O 2 × 1.5 mm ²	max. 4 A
	Alarm reset signal	24 VAC	NYM-O 2 × 1.5 mm ²	max. 1 A
	Control of the fan	0-10 VDC	J-Y(St)Y 2 × 2 × 0.8 mm	
	Control of the burner	0-10 VDC	J-Y(St)Y 2 × 2 × 0.8 mm	
	Signal for maximum output	24 VAC	NYM-O 2 × 1.5 mm ²	max. 1 A
	Signal for minimum output	24 VAC	NYM-O 2 × 1.5 mm ²	max. 1 A
TopVent® GV Ventilation unit	Power supply	1 × 230 VAC	NYM 3 × 1.5 mm ² (min.)	max. 200 m length
	System bus		J-Y(St)Y 1 × 2 × 0.8 mm	shielded, twisted, max. 200 m length

Table F5: Cable list for on-site connections – TempTronic MTC



System design

1 Design example	56
2 Maintenance schedule	58
3 Checklist for project discussions	59

1 Design example



Notice

Use the 'HK-Select' program to design Hoval Indoor Climate Systems. You can download it free of charge on the Internet.

Design data	Example									
<ul style="list-style-type: none"> ■ Geometry of the room ■ Internal heat gains ■ People in the room ■ Heating with decentralised gas-fired heat generation ■ Improvement of air quality, fresh air supply for the people in the room (fresh air flow rate per person = 30 m³/h) 	50 × 60 × 12 m 28 kW 20 people									
Design conditions heating: <ul style="list-style-type: none"> ■ Fabric heat losses ■ Fresh air temperature ■ Room temperature ■ Extract air temperature 	350 kW - 15 °C 18 °C 20 °C									
Fresh air supply <ul style="list-style-type: none"> ■ Required fresh air flow rate in total: ■ Fresh air ratio of supply air units: max. 10 % of the nominal air flow rate <p><i>The fresh air ratio can be adjusted from 0...100 %. Where EU Regulation 1253/2014 applies, it must be restricted to max. 10 % in the design conditions.</i></p> <ul style="list-style-type: none"> ■ Calculate the required number of supply air units from the nominal air flow rate. 	20 × 30 = 600 m ³ /h Size 6: max. 600 m ³ /h fresh air Size 9: max. 900 m ³ /h fresh air → 1 TopVent® MG unit									
Mounting height <ul style="list-style-type: none"> ■ Calculate the actual mounting height (= distance between the floor and the bottom edge of the units). $Y = \text{Hall height} - \text{distance from ceiling} - \text{unit height}$ ■ Compare the actual mounting height with the minimum and maximum mounting height (see Table F3 on page 49 and HK-Select). 	<u>Supply air units:</u> Size 6 → OK Size 9 → OK <u>Recirculation units:</u> Size 6 → OK Size 9 → OK									
Required performance for covering fabric heat losses										
<ul style="list-style-type: none"> ■ Required heat output for coverage of fabric heat losses in total $Q_{H_req} = \text{Fabric heat losses} - \text{internal heat loads}$	350 – 28 = 322 kW									
Required heat output of recirculation units <ul style="list-style-type: none"> ■ Determine the required heat output of the recirculation units based on the output of the supply air unit. $Q_{H_Recirculation} = Q_{H_req} - Q_{H_Supply\ air}$ <p><i>For the supply air unit, take into account only the share of capacity that is used for coverage of fabric heat losses (separately shown in HK-Select).</i></p>	<table border="1"> <thead> <tr> <th>Type</th> <th>Q_{H_Supply air}</th> <th>Q_{H_Recirculation}</th> </tr> </thead> <tbody> <tr> <td>MG-6</td> <td>23.3</td> <td>322 – 23.3 = 298.7</td> </tr> <tr> <td>MG-9</td> <td>51.2</td> <td>322 – 51.2 = 270.8</td> </tr> </tbody> </table> (values in kW)	Type	Q _{H_Supply air}	Q _{H_Recirculation}	MG-6	23.3	322 – 23.3 = 298.7	MG-9	51.2	322 – 51.2 = 270.8
Type	Q _{H_Supply air}	Q _{H_Recirculation}								
MG-6	23.3	322 – 23.3 = 298.7								
MG-9	51.2	322 – 51.2 = 270.8								

Minimum number of recirculation units

- Determine the minimum number of recirculation units depending on the available supply air units. Take into account the following criteria:
 - Floor area covered
 - Heat output
 - Unit clearances

Supply air unit	Recirculation units	Required number of recirculation units			Minimum number of recirculation units
		Floor area covered	Heat output	Unit clearances	
1 unit MG-6	TG-6	5	11	6	11
	TG-9	3	5	6	6
1 unit MG-9	TG-6	4	10	4	10
	TG-9	3	5	4	5

- Choose the final solution from the remaining possibilities, depending on the geometry of the hall and the costs.

2 Maintenance schedule

Activity	Procedure	Interval
Clean unit	<ul style="list-style-type: none"> ■ Clean inside of unit with vacuum cleaner. ■ Clean fan with vacuum cleaner or plastic brush. ■ Clean Air-Injector with vacuum cleaner or plastic brush. (TopVent® TG / MG) 	1 × annually
Functional check	<ul style="list-style-type: none"> ■ Check function of the fan. ■ Check function of the Air-Injector. (TopVent® TG / MG) ■ Check function of the control system. 	1 × annually
Heat exchanger and burner	<ul style="list-style-type: none"> ■ Dismantle connecting lines. ■ Loosen screws on the flange of the gas module and pull out gas module. ■ Visual inspection of the heat exchanger outside ■ Clean heat exchanger with plastic brush (do not use steel brush). ■ Dismantle burner and gas blower by loosening the hexagon socket screws on the burner flange. ■ Visual inspection of the burner ■ Check ignition and ionisation electrode. If necessary, carefully clean with fine sand-paper and readjust. ■ Replace burner flange in the event of corrosion or material fatigue. ■ Visual inspection of the heat exchanger inside, clean where necessary. ■ Reinstall burner and gas blower; use new seals for this. ■ Reinstall connecting lines. 	1 × annually
Flue gas path test	<ul style="list-style-type: none"> ■ Visual inspection of the installed components ■ Remove condensate cap on all inspection T-pieces and clean flue gas pipe on the inside as needed. 	1 × annually
Emission measurement	<ul style="list-style-type: none"> ■ Check setting of the gas control valve and readjust where necessary. 	1 × annually
Filter change (TopVent® TG / MG)	<ul style="list-style-type: none"> ■ Renew air filter. 	When the filter alarm is displayed, at least annually

Table G1: Maintenance schedule

Project

Project No.

Date

Name

Function

Address

Tel.

Fax

E-mail

Information about the hall

Application

Type

Insulation

Length

Width

Height

Is the roof strong enough?

yes no

Are there window areas?

yes no

Percentage?

Is there a crane?

yes no

Height?

Is there enough space for installation and servicing?

yes no

Are there any voluminous installations or machines?

yes no

Are pollutants present?

yes no

Which?

– If yes, are they heavier than air?

yes no

Is oil contained in the extract air?

yes no

Is dust present?

yes no

Dust level?

Is there high humidity?

yes no

How much?

Are local machine extractions required?

yes no

Are any conditions imposed by public authorities?

yes no

Which?

Are sound level requirements to be fulfilled?

yes no

Which?

Design data

Internal heat gains (machines, ...)

kW

Heating and cooling

Unit size

Control zones

Design conditions heating

■ Standard outside temperature

°C

■ Room temperature

°C

■ Extract air temperature

°C

■ Fabric heat losses

kW

Design conditions cooling

■ Standard outside temperature

°C

■ Room temperature and humidity

°C

%

■ Extract air temperature

°C

■ Transmission sensible gains

kW

Further information

Hoval quality. You can count on us.

As a specialist in heating and air-conditioning technology, Hoval is your experienced partner for system solutions. For example, you can heat water with the sun's energy and the rooms with oil, gas, wood or a heat pump. Hoval ties together the various technologies and also integrates room ventilation into this system. You can be sure to save both energy and costs while protecting the environment.

Hoval is one of the leading international companies for indoor climate solutions. More than 70 years of experience continuously motivates us to design innovative system solutions. We export complete systems for heating, cooling and ventilation to more than 50 countries.

We take our responsibility for the environment seriously. Energy efficiency is at the heart of the heating and ventilation systems we design and develop.

Responsibility for energy and environment

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The Hoval logo, consisting of the word 'Hoval' in a bold, white, sans-serif font, set against a red rectangular background.